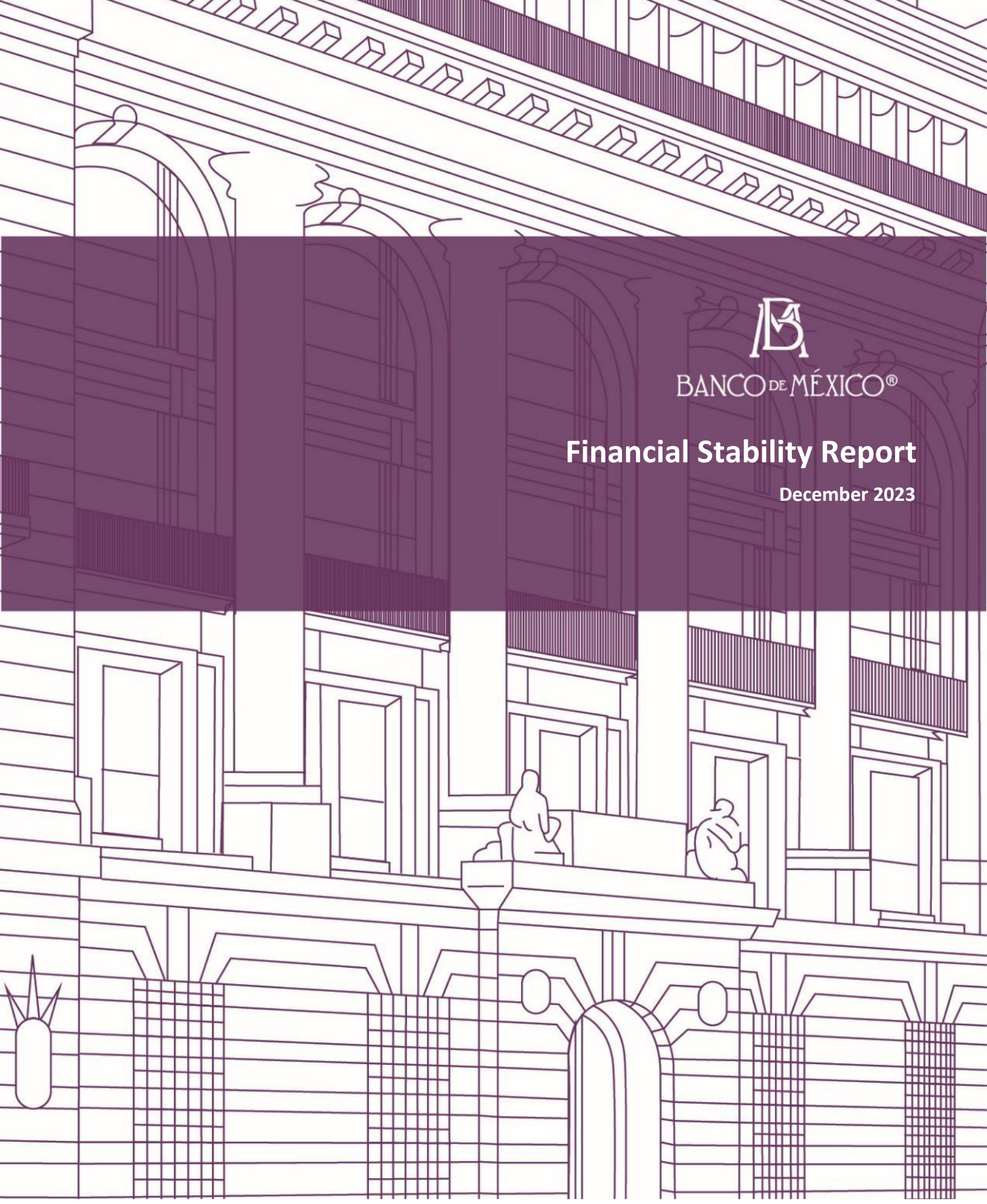


BANCO DE MÉXICO®

Financial Stability Report

December 2023

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NOTICE

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Unless otherwise stated, this document has been prepared with information available as of the third quarter of 2023 for macroeconomic and financial institution variables, and as of December 04, 2023 for market information. Data is preliminary and subject to review.

USE OF ACRONYMS, ABBREVIATIONS AND CONVENTIONS

In this *Report*, abbreviations and acronyms that correspond to names in Spanish and references to this Report are written in italics, whereas those that refer to names in English appear in round print. The meanings of all acronyms are included at the end of the document. The term “billion” represents 1,000,000,000, while “trillion” equals 1,000,000,000,000 (a thousand billion), as commonly used in English.

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Definition of financial stability and scope of the Financial Stability Report

In line with its purposes of promoting the sound development of the financial system and fostering the proper functioning of the payments system, Banco de México monitors the performance of the Mexican financial system and its participants, as well as the main risks and vulnerabilities that could affect its stability and, therefore, its proper functioning.

A stable financial system is one in which financial institutions, markets and their infrastructures facilitate the exchange of funds between savers, borrowers, and investors, with adequate risk management, thus contributing to the proper functioning of the economy and achieving sustainable economic growth. Financial stability also implies that the financial system is able to withstand shocks while also contributing to maintain an environment of macroeconomic stability and growth. An adequate functioning of the financial system also contributes to Banco de México's primary objective of ensuring price stability as it promotes a more efficient operation of monetary policy's transmission channels.

A stable financial system is a necessary but not sufficient condition for achieving a more balanced and sustainable growth, since, as international experience confirms, periods of financial instability have a very high cost for society. For this reason, it is necessary for financial authorities to remain vigilant of developments in the financial system and its interaction with economic activity, as well as its risks, in order to avoid the accumulation of vulnerabilities that could generate systemic problems or amplify or cause negative shocks in the economy. The analysis and monitoring carried out by Banco de México regarding the stability of the financial system is available to the public every six months through the Financial Stability Report. Identifying and monitoring risks that could affect the stability of the financial system, as well as their timely disclosure, are essential to mitigate them and, thereby, reduce vulnerabilities and enhance the resilience of the system.

Executive summary

The Mexican financial system maintains a solid and resilient position despite the complex and uncertain global macrofinancial environment that prevailed during the second half of 2023. This environment was characterized by the risk of prolonged inflationary pressures, which could lead to a further tightening of global financial conditions. Additionally, risk aversion has increased due to the intensification of geopolitical tensions, specifically those associated with the war between Russia and Ukraine and the escalation of the military conflict in the Middle East. Global financial conditions have thus been affected by an environment of high volatility in financial markets, and by increases in long-term interest rates. These increases are mainly explained by the expectation that reference rates will be maintained at a high level for a longer period than previously anticipated. Also, term premiums have risen in response to the increase in uncertainty. Finally, it should be noted that said tightening of financial conditions and the increase in long-term interest rates were marginally reversed in November.

In October, the International Monetary Fund (IMF) maintained its global growth forecasts for 2023 and slightly decreased its estimates for 2024 as compared to those published in July. During the third quarter of 2023, GDP growth for Mexico was 1.1 %. This was due to the favorable evolution of both primary sector activities and industrial production, the latter associated with higher activity in non-residential construction.

This *Report* presents the monitoring and the analysis of potential challenges posed to financial stability by the evolution of key risks. The analyzed risks are divided into two main categories. The first category comprises possible macrofinancial risks, which consist of risks that may arise from the deterioration of financial and macroeconomic variables at both the domestic and international levels. The second category addresses the risks that affect each of the main segments participating in the financial system: households, firms, the public sector, the banking sector, and the non-bank financial sector. The analysis also includes discussion of disruptions and risks that may arise in financial markets and payment systems.

Regarding the first category, four important potential macrofinancial risks are identified as relevant to the stability of the financial system. These are the following: i) a more intense or prolonged tightening of financial conditions than anticipated, ii) a more pronounced or extended slowdown of the world economy than anticipated, iii) a systemic event that affects the global financial system, and iv) unexpected adjustments of credit ratings for either the Mexican government or Pemex.

The analysis of risks corresponding to the second category is based on a series of quantitative and qualitative indicators. The analysis of aggregate risk indicators shows that financial conditions in Mexico, as measured by the Financial Conditions Index (ICF, for its acronym in Spanish), have tightened slightly since the last *Report.* Also, the Mexican Financial Markets Stress Index (IEMF, for its acronym in Spanish) increased slightly since the previous *Report*. Similarly, overall risks in the banking system, as illustrated by the heat map, decreased slightly. The above indicators suggest that the aggregate risk of the Mexican financial system remains contained, having increased marginally with respect to the previous six months.

During the third quarter of 2023, total financing to the Mexican economy increased moderately compared to the previous year and is around a level similar to that observed in 2015. However, the financing gap accumulates ten consecutive quarters with negative values.

The analysis of the financial position of households shows that, as of the end of September 2023, it was slightly reduced in comparison with the previous *Report.* Thus, leverage, measured as the ratio of monthly income available to pay down debt, remained at levels similar to those of last year, while higher leverage is observed for lower-income borrowers than other groups. Consumer credit granted by commercial banks and their related sofomes, as well as by other non-bank financial intermediaries and department stores, exhibited notable dynamism, particularly increases in the credit card, payroll, and, to a lesser extent, automotive segments. Non-performing rates of consumer loans granted by bank and non-bank financial intermediaries increased at the margin. However,

associated risks remain limited because the newly granted credits have a low probability of default. Mortgage loans grew moderately in real annual terms with respect to the previous *Report*, and non-performing loan rates for this portfolio are at historic lows.

With respect to the financial position of non-financial private firms, credit granted by commercial banks to this sector remains the most relevant, although it grew at a slower rate than in the previous three quarters. This is attributed to a moderation of credit granted to large companies. However, credit to smaller companies continued to grow rapidly. The non-performing loan rates of credit granted by commercial banks remained at levels similar to those at the beginning of 2023, while that of credit granted by non-bank financial intermediaries increased slightly with respect to the last *Report*. The Listed Companies Vulnerability Index (IVEL, for its acronym in Spanish) increased due to a deterioration in indicators associated with debt service capacity. However, its level remains below its historical average and exposure of Mexican banks to private non-financial listed companies with some vulnerability remains low when compared to banks' net capital levels.

With respect to the public sector's financial position, from January to September 2023, the budget deficit registered a lower deficit than estimated in the government's 2023 Economic Package. In addition, according to the Ministry of Finance's (SHCP, for its acronym in Spanish) warning system indicators, the debt levels of state and municipal governments remain at sustainable levels. Based on data as of the end of September 2023, state-owned enterprises Pemex and the Federal Electricity Commission (CFE, for its acronym in Spanish) registered quarterly net losses. In the case of Pemex, looking at a twelve-month cumulative period, the loss was higher than that reported in our previous *Report*. In the case of CFE, the quarterly net loss was lower than that observed in the same quarter of the previous year.

Regarding the external sector, based on data from the balance of payments, net cumulative capital inflows were registered for the first three quarters of 2023. Also, during July to September 2023, net portfolio flows from non-residents continued consolidating the recovery exhibited since October 2022 and were within the range of their natural value in the short and medium term. However, there is still a substantial margin for these flows to continue recovering.

Regarding the banking sector, commercial banks, which have the highest share of assets in the total financial system, maintain abundant liquidity and capital levels with respect to regulatory minima. This increases their capacity to absorb unexpected shocks or risks that could materialize in the short and medium terms. Also, their potential vulnerabilities remain limited. With respect to credit and market risk, our analysis concludes that, in contrast to what was published in the previous *Report*, credit risk for consumer and corporate portfolios slightly worsened, due to increases in both the probability and the correlation of default. However, this risk remains small and contained. As for market risk, it increased slightly due to changes in portfolio positions in instruments that are more sensitive to interest rate adjustments.

The results of solvency and liquidity stress tests indicate that overall, commercial banks are resilient. Both of these stress tests assume adverse but possible scenarios that institutions could face. The purpose of credit stress tests is to evaluate the resilience and loss absorption capacity of Mexican banking institutions. This *Report* considers three sets of macroeconomic scenarios consistent with the macrofinancial risks presented herein, as well as three sets of historical scenarios qualitatively similar to crisis episodes that the Mexican economy has faced in the past. The results show that the current capitalization levels of Mexican banking institutions would allow the financial system, both at the aggregate level and in the six scenarios considered, to conclude the stress horizon well above regulatory minimums, including capital buffers. However, at the individual level, in some of the simulated scenarios, the capitalization of certain banking institutions, representing a low percentage of assets in the system, could be more affected.

Development banks and other development financial institutions remain financially sound, both in their capitalization and liquidity levels. Despite reducing their credit exposures and increasing their loan loss

reserves this group of entities shows a favorable evolution in their balance sheet and financial statement items.

The regulated and non-regulated non-bank financial intermediaries' sector (OIFNB, for its acronym in Spanish) continues to face significant challenges due to tighter financial conditions. Although this sector's assets represent a relatively low fraction of the financial system, these entities are a source of financing for individuals engaged in business activities, particularly unbanked Small and Medium Enterprises (SMEs).

In addition to the risks described above, business continuity risks of financial institutions are also monitored, as well as the performance of financial market and payment systems infrastructures managed and operated by Banco de México, due to their systemic importance. At the end of the third quarter of 2023, the Financial Markets and Payment Systems Infrastructure Availability Index remained at high levels, and payment system services were not interrupted by any incident.

Meanwhile, cyber risks to the global financial system continue to be relevant, given the increase in the frequency and sophistication of cyber-attacks. They are also one of the main non-financial risks to the global financial system, with a high potential for causing a systemic event and, therefore, affecting financial stability. Banco de México identified opportunities for improving resilience. Specifically, the coordination of actions and communication among institutions would enable a collective sector-wise response, to identify, contain, investigate, and remediate cyberattacks. Nevertheless, for the period covered by this *Report*, cybersecurity status was favorable, based on Banco de México's indicators of the Mexican financial system's cybersecurity.

In addition to the risks mentioned above, Banco de México has continued to actively conduct analyses to measure the economic and financial impact of climate-related risks on financial institutions and the overall financial system.

Finally, during the period covered by this *Report*, Banco de México was not required to implement any additional macroprudential policy measures to counteract the emergence of systemic risks. The Central Bank remains alert and monitors the evolution of risks and vulnerabilities that could negatively affect financial stability, in order to implement actions to mitigate them and preserve both the stability of the financial system and the proper functioning of the payment systems. The above will be done, according to its constitutional and legal authority, in strict compliance with the legal framework, and in coordination with other financial authorities.

Introduction

One of Banco de México's goals is to foster the sound development of the financial system and promote the smooth functioning of payment systems. To achieve this goal, it supervises financial institutions and other participants in the Mexican financial system and constantly evaluates their performance. It also focuses on identifying risks and vulnerabilities that could jeopardize the stability of this system and, therefore, its proper functioning.

A well-functioning financial system is essential to achieve Banco de México's priority objective of maintaining price stability, since monetary policy transmission mechanisms are more effective under such conditions. Likewise, having a stable financial system can help the economy achieve balanced and sustained growth, since episodes of financial instability can have a significant cost for society in terms of activity, employment and income levels, as it has been demonstrated internationally.

Banco de México shares its analysis and monitoring of the Mexican financial system in this *Financial Stability Report*, which seeks to identify potential vulnerabilities and risks it could face, in order to communicate them in a timely manner and thus strengthen its stability and resilience.

Since the last *Report*, a complex and uncertain situation for the world economy in 2023 was foreseen. However, growth prospects for this year have since been revised upwards, although they still point to a slowdown that could extend to 2024.

On the one hand, headline inflation continued to decline in most countries, thanks to lower pressures on energy and food prices. Nevertheless, it remained at high levels and often above central banks' targets. Against this backdrop, central banks in major economies, such as the US Federal Reserve and the European Central Bank, increased their reference rates and signaled a greater reliance on data to determine their next moves.

Going forward, some challenges for the financial system remain. On the one hand, there is a risk of prolonged inflationary pressures. On the other hand, it is possible that geopolitical tensions could worsen, that China's economic slowdown could spread to other economies, and that financial conditions could tighten further.

This *Report* is divided into seven sections, the first of which is introductory. Section two reviews macro-financial conditions in detail. Section three updates the challenges of the economic environment with respect to the last *Report*. Section four describes the policy measures implemented to promote the sound development of the financial system. Section five presents the risks to the financial system; it is the most extensive section as it not only identifies the aggregate risk indicators, but also studies the positioning of the economic agents that participate in the Mexican financial system. This section also delves into the diagnosis of commercial banks. Section six presents the stress tests developed internally and the recovery plans for commercial banks. Finally, final considerations are presented.

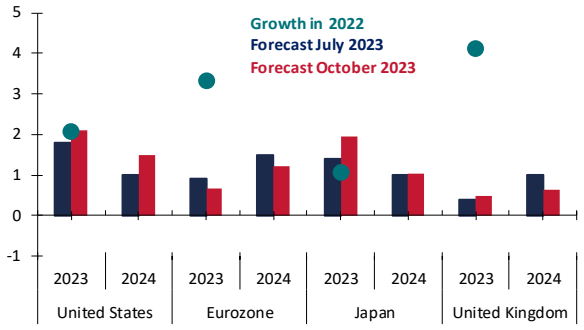
I. Macro-financial conditions

I.1. International economic environment

Global economic activity moderated its growth in the second quarter of 2023 but, with the available information, a peak is expected in the third quarter. However, performance has been heterogeneous across economies and sectors. This is largely due to the fact that the United States and China have shown good economic performance, in contrast to the euro zone, which has been slowing down.

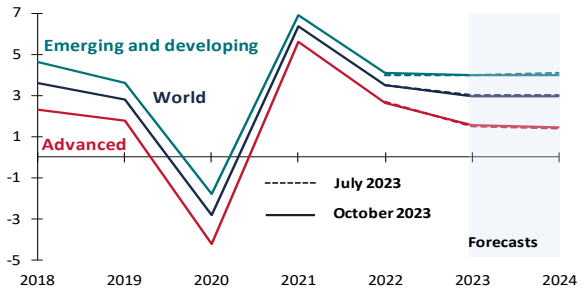
In October, the International Monetary Fund (IMF) maintained its global economic growth forecasts for 2023 and slightly lowered its estimates for 2024, compared to July. These adjustments are related to the lagged effects of the pandemic, the growing fragmentation of commodity markets, driven mainly by geopolitical tensions, the effects of monetary policy tightening, the reduction of fiscal support in economies with high levels of debt, and the possibility of extreme weather events occurring (Graph 1 and Graph 2).

Graph 1
Growth in 2022 and forecasts for 2023 and 2024
Annual variation in percent



Data as of october 2023
Source: IMF, World Economic Outlook July and October 2023

Graph 2
GDP growth forecasts
Annual percentual change



Data as of October 2023
Source: IMF, World Economic Outlook, July and October 2023

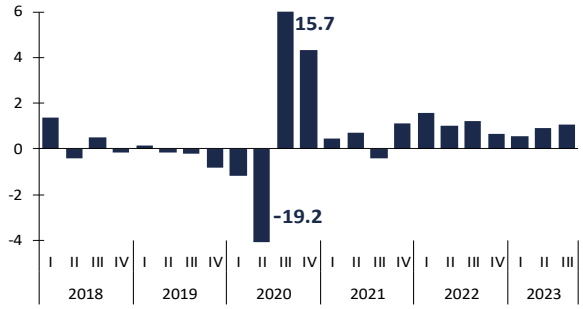
Global inflation declined in most major economies in the second and third quarters of 2023. Nevertheless, inflation remains high and above most central banks' targets. This is largely because core inflation continues to decline gradually, although it still remains at elevated levels.

During the period covered by this *Report*, the US Federal Reserve maintained its target range for the federal funds rate at its June meeting, increased it by 25 basis points at its July meeting and kept it unchanged at its September and November meetings. In the most recent monetary policy statements, the Federal Reserve highlighted the increase in medium- and long-term Treasury bond yields, which was related to higher premia and real yields, the expectation of a tighter monetary policy in the United States and how long it could be maintained. In addition, the central bank emphasized that future movements in its target range will depend on information on the performance of the labor market, inflationary pressures and expectations, and global financial developments.

I.2. National economic environment

Economic activity expanded in Mexico during the second quarter of 2023, registering a quarterly seasonally adjusted growth of 0.9%, while in the third quarter said growth was 1.1%. This, due to a favorable evolution of primary activities and industrial production, the latter linked to greater activity in non-residential construction (Graph 3).

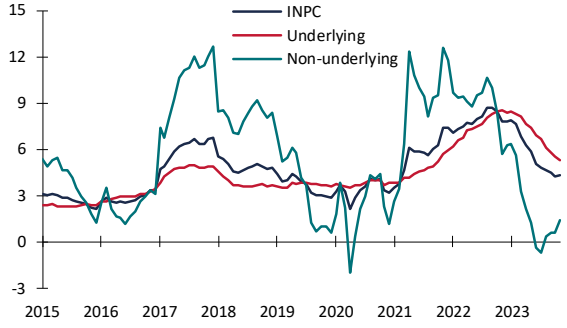
Graph 3
Gross Domestic Product s.a./
Quarterly variation in percent



Data as of third quarter of 2023
Source: INEGI
s.a./ Seasonally-adjusted figures.

Annual headline inflation averaged 5.71% during the second quarter of 2023 and declined to 4.63% in the third one. This was the result of decreases in non-core inflation and, to a lesser extent, in core inflation. In the first half of November, the indicator stood at 4.32% (Graph 4).

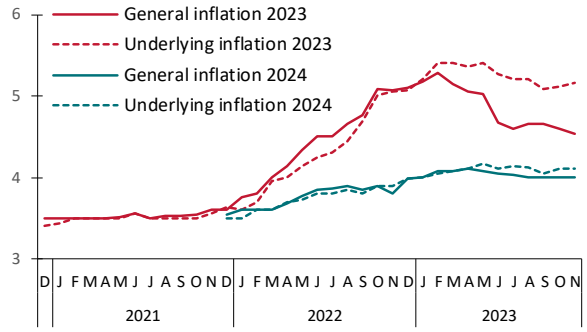
Graph 4
National consumer price index
Annual variation in percent



Data as of November 2023
Source: INEGI.
Note: November 2023 figures correspond to the first half.

Banco de México's headline inflation projections, published in the July-September 2023 Quarterly Report, stood at 4.4% and 3.4% for the end of 2023 and 2024. The medians of headline inflation expectations in the November Survey of Private Sector Economic Specialists' Expectations were 4.54% and 4% for the end of 2023 and 2024 (Graph 5).

Graph 5
Inflation expectations 1/
Percent



Data as of November 2023
Source: Banco de Mexico, Survey of Private Sector Economic Specialists' Expectations.
1/ Median of annual inflation expectations

Banco de México's Governing Board maintained the reference rate at 11.25% in its June, August, September, and November meetings. In its latest Monetary Policy Statement, Banco de México's Governing Board indicated that, although the outlook is still complicated, progress has been made in the disinflationary process. It reiterated that, going forward, it will closely monitor inflationary pressures, as well as all factors affecting the expected path of inflation and its expectations, in order to achieve an orderly and sustained convergence of headline inflation to the 3% target.

I.3. Financial markets

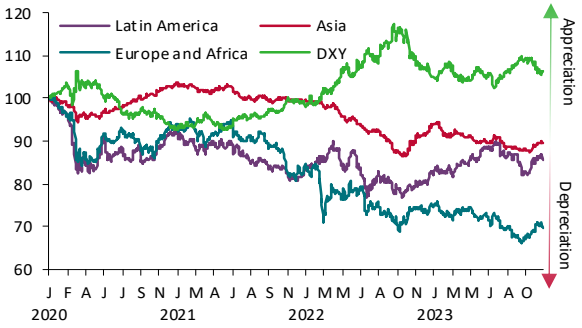
The performance of financial markets during the period covered by this *Report was* largely determined by the release of economic data that showed a greater resilience of global activity than expected. Likewise, inflation remained at high levels, above central banks' targets. This led to the persistence of expectations of a restrictive monetary policy stance at the global level for a longer period of time. This occurred in a context of greater risk aversion due to the continuation of the war between Russia and Ukraine and the escalation of the geopolitical conflict in the Middle East. However, since November, financial markets have shown a correction, caused by the release of economic data that have moderated the expectation that central banks will delay the start of their rate-cutting cycles.

On the other hand, headline inflation readings reflect heterogeneity due to pressures from the recent increase in the price of some commodities and services. Although global core inflation remains at elevated levels, it continues to show some decline. Expectations for year-end remain above most central banks' targets. This inflationary dynamic, present in both developed and emerging countries, has delayed expectations of the start of the monetary policy rate cut cycle for some economies.

Financial markets have been more volatile and uncertain in this environment. Government bond interest rates increased, showing significant variations that were mainly due to expectations that central banks will maintain higher rates for a longer period of time. However, since the beginning of November, these increases have been partially reversed, influenced by the publication of economic data in the United States showing a moderate slowdown in economic activity. On the other hand, stock indexes performed with a positive bias, although they even showed significant declines, while the dollar appreciated considerably during the first part of the period, which was almost completely reversed during November. This contributed to a slight tightening of financial conditions.

The context described above has had a significant effect on the financial markets of emerging countries. The currencies of this group of countries have shown high volatility and marginally negative behavior since June 2023 (Graph 6), affected by the environment of greater risk aversion and the generalized strength of the US dollar that prevailed during most of the period covered by this *Report*.

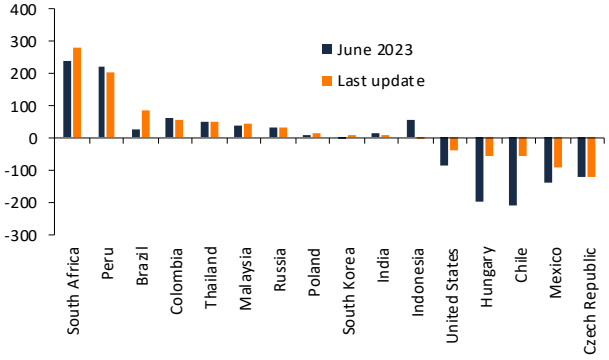
Graph 6
Foreign exchange indexes performance [1/2/]
Index (January 2020 = 100)



Data as of December 2023
Source: Calculations by Banco de México with data from
1/ Latin America incluides Peru, Brazil, Colombia, Chile and Mexico. Asia includes Philippines, South Korea, China, Malaysia and India. Europe and Africa includes a Poland, Hungary, Russia, Czech Republic and South Africa.
2/ DXY refers to the US Dollar Index calculated by the Intercontinental Exchange (ICE) as a weighted average of the nominal exchange rates of six currencies: Euro, Japanese Yen, British Pound, Canadian Dollar, Swedish Krona and Swiss Franc.

On the other hand, in the fixed-income market, yield curves showed mixed movements, although a decrease in the inversion of some countries' yield curves was notable (Graph 7).

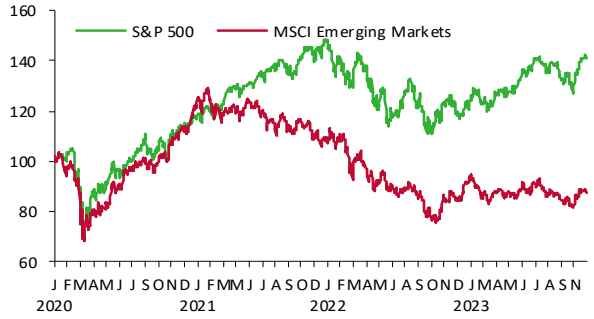
Graph 7
Spread between the 10-years and 2-years yields for selected emerging economies
Basis points



Data as of December 2023
Source: Calculations by Banco de México with data from Bloomberg

Finally, the performance of stock markets was characterized by mostly positive movements, despite the high levels of volatility observed during the period (Graph 8). These movements were mainly due to idiosyncratic events in different countries and regions, as well as to economic growth and monetary policy expectations.

Graph 8
Performance of equity indexes
Index (January 2020 = 100)



Figures as of December 2023
Source: Calculations by Banco de México with data from Bloomberg

I.3.1. Foreign exchange market

The Mexican peso depreciated during the second half of 2023, accompanied by periods of volatility. During the first months of the period, the behavior of the Mexican peso was mainly influenced by the expectation that developed countries' central banks will maintain high reference rates for a prolonged period, by the strength of the dollar, by the increase in implied volatility (which negatively impacts the attractiveness of carry strategies) and by the high positioning[1] of the Mexican peso relative to its emerging peers (which generated the liquidation of strategies in peso-denominated assets during the period). However, starting in November, the Mexican peso showed some correction in its negative performance, in line with the reduced strength observed in the US dollar. Against this backdrop, the Mexican currency traded in a range between 16.69 and 18.33 pesos per dollar during the period covered by this *Report* (Graph 9).

The Mexican peso stands out as the second-best performing currency in the emerging block during the year. In this regard, there are factors that continue to support it, including the prudent conduct of monetary policy, balanced external accounts, significant remittances flows, a low debt-to-GDP ratio compared to countries with similar sovereign ratings,

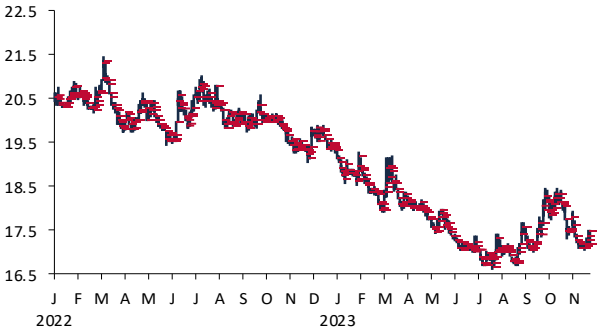
[1] Mexican peso forward purchase transactions.

the interest rate differential compared to other economies, and the lower volatility of the peso compared to that observed in other currencies.

Graph 9

Mexican peso daily trading range [1/]

Foreign exchange mexican peso-US dollar



Data as of December 2023

Source: Bloomberg

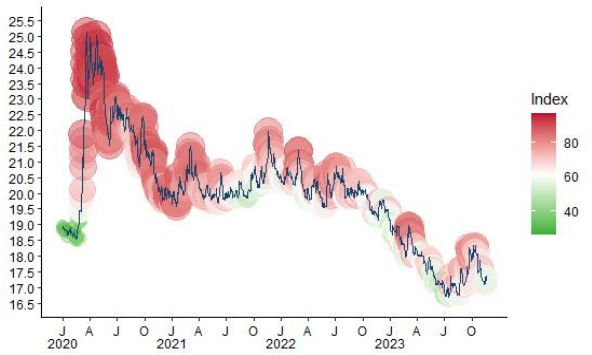
1/ The red lines indicate the closing exchange rate, while the blue bars indicate the trading range

On August 31, the Foreign Exchange Commission announced its decision to gradually decrease the balance of the foreign exchange hedging program in force since February 2017, given that operating conditions in the domestic foreign exchange market have returned to adequate levels of liquidity and depth, and an orderly functioning of the market is perceived (Graph 10). On the other hand, on November 15, the Executive Board of the IMF ratified that Mexico meets all the eligibility criteria to access, if required, the resources of the Flexible Credit Line (FCL). This is in recognition of the soundness of Mexico's institutional framework for macroeconomic policies. In this sense, the Foreign Exchange Commission decided to reduce the amount of access to approximately 35 billion dollars.

Graph 10

Mexican peso trading conditions index [1/]

Mexican pesos per US dollar; Index



Data as of December 2023

Source: Calculations by Banco de México with data from Bloomberg and Refinitiv

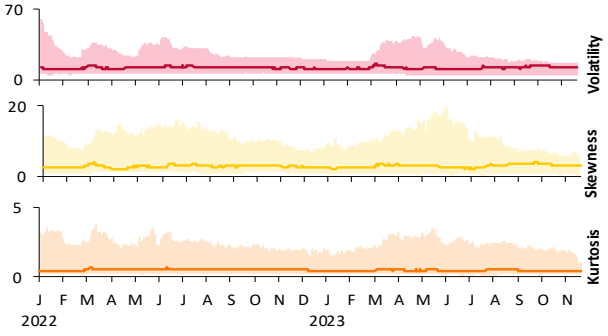
1/ The index is computed as the average of the percentiles of 1-month implicit volatility and skewness, volume and observed spreads. Percentiles are computed since 2018. Red (green) circles mean a greater (lesser) deterioration of the trading conditions in the FX market.

Nevertheless, during the period covered by this *Report*, the prospective operating conditions deteriorated slightly (Graph 11), particularly highlighting the increase in implied volatility in options in all maturities.

Graph 11

3-month implicit trading conditions on FX options for Mexico and selected emerging economies [1/]

Percent



Data as of December 2023

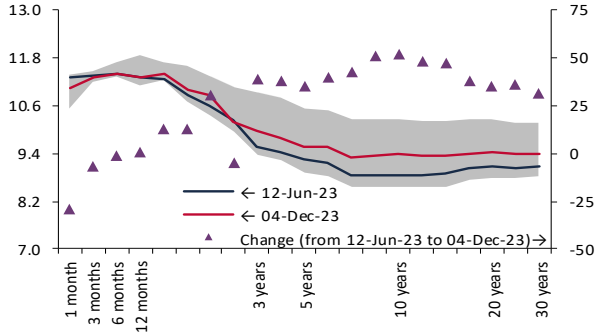
Source: Bloomberg

1/ The emerging countries included in the shaded area (range between the maximum and minimum values) are Brazil, Chile, Colombia, the Philippines, Hungary, India, Indonesia, Malaysia, Poland, South Africa, and Turkey. The solid line represents the value of Mexico. The implicit skewness is measured through Risk Reversal strategies at 25 deltas. Kurtosis is measured with

I.3.2. Fixed-income market

The yield curve in Mexico presented increases in its different terms during the second half of 2023, where the short and medium terms showed the largest movements, which marginally increased the inversion of the yield curve measured by the spread between the 30 and 3-year terms. In this regard, since the beginning of the period covered by this *Report*, up to the end of October, the curve increased more than 100 basis points in its different terms; however, since the beginning of November, the yield curve has decreased, mainly in the short and medium part of the curve (see Graph 12). The increases at the beginning of the period were due to different factors, such as the expectation that interest rates in both undeveloped and developed countries would remain high and, consequently, there was a delay in the expectation of the beginning of the easing cycle in Mexico, although this has been partially reversed after the publication of economic data in the United States, which showed a moderation in the dynamism of the US economy, and after the publication of Banco de México's monetary policy statement in November.

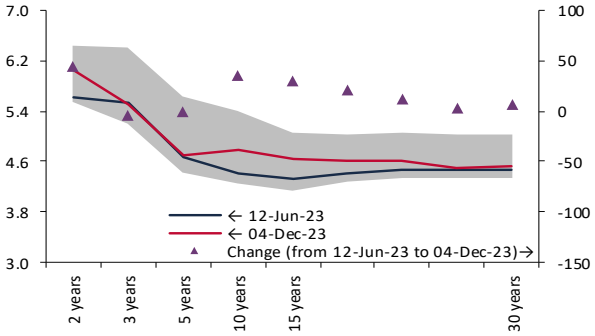
Graph 12
Bonos M Yield Curve [1/]
Left axis: Percent
Right axis: Basis points



Figures as of December 2023
Source: Calculations by Banco de México with data from PIP
1/ The grey area is the yield curve range since June 12, 2023

On the other hand, the real rate instruments curve showed mixed movements, with increases in the mean and in the long term and decreases in the short term (Graph 13). Thus, compensation for inflation and inflationary risk has increased during the period, especially in the short term.

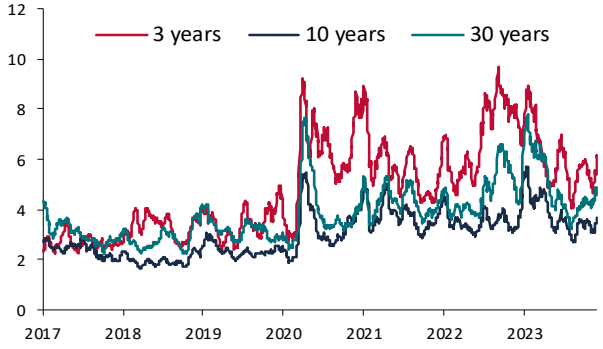
Graph 13
Udibonos yield curve [1/]
Left axis: Percent
Right axis: Basis points



Data as of December 2023
Source: Calculations by Banco de México with data from PIP
1/ The grey area is the yield curve range since June 12, 2023

The movements in the government securities yield curve occurred in a context in which operating conditions in this market deteriorated moderately. Although trading volume has shown an upward trend, liquidity conditions have been reduced due to factors such as volatility and an environment of risk aversion at a global level, a lower participation of the external sector in the secondary market and an expectation of higher issuance amounts of government securities as of 2024 (see Graph 14).

Graph 14
Bid-Ask spreads for selected terms of Bonos M
Basis points (20-days moving average)

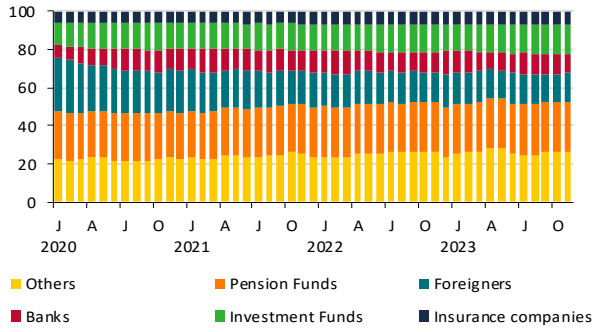


Data as of December 2023
Source: Banco de México

Flows to peso-denominated assets by the external sector have shown a differentiation by type of instrument during the period covered by this *Report* (see Graph 15). In particular, inflows into short-term instruments (treasury certificates (Cetes)) have been maintained and there has been renewed interest in building positions in inflation-indexed bonds (Udibonos). On the other hand, flows into *Bonos* M

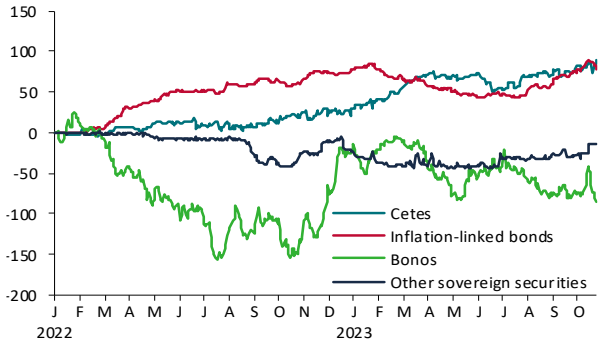
recovered during the period included in this *Report*, although outflows in annual terms have been maintained (Graph 16).

Graph 15
Mexican sovereign debt holdings by sector, as a percentage of the total amount outstanding [1/]
Percentage



Data as of November 2023
Source: Calculations by Banco de México with data from Indeval
1/ Securities considered are Cetes, M Bonds, Inflation-linked bonds, and Bondes. The sector "Others" include securities purchased by Banco de México, repos with Banco de México, guarantees received by Banco de México, and other national residents

Graph 16
Sovereign securities' investment flows by foreigners since 2022
Billion pesos



Data as of November 2023
Source: Calculations by Banco de México with data from Indeval

Box 1: Volatility index of Mexican government bonds

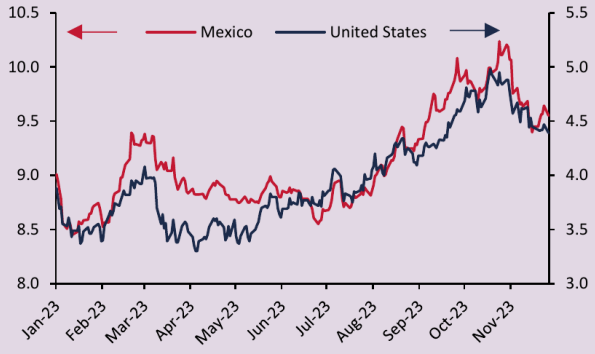
I. Introduction

During the second half of 2023 there have been episodes of significant increases in the interest rates of long-term government bonds in the United States and Mexico (Graph 1). In advanced economies, uncertainty over monetary policy has been reflected in increased volatility in the fixed-income market (International Monetary Fund, 2023).

This *Box* presents a volatility index of long-term government bonds (Bonos M) in order to understand whether the increase in interest rates has been accompanied by a disorderly behavior of the government debt market in Mexico.[1] This index measures how much the agreed interest rates vary within the same day in order to evaluate the operating conditions of the secondary government bond market in Mexico.

Graph 1
Ten-year government bond yields of Mexico and the United States

Percentage points



Data as of November 2023

Source: Bloomberg and Federal Reserve

II. Data, methodology and interpretation

For this purpose, daily information since 2019 of all M-Bond transactions reported by banks and brokerage firms to Banco de México is used. In total, there are approximately 2.3 million Bonos M transactions with different maturities. In addition, transactions in which the SHCP or Banco de México act as counterparty are excluded in order to consider only transactions in the secondary market.[2]

For the construction of the volatility index, the yield to maturity of the bonds in each agreed transaction is calculated. Subsequently, the intraday volatility for each security is obtained, calculated as the standard deviation of the yield to maturity agreed for each security on each day, and the time series of the volatility of each security is standardized. Finally, the index is obtained as an average of the standardized volatilities of all securities, weighted by the amount placed of each security.[3]

When the markets operate in an orderly fashion, it is expected that the agreed prices of the same security on the same day will show small variations. This would therefore be reflected in a low volatility index. However, abrupt fluctuations in bond prices can be observed for several reasons. First, volatility can occur in the face of news releases with information that affects the valuation of securities (Jones et al., 1998). Second, changes in investor sentiment have been found to be linked to short-term stock volatility (De Long et al., 1990; Chiu et al., 2018). Finally, high volatility may be associated with illiquidity or lack of market depth, which does not allow large amounts of securities to be exchanged without affecting their price (Chordia et al., 2005).

III. Results

To evaluate the operating conditions of the secondary government debt market in Mexico in recent years, the following chart shows Graph 2 presents the daily series of the government bond volatility index together with its 20-day moving average. It shows that the index reached its maximum levels in March 2020, in an environment of uncertainty caused by the COVID-19 pandemic. It also recorded elevated levels during the spring of 2021, a period during which concerns arose about a tightening of monetary policy, in the context of the announcement of fiscal stimulus in the United States. Recently, although the index has increased, it is at levels close to its historical average, suggesting that the interest rate increases observed since the summer of 2023 have occurred in a market with orderly behavior, in which there have been no abrupt changes in security prices.

---

[1] An M Bond is a fixed-rate debt security issued by the Federal Government, with maturities ranging from 3 to 30 years and making an interest payment every six months.

[2] Around six thousand transactions with the SHCP or Banco de México are observed, representing a very small fraction of the entire sample.

[3] The calculation of the index follows the following steps:

i. Obtain the standard deviation of the agreed yields to maturity, recorded by arrangement date, for each government bond type Mbono:

$$\sigma_{it} = \sqrt{\frac{\sum_j (r_{jit} - \overline{r_{it}})^2}{N_{it} - 1}}$$

Where r_{jit} is the yield to maturity of the transaction j of the security i concluded on the day t. The calculation omits repeated observations of yield to maturity and eliminates the largest and smallest observations to correct for outliers.

ii. The volatility time series is standardized for each security with a maximum limit of 5 standard deviations to correct for outliers, as follows:

$$\sigma_{it}^{s} = Min\left\{\frac{\sigma_{it} - \overline{\sigma_i}}{\sqrt{Var(\sigma_i)}}, 5\right\}$$

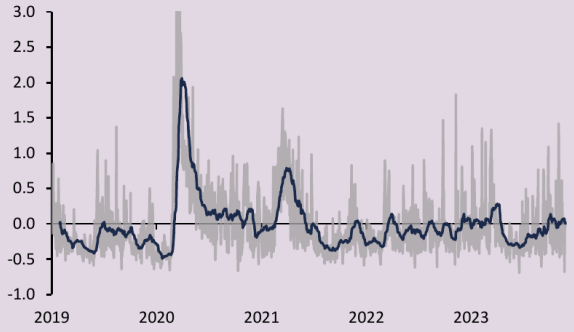
Where $\overline{\sigma_i}$ represents the average volatility of the security i over the entire sample period.

iii. An average of the standardized series is made, weighted by the amount placed of each security. Only observations in which the security has more than 5 transactions registered during the day are considered.

$$y_t = \sum_i \omega_{it}\sigma_{it}^{s} \qquad \omega_{it} = \frac{MontoColocado_i}{\sum_i MontoColocado_i}$$

Where y_t is the bond volatility index.

Graph 2
Government bonds' volatility index 1/
Index



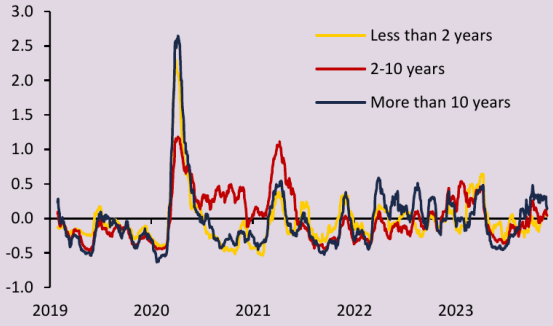
Data as of November 2023

Source: Banco de México

1/ The gray line corresponds to the volatility index, while the blue line corresponds to its 20-day moving average.

On the other hand, in Graph 3 shows volatility indexes by the remaining term of the securities, which are constructed following the same methodology, but restricting the calculations to those securities whose term to maturity is within a certain range. This graph shows that, during the beginning of the pandemic, bonds with more than 10 years to maturity experienced the highest volatility; while, in the spring of 2021, it was bonds with maturities between 2 and 10 years. For the last six months, the volatility indices for all three term segments increased, particularly for bonds with longer remaining maturities. Nevertheless, the index for all maturities is at levels close to its average.

Graph 3
Volatility index by the securities' remaining time to maturity 1/
Index



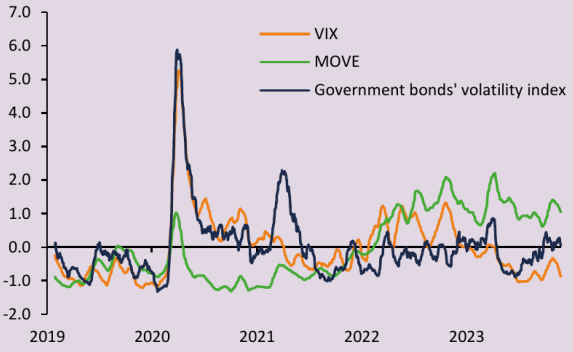
Data as of November 2023

Source: Banco de México

1/ The graph shows the indexes' 20-day moving average.

In addition, in order to explore the relationship between the volatility index and other indicators, in Figure 4, we have included the following Graph 4 the series of this index is presented together with the series of the VIX and the MOVE.[4] In Table 1 shows the values of the correlation coefficients between these series. First, we observe a positive and statistically significant relationship between the Mexican bond volatility index and the VIX. This is mainly explained by the co-movement that both series had during March 2020 and points to the fact that the volatility index is affected by stress in global financial markets. Second, the relationship of the Mexican bond volatility index with the MOVE is weaker. It is worth noting that, in 2022, while the MOVE increased in the face of monetary policy tightening in the United States, the Mexican bond volatility index remained at moderate levels.

Graph 4
Volatility index, VIX, and MOVE 1/
Standard deviations



Data as of November 2023

Source: Banco de México

1/ The graph shows the standardized 20-day moving average of all the series.

Table 1
Correlation coefficients with the volatility index of government bonds 1/, 2/

VIX	MOVE
0.755***	0.030

1/ ***, **, * denote statistical significance at 1%, 5% and 10%. Correlation coefficients were estimated from two linear regressions between the volatility index with the VIX and the MOVE. Since the series are standardized, the estimated coefficients coincide with the value of the correlation coefficients. The standard errors are robust to heteroscedasticity and autocorrelation.
2/ The calculation is performed on the 20-day moving average of the series.

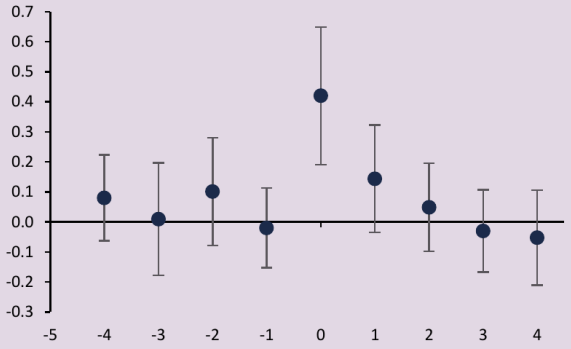
Finally, we explore the relationship between the volatility index and monetary policy announcements in Mexico and the United States. Monetary policy announcements, by resolving uncertainty associated with interest rates, can cause changes in the value of government securities, which generates an increase in the volatility index. To measure the effect, the following regression is estimated with daily data since 2019 for each horizon *h*:

[4] The VIX (CBOE Volatility Index) measures implied volatility in the U.S. equity market. The MOVE (Merrill Lynch Option Volatility Estimate) is a weighted average of the implied volatility of fixed income securities with different maturities of the U.S. Treasury. It should be noted that these indicators are forward-looking, while the volatility index in this *Box* measures historical volatility.

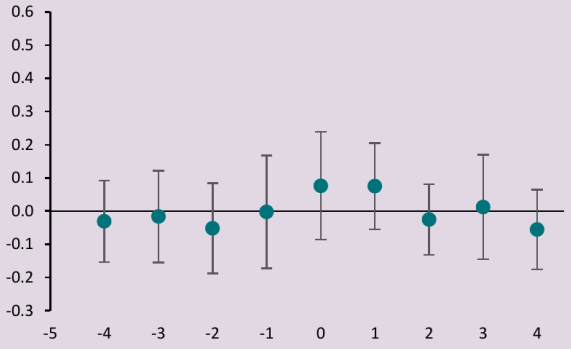
$$IVol_{t+h} = \alpha_h + \beta_{1,h} AnuncioMex_t + \beta_{2,h} AnuncioEEUU_t + \varepsilon_{t,h}$$

Where $IVol_{t+h}$ is the volatility index for transactions arranged on day *t+h*. $AnuncioMex_t$ y $AnuncioEEUU_t$ are dichotomous variables that take the value of one if on day *t* a Mexican and a US monetary policy announcement was made, respectively. Different regressions are estimated for each *h* between -4 and 4.

Graph 5
Estimation of the effect on the volatility index 1/
a) Effect of a monetary policy announcement in Mexico
Vertical axis: no units
Horizontal axis: days after the announcement (h)



b) Effect of a monetary policy announcement in the United States
Vertical axis: no units
Horizontal axis: days after the announcement (*h*)



Source: Own calculations with data from Banco de México and the Federal Reserve

1/ The solid dots correspond to the coefficient's point estimate. The vertical bars represent 95% confidence intervals with standard errors robust to autocorrelation and heteroscedasticity. A different regression is estimated for each horizon *h* using daily data from January 2019 to November 2023.

Figure 5 shows the results of the model estimation. The results suggest that Mexican monetary policy announcements tend to have a positive effect on the volatility of agreed-upon yields on the day of the announcement; however, the effect is not statistically significant for days after the announcement. The results suggest that monetary policy announcements can generate new information that is immediately incorporated into the price of M-Bonds, but there is no persistence on volatility in subsequent days. This result is consistent with Jones et al. (1998), who find that local currency bond market volatility increases on the day of scheduled economic announcements, but this increase is not persistent. It is noteworthy that the impact of U.S. monetary policy announcements on the volatility index is not statistically significant for any day (including the day of the announcement).

IV. Final considerations

The Mexican government bond volatility index uses information from all Bonos M transactions reported by banks and brokerage firms in order to assess the trading conditions of this market. The data show that during the beginning of the pandemic and in the spring of 2021 trading conditions in the bond market deteriorated. Recently, despite significant increases in long-term interest rates in Mexico and the United States, the volatility index has remained at levels close to its historical average, suggesting that there has been orderly behavior in the Mexican government bond market in recent months.

Among the results of this analysis, it is found that currently the indices for the different remaining term segments remain at moderate levels. This is in spite of the recent increase in the indexes of the longer-term segments. It also shows that this index is related to stress in global markets (measured by the VIX). Finally, we find that the volatility index tends to respond to monetary policy announcements in Mexico, although the effect is not persistent.

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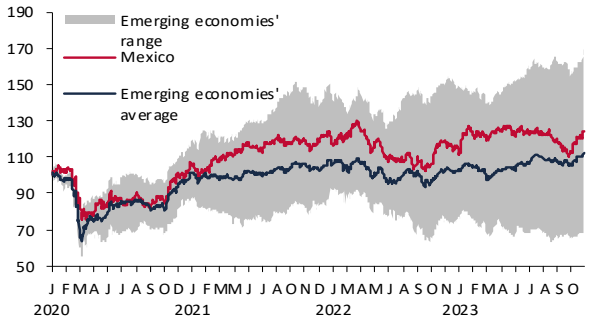
International Monetary Fund (2023). Global Financial Stability Report: Financial and Climate Policies for a High-Interest-Rate Era, October.

Jones, C., Lamont, O., & Lumsdaine, R. (1998). "Macroeconomic news and bond market volatility," Journal of Financial Economics, 47(3), 315-337.

I.3.3. Equity market

Since the last publication of this *Report*, the Mexican stock markets showed a marginally negative cumulative movement (Graph 17). The Mexican Stock Exchange (*BMV*, for its acronym in Spanish) Price and Quotations Index (*IPYC*, for its acronym in Spanish) has trended downwards in recent months which, although it has partially reversed in recent weeks, was influenced by an environment of greater global risk aversion and profit-taking in light of the gains made in the first half of the year. The shares of some companies related to air transportation services decreased in response to the change in the authorized tariff scheme. In this vein, the sectors with a less favorable performance were the industrial and telecommunications sectors, while the financial sector has presented a marginally positive performance.

Graph 17
Equity indexes' cumulative performance for selected emerging economies 1/
Index (January 2020 = 100)



Figures as of December 2023
Source: Calculations by Banco de México with data from Bloomberg
1/Emerging countries included are Brazil, Chile, Colombia, Philippines, Hungary, India, Indonesia, Malaysia, Poland, and South Africa

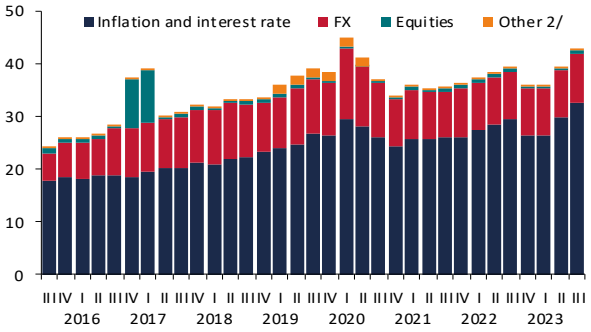
The positioning in this market by foreign investors registered a negative cumulative flow during the second half of 2023, which has been focused on companies in certain sectors such as telecommunications.

On November 15, reforms to the Investment Funds Law and the Securities Market Law were approved. The former proposes, among other modifications, to make the scope of the investment strategies of such funds more flexible, which could broaden the investor base in our country's markets. On the one hand, the reform to the Securities Market Law focuses on incorporating a new simplified securities registration procedure, which will allow small and medium-sized companies to have more agile access to the stock market through the public offering of debt or equity securities in order to obtain the necessary financing to boost their growth.

I.3.4. Derivatives market

During the third quarter of 2023, there was an increase in the amount of interest rate swaps referenced to the 28-day Interbank Equilibrium Interest Rate (TIIE, its acronym in Spanish) in terms of less than one year, which some market participants entered into in order to hedge short-term positions in their derivatives portfolios (see Graph 18). The aforementioned transactions were cleared in the clearing house, which mitigates their counterparty risk.

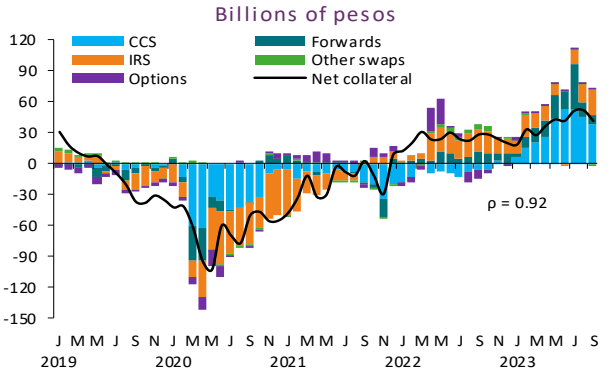
Graph 18
Outstanding notional amount by type of underlying 1/
Trillions of pesos



Data as of September 2023
Source: Banco de México
1/ As of the Financial Stability Report june 2021, Cross Currency Swaps (CCS) are clasificated as Foreign Exchange underlying asset.
2/ Includes debt, other derivatives and commodities.

On the one hand, the net market value of the derivatives portfolio showed capital gains between March and September 2023, mainly due to cross currency swap (CCS) transactions. Although these capital gains may lead to a higher collateral requirement for the brokers' counterparties, there is a positive correlation between net collateral and the portfolio's market value, which reflects the dynamism of collateral to cover counterparty risk as a function of its exposure (Graph 19).

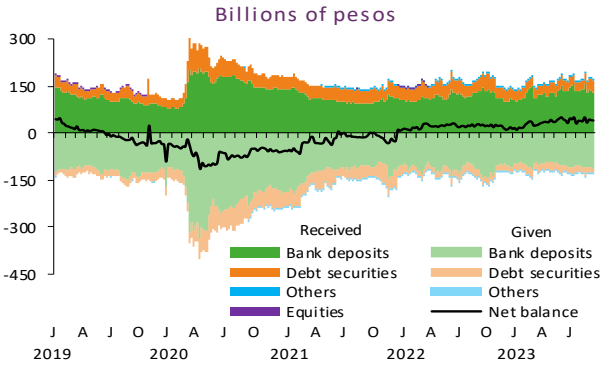
Graph 19
Ratio of the net value of the derivatives portfolio to the net value of collateral



Data as of September 2023
Source: Banco de México

In terms of the composition of collateral received and delivered, cash has historically been the predominant type of collateral in derivative transactions, followed by debt securities (Graph 20).

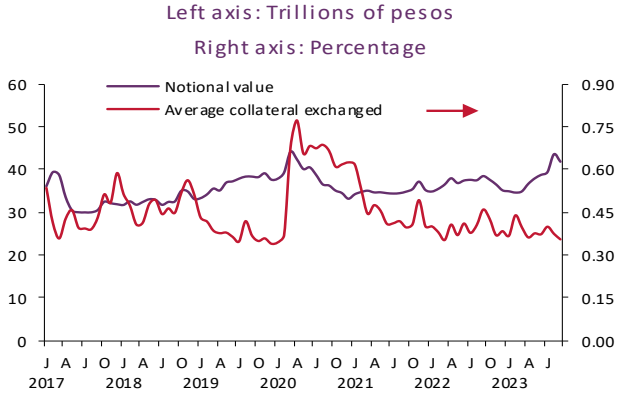
Graph 20
Market value by type of collateral 1/



Data as of September 2023
Source: Banco de México
1/ The graph shows guarantees received as a positive value and guarantees given as a negative value.

The risk factors associated with interest rates were more stable from March to August 2023, which generated a lower amount of collateral in rate transactions; while those related to the exchange rate showed greater volatility, which, given the portfolio's positioning, was reflected in capital gains in CCS transactions during the period under analysis. Consequently, the ratio of total collateral exchanged to the notional amount of derivative transactions showed a stable trend after the first quarter of 2023 (Graph 21).

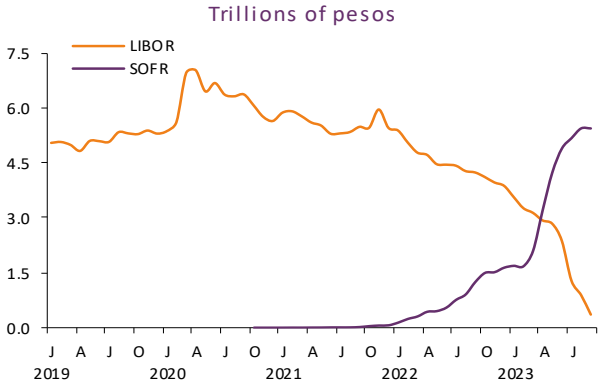
Graph 21
Portfolio notional value and ratio of the collateral as a percentage of the outstanding notional amount

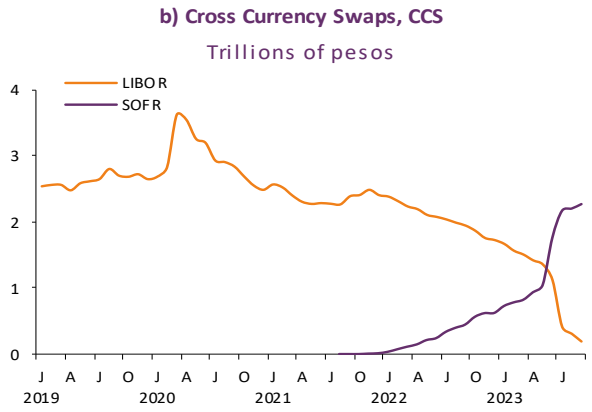


Data as of September 2023
Source: Banco de México

As of June 30, 2023, the IBA (ICE Benchmark Administration) stopped publishing data regarding LIBOR USD rates for overnight, one-, three-, six- and twelve-month terms; as a consequence, financial entities have migrated their portfolios associated with such rates to instruments with reference rates based on market facts and that comply with the principles established by the Financial Stability Board (FSB) and the International Organization of Securities Commissions (IOSCO). This is reflected in an increase in the volume of operations on the *SOFR* rate, both for contracts that were already in force and that migrated to the new reference rate, as well as for new agreements (see Graph 22).

Graph 22
Outstanding notional amount by type of interest rate 1/
a) Interest rates swaps (IRS)





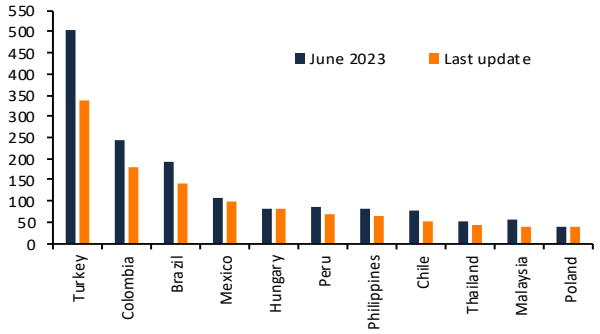
Data as of September 2023
Source: Banco de México
1/ As of the Financial Stability Report june 2023, IRS on LIBOR versus another variable rate are incorporated as part of the LIBOR series.

On December 20, 2022, Banco de México issued a statement highlighting the actions to be taken as part of the reference rate transition process, including the prohibition to use the 91- and 182-day TIIE in new contracts will apply as of January 1, 2024, while for the 28-day TIIE will apply as of January 1, 2025. In addition, adjustments are made to standardized derivative transactions to replace the use of TIIE rates at different terms with the TIIE at one banking business day (*TIIE Funding rate).*[2] Against this backdrop, in August 2023 the notional amount of the derivative operations in force on TIIE 91 and TIIE 182 represented less than 0.01% of the total amount of operations; while those corresponding to TIIE 28 were approximately 66% of said amount.

I.3.5. Risk premia

Credit risk premia at the global level, measured by the price of the credit default swap (CDS), have shown a mostly positive behavior during the period covered by this *Report*, with limited movements for the group of emerging countries (Graph 23).

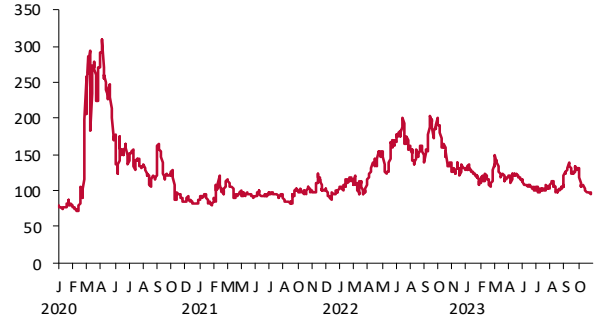
Graph 23
5 year CDS for selected emerging economies
Basis points



Data as of December 2023
Source: Bloomberg

Thus, the 5-year CDS of Mexico's sovereign debt decreased (Graph 24), although of a lesser magnitude than that observed in other emerging market countries.

Graph 24
5-year Mexico's CDS
Basis points



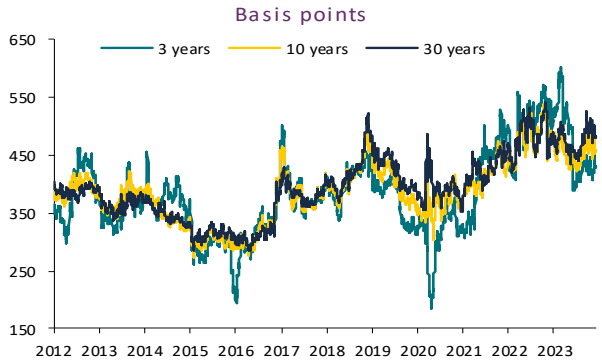
Data as of December 2023
Source: Bloomberg

On the other hand, compensation for inflation and inflationary risk has shown negative dynamics, mainly with an increase in the short term, reaching levels close to 430 basis points in the 3-year term. Likewise, such compensation in the medium and long term reached levels close to 460 and 480 basis points, respectively (Graph 25).

[2] For further details, please refer to: the section on Policy Measures and Transition from the TIIE for terms longer than one banking business day to the TIIE Funding Rate (TIIE Funding Rate) and Circular 7/2023, which amends Circular 4/2012.

Graph 25

Sovereign breakeven inflation rate



Data as of December 2023

Source: Calculations by Banco de México with data from PIP

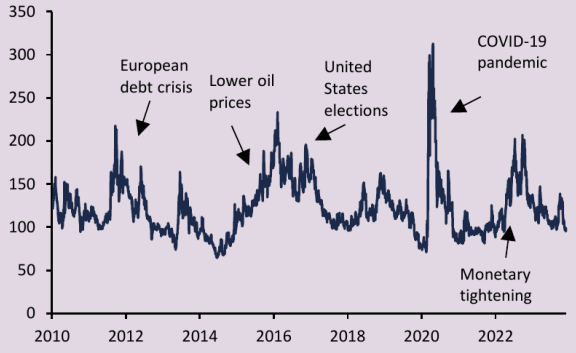
Box 2: Common factor of sovereign credit risk of emerging countries

I. Introduction

A credit default swap (CDS) is a financial instrument in which the buyer makes periodic payments in exchange for compensation in the event of default on a fixed-income security. For this reason, the cost -or premium- of a CDS on sovereign debt is a direct indicator of the perception of that country's credit risk. The analysis of this indicator is relevant for financial stability because it is related to the cost of sovereign debt, which in turn influences the cost of debt of other economic agents, such as companies. In an extreme case, a sovereign debt default can generate financial instability given the close relationship that has been documented between fiscal and financial crises (Bordo and Meissner, 2016).

The Graph 1 shows the evolution of the Mexican government CDS price over a five-year term. The periods where the premium increases notably are associated with: i) the European sovereign debt crisis in 2012; ii) the fall in oil prices in 2015; iii) the 2016 US electoral process; iv) the COVID-19 pandemic in 2020; and v) the tightening of monetary policy in 2022. The above shows that the most important increases recorded by Mexico's CDS coincide with the occurrence of global events, and not necessarily with local events.

Graph 1
Five-year Mexico's CDS
Basis points



Data as of November 2023

Source: Markit

Sovereign risk premiums are determined by several factors. One important component is country-specific credit risk. For example, some scholars have identified that, during the 2011 European crisis, CDS levels were higher for those European countries with high levels of public debt (Huyugüzel et al., 2022). However, other factors, such as unexpected monetary policy decisions by a country, can also have an impact on the sovereign risk premium (Poeschl et al., 2023). Importantly, there is evidence showing that a significant proportion of the variation in sovereign risk premia is determined by an external global factor (Longstaff et al., 2011; Ang and Longstaff, 2013; and Augustin, 2014).

The objective of this *Box* is to decompose the value of the sovereign CDS for Mexico and other countries into two components: i) a common emerging economy risk factor, and ii) an idiosyncratic risk factor. The decomposition is relevant for policy decision making since variations in the CDS caused by idiosyncratic factors may be a more accurate signal of changes in investors' perception of the country's macroeconomic fundamentals and fiscal sustainability in the medium term (European Central Bank, 2012).

II. Methodology and data

The five-year sovereign CDS common factor is obtained from a dynamic factor model (DFM). *DFMs* allow estimating unobservable or latent variables from time series, such as CDS prices, based on the evolution of the set of variables. In this case, information on five-year US dollar-denominated sovereign CDS for a set of countries is used to estimate a common factor or latent variable that explains the common dynamics of the CDS. The specification of the *DFM* used is given by:

$$\mathbf{Y}_t = \mathbf{\Lambda} f_t + \boldsymbol{\varepsilon}_t, \qquad \boldsymbol{\varepsilon}_t \sim \boldsymbol{N}(\mathbf{0}, \mathbf{\Omega})$$

$$f_t = \alpha f_{t-1} + \eta_t, \qquad \eta_t \sim N(0, \sigma^2)$$

where $\mathbf{Y}_t$ is a vector containing daily CDS information for 14 emerging economies[1] from January 2010 to November 2023, f_t represents the common factor and $\boldsymbol{\varepsilon}_t$ y η_t are error terms. The error can be interpreted as a vector of idiosyncratic $\boldsymbol{\varepsilon}_t$ can be interpreted as a vector of idiosyncratic components of the analyzed countries. The first equation is known as the observation equation, which relates the behavior of the observable variable to the common factor. The second equation is known as the state equation and determines the dynamics of the unobservable component. Both the parameters and the value of the common factor, f_t are estimated by maximum likelihood with the Kalman Filter.[2]

III. Results

In the Table 1 presents the results of the estimation of the vector of coefficients of the dynamic factor model $\mathbf{\Lambda}$ of the dynamic factor model exclusively for a subsample of Latin American countries. The results indicate that the common factor determines the value of the sovereign CDS OF these countries and the effects are statistically significant. The coefficient value indicates how many basis points the sovereign CDS increases if the common factor is increased by one unit. A higher coefficient

[1] According to Markit, the 14 countries in the sample have five-year CDS with high liquidity: Brazil, Chile, China, Colombia, Indonesia, South Korea, Malaysia, Mexico, Panama, Peru, the Philippines, South Africa, Thailand and Turkey. The results are similar when excluding Turkey from the sample.

[2] A decomposition of Mexico's and Pemex's CDS using a VAR model was presented in Box 5: Evolution of Sovereign and Pemex Credit Risk in the Financial Stability Report - First Half 2020. In contrast to that methodology, a dynamic factor model uses the common variation of CDS across countries to estimate a common component. This allows capturing common variations in the CDS of several countries that would possibly not be identified if only estimated as in the Box above.

value indicates both a higher level of the CDS and a higher sensitivity to the common factor.

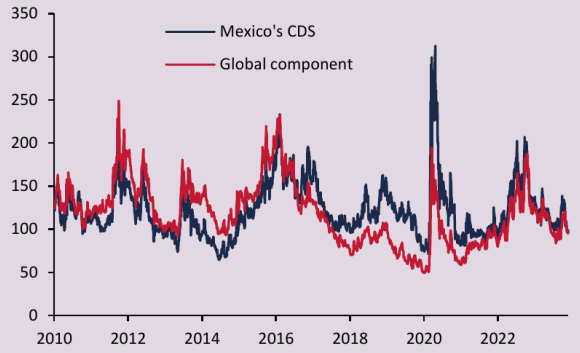
Table 1
Estimated coefficients for Latin American countries 1/, 2/

Country	Coefficients
Mexico	8.08***
Brazil	13.25***
Chile	5.46***
Colombia	10.13***
Peru	7.42***
Panama	7.32***

Daily data used from January 2010 to November 2023
Source: Own elaboration with data from Markit.
1/ ***, **, * denotes statistical significance at 1%, 5%, and 10%, respectively. Standard errors robust to Huber-White heteroscedasticity are used.
2/ Results for non-Latin American countries are omitted, although their coefficients are also statistically significant at 1%.

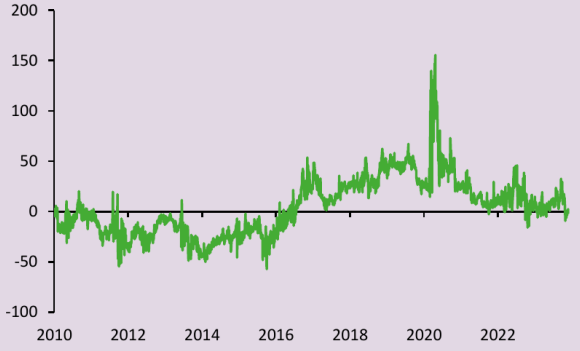
Graph 2 shows the evolution of the five-year Mexican government CDS series and the estimated common risk component.[3] It can be seen that the relationship between both series is close.[4] The common component is sensitive to events associated with global risk such as: i) the European sovereign crisis of 2012; ii) the fall in oil prices in 2015; iii) the COVID-19 pandemic of 2020; and iv) the global monetary tightening of 2022.[5] According to this analysis, during the last two years, variations in Mexico's CDS are mainly explained by variations in the common factor. In Graph 3 shows the evolution of the difference between the common component and the country's CDS. This differential can be interpreted as a measure of idiosyncratic risk. In particular, it is observed that Mexico's CDS increased due to idiosyncratic factors during the 2016 U.S. elections, which were associated with uncertainty about trade agreements with Mexico and Canada. Likewise, a significant fraction of the increase in CDS during the pandemic in 2020 was due to the increase in the idiosyncratic component. While the pandemic was a global phenomenon, the results indicate that Mexico's CDS increased by a greater magnitude than in the rest of the countries analyzed.

Graph 2
Mexico's CDS and the common component
Basis points



Data as of November 2023
Source: Own calculations with data from Markit

Graph 3
Idiosyncratic component of Mexico's CDS
Basis points



Data as of November 2023
Source: Own calculations with data from Markit

IV. Final considerations

A high level of country risk can increase the risks to financial stability in Mexico. Therefore, it is essential to monitor and analyze the evolution of country risk, as well as to understand the factors that determine it. This *Box* presents a model that allows us to quantify the common and idiosyncratic factors that affect the evolution of sovereign CDS prices. It shows that a substantial part of the variation in Mexico's country risk premiums is determined by the common component, which is not directly related to the performance of the Mexican economy.

[3] The common factor is associated with global volatility indicators such as the VIX. The correlation between the common factor and the VIX is close to 0.28. This positive relationship is consistent with what has been found in other studies, such as Longstaff et al. (2011).

[4] The value of the correlation coefficient between Mexico's CDS and the common component is 0.64. This value is lower for Brazil and Colombia, while the correlation is higher for Chile, Peru and Panama.

[5] It is worth noting that variations in Mexico's CDS, both in its common and idiosyncratic components, were not statistically significant in light of the announcement of China's inclusion in global bond indices such as the WGBI.

In particular, during the last two years, variations in Mexico's CDS have been mainly explained by variations in the common component.

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I.4. Macro-financial risks

Financial conditions, both global and local, remain tight. Improved growth prospects for the global economy, as well as the strength of some institutions or sectors of the global financial system, have contributed to a certain easing of financial conditions compared to those observed during some periods of the first half of the year. However, this easing has recently been limited by an environment of high volatility in financial markets and increases in long-term interest rates, mainly explained by the expectation of higher reference rates for longer than previously anticipated, by an increase in geopolitical tensions and by concerns about the fiscal position of some developed countries.

The Mexican financial system as a whole maintains a solid and resilient position against this backdrop. Likewise, its potential vulnerabilities remain limited and, in particular, commercial banks have capital and liquidity levels comfortably above the regulatory minimums. Nevertheless, severe external shocks could affect the proper functioning of the financial system and, therefore, due attention to potential risks continues to be of utmost importance.

Thus, this section identifies and describes the macro-financial risks to the stability of the financial system considered in this *Report*.

A tighter or more prolonged tightening of financial conditions than anticipated

In view of the actions and communications of various central banks in the face of persistently high inflation readings, their reference rates are expected to remain at elevated levels for a longer period of time, and financial conditions are likely to remain tight, if not tighten further. Furthermore, although the global economy is expected to slow down somewhat from the pace seen in 2022, resilience in activity and labor markets has been observed in some countries, which, although it may be due to various factors operating in different directions, raises doubts about the degree to which the real sector may be incorporating this possibility into its decision-making and risk-taking. Should these decisions be inconsistent with scenarios of higher interest rates or for a longer period of time than previously anticipated, this could have adverse implications for the behavior of international financial markets and, therefore, for the stability of the global financial system.

Furthermore, the materialization of this risk could have different implications for the economy. In particular, those demanding financial resources (households, companies and governments) would face higher financing costs. This could combine adversely with some vulnerabilities already existing in several countries, such as high levels of indebtedness and prices of certain assets far from their fundamental values in some markets. Higher interest rates for a longer period of time, together with high levels of indebtedness, could cause increases in non-performing ratio levels of borrowers and in turn could lead to a contraction in credit. Furthermore, generalized deteriorations in the risk-return ratio faced by international investors could lead to capital outflows in emerging economies, including Mexico.

Taken together, these and other possible complications could increase financial stability risks. This is mainly as a result of the consequent increase in credit and market risks faced by financial institutions, including those operating in the country.

A more pronounced or more prolonged-than-anticipated slowdown in the world economy

Global economic activity has continued to recover at a faster pace than expected a few months ago. This has led to an improved growth outlook for 2023; however, the slowdown expected this year may extend into 2024. This weakening would be mainly driven by slower economic growth in China and in other key economies, against a backdrop of still tightening global financial conditions.

In addition, the slowdown in the world economy could be influenced by other factors. These include a possible worsening of geopolitical tensions, mainly those related to the military conflicts in the Middle East and between Russia and Ukraine. The increase in international oil and other energy prices as a result of these conflicts, as well as possible concerted supply restrictions, would introduce additional downwards pressures on economic activity and upwards pressures on inflation.

In view of the above, the balance of risks for world economic activity in the short term continues to be biased downwards. Likewise, medium- and long-term growth risks prevail, associated with the persistence of potentially deep and still unknown effects on the economy derived from shocks that have occurred in recent years, such as the COVID-19 pandemic. Thus, the risk of a weakening of aggregate demand in the national economy, both from abroad and domestically, cannot be ruled out.

In such an environment, the stability of the global financial system, or of the most affected jurisdictions, could be threatened primarily as a result of the consequent increase in the credit risk of financial brokers, without ruling out deterioration in metrics related to other risks (e.g., contagion, market, or liquidity).

Occurrence of a systemic event that affects the global financial system.

As at all times, the risk of global systemic events remains latent, although their probability of occurrence is subject to possible fluctuations. Should such events materialize, they could have an impact in various areas.

On the one hand, both domestic and global financial conditions would be affected by a greater sense of risk aversion and the consequent increase in volatility levels in the markets, whose operation and functioning in general would deteriorate. This peak in volatility could be amplified in an environment of high leverage in the system, especially if combined with liquidity mismatches in financial institutions. On the other hand, economic activity could be weakened by decreases in both credit intermediation and the provision of risk coverage by the financial system; moreover, the repercussions of this type of event on economic activity tend to be profound and persistent.

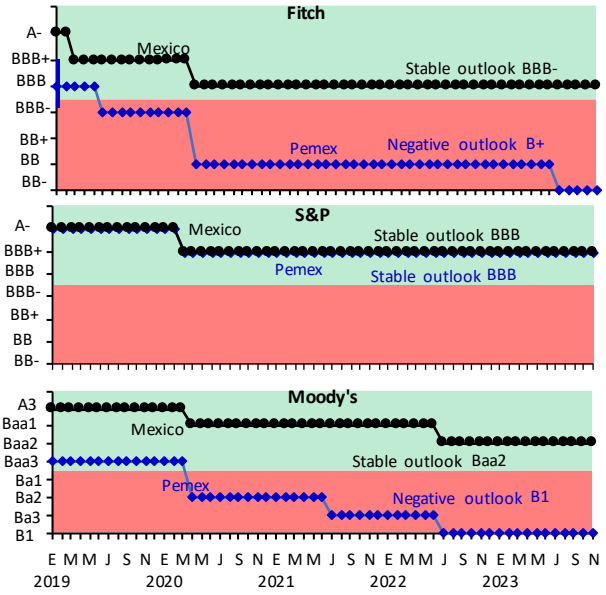
Global financial stability would be affected by the occurrence of this type of events through their consequences on financial markets and economic activity. In view of the high degree of integration of the Mexican economy with the rest of the world, both in the real and financial spheres, similar effects could be expected at the local level, so that the stability of the national financial system could also be threatened. However, the severity of the effects would depend not only on the specific characteristics of the event and the conditions under which they occur and develop, but also on the policy response of the authorities, both national and from other jurisdictions.

Unexpected adjustments in credit ratings for the sovereign or Pemex debt

Since the publication of the last *Report*, the rating agencies have maintained their sovereign debt ratings and outlook unchanged. In contrast, Pemex's debt rating was downgraded by one level by one of the main agencies, while another one changed its outlook from stable to negative (Graph 26).

Graph 26
Evolution of Mexico's and Pemex's Credit Ratings in Foreign Currency [1/]

Fitch, S&P and Moody's scales



Data as of November 2023
Source: Fitch, S&P y Moody's scales
1/ The green areas denote the ratings that are included within the investment grade, whereas the red areas refer to speculative-grade credit ratings.

As for the sovereign debt rating, the agencies highlight that factors such as a prudent macroeconomic framework and a debt-to-GDP trajectory that is comparatively better than other economies with similar ratings support its investment grade. Additionally, according to the same agencies, the sovereign credit rating continues to present relevant risk factors, including a moderate long-term growth outlook and possible contingent liabilities associated with Pemex, in a macro-financial context that poses challenges for public finances.

With respect to Pemex, the rating agencies point out that the main factors that explain the change in their evaluations are the company's weak operating performance and the fact that, as a result of the liquidity and financing restrictions it faces, which could worsen due to the lack of measures to mitigate its exposure to ESG (environmental, social and governance) risks, its capacity to increase capital investment and improve its financial performance will be reduced.

Thus, in a scenario in which such adjustments were to materialize in an unanticipated manner, it is to be expected that the associated risk premia would increase. In turn, this could have a generalized impact on the cost of financing in the economy, which would imply a deterioration of the country's macro-financial risks profile and the possibility of capital outflows.

II. Update on challenges to the economic environment

China's economic slowdown and credit risk to companies

The Chinese economy has been experiencing lower-than-expected growth,[3] and there has been a discussion that it may also have slowed its long-term growth rate.[4] This could result in reduced purchases from Mexico, which would impact the profitability of sectors whose sales are more dependent on China. Consequently, there is the possibility of an increase in credit defaults for some companies in Mexico. Therefore, the exposure of the corporate portfolio to the risk of lower growth in China is studied for different Mexican commercial banks' brokers.[5]

For the total of commercial banks, the portfolio with exposure to the risk of an economic slowdown in China is moderate, around 17%. However, there are some banks that have a portfolio with a high exposure in two dimensions, as a percentage of their net capital and as a percentage of their total portfolio (Graph 27). These banks are small in size and have a small share of the system's total portfolio.

In addition, there are banks that have a portfolio with high exposure, but only in one of the two dimensions. Among these brokers, there are some medium-sized banks with more participation in the system. However, in the exposed portfolio of these brokers, mainly large companies prevail, which are better prepared to face the possible negative effects of an economic slowdown in China. Therefore, the system's exposure to higher non-performing ratio

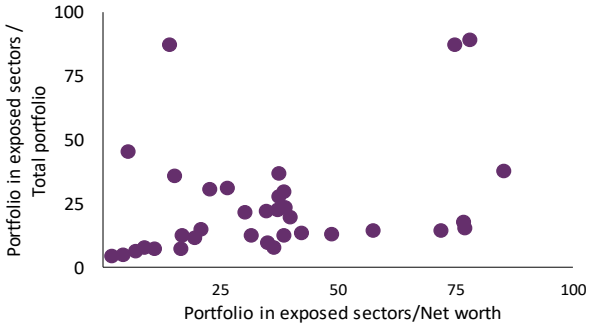
[3] The IMF reduced its 2023 economic growth projection for China by 0.9 percentage points between July and October.

[4] See Everything China Is Doing to Juice Its Flagging Economy by Bloomberg or Does China Face a Lost Decade? by The Economist.

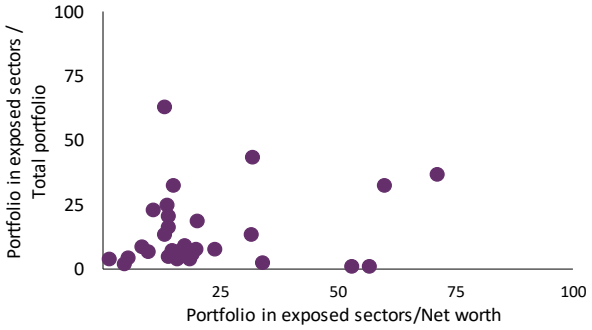
[5] The exposed portfolio is considered to be that which is granted to the quintile of subsectors that export the most to China as a proportion of their production. Portfolio and net capital data as of June 2023 are considered.

levels in the corporate portfolio due to slower growth in China is contained.[6]

Graph 27
Credit to companies in sectors exposed to an economic decline in China: a) all companies
Percent



Credit to companies in sectors exposed to an economic decline in China: b) SMEs
Percent

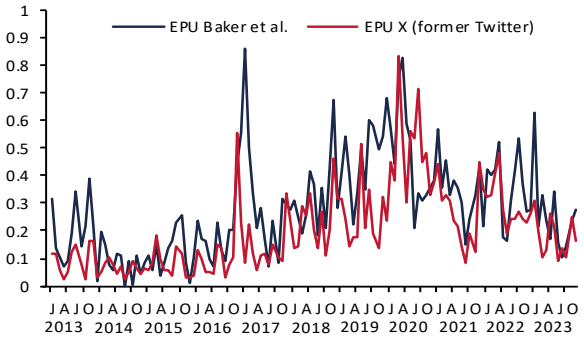


Data as of June 2023
Source: Banco de Mexico, CNBV and INEGI

Evolution of uncertainty

During the second half of 2023, there was a decrease in the level of uncertainty associated with economic policy, according to the timely index prepared with information from the *X* platform (formerly Twitter). However, the index increased during October, reaching a level unseen since the first half of 2022 (Graph 28).

Graph 28
Economic Policy Uncertainty Index[1/]
Uncertainty level



Data as of November 2023
Source: Banco de México
1/ The methodology proposed by Baker et al., 2016, was considered to calculate the Economic Policy Uncertainty index based on posts from X (tweets). In particular, the aggregated number of tweets including terms related to uncertainty, and policy or economy, is calculated. The series obtained is divided by the total number of tweets in each period and then is rescaled between 0 and 1, based on the January 2008 to November 2023 period. For the period between July and October 2023, the total number of tweets in each month was estimated based on an autoregressive model with p=12. The Twitter accounts used are: @eleconomista, @El_Universal_Mx, @reformanegocios, @Milenio, @Reforma, @ElFinanciero_Mx, @lajornadaonline, @elsolde_mexico, @Reporte_Indigo, @LaRazon_mx, @Excelsior, @diario24horas, @sdpnoticias, @LaCronicaDeHoy, @CapitalMexico, @Forbes_Mexico, @heraldodemexico y @EFEMexico.

During the last quarter, the main issues that contributed to the level of the indicator are: uncertainty regarding the direction of monetary policy in different economies and the possibility that central banks will maintain high interest rates, motivated by still high inflation levels and the possible emergence of new upside risks. The slowdown in the global economy, the beginning of the electoral process in Mexico and, more recently, the start of a military conflict in the Middle East also stands out.

III. Policy measures implemented to preserve the sound development of the financial system

During the period covered by this *Report*, the financial authorities carried out actions to improve the regulatory framework, including the adoption of best practices and international standards, in order to keep it robust and up to date. Against this backdrop,

[6] Two additional scenarios were carried out: a first scenario with the impact of reductions only in exports to China and a second scenario including, in addition to total exports of sectors with final goods and services, those sectors with intermediate use goods. Similar conclusions were obtained in both scenarios.

the financial authorities carried out the following regulatory modifications in the areas of credit and market risk, derivatives markets and sustainable finance.

Regulation by Banco de México

In order to promote better credit risk management for financial brokers in Mexico, in June 2023 Banco de México expanded the type of counterparties with which credit institutions may enter into Credit Default Swaps (CDS) and Total Return Swaps (TRS).[7]

In relation to the regulation issued by Banco de México regarding the unique product identifier (UPI), this central bank continues monitoring the development of its implementation at international level in order to publish in a timely manner the recognition of the service provider associated with the *UPI*, as indicated in Circular 20/2022, for its proper adoption in the internal processes of the entities.

Following up on the actions set forth in the National Strategy for the Implementation of the 2030 Agenda and in order to encourage sustainable investments in the national territory, the "Rules for holding syndicated auctions of government securities aligned with environmental, social and corporate governance criteria" were adapted. These rules include the debt instrument issued by the Federal Government denominated in local currency, at a fixed interest rate and aligned with environmental, social and corporate governance (ESG) criteria, to be placed in the domestic market through syndicated auctions.[8]

In relation to the rules that establish margin requirements for non-centrally cleared derivative transactions, Banco de México's Governing Board approved in its November 2023 session modifications to these provisions, among which the extension of the adoption dates of this requirement for different market participants stands out. The above was done in order to allow the appropriate conditions for the proper implementation of this international standard in the derivatives market in Mexico. Thus, as of December 31, 2024, the obligation to settle collateral for the exchange of margins and the modification of contracts for commercial banks, broker-dealers and investment funds, with counterparties that are commercial banks, broker-dealers, investment funds or financial entities abroad, will come into effect. For transactions with counterparties that are non-financial entities and for development banks, these obligations will become effective on September 30, 2025. In all cases, the exchange of margins will only contemplate derivative transactions entered into as of the corresponding effective date.

With regard to the characteristics that reference rates must have, in accordance with the recommendations of the Financial Stability Board (FSB), as well as the CSBB and the IICV, the dates from which the use of the interbank equilibrium interest rates in local currency (*TIIE*) with maturities of 91 or 192 days as the underlying for new derivative transactions will be restricted have been set. This means that the TIIE at terms of 91 or 182 days will no longer be used for new contracts entered into on or after 1 January 2024, and the TIIE with a maturity of 28 days will no longer be used for new contracts entered into on or after 1 January 2025. Similarly, the use of the TIIE on a bank business day (*TIIE* Funding rate) will be recognized as the underlying in standardized derivative transactions.[9]

Regulation by SHCP and CNBV

With respect to transactions subject to market risk faced by credit institutions, the CNBV modified the treatment of Market Risk Capital Requirements (RCRM, for its acronym in Spanish). In particular, for certain types of transactions, the characteristics of transactions involving assets received or delivered as collateral are modified to establish that the party that retains the cash flows, or the capital gains or losses due to the change in their price, must retain such assets for their RCRM.

With respect to the Capital Requirement for Operational Risk (*RCPO*), the CNBV established that development banking institutions must exclude from their calculation, under the business indicator, the profits they deliver to the SHCP.

Regarding the measures that credit institutions must use to identify and control the concentration levels of

[7] Banco de Mexico Circular 6/2023, published in the *DOF* on June 15, 2023.
[8] Banco de Mexico Circular 5/2023, published in the *DOF* on June 7, 2023.
[9] Banco de Mexico Circular 7/2023, published in the *DOF* on September 8, 2023.

their exposures to counterparties or groups of counterparties that may be related to each other, on April 17, 2023, the CNBV published amendments to the prudential framework on this matter. These are aligned with the international standard on the treatment of large exposures issued by the BCBS (see Box 5). Among the elements incorporated in this regulation, two main ones stand out. First, the inclusion of "economic interdependence" as a criterion for identifying common risk groups. Second, a general limit of 25% of core capital is established for such exposures, and 15% in the case of exposures to institutions considered systemically important. These amendments came into effect in October 2023 for local systemically important commercial banks institutions, global systemically important banks, as well as their subsidiaries and sofomes that maintain equity links with these types of institutions. The rest of credit institutions and sofomes must comply with the new regulatory framework as of January 1, 2024. This regulation applies to new transactions originated or restructured by institutions as of its effective date.[10]

In the area of accounting criteria applicable to Clearing Houses and Clearing Members participating in the derivatives contracts market, the standards relating to the valuation, recognition and disclosure of financial instruments, known as IFRS9 (for its initials). These amendments specify, among other aspects, the updated price for the valuation of such instruments, as well as their presentation in the financial statements, in order to have transparent and comparable information with other countries.[11]

With respect to resolution plans, the periods for updating such plans for local systemically important commercial banks and medium-sized banks were shortened. This was in response to the recommendations issued by the IMF as a result of the Financial Sector Assessment Program for Mexico in 2022.[12]

Finally, due to the disappearance of the LIBOR reference rate and in response to the recommendations of the Bank for International Settlements (BIS) and the FSB, the *Circular Única de Seguros y Fianzas* was amended. For insurance companies and surety institutions, the Secured Overnight Financing Rate (SOFR), published by the Federal Reserve Bank of New York, was established as a new reference rate.[13]

Provisional measures to deal with the damage caused by Hurricane Otis

The effects of hurricane Otis severely deteriorated economic activity across large areas of the state of Guerrero, affecting the source of income of households living in the region. Although the stability of the financial system is not expected to be affected, the financial authorities implemented different measures aimed at giving affected households the opportunity to temporarily defer the payment of their loans and other obligations, provided they are still in force.[14]

On October 30, 2023, the CNBV announced the implementation of Special Accounting Criteria (*CCE*, for its acronym in Spanish) applicable to various entities regulated and supervised by the CNBV, to which they may adhere until April 30, 2024.[15] The purpose of the *CCE* is to enable financial institutions to generate support programs for their borrowers, without capitalizing interest or charging any type of commission derived from the restructuring or renewal.

In the same sense, on November 2, 2023, Banco de México determined that, in those cases in which credit institutions so consider and agree with their respective clients, they could temporarily suspend the obligation to require the minimum payment of

[10] For further details on the Large Exposures to credit risk regulation, see Box 5 of this *Report.*

[11] RESOLUTION amending the General Provisions that establish the accounting criteria to be followed by participants in the derivatives market, published in the *DOF* on September 28, 2023.

[12] Agreement amending the General Guidelines that establish the programs and calendars for the preparation of resolution plans for commercial banks, published in the *DOF* on August 2, 2023.

[13] Modifying Circular 3/23 of the Sole Insurance and Bonding Company, published in the *DOF* on October 18, 2023.

[14] The financial measures adopted by the financial authorities are additional to the fiscal measures announced by the SHCP. On November 1, 2023, the SHCP announced the Plan of Attention to the Population Affected by Hurricane Otis, which considers support for 61,313 million pesos.

[15] CNBV press release on October 30, 2023.

credit cards to users residing in the affected municipalities.[16] This measure will be in effect from October 1, 2023 to April 30, 2024.

Likewise, on November 2, 2023, the *CNSF* announced that it will allow insurance companies to modify, through general transitory endorsements, the products they currently have registered with the Commission in order to extend the term for the payment of premiums for up to 90 days, for the benefit of policyholders in the state of Guerrero.[17] Other agencies such as National Fund for Worker's Housing (Infonavit, for its acronym in Spanish) have also activated protocols to temporarily alleviate the financial burden of their borrowers.

Projects under consultation

From August 3 to August 30, 2023, the draft modification of the requirements that financial institutions authorized to operate derivative products must comply with what was published for public consultation.[18] The objective is to strengthen the practices and procedures for the administration, operation and control of derivative transactions. The amendment considers international best practices and includes aspects of corporate governance, documentation of operations, resource management and comprehensive risk management. Among the proposed amendments, the following stand out: improve credit risk measurement; incorporate liquidity risk measurement; measure and control the credit exposure produced by derivatives (*Credit Value Adjustment* or *CVA*); clarify the functions of the risk and audit areas to establish them as second and third lines of defense in the risk management framework; as well as perform an adequate analysis of their clients to establish adequate limits based on their risks.

On November 8 of this year, public consultation began on the rules applicable to repurchase transactions, which aim to adopt international standards by recognizing some practices carried out in other jurisdictions in the execution of these transactions, and thus strengthen the repurchase market in Mexico by promoting more flexible and robust schemes in the arrangement and settlement of these transactions. In particular, the proposed regulation incorporates the possibility of hiring triparty agents to provide services associated with post-trade processes (*triparty repo*); the substitution of securities during the life of the transactions; allowing repurchase transactions with a deferred start date (*forward-starting repo*); and recognizing state owned companies as authorized counterparties acting as repurchase parties.[19]

On December 1, a regulatory project was published for consultation that takes into account the lessons learned during the crisis caused by COVID-19, the experiences with the operation of the Additional Ordinary Liquidity Facility (FLAO), as well as the best practices of other central banks, which would replace the FLAO with the Permanent Liquidity Facility (FPL). This new facility seeks to improve the operating framework and, thus, offer more timely access to liquidity, guaranteed by a broad pool of good quality assets, without causing distortions for the adequate management of risks by financial institutions, nor becoming an alternative to market financing under normal operating conditions. [20]

IV. Financial system risks

IV.1. Aggregate risk indicators

The financial markets stress index (*IEMF*, its acronym in Spanish) increased slightly since the last *Report*. Other stress indices in financial markets showed a similar behavior to the Mexican index, mainly between October and November (Graph 29).

[16] Bank of Mexico's press release and Circular 10/2023 published on November 2, 2023.

[17] November 2 CNSF press release.

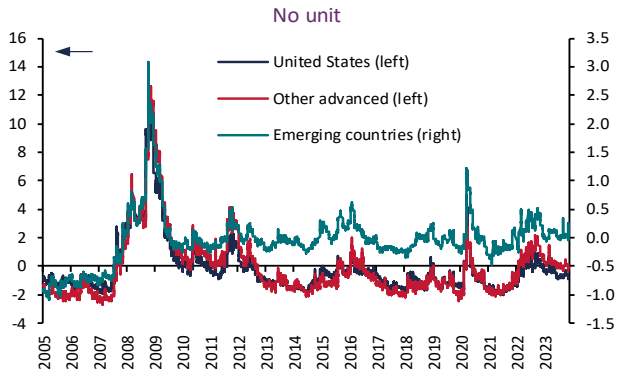
[18] Draft provisions to amend Circular 4/2012, regarding requirements for the execution of derivative transactions, dated August 3.

[19] Consultation draft published by Banco de México on November 8.

[20] Consultation draft published by Banco de México on December 1.

Graph 29

Financial Stress Index for others countries or regions[1/]



Data as of Novermber 30, 2023

Source: Office of Financial Research (OFR)

1/ The Financial Stress Index is a daily market-based snapshot of stress in global financial markets. The FSI shows stress contributions by three regions: United States, other advanced economies, and emerging markets.

Although the *IEMF* decreased during the third quarter of 2023, after the uncertainty associated with the episodes of instability in the banking systems of advanced countries that occurred in March of this year gradually dissipated, it subsequently increased in October due to greater volatility in the variables associated with the debt and foreign exchange markets due to the expectation that interest rates would remain at high levels for a longer period of time at the global level (see Graph 30). In turn, the armed conflict in the Middle East increased volatility in the variables associated with country risk; however, as of November the index showed a slight reduction.

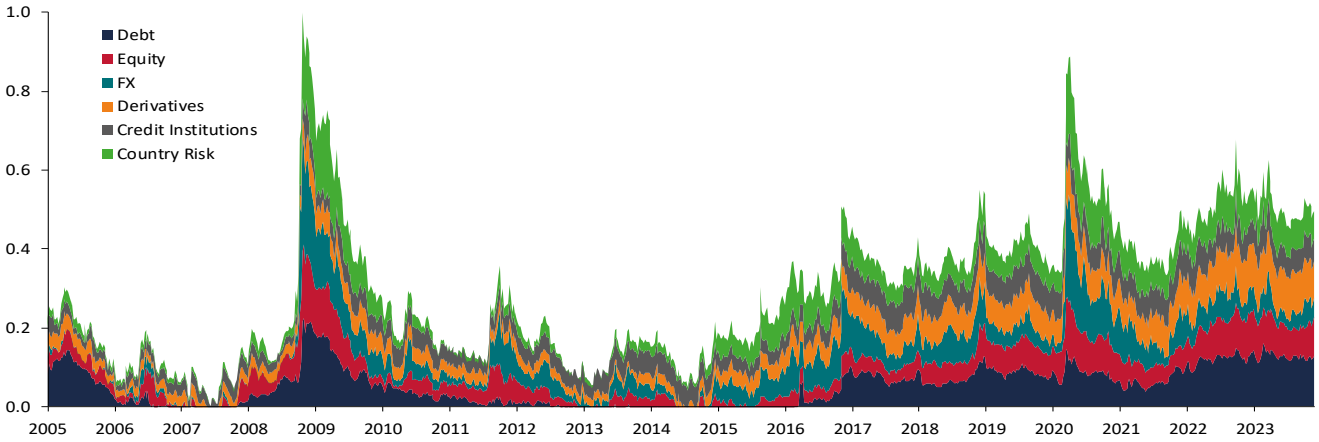
Financial conditions in Mexico, as measured by the Financial Conditions Index (*ICF*, its acronym in Spanish) tightened slightly in November with respect to the last *Report*, and continue to be in the restrictive zone. Although from May to August said conditions eased due to changes in the variables associated with country risk and the debt market, as of September they became more restrictive at the margin due to changes in the stock market and macroeconomic variables. Likewise, the above trend is partly explained by the greater volatility in the markets related to the geopolitical conflicts in October (Graph 31). Other financial conditions indices, such as those published by the International Monetary Fund (IMF), show that financial conditions in emerging countries eased slightly, although they remain in the restrictive zone.

The aggregate risk of the financial system, illustrated through the heat map, decreased slightly in the third quarter of 2023 with respect to the previous *Report*. Macroeconomic risks decreased, which is explained, in part, by the decrease in inflation. Market exposure, financial sector leverage and non-financial sector leverage risks remained at similar levels to those recorded in the previous semester. The market exposure category, which measures risk appetite, remains at high levels due to the fact that interest rate spreads on fixed-income securities with different credit risk are at low levels (Graph 32).

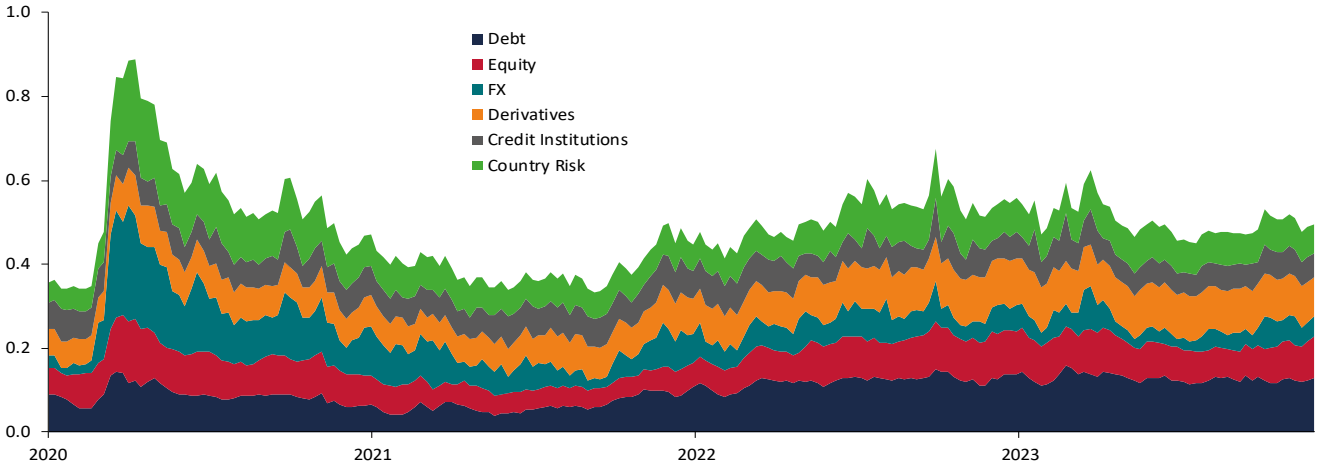
Graph 30

The Financial Market Stress Index [1/]

a) Stress level 2005-2023



b) Stress level 2020-2023



Data as of Novermber 30, 2023

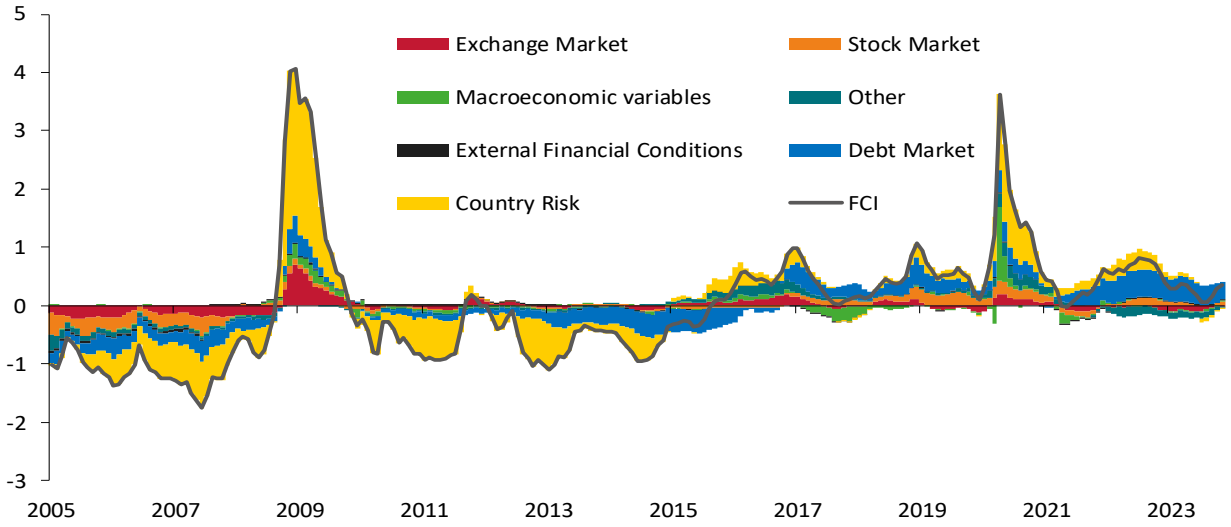
Source: Banco de México

1/ The index was estimated using a principal component analysis on 36 standard variables of Mexican financial markets grouped into 6 categories (debt market,securities market, FX market, derivatives market, credit institutions and country risk). Total components yields the index scaled at interval [0,1]. A higher number represents higher financial stress.

Graph 31

Financial Conditions Index[1/,2/]

Standard deviations



Data as of November 2023

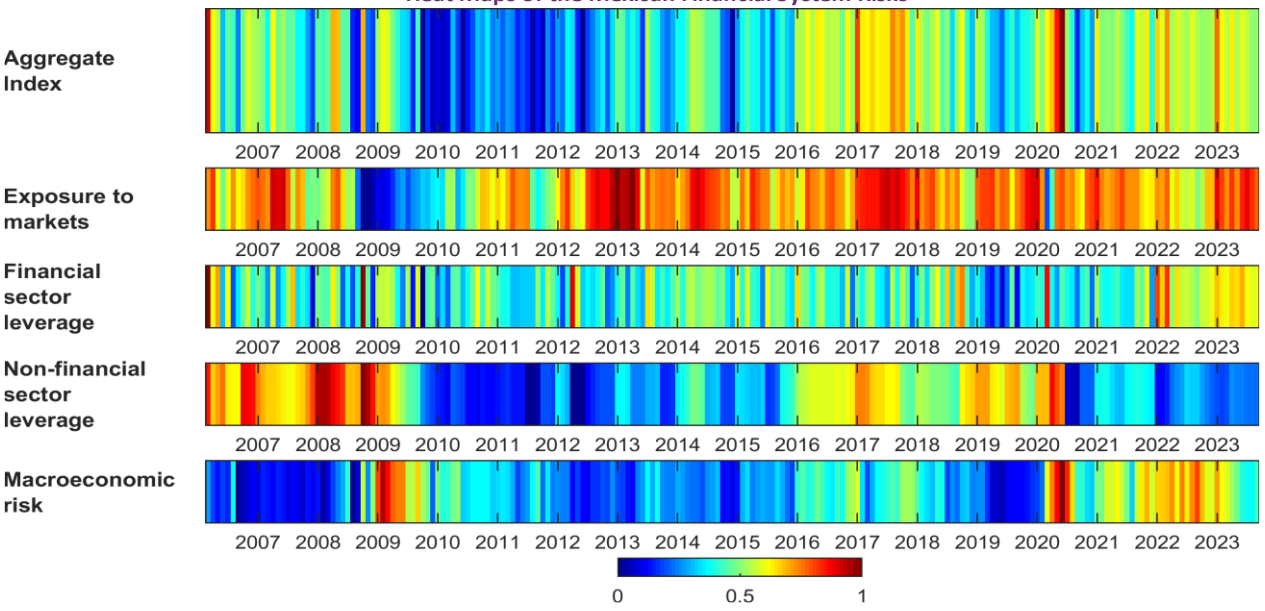
Source: Banco de México

1/ For a description of the methodology see Box 2: Financial Conditions and Growth Risk, Financial Stability Report, December 2019.

2/ The contributions of each FCI variable are estimated using Kalman Filter.

Graph 32

Heat Maps of the Mexican Financial System Risks [1/ 2/]



Data as of September 2023

Source: Banco de México

1/ Refer to Box 3 for a description of the methodology: Heat Maps of Mexican Financial System Risks, Financial System Report 2018. The Exposure to Markets category relates to the Risk Appetite category of the Financial System Report 2018.

2/ The disaggregated map is provided in Annex 1.

The main results of the survey on the perception of systemic risk are described below.[21,22] Regarding the main sources of risk for the financial system, the most cited external financial risk in this edition is higher-than-expected inflation, while the deterioration in the growth prospects of the global economy ranks second in this edition; likewise, higher-than-expected inflation is the most cited internal financial risk, followed by the deterioration in public finances, and political, geopolitical and social risks are the most cited by institutions with respect to non-financial risks (Table 1).

Table 1

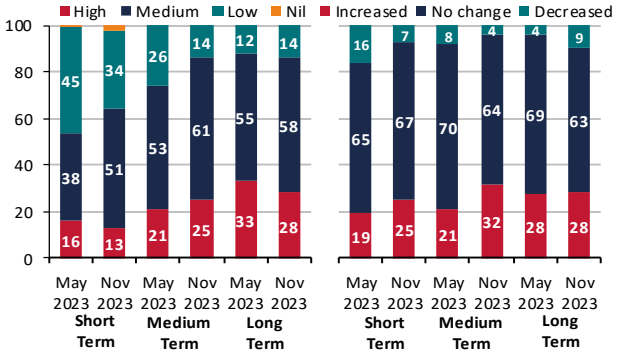
Main sources of financial system risks Percent of total institutions		
	November 2023[1/]	May 2023[2/]
External financial risks		
Inflation higher than expected	86	81
Deterioration of global economic growth outlook	79	82
Disorderly changes in foreign interest rates	71	55
Volatility in commodity prices	54	54
Deterioration of foreign market conditions*	54	63
Domestic financial risks		
Inflation higher than expected	73	79
Deterioration of public finances	71	63
Deterioration of the domestic economic growth outlook	68	74
Deterioration of sovereign credit rating	58	53
Fiscal, financial and economic policies	48	60
Non-financial risks		
Political, geopolitical and social risks	93	94
Cybersecurity and IT risks	79	82
Violence and insecurity	71	71
Deterioration of the rule of law and impunity	49	52
Climate risk	49	34

1/ In the last survey 107 institutions participated.
2/ In the previous survey 108 institutions participated.
* Exchange rate volatility, depreciation and lack of liquidity.

Regarding the section of the survey that talks about the probability of the occurrence of an event affecting financial stability in the short, medium and long term (0 to 6 months, 6 to 12 months, 1 year or more, respectively)[23] the following is highlighted (Graph 33):

- The proportion of institutions that consider the probability of the event occurring to be high decreased for the long and short term; for the medium term, it increased.
- This semester, for the short and medium term, a greater proportion of institutions consider that the probability of a systemic event occurring increased; while in the long term it remained the same.

Graph 33
Probability of Occurrence of a Systemic Event
Percentage of responses [1/]



Source: Banco de México
1/ Certain figures may not add up to 100% due to rounding up.

For the next six months, expectations regarding market risk (currency and equity), liquidity risk (funding) and operational risk decreased with respect to the previous six-month period. On the other hand, expectations about credit risk, market risk (rates) and liquidity risk (market) increased (Graph 34). [24]

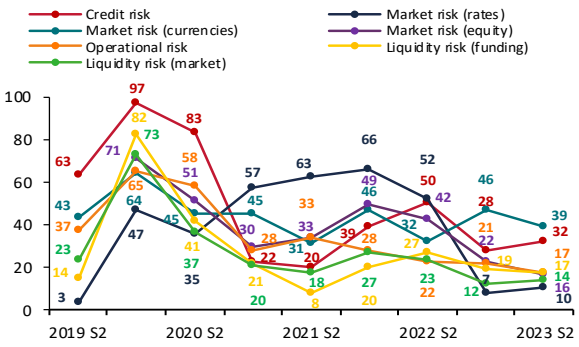
[21] The survey is conducted by Banco de México among risk management directors of various financial institutions. This semester it was conducted from October 30 to November 24, 2023. For more information, see Box 6. Semiannual survey on systemic risk perception, Financial Stability Report December 2019, Banco de México, pp 94-95.

[22] The survey consists of a series of questions grouped into four blocks: i) main sources of financial (internal and external) and non-financial risks; ii) the perception of the occurrence of a high impact event that could affect the proper development of the financial system in different terms; iii) the institutions' expectations regarding the main idiosyncratic risks they face; and iv) aspects related to their risk management. The survey was sent to 133 financial institutions (afores, insurance companies, commercial banks, development banks, broker-dealers and investment funds).

[23] Institutions were asked whether the probability of occurrence was high, average, low or zero for each time frame.

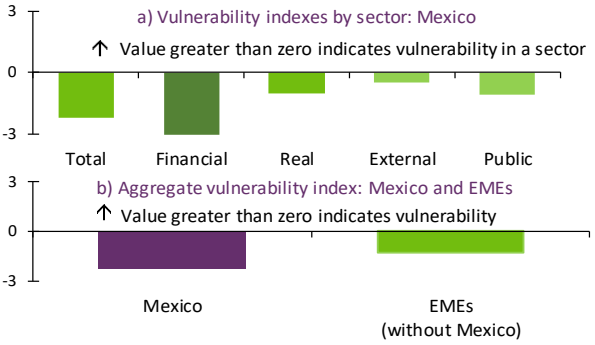
[24] A diffusion index is calculated as the difference between the percentage of institutions that expect risk to increase and the percentage of institutions that expect it to decrease. An increase in the level of the index is interpreted as a higher expectation of risk.

Graph 34
Expectations regarding the evolution of risks in the following six months 1/
Percent



Data as of november 2023
Source: Banco de México
1/ The chart shows the difference between the percent of institutions that expect the risk increase and the institutions that expect the risk decrease.

Graph 35
Macrofinancial vulnerability indexes



Source: Banco de México, Haver Analytics, IMF (*World Economic Outlook* and *Financial Soundness Indicators*). The group of emerging economies includes Brazil, Colombia, Indonesia, South Africa, Thailand, the Philippines, and Turkey.

Macro-financial Vulnerabilities Index

Early warning indicators detect vulnerabilities that increase the risk of a macro-financial crisis in adverse economic times.[25] These early warning indicators are calculated in Mexico's financial, real, external, and public sectors. [26]

The results suggest that currently there are no significant vulnerabilities in any of the four sectors considered (Graph 35). Furthermore, the aggregate indicator, which reflects the vulnerabilities faced by an economy as a whole (i.e., in all the sectors considered) shows an improvement with respect to the previous *Report* and continues to reflect fewer vulnerabilities than in other emerging economies.

Among the sectors for which fewer vulnerabilities are detected; the real and financial sectors stand out. In the real sector, the improvement is largely due to the upward revision in Mexico's growth forecasts for the end of 2023. In the financial sector, it is largely due to higher profitability (ROA) and the deposit-to-loan ratio. For the external sector, the indicator continues to reflect the absence of significant vulnerabilities, but shows a slight deterioration due, in part, to the expectation of lower export growth by 2023.

When interpreting these indicators, it is essential to consider two points. First, crises are usually preceded by vulnerabilities that affect not just one sector, but several sectors of the economy. Second, whether a crisis occurs generally depends not only on a country's vulnerabilities, but also on the size of the adverse event it faces.

IV.2. Financial position of households, companies and public sector

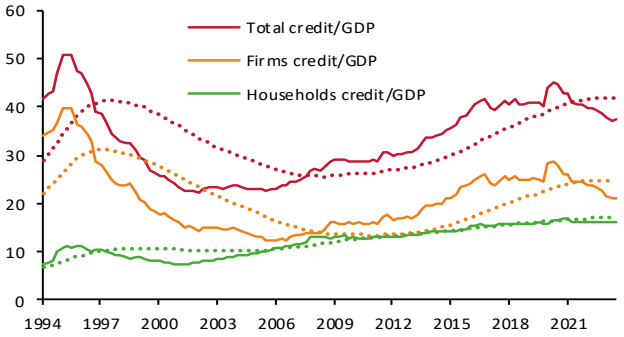
Total financing as a proportion of GDP showed growth for the first time in ten quarters, however, this growth was marginal. Both total financing and financing to companies remained at similar levels to

[25] See IMF Methodological Manual (2012). Strategy, Policy, and Review Department. The IMF-FSB Early Warning Exercise: Design and Methodological Toolkit of the International Monetary Fund (IMF). The following are considered macrofinancial crises: abrupt capital outflows, financial stress, and abrupt fiscal adjustments. The definitions of the 2012 IMF Methodological Toolkit are used for abrupt capital outflows and abrupt fiscal adjustments, and the 2012 Laeven and Valencia definitions for financial stress.

[26] Eleven variables are used as indicators for emerging economies with available information. These variables include current account balance, reserve coverage, export growth, real effective exchange rate, fiscal balance, change in government revenue, CAR, ROA, *IMOR*, loan-to-deposit ratio, and real GDP growth. The sector classification was adjusted according to the IMF classification. An indicator signals vulnerability in a sector when its value exceeds a threshold. This threshold is constructed based on the historical behavior of macrofinancial variables in the years prior to the crises in other emerging economies. Aggregate indicators are obtained by averaging the distance of each indicator with respect to a threshold, taking into account the importance of each indicator in predicting crises.

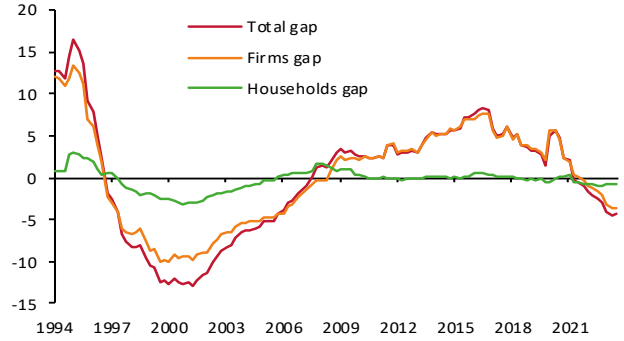
those of 2015 (Graph 36a). The financing gap has been at negative levels for ten quarters and it was only this quarter that it marginally reversed its downward trend (Graph 36b).

Graph 36
Credit to non-financial system private sector 1/
a) Share of GDP
Percent



Data as of September 2023
Source: Banco de México
1/ Dotted lines correspond to long term trend

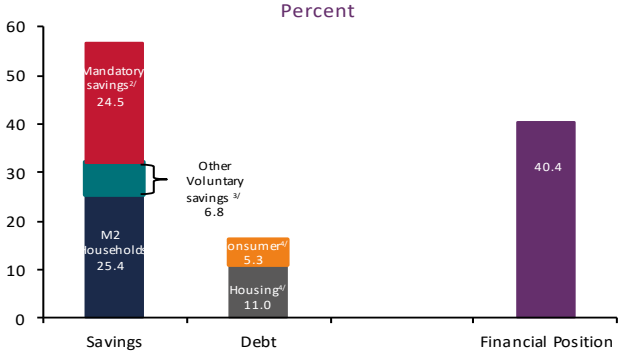
b) Credit-to-GDP gap 1/
Percent



Data as of September 2023
Source: Banco de México
1/ It's the difference between observed credit-to-GDP ratio and its long term trend

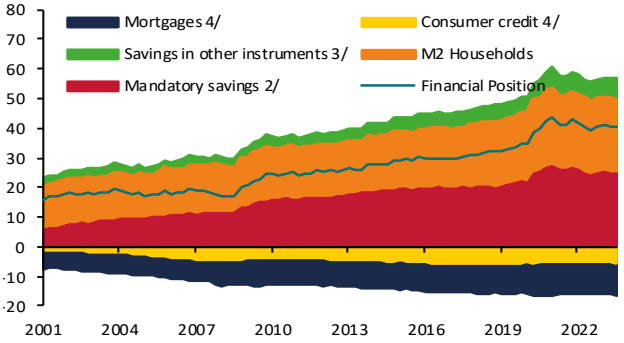
The financial position of households declined slightly compared to the levels shown in the previous *Report* (Graph 37a). Savings showed a reduction while financing grew marginally; the households' financial position indicator is again in line with the pre-pandemic trend (Graph 37b).

Graph 37
Households financial position 1/
a) Share of GDP
Percent



Data as of September 2023
Source: Banco de México
1/ Totals may not add up to 100% due to rounding. Share of four quarters average nominal GDP.
2/ Includes housing and pension funds
3/ Includes public securities, private securities, issued by states, municipalities, OyEs and Fonadin, as well as other banks liabilities held by
4/ Includes credit granted by commercial banks, development banks, non-bank savings and loans entities, credit unions and regulated financial

b) Share of GDP
Percent



Data as of September 2023
Source: Banco de México
1/ Totals may not add up to 100% due to rounding. Share of four quarters average nominal GDP.
2/ Includes housing and pension funds
3/ Includes public securities, private securities, issued by states, municipalities, OyEs and Fonadin, as well as other banks liabilities held by households.
4/ Includes credit granted by commercial banks, development banks, non-bank savings and loans entities, credit unions and regulated financial companies.

Total financing to the Mexican economy increased slightly in real annual terms during the third quarter of 2023 (Table 2). Financing to the public sector increased due to higher domestic securities borrowing. On the other hand, total financing to the non-financial private sector decreased slightly due to lower financing to companies, mainly from abroad, which has already recorded twelve quarters with negative growth rates in real terms. In contrast, financing to households increased in real terms with

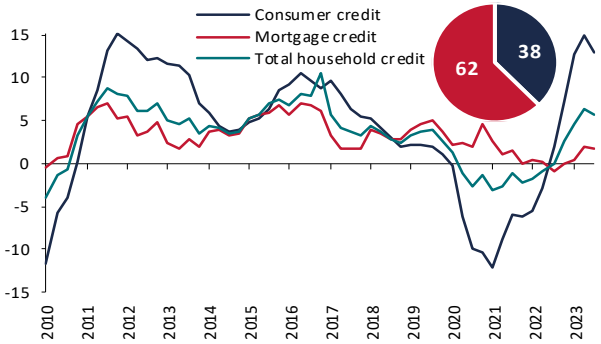
respect to the previous *Report*, mainly consumer financing (Graph 38).

Likewise, financing granted by commercial banks and development banks increased during the period; however, financing granted by development banks grew at a higher rate. Finally, financing for both consumption and housing registered higher growth, although the aggregate growth of the latter was lower than that of the former.

Graph 38

Household credit growth [1/]

Real annual percent change



Data as of September 2023

Source: Banco de México, BMV and Condusef

Note: The percentages shown here consider the figures relating to non-regulated entities that grant financing and that are included at the bottom of Table 2 (Memo); therefore, the differ from those registered in the upper part of the same table. In addition, we exclude non-regulated entities figures for which data from stock echange is not available as they are in debt restructuring or liquidation processes.

1/ Includes the loan portfolio of commercial banks and regulated non-bank entities such as regulated sofomes, socaps, sofipos and credit unions, as well as non-bank non-regulated entities such as non-regulated sofomes and debt-issuing financial companies such as financial leasing companies or financial arms of automotive companies. For mortgages it also includes those granted by Infonavit and Fovissste and for consumer credit includes credit granted by Infonacot. The growth series are adjusted to consider the beginning of availability of the data on financing by non-regulated entities and regulated sofomes that issue debt in the period in which they appear in the sample (2015-2016).

Table 2

Total Financing to Non-Financial Sectors of the Mexican Economy

a) Preliminary figures at September 2023

	Thousands of million Mexican Pesos	Per cent of sector	Per cent of GDP	Real annual percent change [Real annual percent change of balance is USD]		Per cent of financing denominated in Mexican pesos
				3Q23 vs 3Q22	3Q22 vs 3Q21	
Public sector [1/]	**15,151**	**100**	**47.3**	**2.0**	**-2.6**	**74.9**
Securities	**13,680**	**90.3**	**42.7**	**4.2**	**-1.7**	**78.9**
Issued in Mexico	10,788	71.2	33.6	11.3	4.0	100.0
Issued abroad	2,892	19.1	9.0	-16.1 [1.2]	-14.7 [-5.1]	0.0
Bank credit	**369**	**2.4**	**1.1**	**-10.6**	**-9.5**	**18.9**
Commercial bank	124	0.8	0.4	30.0	-18.3	56
Foreign banks	244	1.6	0.8	-22.8 [-7]	-6.4 [4.1]	0.0
Other [2/]	**1,103**	**7.3**	**3.4**	**-15.2**	**-9.0**	**44.6**
Private sector	**11,473**		**35.8**	**-0.7**	**-2.0**	**78.0**
Non-financial companies	**6,355**	**100**	**19.8**	**-5.2**	**-3.9**	**60.4**
Securities	**2,014**	**31.7**	**6.3**	**-12.7**	**-11.7**	**34.0**
Issued in Mexico	669	10.5	2.1	12.6	-6.4	98.3
Issued abroad	1,345	21.2	4.2	-21.5 [-5.4]	-13.4 [-3.7]	1.9
Bank credit	**4,120**	**64.8**	**12.8**	**-1.9**	**0.7**	**76.2**
Commercial bank [3/]	3,134	49.3	9.8	3.1	3.4	78.1
Development bank	452	7.1	1.4	-4.1	-3.1	63.2
Foreign credit [4/]	534	8.4	1.7	-22.1 [-6.1]	-7.5 [2.9]	0.0
Other [5/]	**221**	**3.5**	**0.7**	**12.5**	**3.2**	**98**
Households	**5,118**	**100**	**16.0**	**5.4**	**0.7**	**100**
Consumer credit	**1,708**	**33.4**	**5.3**	**13.5**	**4.7**	**100**
Commercial bank [3/]	1,407	27.5	4.4	13.8	5.8	100
Development bank	46	0.9	0.1	-2.5	-11.1	100
Other [5/]	**255**	**5.0**	**0.8**	**15.4**	**2.6**	**100**
Mortgages	**3,410**	**66.6**	**10.6**	**1.8**	**-1.1**	**100**
Commercial bank	1,329	26.0	4.1	5.1	2.4	100
Development bank	12	0.2	0.0	-7.3	-7.4	100
Other [6/]	**2,069**	**40.4**	**6.5**	**-0.1**	**-3.0**	**100**
Memo: Non-regulated financial entities that grant financing by destination sector [7/]	**1,479**	**100**	**4.6**	**1.3**	**-8.3**	**89.3**
Non-financial companies	1,078	72.9	3.4	-0.9	-7.5	87.6
Consumer credit	362	24.5	1.1	10.2	-8.6	98.8
Mortgages	15	1.0	0.0	1.4	25.1	100.0
Public Sector	23	1.6	0.1	-20.2	-35.5	13.6
TOTAL	**28,103**		**87.6**	**0.9**	**-2.7**	**76.9**

Preliminary data as of September 2023

Source: Banco de México (CF 297), CNBV, SHCP, Condusef and BMV

Note: in order to use comparable data in annual growth figures, they exclude loans from non-regulated entities for which data is not available, as they are in debt restructuring or liquidation processes.

1/ Considers the gross debt balance of the public sector based on the SHCP methodology. Includes financing received by the Federal Government, public enterprises and the development bank.

2/ Includes financing granted by international financial bodies, Pidiregas, the SAR savings fund,ISSSTE, Pemex and CFE obligations.

3/ Includes the portfolios of regulated sofomes for having equity links with banking institutions.

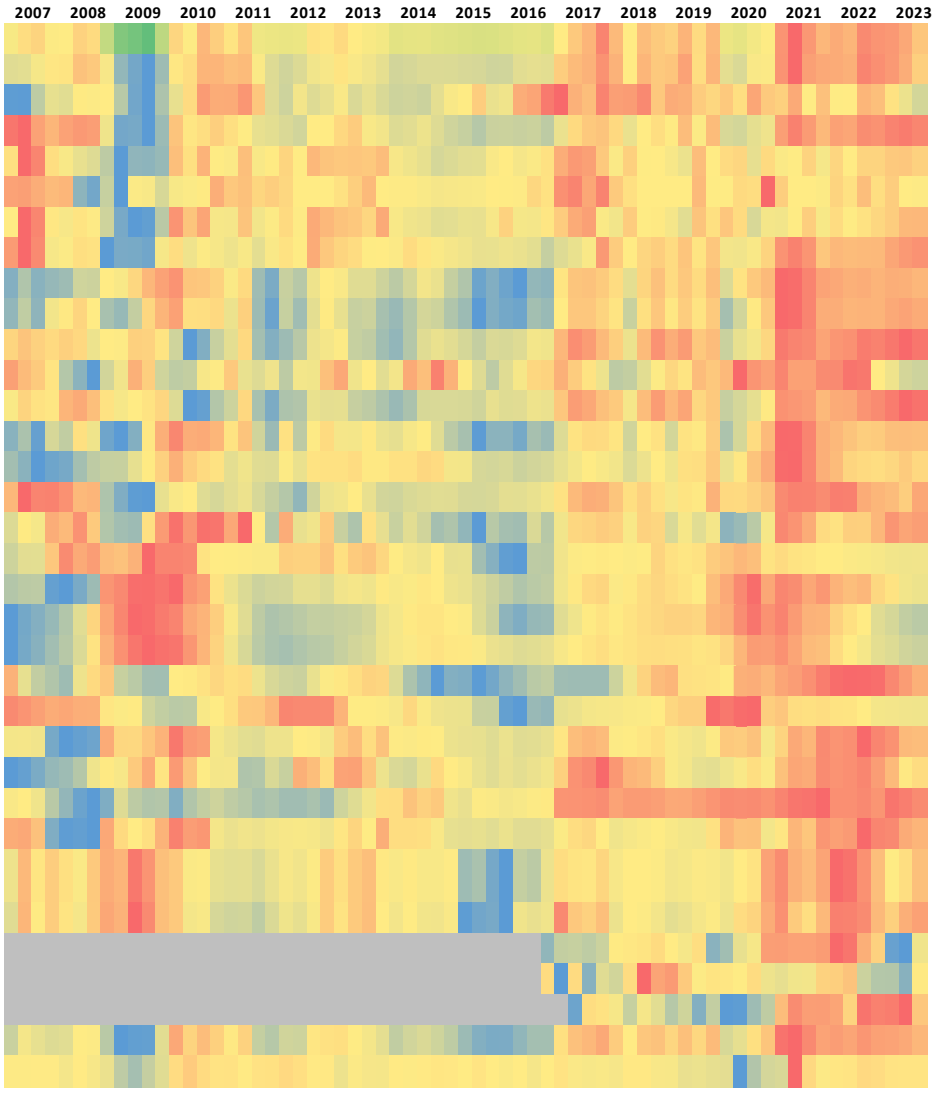
4/ Excludes financing from foreign suppliers.

5/ Includes financing granted by the Infonacot, as well as by regulated non-banking financial entities, such as socaps, sofipos, regulated sofomes for issuing debt, bonded warehouses and credit unions.

6/ Includes financing granted by the Infonavit, the Fovissste, as well as by regulated non-banking entities.

7/ Includes financing granted by non-regulated sofomes, corporate debt issuers engaged in granting financing (e.g., automotive), credit granted by listed department stores to their customers and in the case of private non-financial companies, financing from suppliers (listed companies only).

b) Historical figures: real annual percent change



Data as of September 2023

Source: Banco de México (CF 297), CNBV, SHCP, Condusef and BMV.

Note: The heat map shows the percentiles of the distribution of the real annual growth rate of financing. The highest percentiles are shown in blue and the lowest in red. The color of each indicator or row is based on the history of each series, which covered from Jan 07 to Mar 23, with the exception of those shown in gray, whose history is not available. In addition, in order to use comparable data in annual growth figures, they exclude loans from non-regulated entities for which data is not available, as they are in debt restructuring or liquidation processes.

1/ Considers the gross debt balance of the public sector based on the SHCP methodology. Includes financing received by the Federal Government, public enterprises and the development bank.

2/ Includes financing granted by international financial bodies, Pidiregas, the SAR savings fund,ISSSTE, Pemex and CFE obligations.

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IV.2.1. Households

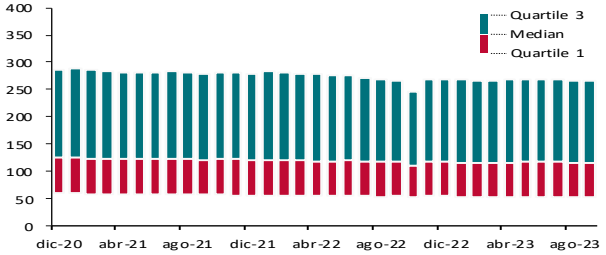
Borrowers' total debt balances, at constant prices, have remained at the same levels in the last two quarters (Graph 39a), while leverage, measured as the proportion of monthly income allocated to debt repayment, remained in September 2023 at levels similar to those prevailing a year earlier, with higher leverage observed in the borrowers with lower income[27] (Graph 39a and Graph 39b).[28]

Graph 39

Distribution of leverage of a sample of households

a) Outstanding debt amount of borrowers with at least one bank loan [1/,2/]

Thousands of pesos



Data as of September 2023

Source: Credit Bureau

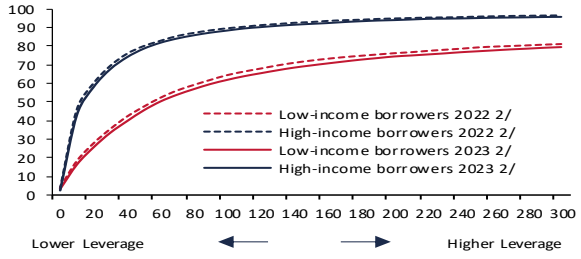
1/ Estimate using information from a sample of Credit Bureau files.

2/ Constant prices (September 2023 base).

b) Monthly payments to monthly income ratio of borrowers with at least one bank loan [1/]

Vertical axis: percent of the number of borrowers

Horizontal axis: monthly payments as a percentage of income reported



Data as of September 2023

Source: Credit Bureau

1/ Estimate using information from a sample of Credit Bureau files.

2/ "Low-income borrowers" and "high-income borrowers" are considered as those whose income is lower than the median income and greater than median income, respectively.

Consumer credit

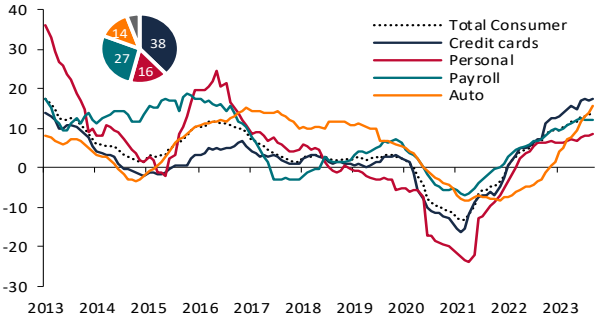
Total consumer financing showed growth in real terms with respect to the previous *Report*; both the portfolio granted by commercial banks and their related sofomes, as well as that of other Non-Bank Financial Intermediaries and department stores, showed notable dynamism.

During the second and third quarters of 2023, consumer credit granted by banks and their subsidiary sofomes continued to the increase; the aggregate balance of the system registered positive annual growth rates in all segments. The growth of the credit card portfolio stands out, explained by a greater use of the lines by borrowers. In addition, the higher growth rate of automotive loans is also noteworthy, a segment which, as of the fourth quarter of 2022, began to increase in real terms (Graph 40).

Graph 40

Consumption portfolio of the banking system [1/]

Real annual change in percent



Data as of September 2023

Source: CNBV

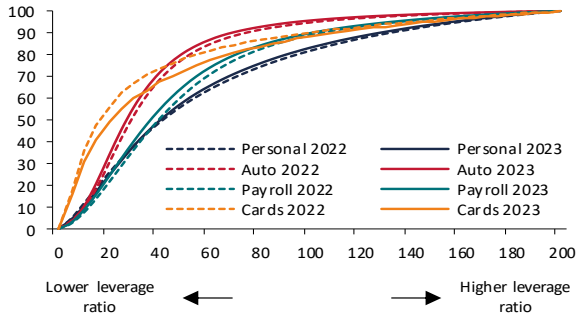
1/ Includes sofomes regulated for having equity links with a bank.

[27] Income is obtained from disaggregated regulatory reports for mortgage and consumer bank loans, provided by the CNBV and Banco de México, respectively. To separate higher-income borrowers from lower-income borrowers, a threshold of 20,000 pesos was used, which approximates the median monthly income of the sampled files.

[28] Balances and leverage were estimated with a panel sample of the total number of files registered in the Credit Bureau that have at least one bank loan, with historical information on all loans contracted by the person associated with the sampled file; the information includes the evolution of their balances and due payments with sample sizes close to 5,000, 5,000, 16,000 and 19,000 observations for loans associated with mortgage, automobile, personal and credit card loans, respectively. Ninety-six percent of bank loans are granted by banks that repurchase from the Credit Bureau.

The financial burden of commercial bank borrowers with consumer credit[29] registered from August 2022 to August 2023 a shift towards lower levels in all segments of the non-revolving portfolio; in the case of credit cards, the financial burden increased during that period (Graph 41).

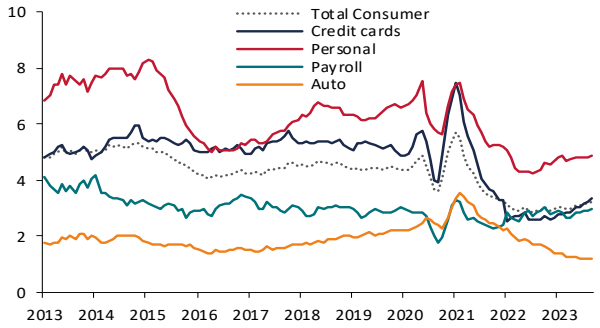
Graph 41
Household leverage ratio by type of consumer bank credit
Vertical axis: Percent of cumulative portfolio
Horizontal axis: Household leverage ratio as a percentage of income reported



Data as of August 2023
Source: Banco de México

The non-performing loan portfolio of commercial banks and their related sofomes continued the upward trend that began in the fourth quarter of 2022, mainly explained by the increase in credit card non-performing ratio levels. Automobile credit is the only one whose non-performing ratio levels continue to decline, mainly due to the increase in its performing loan portfolio (see Graph 42a and Graph 42b).

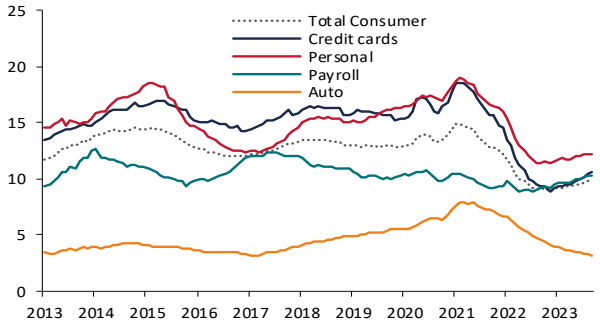
Graph 42
Non-performing loan ratio and adjusted non-performing loan ratio of consumer loan portfolio
a) Non-performing loan ratio
Percent



Data as of September 2023
Source: CNBV

1/ Includes sofomes regulated for having equity links with a bank.

b) Adjusted non-performing loan ratio
Percent



Data as of September 2023
Source: CNBV

1/ Includes sofomes regualted for having equity links with a bank.

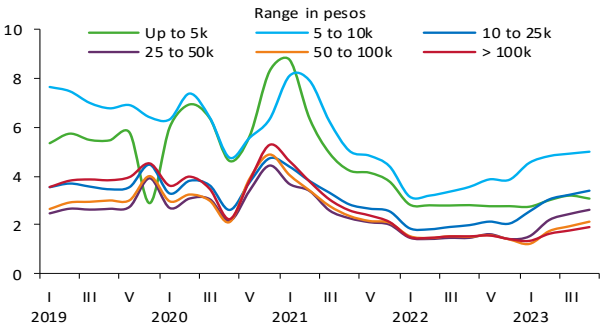
By income level, non-performing loan rates levels of credit cards recorded an increase in the margin for most of the borrowers' income segments. On the other hand, in the case of auto, payroll and personal loans, there was greater growth in non-performing ratio levels for loans granted to individuals with monthly incomes of less than 5,000 thousand pesos and between 10,000 and 25,000 pesos, which represent almost half of this portfolio (see Graph 43a and Graph 43b).

[29] The financial burden is measured as the proportion of income that goes to cover the payment due on all loans that an individual has registered with credit reporting companies. This analysis is performed using the income information available in the regulatory reports for revolving and non-revolving consumer bank loans.

Graph 43
Not-performing loan ratio of consumer loans by income level of the borrower

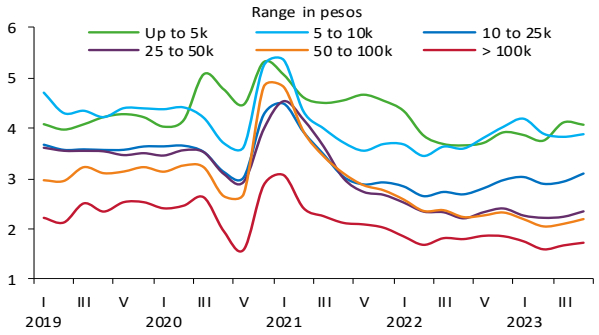
a) credit cards

Percentage



b) other consumer loans

Percentage



Data as of fourth two-month period 2023

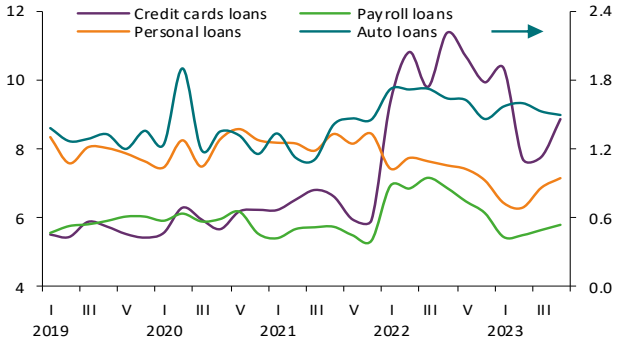
Source: Banco de México

1/ Includes banks loans and linked sofomes loans.

Despite this increase in the margin, the risks associated with this portfolio appear to remain limited, as new consumer loans granted by commercial banks have a low probability of default in relation to the levels observed in 2022. Going forward, it will be important to continue to monitor the possible materialization of higher-than-expected risks in this portfolio (Graph 44).

Graph 44
Probability of default for newly originated consumer loans 1/

Percentage



Data as of fourth two-month period 2023

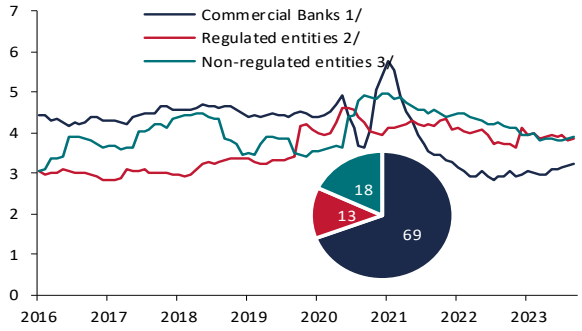
Source: Banco de México

1/ Includes banks loans and linked sofomes loans.

The non-performing ratio levels of the consumer credit portfolio granted by non-banking financial intermediaries and Infonacot increased slightly since the last *Report* (see Graph 45), and it is observed in both regulated and non-regulated sources.

Graph 45
Non-Performing Loan Ratio of Consumer Portfolio

Per cent



Data as of September 2023

Source: Banco de México (SIE), CNBV, BMV and Condusef

1/ Includes the loan portfolio of regulated sofomes having an equity linked with a bank, whether subsidiaries of the latter or not.

2/ Includes the credit portfolios of the development bank and of non-banking regulated financial intermediaries, such as socaps, sofipos and sofomes regulated for issuing debt and the Infonacot.

3/ Includes credit portfolio of non-regulated sofomes, debt-issuing financial companies such as financial leasing companies or financial arms of automotive companies, as well as credit cards granted by listed department stores. The Credit Bureau is the information source of the delinquency ratio for department stores credit cards. The fall observed in June 2018 is due to that a sofom changed from a regulated entity to a regulated entity.

Housing credit

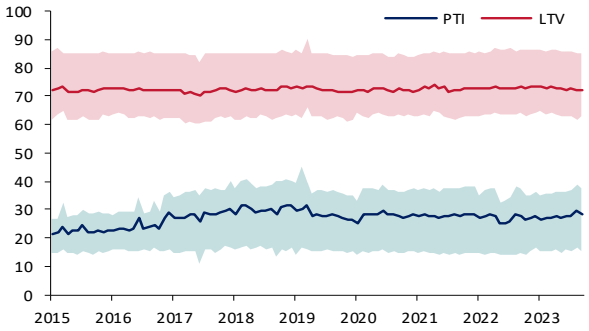
Total housing financing showed moderate growth in real annual terms with respect to that recorded in the previous *Report.* By type of lender, financing granted by commercial banks and their related sofomes grew, while that granted by Infonavit and Fovissste registered a slight contraction in real annual terms, despite the increase in lending in recent months.

As for bank mortgage lending, during the second and third quarters of 2023, the proportion of income going to mortgage payments (PTI) increased, while the ratio of loan amount to property value (LTV) decreased, although both changes were marginal (Graph 46).

Graph 46

Loan-To-Value (LTV) and Payment-To-Income (PTI) of Mortgage Loans [1/, 2/]

Percent



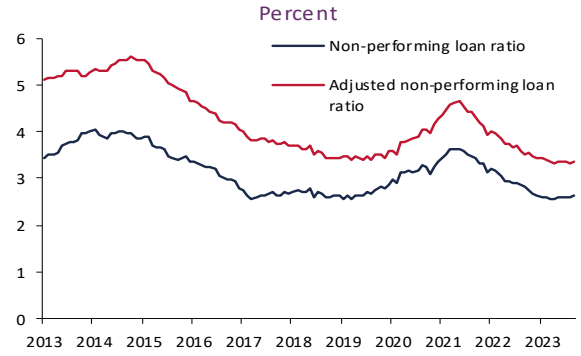
Preliminary data as of September 2022
Source: CNBV
1/ Recently-granted commercial bank mortgage loans.
2/ The shaded area represents the interquantile range of the respective metric.

Bank housing loan portfolio non-performing loan rate has remained at the same levels since May, due to the growth of the performing portfolio, which offset the effect of the growth of the past-due portfolio on the portfolio *IMOR* (Graph 47). Current non-performing loan rates are at historic lows, which are largely explained by the improved default behavior in recent years.

Graph 47

Non-performing loan ratio and adjusted non-performing loan ratio on bank mortgage loans [1/]

Percent



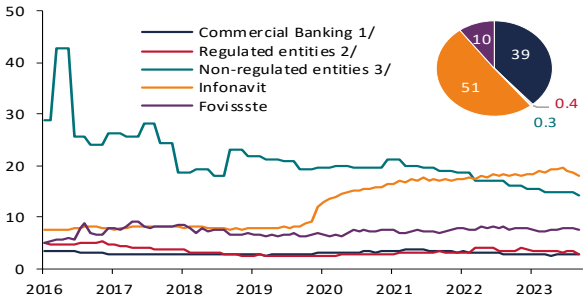
Data as of September 2023
Source: CNBV
1/ Total commercial bank mortgage loans.

Infonavit's nonperforming loan rate (IMOR, its acronym in Spanish) was 18.0% at the end of September, a lower data than that reported since the last *Report*. This, after reaching 19.4% in June, its highest level since records began in 2007.[30] The drop in the indicator was due to a reduction in the past-due portfolio, mainly that under the special amortization regime denominated at times the minimum wage, as well as an increase in the outstanding portfolio of peso-denominated loans. On the one hand, Fovissste's IMOR increased to 7.6% in the same period due to a greater increase in the past-due portfolio in relation to that recorded in the performing portfolio (see Graph 48).[31]

[30] In December 2019, the National Fund for Workers' Housing (Infonavit, for its acronym in Spanish) made a reclassification of loans from performing to past-due portfolio that raised the *IMOR* level permanently and without such correction having been made for prior dates. Thus, the *IMOR* levels that would be consistent with this classification for the period prior to December 2019 are not known.

[31] Between March and June 2023, the past-due portfolio balance decreased. The decreases were due to loan segregation, application of foreclosures and liquidation through self-insurance; however, there were increases in the balance due to transfers from the performing loan portfolio and loan recoveries from CEDEVIS, which almost tripled.

Graph 48
Non-Performing Loan Ratio of Mortgage Portfolio
Per cent

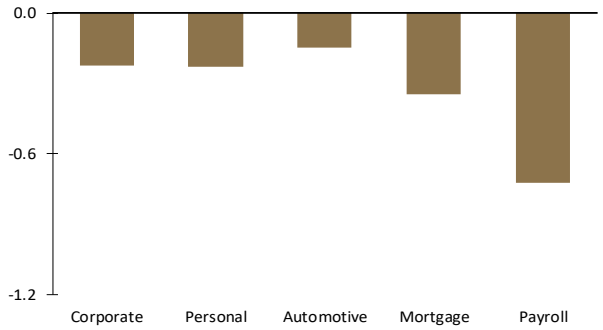


Data as of September 2023
Source: Banco de México (SIE), CNBV, BMV and Condusef
1/ Includes the loan portfolio of regulated sofomes having an equity linked with a bank, whether subsidiaries of the latter or not.
2/ Includes the credit portfolios of the development bank and of non-banking regulated financial intermediaries, such socaps, sofipos and sofomes regulated for issuing debt.
3/ Includes credit portfolio of non-regulated sofomes.

Breakdown of change in non-performing ratio levels and gender

Women generally face more obstacles to accessing credit than men. Therefore, those women who manage to overcome these obstacles tend to have a stronger credit profile. Thus, in Mexico, as in other parts of the world, women have less credit defaults than men for loans with similar financing characteristics (Graph 49).

Graph 49
Difference between the delinquency rate of women and men according to the credit portfolio
Percentage points

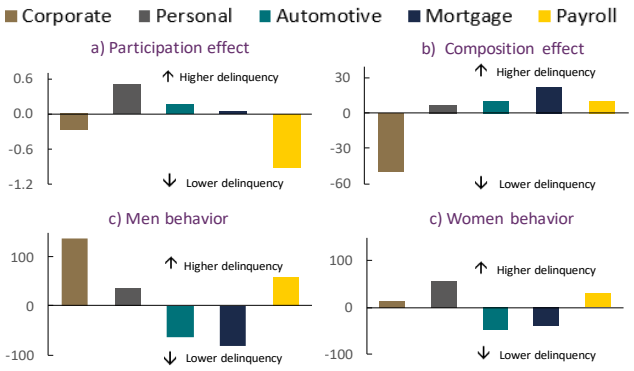


Source: Banco de Mexico
Note: June 2022 information

The annual changes in non-performing ratio levels are broken down into three parts: 1) greater participation of women in credit. Women have less credit defaults than men, so their greater participation in a loan portfolio puts downwards pressure on delinquency (participation effect); 2) changes in women's and men's non-performing loan rate over time, keeping women's participation fixed at its initial level (behavioral effect); and 3) changes in financing conditions that affect delinquency, regardless of the borrower's gender (composition effect).

Participation of women decreased in personal, auto, and mortgage loans, which put upward pressure on the non-performing ratio levels of these portfolios through the *participation effect* (a). In contrast, women's participation increased and put downward pressure on non-performing ratio levels through the same effect in the corporate portfolio.[32] In the payroll portfolio, the higher participation of women also put downward pressure on non-performing ratio levels and, given that in this portfolio women present notably fewer defaults than men, such downward pressure was more important.[33] Thus, the female *participation effect* lowered non-performing ratio levels in fewer portfolios than in the previous *Report.* These results suggest that there is more room for greater female participation in lending to contribute to lower default rates.

Graph 50
Change in credit delinquency distinguishing between men and women
Percentage



Source: Banco de Mexico
Note: Difference in delinquency index (IMOR) between June 2023 and June 2022. Negative values imply downward pressure on delinquency.

[32] For the portfolio to companies, only the gender of the loan applicant can be distinguished in the case of individuals with business activity.

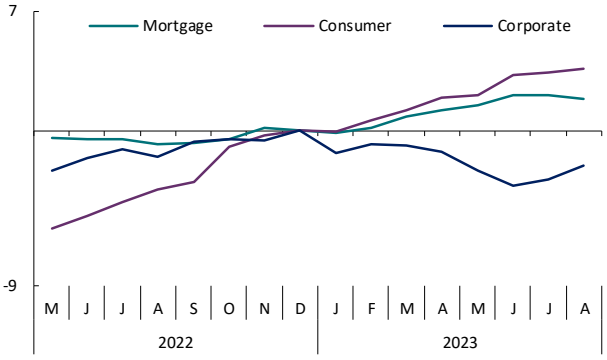
[33] Only the loan portfolio to companies is considered, since it is the one in which borrowers can be identified.

The *behavioral effect* increased the non-performing ratio levels in corporate, payroll, and personal portfolios, as women and men increased their default in these portfolios (Graph 50c). This increase was more significant for men in business loans, reflecting, in part: (a) the increase in the default of small and medium-sized companies in the segment of individuals with business activity; and (b) the fact that men have a greater share in this segment. In addition, the *composition effect*, related to changes in financing conditions, increased non-performing ratio levels in all portfolios except corporate. In this portfolio, the increase in the term of loans reduced non-performing ratio levels (Graph 50b).

Consumer credit, wage bill and financial stability

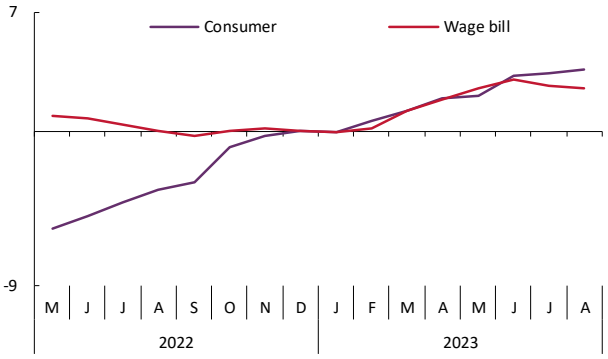
After stagnation for a few months, consumer credit growth accelerated in early 2023, increasing more than business and mortgage credit (Graph 51). This occurred in synchrony with a significant expansion of the wage bill (Graph 52).[34] This indicates that the capacity of borrowers to meet their consumer credit obligations may have increased and reduced risks for financial institutions.

Graph 51
Growth of credit portfolios
Annual percentage growth (December 2022=0%)



Data as of August 2023
Source: Banco de Mexico and INEGI

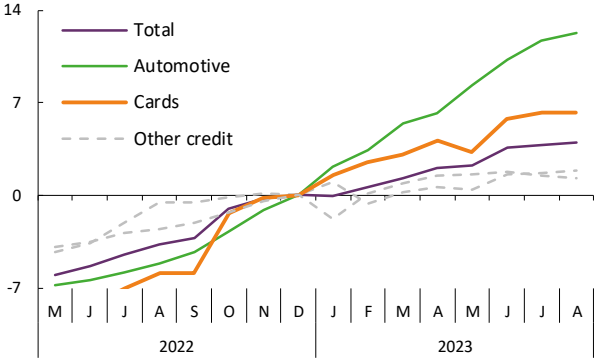
Graph 52
Growth in consumer credit and the wage bill
Annual percentage growth (December 2022=0%)



Data as of August 2023
Source: Banco de Mexico, INEGI and IMSS

In the same sense, in the interior of the Republic, the acceleration of consumer credit is largely explained by the growth of two portfolios: credit cards and automobiles (Graph 53). In addition, the regions with the highest growth in consumer credit are those that also exhibited the greatest expansion of the wage bill. Therefore, wage bill growth may be a credit risk mitigation factor. This could be more important in the case of the automotive portfolio because the labor market performed better in regions where automotive credit grew more than in those where credit card credit grew more (see Graph 54).

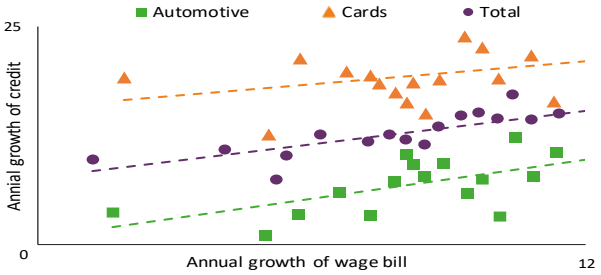
Graph 53
Growth of consumer credit portfolios
Annual percentage growth (December 2022=0%)



Data as of August 2023
Source: Banco de México and INEGI

[34] Wage mass of formal workers.

Graph 54
Wage bill and growth of consumer credit
Annual percentage growth (December 2022=0%)

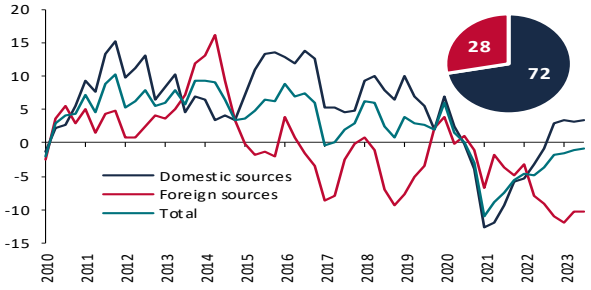


Data as of August 2023
Source: Banco de Mexico, IMSS and INEGI

IV.2.2. Private non-financial companies

Total financing to the country's private non-financial companies decreased slightly in real terms with respect to the previous *Report*, although the rate of contraction declined. By type of source, the external component now shows twelve consecutive quarters of contraction and is explained by both lower foreign bank credit and lower international debt issuance by companies. On the other hand, domestic financing registered positive growth in its three sources: banking, non-bank and debt issuance (Graph 55).

Graph 55
Total financing to private non-financial companies 1/
Real annual percentage change



Data as of September 2023

Source: Banco de México, BMV and SHCP

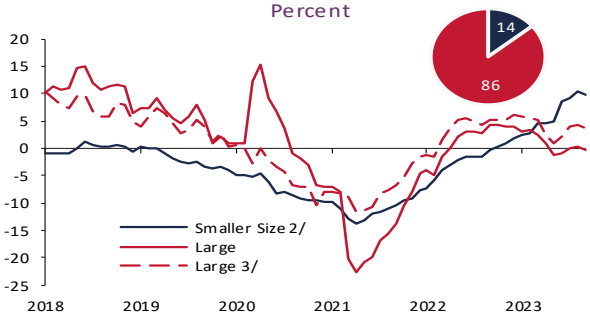
Note: The percentages shown here consider the figures relating to non-regulated entities that grant financing and that are included at the bottom of Table 2 (Memo); therefore, the differ from those registered in the upper part of the same table. In addition, figures exclude non-regulated entities for which data stock echange is not available as they are in debt restructuring or liquidation processes.

1/ Includes the loan portfolio of commercial banks and regulated non-bank entities such as regulated sofomes, socaps, sofipos and credit unions, ase well as non-bank non-regulated entities such as non-regulated sofomes and debt-issuing financial companies such as financial leasing companies or financial arms of automotive companies. Includes also debt securities issued both domestically and abroad. Also includes financing from suppliers for listed companies. The growth series is adjusted to take into account the start of availability of financing figures for non-regulated entities (2015-2016). The external financing figures are adjusted for FX effects.

In addition, although the cost of issuing international debt remains high and has possibly limited companies' access to this type of financing, the current maturity profile provides some leeway, as few companies face international debt maturities in the next two years.

The country's banks are the main providers of financing to companies. During the period covered by this *Report*, the bank loan portfolio grew at a slower rate than in the three previous quarters, explained by the trend in the portfolio of large companies; in the case of smaller companies, growth continued (Graph 56).

Graph 56
Real annual portfolio growth by company size 1/
Percent



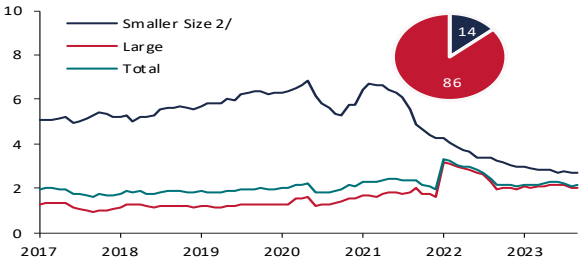
Data as of September 2023
Source: CNBV
1/ The pie chart shows the total percentage of the portfolio of each segment.
2/ Private-non-financial companies not listed on the Mexican Stock Exchange with maximum historical loans less than 100 million Mexican pesos.
3/ Large companies excluding those that had a monthly increase in their balances of greater than 15% in March 2020.

The non-performing ratio of the portfolio granted by commercial banks to companies remained at the same levels during the second and third quarters of 2023, explained by the behavior of the non-performing ratio levels of large companies (see Graph 57); however, the non-performing ratio levels of smaller companies continued to decrease, although at a slower pace, mainly due to the increase in their performing portfolio. It should be noted that the largest increases in non-performing ratio levels were recorded for borrowers in the real estate and media sectors.

Graph 57

Non-performing loan ratio by company size[1/]

Percent



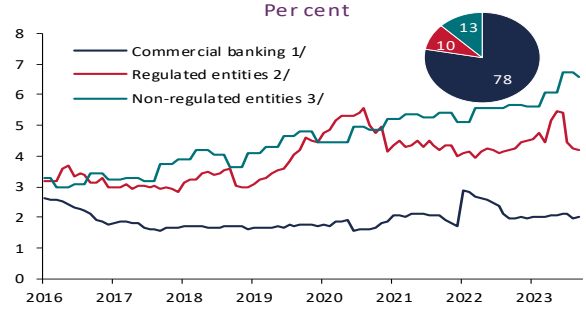
Data as of September 2023
Source: CNBV
1/ The pie chart shows the total percentage of the portfolio for each segment.
2/ Private-non-financial companies not listed on the Mexican Stock Exchange with maximum historical loans less than 100 million Mexican pesos.

The non-performing ratio levels of the credit portfolio to companies granted by non-banking financial intermediaries increased with respect to those recorded in the previous *Report*. In particular, the increase was recorded for non-regulated sofomes and, as of June, their non-performing ratio levels reached the highest level since records began to be kept, although in September this fell slightly (Graph 58).

Graph 58

Non-Performing Ratio of Corporate Loans Portfolio

Per cent



Data as of September 2023
Source: Banco de México (SIE), CNBV, BMV and Condusef
1/ Includes the credit portfolios granted by regulated sofomes for having an equity linked with a bank, whether subsidiaries of the latter or not.

2/ Includes the credit potfolios of non-banking regulated financial intermediaries, such as socaps, sofipos, credit unions, sofomes regulated for issuing debt, bond warehouses, development public trusts (FIRA, FOVI, FIFOMI) and government agencies (FND).

3/ Includes credit portfolio of non-regulated sofomes and debt-issuing financial companies, such as financial leasing companies or financial arms of automotive companies.

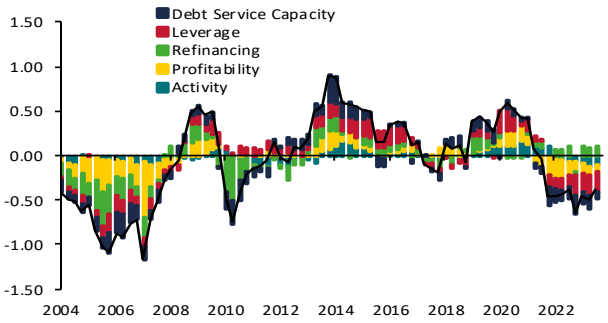
Listed private non-financial companies[35]

The Vulnerability Index of Listed Companies (IVEL) increased with respect to that observed in the previous *Report*; however, it remains below its historical mean. [36] The increase with respect to the last six months is mainly explained by a deterioration in the indicators associated with in-debt service capacity.

Graph 59

Vulnerability Index for Listed Firms [1/]

No units



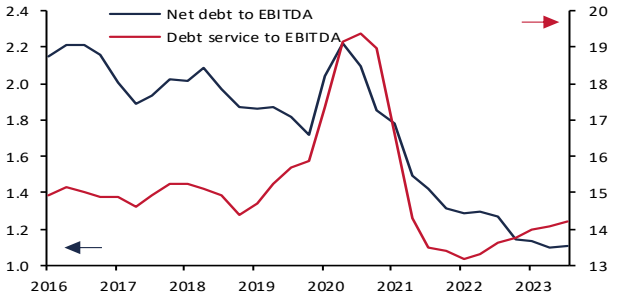
Data as of the third quarter of 2023
Source: Own calculations with data from Bloomberg.
1/ For a description of the methodology, see Box 2: Vulnerability Index for Listed Firms, Financial Stability Report June 2023.

In September, the annual operating cash flow generation (*UAFIDA*, its acronym in Spanish) of listed private non-financial companies decreased with respect to the last *Report* (data as of March) and it is observed in all economic sectors. On the other hand, although the debt balance of the listed companies and the indebtedness indicator decreased during the period analyzed, the in-debt-service cost indicator for interest payments increased slightly (see Graph 60). This occurred despite the fact that they have a debt structure that is not very sensitive to increases in interest rates: most of their debt is at fixed rates. In addition, the use of cash for debt repayment and investment spending decreased, while there was a greater accumulation of cash by the companies.

[35] Includes information on companies in the BMV and BIVA.

[36] A higher index value reflects greater vulnerability of the companies as a whole. For more detail on how this indicator was constructed, see Box 2 of the June 2023 Financial Stability Report.

Graph 60
Listed private non-financial companies' indebtedness and debt service [1/]
Left axis: times EBITDA
Right axis: percent of EBITDA



Data as of September 2023
Source: BMV and BIVA
1/ EBITDA refers to earnings before interest, taxes, depreciation and amortization.

Given the current level of tight international financial conditions, these companies may find their risk appetite and access to international markets limited. However, listed non-financial companies with international debt maturities in the next twelve months are few; their international debt represented only 5% of their total financial debt, without suppliers.[37] On the one hand, the country's banking exposure to listed private non-financial companies with some vulnerability remains low relative to net bank capital.

[37] It comprises eight of 98 listed companies.

Box 3: Analysis of the determinants of the capital structure of listed non-financial Mexican companies

I. Introduction

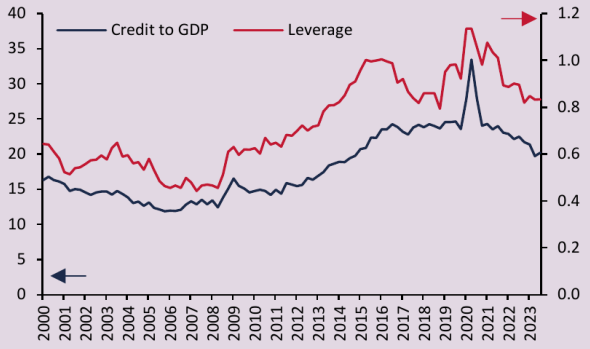
The literature shows evidence that high levels of leverage[1] of non-financial firms precede downturns in economic activity or situations of financial stress.[2] In particular, a high level of leverage increases the risk of default on the debt of non-financial companies, which generates losses for creditors, which may include financial institutions, and represents a vulnerability for the financial system due to the potential for contagion to other institutions that may cause a disruption in the functioning of the financial system. Therefore, from a financial stability point of view, it is relevant to identify and understand the factors that determine the leverage of Mexican non-financial companies listed on the stock exchange.

The Graph 1 shows financing to non-financial companies and leverage of listed companies in Mexico. Although these indicators are at lower levels compared to other economies.[3] During the period from 2008 to 2020, both increased in Mexico. The increase in the level of indebtedness observed in 2020 is partly explained by the fact that companies intensified the use of their credit lines for precautionary reasons, although indebtedness has decreased in the last two years.

Graph 1

Credit to non-financial Mexican firms and leverage of non-financial Mexican listed firms 1/

Per cent (left)|Times (right)



Data as of September 2023

Source: Banco de México, BMV and BIVA

1/ Leverage is defined as total debt to book equity.

The objective of this *Box* is to identify the determinants of leverage in Mexican non-financial listed companies by contrasting two corporate finance theories that provide a different explanation for heterogeneity in the capital structure of firms.[4] There is a large literature that seeks to answer the same question based on these two theories with mixed results on the importance of the determinants of capital structure; however, most have focused exclusively on firms in advanced economies.[5] In particular, having a smaller capital market compared to advanced countries, the determinants of leverage of firms in Mexico could be different from those of firms in those economies.

II. Theoretical framework

In a capital market, in the absence of frictions, the cost of capital and the value of a firm are not affected by the composition of the firm's capital structure (Miller and Modigliani, 1958). Under this assumption, changes in a firm's leverage neither create nor destroy value, but only transfer risk between agents. However, because frictions exist, heterogeneity in costs and capital structure between firms can occur. Therefore, other theories have been proposed to explain why there is variability in leverage. Among the most prominent are the Relative *Trade-off* theory and the *Pecking-order* theory.[6]

Trade-off theory postulates that companies receive a tax benefit from incurring debt because it is tax deductible, whereas issuing equity is not. There is also a benefit of debt when it reduces agency costs by disciplining managers. These benefits are offset by the bankruptcy costs that arise when a firm is highly leveraged.[7] Under this theory, firms choose the optimal level of leverage by considering the costs and benefits of debt.

Pecking-order theory addresses the problems of information asymmetry. It postulates that a firm's manager has incentives to issue shares when he knows that the share price is overvalued. In equilibrium, the cost of financing increases with information asymmetry and the firm chooses, in order of preference, first, financing from internal sources; second, debt; and finally, equity.

III. Methodology and data

We use quarterly data, available from Bloomberg, and obtain an unbalanced panel of 115 listed companies over the period 2001 to 2023.[8] The following econometric model is estimated:

$$y_{it} = \beta_0 + \beta_1' X_{it} + \alpha_i + \alpha_t + \varepsilon_{it},$$

where y_{it} is the company's total debt to stockholders' equity ratio for the quarter i in the quarter t; X_{it} is a vector of variables

[1] Leverage is defined as total debt divided by stockholders' equity.
[2] See IMF (2021), Schularick and Taylor (2012) and Dell'Ariccia et al. (2012).
[3] In emerging and advanced economies, both financing to non-financial companies as a percentage of GDP, as well as the leverage of companies included in global stock indexes, are higher than in Mexico, according to data from the Institute of International Finance and Bloomberg.
[4] Capital structure refers to the combination of debt and equity that a company uses as sources of financing to fund its investments and other assets (OECD, 2000).
[5] See Frank and Goyal (2009) and Kumar et al. (2017).
[6] See Miller and Modigliani (1958), Fischer et al. (1989), Leland (1994), and Myers and Majluf (1984). Berk and DeMarzo (2017) describe capital structure theories.
[7] Bankruptcy or financial fragility costs include direct costs associated with the bankruptcy process, such as the hiring of lawyers and financial restructuring experts. They also include indirect costs such as the loss of customers, suppliers and employees.
[8] To eliminate outliers, observations that are more than 5 standard deviations away from each variable are eliminated and the 1% *winsorizing* technique is used, whereby data above the 99th percentile and below the 1st percentile are set to the 99th and 1st percentile value, respectively.

specific to the firm's financial situation, commonly used in the literature (Frank and Goyal, 2009). In some specifications, firm fixed effects are included, α_i and time fixed effects are included in some specifications, α_t. In Table 1 presents the variables used in the model and their expected relationship with leverage according to the *trade-off* and *pecking-order* theories.

Table 1
Variables and expected relationship with leverage 1/

Variable	Expected sign according to *trade-off* theory		Expected sign according to the *Pecking-order* theory	
Tangible assets / Assets	+	Tangible assets are easier to value, which reduces the costs of financial fragility.	-	Tangible assets reduce information asymmetry, which makes the issuance of capital cheaper.
Effective tax rate	+	A high tax rate increases the tax benefit.	+ -	Undetermined
Annual sales growth	-	Growing companies are more difficult to value, which increases the costs of financial fragility.	+	Growing companies invest more, so they need more external financing.
Logarithm of assets	+	Large, well-known companies have a lower risk of bankruptcy and lower costs of financial fragility.	-	Large companies have less information asymmetry and have greater possibilities of financing from internal sources.
UAFIDA / Assets	+	A high yield decreases the risk of bankruptcy and increases the tax benefit of the debt.	-	High profitability increases the resources available for internal financing.

1/ Based on Frank and Goyal (2009).

IV. Results

Table 2 presents the results of the estimation of the regressions. Column 1 shows the results of estimating a model with no fixed effects, in which the variation in leverage across firms and over time is used to identify the most important determinants of leverage. Column 2 shows the results of estimating a model with time fixed effects to control for changes in leverage over time that are common to all firms, so the focus is on explaining variations in leverage across firms. The third column shows the results of a model incorporating firm fixed effects, in which the effect of firm-level heterogeneity is controlled for.

Table 2
Results of the estimation of the regression explaining the debt-to-equity ratio 1/

	Model 1	Model 2	Model 3
Tangible assets / Assets	-0.035 (0.850)	0.165 (0.498)	0.229 (0.349)
Effective tax rate	0.506*** (0.001)	0.492*** (0.001)	0.266*** (0.002)
Annual sales growth	-0.062 (0.644)	-0.019 (0.889)	0.119 (0.172)
Logarithm of assets	0.091** (0.015)	0.091** (0.017)	0.198 (0.357)
EBITDA / Assets	-0.618 (0.444)	-0.498 (0.623)	-1.529** (0.013)
Time fixed effects	No	Yes	Yes
Unit fixed effects	No	No	Yes
Remarks	5,947	5,947	5,947
R-squared 2/	0.050	0.072	0.104

Source: Own elaboration with Bloomberg data
1/***, **, * denotes statistical significance at 1%, 5% and 10%, respectively. Standard errors clustered at the firm level.
2/The R-squared in column 3 refers to the fraction of within-firm variance explained by the model.

The results show that a higher effective tax rate and a larger firm size, measured by the natural logarithm of assets, are associated with higher leverage. That is, both variables show a positive relationship with leverage, supporting the paradigm proposed by the *trade-off* theory. The first, because a higher tax rate increases the benefit of the tax deduction.[9] The second, because large firms tend to have a lower risk of bankruptcy and tend to be more consolidated in their operation, so the costs of financial fragility are lower. When time and firm fixed effects are introduced, it is observed that profitability, as measured by UAFIDA over assets, has a negative relationship with leverage, which is consistent with the *Pecking order* theory. This is because profitable firms have greater resources to finance themselves internally and do not need to resort to debt issuance.

Table 3 presents the contribution of each variable to the variance explained by the model, based on the Shapley decomposition described in Huettner and Sunder (2012). It is observed that the effective tax rate is the variable that contributes the most to the goodness of fit. While profitability is not useful to explain the heterogeneity of leverage across firms (Model 2), it has a relevant contribution to explain within-firm leverage (Model 3).

[9] Although companies face the same income tax rate, there is heterogeneity in their effective rates, mainly because they make different deductions.

Table 3
Goodness-of-fit decomposition [1/]

	Model 1	Model 2	Model 3
Tangible assets / Assets	0.5%	0.7%	0.1%
Effective tax rate	56.0%	65.7%	67.0%
Annual sales growth	1.2%	1.1%	3.0%
Logarithm of assets	39.1%	32.2%	15.2%
EBITDA / Assets	3.1%	0.2%	14.7%
Time fixed effects	No	Yes	Yes
Unit fixed effects	No	No	Yes

Source: Own elaboration with data from Bloomberg.
1/ Shapley decomposition based on Huettner and Sunder (2012). Figures are expressed as a percentage and represent the contribution of each regressor to the variance explained by the model. For columns 2 and 3 the decomposition is performed on the variance not explained by the fixed effects.

V. Final considerations

Given the importance of leverage of non-financial firms for financial stability, this *Box* documents and identifies which are the most important determinants of the capital structure of firms listed on Mexican stock exchanges. The results suggest that effective tax rate and firm size have a positive relationship with leverage, while profitability exhibits a negative relationship with leverage.

These results are useful for understanding the potential impact of various events on firms' leverage and, therefore, on financial stability. For example, a lower cash flow generation of companies could imply higher indebtedness, as anticipated by the *Pecking-order* theory. For its part, the proposed reform of the Securities Market Law (recently approved by Congress) seeks to increase access to the domestic capital market for smaller companies, which could reduce leverage in line with the *trade-off* theory.

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IV.2.3. Public sector

IV.2.3.1. Federal government

From January to September 2023, the public balance showed a lower deficit than projected in the 2023 Economic Package. Within this balance, both budgetary income and budgetary expense were lower than those programmed in the Federal Income Law (*LIF*, its acronym in Spanish) and the 2023 Federal Expenditure Budget (*PEF*, its acronym in Spanish), respectively. Thus, the Public Sector Borrowing Requirements (*RFSP*, its acronym in Spanish) registered a deficit of 813.6 billion pesos and the Historical Balance of Public Sector Borrowing Requirements (*SHRFSP*, its acronym in Spanish) stood at 14.5 trillion pesos (45.4% of annual GDP). [38,39]

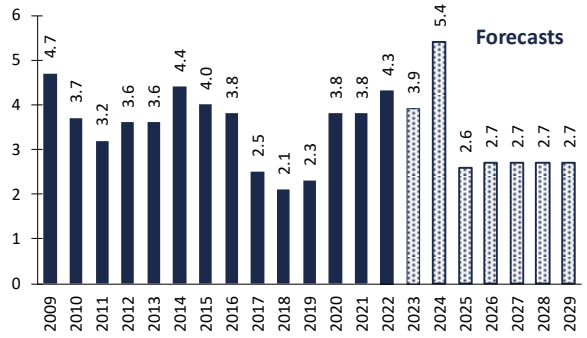
The Federal Government anticipates a public balance deficit of 3.3% of GDP by the end of 2023. To achieve this, it expects budgetary income in 2023 to be 185.1 billion pesos lower than that projected in the 2023 *LIF* by 185.1 billion pesos and budgetary expense in 2023 to be 271.2 billion pesos lower than that established in the 2023 *PEF* by 271.2 billion pesos. Thus, it is estimated that the RFSP will represent 3.9% of GDP and

[38] For 2023, the percentage of annual GDP is the SHCP estimate.

[39] At the end of October, the public sector balance was -674.8 billion pesos. Budgetary income was Ps. 5,780.7 billion and total net expense was Ps. 6,480.4 billion. On the one hand, RFSP was -859.9 billion pesos, while SHRFSP was 14,651.8 billion pesos. See "Información de Finanzas Públicas y Deuda Pública, Enero - Octubre de 2022" published by SHCP.

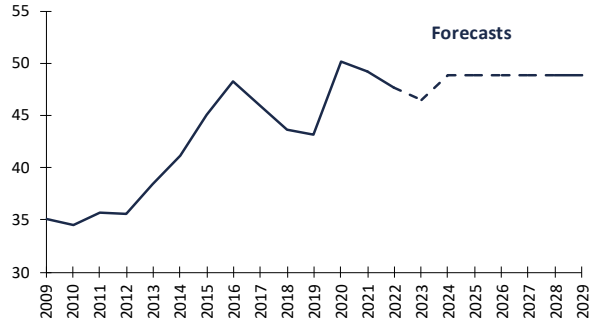
that the SHRFSP will be 46.5% of GDP (Graph 61 and Graph 62).

Graph 61
Public Sector Financial Requirements 1/
Percent of GDP



Data as of September 2023
Source: SHCP
1/ Corresponds to the RFSP without a Banco de México operating surplus. The data observed for 2009-2022 and the estimates for 2023-2029 is taken from the General Economic Policy Criteria 2024.

Graph 62
Public Sector Financial Requirements Historical Balance 1/
Percent of GDP



Data as of September 2023
Source: SHCP
1/ Corresponds to the RFSP historical balance without a Banco de Mexico operating surplus. The data observed for 2009-2022 and the estimates for 2023-2029 is taken from the General Economic Policy Criteria 2024.

A public balance deficit of 4.9% of GDP is anticipated for 2024, with Budgetary income of 135.7 billion pesos less than expected in the 2023 *LIF* and Budgetary expense of 368.8 billion pesos higher than that established in the 2023 *PEF*. Thus, the RFSP and SHRFSP are estimated at 5.4% and 48.8% of GDP.

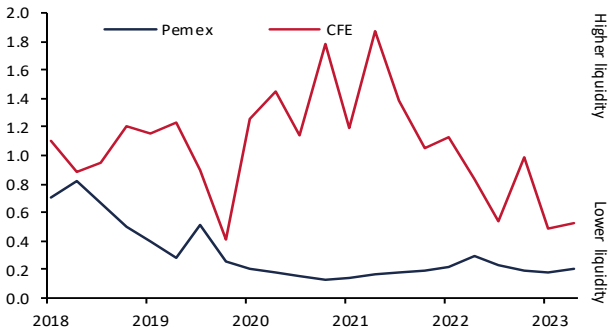
IV.2.3.2. State-owned companies

Petróleos Mexicanos (Pemex)

At the end of September 2023, Pemex recorded a quarterly net loss compared to the net earnings observed in the previous two quarters. On a cumulative 12-month basis, the loss was greater than that recorded since the last *Report*. Although the cost of sales and expenses for taxes and duties decreased, the proportion of reduction in revenues was higher. This is explained by lower domestic and foreign sales, even though the company's production volume increased; lower international crude oil and derivative prices; as well as a foreign exchange loss due to the depreciation of the peso against the dollar in the third quarter.

The peso balance of Pemex's total debt as of September, which includes suppliers, decreased slightly with respect to the previous *Report*, partly due to the appreciation of the exchange rate at the end of the quarter. In addition, the company's short-term debt increased due to higher liabilities with suppliers and banks. As a result of the above, the liquidity indicator decreased, as both peso and dollar credit lines were fully drawn down (Graph 63).

Graph 63
Liquidity position of Pemex and CFE 1/
Times



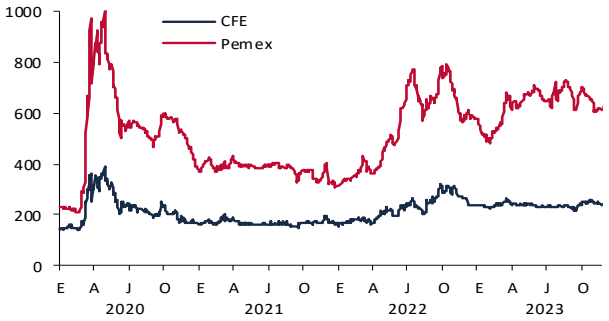
Data as of September 2023
Source: BMV.
1/ It is defined as the result of dividing cash and short-term accounts receivable by the sum of 12-month liabilities with suppliers and 12-month financial debt.

Additionally, Pemex's five-year CDS increased with respect to the previous quarter, following operational incidents and two actions by rating agencies in mid-July. However, from the beginning of October onwards it decreased, showing some stability at the end of November (Graph 64).

Graph 64

USD 5-year Credit Default Swap of Pemex and CFE

Basis points



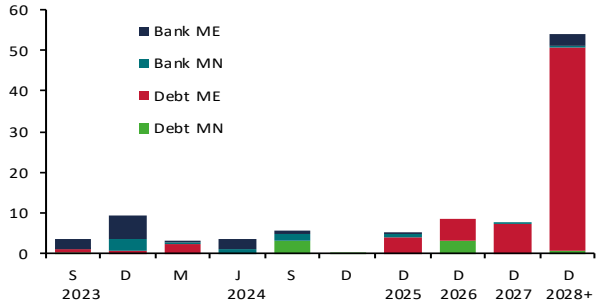
Data as of November 29, 2023

Source: Markit

Graph 65

Pemex debt maturities[1/], sep-23

Percent of the total debt



Data as of September 2023

Source: BMV

1/ Debt maturities reported prior to the third quarter of 2023 (2.3% of total debt) are included in the third quarter of 2023.

At the beginning of July, Pemex received a capitalization from the Federal Government of approximately 85 billion pesos. Subsequently, at the end of October, Pemex received a further contribution of 55.9 billion pesos.[40] As of September 2023, the company's debt maturities for the next twelve months represented 25% of its non-supplier debt, of which 29% corresponds to local and foreign stock debt (Graph 65).

The risks of direct exposure of commercial banks to Pemex remain limited, in September 2023 representing around 12% of the net capital of these credit institutions. In particular, between March and September of this year, Pemex registered a lower use of its financing capacity with commercial banks, in turn increasing its level of indebtedness with development banks.

Federal Electricity Commission (CFE)

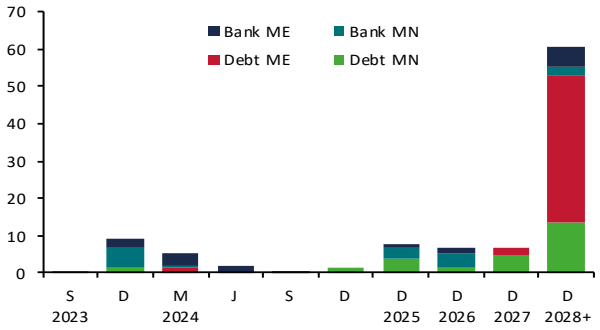
At the end of September 2023, CFE recorded a quarterly net loss, although it narrowed compared to the same quarter of the previous year. The lower loss is explained by higher revenues from energy sales, given an increase in electricity demand, as well as a reduction in operating costs, investment expenses, tax payments, and financial expenses.

The peso balance of the company's debt as of September decreased with respect to the previous *Report*, mainly due to lower liabilities from financial leases with domestic banks and the international debt issued. In addition, the company's short-term debt decreased slightly due to lower short-term bank and stock market liabilities, which offset the increase in liabilities with suppliers. Due to the above and to the increase in cash and cash equivalents reserves, the liquidity indicator improved. The debt maturities that the company will face in the next twelve months represented 17% of its debt with suppliers as of September (Graph 66). Finally, the company carried out a liabilities management operation in the international market at the end of September.[41]

[40] See the Quarterly Report as of the third quarter of 2023.

[41] See the presentation to investors of results as of the third quarter of 2023, page 14.

Graph 66
CFE debt maturities[1/], sep-23
Percent of the total debt



Data as of september 2023
Source: BMV

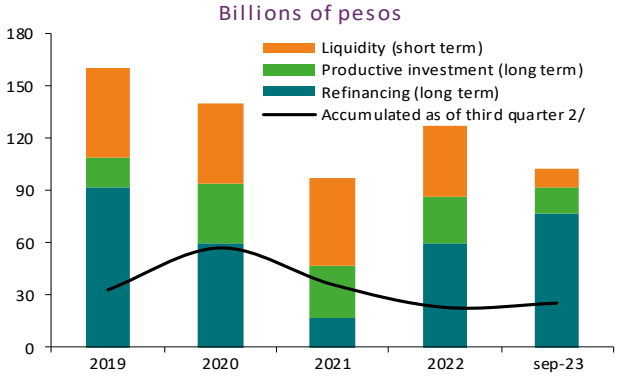
1/ Debt maturities reported prior to the third quarter of 2023 (0.01% of total debt) are included in the third quarter of 2023.

In September 2023, commercial banks' exposure to CFE was lower than in March, representing 4% of their net capital. Finally, at the end of the third quarter, CFE's five-year CDS increased with respect to the end of the previous quarter, while from September to November it remained stable (Graph 64).

IV.2.3.3. States

Bank financing to state governments, both short and long-term, registered a lower dynamism during the third quarter of 2023. Nevertheless, during the period there was an increase in the contracting of loans to refinance long-term obligations (Graph 67).

Graph 67
Loans granted to state governments [1/]
Billions of pesos



Data as of September 2023

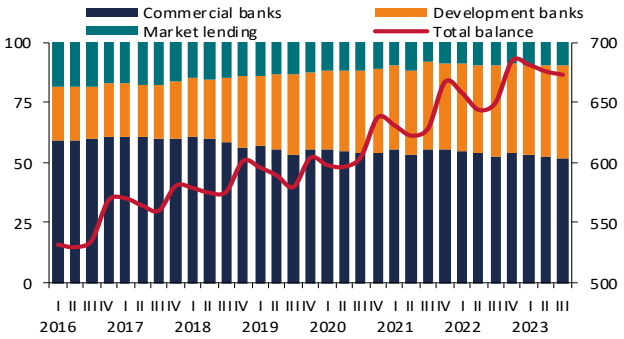
Source: Prepared from state government released information.

1/ Posted information as of november 30th 2023 by state governments.

2/ Accumulated as of third quarter per year considering liquidity and productive investment loans.

Although commercial banks are the main creditors of sub-national governments (slightly more than half of total financing), development banks continued to increase their participation in the financing of these governments, according to data as of September 2023 (see Graph 68).

Graph 68
Subnational government financing
Right axis: Billions of pesos
Left axis: Percentage



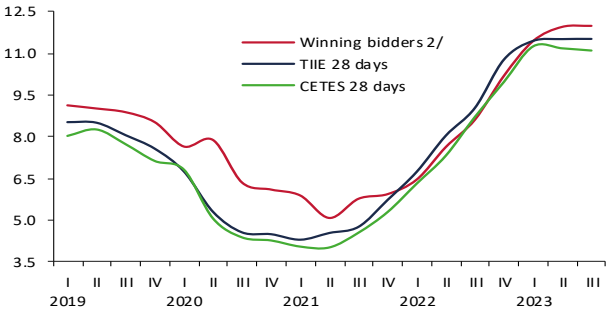
Data as of third quarter 2023
Source: SHCP

State governments recorded relatively favorable conditions for contracting bank financing in the third quarter of 2023, as a result of the competitive scheme for contracting financing.[42] Nevertheless, compared to the first quarter of 2023, the interest

[42] The Financial Discipline Law of the Federal Entities and Municipalities establishes that, for the sustainable management of public finances, the states must carry out competitive processes for the bidding of public debt and once the related legal instruments have been executed, the public entity must publish the results of such instruments. on its official website.

rate for contracting loans registered a marginal increase with respect to the 28-day TIIE (Graph 69).

Graph 69
Weighted average interest rate on offers of bank loans to state governments [1/]
Percentage



Data as of third quarter 2023

Source: Prepared from state government released information.

1/ The Federal Entities and Municipalities Financial Discipline Law establishes that, for the sustainable management of public finances, federal entities must conduct competitive processes for public debt bidding and, once the related legal instruments have been executed, the public entity must post the results of such instruments on its official website.
2/ Posted information as of November 30th 2023 by state governments.

In most of their assessments between April and September 2023, the rating agencies observed an improvement in the perceived credit risk of sub-national governments. Thus, nine state governments recorded a relative improvement in their ratings.[43] Regarding municipal governments, the rating agencies reviewed the credit ratings of twenty-five municipalities with improvement, six reviews were with deterioration and one municipality continues with the lowest rating.

Debt maturity risks and potential revenue pressures for sub-national governments remain contained for 2023. In this regard, the SHCP's alert system, which consists of three indicators that reflect different aspects of debt sustainability, has remained stable for most state governments in recent quarters.[44] According to this alert system, only one state government recorded a level of indebtedness under observation as of the third quarter of 2023 (Figure 1a).

On the one hand, twenty municipal governments exhibited levels of indebtedness under observation and two municipalities high indebtedness as of the first half of 2023 (Figure 1b).

In sum, the debt levels of state and municipal governments remain in sustainable conditions according to these indicators.

Figure 1
Subnational government debt sustainability [1/]
a) State governments, quarterly information [2/]



[43] The Government of the State of Durango was one of the state governments that improved. In this regard, said Government registered a credit event in October 2021, related to its short-term debt. Against this backdrop, the adjustment in its rating reflects the regularization in the corresponding payments of said debt, although the change in rating is limited due to the fact that the State assumed discounted obligations, which are in default, of three decentralized state agencies and a public university of said entity. For further details, see Fitch's press release dated July 17, 2023: "Fitch Ratified at 'RD(mex)' the Rating of the State of Durango" (fitchratings.com).

[44] The indicators considered in the alert system are: i) debt and obligations over unrestricted revenues; ii) debt service and obligations over unrestricted revenues; and iii) short-term obligations, suppliers and contractors minus cash, banks, and temporary investments over total revenues. Details of the methodology are available for consultation on the SHCP's website: Disciplina Financiera de Entidades Federativas y Municipios (hacienda.gob.mx).

b) municipal governments, half-yearly information

2022-1	2023-1
SUSTAINABLE DEBT	
508 municipalities 3/	577 municipalities 3/
OBSERVATION DEBT	
27 municipalities	20 municipalities
Baja California Sur, Coahuila (3), Durango (3), Guerrero, Jalisco (3), México (3), Michoacán, Morelos (3), Nayarit, Puebla, Quintana Roo, San Luis Potosí, Sonora (2), Veracruz (3)	Chihuahua (3), Coahuila (3), Durango (2), Jalisco, México, Morelos (2), Puebla, Quintana Roo, San Luis Potosí, Sonora (3), Veracruz (2)
HIGH DEBT	
2 municipalities	2 municipalities
Mapimí, Tlahualilo (Durango)	Mapimí, Tlahualilo (Durango)

Data as of third quarter 2023 for state governments and as of first half-yearly 2023 for municipal governments

Source: Prepared from SHCP information

1/ The result of the alert system, for its calculation, considers three indicators: i) Debt and obligations on unrestricted income; ii) Debt service and obligations on unrestricted income; iii) Short-term liabilities, suppliers and contractors less cash, banks and temporary investments over total income. The methodology can be found on the SHCP website: https://www.disciplinafinanciera.hacienda.gob.mx/es/DISCIPLINA_FINANCIERA/Entidades_Federativas_2023

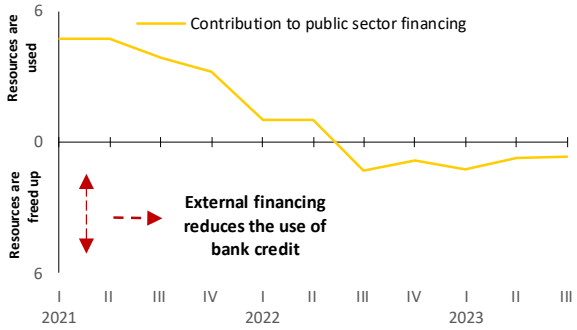
2/ The state of Tlaxcala has no loans and obligations since 2019.

3/ As of first half-yearly 2022, 232 municipalities had failed to provide information and 19 entitites had not been rated, while as of first half-yearly 2023, 127 municipalities had failed to provide information and 62 entitites had not been rated.

IV.2.4. Foreign sector and capital flows

Capital inflows allow sectors with access to external financing, such as the public sector, to obtain resources from abroad and reduce their use of domestic bank credit. This frees up resources for other sectors of the economy to access domestic financing. During the first three quarters of 2023, the balance of payments recorded cumulative net capital inflows, as inflows in the first two quarters exceeded outflows in the third quarter. As a result, the public sector continued to substitute domestic bank credit, albeit to a lesser extent than in the previous version of this *Report* due to the capital outflows in the third quarter (Graph 70).

Graph 70
Contribution of net capital flows to real domestic financing growth of the Public Sector[1/]
Percentage points



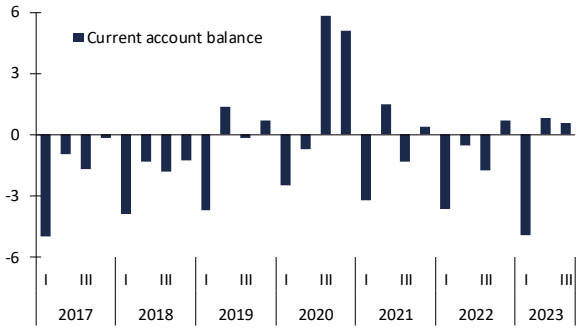
Data as of third quarter 2023

Source: Banco de México and CNBV

1/ The contribution of capital flows to financing is obtained as the difference between the annual growth rate of real financing and the rate that would have been observed in the absence of these flows. The latter rate is obtained by assuming, in a vector autoregressive (VAR) model, that the coefficients associated with capital flows and the shocks to them are equal to zero. The model uses data from Q1 2010 to Q3 2022 and a moving window of 31 quarters. Capital flows are defined as the sum of net direct, portfolio and other investment flows.

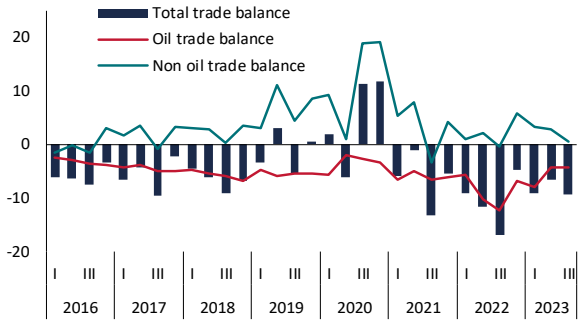
The current account recorded a surplus of 0.8% and 0.6 % of GDP in the second and third quarters of 2023, respectively (Graph 71a). Within this account, the non-oil trade balance showed a surplus and the oil trade balance was in deficit in both quarters (Graph 71b). The financial account recorded net external lending in the second and third quarters of 2023. In the second quarter, this was largely due to the positive balance in the reserve assets item and capital outflows in the portfolio and derivatives items, while in the third quarter it was due to capital outflows in the portfolio and direct investment items.

Graph 71
Current account and trade balance:
a) Current Account
Percent of GDP



b) Trade balance

Billions of dollars

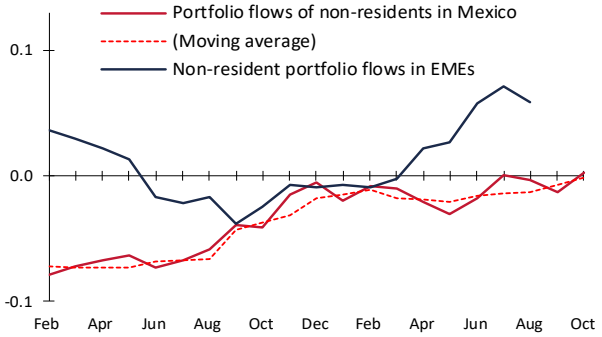


Data as of third quarter 2023
Source: Banco de Mexico and INEGI

Timely information from the Institute of International Finance (IIF) suggests that, in emerging economies, non-resident portfolio flows continued to consolidate the recovery that they had been exhibiting since October 2022 (Graph 72). This occurred after the drop they had experienced earlier that year due to the beginning of the war between Russia and Ukraine. In Mexico, non-resident portfolio flows also continued to consolidate their recovery, albeit in a more moderate manner and with portfolio outflows in the second and third quarters of 2023 (see Box 4). For October, timely information from the IIF suggests that Mexico, in fact, has already begun to show slight portfolio inflows.

Graph 72
Non-resident portfolio flows to Mexico and EMEs [1/]

Percent of 2022 GDP, 1-year moving average

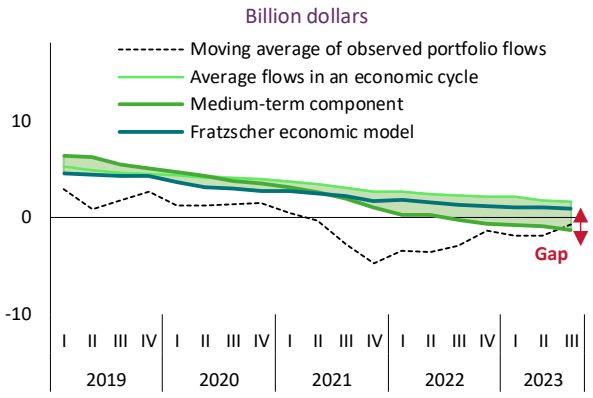


Data as of October 2023
Source: Institute of International Finance (IIF)
1/ The measure of portfolio flows from emerging economies included those countries considered in the monetary policy and international financial markets sections of the Quarterly Report January-March 2021 for which information was available in the IIF. This measure was obtained by adding the flows of all these economies and dividing the total by the sum of their GDP in 2022.

Against this backdrop, it is important to know how much room might be left for portfolio flows to continue to recover, going forward. For this purpose, the estimate of the range of the natural value of portfolio flows is used (see Box 3 of the Financial Stability Report - June 2023).[45] The recovery of portfolio flows that Mexico has been showing, more pronounced since the third quarter of this year, has placed these flows within the range of their natural value in the short and medium term. Therefore, although there is still some margin for flows to continue recovering due to the influence of temporary and persistent factors, this margin has diminished (Graph 73a). Nevertheless, the distance between portfolio flows and their natural long-term value is still considerable, indicating that there is still ample room for flows to continue recovering due to the influence of structural factors (e.g., a consolidation of the nearshoring process) (Graph 73b).

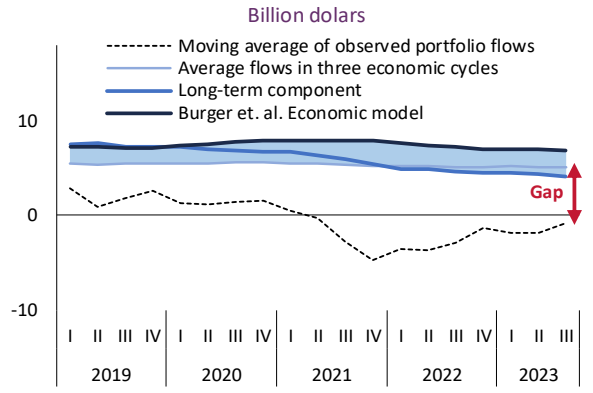
[45] This natural value measures the portion of portfolio flows that is not subject to temporary factors and, instead, is affected only by persistent and structural factors.

Graph 73
Range of natural flows [1/ 2/]
a) Medium-term



Figures as of third quarter of 2023
Source: Banco de Mexico, IMF, Bloomberg, CreditSuisse and IIF
1/ The portfolio flows to Mexico for 2023 Q3 were imputed with information from the IIF.
2/ One year moving average.

b) Long term



Figures as of third quarter of 2023

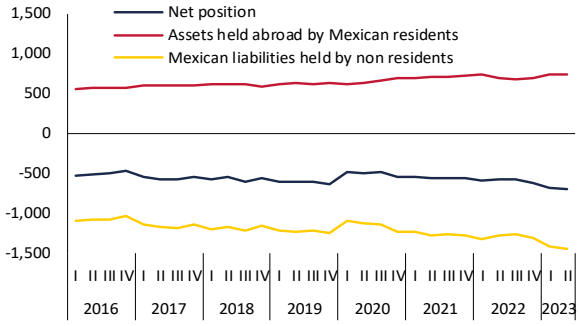
Source: Banco de Mexico, IMF, Bloomberg, CreditSuisse and IIF

1/ The portfolio flows to Mexico for 2023 Q3 were imputed with information from the IIF.

2/ One year moving average.

Mexico's international investment debit (net) position increased in the second quarter of 2023 compared to the same quarter of the previous year. On the assets abroad side, investments by residents in Mexico increased by 6.6% and, on the liabilities side, investments from abroad decreased by 13.8% (Graph 74).

Graph 74
International investment position [1/]
Billions of dollars



Data as of Q2 2023
Source: Banco de Mexico
1/ It refers to the international investment position at the end of the period. The net international position is estimated by substracting liabilities from asssets and then adding the international derivative position. Mexican liabilities in the hands of non.residents have the sign changed with respect to how they are mesured in the international investment position statistics of the balance of payments to obtain the calculation of the country's net creditor position.

The soundness of Mexico's macro-financial fundamentals has been a key factor in maintaining investor confidence and in attracting foreign investment flows. Therefore, it is essential that going forward the country maintains it to minimize the risk of a reduction in the supply of external financing.

Box 4. Capital flows: effects on the government debt yield curve

I. Introduction

Capital inflows are the means by which a country's residents obtain financing from foreigners. This financing is important for emerging economies (EME), since these economies tend to have lower savings rates than advanced economies and need to supplement their domestic savings. This foreign financing can prevent abrupt changes in consumption patterns and encourage the accumulation of productive factors through higher investment.

However, not all capital inflows have the same implications. Some occur because foreigners find an EME more attractive and have a greater appetite to finance it. Conversely, others occur because local participants seek to sell domestic debt due to domestic or international factors. In both cases, there is an inflow of flows, but there is a difference in their effects on interest rates and financing costs. While a greater appetite from foreigners tends to reduce interest rates and, therefore, financing costs, the intention of local participants to sell domestic debt puts upward pressure on rates.

This distinction between flows with different types of implications is important for government debt. Financial intermediaries, firms and households use the interest rates of government debt at different maturities, also known as the yield curve, as a reference for setting other interest rates in the economy and, in general, for making economic and financial decisions. For example, interest rates on medium- and long-term government debt influence aggregate spending on consumer durables and investment. Moreover, these rates are often relevant in monetary policy decision making for central banks, and their movements, if abrupt and unexpected, have implications for financial stability. At the same time, there are a large number of factors, such as national and global financial conditions, which, by affecting the demand and supply of government debt, end up affecting capital flows and, therefore, also medium- and long-term rates (Figure 1). [1]

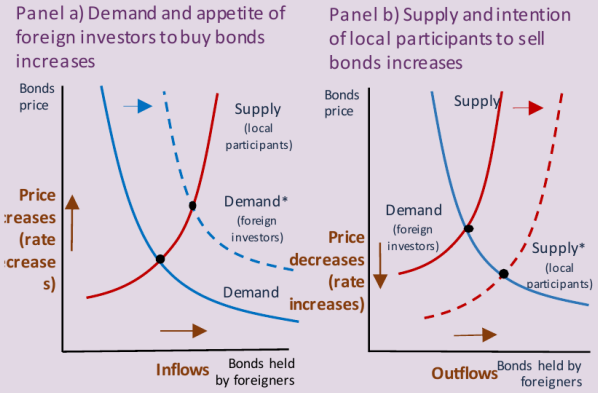
Therefore, it is important to determine what the implications of debt flows are. In particular, it is important to determine whether debt flows are driven by foreigners or by domestic participants and whether they increase or decrease interest rates on the government yield curve. In this *Box*, we develop a method based on a Vector Autoregressive (VAR) model to discern how various factors affect medium and long-term interest rates on Mexican debt when operating through their impact on the intention to sell or buy debt by foreign investors or local participants and, therefore, on capital inflows or outflows. In other words, we analyze how debt flows influence the level of the yield curve. The results allow us to interpret the flows in the economic context in which they occur and are therefore used to study recent episodes of the Mexican economy and its conjuncture.

II. Types of debt flows and their effects on medium and long-term interest rates s

The different nature of debt inflows and their effects on interest rates can be illustrated with two examples. In the first quarter of 2013, the Fed increased the pace of asset purchases, which raised asset prices and lowered bond yields in advanced economies.[2] This lower yield increased foreign appetite and demand for EM bonds, particularly those of Mexico, which put upward pressure on the prices of these financial assets and downward pressure on interest rates (Figure 1 Panel a).[3] Thus, in the first quarter of 2013, Mexico exhibited an inflow of government debt flows driven by foreigners' intention to buy domestic debt and, therefore, a fall in medium and long-term rates on its yield curve.

Figure 1

Two types of igovernment debt inflows */



Note: */ All transactions that take place between residents and non-residents in government debt flows are considered. Implicitly, transactions between residents and non-residents are also considered, to the extent that they affect the intention to carry out transactions abroad and from abroad.

Between November 2016 and January 2017, Mexico also exhibited an inflow of government debt flows. During this period, elections and the inauguration of a new federal administration took place in the United States. However, unlike what happened in 2013, the inflows that Mexico exhibited during this period occurred with an increase in medium and long-term rates. This could have been due to the fact that the intention to sell securities by local participants predominated over that of foreigners. This could have meant that it was foreigners who

[1] It is important to note that the box considers the influence of global and national factors of various kinds that are usually identified as determinants of medium and long-term interest rates. Factors such as monetary policy in different economies or changes in global risk aversion are considered in the model developed in this box, due to the impact these factors have on interest rates through their effect on capital flows. This is despite the fact that they are not explicitly incorporated in the model developed. This strategy is commonly known as a "reduced form" estimation strategy and can also be seen in the supply and demand diagrams in Figure 1, where it is observed that any change in the economy that modifies the demand or supply of government debt securities, in this context will end up affecting capital flows and interest rates. More specifically, in this context capital flows are the quantity variable and rates are the price variable within the same market.

[2] In December 2012, the Fed ratified the quantitative easing policy announced in September (QE3) and announced that starting in January 2013 it would purchase US45 billion in long-term Treasury bonds. In addition, it would also continue to reinvest payments from its mortgage agency bond portfolio and reinvest the maturities of this type of bonds in long-term Treasury bonds.

[3] The reallocation of foreign investors' portfolios to riskier assets is stronger when there are return objectives in their investment strategies. See Box 3. Range of the natural value of portfolio flows, in Banco de México's June 2023 Financial Stability Report.

ended up buying the debt, which increased foreign financing, i.e., there were capital inflows. However, as on this occasion this could have been driven by the intention of local participants to sell securities, Mexican bond prices fell and medium and long-term interest rates on the yield curve increased (Figure 1 Panel b). Therefore, this inflow of flows was different from that of early 2013.

As in the case of inflows, capital outflows can also be of different nature, and their effects on the yield curve can vary. In fact, debt flows can be classified into four categories, depending on whether a flow is an inflow or an outflow, and whether it is driven by foreigners or local participants, which makes their effects on medium- and long-term interest rates different. These four categories are shown in Table 1. The table shows that, on capital outflows, foreigners and local participants affect rates in the opposite way as they do on inflows. That is, when there is an outflow, rates increase if it is driven by foreigners; conversely, when the flow is an outflow and is driven by local participants, interest rates decrease.

Table 1
Types of debt flows and their effects on medium- and long-term interest rates

	Medium and long-term interest rates increase	Medium- and long-term interest rates decline
Inflow of debt flows	Local participants wish to sell their debt	Foreign investors want to buy debt
Debt flow outflows	Foreign investors wish to sell their debt	Local participants wish to purchase debt

III. Methodology

To determine how debt flows affect medium and long-term interest rates, a statistical Vector Autoregressive model with sign restrictions is used.[4] This model allows us to identify whether an inflow or outflow of debt is motivated by foreigners or local participants and, therefore, whether it puts upward or downward pressure on interest rates.

To measure capital flows, information on government debt flows from the Institute of International Finance (IIF) is used. Information on medium and long-term interest rates on government debt comes from Bloomberg.[5] With this information, a principal components index is constructed that summarizes the behavior of all interest rates in a single indicator. The data are considered in their monthly periodicity for the period 2010-2023 and, with them, the following Autoregressive Vectors statistical model is estimated: [6]

$$Y_t = \bar{Y} + \sum_{j=1}^{P} B_j Y_{t-p} + u_t.$$

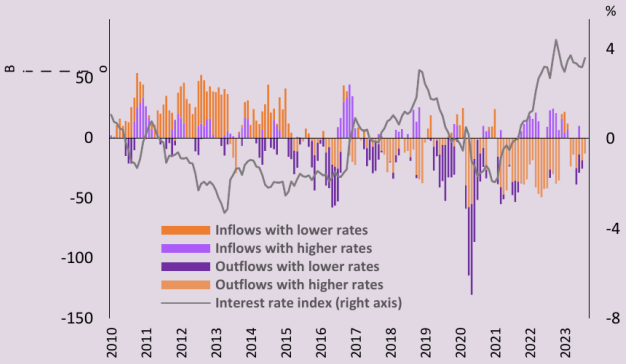
where Y_t is a vector that includes two variables, government debt flows and the index that summarizes the behavior of medium- and long-term interest rates in the month t, Y_{t-p} is a vector that includes the lagged values of the same two variables, [7]B_j is a matrix of coefficients associated with these values, $\bar{Y}$ is a vector of constants and u_t is a vector of errors.

The statistical model allows government debt flows to be classified into one of the four categories of the Table 1. In particular, the model identifies in what proportion the flows in a given month are driven by foreigners and in what proportion they are driven by local participants. Thus, it also determines, depending on whether these flows are a net inflow or outflow, whether there is upward or downward pressure on interest rates.[8]

IV. Results

The Graph 1 shows the results for the entire period following the global financial crisis, from 2010 to 2023, which allows us to analyze economic periods of medium and long duration. In this graph, we show the proportion of each month's government debt flows that is allocated to each of the four categories of flows from the Table 1. Each of these categories is represented in the graph with a different color, where a 3-month moving average is taken for the flows of each color, in order to reduce the volatility of the series and facilitate the interpretation of the results.

Graph 1
Categories of debt flows and their effects on medium- and long-term interest rates



Data as of August 2023, debt flows are a 3-month moving average

Source: Banco de México, Bloomberg and IIF

[4] The methodology proposed by Uhlig (2005) is considered.
[5] Government debt rates are considered for the maturities usually presented in Banco de México's Quarterly Reports (for example, see Quarterly Report-June 2023). From this set of rates, shorter-term rates are excluded, as these rates are strongly determined by the implementation of monetary policy and depend less on the intention to sell and buy government debt by local participants and foreign investors. Rates are constructed by Bloomberg and refer to local currency bonds with terms of 2, 10 and 30 years. The interest rates considered correspond to the average of the month.
[6] From January 2010 to August 2023.
[7] The model considers two lags for each variable. This number of lags was chosen according to the BIC statistical criterion.
[8] If flows and the change in the rate indicator are greater than the historical average in a given month, the model allocates these flows primarily to inflows with upward pressure on rates, and to a lesser extent to inflows with downward pressure or the outflow categories. Conversely, if the inflow is greater than the historical average but the change in the indicator is smaller, the model assigns the flows for that month primarily to inflows with downward pressure and to a lesser extent to inflows with upward pressure or the outflow categories. This model follows a similar procedure to classify outflows.

Overall, in the first part of the period analyzed (2010-2015) Mexico showed net inflows of government debt flows. The results suggest that these inflows were driven by a greater appetite of foreign investors (dark orange bars), so that in general during this period, decreases in medium and long-term rates were also observed. This increased foreign appetite is largely explained by the expansionary monetary policies of advanced economies, which reduced their asset yields and increased the relative attractiveness of EM bonds and, in particular, Mexico.

However, not all inflows during that period had the same implications on interest rates. In 2011, Mexico also experienced debt inflows, but in this case the inflows were driven by local participants' intent to sell (light purple bars), which generated increases in medium and long-term interest rates across the yield curve. In part, this was due to local participants seeking to diversify their portfolios into less risky assets, in response to the volatility exhibited by global financial markets due to concerns about fiscal sustainability in some countries in the European region. Similar behavior, inflows and upward pressure on rates, was observed at the end of 2016 and beginning of 2017 with the elections and the inauguration of a new federal administration in the United States.

With respect to outflows, events related to the period known as "*taper tantrum*" in 2013 stand out. During that period, financial markets reacted to some announcements by the Federal Reserve (FED) that generated the perception that the Fed would adopt a less accommodative stance in the future. Although this change in monetary policy stance ultimately did not occur, the rhetoric generated greater concern, leading to a lower appetite from foreigners for the bonds of and, in particular, Mexico (light orange bars). This reduced foreign appetite led to outflows with increases in medium and long-term interest rates.

In contrast to these events, since the global financial crisis in Mexico there have also been moments with outflows, but without interest rate hikes. In early 2016, there were outflows of government debt, partly due to lower foreign appetite (light orange bars). However, this was offset by downward pressure on rates exerted by higher appetite from local participants (dark purple bars). Therefore, adjustments in quantities were high, i.e., there were strong capital outflows, but adjustments on the bond price and interest rate side were lower.

In other words, there may be outflows and medium and long-term interest rates may remain stable or even fall. For example, if the appetite of local participants increases, they will end up buying domestic debt and foreigners will end up selling it. In this case, due to the greater appetite of local participants, the outflow of flows decreases government debt rates, which may put downward pressure on other interest rates in the economy and, therefore, may also reduce financing costs in other credit markets for various types of borrowers.

Regarding the recent dynamics of flows, at the end of last year and the beginning of this year there were inflows of debt mainly driven by greater foreign appetite and, therefore, accompanied by lower medium and long-term interest rates. Thereafter, there were outflows, some caused by increased appetite from local participants and others by decreased appetite from foreigners, which generated decreases and increases in rates, respectively.

V. Final considerations

This box develops a methodology that emphasizes the importance of interpreting capital flows in the economic context in which they occur and of having statistical methods to do so. Inflows have positive aspects, since they allow companies to obtain financing from abroad to smooth consumption and increase investment. In addition, these inflows can sometimes reflect greater confidence of foreign investors in an economy and, therefore, greater interest in financing it. These investors are more likely to finance projects with high productivity and contribute to microfinance stability because they promote deeper and more liquid financial markets.[9] It is therefore important for emerging economies to have the confidence of foreign investors.

In this sense, it is also important to foster the confidence of local participants. The confidence of these participants can increase the appetite and demand for domestic debt, which tends to lower interest rates on the yield curve. Since this yield curve is used as a benchmark to determine rates in the rest of the economy, this can, in turn, lower the cost of financing in other credit markets for various borrowers.

This underscores the importance for Mexico of continuing to preserve the soundness of its macro-financial framework, which includes the confidence of economic agents that the central bank will fulfill its commitment to guarantee price stability through the convergence of inflation to its target. A sound macro-financial framework promotes investor confidence, both domestic and foreign, and ultimately leads to lower financing costs, thus favoring long-term growth.

References

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Range of natural value of portfolio flows. Box 3 in Financial Stability Report June 2023. Banco de México.

Uhlig, H. (2005). "*What are the effects of monetary policy on output? Results from an agnostic identification procedure*," Journal of Monetary Economics, 52(2), 381-419.

[9] These advantages, as well as others related to investment by foreign investors, are listed in *Non-resident Holdings in Latin America: Permanent or Transitory Factors?* (Menna and Tobal, 2022).

IV.3. Institutions

Total assets of the financial system increased by 3.9% in real annual terms in September, a higher data than the growth registered in the previous *Report*. In general, growth was observed in all participants, although siefores, investment funds, regulated sofomes and sofipos[46], stood out, while the only sector that contracted was that of bond warehouses (Table 3). As for commercial banks, their growth was lower than that of the system and their concentration and participation in the system remained at similar levels compared to the previous *Report*.

Table 3

Mexican Financial System Structure

	Number of entities[2/]	Share of total assets		Real annual growth rate of assets	Share of Top 5 largest entities[3/]
		in the Fin. Syst.	in GDP		
	No units	Per cent	Per cent	Per cent	Per cent
Commercial banks[4/5/]	49	45.2	42.2	2.0	66.3
Siefores (afores)[6/ 7/]	118 (10)	18.6	17.4	7.2	76.0
Investment Funds (Managers)[8/]	627 (30)	11.1	10.4	10.1	67.5
Development Institutions[9/]	9	9.4	8.8	0.0	88.5
Insurance Companies	113	7.6	7.1	3.3	43.3
Broker dealers	36	3.5	3.3	1.8	60.5
Non-regulated sofomes[10/]	1,436	2.0	1.9	3.3	17.4
Regulated sofomes[11/]	24	1.1	1.0	11.0	73.4
Savings and Loan Cooperatives (socaps)	152	0.8	0.8	3.4	54.1
Popular Finance Corporations (sofipos)[12/]	36	0.2	0.2	81.1	76.5
Credit Unions	72	0.2	0.2	0.3	50.8
Bond warehouses	15	0.1	0.1	-4.4	93.2
Total System	**1981**	**100.0**	**93.4**	**3.9**	**n.a.**
Memo: Infonavit, Fovissste and Infonacot	*3*	*8.5*	*7.9*	*5.0*	*n.a.*

Data as of September 2023.

Source: BMV, CNBV, CNSF, Consar y Condusef

1/ This table includes the direct financing granted by the financial institutions mentioned here and may not match the direct and induced financing reported in the Development Banking section.

2/ Refers to the number of entities that report positive assets and may differ from the number of entities authorized to operate.

3/ The five largest entities by assets within each sector are:
Commercial Banks: BBVA, Santander, Banorte, Citibanamex y HSBC.
Siefores: XXI Banorte, Profuturo, Citibanamex, SURA y Coppel.
Investment Funds (Managers): BBVA Bancomer Gestión, Impulsora de Fondos Banamex, Sam Asset Management, Operadora de Fondos Banorte y Operadora Actinver.
Development Institution: Banobras, Nafin, Bancomext, Banjército y FIRA.
Insurance Companies: Pensiones Banorte, Seguros BBVA, Grupo Nacional Provincial, Pensiones BBVA y Citibanamex Seguros.
Broker dealers: Banorte-Ixe, Finamex, Goldman Sachs, Actinver e Invex.
Non-Regulated sofomes: Crédito Real, BMW Financial Services México, Marverde Infraestructura, Préstamos Felices en 15 Minutos y John Deere Financial México.
Regulated sofomes: GM Financial, Cetelem, Arrendadora y Factor Banorte, Ford Credit y Operadora de Servicios Mega.
Socaps: Caja Popular Mexicana, Caja de Ahorro de los Telefonistas, Caja Morelia Valladolid, Acrimex y Coopdesarrollo.
Sofipos: Nu México Financiera, Libertad Servicios Financieros, Financiera Sustentable, Consejo de Asistencia al Microemprendedor (CAME), y Crediclub.
Credit Unions: Unión de Crédito Agricultores de Cuauhtémoc, Ficien, Unión Crédito Industrial y Agropecuario de la Laguna, Unión de Crédito para la Contaduría Pública y Unión de Crédito Alpura.

4/ The total assets of the commercial bank include regulated sofomes that are subsidiaries of the respective bank.

5/ In July 2023, the CNBV approved the revocation of the authorization granted to American Express Bank (Mexico) to organize and operate as a multiple banking institution.

5/ The set of pension funds managers (afores) are 10 and they manage 118 Siefores.

6/ An increase in the number of siefores has been observed since January 2020 due to the Siefores' new Investment Regime based on Generational Funds, in accordance with the modifications to the rules issued by the Consar on December 16th, 2019. Available here: https://www.gob.mx/cms/uploads/attachment/file/517105/BP-32-2019_TDF_transicio_n_VF_2_.pdf

7/ The set of Investment Fund Managers (30) manage 627 Investment Funds.

8/ Includes Development banks (6) and development public trusts (FIRA, FOVI and FIFOMI). In April 2023, the Senate approved the decree for the extinction of the FND, with June 23 being the last month with available information.

10/ The figures referring to the number of non-regulated sofomes come from the Registry of Commissions - RECO (Condusef). Only those Sofomes that present a positive portfolio are considered for the purposes of the number. The credit portfolios of those non-regulated sofomes that grant credit only to related entities or subsidiaries are not taken into account as they are not credit intermediaries in the strict sense. As of March 2023 (latest date available), the Bureau of Financial Entities has information on 2,097 Sofom E.N.R. with operating status, including those that grant credit only to related entities or subsidiaries. The asset figures refer to the total credit portfolio granted by these entities reported to Condusef.

11/ Sofomes regulated for having equity links with a bank, but are not subsidiaries of said bank and therefore do not consolidate their assets, are considered. Some belong to a financial group. Other sofomes are regulated because they issue debt securities and also are included here. In April 2023, the CNBV responded to the request to cancel the registration in the RNV of the "ADAMFIN07" Stock Certificates; therefore, Proyectos Admantine is deregulated.

12/ In December 2022, Nu México, a Fintech entity specialized in credit cards, merged its business with a sofipo that was no longer operating, and which it acquired in December 2021. As of December 2022, its assets are counted in the sector of sofipos and becomes the largest entity in the sector, with a share of assets of 40% of the total, increasing the concentration of the five largest entities in the sector to 79%. Before this migration, there is no information about this entity as it is a non-public financial company and therefore it was not incorporated in any statistics of this or previous editions of the Report.

[46] The strong growth in this sector is explained by the incorporation of *NU Financiera* into the sofipos sector in December 2022.

IV.3.1. Commercial Banks

During the first nine months of 2023, commercial bank assets continued to expand, albeit at a slower pace than in 2022. In particular, this performance originated mainly from the growth of the loan portfolio and securities operations.

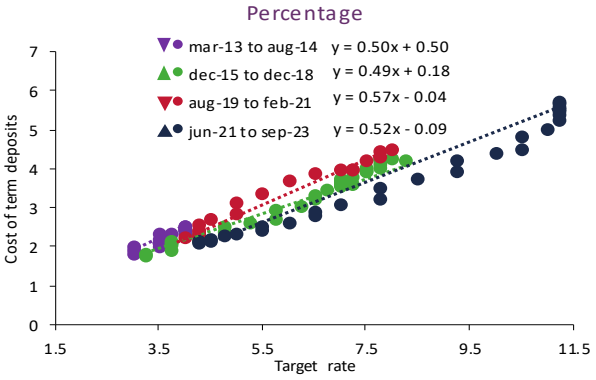
On the other hand, liabilities also increased, as a result of higher levels of both demand and term deposits. In particular, term deposits grew more than demand deposits; although between March and September 2023 the latter maintained the same high levels that had been registered since the beginning of 2020. Against this backdrop, although the target rate has not presented adjustments since March 31, 2023, the cost of deposits by banking institutions increased between April and September, showing a greater degree of response to the target rate than in the previous cycle of monetary policy (Graph 75a). On the other hand, the lending rate of the total commercial bank loan portfolio also shows a greater response to the target rate than in the 2015 to 2018 cycle, but lower than that of the 2019 to 2021 cycle (Graph 75b). It should be noted that the growth of both the loan portfolio and deposits has been orderly and has not generated imbalances.

With respect to commercial banks derivative transactions, it should be noted that as of June 2023, the situation in which the TIIE interest rate *swap* portfolios had shown a positive sensitivity to interest rate increases, which could have generated capital gains in their market value prior to that date, was reversed.

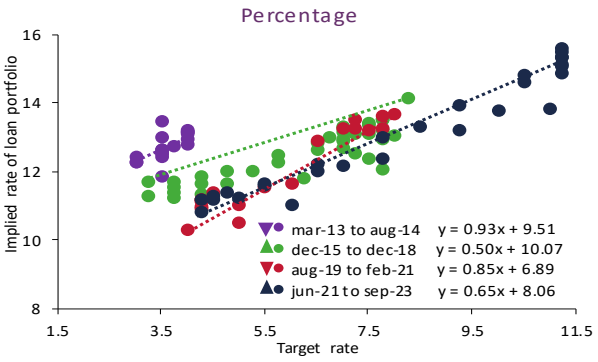
Graph 75

Evolution of the target rate and financial intermediation [1/]

a) Cost of term deposits [2/]



b) Implied rate of loan portfolio [3/]



Data as of September 2023

Source: CNBV y Banco de México

1/ Financial intermediation is defined as deposit taking and local currency loan portfolio and foreign currency loan portfolio.Four cycles are considerated for target rate review, first one expansionary as of March 8th 2013 to August 31th 2014 (-150 basis points), secondly restrictive as of December 17th 2015 to December 20th 2018 (525 basis points), thirdly expansionary as of August 15th 2019 to February 12th 2021 (-425 basis points), and fourthly restrictive as of June 25th 2021 to end September 2023 (725 basis points). First one and thirdly cycles the starting and end points are considered, for the second cycle from the starting point to August 31th 2014, as the next movement of the target rate occurred in December 2015, while in the fourth cycle the starting point and the last observation are considered.

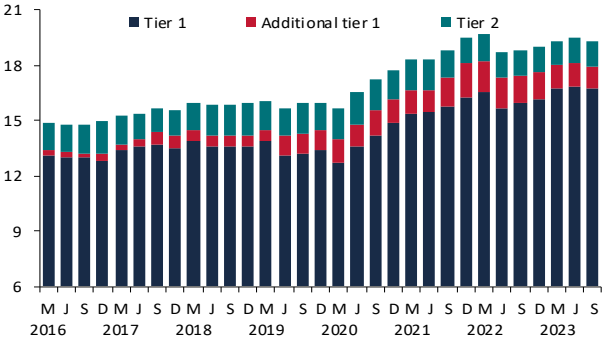
2/ The monthly average cost of term deposits in domestic currency includes, demand deposits, time deposits and interbank deposits.

3/ Implied rate annualized-month = (Interest income / Outstanding average loan portafolio stage 1 current an end balances) x 12.

Solvency

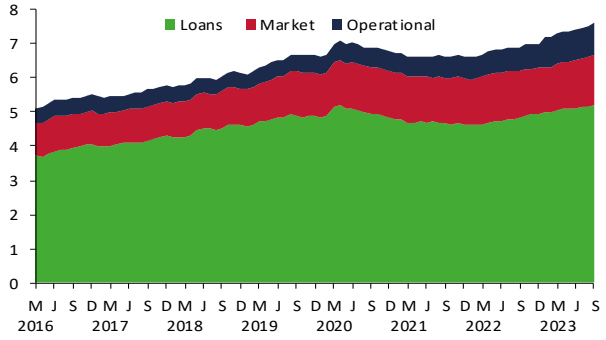
Commercial banks present adequate levels of capitalization. In particular, the capitalization index (CAR) registered a level of 19.30% in September 2023, a similar data to that observed in March 2023 (Graph 76). This behavior reflected an expansion in regulatory capital, particularly in the components of earned capital and the issuance of subordinated debentures, which offset a higher level of risk assets, mainly reflecting an increase in assets subject to credit and market risk (Graph 77).

Graph 76
Structure of banks' Capital Adequacy Ratio (CAR) 1/
Percentage



Data as of September 2023
Source: Banco de México
1/ Capital Adequacy Ratio, is calculated by dividing net capital by risk-weighted assets. Net capital includes Tier 1, Additional tier 1 and Tier 2. Tier 1 includes earned capital and shareholder contributions, it has the major ability to absorb potential losses. Additional tier 1 includes perpetual subordinated bonds and surplus reserves, and therefore it has a lower ability to abosorb potential losses, while Tier 2 includes specif term subordinated bonds, and therefore it has a lowest ability to absorb possible losses.

Graph 77
Risk weighted assets 1/
Trillions of pesos

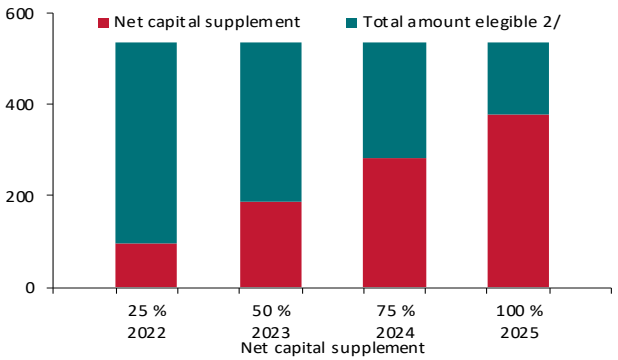


Data as of September 2023
Source: Banco de México
1/ Credit Risk weighted assets reflect the associated risk of the loan portfolio and other credit exposures. Market risk weighted assets are a risk measure that a banking institution holds due to market factors to which are their assets exposed; while operational risk weighted assets are a risk measure for possible losses due to inadequacies or failures in internal processes, personal and internal systems or due to external factors.

Against this backdrop, it is noteworthy that between March and September 2023 there were dividend payments by some commercial banks. These payments partially offset increases in both fundamental capital, originated by an increase in earned capital, and supplementary capital, derived from a greater issuance of subordinated debentures. In particular, the issuance of subordinated debentures corresponded to the gradual adoption of the Net Capital Supplement (NCS), which will end in December 2025.

The NCS requirement, issued in 2021 by the CNBV, seeks to ensure that those banking institutions that are classified as locally systemically important have the capacity to absorb potential losses and maintain adequate levels of regulatory capital without interrupting their functions in the event of an adverse shock (Graph 78).[47]

Graph 78
Net capital supplement 1/
Billions of pesos



Data as of September 2023
Source: Banco de México
1/ The regulation issued by the CNBV as of 18th June 2021 establishes that local systemically important commercial banks shall gradually comply with the NCS requirement as follows: 1/4 of the NCS on December 2022; 2/4 of the NCS on December 2023; 3/4 of the NCS on December 2024 and the total NCS on December 2025.
2/ The eligible amount includes capital securities and capital instruments. The excess of capital instruments considers for its calculation the terms and percentages of article 2 Bis 7 of the General Provisions applicable to credit institutions.

On the one hand, the increase in the expansion of assets subject to credit risk reflected greater credit granting, while the higher levels of assets subject to market risk were the result of an increase in operations with interest rate risk in the domestic market.

[47] The regulation issued by the CNBV on June 18, 2021 establishes that local systemically important commercial banks must gradually comply with the NCS requirement as follows: 1/4 of the NCS in December 2022; 2/4 of the SCN in December 2023; 3/4 of the NCS in December 2024 and the total SCN in December 2025.

Box 5: Regulation of Large Exposures: new regulatory limit in Mexico

I. Background

The 2008 financial crisis revealed the lack of transparency in some markets or operations, as well as the existence of certain deficiencies in the risk management of financial institutions, particularly with regard to the identification, monitoring and follow-up of their exposures and the risk concentrations they generated. One such case was the collapse of Iceland's three largest commercial banks in the fall of 2008, which marked the beginning of a serious systemic financial crisis in that country.[1] The problems of these banks were, among other things, caused by their concentration of credit risk exposures in large conglomerates that experienced severe financial difficulties.[2] The collapse of these banks had international repercussions due to their cross-border operations. In particular, the report on the Icelandic banking crisis, published in 2010 (Special Investigation Commission, 2010), highlighted important weaknesses in the supervisory system for bank concentration risk (Baudino et al. 2020).

The Icelandic case was just one of many others where excessive concentration risk in several large banks can trigger a system-wide crisis. The 2008 international crisis highlighted the importance of developing a comprehensive framework that would implement limits on banks' exposure to several connected counterparties. In this context, the G20 identified within its commitments to strengthen the regulatory framework and risk management practices, the need for supervisors to verify that financial institutions develop processes to have a complete and timely measurement of their risk concentrations, as well as positions with relevant counterparty risk, whether for their different products or regions in which they maintain a presence.[3] Thus, the Basel Committee on Banking Supervision (BCBS), with the objective of strengthening the principles for the measurement and control of relevant exposures, published in 1991, in addition to incorporating in said principles the changes registered in the international financial system and the type of existing exposures, published in 2014 a standard to limit large exposures in banks that addressed the weaknesses identified in the national standards (CSBB, 2014).[4]

Limiting the size of these exposures in banks is a fundamental principle of prudential regulation. In particular, ensuring that banks comply with prudential regulation and reduce the size of their large exposures is a central component of micro prudential banking supervision, which, in turn, contributes to the stability of the financial system by limiting the risk of contagion among global systemically important banks (*G-SIB*). This principle is the basis of the Large Exposures (GE) standard, issued by the CSBB, which complements the risk-based capital standard (CSBB, 2022).

In this regard, the LEX standard, which came into force at the international level in January 2019, establishes a concentration limit in financing transactions granted to the same counterparty or set of connected counterparties. Although this connection between exposures was previously focused only on the elements of control, either by shareholding or by having influence in decision-making, the new principles also contemplate the possible existence of economic interdependence between the parties, i.e. the existence of dependencies due to commercial relationships, such as the role of a supplier, between apparently independent entities, but which could generate financial problems in the economically interdependent counterparties in the event that one of them were to present problems.

The LEX framework is intended as a tool to determine and limit the maximum loss that a bank could incur in the event of failure and its consequences for other counterparties, reducing the risk of bank insolvency and its operational continuity and, thus, possible contagion among institutions of local or global systemic importance. In doing so, the LEX standard complements the capital standard, as the latter assumes that banks maintain a sufficiently diversified portfolio of operations.

This box is intended to provide a summary of the implementation of the LEX framework in Mexico and its implications for the financial system.

II. Implementation in Mexico

In order to align national regulations with the international standard of LEX, and to help preserve the healthy development of the financial system, on April 17, 2023 the CNBV issued amendments to the General provisions applicable to credit institutions in the area of risk diversification to include the Large Exposure framework in the regulation. Previously, the Mexican regulation under which banking operations are carried out contemplated concentration limits for these operations based on the level of the institution's capitalization index, including, if applicable, possible control links, but without considering the economic interdependence of the counterparties. These limits

[1] The bankruptcy of Lehman Brothers in September 2008 triggered the beginning of a worldwide financial crisis, in the context of which the collapse of the three largest banks in Iceland was notorious, since together they represented 80% of the Icelandic financial system and their combined balance sheet was 10 times the size of the Icelandic economy. It is worth noting that the growth of these banks was financed both by demand deposits from foreign customers seeking profits from the high rates they were paying, who withdrew at the onset of the crisis. Among the factors that accelerated the failure of these banks was their practice of granting financing to related business groups without a transparent chain of ownership. Indeed, a 2010 investigation found that at least 20% of the loans granted had been made to six groups of interrelated parties. Each of these parties, in turn, had ownership of at least 10% of the shares in one of these three failed banks. The recovery on these loans ranged from 4% to 6%. In October 2008, the Icelandic financial authority intervened in the three failing banks and changed the laws to reduce the risk of a recurrence of a situation with the size of related party exposure seen before the 2008 crisis (Baudino et al. 2020).

[2] Concentration risk is defined as any individual exposure or set of similar exposures, either directly (same borrower or counterparty), or indirectly (protection providers, same geographic area or industry), with the potential to produce large losses in its income, capital or assets, and which threaten the solvency or ability to maintain its fundamental operations.

[3] For further reference, please refer to the g20 2008 Leaders' Declaration. https://www.g20.org/content/dam/gtwenty/gtwenty_new/about_g20/previous-summit-documents/2008/G20%202008%20Leaders%27%20Declaration.pdf

[4] Exposure is defined as: any active operation, whether previously granted or contingent, of credit, loan, constitution of guarantees for derivative operations, investments in shares or securities, or for credit accounts receivable.

could range from 12% to 40% in those institutions with a capitalization index higher than 15%.

The LEX regulations are applicable to credit institutions and their subsidiaries when the latter carry out financing operations similar to those of the institution. These regulations also apply to multiple purpose financial companies (sofomes) that have links with a financial institution.

The LEX regulation became effective in October 2023 and is applicable to domestic and global systemically important credit institutions, their subsidiaries and sofomes with links to these types of institutions. For the rest of the institutions, as well as for sofomes outside the aforementioned assumptions, the regulation will become effective on January 1, 2024.

This regulation applies to new transactions originated or restructured by the institutions as of its entry into force, while for those transactions in force before the entry into force of the standard, the existing common risk regulation will continue to apply until their maturity.[5]

In this context, the LEX standard defines the existence of economic interdependence between legal entities (counterparties of a banking institution) if one of them, when experiencing financial problems, in particular difficulties in obtaining financing or repaying its obligations, causes the others to experience such difficulties as well.

Some of the criteria for classifying a group of counterparties as connected by economic interdependence include:

a) 50 percent or more of a borrower's gross income or gross (annual) expenses are derived from transactions with another borrower.

b) A borrower guarantees all or part of the credit exposure of another borrower, or when the guarantee granted represents 80 percent or more of the guarantor's liquid assets.

c) All borrowers obtain 80 percent or more of their annual gross income from the same source of income or supplier.

III. Calculation of the LEX limit

The credit risk concentration limit for funding operations considers two elements: the amount of the exposures and the level of the basic part of the institutions' net capital. The limits applicable under the large exposure's regime are presented in Table 1.

Table 1

Percentage of the eligible capital base (Tier 1)	Exposures
15%	Global or Domestic systemically important bank
25%	Exposure values of a non-GSIB or non- D-SIBS to a single counterparty or to a group of connected counterparties
100%	Sum of the four largest exposure values
	Sofomes in which the bank owns 99% of its capital
	Parastatals or public trusts
Exempt	Institutions from the Federal Government

In determining the amount of exposure, each banking institution shall:

1) Identify financing transactions with the same borrower and its counterparties with which it maintains economic interdependence, ensuring that it is not considered as an exemption.
2) Aggregate amounts and classify as large exposure when it exceeds 10 percent of core capital.
3) Sum the large exposures of each borrower or group of interconnected borrowers, and verify that it does not exceed the limit of 25 percent of core capital. If the exposure exceeds this limit, the excess will be deducted in its entirety when determining the institution's net capital.

IV. Benefits of LEX Regulation

By limiting and monitoring risk concentration, banks can anticipate and manage in a timely manner, through lending policies, a possible contagion among debtor companies, particularly where any of these could represent a large exposure for the bank.

The LEX standard will help to minimize problems due to the failure of a counterparty or group of counterparties, the risk of contagion between institutions, and to mitigate and reduce the risk of failure of financial institutions that could propagate potential losses.

V. Final considerations

The entry into force of this regulation required credit institutions to modify their risk control processes to determine criteria, procedures and computer systems to identify and monitor the new elements of economic interdependence established in the regulation. Thus, this new regulation creates the challenge of identifying and evaluating groups of counterparties under the new criteria of economic interdependence and interconnectedness. It is estimated that those exposures that could exceed the limit of 25% of the basic part of the net capital will be treated as exempt exposures. In this regard, considering that exceeding the limits contained in Table 1, implies a cost in terms of capital reduction, which generates a strong incentive to

[5] The concept of common risk refers to the risk posed to an institution by having as debtor(s) individuals and legal entities whose relationship or links with each other are due to their close economic dependence, control or management of the borrower, or because they belong to the same business group or consortium. General Provisions Applicable to Banks, CNBV.

comply with this rule, it is possible that institutions have reduced their exposures in advance to avoid such a capital charge.

References

Baudino P., Sturluson J. and Svoronos JP (2020) The banking crisis in Iceland. FSI Crisis Management, Series, No.1, Financial Stability Institute.

Basel Committee on Banking Supervision (BCBS), (2014) Supervisory framework for measuring and controlling large *exposures.* https://www.bis.org/publ/bcbs283.htm

Basel Committee on Banking Supervision (BCBS), (2022) Large exposures standard - Executive Summary. https://www.bis.org/fsi/fsisummaries/lex.pdf

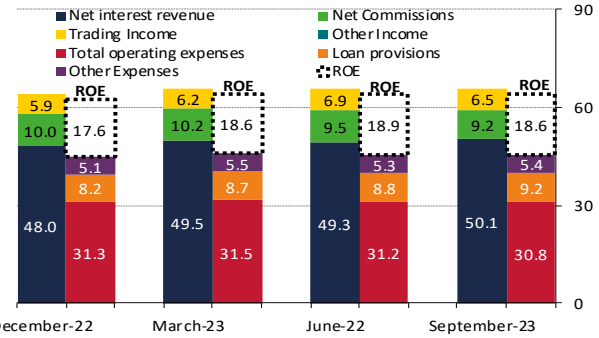
Special Investigation Commission (2010): Report of the Special Investigation Commission, April.

https://www.rna.is/eldri-nefndir/addragandi-og-orsakir-falls-islensku-bankanna-2008/skyrsla-nefndarinnar/english/

Profitability

The profitability of commercial banks, measured as the ratio of twelve-month net income to average stockholders' equity for the period (ROE), decreased at the margin to 18.6% in September. The reduction in the profitability level of banks as a whole is mainly due to higher expenses for the constitution of loan reserves, as well as the other expense item (see Graph 79). Notwithstanding the above, the profitability level reached during the period covered by this repurchase agreement had not been recorded since 2008. Credit reserves created for the commercial portfolio, mainly those related to loans to financial institutions and, to a lesser extent, to government entities, explain this higher outflow. Nevertheless, there is heterogeneity in the levels of profitability among the banks in the system; those banks with lower profitability could have limited capacity to increase their level of reserves, continue their intermediation work and face risks going forward.

Graph 79
Commercial Banks Profitability Components
(12-month flow)



Data as of September 2023
Source: CNBV

Financial indicators

Using the methodology presented in Box 6 of the June 2022 Financial Stability Report, it is possible to construct projections of some relevant indicators, so that not only do we have a point forecast, but by estimating different quantiles, we have a distribution that identifies in which indicators there is a higher level of uncertainty in the estimate, which is usually also reflected in higher levels of risk.

Indicators will be presented that reflect the annual change in profitability, net interest margin and ROE; indicators for credit growth; and, finally, an indicator of the change in the risk of the credit portfolio, estimated by the change in the non-performing ratio levels of such portfolio. [48]

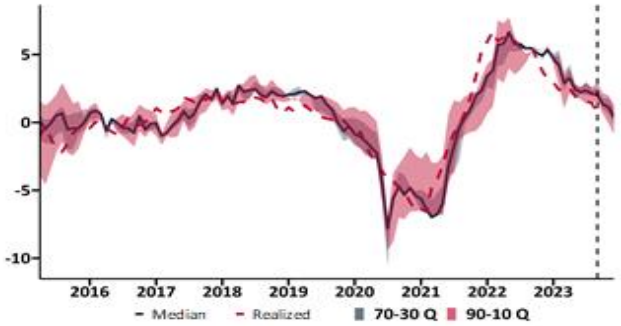
Indicators of profitability measures show that, after suffering declines during the pandemic, both ROE and net interest margin (Graph 80a and Graph 80b)

[48] In all cases, out-of-sample forecasts are presented for a three-month horizon, obtained using quantile regressions of these indicators.

recovered their growth rates, but with a tendency to return to pre-pandemic growth rates.

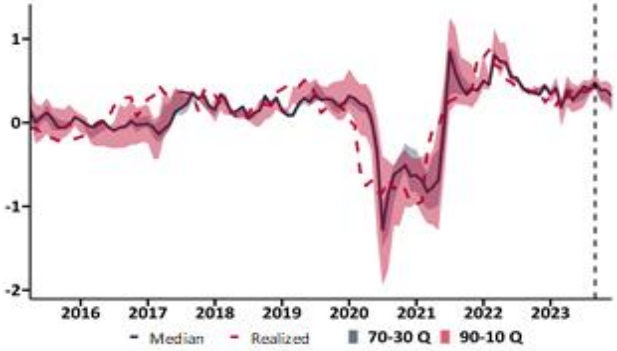
The projection of credit growth already shows some recovery, although with relatively high levels of uncertainty observed in the greater dispersion of the estimates (Graph 80c). As with the profitability indicators, a return to pre-pandemic levels is observed.

Graph 80
Three month horizon out of sample forecast
a) ROE
Percentage points



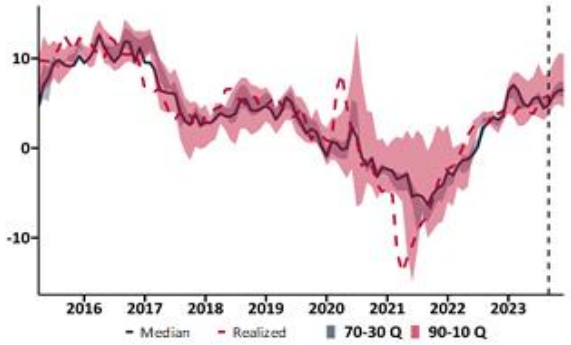
Data as of September 2023. Forecasts up to December 2023
Source: Banco de México

b) Financial margin
Percentage points



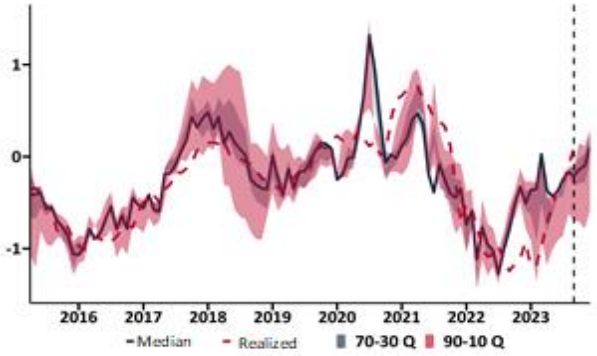
Data as of September 2023. Forecasts up to December 2023
Source: Banco de México

c) Real credit growth
Percentage points



Data as of September 2023. Forecasts as of December 2023
Source: Banco de México

d) Adjusted non-performing ratio
Percentage points



Data as of September 2023. Forecasts as of December 2023
Source: Banco de México

Finally, the indicators of the growth rate of the portfolio's adjusted non-performing ratio levels (*IMORA*) are shown. This indicator reflects a high degree of uncertainty, as well as a peak in its growth levels (Graph 80d).

Credit risk

Bank credit risk, measured by conditional value at risk (*CVaR*) at the 99.9% confidence level as a proportion of the credit portfolio, remained relatively stable during the second and third quarters of 2023, with a slight peak from August onwards, rising from 5.65% in March 2023 to 6.27% in September 2023 (Graph 81a).[49,50] The increase in the last two months is mainly

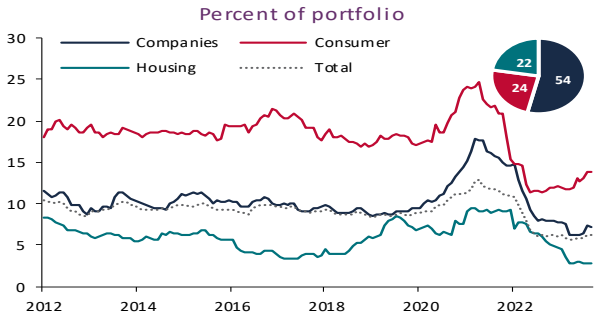
[49] The conditional value at risk (CVaR) allows the analysis of losses in the tail of the distribution, since it represents the expected value of the loss when it is greater than the VAR, which, in turn, represents the percentile corresponding to a given confidence level in a loss probability distribution of a portfolio of assets subject to credit risk.

[50] Credit *VaR* is calculated using the "Capitalization and Credit Risk" (CYRCE) model. The main elements of this model are the probability of default for each loan, the structure of variances and covariances of potential defaults, and the structure and concentration level of the loans in the portfolio. An explanation of the model can be found in Banco de México, *Reporte sobre el Sistema Financiero 2006* (May 2007), 64-67 and in Javier Márquez Diez-Canedo, *Una nueva visión del riesgo de crédito*, Limusa (2006).

explained by higher probabilities and correlations of default in the corporate and consumer credit portfolios (Graph 81b).[51] Although the risk of the consumer portfolio recorded a significant increase in the last two quarters, it is still at historically low levels, in an environment in which risks related to macroeconomic factors have evolved favorably.

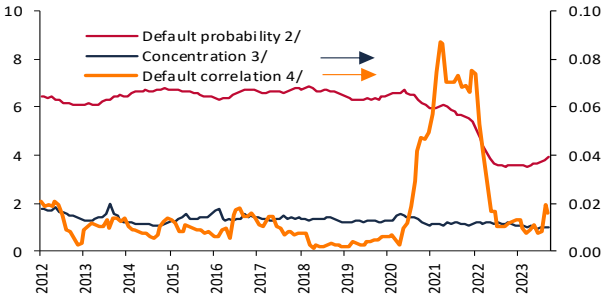
Graph 81

a) Conditional Value at Risk (CVaR) by type of portfolio[1/]



Data as of Septiembre 2023
Source: Banco de Mexico, CNBV and Credit Bureau
1/ Using a time period of one year and a confidence level of 99.9%. The pie chart shows the total percentage of the current balance for each portfolio segment.

b) Portfolio concentration, probabilities and default correlation[1/]



Data as of September 2023
Source: Bank of Mexico, CNBV and Credit Bureau
1/ Components used as inputs to compute the CVaR of the portfolio

2/ Average default probability of the portfolio on annual horizon.

3/ Portfolio concentration measured using the Herfindahl-Hirschman Index.

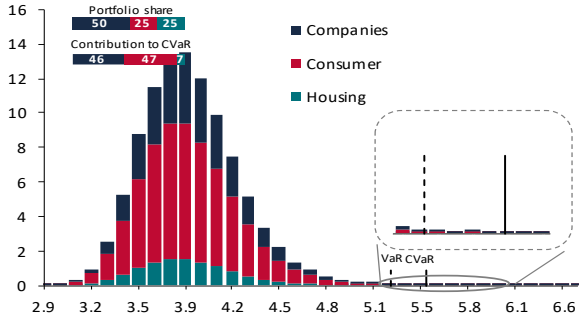
4/ Average default correlation of the portfolio on annual horizon.

When considering all commercial bank loan portfolio exposures and their distribution of potential credit losses,[52] it shows that, although the consumer portfolio is more atomized, it has a relatively higher probability of default than the other portfolios, which makes its contribution to *CVaR* considerably higher than its share of the total portfolio balance (47% vs. 25%), and, since the second quarter of this year, said portfolio has contributed the most to total *CVaR* (Graph 82).

Graph 82

Simulated credit loss distribution of the system

Horizontal axis: Percent of portfolio[1/]
Vertical axis: Percent



Data as of August 2023
Source: Banco de Mexico, CNBV, and Credit Bureau

1/ The percentage of loss for each portfolio is relative to the total loss, within eac interval. The VaR and CVaR levels are 99.9%.

Exposure of banks to changes in inflation, economic activity and formal employment

Inflation, formal employment and economic growth may influence the credit risk of corporate, payroll, mortgage, auto, personal, and ABCD portfolios.

In corporate credit, risk increases when there is a fall or slowdown in economic activity that is reflected in the IGAE as a whole or in the sectors with the largest share in the credit portfolio.[53] With respect to the previous *Report*, the indicator improved, denoting a lower risk for the portfolio (Graph 83). The improvement was greater than that of the IGAE, in part, due to the good performance of some sectors

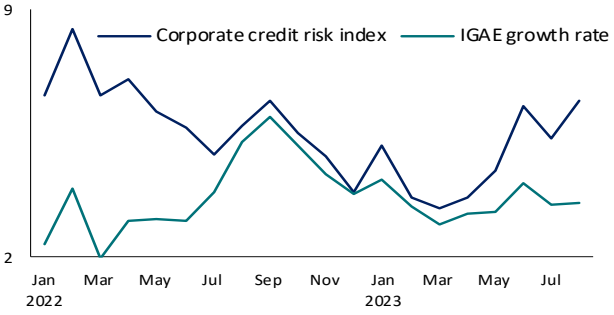
[51] The default probabilities and correlations used in the model are estimated through the observed historical default rates of loans, whose reference can be found in Banco de México, *Reporte sobre el Sistema Financiero* 2006 (May 2007), Box 10.

[52] This distribution is generated using the loan portfolio loss simulation methodology presented in Box 7 of the *Financial Stability Report* June 2022, Banco de México, pp 74-75.

[53] The risk indicator is constructed as the weighted average of economic growth in the different sectors. The weight each sector receives is equal to its share of business credit. Therefore, aggregate and sectoral changes in economic growth are captured. The change of base year in the calculation of the IGAE implied two modifications: 1) an increase in the number of sectors; and 2) the annual growth rates of sectors that already existed were recalculated.

with more weight in credit than in production, such as professional services and construction.

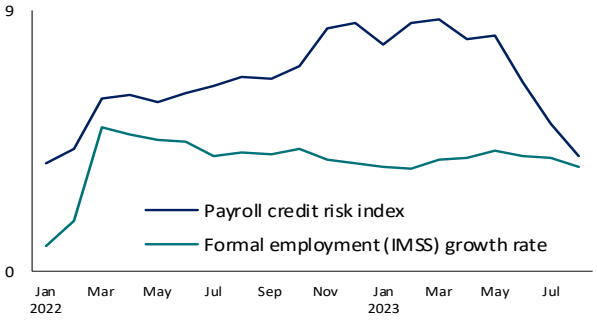
Graph 83
Corporate portfolio credit risk due to changes in economic activity
Variation in percent



Data as of August 2023
Source: Banco de Mexico and INEGI

In payroll, mortgage and automotive credit, risk increases when there is a drop or slowdown in aggregate formal employment or in the labor markets with borrowers having a larger share of the portfolio.[54] In payroll, the indicator decreased, reflecting more credit risk (Graph 84). Said decline was greater than the slowdown in formal employment. This is because the slowdown had a greater impact on higher wage earners, who have a larger share of the payroll portfolio. In mortgages and automotive credit, the indicator also deteriorated, although this worsening was smaller in mortgages because the slowdown in formal employment affected women more, and they have less participation in this type of credit than in the automotive credit.

Graph 84
Payroll portfolio credit risk due to changes in formal employment
Annual variation in percent



Data as of August 2023
Source: Banco de Mexico, INEGI and IMSS

In personal and ABCD, credit risk responds to changes in inflation. In these portfolios, borrowers have less purchasing power and tend to be more vulnerable to price increases as the income they can devote to loan payments is reduced.[55] Thus, risk increases when headline inflation or the items most consumed by borrowers with the largest share of the portfolio also increase.[56] In personal loans, the indicator improved but less than headline inflation because: (i) people with more personal loans spend more on housing;[57] (ii) the increase in housing prices accelerated, unlike headline inflation; and (iii) this caused the recovery in the purchasing power of these people to be more moderate (Graph 85). In ABCD, the indicator also improved, even more than in personnel because: (i) people with more ABCD participation spend more on food and beverages; and (ii) price increases in this item slowed down more than headline inflation.

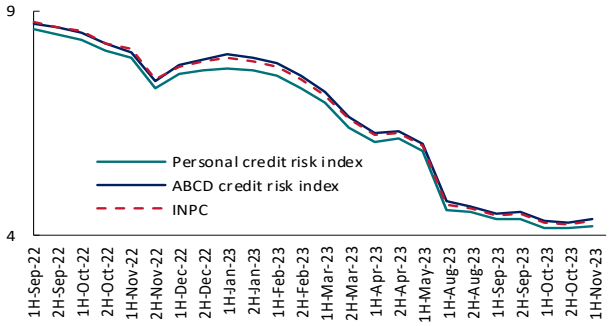
[54] To construct the indices related to formal employment, the proportion of credit in each state is obtained by gender and wage level. The high-wage formal employment threshold is defined as the median of the historical wage distribution of borrowers.

[55] See Box 1 Inflation and non-performing ratio levels in non-revolving consumer credit in the Financial Stability Report-December 2022.

[56] To construct the personnel and ABCD portfolio indexes, the exposure of each municipality to inflation is estimated and then a national average is calculated, weighting each municipality by its share in each portfolio. This exercise uses data from the consumer price index based on the information structure classified by object of expenditure and economic activity by state, which presents disaggregated information on expenditure items such as food, education, leisure and housing, among others. Borrowers are identified through spending patterns, which consider the socio-demographic strata of each region of the country.

[57] The classification by object of expenditure and economic activity by state allows for a detailed analysis at the state level and type of expenditure component. This information differs from that provided by the National Consumer Price Index (NCPI) and its components, such as the core and non-core sub-indices, and their respective breakdowns. An illustrative example is the housing item: in the classification by object of expenditure, this item includes concepts such as electricity and fuels; however, in the classification by CFP subindex, the housing item in the core subindex excludes these concepts, since they are recorded in the non-core subindex.

Graph 85
Credit risk in personal and ABCD portfolios due to changes in inflation
Annual variation in percent



Data as of the first half of November 2023
Source: Banco de Mexico and INEGI

Market risk

Banks' market risk, measured through market *CVAR* as a proportion of net capital, increased during the period from March to September 2023, from 5.09% to 5.96% in September. This is due to changes in the composition of the portfolios, mainly due to the increase in the proportion of instruments that are more sensitive to interest rate movements (see Graph 86).[58]

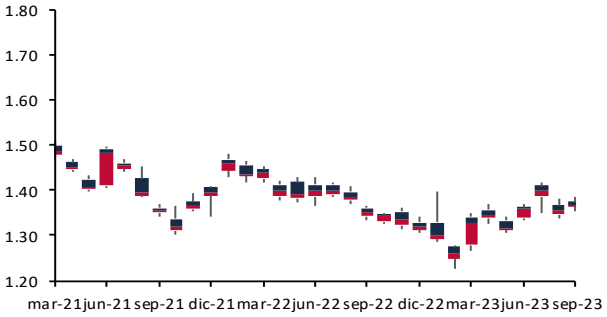
Graph 86
99.9% CVaR for commercial bank's market risk
Net capital percent



Data as of September 2023
Source: Banco de Mexico, CNBV, BMV, Bloomberg and Valmer

The sensitivity of the debt securities portfolio to changes in interest rates, measured through duration based on market information, continued the upward trend that began in March 2023. This change is mainly due to the recomposition of the institutions' portfolios to instruments with remaining maturities longer than one year. As of September, duration stood at an average level of 1.37 years, showing a marginal increase with respect to the value in March 2023, which was 1.32 years (Graph 87).

Graph 87
Average monthly duration of commercial bank's position
Years

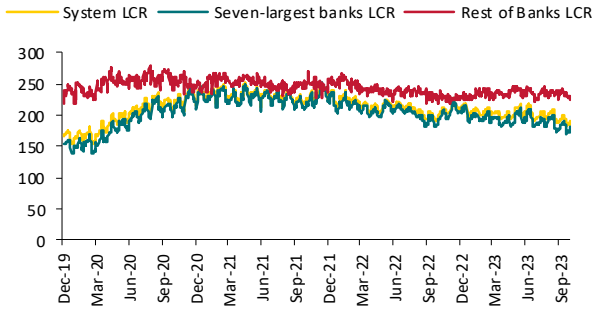


Data as of September 2023
Source: Banco de Mexico and Valmer

Liquidity risk

The liquidity of commercial banks remains ample, at levels higher than those observed before the pandemic. The aggregate Liquidity Coverage Ratio (LCR) for all banks, an indicator of the sufficiency of liquidity to withstand a stress event over a thirty-day horizon, was around 200 percent (Graph 88), and, individually, all banks maintained an LCR greater than the regulatory minimum of 100% during the period covered by this *Report* (Graph 89).

Graph 88
Daily LCR of the banking system and group of banks
Percentage



Data as of October 31, 2023

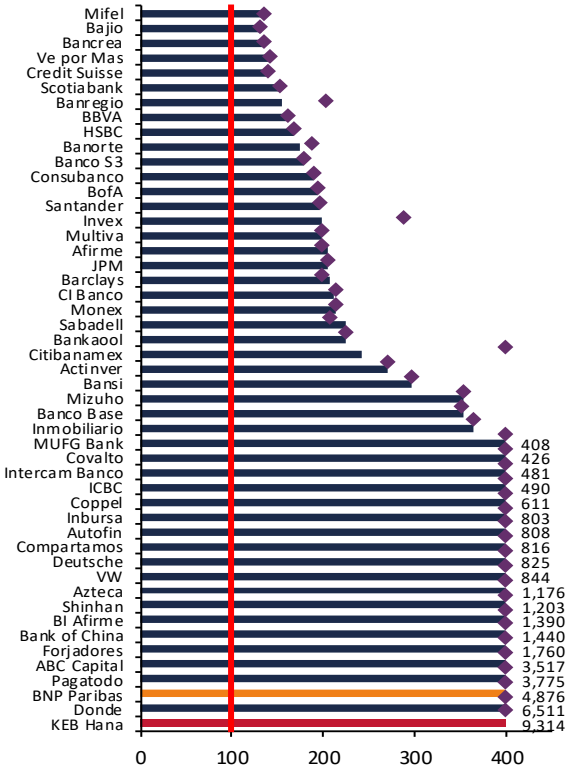
Source: Banco de México

[58] The *CVaR* represents the expected value of losses above the 99.9% quantile of the loss distribution generated by historical simulation. Simulation is generated with the observed 20-day changes of the risk factors since 2004, applied to the positions of the date considered. Given the number of observations, the behavior of the *CVaR* is almost entirely explained by changes in portfolio composition, with a marginal effect of recent changes in risk factors.

Graph 89

LCR of commercial banking institutions [1/]

Percentage



Data from July to September 2023

Source: Banco de México y CNBV

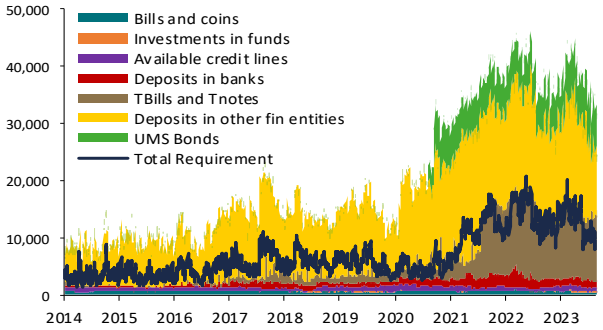
1/ The graph shows the quarterly average of the LCR for each bank from July to September 2023. The bar shows the consolidated LCR and the rhombus the individual LCR. In accordance with the regulation, banks marked in dark blue must meet a minimum LCR of 100%, banks marked in red a minimum of 90% and banks marked in orange a minimum of 70%.

Likewise, banks maintain a large surplus of liquid assets in foreign currency with respect to the regulatory requirement, also above the levels observed before the pandemic. In recent months, there has been an increase in US government debt holdings and a decrease in deposits in financial institutions. At the individual level, all banks in Mexico comply with the regulatory requirement in foreign currency (Graph 90).

Graph 90

Liquidity requirement in foreign currency and liquid assets

Millions of USD



Data as of October 31, 2023

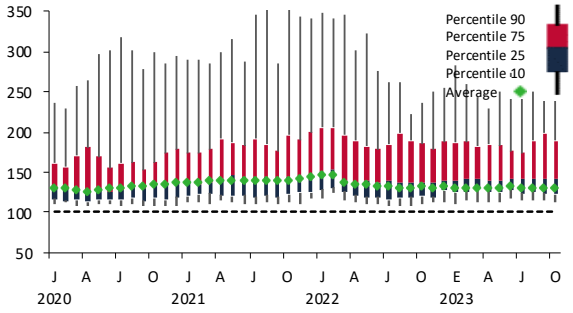
Source: Banco de México.

In terms of their structural liquidity, the Net Stable Funding Ratio (CFEN, for its acronym in Spanish) indicates that banks maintain a structure of adequate funding sources and uses; that is, with sufficient stable funding to finance assets with lower liquidity and longer maturities. The banks' CFEN has remained stable and only marginal movements have been recorded since its implementation in March 2022 (Graph 91). All banks maintained a CFEN above the regulatory minimum of 100% (Graph 92).

Graph 91

NSFR Distribution

Percentage



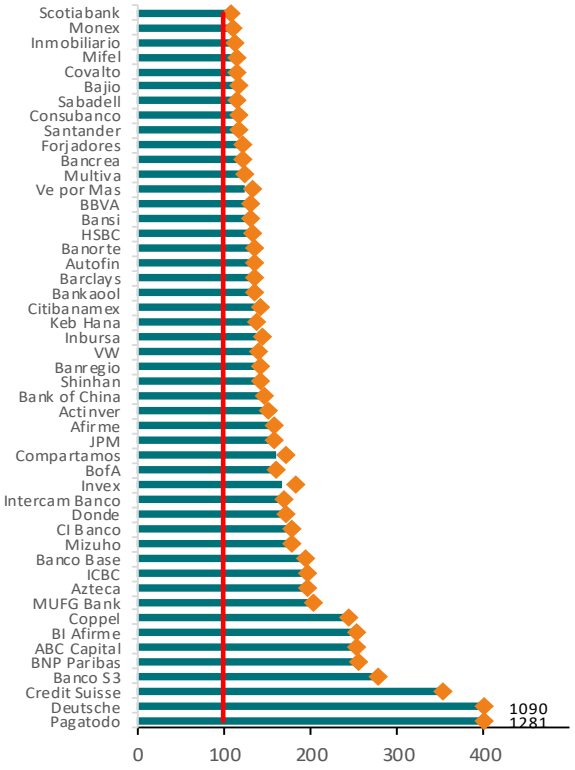
Data as of October 2023

Source: Banco de México.

Graph 92

NSFR of commercial banking institutions [1/]

Percentage



Data from July to September 2023

Source: Banco de México y CNBV

1/ The graph shows the quarterly average of the NSFR for each bank from July to September 2023. The bar shows the consolidated NSFR and the rhombus the individual NSFR.

It is worth noting that the composition of institutions' liabilities remained unchanged during the period since the last *Report*. Traditional bank funding increased in the last semester, mainly in its term component, and funding levels remained above those observed before the pandemic.

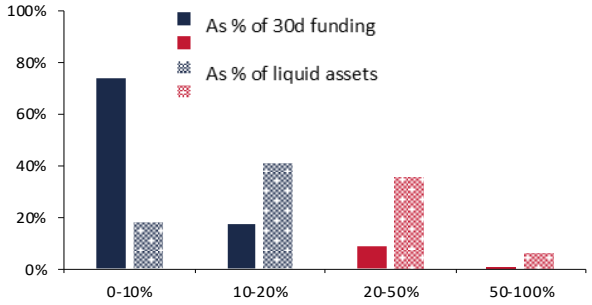
As for funding concentration, it has generally decreased. The level of banks' liquid assets would be sufficient to meet outflows equivalent to the 90th percentile of the historical outflows of their top 10 creditors. However, some small banks maintain a high concentration in a few creditors (Graph 93). It is important to monitor the behavior of the largest creditors, since the withdrawal of their financing could put pressure on the liquidity situation of those institutions that are too concentrated (Graph 93).

Graph 93

Funding concentration of the 10 largest counterparts that fall due within 30 days [1/, 2/]

Vertical axis: proportion of total assets of the system

Horizontal axis: percentage that the 10 largest funding counterparts as a proportion of liquid assets and 30 days funding



Data as of October 2023

Source: Banco de México

1/ Concentrated counterparts consider only those funding counterparts whose total funding at the end of the month is at least 200 million pesos or amounts 0.5 % of the bank's total liabilities.

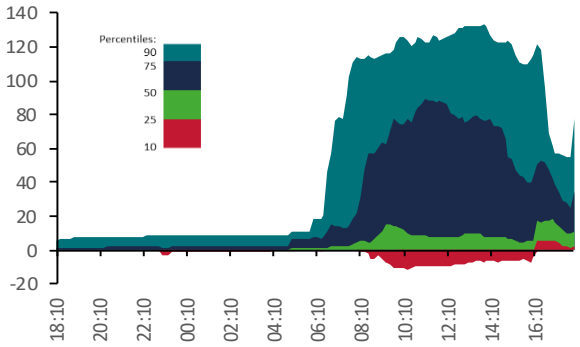
2/ Observations in which the 10 largest counterparts represent more than 20 % of the liquid assets or of 30 days funding are identified in red.

In order to perform a holistic monitoring of institutions' liquidity, it is also necessary to take into account the dynamics of banks' intraday liquidity, which is not captured by existing regulatory requirements. Therefore, it is necessary to monitor complementary indicators for this risk, such as net liquidity flow and total daily activity in payments systems.[59] In general, banks maintain sufficient liquid assets to cover their liquidity needs at the times when they face the highest demands for payments and transfers (Graph 94).

[59] The net flow of intraday liquidity refers to payments received minus payments sent during the intraday; it allows identifying times of the day with a liquidity deficit and its magnitude with respect to available liquidity. The second indicator refers to total payments sent and total payments received; a deficit position at the end of several consecutive days could suggest liquidity problems.

Graph 94
Intraday liquidity usage (received payments minus sent payments) 1/

Vertical axis: Percentage of deposits in Banxico
Horizontal axis: Hours (10 minute intervals)



Data from July to September 2023

Source: Banco de México.

1/ Intraday liquidity usage refers to intraday payments received minus payments sent, it allows identifying times of the day with liquidity deficit and its magnitude with respect to available liquidity. The total payments sent and received are normalized as a proportion of liquidity in Banco de México (DRM, unencumbered deposits in pesos and dollars). The graph presents the percentiles of distribution per hour in 10-minute intervals, considering average observations for the quarter.

Box 6: Permanence and exit risk of significant funding counterparties

I. Introduction

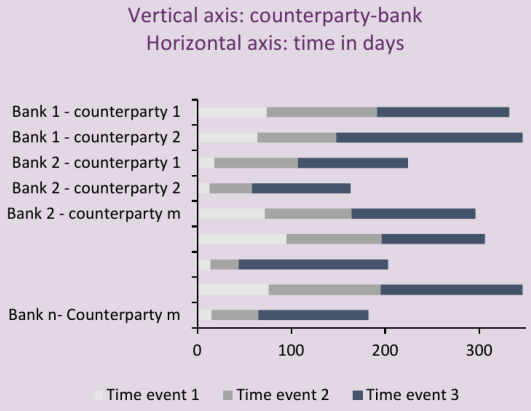
The Principles for Sound Liquidity Risk Management and Supervision, issued by the Basel Committee, establish that banks should maintain a funding strategy with an effective diversification of sources and maturities, as well as carry out liquidity stress exercises that consider different scenarios.[1] In relation to funding sources, banks usually obtain funding from depositors that due to their characteristics, such as size and liquidity needs, may behave differently from traditional creditors. Analyzing the dynamics of large depositors and their outflow probability helps banks to manage their liquidity risk and to prepare strategies to replace such funding and to have funds available to cover their obligations in a timely manner. This *Box* presents an analysis of the permanence shown by the largest counterparties (significant counterparties), using survival models and recurrent events to estimate the probability of exit of these counterparties.[2]

II. Data

In order to study the dynamics of significant funding counterparties, data on demand and time deposits are used for each bank. The creditors to be monitored are those for which the sum of their deposits is equal to or greater than 200 million pesos or represents 0.5% of total deposits in the Liquidity Coverage Ratio (LCR) calculation, or which are one of the bank's ten largest creditors. The database makes it possible to identify the amount of deposits by bank and counterparty on a weekly basis, so that it is possible to determine the days that the deposit remains in the institution before a withdrawal occurs, if any.

For the analysis of recurring events, in addition to considering the history with the duration of the deposit, the characteristics of the deposit and the counterparty are considered; that is, the same counterparty in two banking institutions is considered as two independent counterparties. A withdrawal of at least 90% of the previous balance is considered a relevant outflow event for a counterparty.[3] In addition, it is assumed that if a counterparty disappears from the database, it is considered a 100% exit and no censored observations are considered.[4] This is regardless of the fact that counterparties may return their deposits and be in the sample with subsequent events.[5] For this type of analysis, the variable of interest is the time elapsed from the time a deposit is made until the relevant outflow event (Figure 1).

Figure 1
Diagram of the information structure for recurring event analysis



Source: Banco de México

1/ Diagram for explanatory purposes on the data structure for recurring events analysis.

Considering data from January 2022 to September 2023, there are 72,016 observations with disaggregation by bank, counterparty and other characteristics.[6] The median time between events is 54 days, with an interquartile range of 47 days (Graph). Likewise, the counterparties that recorded events have an average of 5 events, with a minimum of 1 and a maximum of 31 events.

Regarding the characteristics of each deposit, it is considered whether it is on demand, pays interest, is operational[7] and the percentage covered by IPAB's deposit insurance. In the sample, time deposits dominate (81%), interest paying (55%), non-operational (58%). Regarding additional characteristics, it is considered whether it is a related counterparty[8] , whether the deposit is made in a large bank, whether the counterparty is governmental, wholesale, financial or individual. The sample is dominated by large bank counterparties, government counterparties and those that are not related to the bank (Graph 212).

---

1 See Principle 7 and 10 of the Principles for Sound Liquidity Risk Management and Supervision (September 2008).

2 Survival and recurrent event models study processes that generate events repeatedly over time. Survival models consider a single event per counterpart while recurrent event models allow for multiple events per counterpart. Some examples of their usefulness are the study of errors in production lines; detection and elimination of software failures; medical studies for the detection of illness or death; credit default.

3 The analysis considers an output of 90% in order to evaluate events whose impact could be high, while maintaining a sufficiently large sample of observations for the statistical analysis of recurrent events.

4 Censored observation refers to observations in which the event was not observed either because the event did not occur or because the individual left the base.

5 An example of this behavior is counterparties with biweekly outflows, presumably for payroll.

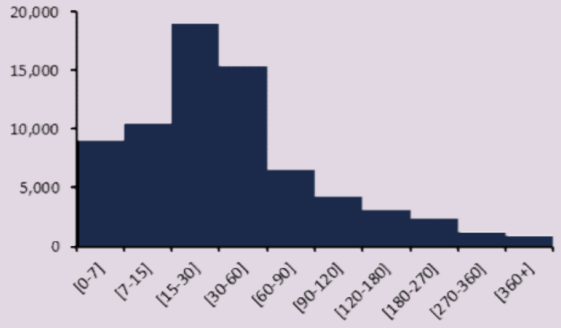
6 The exercise is carried out with the form of significant counterparties that multiple banking institutions must report on a weekly basis as of January 2022.

7 Operational deposits refer to the classification of demand deposit accounts and term deposit accounts of less than 30 days opened by corporations that comply with the characteristics described in the General Provisions on liquidity requirements for commercial banks.

8 Related counterparties are those that maintain a type of relationship with the institution, according to the related parties catalog: Holders of 2% or more of the Representative Securities; Members of the Board of Directors; Spouses and related persons; Persons with influence; Holders of 10% or more of the representative securities; Directors or Administrators; Persons with power of command; or Relevant related person.

Graph 1
Histogram of time interval until event (outflow)

Vertical axis: number of events
Horizontal axis: time interval in days

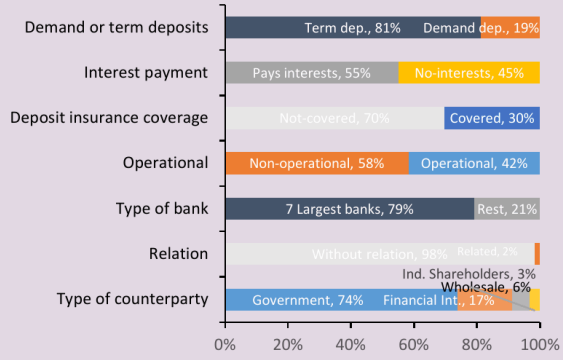


Data from January 2022 to September 2023.

Source: Banco de México

Graph 212
Features of deposits and counterparties

Percentage



Data from January 2022 to September 2023.

Source: Banco de México

III. Statistical model and probability of permanence curves

Based on the literature on recurrent events, a Cox proportional hazard model (*CoxPH*) is used. This model is a semi-parametric model, estimated by maximum likelihood, to analyze survival and recurrent events. In general, econometric duration models allow the analysis of the time elapsed before the occurrence of a certain event. Due to the characteristics of the analysis of significant counterparts, we chose to use the time interval since the last event and robust errors. Robust errors are those that adjust for the correlation between observations of the same individual over time. The risk function, i.e. the probability of the event occurring conditional on the time elapsed, is given by:

$$h_{ij}(w) = h_{0j}(w)\exp(Z_{ij}\beta_j)$$

$$i = 1, 2, \ldots contraparte;\ \ j = 1, 2, \ldots número\ de\ evento$$

Table 112
CoxPH model estimation with time intervals and robust errors.

Dependent variable: Time interval between events.	coefficient	robust standard error	p-value	
Sight or Term (term)	-0.03157	0.01258	0.01209	**
Pays interest (interest-free)	0.03248	0.01049	0.00197	***
IPAB coverage (uninsured)	0.02685	0.01088	0.01358	**
Operational (non-operational)	-0.03773	0.01095	0.00057	***
Related counterparty (non-related)	0.05499	0.03542	0.12053	
Type of bank (remainder)	-0.09160	0.01199	0.00000	***
Type of counterparty (wholesale)	-0.05431	0.02424	0.02508	**
Type of counterparty (governmental)	-0.01907	0.01348	0.15716	
Type of counterparty (individuals)	-0.12997	0.02881	0.00001	***
Average balance	0.00000	0.00000	0.15254	
Number of events		72016		
Likelihood		190.2	0.0	
Wald test		128.5	0.0	

Significance: 0 '***' 0.01 '**' 0.05 '*' 0.1.
If the coefficient is positive, the variable contributes to a higher exit risk (lower duration) and if the coefficient is negative, it contributes to a lower exit risk (higher duration).
Source: Banco de México

The results (Table 112) indicate that counterparty and deposit characteristics do have an effect on the probability of exit (deposit withdrawal) and are statistically significant. The independent variables correspond to the seven categorical variables on the characteristics of the deposits and counterparties (Graph 212) and the continuous variable of average balance. In particular, significant counterparties with demand deposits, non-interest bearing, operational, in large banks[9], financial institutions have higher exit risk. The categorical variable of whether a counterparty is related was not statistically significant, which could be due to the fact that there are few observations of related counterparties (2% of the sample). The type of counterparty has a behavior aligned to the expected liquidity risk, with financial institutions being of higher risk and individuals being of lower risk. [10]

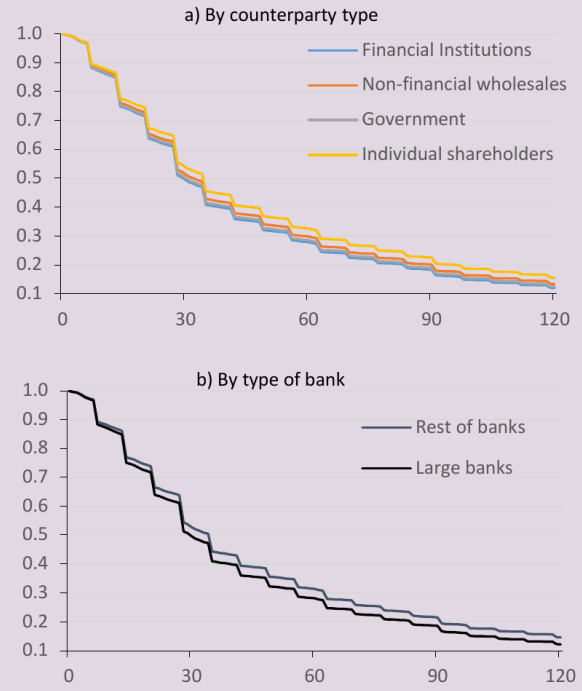
[9] Due to the type of analysis, it is normal that the significant counterparties with deposits greater than 200 million pesos for which events are observed have a greater incidence in large banks, since they concentrate the great majority of such counterparties.

[10] The results presented are maintained considering different deposit outflow percentages, in particular considering outflows of 25% and only counterparties in excess of 200 million pesos.

Graph 3

Duration curves for deposits from significant counterparties

Vertical axis: Probability of deposit permanence
Horizontal axis: Time (days)



Source: Banco de México

Based on the statistical model, the conditional probability of the event occurring in each period can be obtained, as well as the reciprocal, which is the probability of the event not occurring. Based on these probabilities, the survival curve can be calculated, which in the case of significant counterparties is equivalent to a deposit permanence curve. According to the calibrated model, the permanence curve is decreasing at decreasing rates, i.e., as time passes, the marginal probability of survival is higher. The greatest risk is concentrated in the first 30 days for this type of counterparty. According to the model, deposits from individuals have a higher probability of permanence than deposits from other financial institutions. By type of bank, the model indicates that deposits of significant counterparties in Banks of Local Systemic Importance (BISL) have a higher probability of outflow compared to those deposited in the rest of the banks (Graph 3). This is explained by the fact that BISL account for the vast majority of deposits over 200 million pesos. However, when evaluating deposit outflows associated with events expressed as a proportion of total deposits, these are considerably lower for the BISL than for the rest of the banks.

IV. Conclusions

Data on significant funding counterparties can be exploited with the survival and recurrent event analysis tools. The database contains sufficient granularity to track the same counterparty over time. This type of models can contribute to increase the portfolio of liquidity risk management measures of banking institutions by providing information on the behavior of these large counterparties. In addition, these models allow several additional analyses to be carried out, such as, for example, analysis of the behavior of depositors of individual institutions or by type of business of the institutions, information that can contribute to improve the calibration of liquidity stress scenarios.

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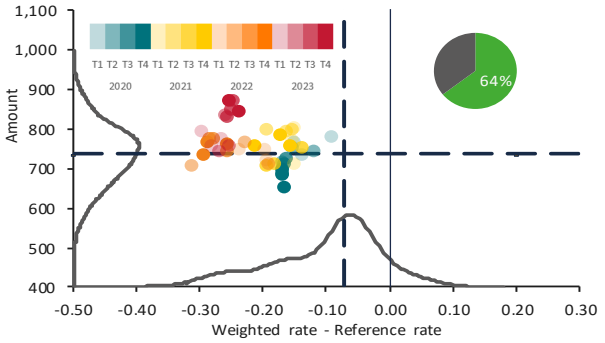
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Interbank financing

During the third quarter of 2023, the amount of repurchase financing from banks remains at historically high levels (since 2008) (Graph 95 and Graph 96). For Local Systemically Important Banks (DSIB), the spread between funding rates in the repurchase market and the monetary policy target rate remains unchanged since the second quarter of 2022, at around -0.27 basis points (Graph 95); while the spread increased for the rest of the institutions in this period, standing at around -0.2 basis points (Graph 96).

Graph 95
Repo Market[1/]
DSIBs[2/ 3/]
X axis: Basis points
Y axis: Billions of pesos

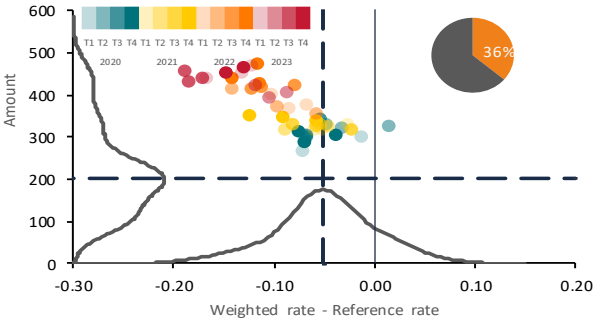


Data as of November 27, 2023

Source: Banco de México

1/Data includes all authorized counterparties and all types of collaterals.
2/Data points correspond to monthly weighted average of the daily observations for rates' spread and simple monthly average for the amount.
3/Dotted lines correspond to medians calculated since 2008.

Graph 96
Repo Market[1/]
Non DSIBs[2/ 3/]
X axis: Basis points
Y axis: Billions of pesos



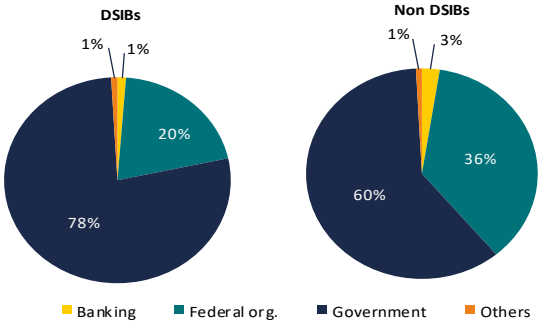
Data as of November 27, 2023

Source: Banco de México

1/Data includes all authorized counterparties and all types of collaterals.
2/Data points correspond to monthly weighted average of the daily observations for rates' spread and simple monthly average for the amount.
3/Dotted lines correspond to medians calculated since 2008.

As for the type of assets that institutions repurchase, the vast majority are government instruments.[60] On the other hand, banks that are not locally systemically important use instruments of federal agencies[61] in greater proportion than DSIB (Graph 97).

Graph 97
Collaterals in the repo market
Percent



Data as of November 27, 2023
Source: Banco de México

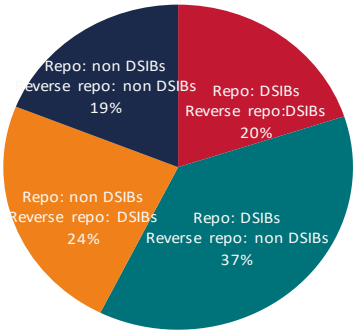
The amount of transactions carried out in the interbank repurchase market is dominated by

[60] Federal government bonds: bondes D, bondes F, bondes G, udibonos, development bonds, federal government certificates, BREMS.

[61] Development banking, Pemex, CFE, state and municipal instruments, Banking and Deposit Insurance and Resolution Agency (IPAB, its acronym in Spanish)

operations in which DSIB act as the selling party (57% of the total, Graph 98).

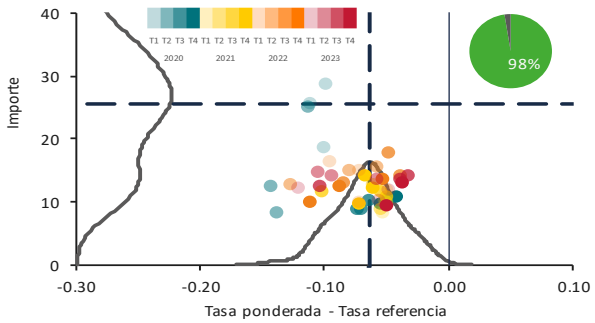
Graph 98
Amount traded in the interbank repo market by counterparties
Repo - Reverse repo
Percent



Data as of November 27, 2023
Source: Banco de México

As for financing in the unsecured market, it remains relatively low and with little variation in the amounts and spreads since the last *Report*, the difference in rates remains around zero, close to the historical median (see Graph 99 and Graph 100).

Graph 99
Unsecured market
DSIBs[1/2/]
X axis: Basis points
Y axis: Billions of pesos



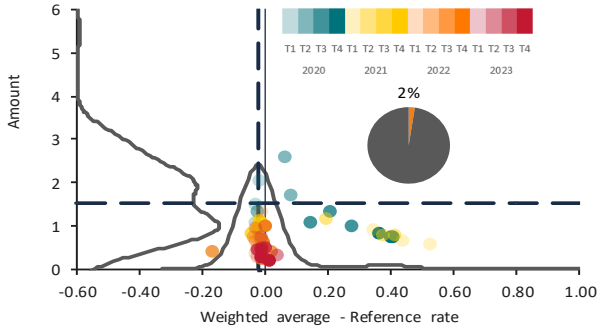
Data as of November 27, 2023

Source: Banco de Mexico

1/ Data points correspond to monthly weighted average of the daily observations for rates' spread and simple monthly average for the amount.

2/ Dotted lines correspond to medians calculated since 2008.

Graph 100
Unsecured market
Non DSIBs[1/2/]
X axis: Basis points
Y axis: Billions of pesos



Data as of November 27, 2023

Source: Banco de México

1/Data points correspond to monthly weighted average of the daily observations for rates' spread and simple monthly average for the amount.

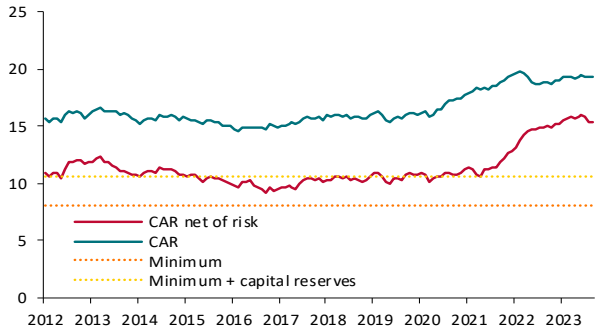
2/Dotted lines correspond to medians calculated since 2008.

CAR and liquidity-at-risk

A joint assessment of commercial banks´ net-risk Capital Adequacy Ratio (CAR) and the Liquidity Coverage Ratio (LCR) at risk shows that, at the end of September, as in previous editions of the *Report*, most banks have sufficient capital and liquid resources to withstand periods of stress.

The net risk capitalization ratio, which is estimated as the resulting capitalization ratio against portfolio losses equivalent to the 99.9% credit *CVaR*,[62] remained at the same levels during the second quarter of 2023, with a slight decrease in the third quarter, from 15.81% in March 2023 to 15.36% in September 2023 (Graph 101). This is the result of the behavior of the system's CAR, together with the slight increase in portfolio risk in the last two months. The banking system ratio levels continue to be higher than the regulatory minimum, which shows the banks' capacity to absorb unexpected losses derived from the credit default of their portfolios.[63]

Graph 101
CAR net of risk 1/
Percent



Data as of September 2023
Source: Bank of Mexico, CNBV and Credit Bureu

1/ Estimated as the capitalization ratio that results from reducing the CVaR at a 99.9% confidence level, both from the net capital and risk weighted assets. This indicator assumes that the credit portfolio incurs losses in an amount equivalent to a CVaR of 99.9% and such losses are absorbed by the banks and then reflected in their capital levels without affecting reserves, and that this portfolio is weighted at 100% to determine their capital requirements.

According to the results of the liquidity-at-risk exercise[64] at the end of September, the banking system has a solid liquidity position. Even under extreme deposit outflow scenarios, most banks, which represent around 95% of the system's total assets, maintain an LCR above the regulatory minimum level of 100% (Table 4).

[62] It is assumed that such losses are absorbed directly with the banks' capital without affecting its reserves and that such portfolio has a 100% weighting for the determination of its capital requirement. This indicator can be used to assess whether a bank's capitalization levels are adequate to cope with unanticipated losses in its loan portfolio.

[63] As these estimates are based on historical conditions observed to date, this indicator is a reference and not a forecast of the potential losses that could be observed in the current situation.

[64] The liquidity-at-risk exercise aims to assess whether commercial banks have sufficient liquid assets (cash and high-quality debt securities) to meet their net outflows in a 30-day stress period. For this purpose, outflow factors are estimated based on historical information on each bank's deposits (*CVaR* at 95%). The potential impact on the value of liquid assets is also considered under four historical scenarios, four macroeconomic scenarios (section VI.1), and two scenarios associated with climate change (section VI.3).

Table 4

Bank groups by liquidity at risk[1/]

Group	Criteria	Group bank assets as a share of total commercial banking assets
1	CCL ≤ 65	2.3 %
2	65 < CCL ≤ 100	2.7 %
3	CCL > 100	95.0 %

Data as of November 2023

Source: Banco de México

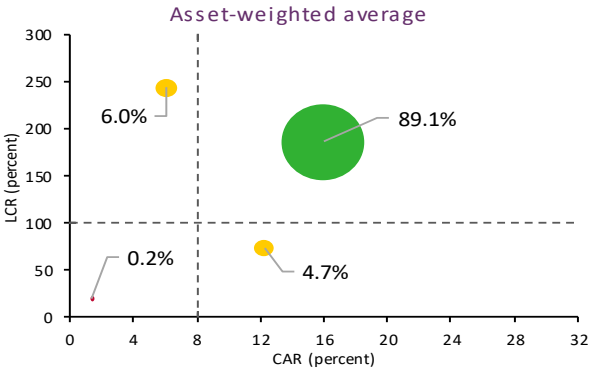
1/ Total assets data for commercial banks refer to those released by the CNBV at the end of November 2023.

The results suggest that, in the aggregate, the Mexican banking system would have sufficient liquid resources to face periods of stress associated with extreme outflows in the system's deposits.

Finally, when jointly evaluating the results of the liquidity-at-risk and net-risk capitalization ratio exercises, the results suggest that most banks comply with both requirements and have sufficient liquid resources and capital to face periods of stress. Thus, at the end of September, the institutions below the regulatory minimum in both requirements, under the stress scenarios, represent around 0.2% of the system's assets (Graph 102).

Graph 102

Liquidity and solvency at risk of commercial banks [1/ 2/]



Figures as of September 2023

Source: Banco de México

1/ The lines show the regulatory thresholds for the liquidity requirement (LCR = 100 %) and the minimum capitalization requirement (CAR = 8 %). The bubbles depict the total assets for the group of institutions within each quadrant, and the percentage is its proportion with respect to the commercial banks' total assets, where the centroid is the asset-weighted average. The red, yellow and green colors denote those institutions that: fail to comply both requirements; fail to comply with one of the two requirements; and comply with both requirements.

2/ For ease of visualisation, for each institution, the indicators of CCL at Risk and ICAP Net of Risk were capped at 300 % and 40 %.

Contagion risk

This section describes the results of the contagion risk assessment.[65] In this exercise, the exposures network between financial institutions in the interbank market is used, and the mechanisms that allow the spread of risks and vulnerabilities to the entire financial system are analyzed. Daily information is used for all exposures in the domestic financial system, as well as between financial institutions abroad.[66]

During the period between the release of this *Report* and the previous one, two periods of higher contagion risk were observed, measured both by the share of broker assets in the worst contagion chains[67] (Graph 103) and by the severity of losses (Graph 104), considering how many banks end up with capitalization levels below various thresholds: the

[65] Interbank contagion risk refers to the possibility that the problems faced by a bank in meeting its financial commitments may be transmitted to other banks, either directly or indirectly.

[66] It is considered information of exposures in the interbank network, originated by: (i) the purchase and sale of securities; (ii) deposits and loans; (iii) market operations, such as derivatives and repurchase agreements; and (iv) foreign currency purchase and sales operations.

[67] To determine which are the worst contagion chains, a counterfactual exercise is carried out to assess the impact that the bankruptcy of each of the brokers analyzed would have on the financial system. The worst contagion chain is the chain in which the most losses are observed.

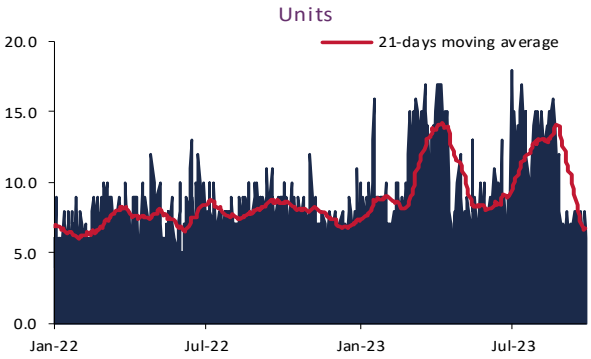
first in March and April, and the second in July and August.

A common element in both periods is that more brokers increased their exposures relative to their capital. This can be seen in the increase in the number of overexposed brokers (Graph 105). A broker is overexposed when the total of its interbank exposures exceeds the amount of capital it has to absorb such losses without remaining below the regulatory minimum. This increased the number of brokers affected in the contagion chains.

In addition, in the second period a change in the network's structure is observed (Graph 106). Density decreased, which implies that the network showed a lower number of interconnections; also, disassortativity increased.[68] This means that during the second period where an increase in contagion risk is identified, the number of interconnections in the network was reduced, but banks with few interconnections sought out larger banks to establish exposures. This concentrated the exposures and increased the potential losses and the number of banks affected in the contagion exercise.

Graph 103

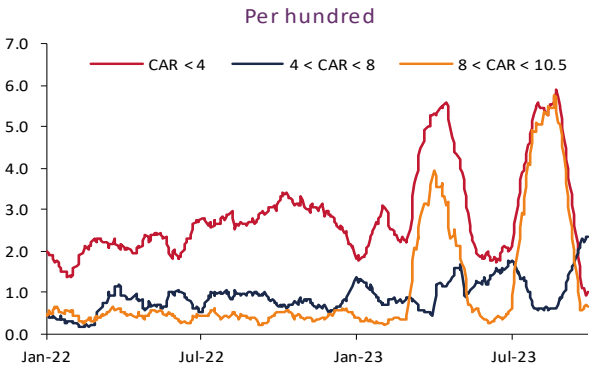
Maximum number of banks and brokerage firms involved in the contagion chains



Data as of September 30, 2023.
Source: Banco de México.

Graph 104

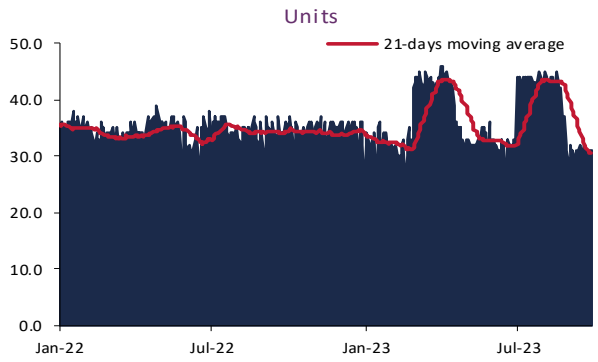
Percentage of the bank's assets lost in the worst contagion chains by final CAR Levels 1/



Data through September 30, 2023
Source: Banco de México
1/ The graphed series relates to the simple 21-days moving average of the original series.

Graph 105

Number of banks and brokerage firms overexposed

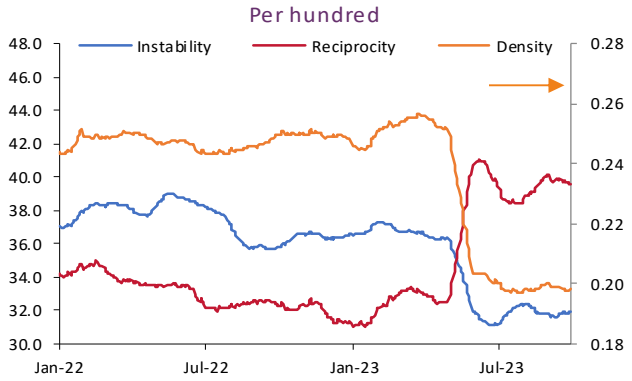


Data as of September 30, 2023.
Source: Banco de México.

[68] *Disassortativity* is defined as a greater propensity for brokers, who are generally not very interconnected, to seek greater relationships with highly interconnected brokers, suspending interrelationships with others who are not very interconnected.

Graph 106

Measures of the interfinancial exposure network [1/]



Data through September 30, 2023
Source: Banco de México
1/ The graphed series relates to the simple 21-days moving average of the original series.

Although the network structure has not returned to its previous form, the risk of contagion has returned to levels similar to those prior to the periods of increased contagion.

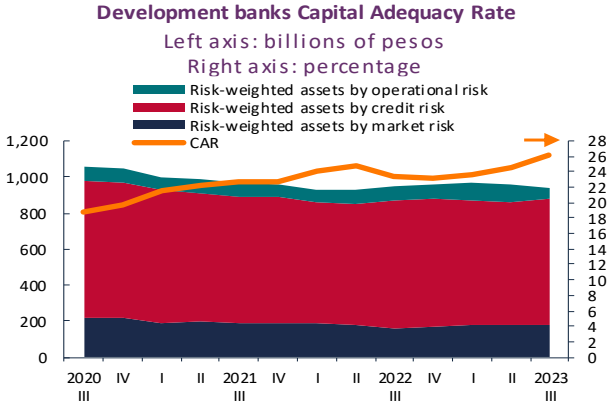
IV.3.2. Development banks and other financial institutions

As of September 2023, the development banks and other public development financial institutions (development banking system)[69] remained financially sound. The system reflects a favorable evolution in the main items of the financial statements, in which a positive net income and a growing capitalization index stand out, notwithstanding the decrease in the balance of financing in recent years and a greater constitution of preventive reserves.

Development banking institutions have ample capital; as of September 2023, they registered a CAR of 26.2%, which increased by 276 bps with respect to the level of September 2022. Total risk assets remained at the same level as in September 2022, while net capital increased by 11%. As of the third quarter of 2022 and during the first half of 2023, assets subject to credit risk increased due to a peak in placement by some institutions (Graph 107).

Graph 107

Development banks Capital Adequacy Rate



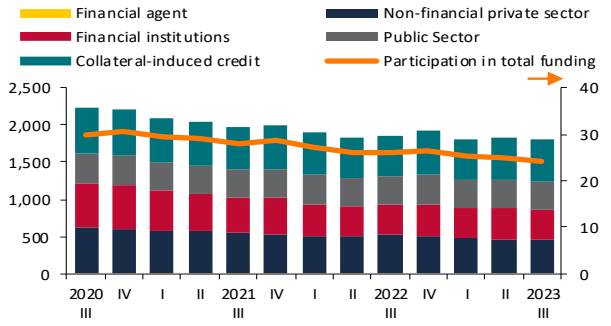
Figures as of september 2023
Source: CNBV

As of September 2023, the development banking system registered a balance of direct and induced financing [70] of 1,804 billion pesos; registering an annual contraction of 2.3% in real terms with respect to the balance as of September 2022. The decrease in the balance is explained by the 3.9% real fall in credit to the private sector, linked to the extinction of the National Farming, Rural, Forestry and Fisheries Development Bank (*FND*, for its acronym in Spanish) and the exchange rate appreciation; this behavior was partially offset by the 2.8% real increase in credit to the government sector. The total balance is equivalent to 27% of total banking sector financing, and 5.6% of GDP (Graph 108). As of the same date, total financing granted by development banks and other financial institutions was made up of 69% direct credit and 31% net induced credit (Figure 2).

[69] Refers to the 6 development banks (Bancomext, Banco del Bienestar, Banjercito, Banobras, Nafin and Federal Mortgage Society (*SHF*, for its acronym in Spanish) and Agricultural Trusts (FIRA, for its acronym in Spanish). As of the third quarter of 2023, the system's financial information does not include FND, since this institution stopped repurchasing financial statements due to its extinction process.

[70] Development banks and other financial institutions fulfill their mandate through: a) the provision of financing through first and second-tier credit, "direct credit", and the provision of guarantees, "induced credit", which refers to the amount of final credit that has a percentage of guarantee coverage; b) the operation of special development programs; c) technical assistance; and d) operations as a financial agent.

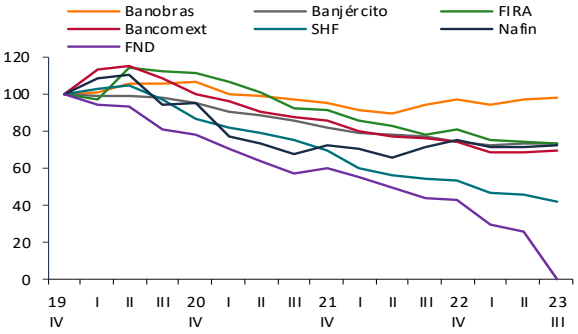
Graph 108
Evolution of loan balances and induced credit balances from development banking system
Left axis: billions of pesos
Right axis: percentage



Figures as of september 2023
Source: CNBV

First-tier credit showed a contraction of 5.2% real in the last year, while second-tier credit contracted by 1.9% real, which was offset by the real increase in the balance of guarantees. The total credit balance showed a mixed behavior among institutions (Graph 109). The real annual increase in the portfolio balance of Nafin and Banobras of 2.1 and 3.6%, respectively, stands out, mainly due to financing related to state-owned companies; while the other institutions exhibited real annual decreases.

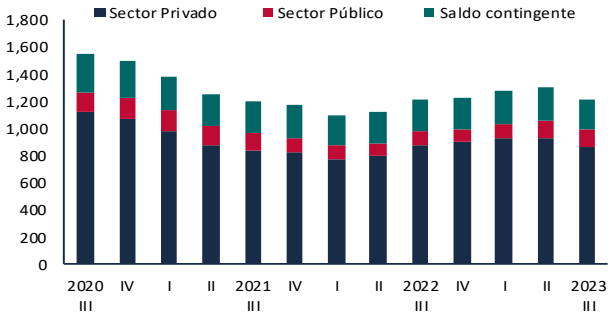
Graph 109
Evolution of loan portfolio by institution
Index (December 2019 = 100)



Figures as of september 2023
Source: CNBV y Banco de México

The placement of credit and guarantees as of September 2023, defined as the amount disbursed in the last 12 months, grew at an annual rate of 0.05% real (Graph 110). Placement in the government sector increased by 18% real in the last year, while private sector and guarantees contracted by 0.5 and 5.4% real, respectively. The increase of 51% in real terms in the amount granted by Banobras is noteworthy.

Graph 110
Loan and guarantee placement flows from development banking system (12M)
Billions of pesos



Figures as of september 2023
Source: CNBV y Banco de México

The concentration of the development bank loan portfolio in borrowers, measured by the Herfindahl-Hirschman Index (HHI), is less than 110 in the aggregate.[71] SHF and Banobras have the relatively highest HHIs among development banks (418 and 301, respectively).[72] Additionally, 90% of the portfolio is concentrated in the highest regulatory credit ratings (A1/A2 CNBV scale).

As of September 2023, the stage 3 portfolio stood at 3,193 million pesos, registering a contraction of 11.5% in real terms with respect to the same month of the previous year, mainly due to the fact that the FND stopped repurchasing financial information, which was partially offset by the entry into the stage 3 portfolio of some specific cases in Bancomext and Federal Mortgage Society (SHF, for its acronym in Spanish). It should be noted that 63% of this portfolio is concentrated in 10 counterparties. Preventive reserves increased at a real annual rate of 15.1%, mainly explained by the higher loan placement during the period.

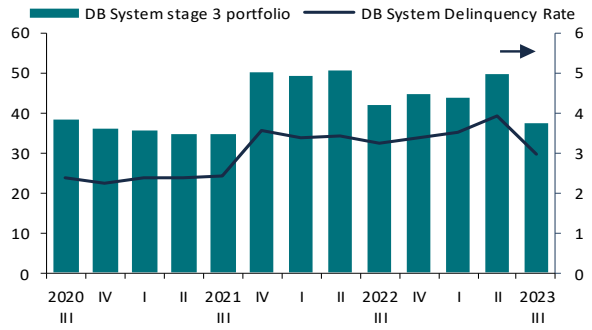
In September 2023, the delinquency rate (*IMOR*, for its acronym in Spanish*)* of the development banking system was 2.98%, 256 bps higher than that registered in September 2022 (Graph 111). As a

[71] Some development institutions, according to their mandate, serve specific economic sectors; therefore, a sector concentration indicator is not applicable.

[72] Cofece considers that a market structure will have a low probability of hindering, diminishing, damaging or preventing free competition or economic competition when the change in the Index is less than 100 or the index is less than 2000.

reference, the *IMOR* of the commercial banks' portfolio reached 1.63%.[73] The contraction in *IMOR* is explained by the decrease in the stage 3 portfolio.

Graph 111
Evolution of "Stage 3" portfolio from development banking system
Left axis: billions of pesos
Right axis: percentage



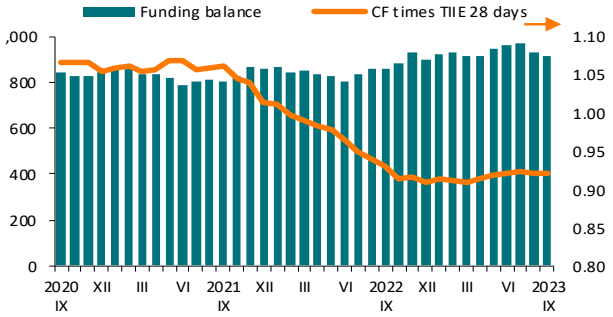
Data as of september 2023
Source: CNBV and Banco de México

As of September 2023, credit induced by collateral accounts represents 2.54 times the contingent balance, that is, the coverage is 39.4% on average; induced credit registered an increase of 2.4% in real terms last year. This is due to the increase in Federal Mortgage Society (SHF) and Bancomext. The rest of the institutions registered negative real growth in the induced balance.

The main funding sources for the sector are promissory note with interest payable at maturity (PRLVS, for its acronym in Spanish) and securities issued, which as of September 2023 have a 63% and 30% share, respectively, of the total. As of the same date, the cost of funding was below the 28-day TIIE (Graph 112).

Regarding market risk, three institutions account for 75% of the total development bank's own holdings in securities. Seventy-one percent of the securities have a term to maturity of less than three years and, in terms of own holdings, the majority are in government securities.

Graph 112
Development banks funding evolution
Left axis: billions of pesos
Right axis: times

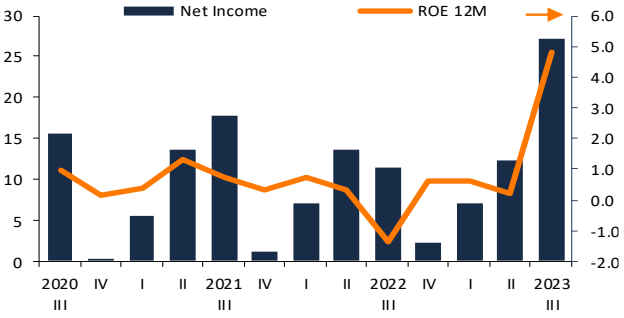


Figures in current prices
Source: Banco de México
CF: Cost of funding in times TIIE 28 days times (weighted average)

As of September 2023, liquidity conditions in development banks and development institutions have remained stable.

As of the same date, the development institutions as a whole reported a net income of 27,199 million pesos, 138% higher than the same period of the previous year.[74] In this regard, Banobras and Banjercito exhibited the most representative positive results of the system. The system's annualized ROE indicator stood at 4.81% (Graph 113).

Graph 113
Net income and ROE (12M) from development banking system
Left axis: billions of pesos
Right axis: percentage



Figures as of september 2023
Source: CNBV and Banco de México

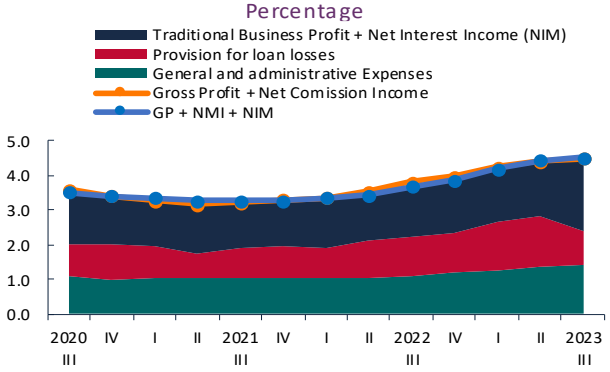
Net interest income as of September 2023 was 26% higher than in the same period of the previous year, mainly due to higher interest income from securities and repurchase agreements, as well as higher income

[73] The data for commercial banks also includes the loan portfolio of sofomes regulated as having an equity link with a bank, whether or not they are subsidiaries of the latter.

[74] As of September 2023, the amount of resources tapped from development banking institutions was 3,532 MDP.

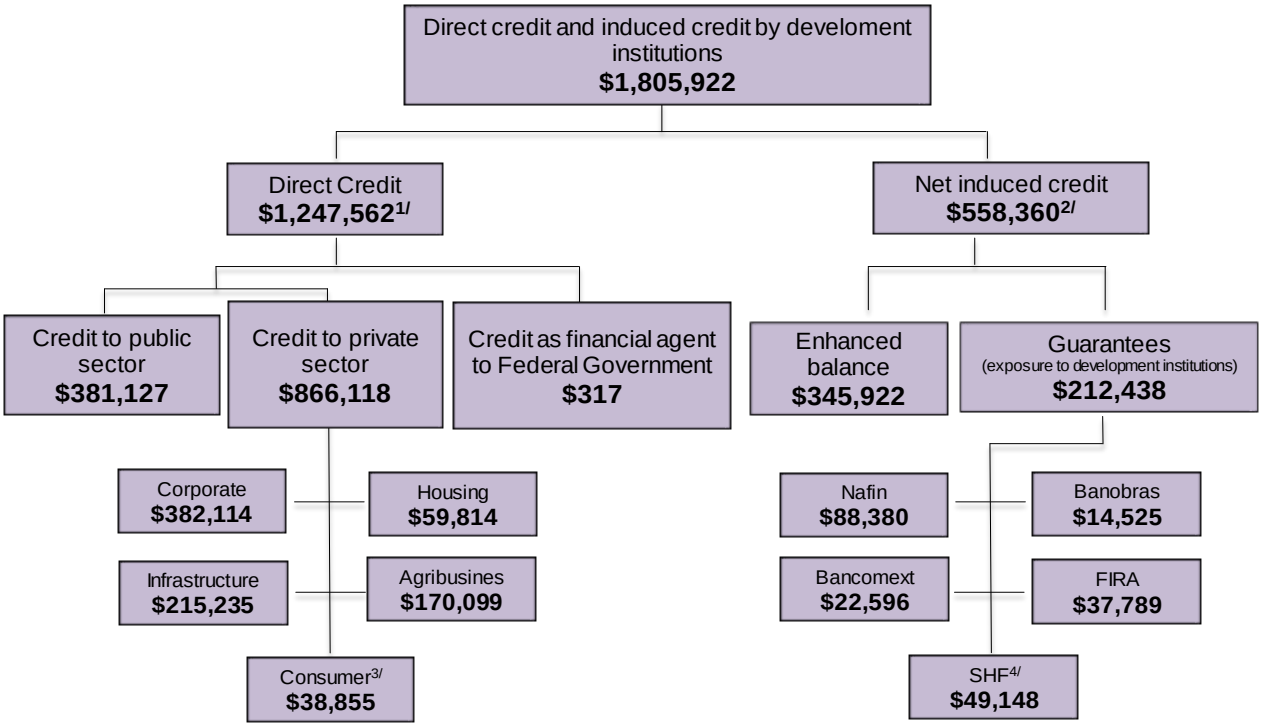
from the loan portfolio, as a result of the increase in reference rates. Interest income increased 47% and interest expense increased 56%; however, the increase in interest income was sufficient to offset the increase in expenses and the creation of allowances for loan losses (Graph 114).

Graph 114
Performance indicators (proportional to Net Productive Assets)
Percentage



Data as of september 2023
Source: CNBV and Banco de México
Cumulative figures from the last 12 months

Figure 2
Direct credit and induced credit by development banking system
Million pesos



Figures as of September 2023.
Source: Banco de México.
1/ Credit balance/portfolio on development institutions' balance sheet.
2/ Net induced credit means aggregated credit balance granted by private financial intermediaries, partially collateralized by development institutions.
3/ Consumer credit portfolio includes credit granted to the Mexican military through Banjercito and development bank loans to employees related to labor benefits.
4/ Includes insurance guarantees from the SHF's Mortgage Credit Insurance.

IV.3.2.1. Infonavit and Fovissste

Infonavit

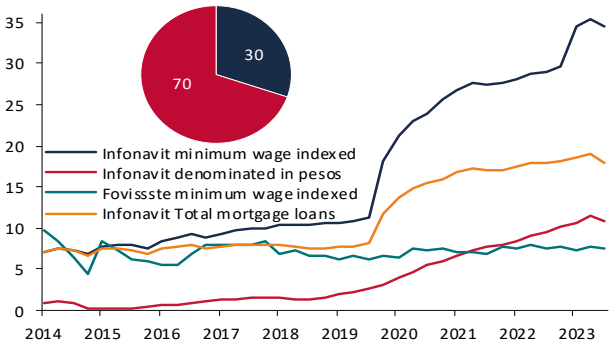
Infonavit is the main provider of housing financing in Mexico. It grants mortgage loans mainly to low-income claimants through fixed and differentiated interest rates based on their income. It also manages the resources of the national housing fund for working people, part of the retirement savings system, through the investment of the resources concentrated in the housing subaccounts of the claimant workers.[75]

At the end of September 2023, both the outstanding and past-due balances of the housing portfolio registered a real annual contraction (-1.4% and -1.2%). The contraction in the outstanding balance is explained by a 6.5% reduction in the number of loans granted to lower-income claimants (income up to 12 Units of Measurement and Actualization – *UMA,* for its acronym in Spanish), which represent around 85% of the total granted in the last twelve months. Despite the annual drop, the last six months have seen a recovery in both the number and amount granted for all income levels and particularly for the aforementioned income group. The annual variation in the amount granted was positive for all income levels (5.5% for the aggregate in real terms and 3.4% for those with incomes below 12 *UMA*).

The *IMOR* of the housing portfolio decreased 0.6 percentage points since the last *Report*, to 18.1% as of the third quarter of the year. The reduction in the *IMOR* is mainly explained by the creation of new loans, by loans that changed their status from past due to performing, and by the segregation of loans.[76] On the one hand, the balance of Infonavit loan reserves decreased 6.4% annually in real terms and cover 77.2% of the past-due portfolio. According to Infonavit, 64% of the *IMOR* level as of December 2022, that is, 12.2 percentage points of 18.1%, was explained by a portfolio that was already in judicial collection process. [77]

As for the composition of its portfolio, the share of the portfolio granted in *VSM* was reduced thanks to the program to convert this portfolio to pesos, and as of September 2023 it already represented 30.3% from 42.9% a year earlier (Graph 115).[78]

Graph 115
Non-performing Ratio [1/] of Infonavit and Fovissste's [2/] Mortgage Portfolio
Per cent



Data as of September 2023
Fuente: Infonavit y Fovissste
1/ The delinquency rate or Non-performing loan ratio is defined as the ratio of non performing loans over the total portfolio.
2/ Fovissste's total portolio is minimun wage indexed.

The most important risk for Infonavit is the unemployment of its borrowers, since without the direct payroll deduction made by employers; in addition, the credit risk of the portfolio depends on people's willingness to pay once they exhaust the extension scheme.

Infonavit improved its profitability, measured by its net income to total assets (ROA) ratio, supported by a higher financial margin due to higher interest earned

[75] See *Ley de los sistemas de ahorro para el retiro* and *Ley del Infonavit.*

[76] Infonavit carries out portfolio segregation, particularly in traditional loans in times the minimum wage (VSM, for its acronym in Spanish), which affects the value of the *IMOR*. IN addition, at the end of September, they made accumulated write-offs related to the Shared Responsibility 2.0 program, so that the expense for the constitution of loan reserves increased by 15.7 billion pesos compared to September 2022. As a result, the percentage of past due loans decreased from 15.3% to 14.3%.

[77] Judicial collection is initiated when there are more than 9 delinquent payments. Loans in judicial collection are removed from the balance sheet until a final judicial sentence is issued. See Addendum to the Strategic and Financial Plan 2023-2027, Infonavit.

[78] These VSM-denominated loans were granted between 1997 and 2016 and their outstanding balances are currently denominated in units of measurement for updating (*UMA*, for its acronym in Spanish), and their value is revised every time the minimum wage is modified, i.e., annually. For 2023, the Board of Directors of the National Fund for Workers' Housing (Infonavit) determined that the adjustment to loans denominated in times the minimum wage (VSM) would be only 5.2%: the average of the annual increases in inflation over the last five years; while the increases to the minimum wage and the *UMA* were 20% and 7.82%. See National Fund for Workers' Housing (Infonavit, its acronym in Spanish) press release #003.

on the portfolio, as well as interest earned on investment securities, and despite higher loan loss provisions and trading losses.[79] To date, Infonavit has sufficient equity and reserves to absorb losses in the short and medium term.[80]

On the other hand, due to the event of Hurricane Otis in the state of Guerrero, Infonavit has implemented measures to mitigate the default of borrowers in affected municipalities.[81]

Institute of Security and Social Services of the Governmental Workers (Fovissste)

Fovissste is the third largest provider of housing loans in Mexico and, like Infonavit, it administers the resources of affiliated workers (in this case, public service officers working for the federal government). The resources of the housing fund are used to grant loans for the acquisition or construction of housing, repairs, additions or the payment of liabilities for the aforementioned items.

In September, Fovissste's performing portfolio grew by 6.5% in real annual terms, while the past-due portfolio grew by 8.4%. The housing portfolio increased 0.4 percentage points since the last *Report*, to 7.6% in the third quarter of the year. Meanwhile, loan-loss reserves, which include both expected and unexpected losses, more than cover the total past-due portfolio.[82]

To deal with unexpected losses, Fovissste has an equity strength indicator (IFP, for its acronym in Spanish).[83] It should be remembered that Fovissste does not have its own equity because it is a decentralized body of ISSSTE. As of September, the IFP was 16.9% and profitability, measured by its net income to total assets (ROA) ratio, was 3.9%, slightly lower than that recorded since the previous *Report.*

The employment stability of Fovissste's claimants has been an element of strength for its financial situation.

Like Infonavit, Fovissste published a program of facilities for its borrowers affected by Hurricane Otis in the municipalities of Guerrero. The measures include suspension of discounts for mortgage loan payments, an extension without interest and updates for a period of six months and, if the borrower has a current loan, they may request the activation of the damage insurance covered by Fovissste

IV.3.3. Siefores and mutual funds

Siefores

Siefores continue to be the main institutional investors in the country, and the composition of their portfolio is mainly composed of government securities and foreign securities.

Between March and July 2023, the siefores showed capital gains in their investment portfolios, which offset the losses observed in most of 2022, mainly due to the increase in the value of the government securities position. However, during August and September there were losses in the portfolio, in an environment of uncertainty and high volatility in the global financial markets, reflecting global geopolitical tensions, the response of international markets to the economic situation and the current global monetary policy stance (Graph 116).

[79] These losses are explained by the adverse performance of domestic fixed-income instruments and international equities, as well as the appreciation of the exchange rate compared to the same period of the previous year.

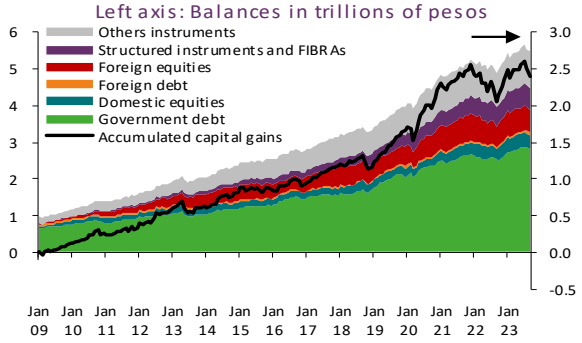
[80] Infonavit refers to the Equity Strength Index (*Índice de Fortaleza Patrimonial, IFP*) interchangeably as the capitalization index in its quarterly statement of financial position reports.

[81] The measures include an interest-free payment suspension program for up to six months, the possibility of withdrawing the housing sub-account, among others. Houses with Infonavit's mortgage loans are covered by damage insurance.

[82] In September 2023, Fovissste carried out a segregation or removal of a past-due portfolio of 1.02 billion pesos on 1,900 past-due loans, fully reserved, which were transferred from the balance sheet to memorandum accounts. The outstanding balances were 1.7 billion pesos, including accrued interest and surcharges, the latter of which were already recorded in memorandum accounts prior to the segregation.

[83] The Equity Strength Index is calculated as the ratio between the resources to face unexpected losses and the positions subject to risk. For more details on its calculation, see here.

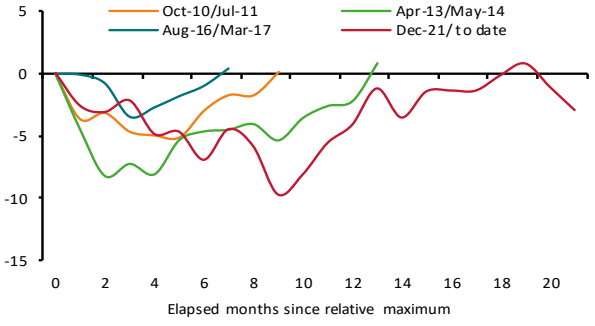
Graph 116
Siefores' portfolio and accumulated capital gains
Right axis: Accumulated flows in trillions of pesos
Left axis: Balances in trillions of pesos



Data as of September 2023
Source: Consar

Due to the nature of these types of brokers, their portfolios have a long-term investment horizon, so that downward fluctuations in their value have tended to disappear over time, as the shocks affecting the markets dissipate and the markets recover their price level (see Graph 117). In fact, the losses observed between August and September were mainly due to decreases in the value of long-term instruments held by the siefores in their portfolios. Therefore, these fluctuations in the value of such assets are temporary and should not permanently affect either the financial system or working people.

Graph 117
Accumulated capital gains: selected periods 1/
Assets percentage



Data as of September 2023
Source: Consar
1/ Capital gains calculated as a share of net assets of onset accrual period.

The amendments approved at the end of 2020 to the laws of the Retirement Savings System and the IMSS establish a gradual increase in employer contributions to retirement savings accounts for working people starting in 2023, which has resulted in a greater rate of accumulation of retirement funds.

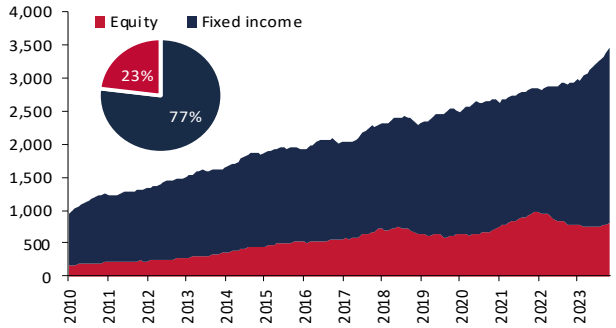
Thus, the reform is expected to gradually strengthen workers' savings as contributions increase until they reach the equivalent of 15% of salary in 2030. Against this backdrop, with the aforementioned reform, contributions increased from 6.5% of workers' income in 2022 to 7.366% in 2023. Likewise, by 2024, contributions will represent 8.456% of workers' income.

Unemployment withdrawals remained high in the third quarter of this year, showing an average level between March and September that was higher than the same period of 2022. These withdrawals occurred in a context in which the labor market strengthened due to the low unemployment rate. However, unemployment withdrawals continue to be a limited risk, as they represent a smaller percentage of the bimonthly contributions received by the Afores.

Investment funds

The mutual fund system is comprised of 248 fixed-income funds and 379 equity funds and ranks third in asset share over the Mexican financial system, with 11.1%. As of November 22, 2023, the amount of assets managed by mutual funds is 3.45 trillion pesos (Graph 118), which represents an increase of 8.6% with respect to the end of the first half of the year. This was mainly driven by the growth in fixed-income funds.

Graph 118
Investment funds' net assets
Billions of pesos



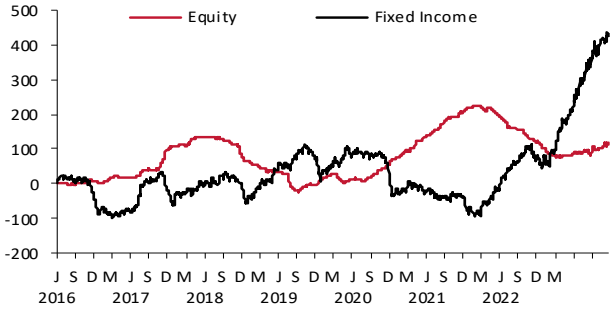
Data as of november 2023
Source: Banco de México using CNBV data

Fixed income funds increased their total assets by 9.4% during the second half of 2023 as a result of both inflows and positive returns observed during that period (Graph 119 and Graph 120).

Graph 119

Cumulative flows of investment funds

Billions of pesos



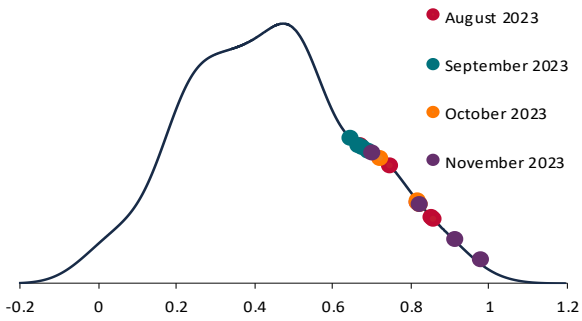
Data as of november 16th, 2023

Source: Banco de México using CNBV data

Graph 120

Monthly returns of fixed income funds[1/]

Percent



Data as of november 22nd, 2023

Source: Banco de México using CNBV and Morningstar Direct data

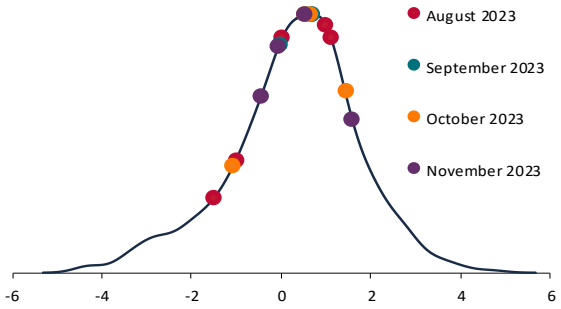
1/Each point represents the average of the daily observations of the monthly returns for each week of the month

Meanwhile, equity funds have shown heterogeneous returns and net flows close to zero, so that the amount of assets under management by these funds remains practically unchanged as of the second half of 2023 (Graph 119 and Graph 121).

Graph 121

Monthly returns of equity funds[1/]

Percent



Data as of november 22nd, 2023

Source: Banco de México using CNBV and Morningstar Direct data

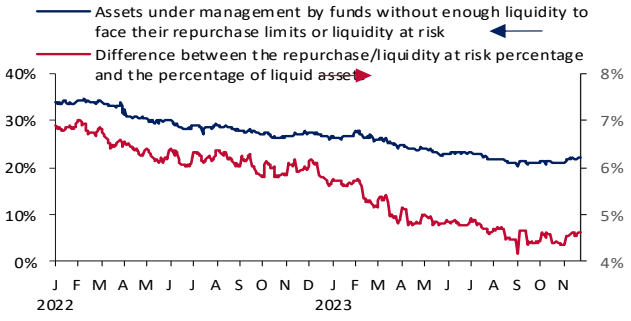
1/Each point represents the average of the daily observations of the monthly returns for each week of the month

The liquidity of mutual funds has increased since the beginning of 2022. Also, when considering only those funds without sufficient liquidity to meet their repurchase limits or liquidity-at-risk, they represent a smaller proportion of the system (21% of the sector's total assets) at the date of preparation of this *Report* (see Graph 122).

Graph 122

Assets of investment funds with liquidity shortfall[1/]

Percent of total net assets



Data as of november 22nd, 2023

Source: Banco de Mexico using data fron CNBV

1/The red line shows the weighted average of the spread between the maximum value of liquidity at risk or repurchase limit, and the percetage of liquid assets.

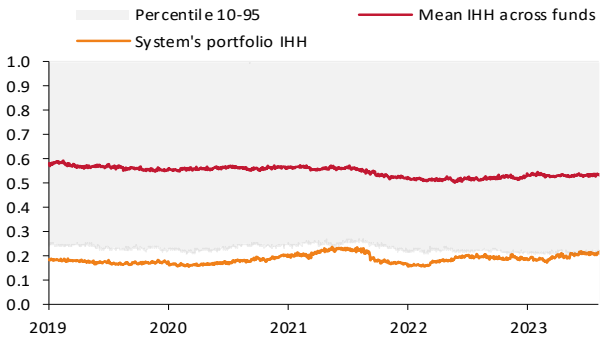
As of November 22, 2023, mutual fund portfolios are relatively concentrated according to the average Herfindahl index (HHI) (0.53 for fixed income and 0.72 for equity), while the aggregate portfolio of the system is less concentrated (HHI of 0.22 for the fixed income system and 0.26 for the equity system). This shows the diversity of portfolios within the system with specialized investment schemes for the

individual funds (HHI of 0.22 for the fixed income system and 0.26 for the equity system) (Graph 123 and Graph 124).

Graph 123

Herfindahl Index - Fixed income investment funds

Units

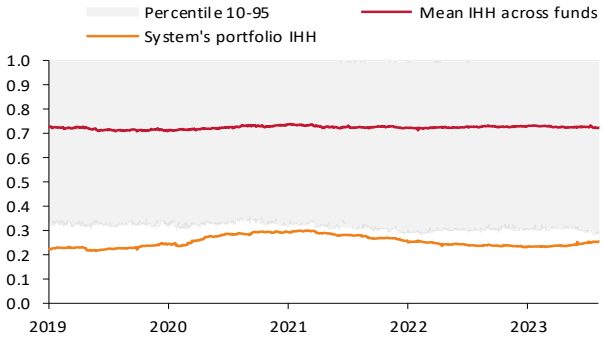


Data as of november 22nd, 2023
Source: Banco de México using CNBV data

Graph 124

Herfindahl Index - Equity investment funds

Units



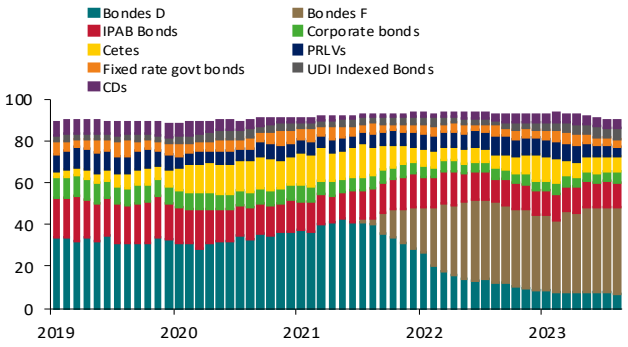
Data as of november 22nd, 2023
Source: Banco de México using CNBV data

The assets of the fixed-income fund system are mainly composed of government instruments, in addition to a recomposition towards longer-term instruments. As of November 2023, F bonds represent 43.4% of total assets. However, the participation of Federal Treasury Certificates (*Cetes*, for its acronym in Spanish) has decreased by nearly half between the end of 2021 and November 2023, whose share represented 7.6% of the total (Graph 125).

Graph 125

Top holdings in fixed income funds' portfolios

Percent



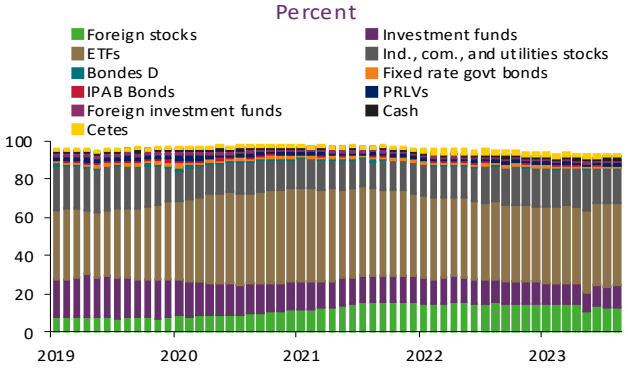
Data as of november 22nd, 2023
Source: Banco de México using CNBV data

Equity funds invest mainly in equity-linked securities (Tracs, for its acronym in Spanish), which represented 44.2% of the system's assets as of November 2023. In addition, they invest in domestic industrial, commercial and service stocks, foreign stocks, and in other investment funds. Particularly, the participation of the latter has decreased since the beginning of 2020, from 19.3% to 11.0%; likewise, an increase in the participation of foreign shares is observed, which went from 7.7% to 13.3% of the total assets in the same period (Graph 126).

Graph 126

Top holdings in equity funds' portfolios

Percent



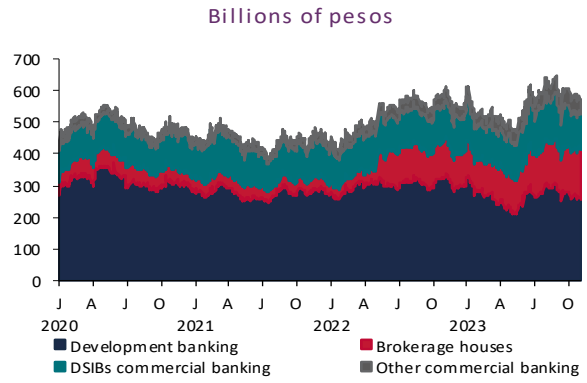
Data as of november 22nd, 2023
Soruce: Banco de México using CNBV data

Investment funds are providers of liquidity to the financial system through the repurchase market and granted 21% of total financing in this market as of November 27, 2023. This proportion increased 167 basis points since the end of May of the same year; additionally, the amount of financing granted by

them increased by 22% in the same period, mainly due to an increase in operations with development banks and broker-dealers. The main counterparties of mutual funds are development banking institutions (46%), followed by commercial banks (28%) and broker-dealers (26%) (Graph 127). Regarding the receipt of financing, investment funds have not used these operations as a source, despite having the authorization to do so since June 2020.

Graph 127

Amount financed by investment funds in the repo market



Data as of November 27th 2023

Source: Banco de Mexico

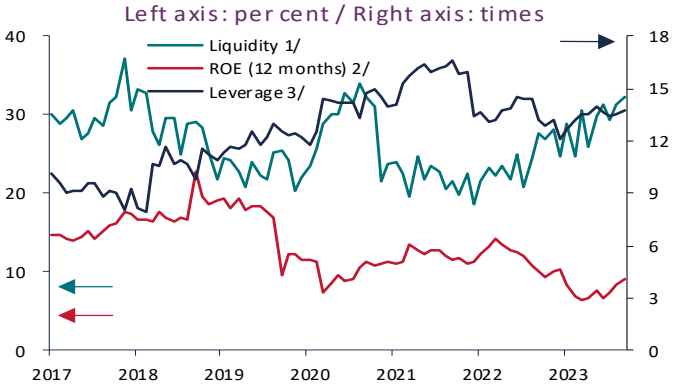
IV.3.4. Broker-dealers

The broker-dealers sector is comprised of 36 institutions. The sector's assets totaled a little over one trillion pesos and increased by 1.8% in real annual terms. Assets represented 3.5% of the total assets of the financial system at the end of September 2023.

The main risks of this sector are leverage through repurchase transactions and the market risk of its investment portfolio. Since the last *Report*, broker-dealers' leverage increased slightly due to higher liabilities positions with repurchase agreements, mainly with mutual funds and individuals.[84] Meanwhile, the liquidity indicator improved slightly. Since the last *Report*, broker-dealers recorded improvements in their different income components, in particular, there was an improvement in net interest income. However, the average stockholders' equity for the period increased less than the net income, a situation that slightly increased the profitability indicator (see Graph 128).

Graph 128

Leverage, Liquidity and ROE



Data as of September 2023

Source: Banco de México and CNBV

1/ Liquidity = Current assets / Current liabilities. Where:
Current Assets = Cash and Equivalents (Cash + Banks + Other cash and cash equivalents + Currencies receivable) + Unrestricted Tradeable Instruments + Unrestricted Readily Marketable Instruments + Repo Receivables + Accounts Receivable.
Current Liabilities = Short-term bank loans and from other bodies + Repo liabilities + Other Accounts Payable

2/ ROE = Net Income 12-month flow / Total Equity 12-month
3/ Leverage = (Total liabilities - Settlement Receivables) / Total

The sector's profitability, measured in terms of the twelve-month net income to stockholders' equity ratio (ROE), increased slightly after the downward trend that began in the second quarter of 2022, and as of September 2023 stood at 9.2% compared to the 6.3% registered as of the last *Report*.

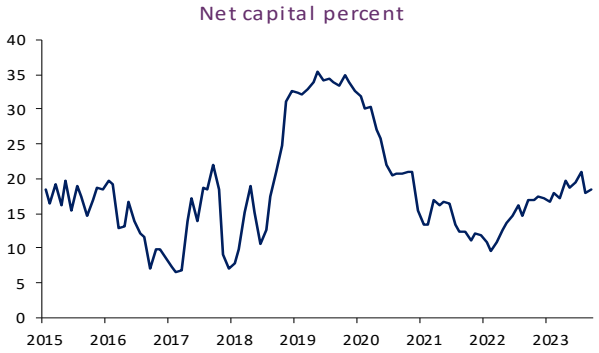
Regarding the sector's solvency, the CAR stood at 31.6% in September and decreased slightly with respect to the last *Report* (data as of March); however, it remains at high levels both for the system and for most of the individual institutions. The decrease in the system's CAR is explained by an increase in assets subject to market risk, which was greater than the impact of the increase in net capital. With respect to the composition of total risk assets, both the credit and market risk components increased.

[84] In January 2022, the IFRS9 accounting criteria for broker-dealers came into effect, which affected their calculation and level, so the indicator is not comparable with the data prior to the aforementioned month.

The market risk to which broker-dealers are exposed, measured through the market *CVAR* as a proportion of net capital, increased in the second and third quarters of 2023, from 17.10% in March to 18.51% in September 2023. This variation is mainly due to changes in the positioning of the institutions' portfolios (Graph 129).

Graph 129

99.9% CVaR for brokerage firm's market risk



Data as of September 2023
Source: Banco de Mexico, CNBV, BMV, Bloomberg and Valmer

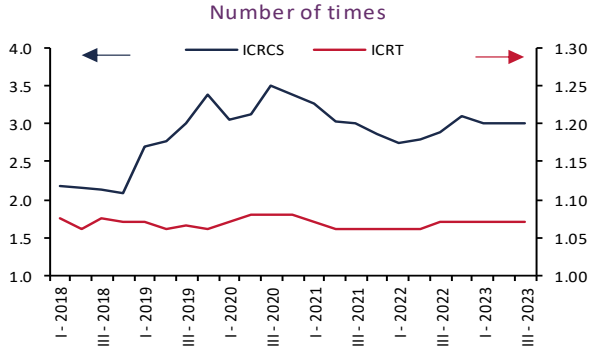
Interest rate sensitivity of the broker-dealers' debt securities portfolio, measured by market-based duration, increased during almost the entire period covered by this *Report*; however, in September it registered a level similar to that prevailing in March 2023, as a result of the decrease in that month.

IV.3.5. Insurance companies and bonding institutions

The insurance and bonding sector in Mexico continue to show high solvency ratios. Both the Technical Reserves Hedging Index[85] (*ICRT*, for its acronym in Spanish) and the Capital Solvency Requirement Hedging Index[86] (ICRCS, for its acronym in Spanish) indicate that the sector has sufficient reserves to face its risks without endangering the stability and solvency of the sector (Graph 130).

Graph 130

Coverage ratios of the insurance sector



Data as of September 2023
Source: CNSF

The sector is comprised of 103 insurance and 10 bonding institutions. The sector's assets as of the third quarter of 2023 totaled 2.24 trillion pesos (7.6% of the financial system's total assets), which registered a real annual increase of 3.3%.

Premium issuance in the sector increased by 9.3%[87] during the first half of the year (Graph 131), with increases in the volume of premiums written in almost all lines, with the exception of Pensions. The greatest contribution to this growth is explained by the Property and Casualty line, both in automobile insurance, with a growth of 19.2%, and in the rest of the property and casualty insurance covered,[88] with a growth of 7.5%. Life and Accident and Health operations also contributed to this growth, with increases of 10.3% and 7.9%, respectively.

[85] The ICRT is calculated by dividing the investments backing the technical reserves by the amount of such reserves. When this ratio is greater than or equal to one, it means that the institution maintains sufficient resources to back its obligations.

[86] The ICRCS is calculated by dividing the sum of eligible own funds supporting the solvency capital requirement by the amount of the solvency capital requirement. If the ratio is greater than one, it means that the institution maintains sufficient resources to cover unexpected losses.

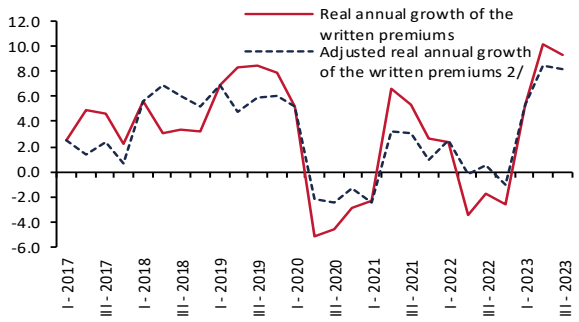
[87] Growth data in this section are expressed as growth in the cumulative amount for the year to the quarter of the cutoff, with respect to the same period of the previous year.

[88] Includes Civil Liability and Professional Risks, Maritime and Transportation, Fire, Catastrophic Risks, Agricultural and Animal Risks, and coverage contracted by Pemex, which were renewed during this period.

Graph 131

Real annual growth of the written premiums of the insurance and bonding sector [1/]

Percentage



Data as of September 2023
Source: CNSF

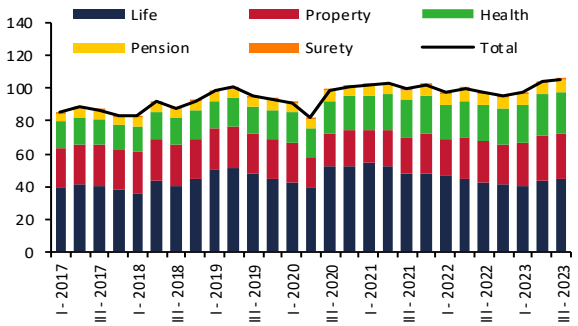
1/ Real annual growth of cumulative amounts during the year to reported quarter, refered to same period of the previous year.

2/ The Pemex comprehensive policy has a biennial term. In order to understand the growth trends of the sector, the premium is evenly spread over each year.

Graph 132

Quarterly insurance claims [1/, 2/]

Billions of pesos



Data as of September 2023
Source: CNSF

1/ Series with seasonal adjusment in constant pesos of 2023.

2/ Property includes car operation

The cost of claims for the sector remained at high levels, with a real growth of 5.1% in the accumulated amount for the year to the third quarter compared to the same period of the previous year. This increase is explained by higher costs of claims, both in the Property & Casualty line (driven by the scarcity of auto parts) and in the Accident & Sickness line (explained by the increase in the costs of goods and services in the health insurance sector), with real annual growth of 15% and 12.4%, respectively. The aggregate amount of claims in the Life line had a reduction of 4.3%, which significantly offset the increase in the cost of claims in the sector, which is explained by the decrease in mortality in the period (see Graph 132).

Although the damage caused by Hurricane Otis could significantly increase the cost of claims in the sector, the exposure of insurance companies to hydro-meteorological phenomena in Guerrero is low, so it is expected that insurance companies' reserves for catastrophic risks will be sufficient to cover their obligations. The Mexican Insurance Institutes Association (*AMIS*, for its acronym in Spanish) estimates that Otis claims will reach 28.1 billion pesos, which places it among the five events with the highest amount covered by insurance companies.[89]

The sector's profit increased in real terms by 10.5% in September 2023 compared to the previous year, which is explained by the good performance in the investment of the sector's reserves (with an increase of 45.7%) and by the growth in the issuance of premiums; however, profit levels still continue to be below those observed in 2019.

IV.3.6. Other-Non-bank Financial Intermediaries (*OIFNB*, for its acronym in Spanish)

Financial institutions, as well as companies that, among other activities, carry out credit intermediation or credit transactions on a regular and professional basis in the country, collectively referred to as other Non-bank Financial Intermediaries (OIFNB),

[89] See Mexican Insurance Institutes Association (*AMIS*, for its acronym in Spanish) press release dated November 30, 2023. The data are subject to revision. The hurricane that has generated the largest claims payments is Wilma in 2005, which cost the insurance industry close to 50 billion pesos.

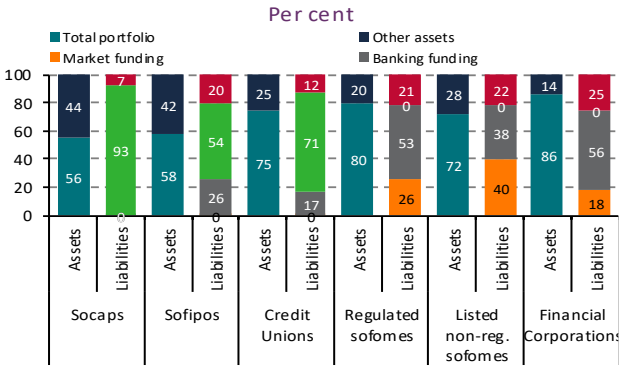
continue facing challenges particularly related to more restrictive financial conditions (see Table 5).

The non-regulated segment (financial companies or non-regulated sofomes) faces significant challenges to refinance its debt in a context of greater risk aversion among investors, due to the default in payment into which some entities in the sector fell, almost all of them with liabilities in international bonds.[90] Although some of these entities have entered into bankruptcy or liquidation processes and in some cases have reached agreements with creditors, these processes have not concluded and the uncertainty for recognized creditors has not yet dissipated, which could limit financing to other entities in the sector that need to roll over.

The greater risk aversion towards the sector stems in part from the fact that some entities are not subject to supervision or prudential regulation by any financial authority, except for anti-money laundering and terrorist financing in the case of non-regulated sofomes (see Table 6). Although the observed cases of defaults do not jeopardize the stability of the financial system, in the future additional effects on OIFNB that depend on internal or external market funding or with a high concentration of funding sources from banks or other institutions cannot be ruled out (Graph 133).

Although the assets of the OIFNB sector represent a relatively low fraction of the Mexican financial system's assets, for some segments of the non-financial private sector, OIFNB represent an important percentage of their sources of financing, such as individuals with entrepreneurial activity, particularly small-and-medium-size-businesses (SMEs). Consumer credit granted by these entities is also relevant and has recently increased in the non-regulated sector. In the case of non-regulated sofomes, only auto, credit card and personal loan portfolios increased; the rest decreased. Regulated sofomes, either by having links with banks or by issuing debt, increased their lending to large companies and small-and-medium-size-businesses (SMEs), but to a greater extent to the former. Likewise, regulated entities have improved their funding sources compared to non-regulated ones, allowing them to increase credit granting. In the case of credit unions, the financing they grant continues to decrease.

Graph 133
Assets and Liabilities of Other Non-Bank Financial Intermediaries (ONBFI)



Data as of September 2023
Source: Banco de México, BMV, CNBV and Condusef

[90] They do not have prudential supervision and regulation by any financial authority, except for money laundering and terrorist financing issues.

Table 5

Regulation and Risks Related to Other Non-Banking Financial Intermediaries[1/]

Entity / Instruments / Activity		Risk of:			Those that participate in credit intermediation other than banking	Total assets			Regulation by:			Supervisor / Regulator
		Maturity Trans-formation	Leverage	Runs		Thousands of million Mexican Pesos	% of GDP	Real annual change in per cent	Capitalization	Liquidity	Leverage	
Socaps (levels 1 to 4)		✓	✓		✓	247	0.8	0.0	✓	✓		CNBV
Sofipos (levels 1 to 4)		✓	✓	✓	✓	73	0.2	70.2	✓	✓		CNBV
Credit unions (levels 1 to 3)		✓	✓		✓	66	0.2	-2.4	✓	✓		CNBV
Regulated Sofomes	With links with a bank and consolidated with said bank	✓	✓			306	1.0	-21.3	✓	✓		CNBV
	With links with a bank but not consolidated	✓	✓			60	0.2	-12.3	✓	✓		CNBV
	No links with a bank and issues debt[2/]	✓	✓		✓	245	0.8	16.2				CNBV
Non-regulated Sofomes[3/]		✓	✓		✓	584	1.9	3.3				
Financial corporations[4/]		✓	✓		✓	391	1.2	7.0				
Non Bank credit card issuers[5/]		✓	✓		✓	77	0.2	13.9				
Securitizations of financial entities[6/ 7/]		✓	✓		✓	496	1.6	-1.7				CNBV
Securitizations of non-financial entities[6/ 8/]		✓	✓			271	0.9	-9.9				CNBV
Total non-banking financial intermediaries						**2,511**	**8.0**	**2.9**				
Real Estate Investment Trust (fibras)[6/]			✓			516	1.6	10.9			✓	CNBV
Mortgage trusts (no fibras)[6/]		✓	✓		✓	6	0.02	-14.5			✓	CNBV
Development Capital Certificates (CCD)[6/]			✓			401	1.3	5.3			✓	CNBV
Energy and infrastructure trusts (fibra E)[6/]			✓			141	0.4	3.6			✓	CNBV
Investment projects trusts (CERPIS)[6/]			✓			61	0.2	1.8			✓	CNBV
Total infrastructure financing vehicles						**1,126**	**3.6**	**7.2**				
Total of financial intermediaries, infrastructure financing vehicles and activities						**3,637**	**11.5**	**4.2**				
Other financial intermediaries or activities[9/]					✓	1,198	3.8	2.1				CNBV/CNSF
Capital investment funds[10/]						0	0.0	n.a.				
Pensions funds[11/]						6,089	19.3	5.7				Consar
Commercial banks		✓	✓	✓		13,267	42.0	1.5	✓	✓	✓	CNBV/Banxico

Data as of September 2023

Source: Banco de México, CNBV, CNSF, Condusef, Indeval and BMV

1/ The red marks indicate cases in which the risk described may materialize or does materialize currently in some of the entities within the specific sector in Mexico. The risks in the columns are defined as: (i) maturity transformation risk: the risk from obtaining short-term funding to invest in long-term assets; and (ii) the leverage risk: the risk coming from borrowing funds to buy assets to increase potential investment profits (losses).

2/ In 2014 several legal provisions were reformed to include sofomes that issue debt within the regulatory framework. From 2015, 18 non-regulated companies changed their purpose to regulated on being issuers of debt and gradually began to report to the CNBV.

3/ The figures referring to the number of non-regulated sofomes is taken from the Commission's Registry - RECO (Condusef). The figures on assets are not available, so we use instead the size of the total credit portfolio granted by the entities and reported to the Condusef. The credit portfolios of non-regulated sofomes that only grant credit to related or affiliated entities are not considered. The figures of non-regulated Sofomes collected by the Condusef are subject to changes.

4/ These are companies that take on indebtedness but are no financial entities under Mexican law. For example, the financial arms of auto manufacturers and commercial credit or leasing companies. The figures shown here only include those that issue debt in the financial markets.

5/ This only includes the balance of the credit granted directly by department stores to their customers without the intervention of any financial broker. Figures at June 2023.

6/ Relates to the outstanding value a market prices.

7/ Includes securitizations of banks, sofomes, the Infonavit and the Fovissste.

8/ Includes securitizations of both the private and public sectors, such as of the states and non-financial companies.

9/ Includes fixed income investments funds, locally exchange traded funds (ETFs) bond warehouses, brokerage firms and credit insurers.

10/ Includes investment funds in capital instruments and local ETFs linked to equity indexes.

11/ Includes Siefores.

Table 6

Prudential Regulation for Banks and Other Non-Banking Financial Intermediaries									
	Commercial Banks Basel 3 (2011-)	Regulated Sofomes with links to a bank	Regulated Sofomes for issuing debt (2014)	Sofipos (2003)	Socaps (2012)	Credit unions (2014)	Bonded Warehouses (2014)	Non-regulated Sofomes	Financial corporations
Pillar 1: minimum capital requirements									
Minimum capital requirements for credit risk: Tier 1 and Tier 2, ICAP >8%	✓	✓	x	✓2/	✓5/	✓8/	✓12/	x	x
Regulatory capital is reinforced: common equity, Tier 1 and Tier 2 definitions	✓	✓	x	x	x	x	x	x	x
Leverage ratio limits are established	✓	x	x	x	x	x	x	x	x
Minimum capital requirements for market risk	✓	✓	x	✓3/	✓6/	✓9/	x	x	x
Discretion to assess market risk is reduced	✓	✓	x	x	x	x	x	x	x
The use of internal models is allowed for credit risk if authorized	✓	✓	x	x	x	x	x	x	x
Limits to mitigate common risk or concentration risk	✓								
Minimum capital requirements for operational risk	✓	✓	x	x	x	x	✓13/	x	x
Includes financial derivatives exposures	✓	✓	x	x	x	x10/	x	x	x
Higher capital requirements are established for securitizations and OTC derivatives	✓	✓	x	x	x	x	x	x	x
VaR is used as a risk measure	✓	✓	x	x	x	x	x	x	x
Forward looking credit risk provisions	✓	✓	✓1/	x	x	x	x	x	x
Liquidity coverage ratio limits are established	✓	✓	x	✓4/	✓7/	✓11/	✓14/	x	x
Macroprudential approach: additional capital buffers are established, conservation capital buffer (2.5%), countercyclical capital buffer (0-2.5%) and for systemic entities	✓	✓	x	x	x	x	x	x	x
Stress testing requirements are established	✓	✓	x	x	x	x	x	x	x
Pillar 2: Supervisory Review									
Four principles-based supervisory guidance	✓	✓	x	x	x	x	x	x	x
Pillar 3: Market discipline									
Disclosure to the public of their risks and how they manage them	✓	✓	x	x	x	x	x	x	x
Large exposures framework	✓	✓	x	x	x	✓	x	x	x
Restrictions on the type of liabilities assumed	✓	✓	x	✓	✓	✓	x	x	x
Memo: Accounting Criteria CNBV / IFRS 9	✓/ ✓	✓/ ✓	✓/ x	✓/ x	✓/ x	✓/ x	✓/ ✓	x/ x	x/ x
Prudential regulation currency mismatches limits	✓/ ✓	x	x	x	x	x	x	x	x
Deposit Insurance Scheme	✓	x	x	✓15/	✓15/	x	x	x	x

Data as of November 2023.

Source: BIS (Basel Framework), IFRS and national regulation (CNBV).

1/ Art. 87-of the LGOAAC (Credit Organizations and Auxiliary Activities General Law), added in 2014.

2/ It's NICAP instead of ICAP (CAR in english). The minimum is NICAP >100% = net capital / total risk capital requirement, with early warnings depending on the level of operations. Art. 42 Bis of the LACP (Popular Savings and Credit Law).

3/ Applicable only to SOFIPOs with operations level III and IV.

4/ The liquidity requirement is very simple, it is not a LCR; it requires keeping at least 10% of its short-term liabilities in liquid securities.

5/ Art. 31 of the LRASCAP (Law to Regulate Activities of Savings and Loan Associations). The capital requirement for credit risk will depend on the Association's Operation Level. There are four levels (I-IV) of socaps. The credit risk capital requirement for each level is defined in the "General provisions applicable to the activities of cooperative savings and loan associations" (the "SOCAPs Provisions") issued by the CNBV, Arts. 25, 50, 90 and 135, respectively.

6/ Art. 31 of the LRASCAP. The market risk capital requirement will depend on the Association´s Operation Level. Only applies to operations level II, III and IV. This requirement is defined in the "SOCAP Provisions" Arts. 51, 91 and 136,

7/ Art. 31 of the LRASCAP. The liquidity coverage ratio will depend on the Association's Operation Level. The liquidity coverage ratio for each level is defined in the "SOCAP Provisions" issued by the CNBV, Arts. 44, 84, 129 and 187

8/ Art. 48 Credit Union Law. Arts. 77 and 78 of the General Provisions applicable to general bonded warehouses, Broker-dealers, credit unions and regulated sofomes (the "Provisions").

9/ Art. 48 Credit Union Law. Art. 77 y 79 of the "Provisions".

10/ Allowed for hedging purposes only.

11/ Art. 46 of the Credit Union Law contemplates that the CNBV, within its legal provisions, can issue guidelines regarding liquidity coverage ratio, but currently the Provisions do not contemplate it.

12/ Art. 12 Bis of the LGOAAC : The minimum subscribed and paid capital will be according to the classification of bonded warehouses. Art. 12 of the LGOAAC: Bonded warehouses could be one of four types according to the activities to which they are dedicated. Art. 5 of the General Rules applicable to bonded warehouses and Broker-dealers (the "Rules"), establishes the procedure for determining the capital requirement for credit risks.

13/ Art. 6 of the "Rules", establishes the procedure for determining the capital requirement for operational risk.

14/ Art. 13 of the LGOAAC. The bonded warehouses can issue certificates of deposit of up to 30 times their capital.

15/ Up to 25 thousand Udis

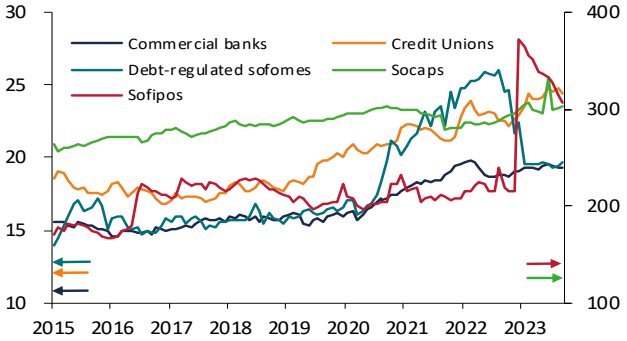
The new competitors in the popular Finance Corporations sector, following their entry through the acquisition of licenses from sofipos[91] and the subsequent increase in credit granted by regulated OIFNB, face important challenges ahead. On the one hand, accessing and maintaining a stable source of funds, and on the other, keeping their credit risk level under control, given that their models incorporate many individuals with no previous credit history.[92] These institutions compete for the same borrowers -or with similar characteristics- and may generate a high level of indebtedness for these borrowers, which could hinder adequate risk management for the institutions and compromise their clients' future access to credit. These new entrants are offering savings products with high liabilities rates to attract deposits, although deposit insurance coverage is lower than that of banks in the case of sofipos. For the time being, the fraction of deposits they have is small and the evolution of their results will have to be monitored as their loan portfolio matures. The transformation of a sofipo with a digital business into a bank was recently announced and is expected to take place in the medium term; this could broaden the services it can offer to the public, favoring inclusion under more robust regulation and supervision.[93]

The non-performing ratio levels of the portfolio originated by the OIFNB sector increased slightly in September with respect to the last *Report*, and are explained by the increase observed in non-regulated sofomes and deposit warehouses. Although non-performing ratio levels had been increasing since the beginning of 2023, they declined slightly in September; however, they remain at historically high levels, particularly for the two types of entities mentioned here.

Graph 134

Capitalization Level of Regulated NBFIs [1/, 2/]

Per cent



Data as of September 2023

Source: CNBV

1/ Right axis: Capitalization Level = Net capital / Total capital requirement for risks. Socaps and Sofipos must maintain a net capital equal to or greater than the total regulatory capital requirement for risks; i.e., equal to or greater than 100%.

2/ Left axis: Capitalization Index = Net capital / Risk-weighted assets. Commercial Banks, regulated Sofomes equity-linked to Commercial banking institutions or financial groups and and Credit Unions must maintain a minimum ICAP of above 8%.

Profitability is heterogeneous across sectors and increased for most types of institutions. The sectors of Savings and Loan Cooperatives (socaps, for its acronym in Spanish) and regulated debt-issuing sofomes maintain higher profitability levels than banks; meanwhile, for sofipos the indicator is negative. The latter has high levels of administrative expenses, as well as loan provisions, although with the entry of digital companies into the sector, these expenses are expected to decrease.

In general, OIFNB are vulnerable to downturns in economic activity, so the recent strength of economic activity has been beneficial for these brokers. However, an abrupt slowdown could cause problems in their credit quality and net interest income generation in the event of a significant deterioration

[91] According to Article 36 of the Popular Finance Corporations Law (Ley de Ahorro y Crédito Popular), sofipos can raise funds from the public and therefore, in general, have a cheap funding alternative; however, depending on the scale of operation of the entity - level of operation - the range of active and passive activities they can carry out is broadened. This could generate regulatory arbitrage, since, although this figure was not conceived to have the levels of assets and liabilities that a bank can reach, in practice it can happen with the higher level of operation that the regulation contemplates for sofipos). These entities were originally conceived to organize the informal popular savings and loan sector that had no legislation and that provided financial services to sectors of the population not served by the country's banks.

[92] As of December 2022, NU Financiera México, a Fintech entity specializing in credit through a digital card, became a Popular Finance Corporations (sofipo, for its acronym in Spanish) after purchasing an entity that was no longer operating. Fintech Klar also acquired the sofipo Servicios Financieros Alternativos (Sefia) in April 2023 and the company Fondeadora acquired the sofipo Apoyo Múltiple in September 2023. The shares of these Popular Finance Corporations (sofipos, for its acronym in Spanish) within the sector are 39.8%, 4.7% and 4.1%, respectively.

[93] In addition, the potential for regulatory arbitrage is reduced, as banking regulation is more robust in several areas compared to that currently applicable to the sofipos sector.

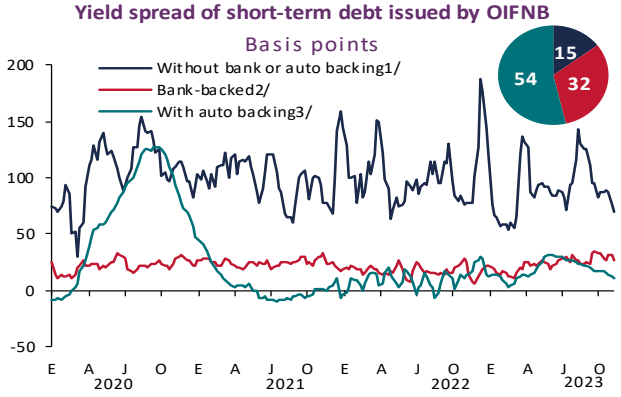
in non-performing ratio levels. Although these institutions do not represent a risk to financial stability, as they are small and not very interconnected with the country's banks and other financial brokers, they can contribute to the over-indebtedness of households and small-and-medium-size-businesses.

With respect to Hurricane Otis, which affected several municipalities in Guerrero, the amount of credit granted by sofipos and regulated sofomes in that region is limited relative to their total exposures or their stockholders' equity. In addition, to date there is no estimate of the amount that will benefit from the implementation of the special accounting criteria issued by the CNBV.[94]

The amount of financing that the OIFNB (regulated and non-regulated) have obtained, since the last *Report*, through the issuance of short-term debt has decreased and its cost remains high (Graph 135). In contrast, the bank financing they received increased.

Graph 135

Yield spread of short-term debt issued by OIFNB



Data as of Nov 10, 2023

Source: BMV and BIVA

1/ Non - bank financial institutions, without bank or auto backing: Mercader, Crediclub, Factoring Corporativo, Financiera Bepensa, Ion Financiera, Mercader Financial, Portafolio de negocios, Sofoplus, Cetelem (are sofomes ER), Corporación Actinver y BBVA Leasing (are financial companies).

2/ Non - bank financial institutions, bank-backed: Afirme almacenadora, Afirme arrendadora, Afirme Factoraje, Fundación Dondé y Start Banregio (the first one is a OAC, the rest are sofomes ER).

3/ Non - bank financial institutions , auto backed: GM Financial, Navistar Financial (son sofomes ER), Paccar Financial, Toyota Financial, VW Leasing (are financial companies).

Other financing vehicles

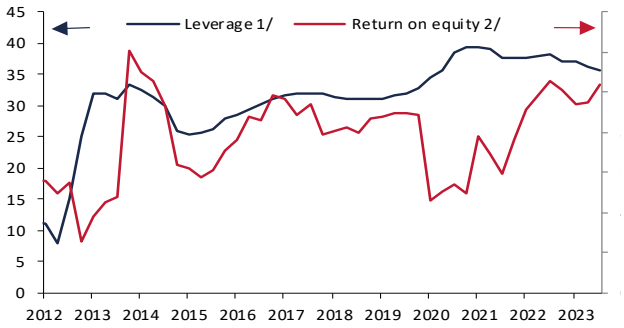
As of September, Real Estate Investment Trusts (Reits) specialized in all sectors (industrial, office, commercial and hotels) increased their profitability and occupancy rates due to the recovery in economic activity since the last *Report*. At the same time, their leverage levels continued their downward trend, and although the movement was from different levels for each sector, in general, they are low in relation to those observed in recent years (Graph 136). In addition, the in-debt-service coverage indicator and liquidity of the Reits improved due to higher liquid assets, the renewal of credit lines and lower payments for debt amortization. The increase in liquidity was due to capital injections made by some Reits to finance new property acquisition projects; these improvements were concentrated in Reits in the industrial sector, which anticipate that they could benefit from the relocation of production chains known as *nearshoring*. In the first nine months of this year, the amount of real estate certificates placed by the Reits amounted to 18,652 million pesos, while the debt issued by them in the same period was 12,950 million pesos. Among the Reits that raised funds through these issues, those specialized in the industrial sector stand out, possibly in relation to the relocation of companies to Mexico. The cash generated by the Reits is being used for investment spending, although at a slower pace compared to the last *Report*; nevertheless, it continues to be of significant magnitude for the industrial and hotel sectors. Some Reits announced the creation of new industrial Reits within their group, which suggests growth opportunities for this market.

[94] In order to access the program, loans must be current as of October 24, and borrowers will have until April 30, 2024 to apply to the broker under the assumption that it adheres to the program before the CNBV.

Graph 136

Leverage and return on equity of Mexican REITs

Per cent



Data as of September 2023

Source: BMV and BIVA

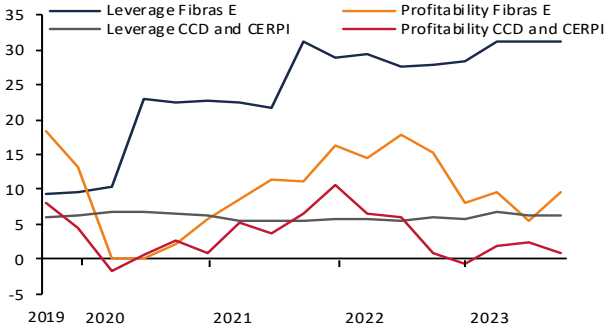
1/ Leverage is calculated by dividing debts by assets. Assets and debt are the average of the last 4 quartes.

2/ Return on equity (ROE) is calculated by dividing Net Income by Equity. Net Income is the sum of the last 4 quartes, whereas total equity is the average of the last 4 quartes.

Graph 137

Leverage & profitability of Fibras E, CCD and CERPI 1/

Percent



Data as of September 2023

Source: BMV and BIVA

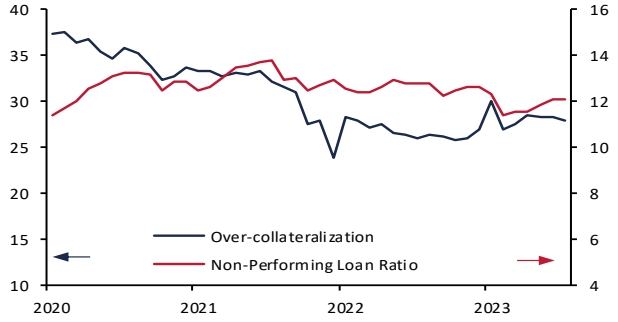
1/ Leverage is calculated as total liabilities divided by total assets. Profitability is mesured by ROE, and it is considering the 12-month net income.

The outstanding balance of Certificates of Capital Development (CCD) and Senior Trust Bonds for Investment Projects (Cerpis, for its acronym in Spanish) remained constant since the last *Report*. However, the proportion of assets in these vehicles dedicated to investment projects increased with respect to the total, as some of them have made investments. In the first half of the year, profitability increased due to the greater use of their assets in productive investments. However, in the last quarter it declined. Also, the liquidity indicator of these vehicles deteriorated slightly and leverage remained stable with respect to historical levels.

The balance of Fibras E (*Fideicomiso de Inversión en Energía e Infraestructura*) capital issues increased at the end of June. As of September, their leverage and liquidity risk indicators are stable, while their profitability stands out for a slight recovery in the last quarter, despite showing a downward trend since mid-2022 (Graph 137). The drop in profitability is explained, in particular, by the loss recorded by one institution in the first half of the year. Likewise, for the sector as a whole, there were higher expenses and commissions payable to structurers and trustors, in turn, the proportion of assets invested in productive projects remained low.

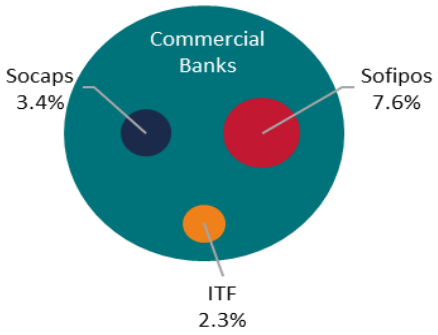
The balance of securitizations of mass or homogeneous credit debt issues continued downwards. Most of the assets backing these issues are from Infonavit and Fovissste; while the main holders are siefores, development banks and treasuries of private companies. The capacity or overcollateralization risk indicator showed a slight decrease in recent months, although it is high for all types of issuers, so there is ample capacity to absorb shocks to the portfolio. On the other hand, the portfolio's delinquency ratio levels are stable, as a result of the recent evolution of government and private mortgage securitizations issued more than ten years ago (see Graph 138). In the case of non-homogeneous securitizations (e.g., road tolls), the outstanding balance also fell and a high but stable leverage level was observed, as well as a slight improvement in their liquidity indicator. The profitability of the assets backing these trusts remained high, although with a slight decline. The main holders of these instruments continue to be siefores and companies' treasuries.

Graph 138
Over-collateralization and Non-Performing Loan Ratio in Homogeneous Securitizations[1/]
Per cent



Data as of September 2023
Source: BMV y BIVA
1/ Over-collateralization is calculated as 1 minus the ratio of the outstanding balance of the issuance to the sum of current assets and cash, multiplied by 100.

Graph 139
Relative size of financial intermediaries compared to commercial banks [1/]
Percentage in terms of capital stock



Data as of November 2023
Source: CNBV, Federal Official Gazette, Crunchbase and entities' websites
1/ For the case of Financial Technology Institutions (ITF), this refers to the contributed capital, which results from the sum of the initial capital stock plus the financing obtained through several investment rounds. Since April 19, 2022, the Official Gazette does not specify the social capital of some authorized ITF, in this case the lower limit stablished in this document is considered (500,000 or 700,00 UDIs depending on the case). In the case of Albo, the social capital published in the official Gazette and the investment round after the publication is considered. The figures related to capital stock of Commercial Banks , Socaps and Sofipos are up to September 2023.

Institutions using financial technology

During the second half of 2023, the incorporation of Financial Technology Institutions (*ITF*, for its acronym in Spanish) to the financial sector continued with the authorization of 12 licenses, all of them for Electronic Payments Fund Institutions (IFPE, for its acronym in Spanish). The sector continues its growth and contribution to the provision of innovative financial services that compete with those granted by other brokers, although some business models still face challenges to consolidate.

As of November 2023, a total of 70 ITFs have been authorized under the Law to Regulate Financial Technology Institutions (*LRITF,* for its acronym in Spanish). Of these, 22 correspond to Crowdfunding institutions (*IFC,* for its acronym in Spanish) and 48 to Electronic Payment Fund institutions (IFPE).

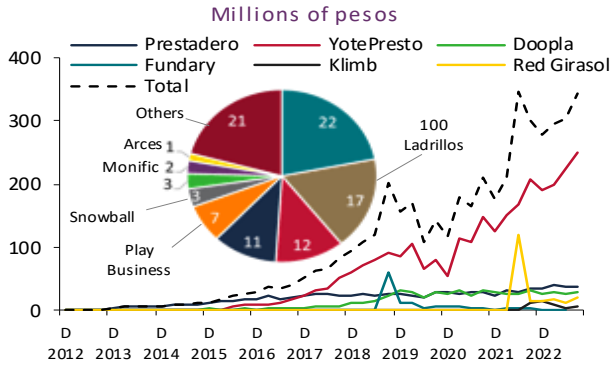
The ITF sector faces some challenges arising from the tightening of financial conditions, although despite its growth, its size does not represent a threat to financial stability. The ITF sector remains small relative to commercial banks. However, ITF capital is equivalent to 68.0% of the capital of socaps and 30.4% of the capital of sofipos (Graph 139). In this regard, it is important to continue monitoring this sector given its growth and the challenges it faces for its consolidation.

Financing granted through debt IFC continues to show a growing trend with an annual increase of 11.6% as of September 2023, and a quarterly growth of 11.7% (Graph 140a). However, non-performing loans continue to be a relevant issue for some of these institutions, with levels close to 30%, so their situation and the viability of their business model should be monitored. With respect to co-ownership, equity or royalty IFC, few changes have been observed in recent years, although there was a decrease in the total financing granted during the first half of the year (Graph 140b).

Graph 140

Funding granted by institution

a) Debt IFC [1/]

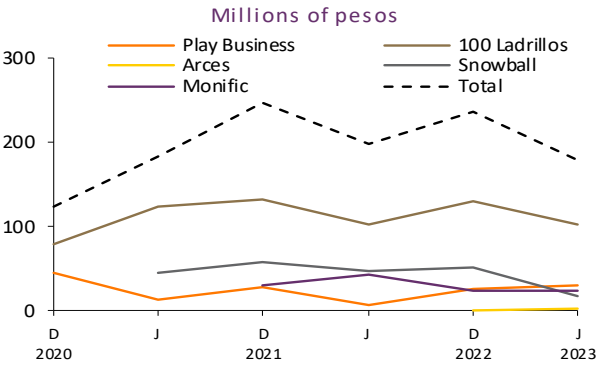


Data as of September 2023

Source: Institutions' websites

1/ The pie chart denotes the proportion of capital contributed by the IFC compared to the total (percent).

b) Equity, co-ownership or royalties IFC



Data as of June 2023

Source: Institutions' websites

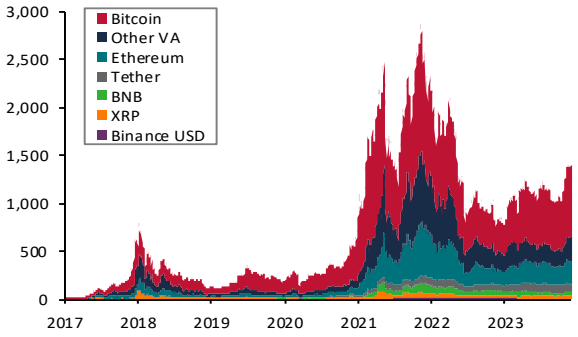
The spectrum of services provided by financial institutions that perform technology-based services, also known as Fintech in the broad sense, is greater than that of ITF. In Mexico, this has led some of them to partner with or acquire companies with other types of licenses, such as sofipos.[95] Banco de México remains vigilant to the evolution of these institutions to ensure the healthy development of the financial system.

Regarding the virtual assets (VA) market, although so far in 2023 there has been an increase in the total market capitalization of this type of assets, it remains considerably below the historical highs observed around 2 years ago (Graph 141).

Graph 141

Total market capitalization of virtual assets [1/]

billion dollars



Data as of November 2023

Sources: CoinGecko, Coin Dance

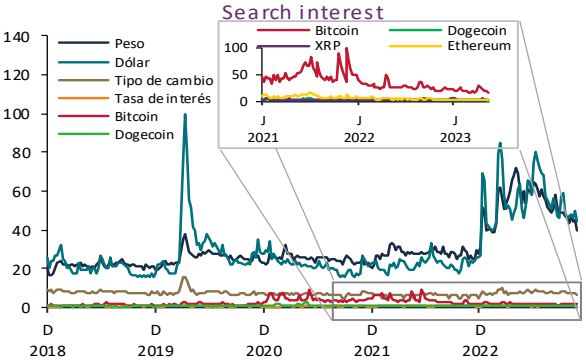
1/ The "Other VA" category represents the market capitalization of the remaining VA, according to the total estimated by Coin Dance.

The Mexican financial system has remained on the sidelines of the operation and events of this market. Thus, it will be important to continue monitoring it in order to identify any threat to the financial system in a timely manner. As for the general interest in Mexico for this type of assets, using the number of Google searches as an indicator, there is still no significant interest in this type of assets (Graph 142).

Graph 142

Google searches for main virtual assets in Mexico [1/]

Search interest



Data as of November 2023

Source: Google Trends

1/ "Google Trends" normalizes search interest to facilitate comparisons between terms. Search results are normalized relative to the time and region of the query. The graphs show the normalized search interest for the sample of all selected search terms. Some virtual assets were omitted from the graph as their search interest was close to zero (<6).

[95] Although sofipos are regulated entities, they are subject to less stringent rules than banks and, depending on the scale of the broker, may generate the possibility of regulatory arbitrage.

In contrast, it is observed that based on the Chainalysis Cryptocurrency Adoption Index, Mexico has increased its relative position, for the first time ranking in the top 20 countries.[96] However, the overall index is trending downwards compared to its peak in the first quarter of 2021. After this peak, global adoption fell to a minimum level in the fourth quarter of 2022 and, although it has risen slightly over the course of 2023, it is well below its peak in Q1-2021.

This coincides with a decline in the participation of both retail and institutional investors in these assets. According to figures from the Coinbase platform,[97] since the end of 2021, a downward trend has been observed in the AV transactional volume within the platform.

IV.4. Financial Market Infrastructure

Securities depository institutions and securities settlement systems

In Mexico, the market infrastructure responsible for the deposit of securities and securities settlement systems is the Securities Deposit, Administration and Settlement System (*DALI*, for its acronym in Spanish), which is operated by Mexico's Central Securities Depository (*Indeval*, for its acronym in Spanish). Securities transactions are settled in the DALI; in the purchase and sale, repo and securities lending operations of the Mexican financial market.

At the end of September 2023, the accumulated availability level of DALI'S services was 99.85%. The accumulated availability of peripheral services in the same period was 100 %, such services correspond to:

Collateral management for repurchase agreement transactions (SAVAR) administers collateral for repo transactions with terms of more than three days in Mexico;

Specialized securities lending (Valpre E) administers securities lending in Mexico related to the SHCP'S market makers program, and;

Securities Lending Value Date (Valpre FV) allows the arrangement of loans between financial institutions in Mexico.

At the end of September 2023, the average daily settlement amount in the DALI was 4.45 trillion pesos. Settlement was mostly composed of government securities, which accounted for 85.26 % of the average amount settled, followed by bank securities with 12.57 %, corporate sector securities with 1.48 % and capital market securities with 0.69 %.

Central counterparts

A central counterparty is a financial market infrastructure which stands between parties entering into financial transactions, that is, its function is to be a buyer for every seller and a seller for every buyer.

Contraparte Central de Valores, S.A. de C.V. (CCV, for its acronym in Spanish) and the *Asigna Compensación y Liquidación* (Asigna) trust are the central counterparties established in Mexico to clear and settle securities and derivatives transactions, respectively. Asigna and CCV have procedures and methodologies to manage the risks of the financial transactions they assume as a result of their role as reciprocal debtor and creditor of the financial transactions they clear and settle. In particular, it manages credit and liquidity risk exposures. To this end, these central counterparties require financial resources from their participants to manage these risks. These resources are mainly composed of the Contribution Fund and the Clearing Fund. The Contribution Fund is made up of collateral provided by the participants of the central counterparties, also known as Clearing Members, and the clients of these members to cover their market and liquidity risk exposures in the event that the credit risk of a Clearing Member materializes. In turn, the Clearing Fund is made up of the Clearing Members with collateral that can be mutualized to face a default, particularly in stressed market conditions. At the end of October 2023, the CCV and Asigna systems had a

[96] Chainalysis. "The 2023 Geography of Cryptocurrency Report". October 2023.

[97] Coinbase (2023). "Shareholder Letter Third Quarter 2023". November 2, 2023. Coinbase is the second largest platform for buying and selling Cryptocurrencies. It operates in more than 100 countries and allows the exchange of more than 150 different Cryptocurrencies.

cumulative availability level of 99.87% and 99.94%, respectively.

During the second half of 2023, Asigna and CCV have covered their risk exposures, consistent with the resources required as guarantees for the Contribution Funds and the Compensation Funds. In the case of Asigna, its Safety Net[98] is 29,996 million pesos, which is composed mainly of a Contribution Fund of 25,951 million pesos, 54.17% of which is in cash, and a Compensation Fund of 3,166 million pesos, composed entirely of cash resources.[99]

On the part of CCV, its Safety Net is 5,406 million pesos and is mainly composed of a Contribution Fund of 3,881 million pesos, with 95.94 % cash resources, as well as a Compensation Fund of 897 million pesos, composed of cash resources.[100]

IV.5. Other risks to the financial system

IV.5.1. V.5.1. Business continuity risks

Banco de México must maintain a high availability rate of the systems it manages and operates due to the systemic importance of Financial Markets Infrastructures and payment systems. At the end of the third quarter of 2023, the average availability rate of the two Interbanking Electronic Payment System (SPEI, for its acronym in Spanish) instances was 99.9975%, which represents an unavailability of 13 minutes on average considering both instances derived from the time required to maintain the infrastructure that supports the operation of the system.

On the other hand, during the third quarter of 2023, we continued with the execution of exercises of the operating continuity mechanisms implemented jointly with the participants, in order to verify that the necessary elements are in place to deal with any event that could affect the availability of both the central infrastructure and the participants.

It is worth mentioning that as of the third quarter of 2023, Banco de México has not had any incidents in the technological infrastructure used to operate the payment systems, nor in its operating processes. In this regard, the payment systems have not had any interruption in their services as a result of any incident.

IV.5.2. V.5.2. Cybersecurity risks

Cyber risks to the global financial system continue to be relevant, given the increasing frequency and sophistication of cyber-attacks. A successful cyberattack on a financial institution could impact the country's financial services and damage customer confidence in those services.[101] As a result, financial institutions and authorities have implemented different measures to monitor cybersecurity risks and threats, both in Mexico and globally.

Particularly in view of the increase in geopolitical conflicts, specific follow-up is given to risks related to the cybersecurity of financial systems, as events could occur that affect critical infrastructure through cyber-attacks. Since last year, Banco de México and the Mexican financial authorities have been monitoring the cyber-attacks originated by the conflict between Russia and Ukraine and decided to set the alert level for the Mexican financial system to "Yellow".[102] This monitoring has been extended and updated in light of the recent conflict in the Middle East, determining that the alert conditions have not changed and therefore the same level will be maintained. Banco de México will continue to monitor any possible cyber threat and will encourage financial institutions in Mexico to strengthen their protection and response schemes.

As of the publication of this *Report*, during 2023, financial institutions in Mexico reported [4] relevant

[98] The Safety Net is a set of financial resources that the central counterparties make up, mainly from the requirements they make to their participants, to cover credit and liquidity risk exposures in the event of a default in the transactions in which they are counterparties.

[99] Figures provided by Asigna as of October 31, 2023.

[100] Figures provided by CCV as of October 31, 2023.

[101] Promoting Global Financial Stability: 2023.FSB Annual Report.

[102] In the "Yellow" alert level, digital surveillance is maintained, focused on monitoring cyber threats and relevant events associated with military conflicts by the actors directly involved or their sympathizers. It comprehensively considers technological and operational actions to monitor the SWIFT system and other platforms used for international transactions.

cyber incidents,[103] which were dealt with by the Response Group for Sensitive Information Security Incidents (GRI, for its acronym in Spanish) of the financial authorities[104] according to their protocols, with no relevant economic impact reported for the clients of the attacked institutions.

In order to increase the cybersecurity maturity of the Mexican financial sector, the GRI, through the use of IT tools, promotes the exchange of intelligence information related to cyber threats, vulnerabilities, incidents and risks. In particular, these tools allow financial authorities to more efficiently exchange information on cyber-incidents that have occurred in the Mexican financial sector and, consequently, to promote actions among their respective regulated entities to prevent attacks that have been observed in other institutions. Thus, during this semester the financial authorities, through the GRI, issued [13] bulletins with technical information on cybersecurity intelligence.

In order to further develop the capabilities of financial institutions to deal with cyber incidents, in September 2023 a cyber-resilience drill was conducted with the participation of Banco de México and 5 local systemically important financial institutions, in which the capabilities of all participants to identify, contain, investigate and remediate a cyber-attack were evaluated. As a result, the participating financial institutions demonstrated that they have clear response protocols, in which cyber-resilience is addressed with a multidisciplinary perspective and focused on maintaining the provision of services to their clients. On the other hand, opportunities for improvement were identified related to the coordination of actions and communication between institutions, in order to be able to respond as a sector as a whole and not only individually. This Central Institute will continue to promote this type of exercises to strengthen the Mexican financial sector's response capabilities to various cyber incidents in different processes of Banco de México.

As indicated in the *December 2022 Report*, Banco de México developed three indicators to measure cybersecurity levels of the Mexican financial system that are based on Banco de México's experience and the information it collects directly from financial institutions.

The Cybersecurity Index of Mexican Financial Institutions,[105] is at a level of 83%, improving from the 82% obtained in 2022. Strengths were detected in cybersecurity governance issues, indicating that financial institutions have specialized personnel in this area, who dedicate full time to these activities and have designed processes to institutionally manage cybersecurity and cyber resilience. Meanwhile, areas of opportunity were identified to strengthen the capabilities of most financial institutions in the collection and analysis of cyber intelligence information.

Mexico's Cyber Attack Risk Index[106] (Graph 143) showed that during 2023 the most recurrent cyber threats have been: cybercriminal groups, ransomware and card sellers. It is worth mentioning that the activity of cybercriminal groups represented the threat with the most significant increase during the year, who have intensified their attempts to breach the security systems of the financial system and have extended their attacks to correspondents, commission agents and corporate clients of credit institutions. On the other hand, ransomware presented the second highest growth rate in relation to last year, mainly due to the identification of a greater number of attacks of this type aimed at affecting the technological infrastructure of internet banking, branches, electronic transfers and automated teller machines (ATMs) of some financial institutions.

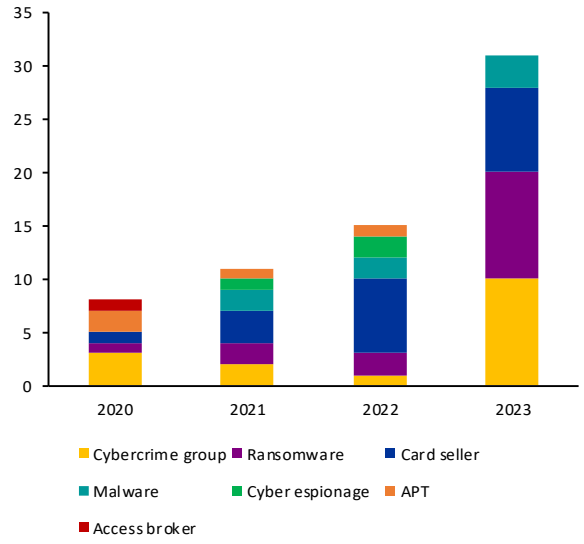
[103] Main relevant cyber incidents occurred in 2023 in the Mexican financial system that have been repurchased to Banco de México, in this link, in the section of Response to Incidents in the Financial Sector.

[104] SHCP, Banco de México, CNBV, Condusef, National Commission for the Pension System (Consar, for its acronym in Spanish), IPAB and CNSF

[105] It is built with information from 85 financial institutions in the areas of Governance, Intelligence, Resilience, Technical Capacity, and Awareness and Training; based on international standards and best practices.

[106] It provides a perspective on the types of cybersecurity attacks that have been carried out against Mexican financial sector institutions during the period of this *Report*. This indicator is based on news and publications in different specialized forums.

Graph 143[107]
Cybersecurity Attack Risk Index in Mexico
News items



Data as of December 2023

Source: Banco de México

The Financial System Cyber Attack Risk Perception Index,[108] which measures cyber risk in the financial sector for different countries based on news,[109] indicates that, for the period from January 2021 to November 22, 2023, Mexico ranks 29th out of 104 countries (ranked from lowest to highest risk) with a rating of 2.62%, with 5.93% being the mean of all countries and the median of 4.74%.

The indexes presented allow an approximate diagnosis of the state of cybersecurity in the Mexican financial system, which is considered acceptable in this period. However, given the global and multifactorial nature of this risk, it is essential to maintain surveillance of its status, develop the capacity to respond in a timely manner in the event of an incident materializing, and encourage financial institutions to report these events to the authorities in a timely manner. All these actions, which Banco de México promotes on a permanent basis, are vital to safeguard the financial system and prevent risks to its stability due to these events. Additionally, Banco de México will continue to promote those financial institutions to maintain robust cybersecurity strategies, develop their proactive capabilities such as cyber intelligence, raise awareness among personnel including senior management, and practice simulation exercises that include cyber-attack scenarios, in which they put into practice their containment and remediation capabilities. These actions, together with compliance with regulations on the subject, improve the protection and resilience of the financial sector in the face of cyber risks.

Banco de México, in addition to constantly monitoring cybersecurity, maintains continuous communication with financial institutions on the evolution of cyber risks in the Mexican financial sector in order to collaboratively undertake timely actions to mitigate their impact in the case they arise.

IV.5.3. IV.5.3 Environmental risks and sustainability of investments

Banco de México actively encourages financial system participants to internalize climate change-related risks. This, considering that the economic and financial impacts associated with such risks, as well as those derived from the transition to a lower carbon and, in general, more sustainable economy, may

[107] **Access broker** Threat actor that illegally accesses organizations' computer networks and resells access through clandestine Internet forums. **APT:** Advanced Persistent Threat, with high levels of expertise in hacking techniques and the resources and time required to use various sophisticated attack vectors to breach target organizations in order to sabotage them or obtain sensitive information or financial gain. **Card seller:** Threat actors whose main activity consists in stealing information related to bank cards of financial institutions' customers, in order to sell such information in clandestine Internet forums. **Cyberespionage:** Threat whose purpose is to extract sensitive information from government institutions or large corporations. **Cybercriminal group:** Threat dedicated to carrying out criminal activities directed mainly at computer systems, with the aim of obtaining economic resources. This category groups together generalized threats that cannot be associated with any of the other categories. **Malware:** Threat designed to compromise the confidentiality, integrity or availability of information on a computer system. **Ransomware:** A type of malicious software whose purpose is to hijack sensitive information from a computer system in order to make the victim pay a ransom for it or to prevent its publication on clandestine Internet forums.

[108] The country index is calculated as the ratio between the number of news items referring only to cyber risk in the financial sector and the number of news items referring to general risks in this sector (cyber risk, credit risk, reputational risk, environmental risk, among others), so that the higher the value, the greater the number of news items on financial cyber-attacks in relation to news items on other risks for the country evaluated.

[109] In contrast to the index of the previous *Report*, in which information sources from Reuters and X (formerly Twitter) were used to calculate it, this time only Reuters information was used, considering the sections: Technology, Fintech, Funds, Economy and Banks.

result in considerable future losses for financial institutions, which in turn represents a risk for the financial system as a whole. Thus, this section updates the analysis of these risks presented in previous editions of this *Report*.

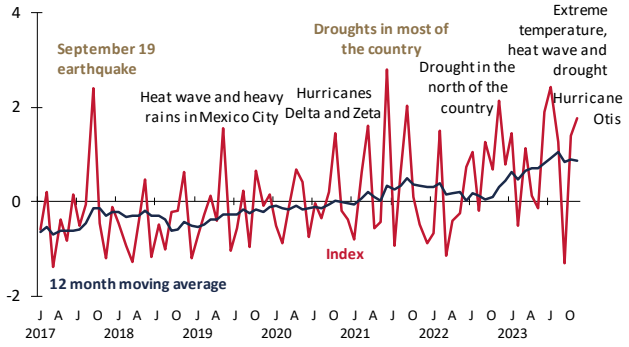
Public interest indexes related to environmental risks and natural disasters

Since the last *Report*, the index[110] of extreme events and natural disasters exceeded, on average, that of the previous six months. The levels recorded in the months of October and July are high, and in the latter reached a value similar to that of the earthquake of September 19, 2017 (Graph 144). The most searched terms were "heat wave", "drought" and "hurricane" due to: i) the occurrence of hurricane Otis in the state of Guerrero and, in particular, in Acapulco at the end of October; ii) the heat waves with record temperatures that affected a large part of the national territory in June, July and August; and iii) the intensification of droughts due to the *"la niña"* weather phenomenon in July.

Graph 144

Interest index on isssues related to extreme hydro-meteorological events and natural disasters

Summary



Data as of November 2023

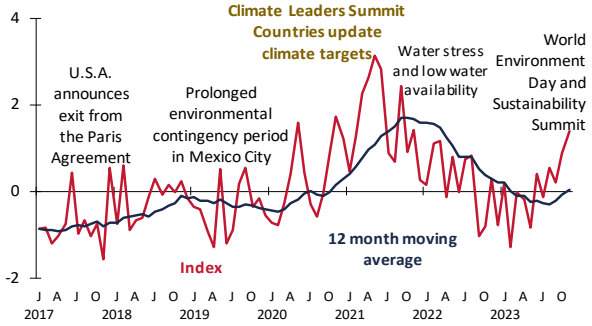
Source: Banco de Mexico and Google Trends

Meanwhile, the index of events related to transition risks showed a change in trend, with increases that placed it above the average of the previous six months (Graph 145). The most searched terms were "environmental hazard", "pollution control" and "climate change summit" due to: i) Mexico's adherence to the "Global movement against plastic pollution" emphasized by the United Nations (UN) on World Environment Day; and ii) the "International Summit on Environmental Sustainability and Innovation" in August.

Graph 145

Interest index on issues related to transition risks

Summary



Data as of November 2023

Source: Banco de Mexico and Google Trends

An increase in indices denotes a growing interest by the public, which may arise from events with a positive, negative or neutral impact on the environment. Therefore, an increase in indices should not automatically be associated with higher environmental risks or higher transition costs.

Transition risks

This section analyzes the commercial bank loan portfolio in the sectors of economic activity most exposed to transition risks. A transition to a cleaner economy could be costly if it were to occur in a disorderly manner.[111] For example, it could abruptly reduce the price of some financial assets, increase costs and reduce companies' revenues unexpectedly, or damage the reputation of institutions that do not support the implementation of green policies. This could increase credit default, so the possibility of a disorderly transition creates challenges and emphasizes the need for financial institutions to take risks into account.

The exposure of the loan portfolio in the sectors most vulnerable to transition risks represents 33%. These

[110] The indexes are built from public searches on the web for terms related to each type of event.

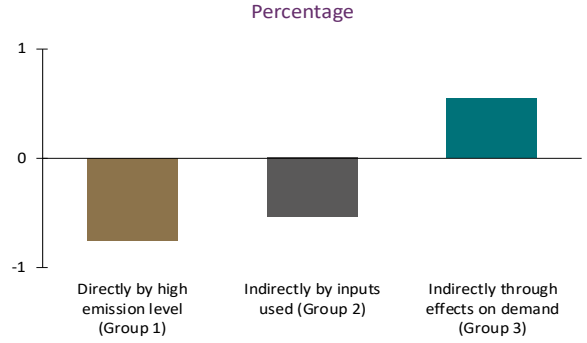
[111] Reducing greenhouse gas emissions could entail costs for companies, for example, because of the need to invest more in new technologies or to implement other measures to improve energy efficiency.

sectors are grouped into three categories[112]: sectors directly exposed because they generate high emissions in their own production process (Group 1); sectors indirectly exposed because they use inputs that generate high emissions (Group 2)[113]; and sectors indirectly exposed because a large part of their demand comes from polluting industries (Group 3). This classification is complemented with an analysis of the characteristics of the companies belonging to each group, to identify vulnerabilities that could amplify or mitigate the impacts if the transition risks materialize.

Exposure to transition risks continued with the trend reflected in the last version of this *Report.* There was a reduction in the direct exposure of commercial banks (due to a lower weight in the Group 1 portfolio), but an increase in indirect exposure. In particular, commercial banks exposure increased to sectors that could be more affected if demand from the most polluting industries were to fall. In other words, indirect exposure to transition risks increased due to a greater weight in the portfolio of Group 3 sectors, such as, for example, those that supply services and chemical products to those of Group 1 (Graph 146).

Graph 146

Portfolio balance changes in sectors exposed to transition risks



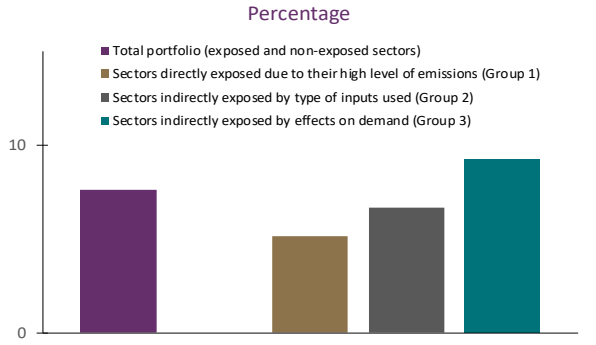
Data as of June 2023
Source: Banco de Mexico, CNBV and INEGI

In addition, the companies in Group 3 have characteristics that could amplify the impact if the transition risks materialize. In particular, in this group there is more representation of small-and-medium-sized firms (SMEs) and individuals with entrepreneurial activity (Graph 147a and Graph 147b). SMEs tend to have fewer resources and a business structure that is generally less suitable for risk management. Also, individuals may be more vulnerable in times of financial stress because their resources depend on the assets of a single owner. Therefore, SMEs and individuals, which are more represented in Group 3, may have greater liquidity needs if risks materialize, but, at the same time, they may also be perceived as riskier and have more difficulty accessing financing.

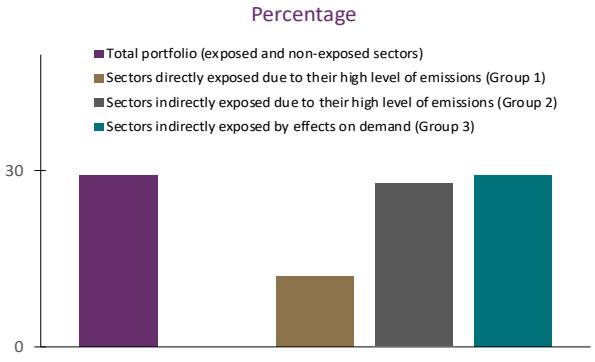
Graph 147

Portfolio in sectors exposed to transition risks, by type of exposure

a) Percentage of the portfolio in companies of natural persons



b) Portfolio percentage to SMEs



Data as of June 2023
Source: Banco de Mexico, CNBV and INEGI

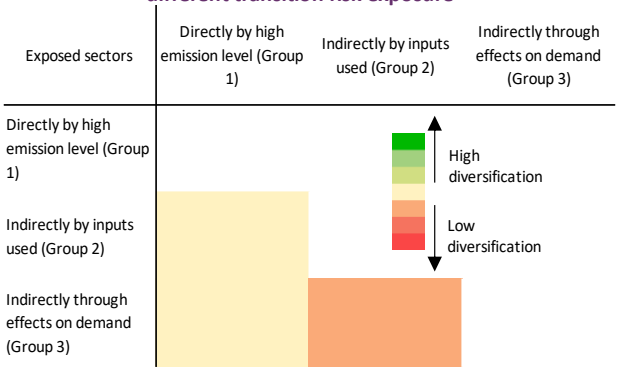
In addition, the banks with the greatest exposure to Group 3 sectors are those that also have the greatest

[112] For more details on sector classification, see the December 2020 Financial Stability Report.

[113] The definition of Group 2 is related to Scopes 2 and 3 of the GHG Protocol, since these scopes consider that companies can generate emissions even when they occur physically in the plant that produces the inputs and not in the company that consumes them. In other words, they may emit indirectly through the use of inputs. The definition of Group 1 is directly related to the definition of Scope 1.

exposure to Group 2 sectors and therefore have a less diversified portfolio (Graph 148). This low diversification could cause these banks to be more affected if the transition hurts both the sectors that receive inputs and those that receive demand from the most polluting industries.

Graph 148
Portfolio diversification among sectors with different transition risk exposure [1/]



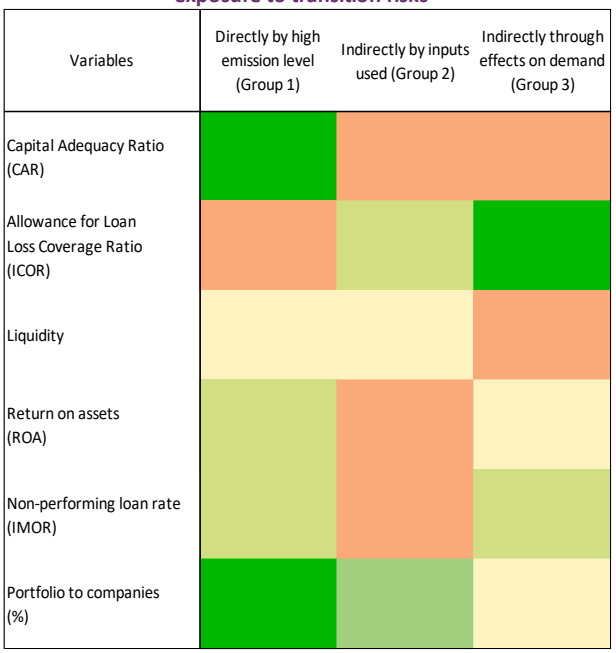
Data as of June 2023

Sourcee: Banco de México, CNBV and INEGI

1/ The colors show how diversified the portfolio is against these risks. The red color means less diversification, while the green color means more diversification. Diversification is based on the correlation coeffcicient between each bank's credit portfolio share in sectors exposed to different transition risks.

However, the past-due portfolio coverage ratios with preventive reserves (ICOR, for its acronym in Spanish) and liquidity ratios (liquid assets/liquid liabilities) increased in these banks, which could reduce the impact if transition risks materialize (see Graph 149).

Graph 149
Risk amplifiers and mitigants, depending on the bank's exposure to transition risks[1/]



Data as of June 2023
Source: Banco de Mexico, CNBV and INEGI
1/ Shades of green show mitigating effects while shades of red show amplifying factors. The color is defined by the correlation coefficient between each factor considered and the credit portfolio shares in each sector subject to transition risks.

Physical risks: Corporate Loan Portfolio

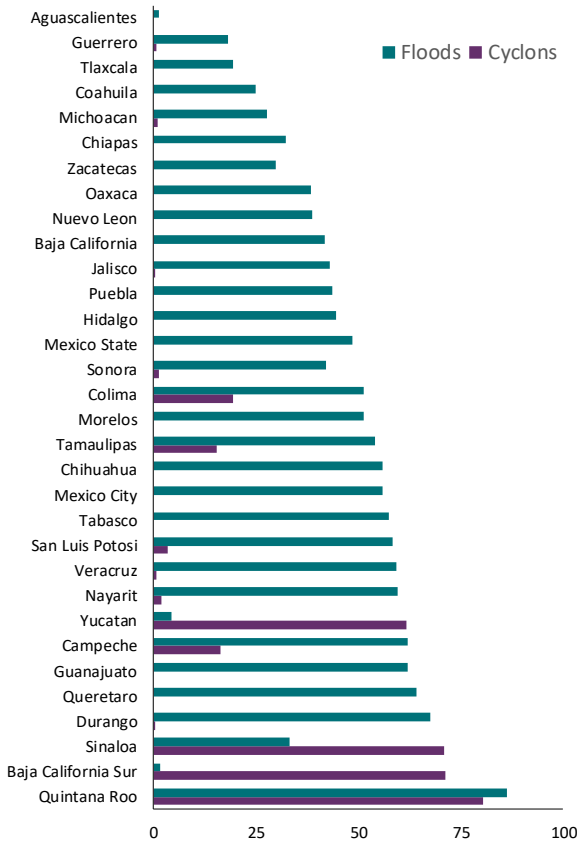
An increase in the frequency and intensity of hydro-meteorological events can cause economic losses and, therefore, lead to the default of companies' credit.[114] This section studies the exposure of corporate credit to the risk of four hydrometeorological events (physical risks): hurricanes, droughts, warm waves and floods. Credit is first identified in sectors and regions exposed to the same type of event. Then, credit is accounted for in municipalities exposed to a type of event. For each municipality, only the credit in the sectors vulnerable to the same type of event is considered. The analysis is carried out for the country's states and commercial banks.

Floods continue to be the hydro-meteorological event to which corporate credit is most exposed. However, this exposure continues with the

[114] Aguilar-Gómez, Gutiérrez, Heres, Jaume and Tobal (2022) show that an unusual number of days of extreme temperatures increase the credit default of companies in Mexico.

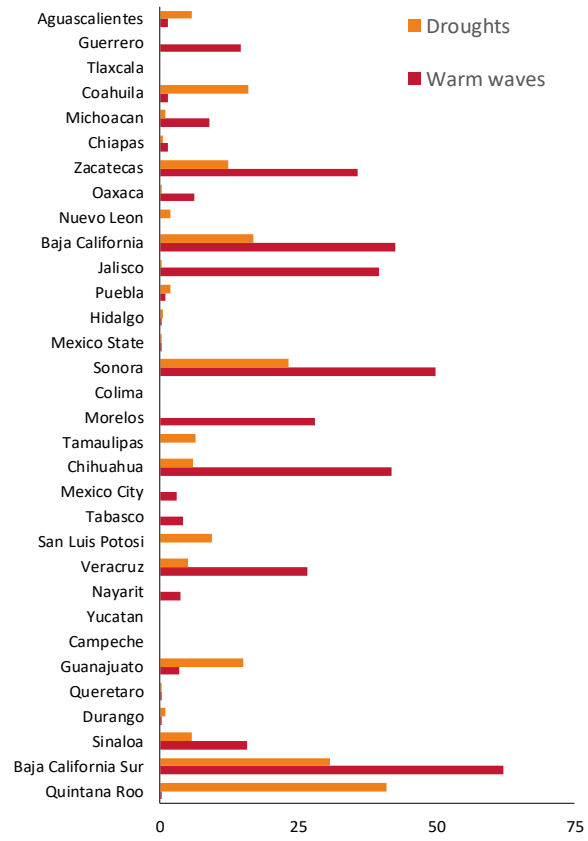
downward trend it had been showing, while exposure to the other three events increased (Graph 150 and Graph 151). In this vein, the occurrence of Hurricane Otis,[115] and warm waves stand out, a phenomenon to which commercial banks showed the greatest increase in exposure.

Graph 150
Portfolio in sectors and municipalities vulnerable to cyclons and floods
Percentage



Data as of June 2023
Source: Banco de Mexico, CENAPRED, CNBV and INEGI

Graph 151
Portfolio in sectors and municipalities vulnerable to heat waves and droughts
Percentage



Data as of June 2023
Source: Banco de México, CENAPRED, CNBV and INEGI

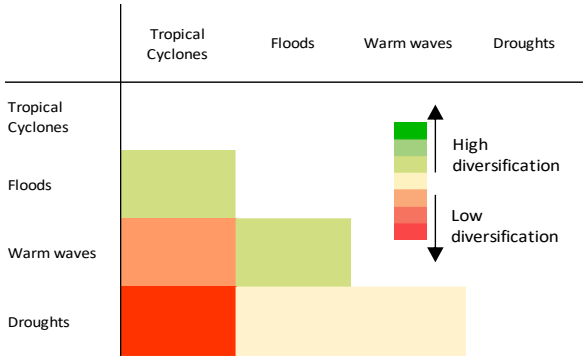
Hurricane Otis impacted Acapulco, significantly affecting the lives of its inhabitants. Total losses have not yet been established. However, the proportion of the total portfolio in Acapulco is small and therefore does not represent a risk to financial stability. This exposure is higher for the non-revolving consumer and mortgage portfolios than for the revolving consumer and corporate portfolios. However, in the latter there is a high participation of SMEs, which, as mentioned in the transition risk section, could be riskier.[116]

[115] Unlike the scenarios considered in Box 5*: Increased occurrence of tropical hurricanes and credit exposure in Mexico* in the Financial Stability Report - June 2023, in which the possible evolution of environmental phenomena in the future is incorporated in the exposure calculation, the exposure in this graph is constructed based on data from the National Disaster Prevention Center (Cenapred, for its acronym in Spanish). This information considers the past occurrence of the different phenomena; therefore, if any phenomenon did not occur in the past, a low probability is calculated.

[116] This exposure is equal to 0.67% in housing, 0.66% in non-revolving consumption, 0.49% in revolving consumption, 0.03% in companies and 0.12% in SMEs.

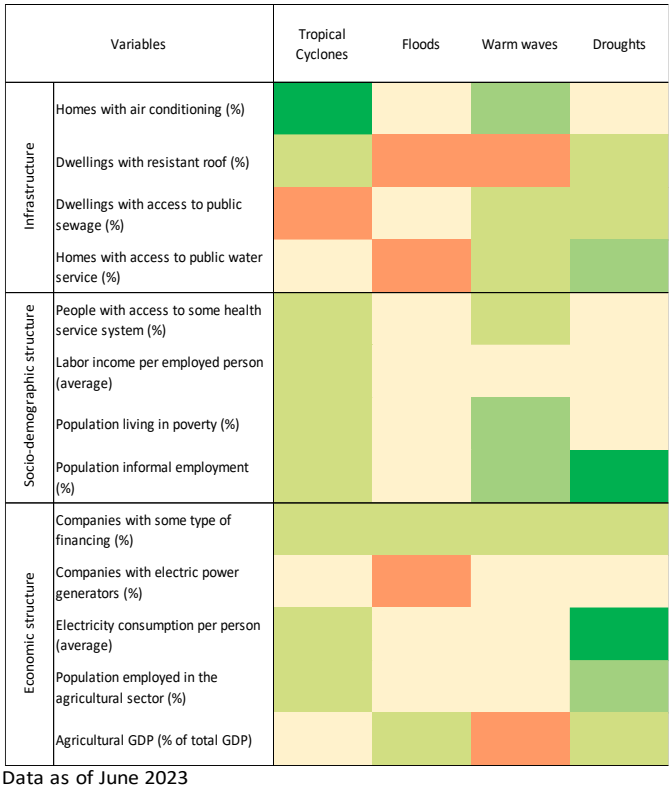
The states of the Republic with more exposure to warm waves are those that also have more exposure to hurricanes. This low diversification of the portfolio could mean that, if these two phenomena were to occur in close periods, these states would be more affected (Graph 152). However, these are states with a lower proportion of the population living in poverty, which could mitigate the effects if physical risks materialize (Graph 153).

Graph 152
Portfolio diversification among sectors and municipalities exposed to different hydro-meterological events (for different states) 1/



Data as of June 2023
Source: Banco de México, CENAPRED, CNBV and INEGI
1/ The colors show how diversified the portfolio is against these risks. The red color means less diversification, while the green color means more diversification. Diversification is based on the correlation coeffcicient between each state's share of loan portfolios exposed to different hydro-meteorological events.

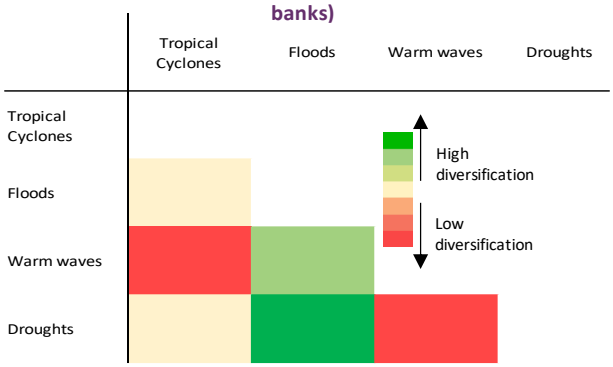
Graph 153
Amplifying and mitigating factors of physical risks (for different states) 1/



Data as of June 2023
Sourcee: Banco de Mexico, CENAPRED, CNBV and INEGI
1/ Shades of green show mitigating effects while shades of red show amplifying factors. The color is determined by the correlation coefficient between each factor and the shares of credit portfolios for each sector and state exposed to the different hydro-meteorological events.

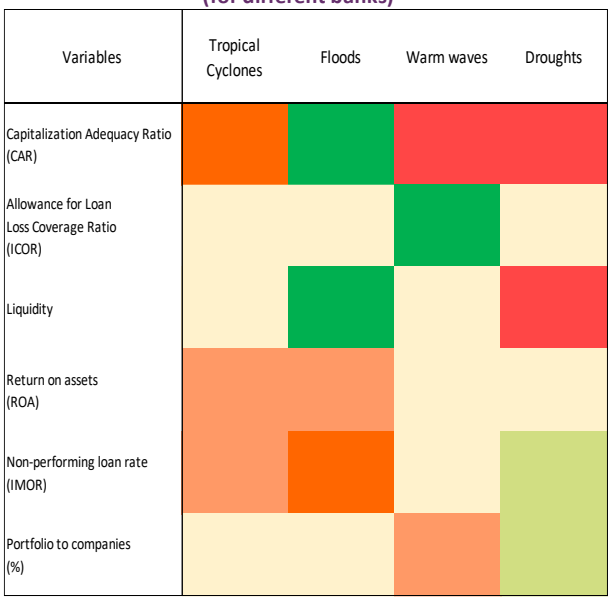
The low diversification of the portfolio is also a vulnerability when the analysis is done for banks (Graph 154) Banks with more exposure to warm waves are those that also have more exposure to hurricanes and droughts. However, for these banks, loan losses coverage ratios with preventive reserves (ICOR) increased, which could lessen the effects if physical risks materialize (Graph 155).

Graph 154
Portfolio diversification among sectors and municipalities exposed to different hydro-meteorological events (for different banks)



Data as of June 2023
Source: Banco de Mexico, CENAPRED, CNBV and INEGI
1/ The colors show how diversified the portfolio is against these risks. The red color means less diversification, while the green color means more diversification. Diversification is based on the correlation coefficient between each bank's share of loan portfolios exposed to different hydro-meteorological events.

Graph 155
Factors amplifying and mitigating physical risks (for different banks)[1/]



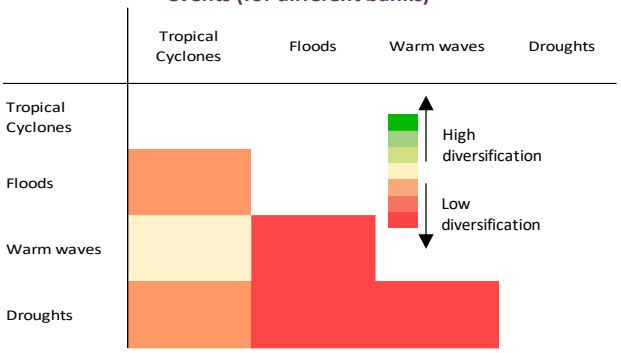
Data as of June 2023
Source: Banco de Mexico, CENAPRED, CNBV and INEGI
1/ Shades of green show mitigating effects while shades of red show amplifying factors. The color is determined by the correlation coefficient between each factor and the shares of credit portfolios for each sector and state exposed to the different hydro-meteorological events.

Physical Risks: Housing and Consumer Loan Portfolio

The analysis of exposure to physical risks is expanded to include mortgage loans and part of consumer loans (payroll, automobile, personal and revolving). The same four hydrometeorological events are considered as in the previous section, and it follows similar process to determine the portfolio exposure, using the municipality and sector where the loans are granted.[117]

In mortgage lending, banks continue to have a portfolio that is not very diversified due to the occurrence of several hydro-meteorological events in nearby periods (Graph 156). However, this diversification improved, as banks with more credit exposed to hurricanes reduced their exposure to other events. In addition, these banks reduced the share of mortgage credit in their total portfolio which, together with high liquidity and profitability and low non-performing ratio levels, makes them less vulnerable to the possible effects of hurricanes on this type of credit (Graph 157).

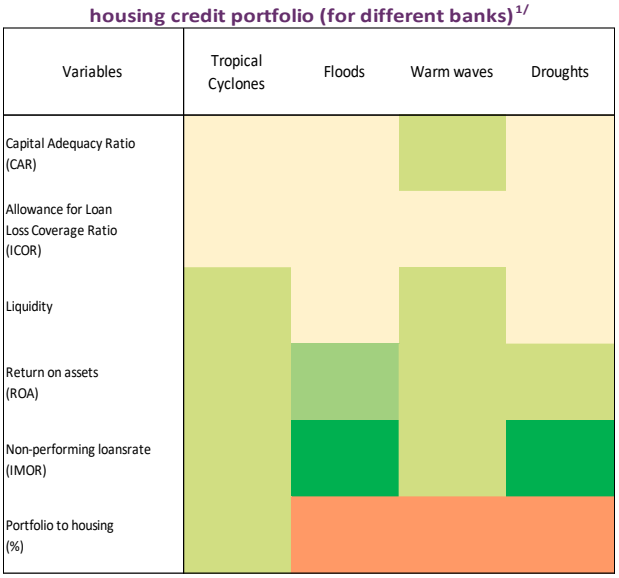
Graph 156
Housing loan portfolio diversification among sectors and municipalities vulnerable to different hydro-meteorological events (for different banks)[1/]



Data as of June 2023
Source: Banco de Mexico, CENAPRED, CNBV and INEGI
1/ The colors show how diversified the portfolio is against these risks. The red color means less diversification, while the green color means more diversification. Diversification is based on the correlation coefficient between each bank's share of loan portfolios exposed to different hydro-meteological events.

[117] As with the corporate portfolio, credit is identified in regions and sectors exposed to the same type of hydrometeorological phenomenon. On this occasion, however, the proportion of the portfolio in at-risk sectors is approximated by following two steps. First, for each municipality, the proportion of the portfolio in high and low wages is identified. Second, we combine this information with employment data from the latest census. In particular, for each wage level, the portfolio of at-risk sectors is approximated as the share of formal employment in those sectors.

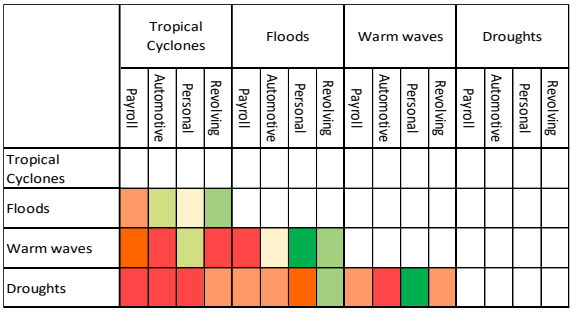
Graph 157
Amplifying and mitigating factors of physical risks in the housing credit portfolio (for different banks)[1/]



Data as of June 2023
Source: Banco de Mexico, CENAPRED, CNBV and INEGI
1/ Shades of green show mitigating effects while shades of red show amplifying factors. The color is determined by the correlation coefficient between each factor and the shares of credit portfolios for each sector and municipality exposed to the different hydro-meteorological events.

In consumer credit, banks generally continue to have a more diversified portfolio due to the occurrence of several events than in mortgage lending (Graph 158). Within consumer loans, the most diversified segments are revolving and personal loans. For the payroll segment there is now less diversification, particularly in the face of hurricanes, in contrast to what occurred in the mortgage segment.

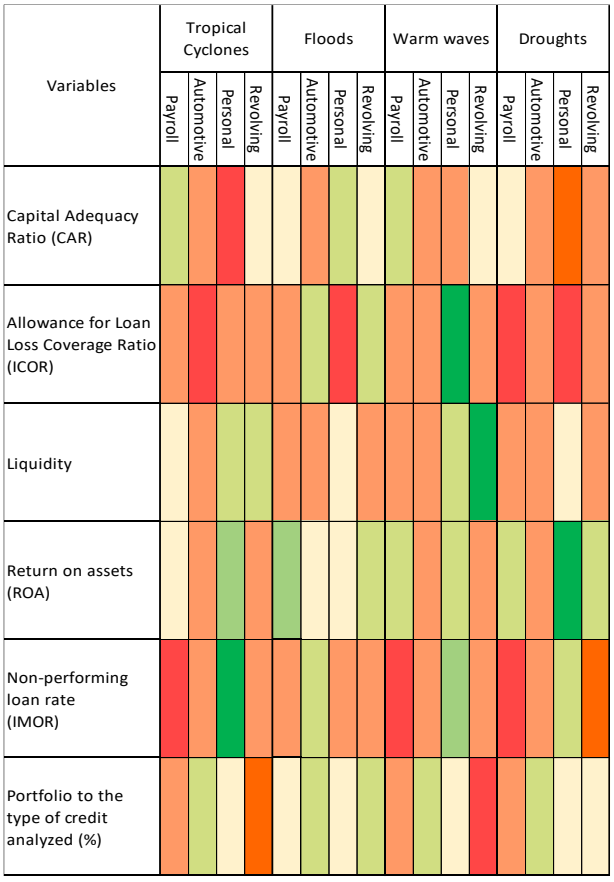
Graph 158
Consumer loan portfolio diversification among sectors and municipalities vulnerable to different hydro-meteorological events (for different banks)[1/]



Data as of June 2023
Source: Banco de Mexico, CENAPRED, CNBV and INEGI
1/ The colors show how diversified the portfolio is against these risks. The red color means less diversification, while the green color means more diversification. Diversification is based on the correlation coeffcicient between each bank's share of consumer loan portfolios exposed to different hydro-meteorological events.

Regarding the characteristics of commercial banks that could amplify the impact, banks with more exposed consumer credit are also those with lower coverage ratios of past-due portfolio with preventive reserves (ICOR) and non-performing ratio levels (*IMOR*). However, these banks are also the ones with the highest profitability ratios, which could lessen the impact if physical risks materialize (Graph 159).

Graph 159
Amplifying and mitigating factors of physical risks in the consumer credit portfolio (for different banks)[1/]



Data as of June 2023

Source: Banco de Mexico, CENAPRED, CNBV and INEGI

1/ Shades of green show mitigating effects while shades of red show amplifying factors. The color is determined by the correlation coefficient between each factor and the shares of credit portfolios for each sector and state exposed to the different hydro-meteorological events.

Committee on Sustainable Finance

The Committee on Sustainable Finance (*CFS*, for its acronym in Spanish), within the Financial System Stability Council (*CESF*, for its acronym in Spanish), continued meeting in the second half of 2023. Likewise, the working groups established by the Committee continued to develop evaluations,

proposals, recommendations, and training on sustainable taxonomy and the integration of environmental and social risks in decision-making by authorities and institutions through scenario analysis, mobilization of sustainable financing, and disclosures of environmental, social, and corporate governance factors by issuing companies and financial institutions.

As a follow-up to the launch of the Sustainable Taxonomy in March 2023, the *CFS* Taxonomy Working Group developed an online learning tool to enable users of the Taxonomy to understand its objectives, elements and uses. In addition, the *CFS* is working on the implementation of a Sustainable Taxonomy Pilot Program, which seeks to identify information gaps and training needs, as well as to issue recommendations for the design, implementation and regulation of sustainable instruments.

During the second semester of 2023, progress was made on the roadmap established by the *CFS* for the analysis of climate scenarios. In particular, progress was made in calibrating the GCAM (*Global Change Assessment Model*) to analyze four climate scenarios for Mexico approved by the *CFS*: three scenarios defined by the Network for Greening the Financial System (NGFS) and one asymmetric scenario (non-NGFS), in which the rest of the world has net zero emissions targets (1.5°C) while Mexico continues with current policies.[118]

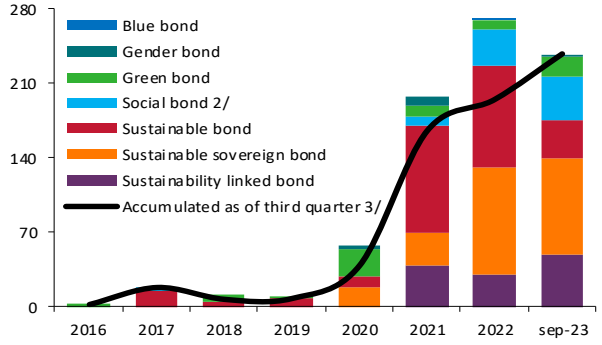
In terms of disclosure, the CFS followed up on the two International Financial Reporting Standards (IFRS) published in June 2023 by the International Sustainability Standards Board[119] (ISSB): one on general disclosure requirements related to sustainability (S1) and the other on climate-related disclosure (S2).[120] The Mexican Financial Reporting Standards Board (*CINIF*, for its acronym in Spanish) was also invited to submit two projects of Sustainability-related Financial Reporting Standards that were part of the consultation process carried out between August 31 and November 30, 2023.[121]

The Sustainable Finances Committee, through Banco de México, continued working on the creation of a digital repository for learning and collaboration in sustainable finance.

Sustainable financial assets

The thematic bond market shows dynamism, which allows companies and other issuers to increase the diversification of their financing sources that consider sustainability criteria. Thus, with data to September 2023, the placement in the domestic and international markets of thematic bonds, by domestic private and public issuers, registers a level of 238 billion pesos, a figure higher than the 195 billion pesos observed in the same period of the previous year; in addition, the participation of public entities stands out. On the other hand, during the first nine months of 2023, sustainable bonds for approximately 128 billion pesos have been placed (Graph 160).

Graph 160
Issuance balance of sustainable, green, social and gender bonds 1/
Billions of pesos



Data as of September 2023
Source: Consejo Consultivo de Finanzas Verdes and Indeval
1/ Face value.
2/ Includes COVID-19 social bond.
3/ Accumulated issued amount as of third quarter per year not considering bond type.

[118] In 2024, a pilot climate scenario analysis exercise will be developed with financial institutions, within the framework of the roadmap defined by the *CFS*. Banks, pension funds and insurance companies are expected to participate.

[119] In 2021, the IFRS Foundation created the ISSB, which aims to provide a global and comprehensive baseline for the disclosure of risks and opportunities related to the sustainability of companies.

[120] Also, with respect to disclosure, the Basel Committee on Banking Supervision published a document on November 29, 2023, based on the aforementioned *ISSB* standard S2, with which it seeks to obtain feedback from the parties involved on possible disclosure requirements for banks, aimed at complementing the framework on this matter promoted by the *ISSB*.

[121] See NIF and NIS regulations in auscultation.

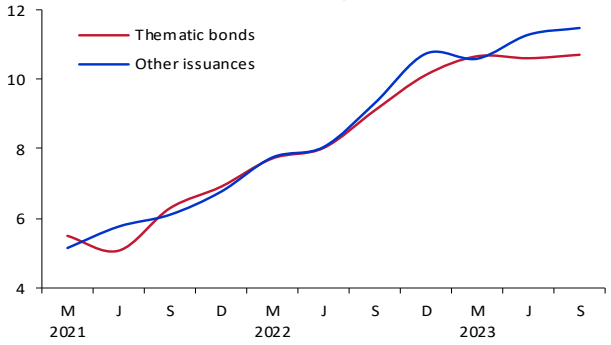
Regarding placements by private issuers during the current year, the amount of sustainable thematic bond issuance represents approximately 45% of the total amount placed in the domestic market.

There is no difference between the rates paid by ESG bonds and the rest of the corporate bonds (Graph 161), which could suggest that the demand for this type of bond is more related to the adoption of investment criteria that consider an Environmental, Social and Governance (ESG) agenda, than to other types of factors.

Graph 161

Corporate bond yields in domestic currency: thematic bonds and other issuances 1/

Percentage



Data as of September 2023

Source: Consejo Consultivo de Finanzas Verdes, Indeval, Valmer and PIP

1/ Corporate bonds are defined as the total issuance of domestic securities excluding government securities.

V. Stress tests and recovery plans

V.1. Credit stress tests

Stress tests are exercises conducted by Banco de México as part of its work to promote the sound development of the financial system. It is a simulation exercise to evaluate the capital adequacy of commercial banks in the face of severe but plausible macroeconomic and financial shocks that may affect their solvency or financial intermediation capacity.

In this exercise, the impact of the materialization of three sets of macroeconomic scenarios was evaluated,[122] consistent with the macro-financial risks presented in this document. Three historical scenarios that replicate the trajectories followed by the main macrofinancial variables during high stress and volatility events were also considered, with the aim of observing the resilience of the system in the face of scenarios similar to those episodes.

The results indicate that at an aggregate level the financial system is resilient to the shocks considered in the scenarios examined. With respect to solvency, the system's CAR and leverage ratio remain above the regulatory minimum over the stress horizon.

Although the stress scenarios are built on the basis of the macro-financial risks presented in this *Report*, they should not be associated with a probability of occurrence, nor should they be taken as a prediction of the expected behavior of the economy. The aim is to identify and analyze the vulnerabilities of the banking system as a whole, so the exercise should be judged taking into account that it is a counterfactual and partial equilibrium simulation.

Scenario A: Prolonged state of tight global financial conditions

In this scenario there would be conditions of high volatility and uncertainty in financial markets, with the consequent pressure on the exchange rate and interest rates. In this environment there would be higher risk premia, which would be reflected in higher financing costs, resulting in lower credit growth and higher non-performing ratio levels.

Scenario B: slowdown in global economic activity

This scenario describes a situation in which, as a consequence of restrictive monetary measures, there is a significant slowdown in advanced economies, particularly the United States, thus the latter enters into recession. In this context, industrial activity would slow down and imports would be reduced. This

[122] The variables modeled in the scenarios are derived from a set of simultaneous shocks to all variables. The set of Scenarios A comprises shocks between -1.33 and 2.00 standard deviations for all variables. Among the most significant shocks are a 2.00 standard deviation shock in the exchange rate and a shock of -1.33 to the annual growth of the IGAE. In the set of scenarios B, the shocks vary between -1.73 and 2.80 deviations. The shocks of 1.99 standard deviations in unemployment, 2.80 standard deviations in the exchange rate and -1.73 in the annual growth of the IGAE are relevant. In the set of C's scenarios, the shocks for all variables fluctuate between -1.50 and 2.80 standard deviations. The shocks of 1.52 standard deviations in unemployment, 2.80 standard deviations in the exchange rate and -1.50 in the annual growth of the IGAE stand out.

would be reflected in a lower growth rate of the Mexican economy and greater volatility in financial markets and the exchange rate. The decline in economic activity would also be reflected in lower demand for credit, higher unemployment rates and an increase in non-performing ratio levels in the credit portfolio.

Scenario C: adjustment in credit rating

This scenario describes the impact of a possible adjustment in the sovereign and Pemex ratings due to a deterioration in the outlook of some rating agencies. There would be high volatility in domestic financial markets, a depreciation of the exchange rate, higher risk premia and, therefore, upward pressure on interest rates. This would also be reflected in a contraction in aggregate demand, which would cause a drop in output and a higher unemployment rate. In an environment such as the one described above, credit growth would be affected and higher delinquency ratio levels would be expected. Both phenomena would affect the income generation mechanisms of the banking sector.

Historical scenarios

Three historical scenarios were considered that replicated the trajectories of the main macrofinancial variables during relatively recent high stress or volatility events: the 1995 crisis (scenario H1), the 2008 global financial crisis (scenario H2), and the economic crisis resulting from COVID-19 (scenario H3).

Methodological considerations

This exercise used the same methodology as in previous editions of the *Report*. The scenarios are generated using an econometric model of autoregressive vectors (VAR) over a 36-month horizon, based on a central path that reflects the main movements in macroeconomic and financial variables. With this model it is possible to generate simultaneous random shocks that affect the trajectories of macrofinancial variables, respecting the internal consistency of estimated covariances and the dynamics of the variables.

Despite the advantages of this approach, the model could underestimate the occurrence of extreme events resulting from the simultaneous interaction of shocks from different scenarios, feedback effects from the financial sector to the real sector or unexpected non-linear effects.

Based on the scenarios generated, the possible market losses that banking institutions would incur in a stress scenario were evaluated. The losses contemplate the financial contagion effects that could propagate and increase the magnitude of the shock through the interbank network.

In turn, an econometric model is used to estimate the effect that the impact on macroeconomic variables would have on the constitution of reserves, the probabilities of a default of the loan portfolio and the dynamics of each bank's loan portfolio.

In addition, the exercise considers effects differentiated by the risk level of each economic sector, based on the economic growth of each sector and its non-performing loan rates for the loan portfolio to private non-financial companies.

Additionally, a simulation process is used to model low probability and high severity events to take into account the effect that the default of the largest borrowers would have on the system's capital levels.

Finally, the effect on operating income and solvency is calculated. On the one hand, the financial margin is estimated based on the elasticities of each bank's lending and deposit interest rates with respect to cetes' rate. On the other hand, non-interest income and administrative expenses are modeled, assuming that both are proportional to each bank's loan portfolio. According to the results of the operation, market and contagion losses and credit losses, the shock absorption capacity and the evolution of the banking system's net capital in each scenario are evaluated.

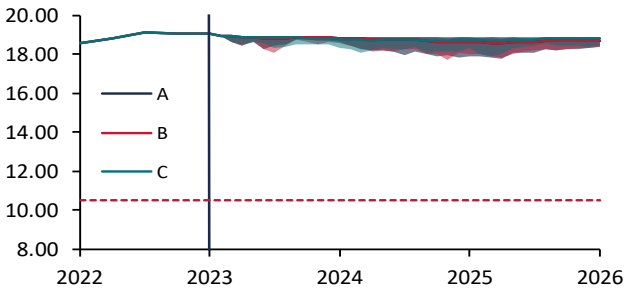
One assumption of the exercise is that the reactions of banks and regulators to the occurrence of the simulated adverse events are not considered. That is, on the one hand, banks do not make changes in their business strategy, capital contributions or adjust their derivatives or repurchase positions over the stress horizon. On the other hand, regulators do not take any corrective measures or grant facilities that would allow mitigating shocks. Therefore, the stress

exercise is a counterfactual and partial equilibrium exercise.

Main results

In the simulated scenarios, the system ends up with capitalization levels above the regulatory minimum at the end of the evaluated time horizon (Graph 162a). When considering the historical scenarios, the observed capitalization levels are lower, but still above the regulatory minimum (Graph 162b). However, in the short term, reductions are observed in both net capital levels (Graph 163a) and in risk-weighted assets (Graph 164a). This is consistent with a deleveraging process in in light the severity of the scenarios, and is also more pronounced in the historical scenarios (Graph 163b and Graph 164b).

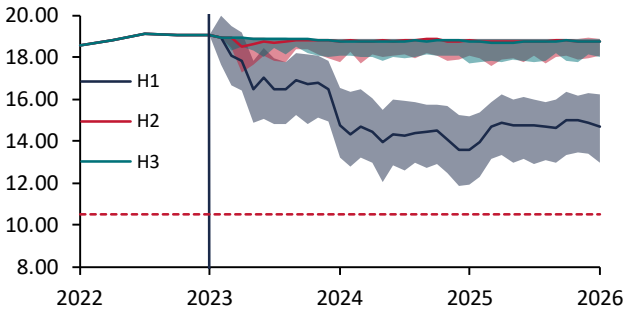
Graph 162
System's Capital Adequacy Ratio (CAR)
a) Scenarios A, B and C
Percent



Data as of September 2023 and simulations 3 years thereafter.

Source: Banco de México

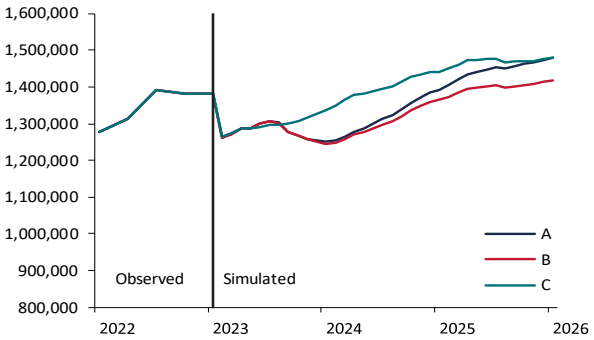
b) Historical Scenarios
Percent



Data as of september 2023 and simulations 3 years thereafter.

Source: Banco de México

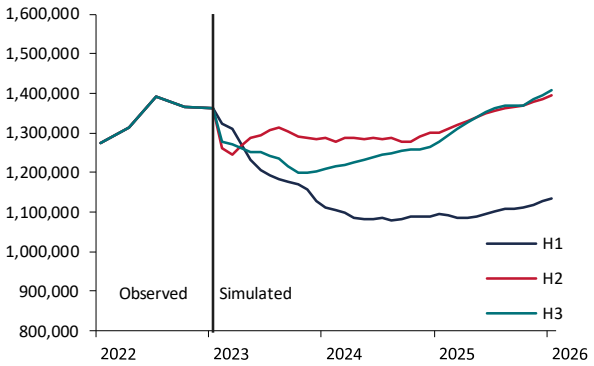
Graph 163
Evolution of the average net capital of the system
a) Scenarios A, B and C
Million pesos



Data as of september 2023 and simulations 3 years thereafter.

Source: Banco de México

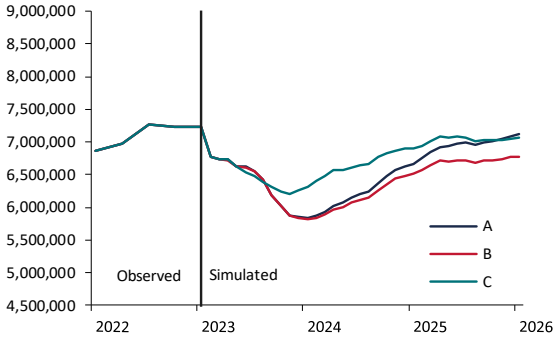
b) Historical Scenarios
Million pesos



Data as of september 2023 and simulations 3 years thereafter.

Source: Banco de México

Graph 164
Evolution of the system's average risk-weighted assets
a) Scenarios A, B and C
Million pesos

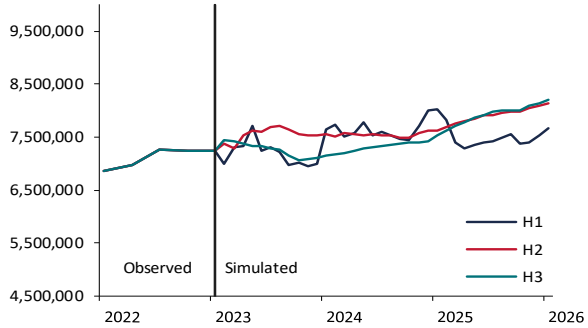


Data as of september 2023 and simulations 3 years thereafter.

Source: Banco de México

b) Historical Scenarios

Million pesos



Data as of september 2023 and simulations 3 years thereafter.

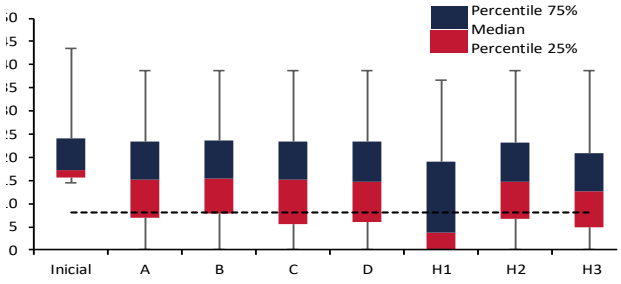
Source: Banco de México

Although the system as a whole would maintain capitalization levels above the regulatory minimums, at the individual level there are certain banking institutions that represent a low percentage of the system's total assets, which, in some of the simulated scenarios, could have a greater impact on their capitalization levels (Graph 165).

Graph 165

Distribution of the average CAR at bank level at the end of the test[1/]

Percent



Data as of September 2023 and simulations 3 years thereafter.

Source: Banco de México

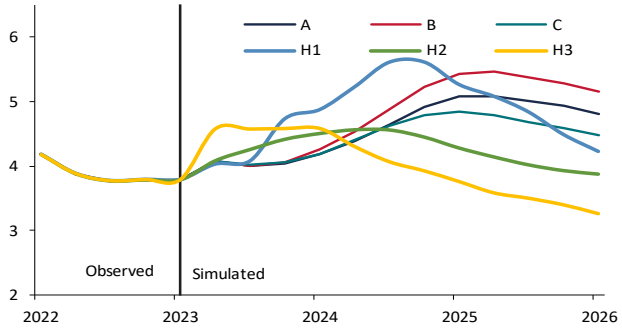
[1/] The dotted horizontal line corresponds t o the minimum ICAP without considering capital supplements. In the box and arms diagram, the arms represent 10 and 90% of the distribution

One indicator that helps to illustrate the impact of these scenarios is the behavior of the portfolio's non-performing ratio levels. Graph 166 shows that at the beginning of the year, non-performing ratio levels were at low levels; therefore, even though the shocks imply important relative changes in this indicator, the levels would continue to be low.

Graph 166

Average probabilities of default of the system's credit portfolio

Weighted by the current portfolio of each bank, percent



Data as of september 2023 and simulations 3 years thereafter.

Source: Banco de México

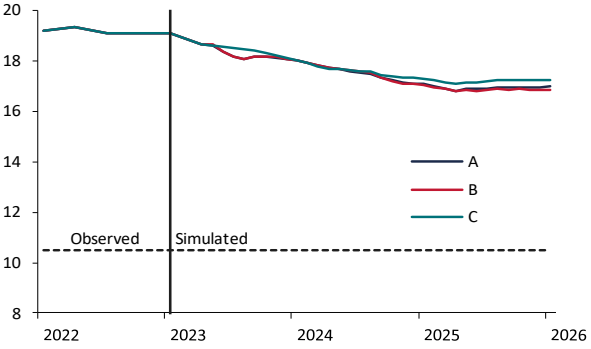
A common characteristic of the Mexican banking system's loan portfolio is high concentration. A relatively small number of borrowers hold a high proportion of credit. To evaluate the effect that this high concentration may have on the resilience of the system, an exercise is performed to simulate the default of these large borrowers (Graph 167a and Graph 167b). The capitalization levels in this exercise are lower, but still above the regulatory minimums for the system as a whole.

Graph 167

Average CAR of the system considering an impact per concentration corresponding to 99% of the losses [1/]

a) Scenarios A, B and C

Percent



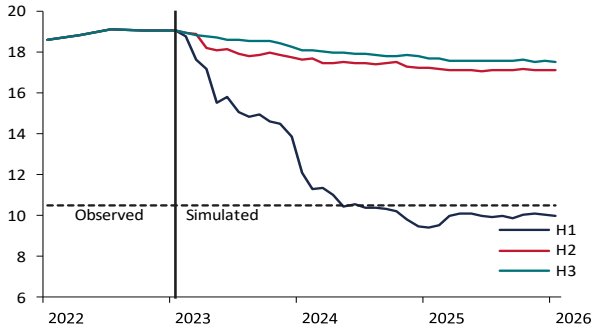
Data as of september 2023 and simulations 3 years thereafter.

Source: Banco de México

[1/] The horizontal line corresponds to the minimum CAR plus capital supplements.

b) Historical Scenarios

Percent



Data as of september 2023 and simulations 3 years thereafter.

Source: Banco de México

1/ The horizontal line corresponds to the minimum CAR plus capital supplements.

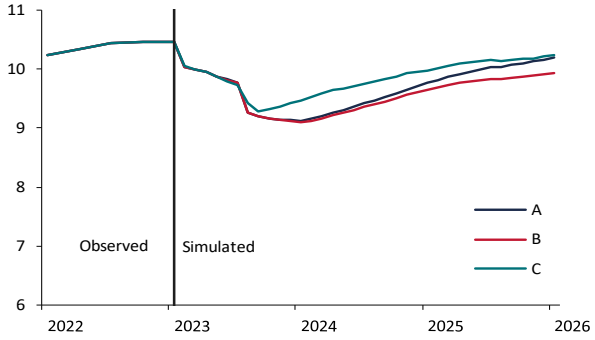
This exercise also assesses the impact of the scenarios on the banks' leverage ratio. The average leverage level of the system was above the regulatory minimum of 3% (Graph 168a and Graph 168b); however, individually, some institutions would end up the year with rates lower than this level. Likewise, there is a high correlation between the level of leverage and capitalization: those institutions with greater effects on their capitalization levels also tend to present a leverage ratio below the regulatory minimum (Graph 169).

Graph 168

Average leverage ratio of the system

a) Scenarios A, B and C

Percent

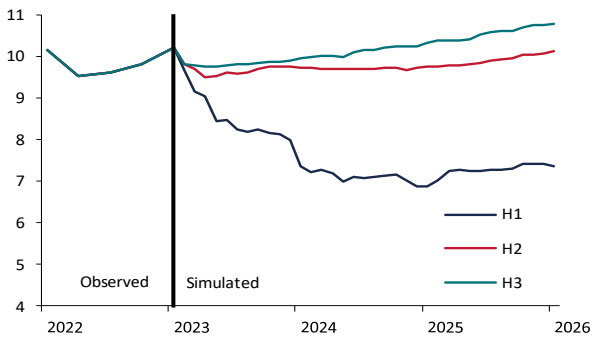


Data as of september 2023 and simulations 3 years thereafter.

Source: Banco de México

b) Historical scenarios

Percent



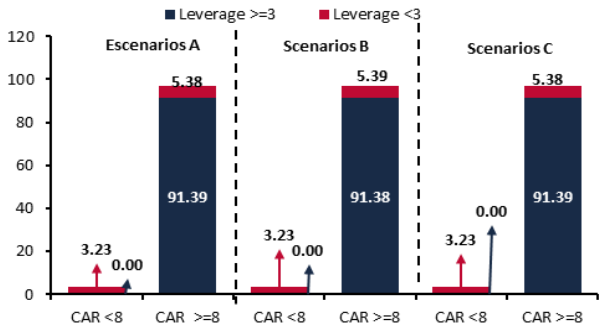
Data as of september 2023 and simulations 3 years thereafter.

Source: Banco de México

Graph 169

Distribution of the average CAR at bank level at the end of the test

Percent of System Assets



Data as of september 2023 and simulations 3 years thereafter.

Source: Banco de México

V.2. Liquidity stress tests

The solid liquidity position of the banking system would allow it to face stress episodes higher than those experienced in the past and those required by international standards. Although some institutions, which represent a low amount of the system's assets, could individually present liquidity shortages in the face of very severe scenarios.

On the one hand, the liability coverage horizon, with data as of October 2023, indicates that most banks could meet their obligations for a period of at least 30 days using only their stock of liquid assets. The liability coverage horizon evaluates funding risk under a more severe scenario than the LCR, as it does not consider the inflow of contractual cash flows that

banks normally have available to meet their obligations (see Graph 170).

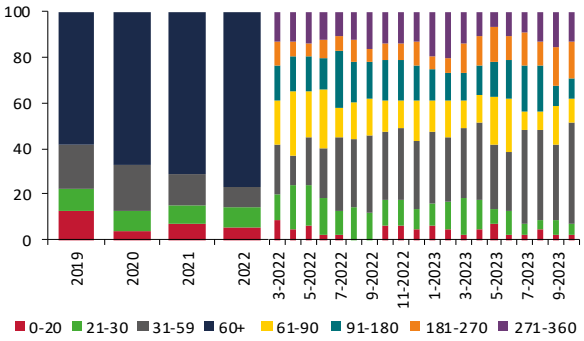
Graph 170

Percentage of banks that could meet their liabilities under the liabilities coverage stress scenario 1/

Vertical axis: percentage of banks

Horizontal axis: date of the calculation

Color: days that banks could cover their obligations



Data as of October 31, 2023

Source: Banco de México.

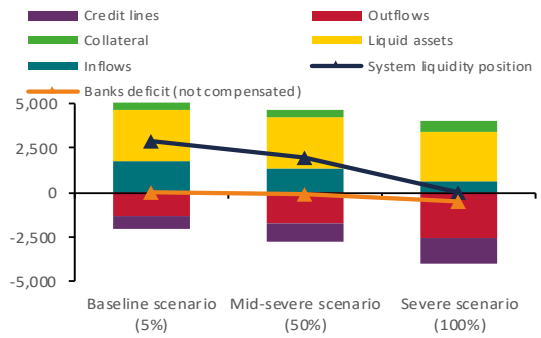
1/ For each month, banks are aggregated by range of days according to therir monthly average, calculated with daily observations, of the number of days that they could cover their liabilities in a severe stress scenario. Begining on March 2022, the liabilities coverage horizon is calculated with a wider range (See Box 9 of the December 2022 Financial Stability Report).

On the other hand, cash flow stress tests for a 90-day horizon, with data as of October 2023, indicate that the stressed value of liquid assets and inflows for the banking system as a whole would turn out to be higher than the stressed outflows modeled in the 21 stress scenarios considered. In the most severe scenario, banks would have a liquidity surplus equivalent to 0.2% of system assets. Although some individual institutions would face a liquidity shortfall (Graph 171),[123] in all cases these are small institutions, representing a low percentage of the system's assets, or very small deficits.

Graph 171

Liquidity stress scenarios over 90-day period 1/

Billions of pesos



Data as of October 31, 2023

Source: Banco de México.

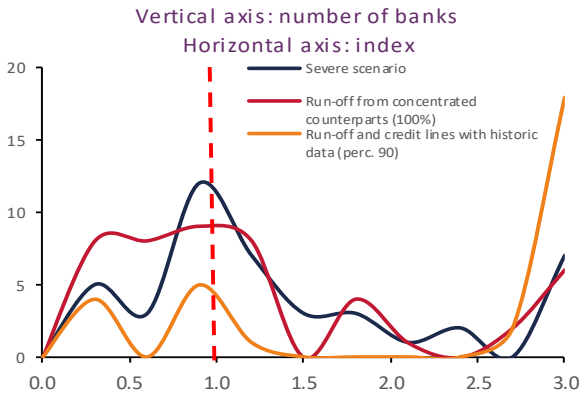
1/ In the severe scenario (100% severity), a haircut on liquid assets of around 4% is considered. Repos have a roll-over of 45% and released collateral has the same haircut as liquid assets. Inflows from loans portfolio are not considered (100% haircut). Wholesale deposits (demand and term) have a 20% run-off factor and retail deposits (demand and term) have a 10% run-off factor. Contingent liquidity and credit lines granted have a 40% run-off factor. The baseline scenario and mid-severe scenario consider a 5% and 50% severity compared to the severe (100%) scenario. The mid-severe scenario estimates an aggregate outflow which is similar in magnitude to the outflow calculated under the LCR (See Box 9 of the December 2022 Financial Stability Report).

Additionally, based on the cash flow framework, two additional stress exercises were performed in which some assumptions are modified. In one exercise, new assumptions on funding outflows and the use of credit lines granted are used, which are calibrated based on historical data since 2017 for each bank and considering the 90th percentile of the distribution of such data. In the other exercise, in addition to the assumptions on the outflow of funding, the outflow of the 10 largest counterparties is assumed. In both exercises, the results suggest that the current liquidity of the banks would allow them to face the scenarios proposed, although, depending on the scenario evaluated, certain vulnerabilities are identified in some institutions (see Graph 172).

[123] For a detailed description of the methodology used, see Box 9. Methodology of the liquidity tests based on contractual flows in the December 2022 Financial Stability Report.

Graph 172

Distance to Liquidity Stress under different scenarios



Data as of October 31 2023

Source: Banco de México.

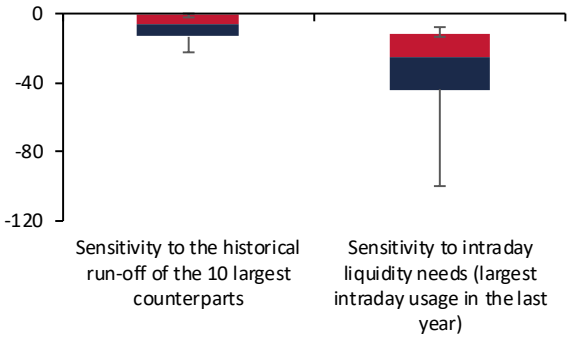
1/ The DLSI refers to the severity sufficient for the institution to present a liquidity deficit. The severe scenario is normalized to 1. In the severe scenario it corresponds to the scenario calibrated to stress the entire bank (liquid assets written off at 4%; repo is renewed only 45%; entries written off 100%; wholesale deposits (sight and term) 20% exit; retail deposits (sight and term) 10% exit; 40% contingent exits. The scenarios adjusted with historical data (historical outflows and credit lines) consider data since 2017 by bank to calculate the 90th percentile of financial, wholesale and retail outflows, or exercise of credit lines. In the event that the 90th percentile is lower than the base scenario (5% of the severe scenario), the assumptions of the base scenario are used. The concentration scenarios (100% counterpart exit) consider that in addition to the severe scenario exits, the 10 main counterparties exit at 100%.

Additionally, exercises were performed to measure the sensitivity of the LCR under different assumptions of concentration and intraday liquidity needs. To assess the sensitivity to concentration, a LCR was calculated assuming the outflow of the top 10 creditors according to their historical outflows. To assess the potential impact of intraday liquidity risk, a LCR was calculated adjusted for the "maximum intraday liquidity usage"[124] observed in the last year for each bank. The results for both calculations indicate that most banks have sufficient liquid assets to cope with this type of event while still meeting the minimum LCR requirement (Graph 173). It is important to note that presenting a LCR below 100% under more astringent assumptions is not indicative, by itself, of a negative event, since liquidity reserves are precisely intended to be used to face liquidity stress events. However, these exercises allow us to identify those events to which some institutions are more vulnerable.

Graph 173

Sensitivity (what-if analysis) of the LCR under different assumptions of concentration and intraday liquidity needs 1/

Percentage, change from the regulatory scenario



Data as of October 31, 2023

Source: Banco de México

1/ The graph presents the percentage difference from the regulatory scenario. In the case of the concentration analysis, the historical output (90th percentile) of the 10 counterparties with the highest concentration is assumed. In the intraday liquidity analysis, the largest gap between payments sent and received accumulated on the intraday, observed over a 1-year horizon, is subtracted from the liquid assets.

V.3. Recovery plans

The recovery plans of commercial banks show an improvement with respect to those presented in previous years (see Box 7). However, the new requirements related to the communication plan show a higher percentage of default, as well as the new items related to recovery actions. Against this backdrop, banks should improve the measurement of the impact of their recovery actions, their possible incompatibility, the description of the factors that would obstruct their implementation and their respective mitigants.

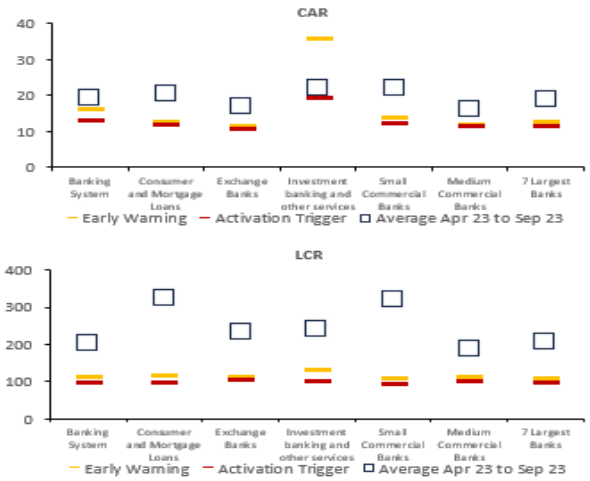
Regarding the indicators used in the plans and their thresholds, during the third quarter of 2023, the observed levels of CAR and LCR of the banks remained above the activation threshold established in the recovery plans of the different groups of banks (Graph 174).

[124] This metric is part of the liquidity monitoring toolkit and allows incorporating into the analysis the different timing of inflows and outflows throughout the day.

Graph 174

Activation thresholds and observed data of CAR and LCR [1/]

Percentage



Data of CAR and LCR from April 2023 to September 2023.

Source: Banco de México and CNBV

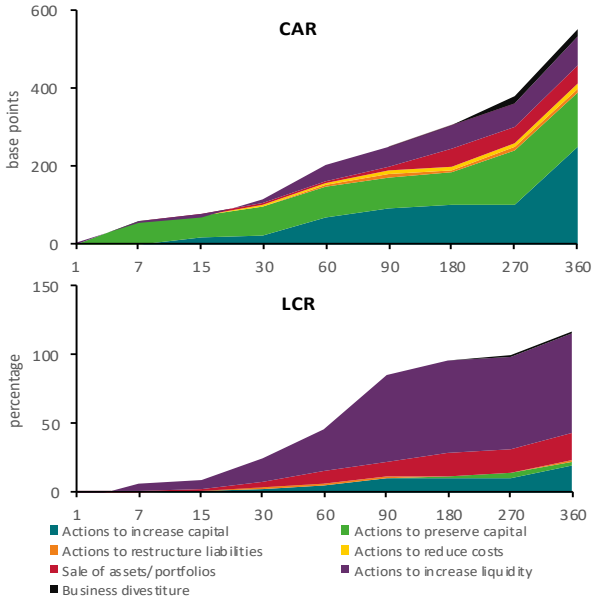
1/ The averages of thresholds and data observed by type of institution are presented. The most recent threshold available is considered. For the observed data, capped averages are presented due to scale issues, the LCR is capped to 350 and the CAR is capped to 25.

Graph 175

Recovery Capacity of CAR and LCR

Vertical axis: Base points for CAR and percentage for LCR

Horizontal axis: days



Data of DSIB's Recovery Plans of 2023

Regarding the impact of the recovery actions, the solvency and liquidity recovery margin is reasonable if: i) the institutions manage to correctly execute the measures within the expected timeframe, ii) the potential impact of their recovery actions on their financial situation is not diminished, and iii) no other shocks occur (see Graph 175).

Box 7: Comparison of contingency plans of local systemically important banks

I. Introduction

Since 2016, commercial banks have been required to prepare contingency plans (CP) to identify the different actions they could take in order to restore their financial situation in the event of adverse scenarios that could affect their liquidity or solvency.[1] The Mexican regulation that establishes the requirements of the CPS IS in line with the provisions of the Basic Attributes of the *FSB'S* Effective Resolution Regimes.[2] As of 2023, some modifications to the requirements for the elaboration of the CPS came into force as part of their continuous improvement. [3]

In accordance with the Credit Institutions Law, each institution's plans must be approved by the CNBV, with the opinion of IPAB, the SHCP and Banco de México. to this end, local Systemically Important Banks (LSIB) must present their updated CP each year in march.[4] In this context, this box presents a comparison of the evolution of the PC submitted by the LSIB, focusing on three key periods: before the pandemic (2019-2020), during the pandemic (2021-2022) and under the new Annex 69 (2023). It also reports on good practices observed in terms of the clarity, credibility and feasibility of contingency plans.

II. Compliance

In general, the quality and fulfillment of the LSIB plans has improved in recent years. However, some PC present areas of opportunity, mainly in communication strategies in crisis situations (Table 1).[5] It should also be noted that in recent years the number of pages in the plans has increased, partly due to the greater granularity required by the authorities.

Table 1
Degree of compliance with contingency plans

	2019-2020	2021-2022	2023
Number of plans 1/	12	12	6
Number of pages	Minimum: 141 Average: 241 Maximum: 462	Minimum: 157 Average: 265 Maximum: 574	Minimum: 146 Average: 300 Maximum: 694
Compliance with the requirements by category (average)			
Executive summary			
Description of the bank			
Group description			
Approval processes			
Communication plan			
Indicators			
Recovery actions			
Stress tests			

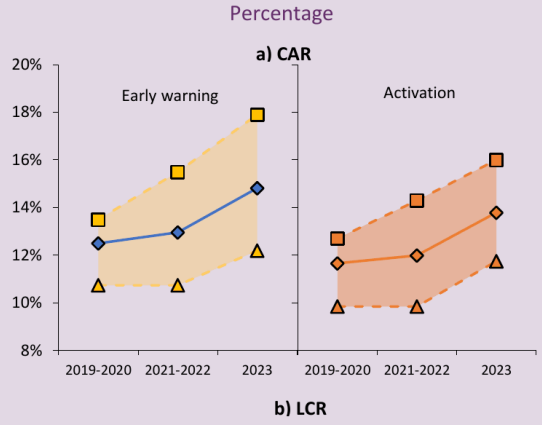
Source: Banco de México with information from Contingency Plans. Scale of degree of compliance: red - [0%-50%]; orange [50%-75%]; green [75%-100%].
1/ The sample considers the plans of the 6 LSIBs submitted between 2019 and 2023. LSIBs are required to submit their plan annually, the 2019-2020 and 2021-2022 biennial periods comprise twice as many plans as the 2023 annual period.

III. Indicators for activating the plan and recovery actions to restore the financial situation

The PC must consider monitoring and scaling up processes to ensure their timely implementation. The regulatory modification applicable to CPS strengthened, among other aspects, the use of monitoring indicators by banks. The LSIB plans increased the number of indicators used for solvency, liquidity, profitability and asset quality. These indicators are aligned with their desired risk profile and their monitoring is complemented by the strategies of the integrated risk management units.

Regarding the timely activation of the plans, the LSIB have usually considered early warning and plan activation thresholds. The rest of the banks are increasing the use of this practice, mainly with respect to the Capitalization Ratio (CAR) and Liquidity Coverage Ratio (LCR) (Graph 1). In particular, the increase in the thresholds is due to the fact that in previous versions banks considered the regulatory minimums as the thresholds, which is a lax criterion that could result in a late implementation of the plan. More recently, the increase in ICAP thresholds reflects the implementation of the Total Loss Absorbing Capacity (*TLAC*) requirement applicable to LSIB.

Graph 1
CAR and LCR activation thresholds over time[1/]



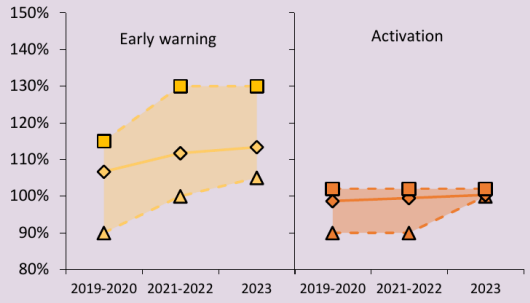
[1] Contingency plans are regulated by Article 119 of the Law of Credit Institutions and by Articles 172 Bis 37, 172 Bis 38, 172 Bis 39 and Annex 69 of the General Provisions Applicable to Credit Institutions (CUB).

[2] See *FSB* Key Attributes of Effective Resolution Regimes for Financial Institutions (October, 2014).

[3] Exhibit 69 to the CUB amended September 02, 2022. See Section IV. Policy measures implemented to preserve the healthy development of the financial system of the December 2022 Financial Stability Report.

[4] Institutions that are not designated as locally systemically important must submit updates to the contingency plan every two years according to a schedule published by the CNBV.

[5] In general, the plans with a low degree of compliance do not present clear guidelines for communication in crisis events that consider the different stakeholders. In this regard, the amendments to Annex 69 consider a greater breakdown of the requirements and considerations that should be incorporated into crisis communication strategies, in order to better guide banks on what to incorporate in communication plans and how to reflect it in the CPs.



Source: Banco de México with information from the Recovery Plans.

1/ The graph presents the minimum, average and maximum of the early warning and activation threshold.

In addition, the plans must develop recovery actions to maintain their financial viability and restore their liquidity and solvency levels. The LSIB plans consider an average of 18 recovery actions of different categories. In general, the number and type of recovery actions has not changed in recent years. The actions considered in the plans include cost estimates, implementation times and impacts.

IV. Best practices

Although the guidelines in Annex 69 establish a minimum content and quality of contingency plans, some LSIB plans have incorporated additional elements that contribute to better preparedness for crisis events. These types of practices increase the credibility of the plans and the likelihood that they will be executable in the face of adverse events.

The LSIB plans contemplate a greater number of scenarios in their stress tests. The objective of these tests is not to predict with certainty in the plans those events that would affect the financial situation of the banks, but rather the incorporation of a greater diversity of stress scenarios facilitates better preparation to face an adverse event. Among the scenarios that banks consider are those related to traditional risks, such as a failure of major counterparties; an outflow of deposits; the materialization of risks from international or domestic events; as well as some emerging risks, such as cybersecurity attacks and climate change. The new Annex 69 requires stress tests to consider scenarios in which their indicators fall below the alert or trigger thresholds, for which some institutions present scenarios constructed through reverse engineering.

In the event of an adverse event, communication within and outside the banks is of utmost importance for the management of such stress events. The contingency plans of the best evaluated BANKS IN this area present clear guidelines for communication with the different stakeholders. In general, the internal strategy should be robust in disseminating the institutional position to staff, detailing the aspects that make up the plan to be carried out and identifying the areas or officials who will attend to the doubts of the press and clients, if any. The external strategy should define the message that will be used to manage possible negative reactions from the public, considering the different counterparts (authorities, shareholders, clients, rating agencies, among others), the communication channels that could be most effective and even communication templates with clear processes for their issuance.

Among the best practices in risk management, it has been identified that the most robust LSIB PC's include preparatory actions to speed up implementation and reduce execution times. For example, some institutions detail, in sheets or outlines, the processes to be followed to carry out recovery actions, strengthening their feasibility and helping to ensure that the personnel involved will have the necessary knowledge to carry them out. This type of brief documents helps to mitigate the operational risks that may arise in the absence of the personnel in charge. As part of a preventive risk culture, some institutions have developed technological tools that compile monitoring indicators in a single platform to provide agile and timely access to the different lines of defense. Such tools can even include alerts if thresholds are exceeded and perform simulations of the solvency, liquidity and profitability situation by executing pre-loaded recovery actions.

VI. Final Considerations

The LSIB plans adequately comply with most of the requirements of Annex 69.[6] Since it was established as a regulatory requirement, the preparation of contingency plans has shown an improvement in their content and they have been integrated into risk management, both for the LSIB and for the rest of the banks.[7] However, it is important to stress the importance of all banks keeping this tool up to date and incorporating the observations made to them. The financial authorities carry out each cycle of delivery and review established by regulation. This helps institutions to be in a better position to face adverse events that could materialize.

References

Financial Stability Board (2014). "Key Attributes of Effective Resolution Regimes for Financial Institutions."

Official Gazette of the Federation (2022). "Resolution that modifies the general provisions applicable to credit institutions", DOF September 2, 2022.

Financial Stability Board (2014). "Key Attributes of Effective Resolution Regimes for Financial Institutions".

Diario Oficial de la Federación (2022). "Resolución que modifica las disposiciones de carácter general aplicables a las instituciones de crédito", DOF 2 de septiembre del 2022

[6] In case multiple banking institutions do not have an approved contingency plan, the CNBV could impose fines between 30,000 and 100,000 UMAS.

[7] See section V.3 Contingency Plans which reports in general the status of the most recent contingency plans.

VI. Final considerations

The Mexican financial system shows a solid and resilient position at the end of 2023. The capital and liquidity levels of commercial banks comfortably exceed regulatory minimums. International financial markets were volatile and uncertain during the second half of the year; this behavior was associated with the publication of economic data that showed a greater resilience of the global economy than expected, high inflation levels and above the targets of most central banks, as well as the expectation of high reference rates at a global level for longer than previously anticipated. This in a context of greater risk aversion due to geopolitical conflicts between Russia and Ukraine, as well as in the Middle East.

In October, the International Monetary Fund (IMF) maintained its global economic growth forecasts for 2023 and slightly lowered its estimates for 2024, compared to those of July. These adjustments are related to the possible adoption of more restrictive monetary policies to combat inflation, the withdrawal of fiscal support in economies with high levels of debt, the growing fragmentation of commodity markets driven by geopolitical tensions, and the possibility of the occurrence of extreme weather events.

Therefore, it is appropriate to monitor vulnerabilities and imbalances that could occur in the financial system and affect its proper functioning, given that certain external risks have intensified and others persist in the domestic sphere. The following macro-financial risks to financial stability are considered in this *Report*: i) a greater or more prolonged tightening of financial conditions than expected; ii) a more pronounced or prolonged slowdown in the global economy than anticipated; iii) the occurrence of a systemic event affecting the global financial system; and iv) unexpected adjustments in the sovereign and Pemex debt ratings.

Credit stress tests were conducted for the Mexican banking system based on these risks, and from the results obtained it can be concluded that the Mexican banking system has sufficient capital levels to face the simulated adverse scenarios. However, some banks that represent a low percentage of the system's total assets could register greater effects on their capitalization levels in some of the simulated scenarios, and concentration risk could generate additional pressures on the system's capital. At the aggregate level, leverage ratio levels would also remain above the regulatory minimum.

Liquidity and credit risks for commercial banks remained stable and limited in the second half of 2023, although market risk increased and there was a period of higher contagion risk since the last *Report*. Likewise, the level of capitalization and liquidity of the Mexican banking system -in the aggregate- remain above the regulatory minimums.

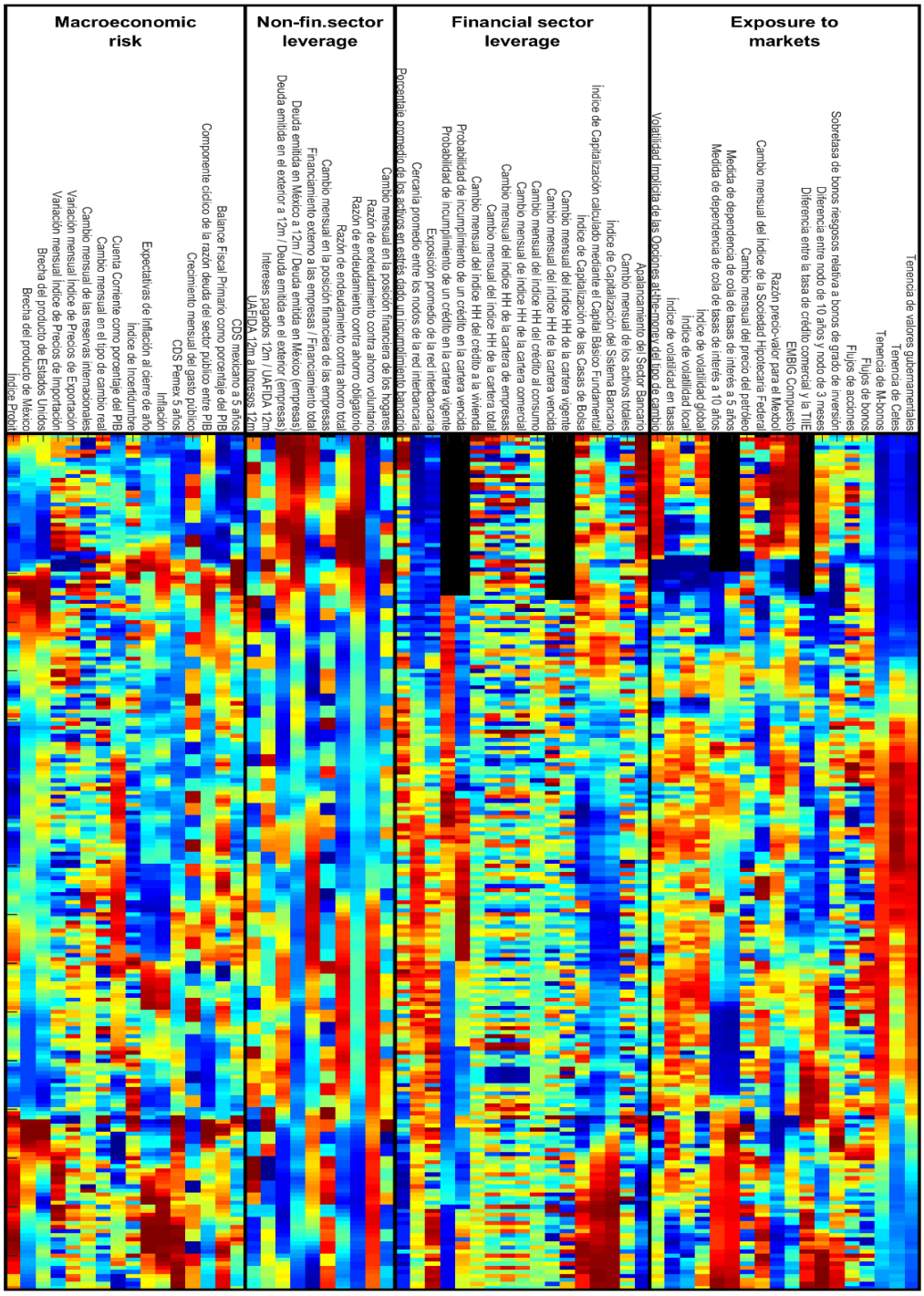
Other non-bank financial intermediaries still face challenges, particularly related to tighter financial conditions. Regulated entities show improvements in their funding sources, while the situation of the non-regulated sector presents important challenges, among them the refinancing of their debt in the face of greater risk aversion among investors. However, the sector's assets represent a small fraction of the financial system. Furthermore, there is little interconnection between these entities and the country's banks and other institutional brokers, so they do not represent a risk to financial stability.

During the period, the financial authorities carried out actions to improve the regulatory framework, including the adoption of international standards and best practices, in order to keep it robust and up to date. Regulatory changes were made in the areas of credit and market risk, derivatives markets and sustainable finance. Provisional measures were also implemented to address the damage caused by Hurricane Otis in Guerrero, allowing affected households to temporarily defer payment of their loans and other obligations.

Banco de México will remain alert to the evolution of Mexico's financial markets and will take the actions required in the exercise of its powers, in strict compliance with the legal framework and in coordination with other financial authorities, to preserve the stability of the financial system and the proper functioning of the payment systems.

Annex 1

Disaggregated Heat Maps of Mexican Financial System Risks



Data as of September 2023
Source: Banco de México

List of acronyms and abbreviations

AMIS	Mexican Insurance Institutes Association *(Asociación Mexicana de Instituciones de Seguros)*
Asigna	Asigna default and settlement *(Asigna Compensación y Liquidación)*
Bancomext	National Foreign Trade Bank *(Banco Nacional de Comercio Exterior)*
Banobras	National Public Works and Services Bank *(Banco Nacional de Obras y Servicios Públicos)*
BCBS	Basel Banking Supervision Committee
BISL	Banks of Local Systemic Importance
BIVA	Institutional Securities Exchange *(Bolsa Institucional de Valores)*
BMV	Mexican Stock Exchange *(Bolsa Mexicana de Valores)*
BONDES	Federal Development Bonds *(Bonos de Desarrollo del Gobierno Federal)*
BPAS	Savings Protection Bonds *(Bonos de Protección al Ahorro)*
CAR	Capital Adequacy Ratio
CCD	Certificates of Capital Development *(Certificados de Capital de Desarrollo)*
CCE	Special Accounting Criteria *(Criterios Contables Especiales)*
CCV	Mexican Central Securities Counterparty *(Contraparte Central de Valores)*
CDS	Credit Default Swaps
CESF	Financial System Stability Council *(Consejo de Estabilidad del Sistema Financiero)*
Cerpis	Senior Trust Bonds for Investment Project *(Certificados bursátiles fiduciarios de proyectos de inversión)*
Cetes	Federal Treasury Bills *(Certificados de la Tesorería de la Federación)*
CF	28-Day Equilibrium Interbank Interest Rate (*TIIE*) Deposit Cost *(Costo de captación a plazo en veces TIIE 28 días)*
CFS	Committee on Sustainable Finance (Comité de Finanzas Sostenibles)
CFE	Federal Electricity Commission *(Comisión Federal de Electricidad)*
CINIF	Mexican Financial Reporting Standards Board *(Consejo Mexicano de Normas de Información Financiera)*
CNBV	National Banking and Securities Commission *(Comisión Nacional Bancaria y de Valores)*
CNSF	National Insurance and Bonding Commission *(Comisión Nacional de Seguros y Fianzas)*
CVAR	Conditional Value at Risk
DALI	Securities Deposit, Administration and Settlement System *(Sistema de Depósito, Administración y Liquidación de Valores)*
D-SIBS	Domestic Systemically Important Banks
EME	Emerging Market Economies
ESG	Environmental, Social and Corporate Governance
FED	Federal Reserve
Fibra	Real Estate Infrastructure Trust -REIT *(Fideicomisos de infraestructura y bienes raíces)*
FIRA	Agricultural Trusts *(Fideicomisos Instituidos en Relación con la Agricultura)*
FND	National Farming, Rural, Forestry and Fisheries Development Bank *(Financiera Nacional de Desarrollo Agropecuario, Rural, Forestal y Pesquero)*
Fovissste	State Workers' Social Security and Services Institute Housing Fund *(Fondo de Vivienda del ISSSTE)*
FSB	Financial Stability Board
GRI	Response Group for Sensitive Information Security Incidents *(Grupo de Respuesta a Incidentes Sensibles de Seguridad de la Información)*
IBA	ICE Benchmark Administration
IBOR	Interbank Offered Rate

ICOR	Loan loses Coverage ratio with preventive reserves *(Índices de cobertura de cartera vencida con reservas preventivas)*
ICF	Financial Conditions Index *(Índice de Condiciones Financieras)*
ICRCS	Capital Solvency Requirement Coverage Index *(Índice de Cobertura del Requerimiento de Capital de Solvencia)*
ICRT	Technical Reserves Coverage Index *(Índice de Cobertura de Reservas Técnicas)*
IEMF	Financial Markets Stress Index *(Índice de Estrés de los Mercados Financieros)*
IFC	Crowdfunding Institutions *(Instituciones de Fondeo Colectivo)*
IFNB	Non-Banking Financial Institutions *(Instituciones Financieras No Bancarias)*
IFP	Equity Strength Indicator *(Indicador de Fortaleza Patrimonial)*
Indeval	Mexico's Central Securities Depository (Institución para el Depósito de Valores, S. A. de C. V.)
ITF	Financial Technology Institutions *(Instituciones de Tecnología Financiera)*
IFRS	International Financial Reporting Standards
IFPE	Electronic Payments Fund Institutions *(Instituciones de Fondos de Pagos Electrónicos)*
IMF	International Monetary Fund
Imora	Adjusted non-performing loans rate *(Índice de morosidad ajustado)*
INEGI	National Geographical Statistics and Information Institute *(Instituto Nacional de Estadística y Geografía)*
Infonavit	Federal Housing Fund *(Instituto del Fondo Nacional de la Vivienda para los Trabajadores)*
IOSCO	International Organization of Securities Commissions
IPAB	Institute for the Protection of Bank Savings *(Instituto para la Protección al Ahorro Bancario)*
LCR	Liquidity Coverage Ratio
LIBOR	London Interbank Offered Rate
LIF	Federal Income Law *(Ley de Ingresos de la Federación)*
LRITF	Financial Technology Institutions Regulation Law *(Ley para Regular las Instituciones de Tecnología Financiera)*
LTV	Loan to Value
Nafin	Mexican Development bank *(Nacional Financiera)*
NGFS	Network for Greening the Financial System
OIFNB	Other Non-Banking Financial Brokers *(Otros Intermediarios Financieros No Bancarios)*
PEF	Federal Expenditure Budget *(Presupuesto de Egresos de la Federación)*
Pemex	*Mexican state oil company (Petróleos Mexicanos)*
PRLV	Promissory Notes with Interest Payable on Maturity *(Pagaré con Rendimiento Liquidable al Vencimiento)*
RCS	Capital Solvency Requirement *(Requerimiento de Capital de Solvencia)*
RFSP	Public Sector Financial Requirements *(Requerimientos Financieros del Sector Público)*
ROE	Return On Equity
SAR	Retirement Savings Fund *(Sistema de Ahorro para el Retiro)*
SAVAR	Collateral management for repurchase agreement transactions *(Servicios de administración de Valuación de Reportos)*
SHCP	Ministry of Finance and Public Credit *(Secretaría de Hacienda y Crédito Público)*
SHF	Federal Mortgage Society *(Sociedad Hipotecaria Federal)*
SHRFSP	Historical Public Sector Financial Requirement Balance (*Saldo Histórico de los Requerimientos Financieros del Sector Público)*
siefores	Pension Funds *(Sociedades de inversión especializada en fondos para el retiro)*
socaps	Savings and Loan Cooperatives *(Sociedades cooperativas de ahorro y préstamo)*
sofipos	Popular Finance Corporations *(Sociedades financieras populares)*

***sofomes* enr**	Non-Regulated Multi-Purpose Financial Companies *(Sociedad financiera de objeto múltiple entidades financieras no reguladas)*
SPEI	Interbanking Electronic Payments System *(Sistema de Pagos Electrónicos Interbancarios)*
SMES	Small and Medium-sized Enterprises
TIIE	Interbank Equilibrium Interest Rate *(Tasa de interés interbancaria de equilibrio)*
TLAC	Total Loss Absorbing Capacity
TRACS	Equity-linked securities *(Títulos referenciados a acciones)*
UMA	Unit of Measurement and Actualization *(Unidad de Medida y Actualización)*
VSM	Minimum Salary Multiple *(Veces Salario Mínimo)*


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