



Financial Stability Report – Second Semester 2022

December 7, 2022



Introduction

The Financial Stability Report describes:

- ✓ The **current state of the financial system**
- ✓ The **evolution of the most important risks and vulnerabilities**
- ✓ The **results of credit, liquidity and climate-related physical risk stress tests**



- Mexico's **financial system** continues to be in a **solid and resilient position**. In particular, **commercial banks** have **capital and liquidity levels well above regulatory minima**.
- However, it faces a **more complex and uncertain environment**, characterized by:
 - ✓ **High inflation levels**
 - ✓ **A deteriorating growth outlook**
 - ✓ **Tighter global financial conditions**
 - ✓ **Risks to financial stability in advanced countries**



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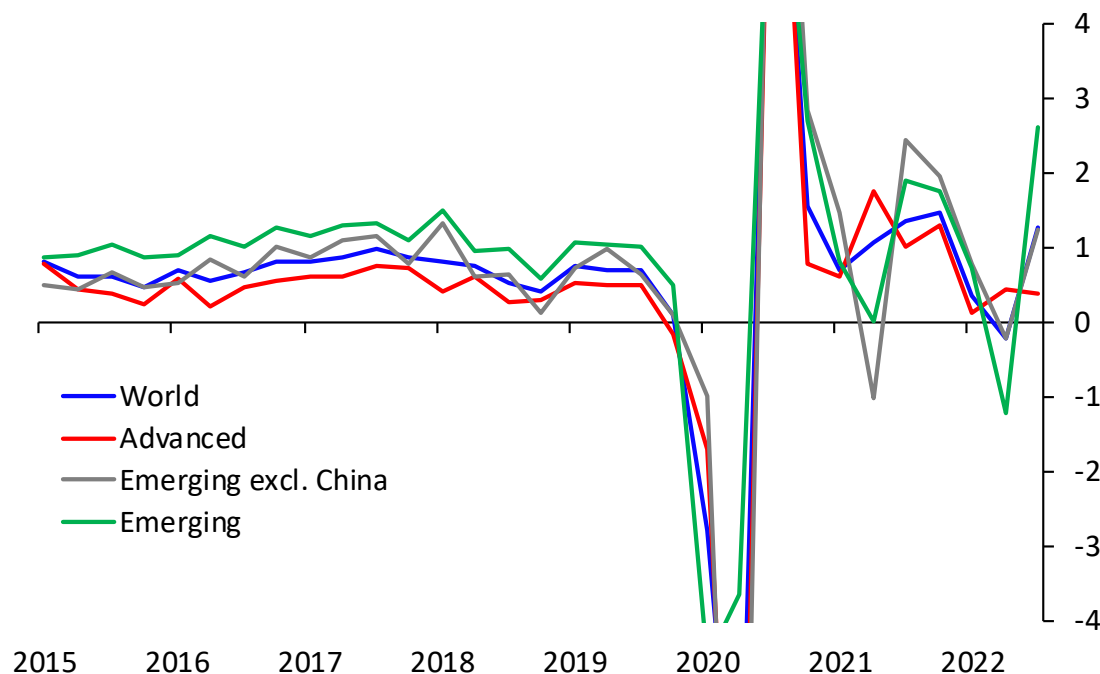
4 Stress tests

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1 Global economic growth

During S2-2022, world economic activity weakened as a result of the military conflict between Russia and Ukraine, a weaker-than-anticipated recovery in China, and tightening global financial conditions as a result of the reduction of monetary stimulus worldwide. Thus, growth forecasts were maintained for 2022 and were revised downwards for 2023.

GDP Growth ^{1/}
Quarterly % change, s. a.



Data as of Q3-2022.

Source: Prepared by Banco de México with data from Haver Analytics and J.P.Morgan.

s. a./ Seasonally adjusted figures.

1/ The sample of countries used for the calculation represents 85.7% of world GDP measured by purchasing power parity. Forecasts are used for some countries in the sample for Q3-2022.

Global GDP growth forecasts
%

| | <i>World Economic Outlook</i> October 2022 | | Change from July 2022 | |
|-----------------|---|------------|--------------------------|-------------|
| | 2022 | 2023 | 2022 | 2023 |
| World | 3.2 | 2.7 | 0.0 | -0.2 |
| Advanced | 2.4 | 1.1 | -0.1 | -0.3 |
| United States | 1.6 | 1.0 | -0.7 | 0.0 |
| Euro area | 3.1 | 0.5 | 0.5 | -0.7 |
| Japan | 1.7 | 1.6 | 0.0 | -0.1 |
| United Kingdom | 3.6 | 0.3 | 0.4 | -0.2 |
| Emerging | 3.7 | 3.7 | 0.1 | -0.2 |
| Excl. China | 4.0 | 3.4 | 0.2 | -0.2 |
| Mexico | 2.1 | 1.2 | -0.3 | 0.0 |
| China | 3.2 | 4.4 | -0.1 | -0.2 |
| India | 6.8 | 6.1 | -0.6 | 0.0 |
| Brazil | 2.8 | 1.0 | 1.1 | -0.1 |

Data as of October 2022.

Source: IMF, World Economic Outlook, October and July 2022.

2 International financial markets

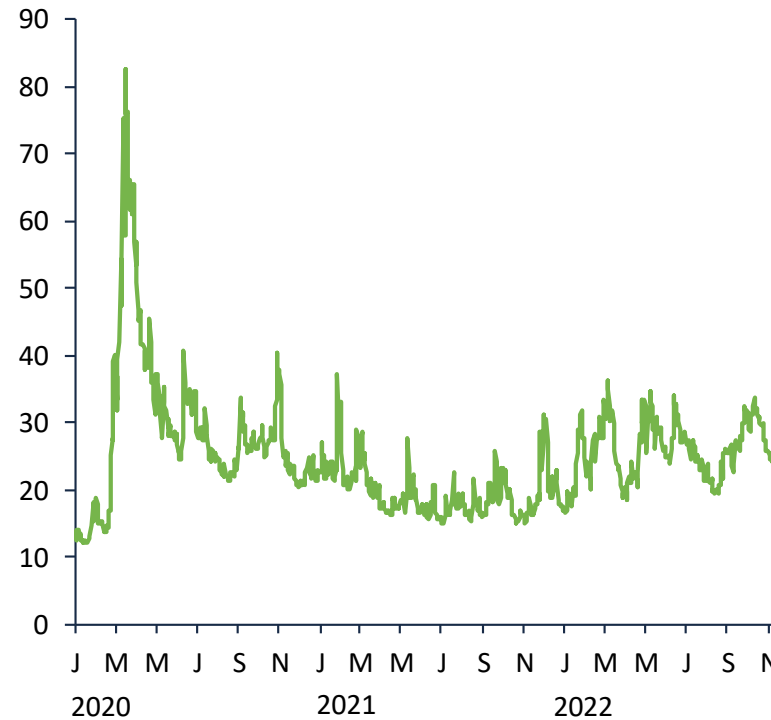
As of S2-2022, international financial markets have been affected by the current environment, as well as by episodes of high volatility, greater risk aversion, and significantly tighter financial conditions.

Stock market and FX indices' performance
Index (January 2020 = 100)



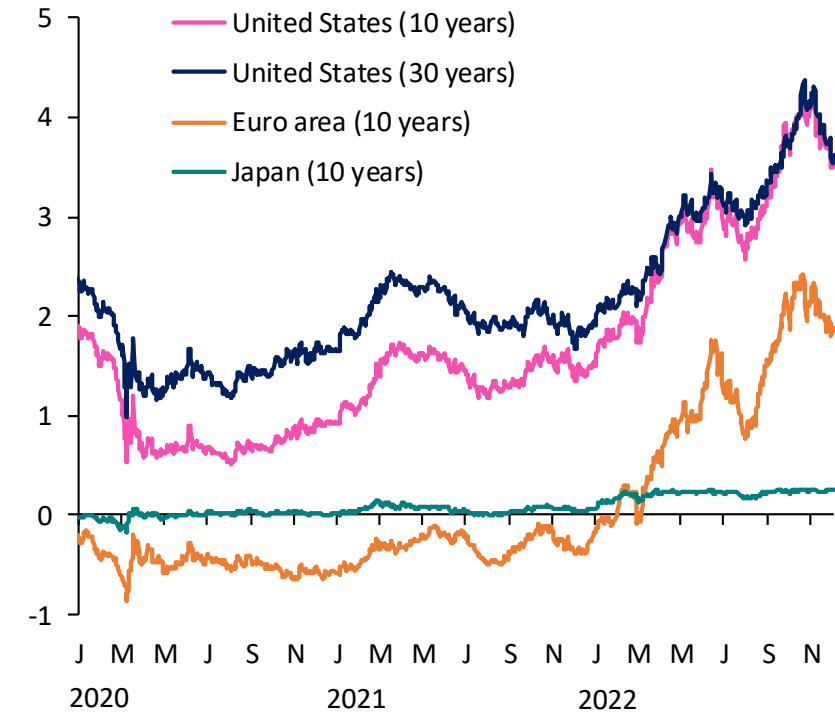
Data as of December 2022.
Source: Prepared by Banco de México with data from Bloomberg.

The VIX index ^{1/}
%



Data as of December 2022.
Source: Bloomberg.
1/ The VIX index is a weighted indicator that measures implied volatility in the options market for S&P 500.

Government bonds' interest rates
%

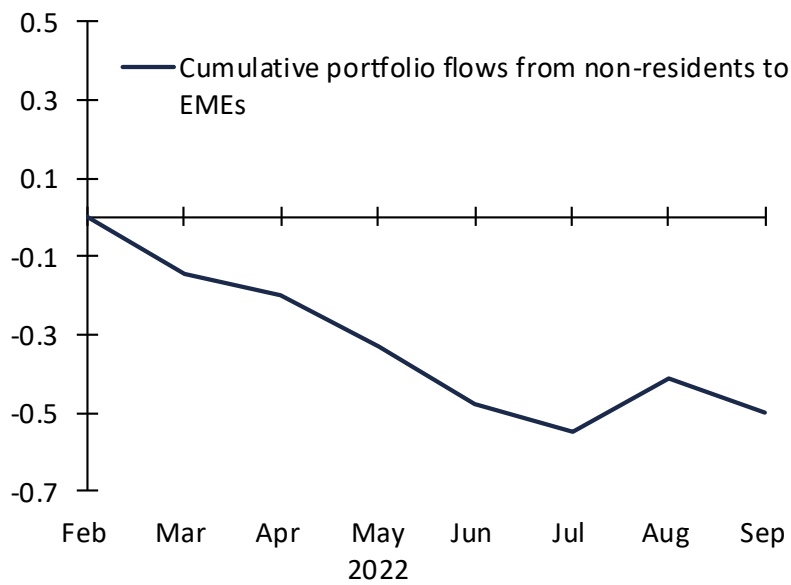


Data as of December 2022.
Source: Bloomberg.

3 Financial markets: emerging market economies

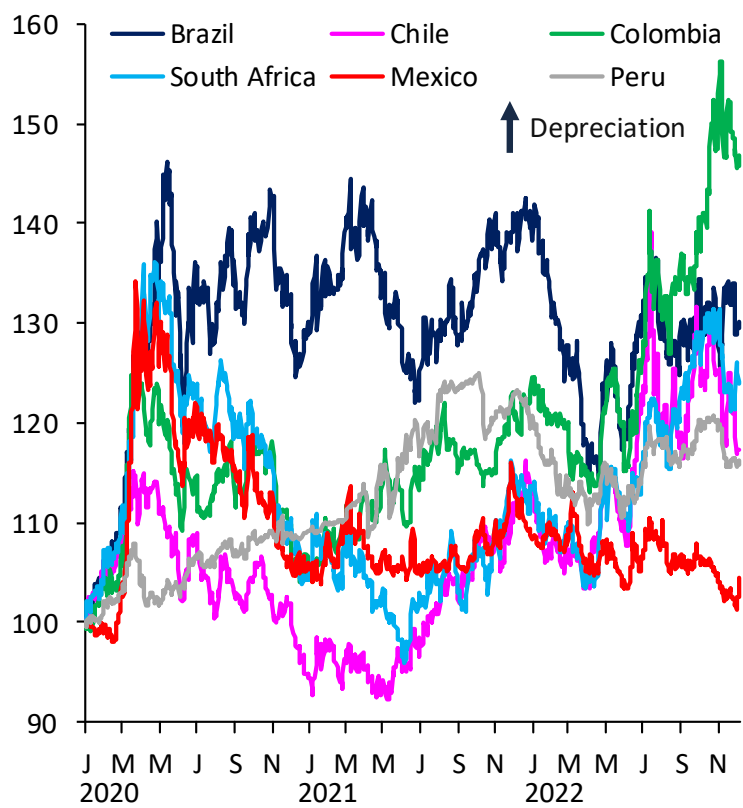
As of S2-2022, emerging economies' financial markets have been affected by the current environment of increased volatility and tighter global financial conditions. Since June 2022, the currencies of these economies (except for the Mexican peso) have depreciated against the US dollar and capital flows to emerging economies have been negatively affected.

Cumulative portfolio flows from non-residents to EMEs ^{1/}
% of GDP in 2020



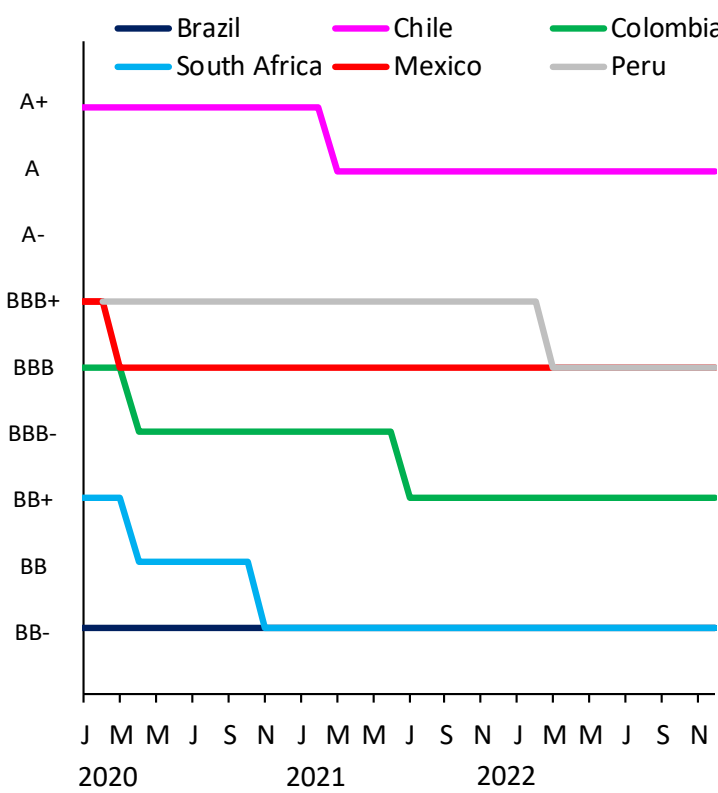
Data as of September 2022.
Source: Institute of International Finance (IIF).
^{1/} The measurement of portfolio flows of emerging economies includes those countries considered in the section "Monetary policy and international financial markets" of the Quarterly Report January-March 2021, for which information was available in the IIF. This measure was obtained by adding the flows of these economies and dividing it by the sum of their GDP in 2020. The flows were accumulated since February 2022. The information for the rest of EMEs goes up to September 2022 since it is the latest information update available that allows a sufficiently large number of these countries to be obtained.

Nominal exchange rates against the USD
Index 01-Jan-2020 = 100



Data as of December 2022.
Source: Bloomberg.

Credit ratings of emerging market economies ^{1/}

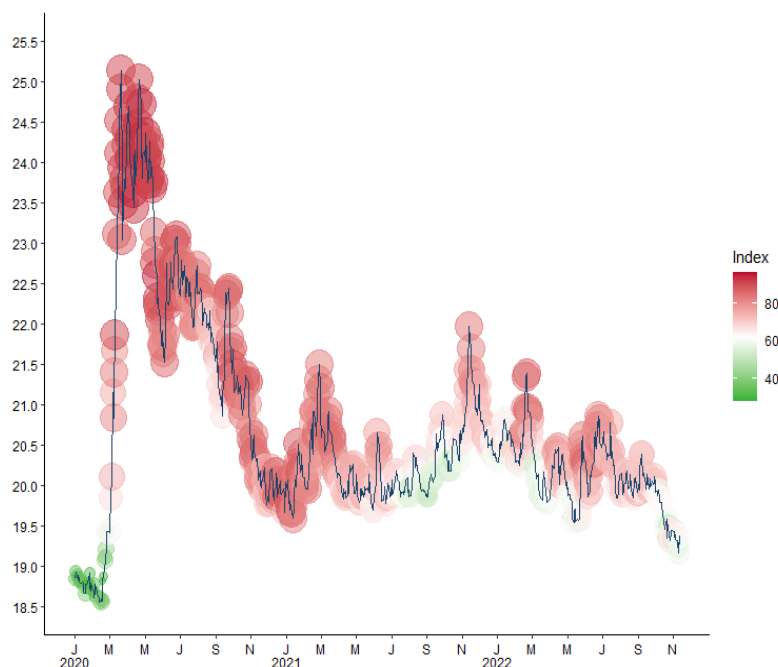


Data as of December 2022.
Source: S&P, Fitch and Moody's.
^{1/} Includes the median of the long-term rating in foreign currency of 3 credit rating agencies (S&P, Fitch, and Moody's).

4 Mexican financial markets

During S2-2022, domestic financial markets were also affected by the current conditions by exhibiting some volatility. The Mexican peso appreciated against the US dollar and the foreign exchange market has operated with resilience. The yield curve of government bonds showed an investment dynamic with increases in the short-term node and decreases in the long-term node, while the Mexican stock market registered gains in certain sectors.

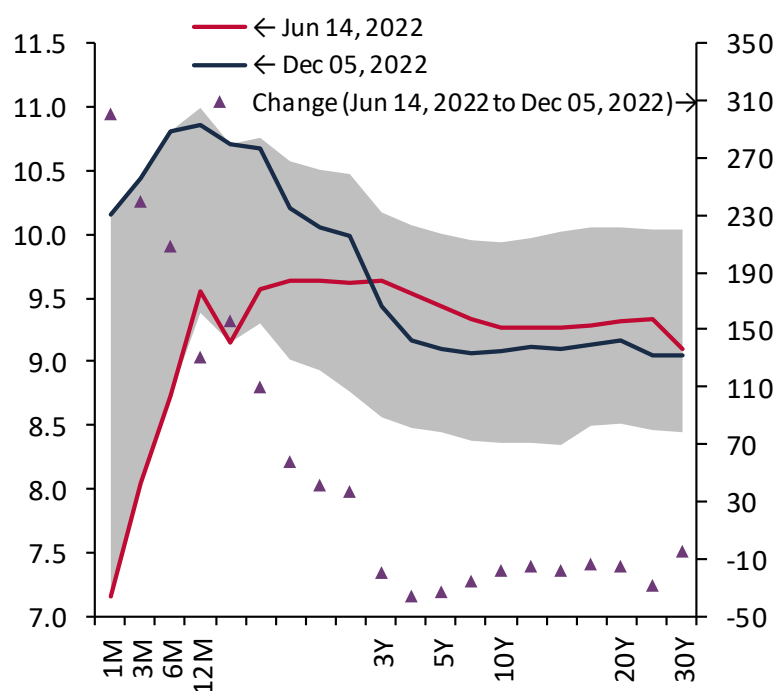
Trading conditions of the Mexican peso ^{1/}
MXN/USD; Index



Data as of December 2022.

Source: Prepared by Banco de México with data from Bloomberg and Refinitiv.
1/ The index is estimated as the average of the percentiles calculated since 2018 of the implicit volatility and skewness at one month, and of the observed volume and spread, where the red (green) color indicates a greater (less) deterioration of trading conditions in the exchange market.

Bonds M nominal yield curve ^{1/}
Percent

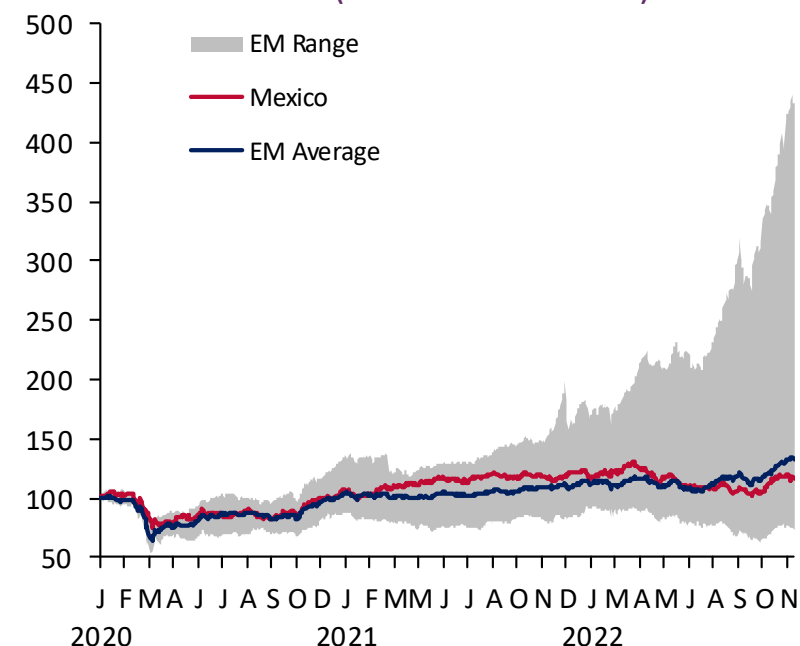


Data as of December 2022.

Source: Prepared by Banco de México with PIP data.

1/ The gray area refers to the range of daily yield data since June 14, 2022.

Cumulative performance of stock market indexes in emerging economies ^{1/}
Index (Jan 01 2020 = 100)



Data as of December 2022.

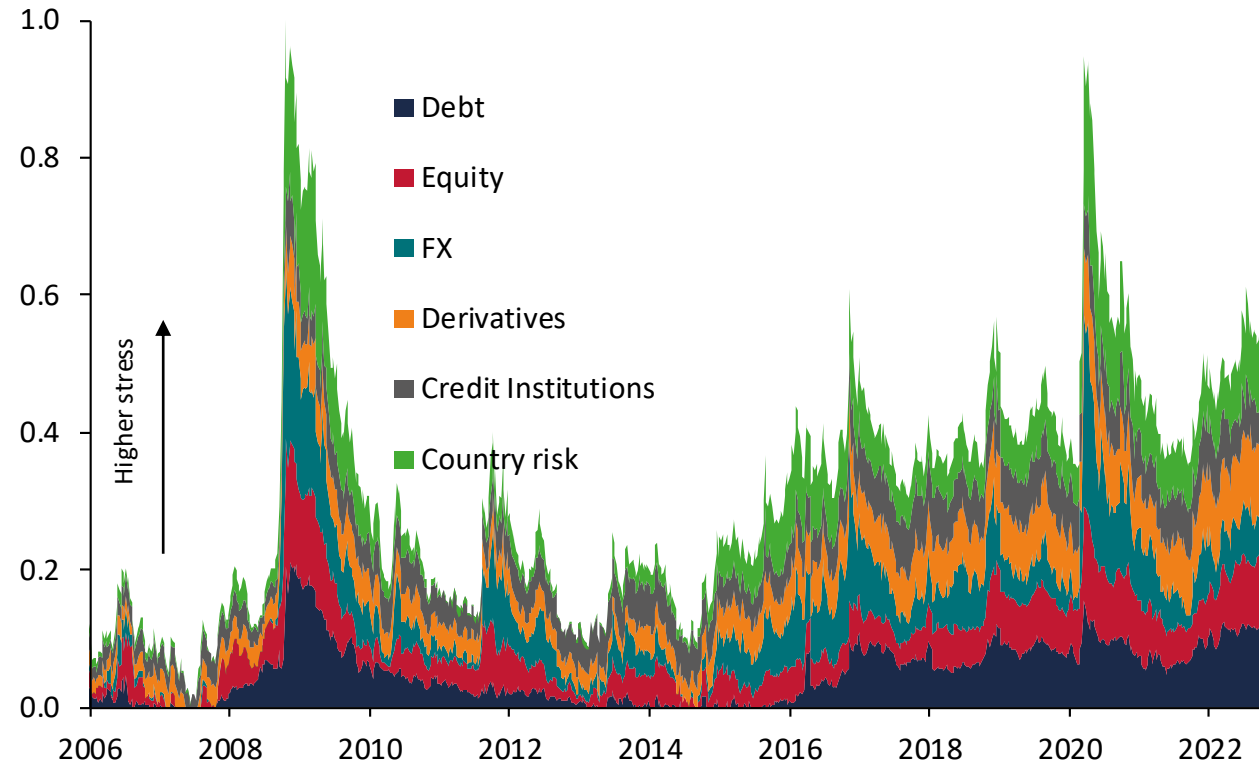
Source: Prepared by Banco de México with data from Bloomberg.

1/ The gray area refers to range of emerging market economies. EMEs included in the sample are: Argentina, Peru, Colombia, Turkey, the Philippines, Poland, Hungary, Indonesia, South Africa, Russia, Brazil, Colombia, Malaysia, and India.

4 Mexican financial markets

The Mexican Financial Markets Stress Index (IEMF) increased from June up to October 2022, and was above its pre-pandemic level. Nevertheless, since October, it has decreased, mainly due to lower volatility in the variables associated with country risk and the foreign exchange market. The Financial Conditions Index (FCI) tightened from December 2021; however, it eased somewhat in November 2022.

Mexican Financial Market Stress Index ^{1/}
Stress level 2006-2022



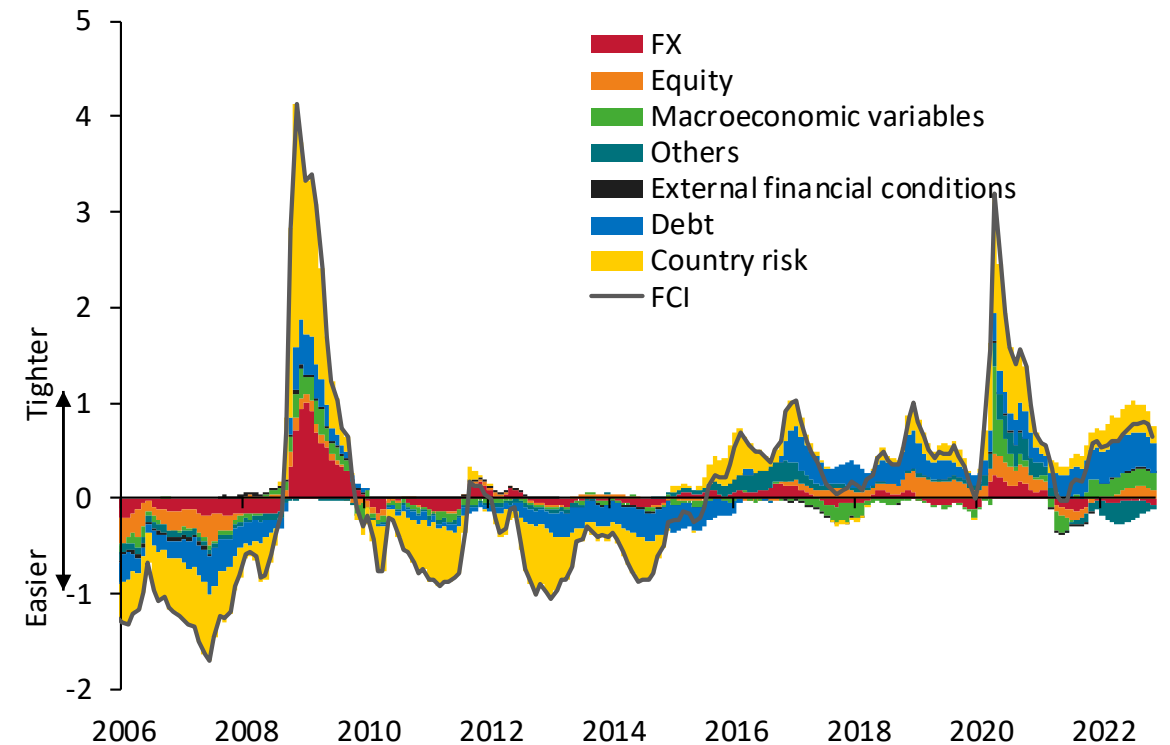
Data as of December 2, 2022.

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 IEMF scaled at interval [0,1].

A higher delinquency rate represents higher financial stress.

Mexican Financial Conditions Index ^{1,2/}
Standard deviations



Preliminary data as of November 2022.

Source: Banco de México.

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

2/ The contributions of each variable to the FCI are estimated using a Kalman filter.

5 Macro-financial risks

- Certain vulnerabilities and risks to the financial system, which rose since the pandemic, have been diminishing, although some macro-financial risks that could affect the financial system still prevail. Regarding the latter, the following stand out:
 - 1 A greater and faster tightening of global financial conditions.
 - 2 A lower-than-expected world economic growth characterized by a downward trend.
 - 3 A further weakening of aggregate demand.
 - 4 Additional adjustments in both sovereign debt and Pemex credit ratings.
- These risks are considered in the stress test scenarios.

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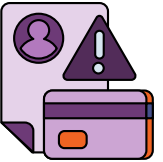
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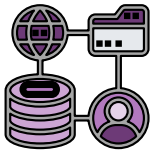
Measures to promote and preserve the sound development of the financial system



- During S2-2022, the financial authorities continued working on constantly improving the regulatory framework and adopting international standards and best practices.



- The National Banking Securities Commission (CNBV) and Banco de México made adjustments to regulation, on issues related to credit and market risk, the financial safety net, and fixed-income and repo markets.



- These measures aim at maintaining a robust and updated regulatory framework.



- Whenever necessary, and in compliance with the legal framework, Banco de México will continue taking actions within its mandate in a timely manner to promote and preserve the sound development of the financial system.

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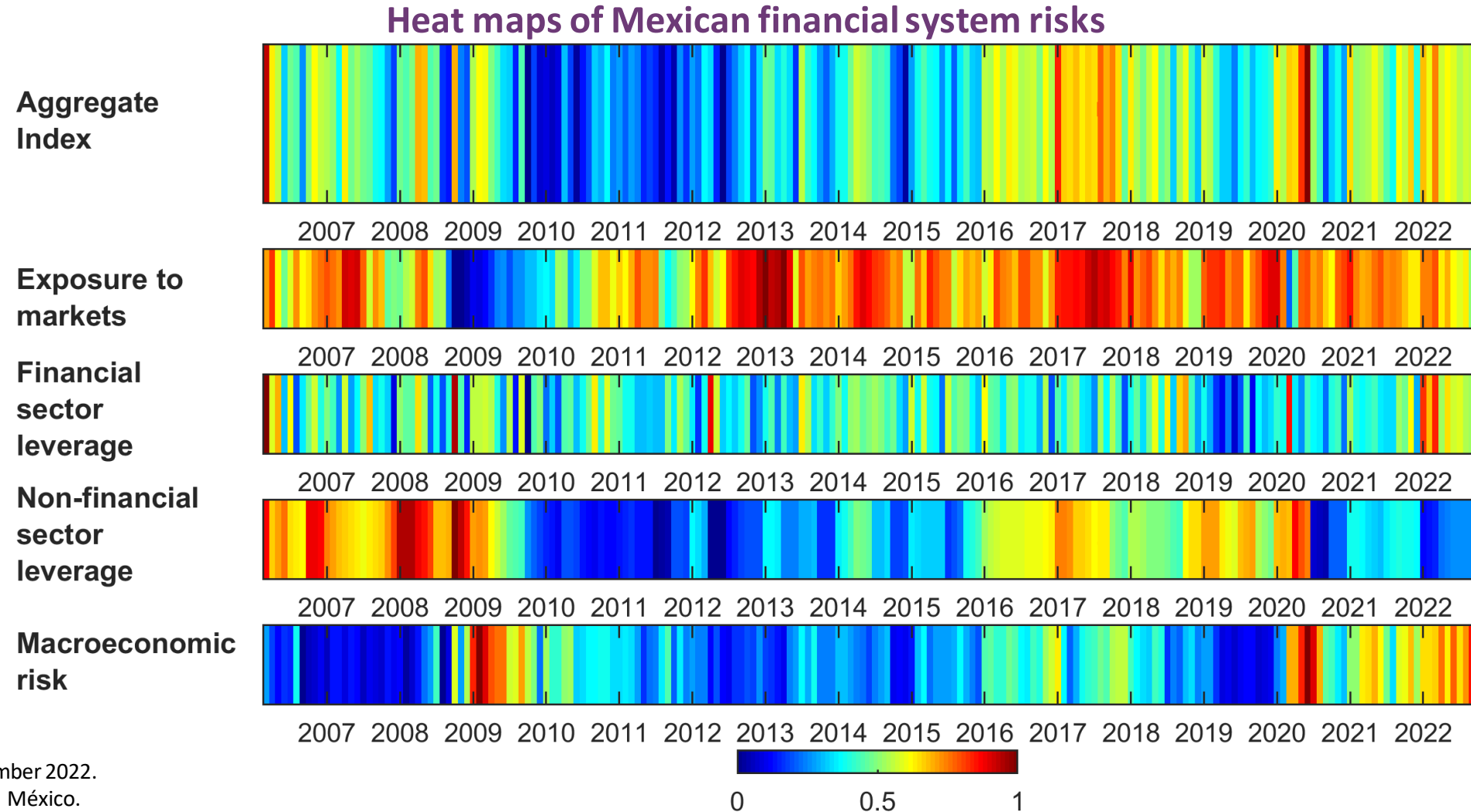
3 Financial system risks

4 Stress tests

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1 Heat maps of the Mexican financial system risks

As illustrated by the heat map, the aggregate risk of the financial system decreased with respect to that of the Q1-2022 and remained at moderate levels in Q3-2022.



Data as of September 2022.

Source: Banco de México.

2 Survey on systemic risk perception among financial institutions

According to financial intermediaries, the higher-than-expected inflation risk is the most frequently mentioned, in terms of both domestic and external financial risks. Fewer institutions expect an increase in the different types of risk mentioned for the next 6 months, except for credit risk and liquidity risk.

Main sources of financial system risks (6m ahead) ^{1/ 2/}
Percent of total institutions

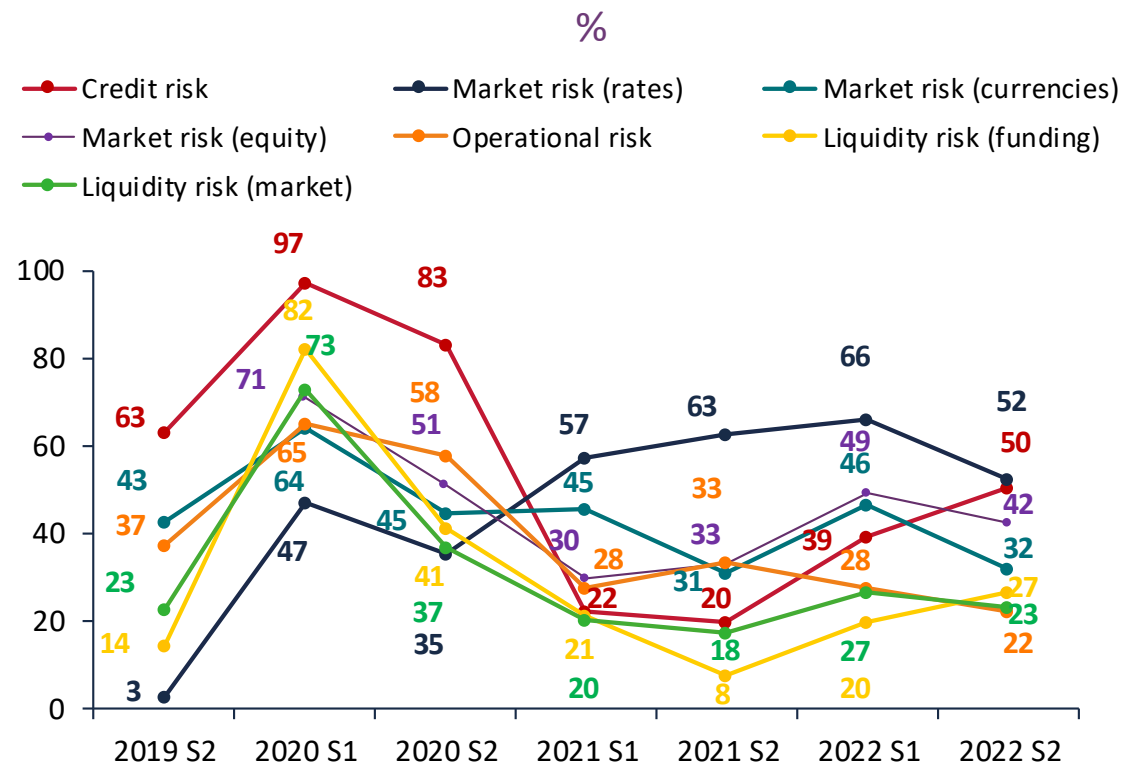
| Main sources of financial system risks | | |
|---|----------|---------------|
| Percent of total institutions | | |
| | May 2022 | November 2022 |
| External Financial risks | | |
| Inflation higher than expected | 60 | 81 |
| Deterioration of global economic growth outlook | 69 | 75 |
| Disorderly changes in foreign interest rates | 70 | 65 |
| Deterioration of foreign market conditions* | 59 | 64 |
| Volatility in commodity prices | 62 | 54 |
| Domestic Financial risks | | |
| Inflation higher than expected | 54 | 76 |
| Deterioration of the domestic economic growth outlook | 68 | 72 |
| Deterioration of public finances | 59 | 60 |
| Deterioration of sovereign credit rating | 57 | 54 |
| Fiscal, financial and economic policies | 54 | 50 |
| Non-financial risks | | |
| Political, geopolitical and social risks | 89 | 87 |
| Cybersecurity and IT risks | 84 | 83 |
| Violence and insecurity | 71 | 66 |
| Deterioration of the rule of law and impunity | 56 | 54 |
| COVID-19 (new wave) | 65 | 45 |

1/ In the last survey 109 institutions participated.

2/ In the previous survey 112 institutions participated.

* Exchange rate volatility, depreciation, and lack of liquidity.

Expectations regarding the evolution of risks in the following six months ^{1/}
%



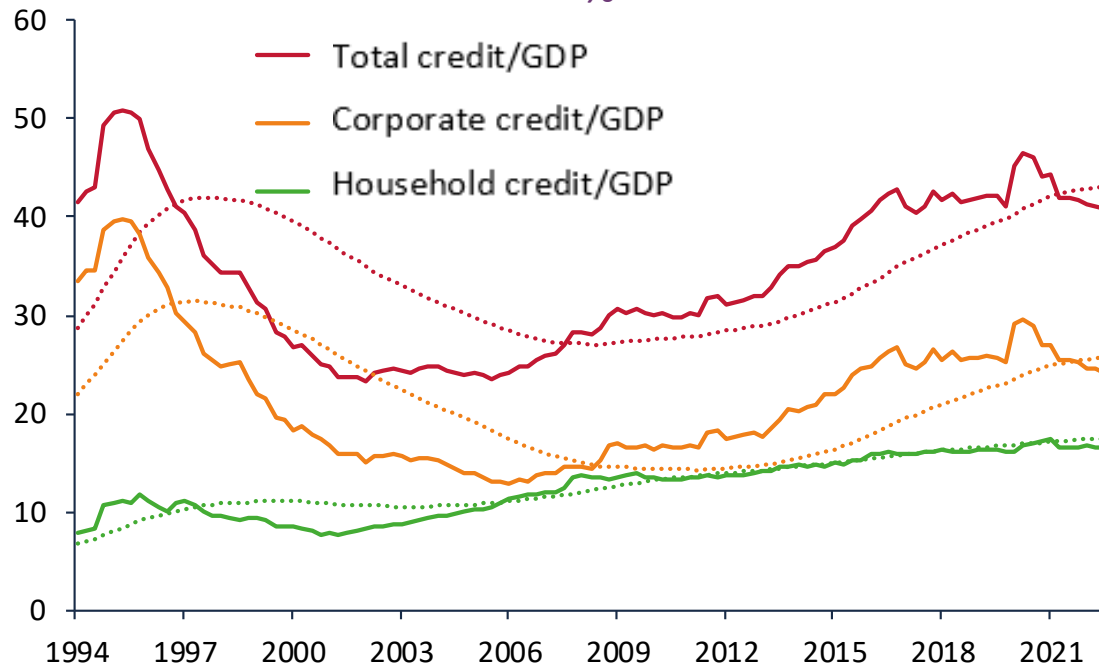
Source: Banco de México.

1/ The chart shows the difference between the percentage of institutions that expect risk to increase and the percentage of institutions that expect it to decrease.

3 Total financing to the non-financial private sector

Total financing to the non-financial private sector remains below trend, registering six consecutive quarters with a negative credit gap.

Credit to the non-financial private sector as a proportion of GDP^{1/}
%

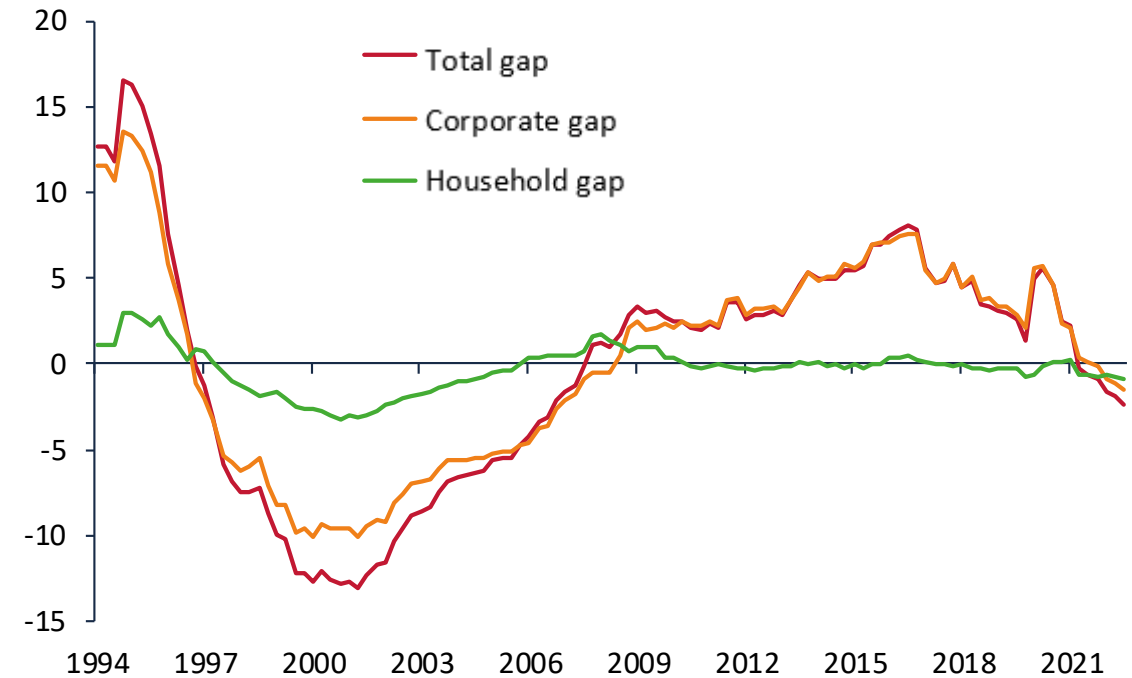


Data as of September 2022.

Source: Banco de México.

1/The dotted lines correspond to the long-term trend.

Credit gap ^{1/}
%



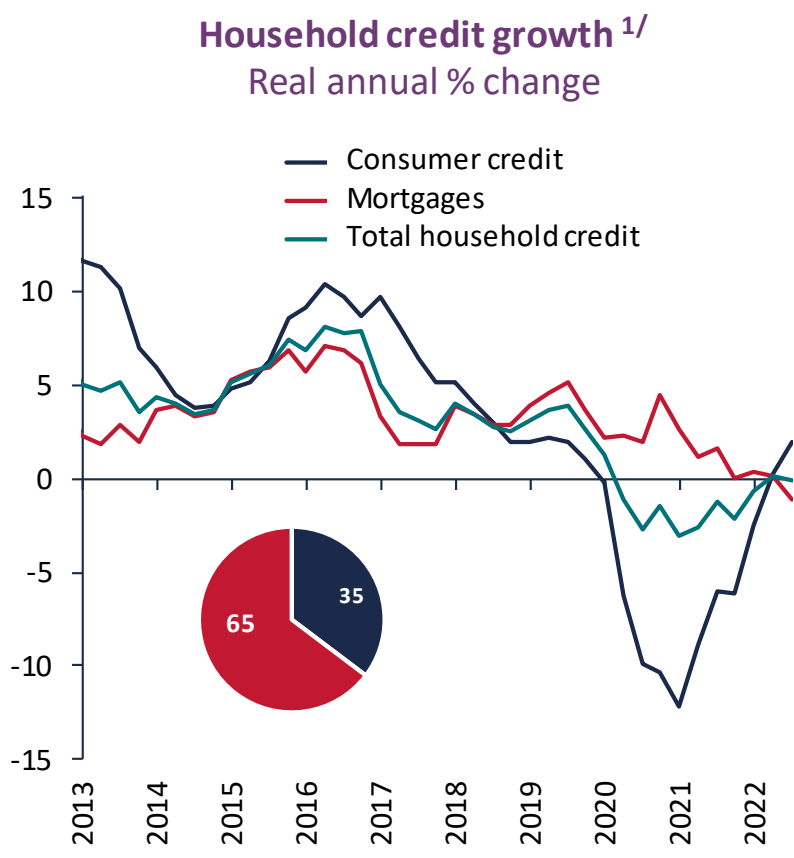
Data as of June 2022.

Source: Banco de México.

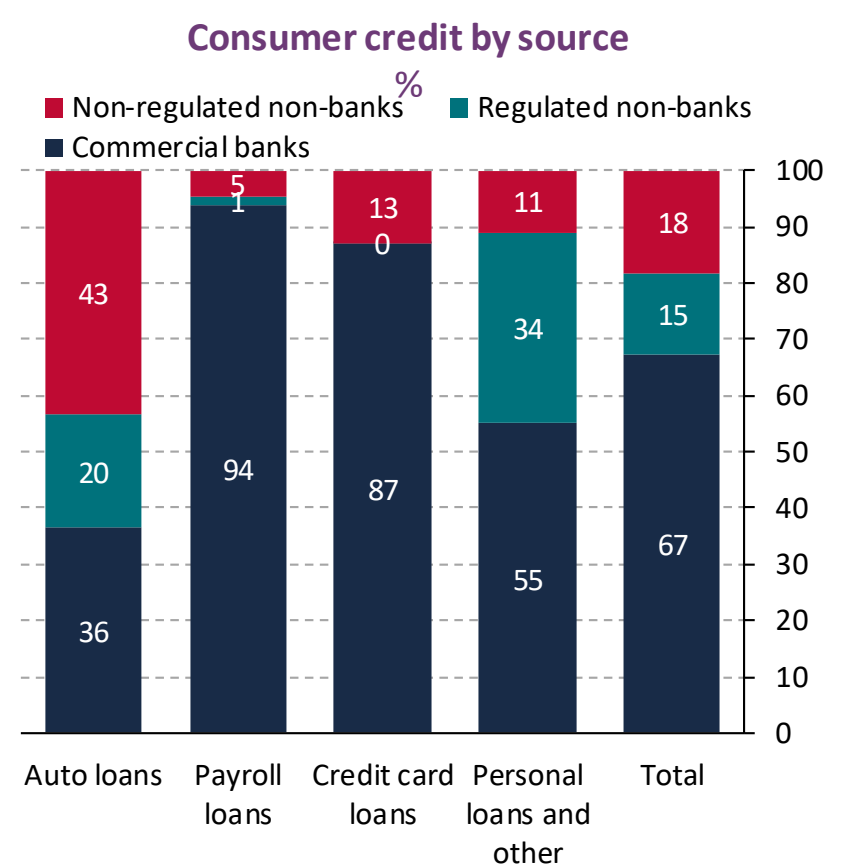
1/ Refers to the difference between the credit and its long-term trend.

4 Households' financial position

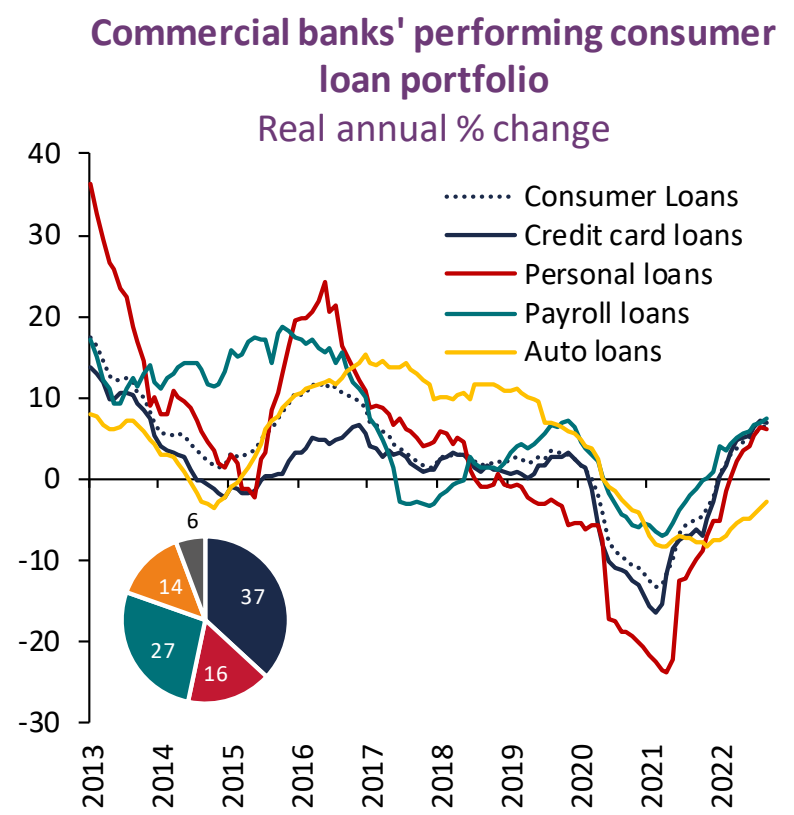
Total financing to households stabilized during the period. This reflected the trend of consumer credit, as mortgage loans have lost momentum in recent months. Consumer credit granted by commercial banks continues showing positive growth rates in practically all segments, except for auto loans.



Preliminary data as of September 2022.
 Source: Banco de México, BMV and Condusef.
 1/ See the Report for details on what is included in each item.



Data as of September 2022.
 Sources: Banco de México, CNBV and Condusef.
 1/ Includes the loan portfolio of sofomes regulated as having an equity link with a bank. 2/ Includes the loan portfolio of development banks, socaps, sofipos, sofomes regulated for issuing debt, and Infonacot. 3/ Includes the loan portfolio of finance companies, unregulated sofomes, and department stores.



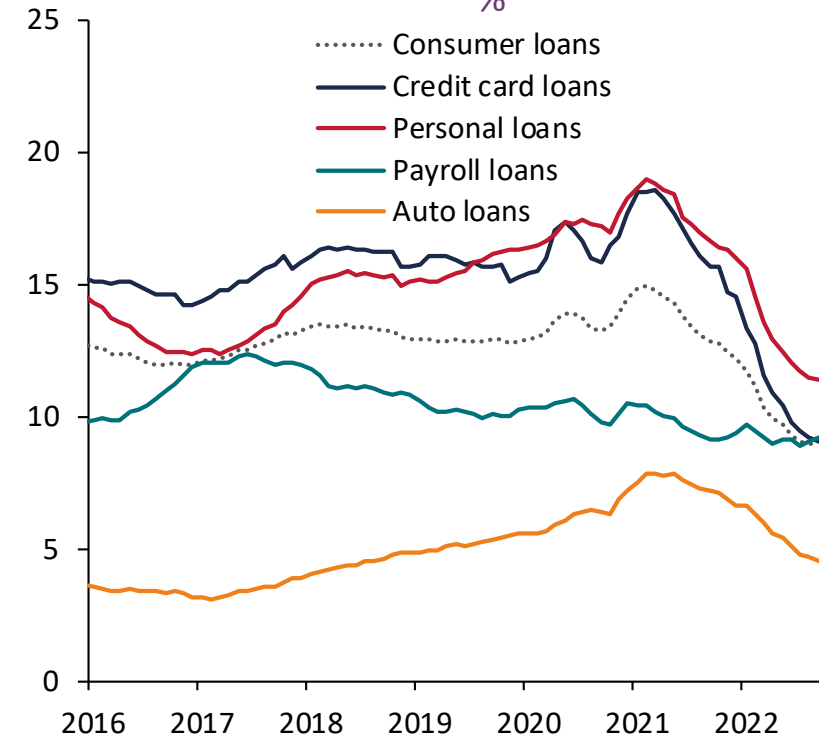
Data as of September 2022.
 Source: CNBV.

4 Households' financial position

The delinquency rate of the consumer bank loan portfolio remained relatively stable during the second and third quarters of 2022, although some segments have registered increases. Meanwhile, the delinquency rate of the mortgage loan portfolio has continued increasing for some lenders.

Adjusted delinquency rate of banks' consumer loan portfolio^{1/}

%



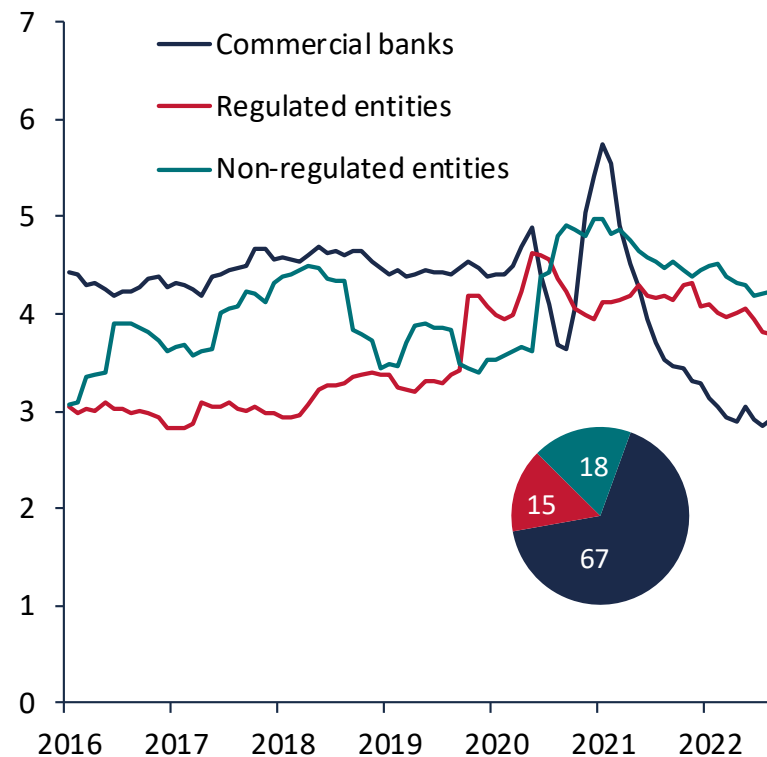
Data as of September 2022.

Source: CNBV.

1/ Includes regulated sofomes with equity links to banks.

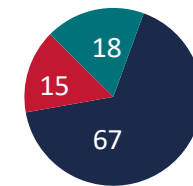
Delinquency rate of consumer loan portfolio

%



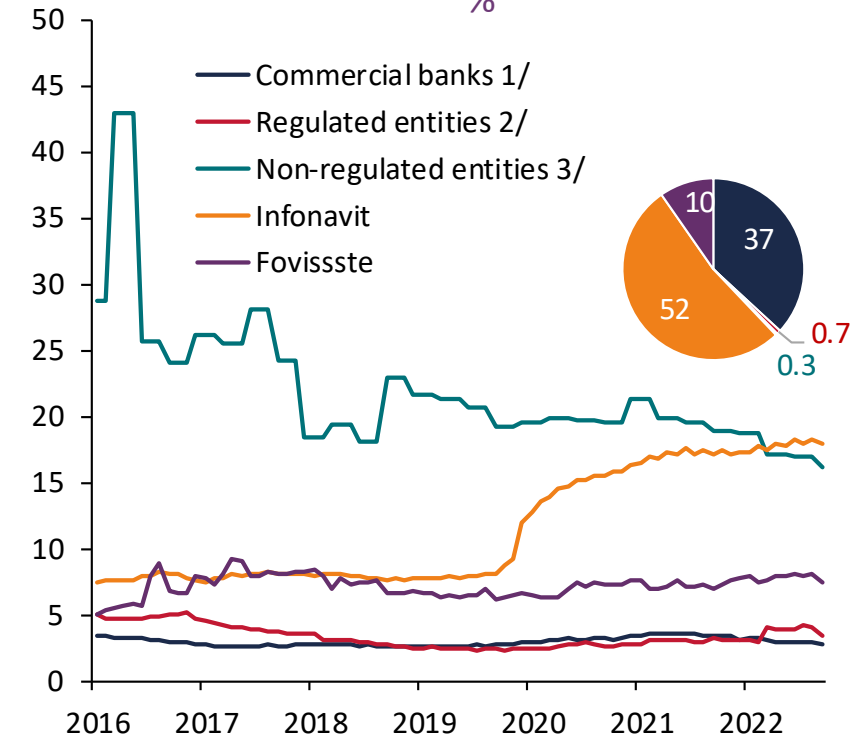
Data as of September 2022.

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



Delinquency rate on mortgages by type of granting entity

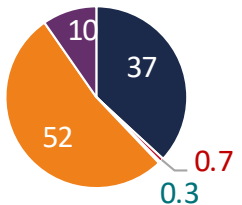
%



Data as of September 2022.

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

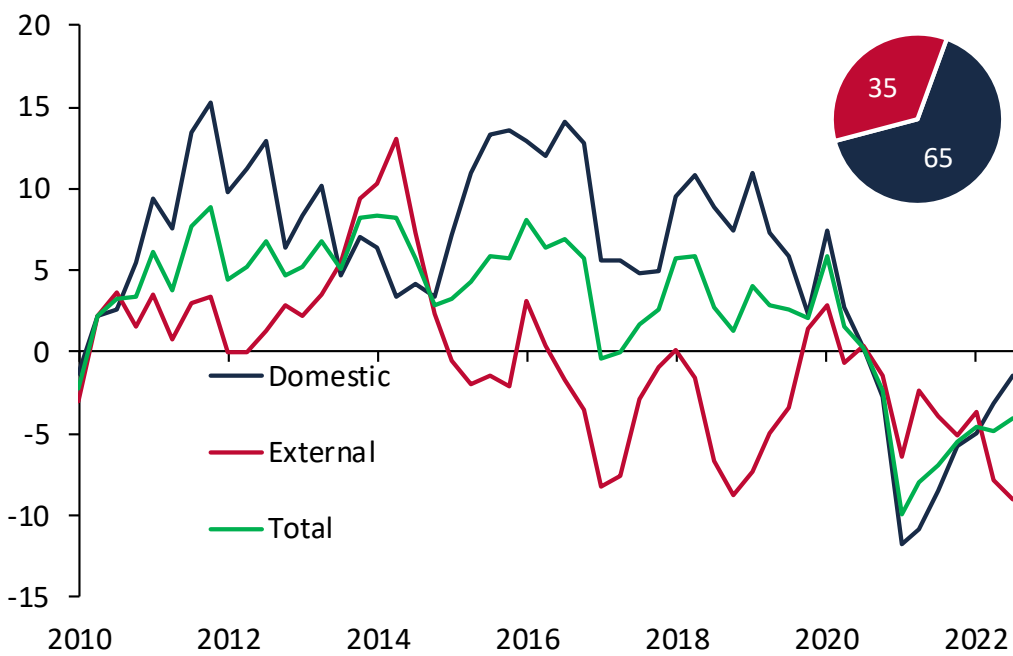
1/ Includes the loan portfolio of sofomes regulated that have an equity link with a bank. 2/ Includes the loan portfolio of development banks and regulated non-bank financial institutions such as socaps, sofipos, and sofomes regulated issuing debt. 3/ Includes non-regulated sofomes.



5 Non-financial private firms' financial position

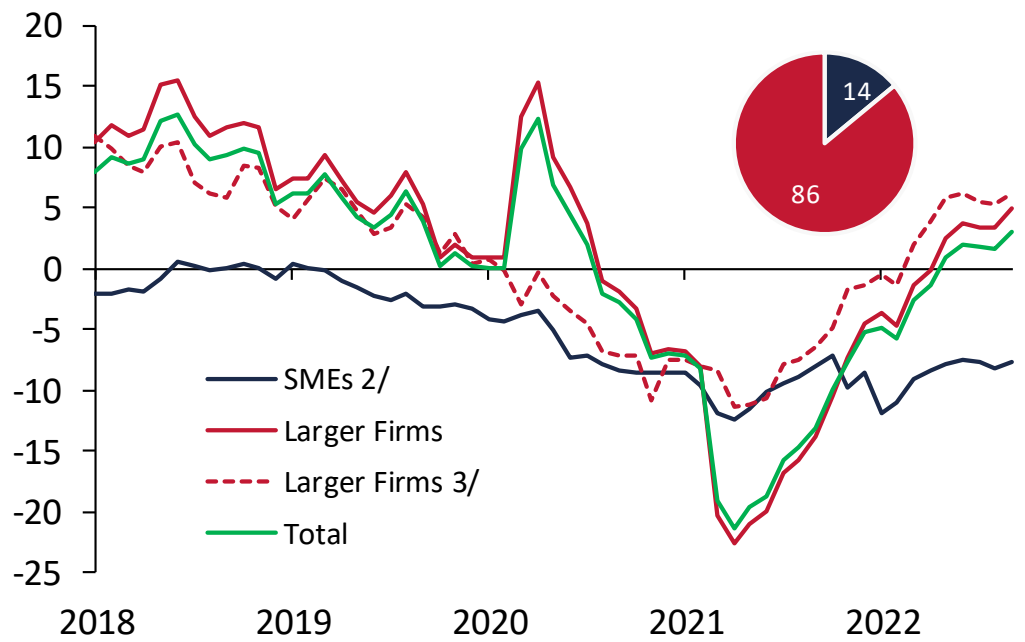
Total lending to non-financial private firms in Mexico continued declining in real terms, in both its domestic and external components. As of Q2-2022, bank lending to larger firms has registered positive annual real growth rates for the first time since mid-2020, although lending to smaller firms continues decreasing.

Total financing to private non-financial firms ^{1/}
Real annual % change



Data as of September 2022.
Source: Banco de México, BMV and SHCP.
1/ The percentages consider the figures related to non-regulated entities granting financing, which are included at the bottom of Table 1 (Memo) and therefore differ from those shown at the tip of the same Table.

Real annual portfolio growth by firm size ^{1/}
Real annual % change

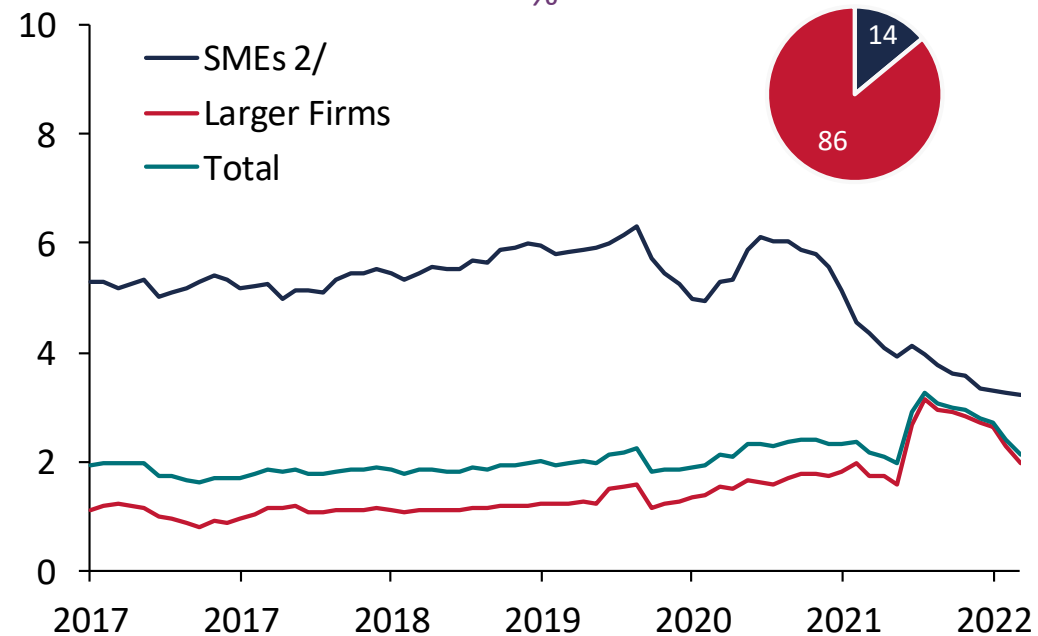


Data as September 2022.
Source: CNBV.
1/ Bank portfolio. The pie chart shows the total percentage of the portfolio for each segment. 2/ Non financial private companies not listed on the Mexican Stock Exchange with historical maximum credits of less than 100 million pesos.
3/ Large-size firms excluding those that had a monthly increase in their balance of more than 15% in Mar-20, which represent 30% of the balance and 16% of borrowers of large firms as of the last date.

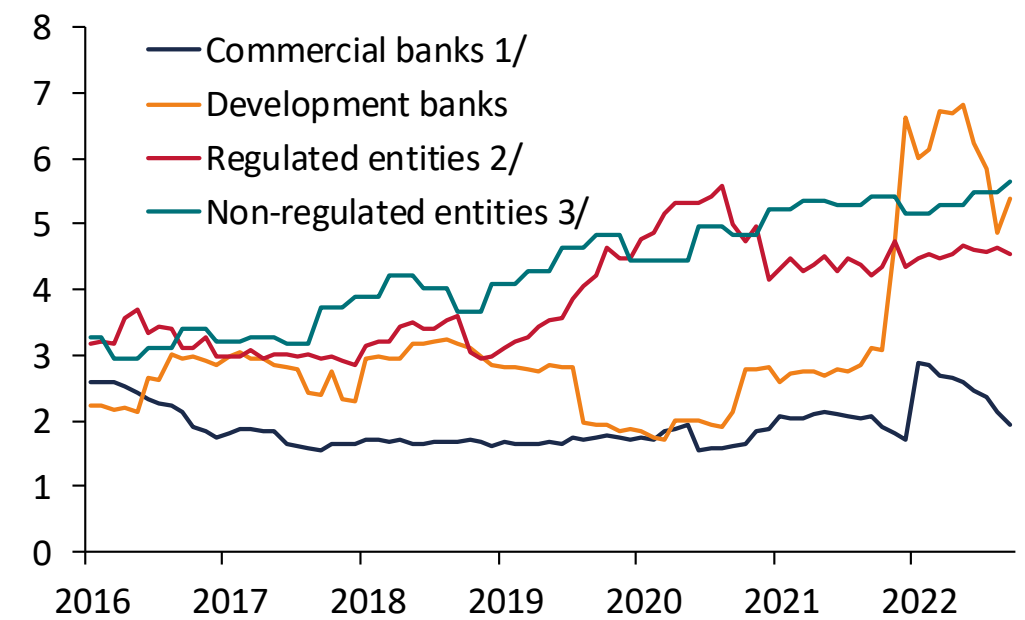
5 Non-financial private firms' financial position

The delinquency rate of commercial banks' portfolio for both large and small or medium-size firms has continued decreasing in S2-2022. In contrast, the delinquency rate of the non-regulated non-bank financial intermediaries' credit portfolio rose during the period.

Delinquency rate of non-financial firms' loan, by firm size ^{1/}
%



Delinquency rate of non-financial firms' loan, by lender
%



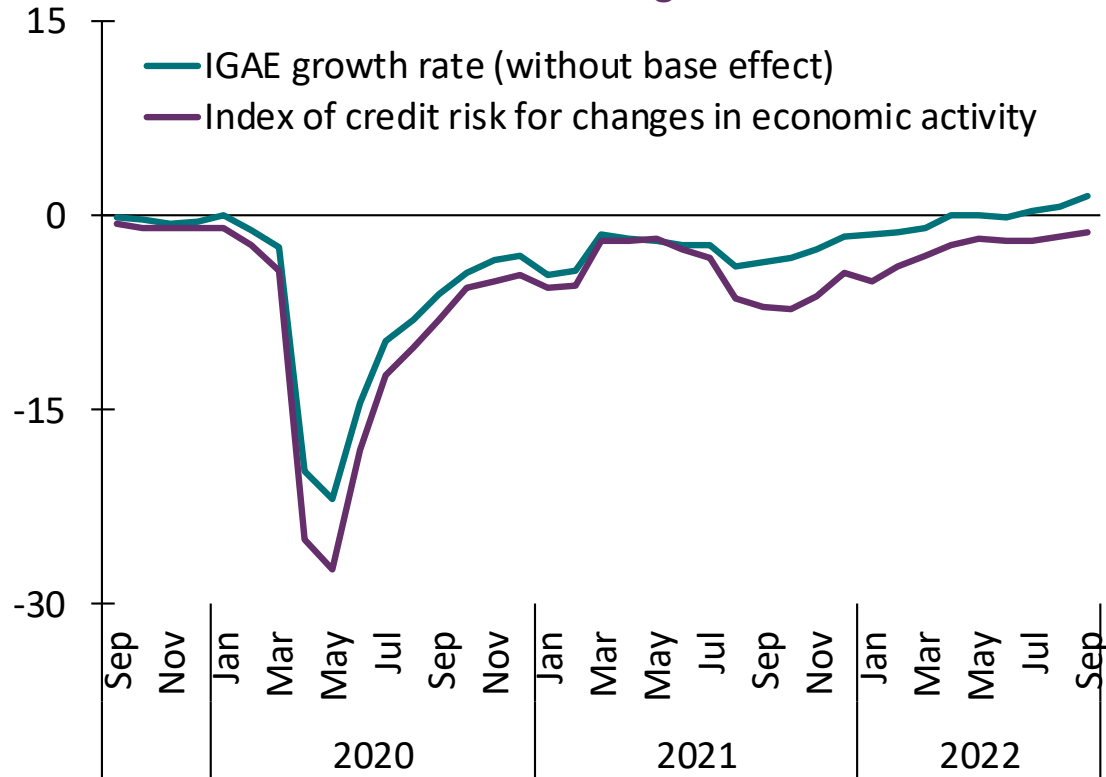
Data as of September 2022.
Source: CNBV.
1/ The pie chart shows the total percentage of the portfolio for each segment.
2/ Non-financial private companies not listed on the Mexican stock exchange with historical maximum loans of less than 100 million pesos.

Data as of September 2022.
Source: Banco de México (SIE), CNBV, BMV and Condusef.
1/ Includes the loan portfolio of sofomes regulated that have an equity link with a bank, regardless if they are the bank's subsidiaries or not. 2/ Includes the loan portfolio of regulated financial entities, such as socaps, sofipos, credit unions, regulated sofomes for issuing debt and development trusts (FIRA, FND, FOVI and FIFOMI). 3/ Includes the portfolio of non-regulated sofomes and financial entities that predominantly grant credit, as part of the line of business, such as financial leasing companies and some financial arms of automotive companies.

6 Commercial banks: exposure to changes in economic activity and formal employment

Economic growth and employment dynamics are relevant determining factors for credit risk faced by commercial banks.

Credit risk of non-financial firms caused by changes in economic activity ^{1/}
% change

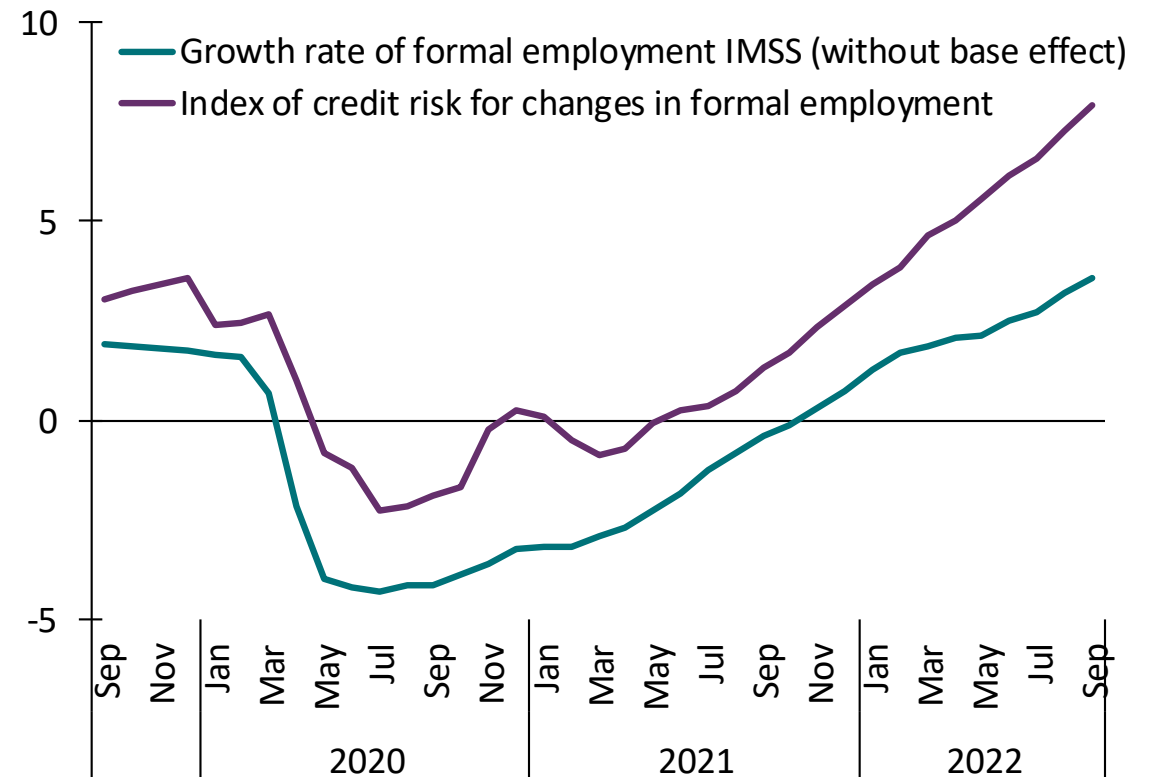


Data as of September 2022.

Source: Prepared by Banco de México with own data and data from INEGI.

^{1/} Starting from March 2021, the interannual growth rate of IGAE considers the base effect. Thus, the interannual growth rate in each month is determined as the sum of interannual variation as of February 2021 and the monthly variation in the same month.

Credit risk of payroll portfolio caused by changes in formal employment ^{1/}
% change



Data as of September 2022.

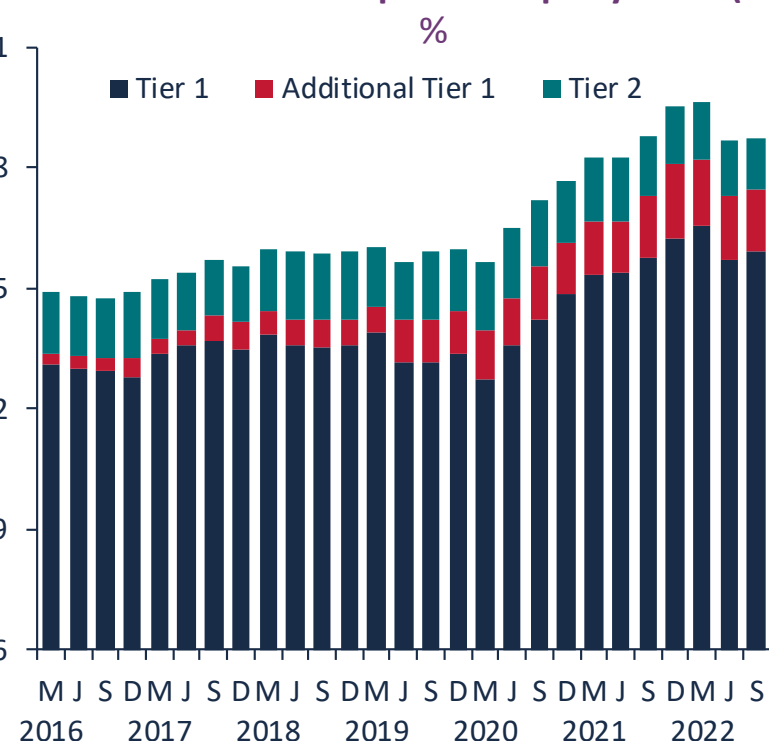
Source: Prepared by Banco de México with own data, data from INEGI and IMSS.

^{1/} Starting from March 2021, the interannual growth rate of formal employment considers the base effect. Thus, the interannual growth rate in each month is determined as the sum of interannual variation in February 2021 and the monthly variation in the same month.

6 Institutions: commercial banks

The capitalization level of commercial banks was adequate, although it decreased between March and September 2022. Similarly, the Conditional Value at Risk (CVaR) of the credit portfolio continued declining and net capitalization increased. The sector thus remains in a solid position to face possible adverse scenarios associated with credit defaults.

Structure of banks' Capital Adequacy Ratio (CAR)^{1/}

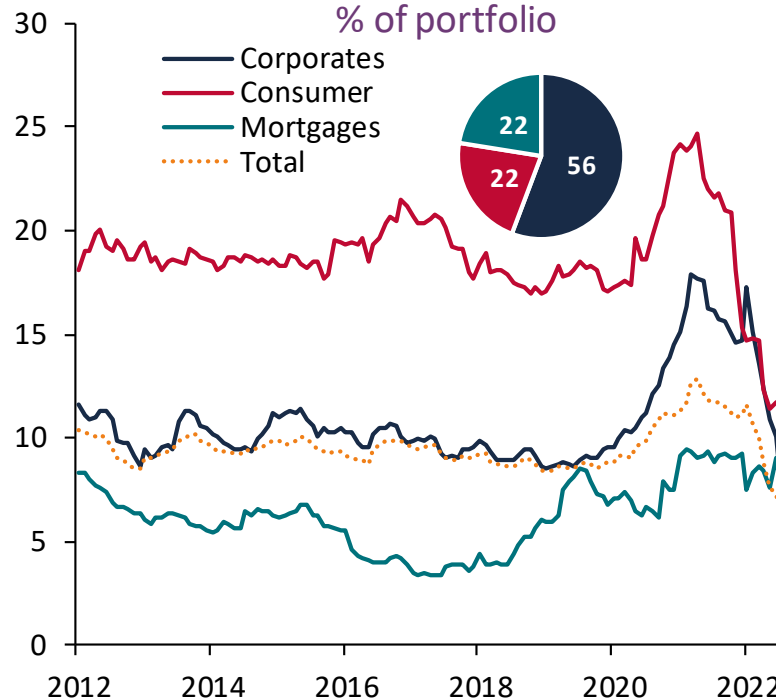


Data as of September 2022.

Source: Banco de México.

1/ The Capital Adequacy Ratio (CAR) is calculated by dividing net capital by risk weighted assets. Net capital is the regulatory capital that includes the Tier 1, Additional Tier 1, and the Tier 2 capital.

Credit Conditional Value at Risk (CVaR) by type of portfolio^{1/}

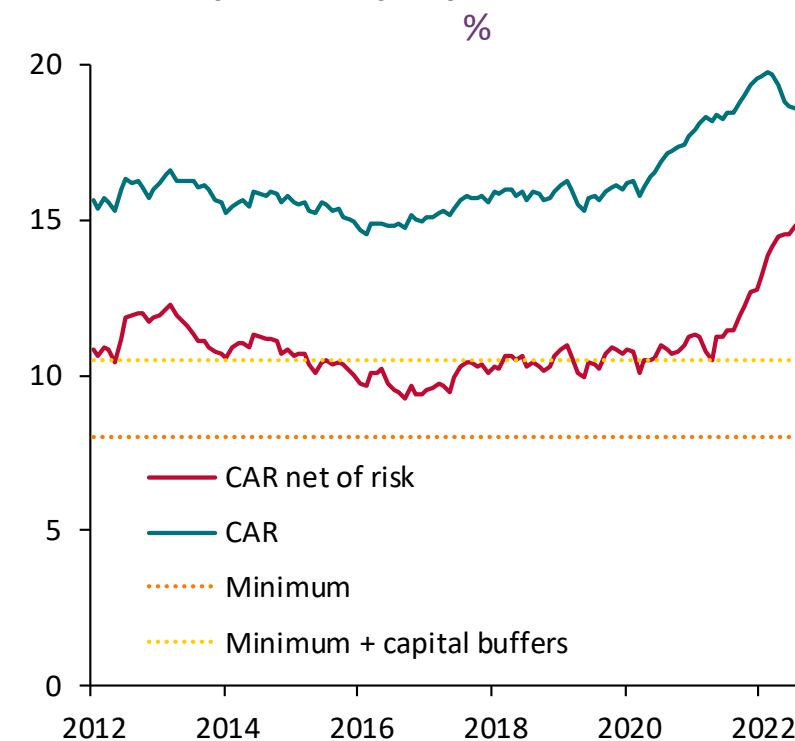


Data as of September 2022.

Source: Banco de México, CNBV and Buró de Crédito.

1/ Using a time horizon of a year and a 99.9% confidence level. The pie chart shows the percentage of the total performing balance for each segment of portfolio.

Capital Adequacy Ratio Net of Risk^{1/}



Data as of September 2022.

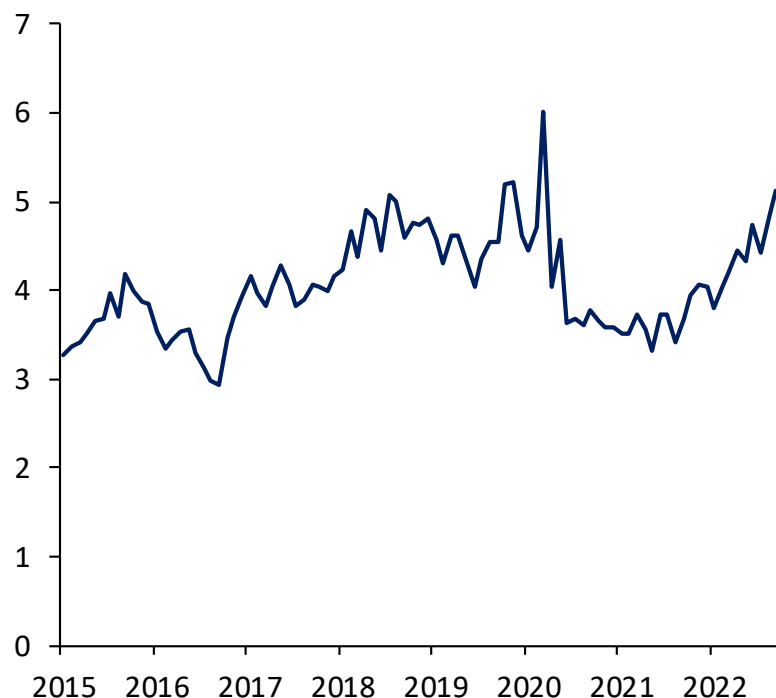
Source: Banco de México, CNBV and Buró de Crédito.

1/ Estimated as the capitalization ratio that results from reducing the CVaR at a 99.9% confidence level, both of the net capital and risk weighted assets. This indicator assumes that the credit portfolio has losses for an amount equivalent to CVaR at 99.9%, which the bank assumes by directly reflecting the capital loss without affecting its reserves and considering that said portfolio was weighted by the effects of determining capital requirements at 100%.

6 Institutions: commercial banks

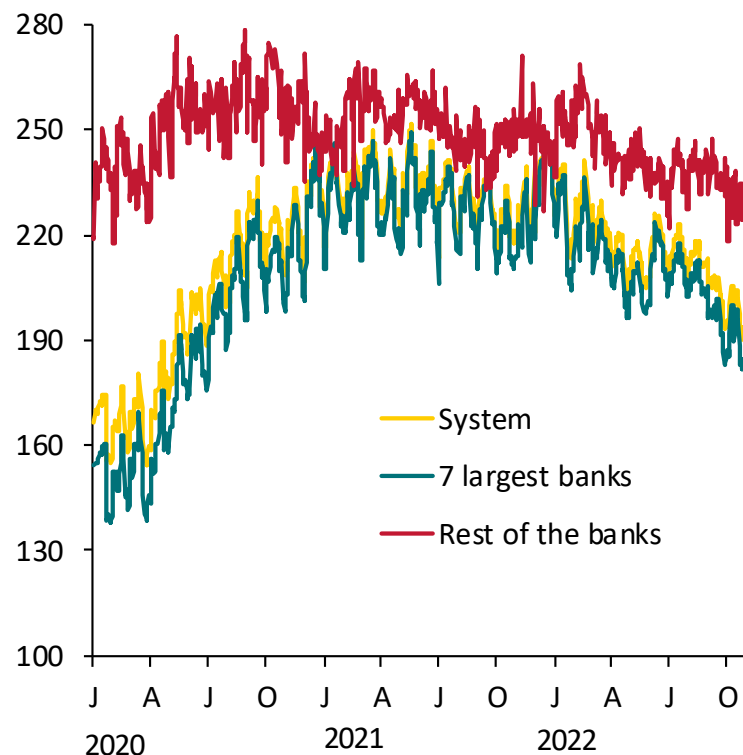
During S2-2022, commercial banks' market risk further increased, while liquidity levels in the banking system amply exceeded the regulatory minima.

Market Conditional Value at Risk (CVaR) of Commercial Banks at 99.9% confidence level
% of net capital



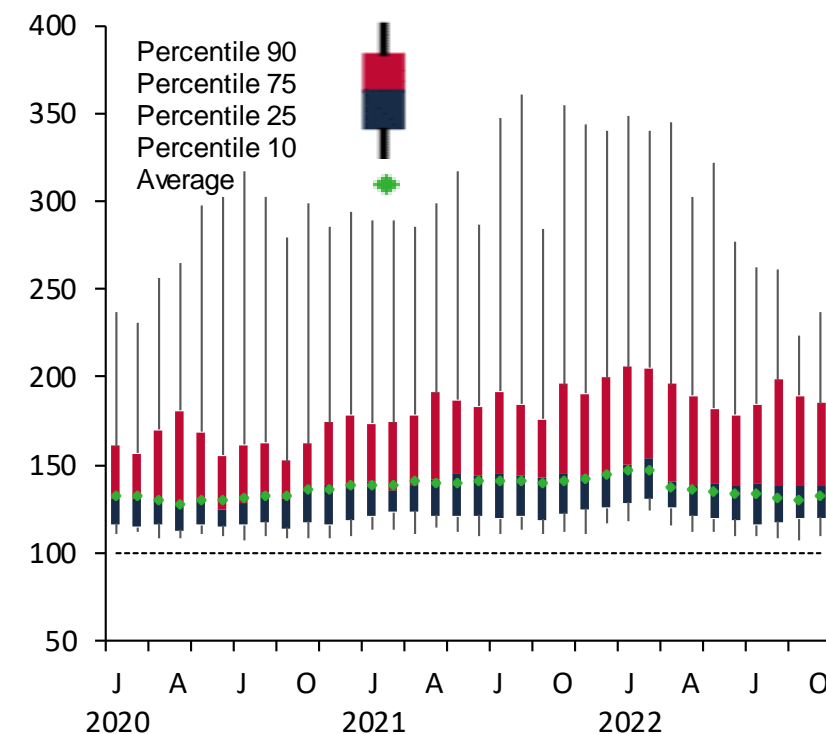
Data as of September 2022.
Source: Bancode México, CNBV, BMV, Bloomberg, Valmer.

Liquidity Coverage Ratio (LCR)
%



Data as of November 15, 2022.
Source: Bancode México.

Distribution of Net Stable Funding Ratio (NSFR)
%

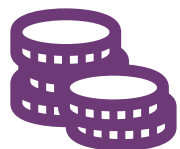


Data as of October 2022.
Source: Bancode México.

7 Other risks: operational continuity risks



- The **operability of financial markets' infrastructures** and payment systems managed and run by Banco de México **has remained high. Payment systems have not interrupted any of their services as a result of incidents.**



- In order to strengthen operational continuity, **in September 2022 the first stage of the new SPEI's operational continuity scheme came into effect.**



- During the period, **operational continuity mechanism exercises continued** and were implemented with the participants.

7 Other risks: cyber risks

- **Cyber risks have continued increasing worldwide.**
- Banco de México has implemented various actions to further develop financial institutions' capabilities to face potential cyber incidents, for example:



- ✓ A **cyber resilience exercise** was carried out among Banco de México, the National Banking and Securities Commission (CNBV) and the Institute for the Deposit of Securities (Indeval).

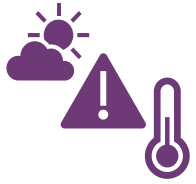


- ✓ The **Cybersecurity Index of Regulated Financial Institutions** was developed by Banco de México. For 2022, this general indicator was set at 82%.



- ✓ The **Financial Cyberattacks Risk Index** is presented, which measures the cyber risk in the financial sector for different countries, based on news from newspapers with international coverage.

7 Other risks: environmental risks and sustainable investing



- Banco de México continues working actively to **help Mexico's financial system participants incorporate climate-related risks in their risk management practices**. It is also continually improving and developing tools and conducting analysis related to climate change.



- The Sustainable Finance Committee approved the creation of a **Sustainable Finance Training Hub** to provide free access to virtual guides and a digital repository of current and relevant material for sustainable finance training purposes.



- **Thematic bond** issuance in the Mexican market increased between March and September, 2022.
 - ✓ **Domestic** public and private **issuers** have reached in Q3-2022 an **issuance level** that is **very close to that registered throughout 2021** in both domestic and international markets.
 - ✓ In this regard, noteworthy is the issuance of sustainable bonds made by development banks, state-owned enterprises, and the Federal Government for an amount of nearly **150 billion Mexican pesos**, which was placed in both Mexican and international markets.
 - ✓ As for **climate stress tests**, similar shocks to those used in the previous *Report* were evaluated, and since credit exposures in vulnerable sectors and regions did not show major changes, the results of the exercise were similar.

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Stress tests to commercial banks

- The stress tests carried out by Banco de México are simulations performed to **assess the resilience of the Mexican banking system** under extreme adverse economic scenarios.
- The scenarios considered **should not be taken as a forecast** of the expected performance of the economy, nor should they be associated with a probability of occurrence.
- The purpose of the **credit stress tests** is to assess if, under extreme adverse economic conditions, the banking system could continue performing its financial intermediation functions, maintaining a **capital adequacy ratio** above regulatory minimums.

Stress tests

Scenarios^{1/}

Assumptions on macrofinancial variables

Additional assumptions:

A

Tighter global financial conditions and low world economic growth



- Higher volatility in financial markets.
- Lower industrial production and lower imports in advanced economies, which will potentially affect the exchange rate and economic activity in Mexico.
- Decrease in banks' credit portfolio and higher unemployment rates.

B

Weakening of domestic consumption and investment



- Capital flows to Mexico are affected, exerting pressure on the exchange rate, employment and households' income.
- Interest rates remain stable in the short and medium term.
- Inflation converges to its target in the medium term.

C

Adjustment in credit rating



- High volatility in financial markets.
- Exchange rate depreciation and upward pressures on interest rates.
- In the short term, a contraction in aggregate demand that negatively affects GDP and employment.

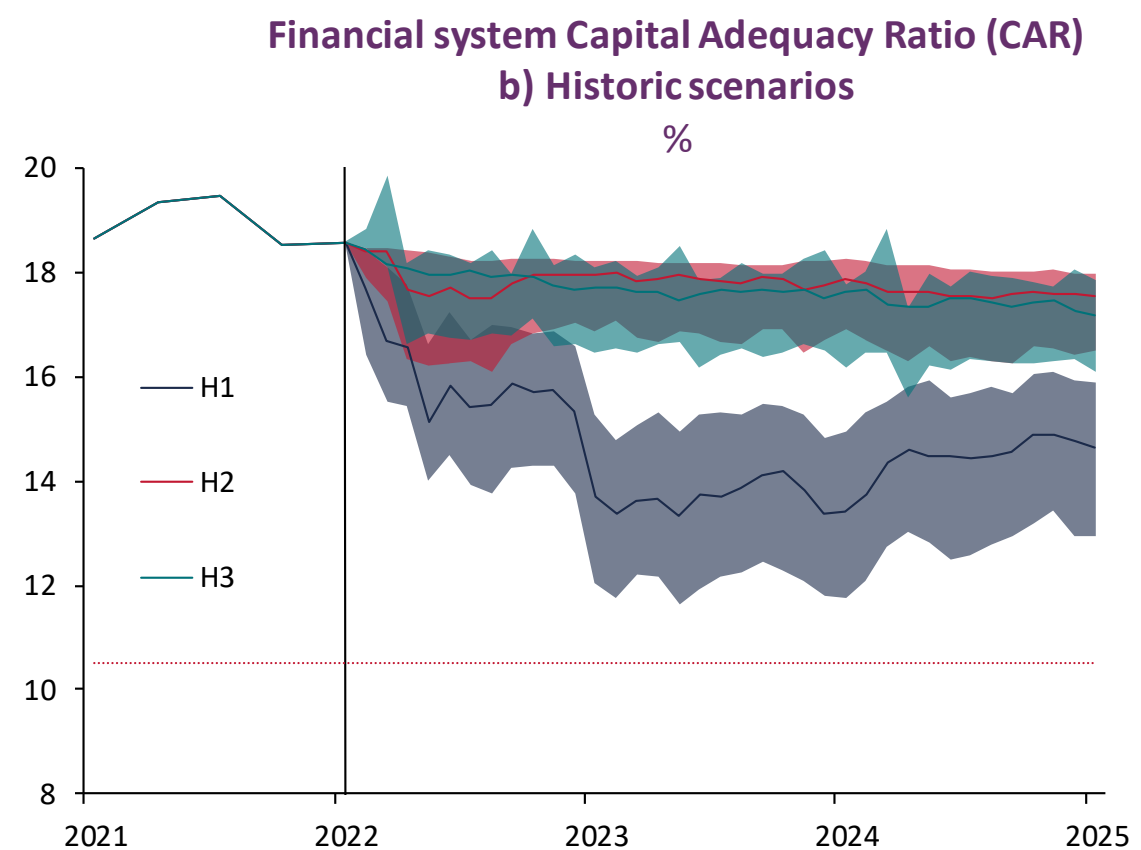
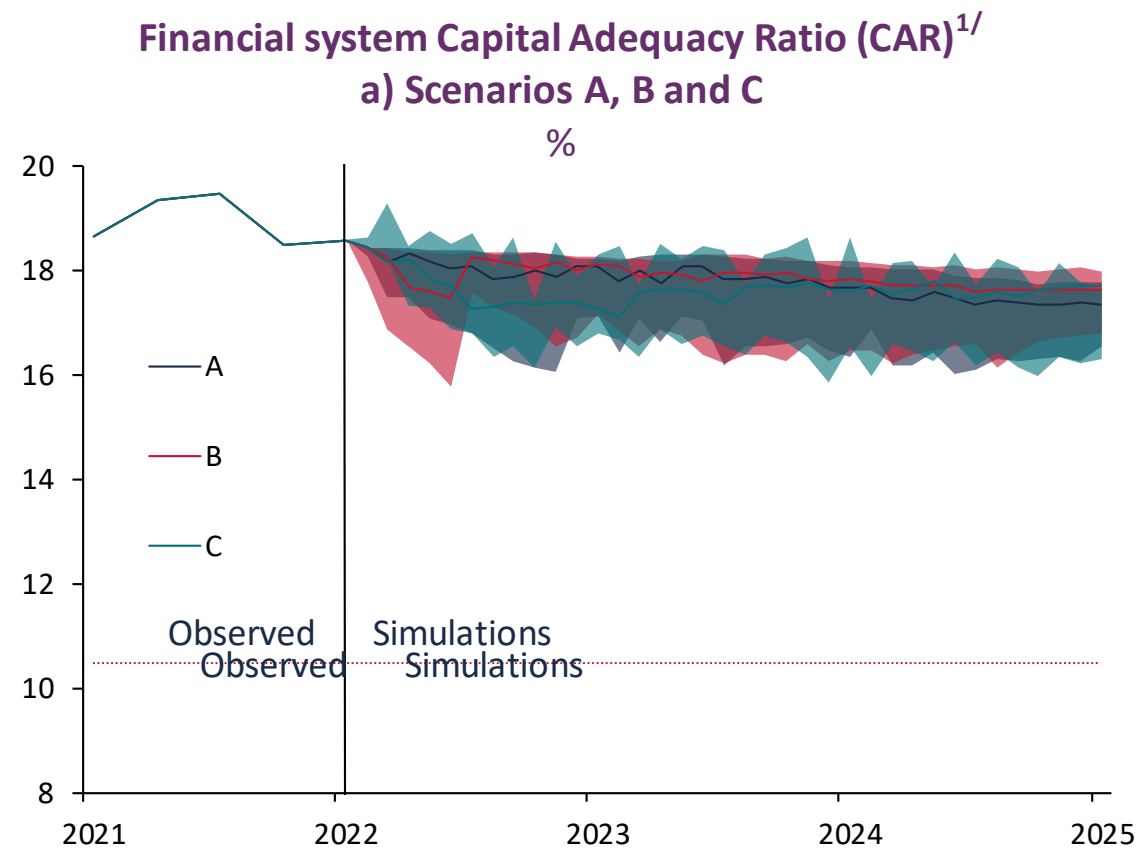
① *This exercise is common to all institutions and does not consider idiosyncratic problems related to loan origination.*

② *It does not consider possible mitigation measures that could be implemented by the institutions in the simulation (counterfactual simulation of partial equilibrium, and not general equilibrium)*

1/ For more detailed information on these scenarios, refer to the complete version of this *Report*.

Credit stress tests

Stress test results suggest that the Mexican banking system has sufficient capital levels to face the simulated stress scenarios. A set of historical scenarios are considered that replicate situations similar to those faced by the Mexican economy in the past. Simulations indicate that the banking system would also end the stress horizon with capitalization levels above the regulatory minimum.



Data as of September 2022 and 3-year simulations starting from that date.

Source: Banco de México.

^{1/} The horizontal line corresponds to minimum CAR plus capital buffers.

Observado Simulado

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Final remarks

- 1 Although the Mexican financial system currently faces a more complex and uncertain environment, it remains solid and resilient, with commercial banks maintaining capital and liquidity levels that amply exceed regulatory minimums.
- 2 In an environment of high inflation, a deterioration in the growth outlook, a tightening of global financial conditions, and risks to financial stability in advanced economies, monitoring the evolution of the Mexican financial system, just as Banco de México has been doing, will be of utmost importance so that the central bank can implement the proper measures to preserve financial system stability.
- 3 Certain risks to commercial banks have diminished, while other persist.
- 4 In this context, Banco de México will monitor the evolution of Mexican financial markets and will continue taking actions, in compliance with the legal framework.

Recuadros

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