



ISSN 2179-5398

## Financial Stability Report

Volume 19 | Issue No. 1 | April 2020



ISSN 2179-5398  
CNPJ 00.038.166/0001-05

## Financial Stability Report

Volume 19 | Issue No. 1 | April 2020

## Financial Stability Report

Semiannual Central Bank of Brazil publication.

Reproduction permitted only if source is stated as follows: Financial Stability Report, Volume 19, n. 1.

Occasional discrepancies between constituent figures and totals as well as percentage changes are due to rounding.

There are no references to sources in tables and graphs originated in the Central Bank of Brazil.

# Contents

---

|                                                                                                  |           |
|--------------------------------------------------------------------------------------------------|-----------|
| <b>Preface</b>                                                                                   | <b>5</b>  |
| <b>Executive Summary</b>                                                                         | <b>6</b>  |
| Decisions of the Financial Stability Committee on the Countercyclical Capital Buffer             | 11        |
| <b>Financial System Overview</b>                                                                 | <b>12</b> |
| 1.1 Liquidity                                                                                    | 12        |
| 1.2 Credit                                                                                       | 17        |
| 1.2.1 Introduction                                                                               | 17        |
| 1.2.2 Broad credit and long run trend                                                            | 18        |
| 1.2.3 Companies                                                                                  | 19        |
| 1.2.4 Households                                                                                 | 23        |
| 1.2.5 Domestic banking credit – By ownership                                                     | 26        |
| 1.2.6 Risks and provisioning                                                                     | 26        |
| 1.3 Profitability                                                                                | 27        |
| 1.4 Solvency                                                                                     | 32        |
| 1.5 Capital stress tests                                                                         | 34        |
| 1.5.1 Scenario analysis – Macroeconomic stress tests                                             | 35        |
| 1.5.2 Sensitivity analysis                                                                       | 36        |
| 1.5.3 Simulation of direct interbank contagion                                                   | 38        |
| 1.6 Financial stability survey                                                                   | 38        |
| 1.6.1 Introduction                                                                               | 38        |
| 1.6.2 Risks to financial stability                                                               | 40        |
| 1.6.3 Financial and economic cycles                                                              | 45        |
| 1.6.4 Resilience and confidence in the financial system stability                                | 47        |
| 1.6.5 Expectations for the countercyclical capital buffer                                        | 48        |
| 1.7 Systemically important financial market infrastructures                                      | 48        |
| <b>Selected Issues</b>                                                                           | <b>51</b> |
| 2.1 Covid-19 stress test                                                                         | 51        |
| 2.1.1 Methodology                                                                                | 51        |
| 2.1.2 Companies selection                                                                        | 53        |
| 2.1.3 Results                                                                                    | 54        |
| 2.2 Measures to confront the crisis caused by the impact of the Covid-19 pandemic in the economy | 55        |
| 2.2.1 Introduction                                                                               | 55        |

|                                                                                                                   |    |
|-------------------------------------------------------------------------------------------------------------------|----|
| 2.2.2 Main measures aimed at releasing regulatory capital for use by FIs                                          | 56 |
| 2.2.3 Main measures aimed at increasing liquidity in the SFN and promoting the regular functioning of the markets | 59 |
| 2.2.4 Main adjustments required by force of the restrictions imposed by the pandemic                              | 63 |
| 2.2.5 Final remarks                                                                                               | 66 |

## Appendix 69

## Annex 73

|                                             |    |
|---------------------------------------------|----|
| Concepts and Methodologies                  | 73 |
| Concepts and Methodologies – Capital Stress | 76 |
| Working Papers About Financial Stability    | 80 |

# Preface

---

The Financial Stability Report (FSR) is a semiannual publication issued by the Banco Central do Brasil (BCB) that presents an overview of recent developments and the outlook on financial stability in Brazil, focusing on the main risks and on the domestic financial system resilience, as well as conveys the Financial Stability Committee (Comef) view on the policy and measures to preserve financial stability. The current edition covers the second half of 2019, highlighting more recent events when relevant.

The BCB defines financial stability as the regular operation, over time and in any economic scenario, of the system responsible for the financial intermediation among households, non-financial corporations and the government.

The report comprises two chapters. Chapter 1 – Financial system overview – presents an analysis of risks related to liquidity, credit, profitability and solvency, of capital stress tests and their effects on the solvency of financial institutions, of the Financial Stability Survey (FSS) results, and of systemically important financial market infrastructures operation. Chapter 2 – Selected issues – discusses relevant but not necessarily recurring topics that may have implications to financial stability in Brazil.

The Statistical annex shows charts and tables underlying data and can be found on the FSR website, <<https://www.bcb.gov.br/en/publications/financialstabilityreport>>, as well.

Moreover, important time series for financial stability monitoring (e.g. total capital ratio, short-term liquidity ratio, delinquency ratio, and return on equity) can be downloaded from the Time Series Management System (SGS) in <<https://www3.bcb.gov.br/sgspub/localizarseries/localizarSeries.do?method=prepararTelaLocalizarSeries>>.

## Executive Summary

---

Domestic economic activity continued to recover gradually until the end of the second half of 2019, in an environment of historically low interest rates and inflation.

The positive scenario observed in the second half of 2019 allowed advances in both bank credit for households and financing for companies in the capital markets. The performance of private banks was crucial in both cases. Public banks opted to retain part of the credit receipt flows and increased liquidity even further. At the end of 2019, banks consolidated their provisions for losses, taking advantage of the effects arising from the increase in the Social Contribution on Net Profit (CSLL). Consequently, the SFN started 2020 well capitalized, with enough provision levels to face eventual increase in credit risk, and enough liquidity to support the growth of economic activity.

In the first two months of 2020, the potential negative economic effects arising from the new coronavirus (Covid-19) raised concerns due, especially, to the possibility of problems with the supply of imported inputs and with external demand. However, expectations changed rapidly over the first weeks of March, worsening the outlook for domestic and global growth.<sup>1</sup> The result of the stress test based on this new scenario is one of the harshest ever carried out by the BCB.

In view of the new environment, the National Monetary Council (CMN) and the BCB announced and implemented measures to mitigate and alleviate the stress caused by Covid-19 in the real economy and in the SFN. These measures released capital on time and expanded and targeted liquidity, in order to maintain the functionality of financial markets and to ensure financial stability.

Uncertainties regarding the duration and effects of Covid-19 in the economy persist, but the BCB is attentive to the evolution of the pandemic and is engaged to maintain the banking system capitalized, provisioned, liquid and resilient to cope with conditions of stress.

**The advance in financing to non-financial companies in the second half of 2019 was particularly due to the performance of private banks in the capital markets. Bank credit should again be the main funding source for large companies until the domestic and international capital markets return to normality.**

- The payment capacity and profitability of publicly traded non-financial companies kept improving in 2019. The number of requests for judicial recoveries was reduced in comparison with 2018.
- As a reflection of the more favorable conditions of the corporate bond market, the number of companies that accessed the capital markets in the second half of 2019 increased. Private banks accounted for almost 2/3 of the half-yearly advance of financing through the capital markets, concentrating in larger companies.
- Regarding bank credit, the increase in the stock of financing to Small and Medium Enterprises (SMEs) in the second half of 2019 neutralized the contraction of credit to large companies.

---

<sup>1</sup> Refer to the box “Economic effects of the Covid-19 pandemic” in the Inflation Report of March 2020, available at <https://www.bcb.gov.br/publicacoes/ri>.

- The Problem Assets (APs) ratio related to SMEs has been declining since the beginning of 2017. However, due to Covid-19, it should again show an increase in the coming semesters and might rise above the peak reached in 2017.
- The risk related to large companies, in turn, has increased and remains one of the main points for concern. With the shutdown of the domestic and international capital markets, the banking market should once again be the main source of financing for the segment throughout 2020.
- The trend in the growth of financing to large companies in the capital market and of the non-earmarked banking credit to SMEs should be reviewed in accordance with the magnitude of the impact and with the capacity of the government, of non-financial companies and of society as a whole to respond to the Covid-19 pandemic.

**Credit to households kept growing above single digits throughout the second half of 2019. In the face of Covid-19, the trend indicates that the observed growth rate will be reduced in the coming semesters, increasing debt restructuring negotiations to adjust the payment capacity of households.**

- The double-digit increase, which had not occurred since 2015, was consistent with the gradual recovery of the economy, in a context of slight improvement in employment and in household income. The consumer-oriented modalities – “credit card” and “vehicle financing” – continued to stand out in terms of growth rate.
- The ratio of APs related to households continued to increase slightly but did not represent a relevant risk to financial stability, as it remained very close to the historical minimum until the end of 2019. However, “non-payroll loan” and, mainly, “vehicle financing” deserve monitoring, as their APs showed an upward trend in the most recent samples. This last modality presented increases in its Loan to Value (LTV) and in its average term over the last three years.
- The intensity and possible persistence of deterioration in employment and income conditions in 2020, as a result of Covid-19, can cause important changes in the demand and supply of credit to households. As it happened in the case of SMEs, there will be an increase in debt restructuring and an increase in defaults and problem assets in the coming semesters, which may exceed the peak observed in 2016.

**Profitability remained on the rise in 2019, with an expected reduction in 2020 due to the consequences of Covid-19.**

- The increases in profitability seen in the second half were mainly due to the growth in credit in transactions with a higher spread in private banks, to the improvement of operational efficiency in public banks and to the income from equity interests.
- Provision expenses increased, influenced by the higher volume of retail operations – with a higher credit risk than those in wholesale – and, above all, with the increase in provisions that occurred at the end of the fiscal year to make use of the impacts from the revaluation of the deferred taxes.
- At the end of 2019, there were signs of recovery for the smaller banks, although the segments most affected by the recession (2015-2016) were still undergoing business adjustments. Banks that operate in “Wholesale Credit” continued to face challenges due to competition with the capital market.
- As of the second half of 2020 and throughout 2021, banks’ results will be under pressure by the increase in the CSLL rate, by enhanced competition with new business models, by the limits for the definition of interest rates on overdraft and, especially, by the increase in provision expenses, which may exceed the significant rise observed in 2015 and 2016, due to new economic scenario by reason of Covid-19.

**The capitalization ratios remained comfortable, well above the regulatory minimums, despite the reduction in the second half of 2019. The measures taken by the CMN and the BCB at the beginning of 2020 were important to preserve the capital of financial institutions in the coming semesters and to guard against the adverse effects of Covid-19.**

- The reduction in the Common Equity Tier 1 Ratio (CET1) mainly reflected the increase in the required capital of private banks, due to the increase in credit transactions in this bank segment.
- At the end of 2019, the significant increase of approximately BRL15 billion in provisions for losses increased the perception of soundness to face eventual risks in the credit portfolio.
- The BCB allowed financial institutions (FIs) to temporarily restructure credit transactions that meet the requirements. This measure allows FIs to operate more freely with households and companies and minimizes the need for new provisions that might compromise the level of capitalization at a time of intense uncertainty.
- Among the measures to fight the effects of the pandemic, the CMN reduced, from the second quarter of 2020, the requirement for the Capital Conservation Buffer. This measure, which is in line with the flexibility implemented by most of the signatory jurisdictions of the Basel III prudential framework, temporarily eased the regulatory requirement and increased the capacity to grant credit.
- Another important measure from the CMN that relieves the capital of FIs is the temporary permission not to deduct tax credits from tax losses resulting from operations that have the objective of protecting investments abroad. For this type of protection – hedge –, FIs assume short positions in an amount higher than that of the value of the investment abroad. It should be noted that the hiring of excess protection – called overhedge – will no longer be necessary if Provisional Measure No. 930 is converted into law, as this will correct the effects of the tax distortion.
- Finally, the restraint on dividend distribution established by Resolution 4,797, of April 6, 2020, seeks to preserve the capital of banks in the fiscal year 2020.

**The liquidity level of banks remained adequate throughout 2019, and actions timely announced and implemented by the CMN and the BCB ensured the liquidity needed for the correct functioning of the SFN in face of the stress and of the effects caused by Covid-19.**

- Banks have enough short-term liquidity for the perceived risk, although with different dynamics among the segments. The liquidity of private banks showed a downward trend in 2019, given the strategy of increasing the loan and debentures portfolios. Public banks, in turn, have been improving their liquidity since 2016, due to the policy of retaining part of the flow of credit received.
- All banking conglomerates subject to compliance with the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) show regulatory levels above 100%, in both indicators.
- Even though liquidity was compatible with risks, the measures adopted by the regulatory authorities were important to allow FIs to meet the various demands arising from the Covid-19 pandemic, without compromising the SFN's liquidity levels. It is worth mentioning that cash inflows tend to diminish, due to the need for FIs to renegotiate credit transactions to adapt them to the capacity of companies and households to effect payments in the coming months. Cash outflows, in turn, were expanded to meet the considerable increase in the demand for credit throughout March. In addition, outflows were intended to honor the payment of significant daily mark-to-market settlements and margin calls for derivative transactions in the [B]3 – because of the strong market volatility due to the stress caused by Covid-19 – and to compensate for the reduction in the availability of external funding, a common event in stress scenarios such as the current one.

- The measures include, among others, the release of reserve requirements, the supply of a special temporary liquidity line, the reactivation of the Term Deposit with Special Guarantees (DPGE) and the prohibition, for a specified period, of the distribution of profits and the increase in the remuneration of managers of financial institutions and other institutions authorized to operate by the BCB. These measures ensure the liquidity necessary for the normal functioning of the SFN in face of the adverse scenario due to Covid-19.<sup>2</sup>

**The result of the stress test carried out based on the impact of Covid-19 on the most affected economy agents of the real economy is one of the harshest carried out to date by the BCB, but even in these conditions the simulations continue to demonstrate that Brazilian banks have the capacity to face situations of stress.**

- Stress tests regularly carried out based on scenarios with variations in conjunction and in time with variables such as GDP, employment level, inflation, interest rate and exchange rate, as well as sensitivity analyses for the main risks assessed independently (credit, interest, foreign exchange and real estate devaluation) indicated that, at the end of 2019, the banking system presented similar or better results than those reported in the semester that ended in June 2019, which corroborates the good level of capitalization.
- A specific stress test for the effects of Covid-19, assuming a possible decline in the assessment of the quality of credit risk or even default of companies and workers in the most affected economic sectors, including contagion caused in the real sector and in the financial sector, indicates the need for a significant increase in provisions. However, the current level of capital of the SFN and the level of set up provisions act as important buffers for these shocks.
- This specific test demonstrated an additional capital need of, approximately, BRL70 billion for FIs to return to compliance with the regulatory capital limits, an amount equivalent to 7.2% of the total SFN Regulatory Capital, while the Basel Ratio decreased from 19.5 to 15.3.
- If, on the one hand, the specific stress test demonstrated that the system has the capacity to restore the minimum capital levels, on the other, due to the volume of provisions that would be necessary, the system's capacity to generate new credits and sustain the growth of the economy would be temporarily compromised. Considering the profitability in previous periods of crisis, it would take three years for the system to restore its current capacity.
- However, the result of this specific test must be put into perspective, considering that all events affect FIs' accounting results in a single moment and the retention of future profits or the reaction of banks to mitigate losses were not taken into account. As a comparison, the worst accounting result obtained by the system, at the peak of the 2016-2017 recession, when GDP fell 3.4%, was a net profit equivalent to 10.5% of the PR.

**Due to the uncertainties surrounding the magnitude and persistence of stress, the CMN and the BCB took measures to mitigate the negative consequences for the real economy and for the financial sector. These measures are better explained in Chapter 2 of this Report.**

- The measures adopted by government to support employment and preserve the capacity of companies to honor their obligations are critical to mitigate the effects of the health crisis on the real economy and, therefore, contribute to reduce the damage that the crisis may generate in the capacity of these economic agents to honor their obligations.
- The measures adopted by the CMN and the BCB are unparalleled in the history of the SFN. Regulation aimed at providing liquidity has a potential of producing almost five times more liquidity than that made available during

<sup>2</sup> Another significant measure is related to the interbank DPGE, implemented by means of Resolution 4,805, of April 23, 2020, published after the completion of this Report.

the 2008 financial crisis, when compared to the Gross Domestic Product (GDP). Measures related to capitalization, in turn, have the potential to generate new credit transactions equivalent to 16.4% of the GDP. To facilitate understanding, these measures may be grouped into three categories.

- The first group is aimed at increasing the demand of economic agents for liquidity, as well as at the preservation of the normal functioning of the markets. This group of measures seeks to provide the SFN with enough liquidity to honor its commitments to depositors and meet the demand for credit. Thus, the increase in the demand from households and companies for credit lines that can help them at a time of sharp decline in economic activity and scarcity of liquid resources to honor their day-to-day obligations is answered.
- The second group of measures consists of temporarily reducing regulatory requirements that require capital and provision from FIs. These measures have the main objective of providing better conditions for FIs to keep supplying credit to companies and households and to acquire assets from agents who wish to sell them.
- The third group of measures seeks to temporarily relax compliance with regulatory requirements that have become challenging to comply with because FIs' employees are mostly operating remotely. At this time of crisis, the BCB understands that there are costs for adapting FIs to the remote work regime, which weigh on their ability to comply with all established deadlines.
- The measures implemented and announced by the CMN and the BCB tend to mitigate and alleviate the result of the specific stress test performed for Covid-19.

**Enhancement of legal uncertainty in the fulfillment of contracts, deriving from legislative or legal measures may aggravate the effects of the already stressed scenario due to Covid-19, representing an additional risk to financial stability.**

- Periods of tension such as the current one raise the risk of the search for solutions that try to solve the problems of households and companies in the very short term, through legislative or legal measures, but this can cause significant damage to the normal functioning of the markets in the future.
- Initiatives that involve breach of contract, such as exemption from the obligation to pay debts, postponement of payments or revision of prices and tariffs, usually result in an increase in legal uncertainty and, consequently, in an increase in risk premiums and in the inhibition of the potential of the credit market when growth is resumed.

**The market has raised its perception of risk in relation to the international scenario but considers the SFN capable of responding to relevant crisis events.**

- The risks arising from the international scenario were already those most mentioned in the PEF (Financial Stability Survey), due to the commercial tension between the United States of America (USA) and China. The Covid-19 outbreak elevated concerns, given the possibility that the reduction of Chinese and global activities might impose restrictions on the pace of recovery of the Brazilian economy. It is important to note that the market research was conducted before the intensification of stress in the international financial markets, which occurred after February 24, 2020.
- In the domestic arena, the PEF highlights the increase in the mentions of political risk exclusively in relation to governance conditions. After the approval of the reform of the pension system, there are still concerns about the continuity of the reform agenda.

- Market confidence in financial stability remains high. The perception of the SFN's resilience remains positive, with a high degree of agreement among FIs on the adequacy and sufficiency of the available tools to face a scenario of serious financial crisis.

**The systemically important financial market infrastructures worked safely and efficiently throughout the second half of 2019.**

- The need of resources for payments in the system – denominated the Effective Liquidity Need (NEL) – was, on average, 2.8% of the available liquidity, with 16.2% being the maximum percentage observed in the period.
- Backtesting analyses for the clearing and settlement systems for transactions with bonds, securities, derivatives and foreign currency, in which there is an entity acting as a central counterparty (CCP), gave satisfactory results.

## **Decisions of the Financial Stability Committee on the Countercyclical Capital Buffer**

The Comef decided, at the quarterly meetings of November 21, 2019 and March 3, 2020, to maintain the Countercyclical Capital Buffer (CCyB, or ACCP<sub>Brasil</sub>) at 0%.<sup>3</sup> The Comef assessed the evolution of credit and asset prices in the country and judged that the ongoing growth in credit is consistent with the maintenance of financial stability. Banks in general voluntarily maintain capital and liquidity at levels above the minimum prudential requirements, and their resilience is verified by means of stress tests. These decisions were made by the Comef in the exercise of its attributions provided for in Circular 3,927, of February 11, 2019, and followed the principles and objectives described in Communiqué 30,371, of January 30, 2017.

---

<sup>3</sup> Communiqués 34,724, of November 21, 2019; and 35, 259, of March 3, 2020.

# Financial System Overview<sup>4</sup>

The current chapter was prepared based on analyses of data behavior and their trends at the end of 2019. However, due to the relevant economic and social impacts related to the Covid-19 pandemic, comments were added regarding the expected changes, given the new scenario.

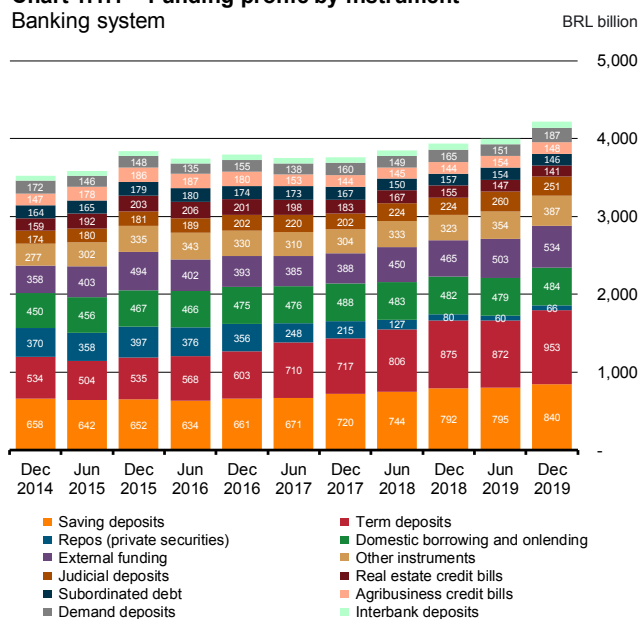
## 1.1 Liquidity

In the second half of 2019, the banking system remained with proper availability of funding, both from domestic and external sources, presenting a comfortable liquidity profile to withstand cash requirements in stress scenarios. The increase in liquid assets combined with the reduction in the need for liquidity in stress scenarios kept the improvement trend in the banking system's aggregate short-term liquidity ratios. Meanwhile, the long-term liquidity risk ratios remained more stable, at low-risk levels.<sup>5</sup> As reported in the previous edition of this FSR, distinct dynamics between public and private banks along 2019 have remained, with the latter consuming a portion of their liquidity surplus, although preserving risk measures at appropriate levels.

<sup>4</sup> Please note that, within sections 1.3 Profitability, 1.4 Solvency and 1.5 Capital stress tests, the granularity of the analysis is in the level of prudential conglomerates, as defined by Resolution no. 4,280, from October 31, 2013, to which the minimal capital requirements are applied, as stated by Resolution no. 4,193, from March 1, 2013. In sections 1.1 Liquidity, the basis of the analysis is the whole banking system, comprised by commercial banks, multiple banks, foreign exchange (FX) banks and investment banks and by financial conglomerates including at least one of these types of institutions. In 1.2 Credit, the scope is the whole SFN.

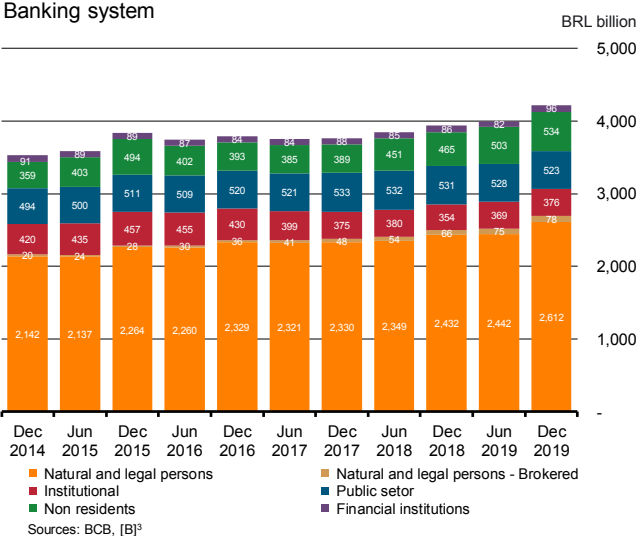
<sup>5</sup> In order to monitor the bank's resiliency to liquidity stress scenarios in the short and long terms, BCB mostly uses Basel III standard liquidity ratios – LCR and NSFR – calculated and reported by domestic systemically important financial institutions (S1 Segment), as well as two conceptually similar liquidity ratios – Short-term liquidity ratio (IL) and Structural liquidity ratio (ILE) –, measured internally by BCB to all banks, based on its own liquidity stress scenarios and on data recorded on a daily basis by financial institutions in securities clearings and trade repositories (Selic, [B]<sup>3</sup>, Cere, etc.)

**Chart 1.1.1 – Funding profile by instrument**  
Banking system



[Statistical annex](#)

**Chart 1.1.2 – Funding profile by type of investor**  
Banking system



[Statistical annex](#)

The BCB is continuously monitoring the unfolding of events due to the Covid-19 pandemic, adopting supportive measures<sup>6</sup> such as reserve requirements release, as well as providing temporary standing facilities to preserve banking system's proper liquidity profile. Cash inflows tend to reduce due to credit operations restructuring processes, in order to adjust to the payment capacity of companies and households in the coming months. Cash outflows, in turn, have increased to meet the expressive expansion in the demand for credit over March 2019, as well as relevant disbursements of daily mark-to-market settlements and margin calls for derivative transactions in [B]<sup>3</sup> – due to the strong market volatility in this period –, and the drop in the availability of external funding, a common event in stress scenarios, such as the current one.

Funding has grown 5.5% over the second half of 2019 and 7.2% year on year. The stocks of term deposits, savings accounts and demand deposits have grown, whereas those of agribusiness credit bills (LCA) and real estate credit bills (LCI) have decreased (Chart 1.1.1).

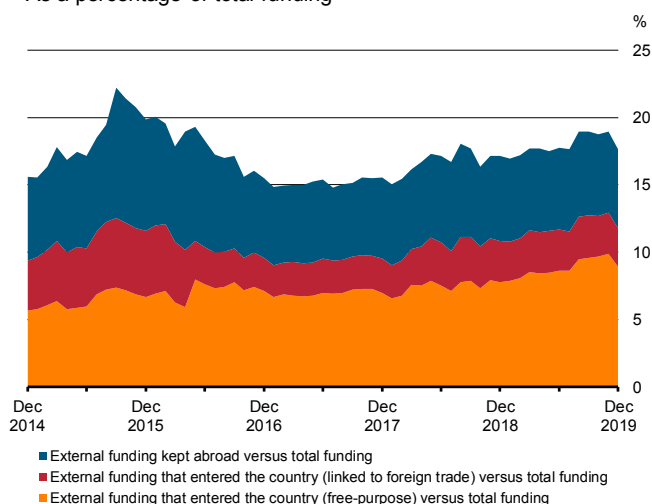
Funding profile by type of investor shows the prevalence of natural and legal persons not classed otherwise,<sup>7</sup> whose stock represented 64% of the outstanding amount on December 2019 – part of which (2% of the outstanding amount) constitutes brokered funding, which has grown at a considerable slower pace (4%) this half than in previous ones. Funding from the public sector has decreased from 13% to 12% of the total, whereas that from institutional investors has kept its share (9% of the total). It is worth mentioning that funding from the public sector is almost entirely linked to the brokering of government loans or credit lines<sup>8</sup> (Chart 1.1.2).

6 The above-mentioned set of supportive measures is detailed in Section. 2.2 of this FSR.

7 Definition comprising not only companies, but other entities (such as non-profit ones) as well.

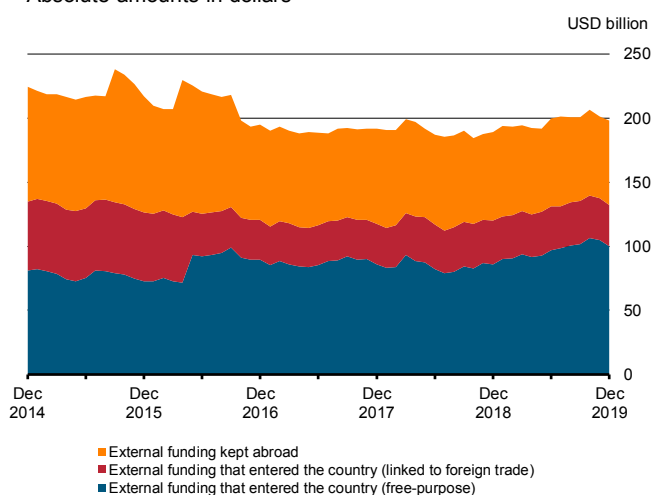
8 Housing, Agribusiness Credit, Machinery and Equipment, Urbanization, Innovation etc.

**Chart 1.1.3 – Profile of external funding**  
As a percentage of total funding



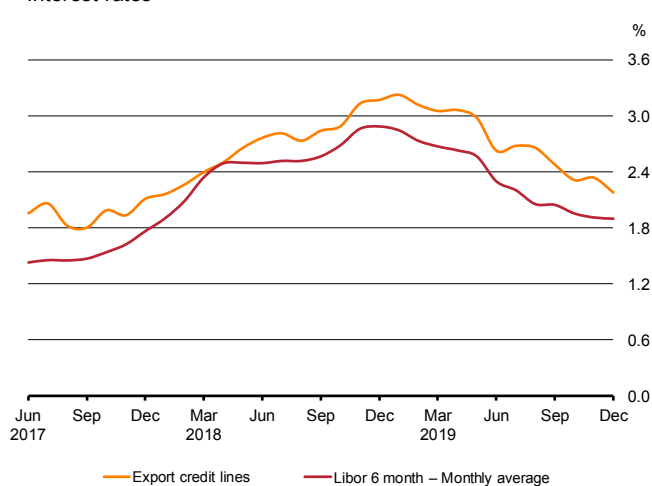
[Statistical annex](#)

**Chart 1.1.4 – Profile of external funding**  
Absolute amounts in dollars



[Statistical annex](#)

**Chart 1.1.5 – External credit lines for export**  
Interest rates



[Statistical annex](#)

The ratio of external funding to total funding maintained, at the end of 2019, a level like the previous semester (Charts 1.1.3 and 1.1.4). The amount of external funding internalized in the domestic market was BRL533.5 billion: BRL130.9 billion of export/import financing or on-lending operations and BRL402.6 billion of free destination lines. Considering the uncertainties surrounding the internal and external conjunctures and the increase in risk aversion, the supply of external funding lines should be more restricted, with an impact on cost, in the next semester.

Since more than 92% of external funding is referenced in U.S. dollars, average costs followed the evolution of dollar interest rates. The monthly average for the Libor US\$ six-month rate started the current cycle of reduction at the end of 2018: after a maximum monthly average of 2.89% in December 2018, it fell to 2.30% in June 2019 and 1.90% in December. External credit lines linked to exports – very important for trade financing – have a cost behavior like external rates referenced in US\$ (Chart 1.1.5).

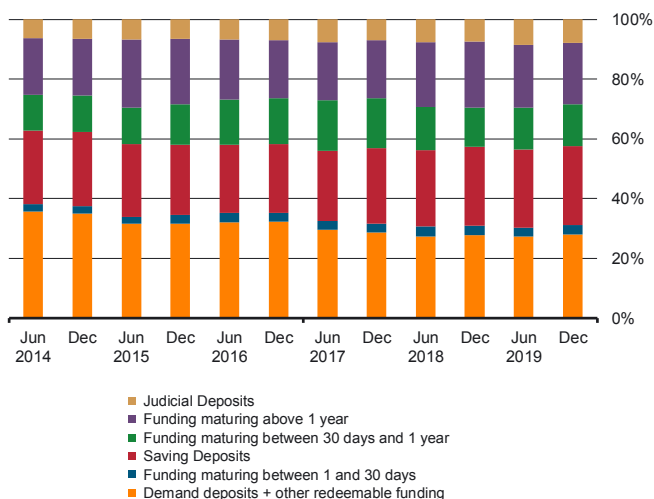
The domestic funding maturity profile remained almost stable in the second half of 2019, with the aforementioned growth in demand deposits leading to a slight increase in the share of funding with immediate liquidity (Chart. 1.1.6).

The stock of banking system's liquid assets rose (3%) in nominal terms, in the second half of 2019, due to the increase in the market value of fixed-rate and inflation-linked domestic sovereign bonds, reflecting the shrinkage trend of the yield curve, started since mid-2016. Whereas, cash requirements in the next 30 days under the BCB stress scenario decreased 1% compared to June 2019, due to the reduction in the estimates of funding run-offs.

Therefore, due to the joint effect of liquid assets expansion and a slight decrease in stressed cash outflows, the banking system's aggregate short-term liquidity ratio (IL)<sup>9</sup> closed 2019 at 2.43 – a positive variation of 9 points in comparison with the first half, remaining stable compared with the end of 2018 (+1 bps). Thus, banking

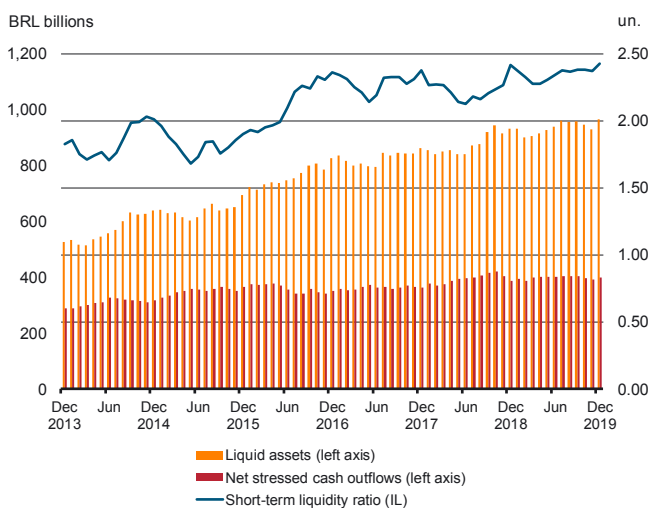
<sup>9</sup> The IL measures whether banks have enough liquid assets to cover their short-term cash-flow needs in a simulated stress scenario (period of 21 business days) defined and calibrated by the BCB. The cash outflows arise from the run-off of maturing or redeemable liabilities, losses from market risk exposures, for instance, margin calls and settlements of derivatives, and others contractual payables over the next month. Institutions with IL above 1 have enough liquid assets to face those cash outflows. For further details about this indicator, please refer to the Concepts and Methodologies appendix, item a.

**Chart 1.1.6 – Domestic funding**  
Residual maturity profile



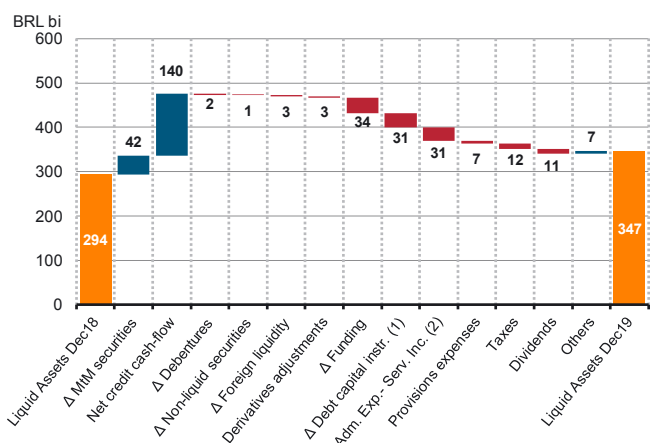
[Statistical annex](#)

**Chart 1.1.7 – Short-term liquidity ratio (IL)**



[Statistical annex](#)

**Chart 1.1.8 – Cash Flow Public Banks 2019**



(1) Issuance (+) or repurchase (-) of debt capital instruments.  
(2) Adm.Exp. - Serv.Inc.: Administrative expenses minus Services Income.

[Statistical annex](#)

system's liquidity profile preserved its historically high resiliency to liquidity stress scenarios estimated by BCB (Chart. 1.1.7), behavior to be monitored in the coming periods upon the materialization of risks arising from the Covid-19 pandemic.

By type of control, the aggregate stock of public banks liquid assets grew 10% in the second half (+21% in twelve months), increasing even more their high liquidity buffers. On the other hand, in the same period private banks liquid assets dropped 3% (-9% in twelve months), indicating distinct treasury and credit granting strategies between these two groups of institutions.

Analyzing the cash flow of public banks in 2019,<sup>10</sup> their liquidity increase was mainly due to the partial retention of inflows from interest and principal payments of credit portfolios, this is, loans inflows not fully used in roll-overs or new credit granting operations. Moreover, the increase in the market value of domestic sovereign bonds reinforced this liquidity growth dynamics (Chart 1.1.8).

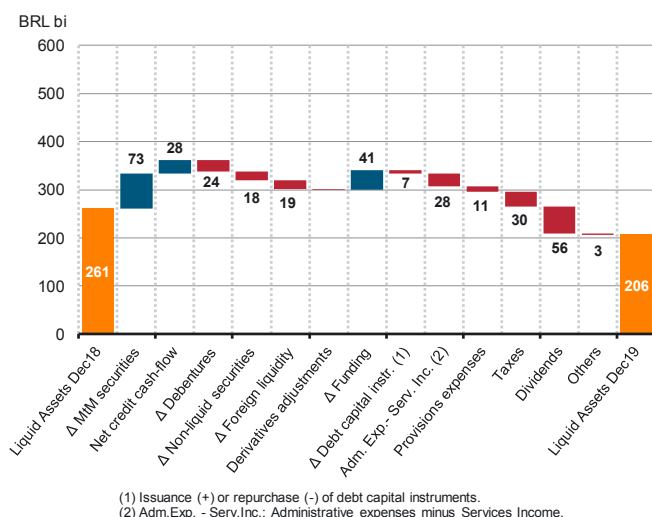
On the other hand, private banks retained a lower volume of credit operations inflows, in absolute terms (Chart. 1.1.9). Thus, despite the increase in the market value of sovereign bonds and the funding growth in 2019, the private banks cash generation, and part of their liquidity, were consumed in the period. Among the most important disbursements are dividends and tax expenses, as well as the purchase of non-liquid assets like corporate bonds and foreign securities.

The short-term cash flows estimated under the BCB stress scenario also presented opposite movements, when analyzed by type of control. Increases in funding and in exposures to market risk (considering operations that have direct impact on liquidity) raised private banks projected cash disbursements by 2% in the second half of 2019. Conversely, public banks projected cash disbursements declined by 8%, reflecting a decrease in funding run-off estimates in the stress scenario, due to the reduction in their funding volatility.

In this context, the distance between the IL ratios by type of control has further increased in the second half of 2019. However, both have kept liquidity risk profiles at comfortable levels (Chart 1.1.10)

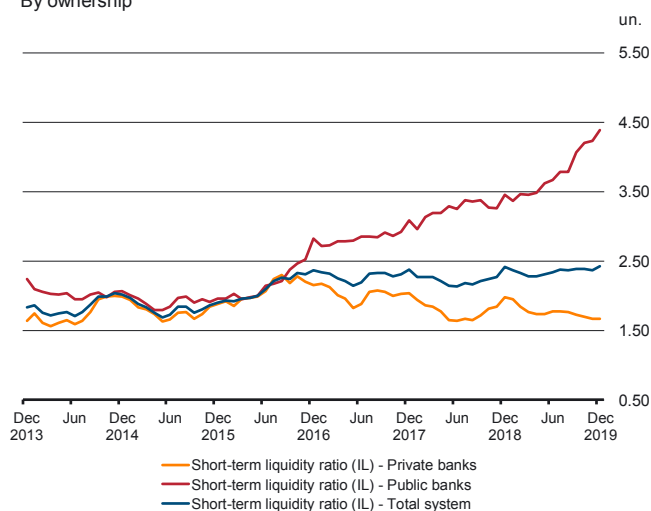
<sup>10</sup> Cash flow proxy based on financial statements of banks.

**Chart 1.1.9 – Cash Flow Private Banks**  
2019



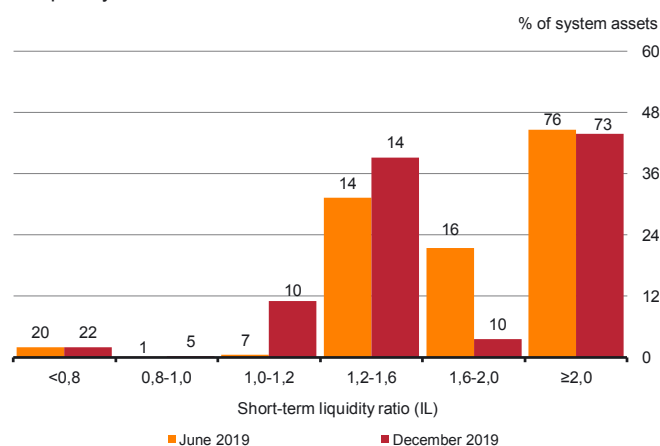
[Statistical annex](#)

**Chart 1.1.10 – Short-term liquidity ratio (IL)**  
By ownership



[Statistical annex](#)

**Chart 1.1.11 – Short-term liquidity ratio (IL)**  
Frequency distribution<sup>1/</sup>



<sup>1/</sup> The numbers above bars are the number of financial institutions with IL within the corresponding interval.

[Statistical annex](#)

By looking at the liquidity risk individually, the IL of domestic systemically-important banks, in terms of total assets, has been reduced (Chart 1.1.11). Even so, at the end of 2019, 98% of the banking system assets were on banks' balance sheets with enough stock of liquid assets to withstand a liquidity crisis scenario projected by the BCB, i.e., banks that had an IL above 1. In comparison with June 2019, the number of institutions with an IL below 1 increased from 21 to 27, all banks with low representativeness in the financial system and which, in large part, have support from controllers.

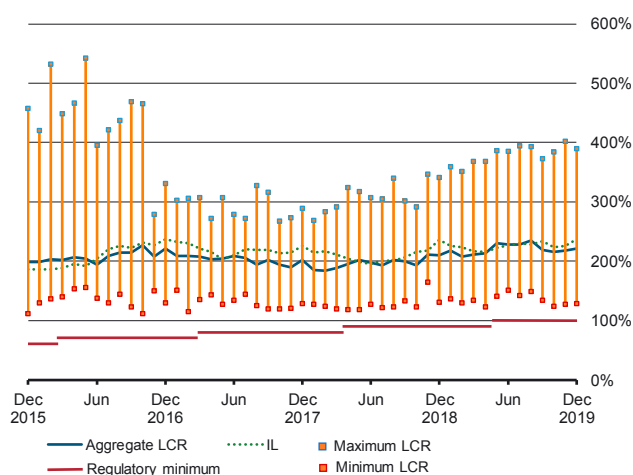
The Liquidity Coverage Ratio (LCR)<sup>11</sup> corroborates the low short-term liquidity risk already outlined by IL. All banking conglomerates required to comply with this ratio kept their ratios above regulatory minimum (100%). The aggregate LCR of those institutions reached 222% by the end of 2019, with little change year-over-year (Chart 1.1.12). Thus, both the IL and the average LCR of the biggest institutions indicate a high capacity to face stress scenarios in the short term.

By analyzing the liquidity risk over a period of more than 30 days, the banks' funding structures continue to indicate low susceptibility to liquidity crises in the medium and long term, dynamics to be monitored in the coming periods due to the pandemic of the Covid-19. There was an increase in capital and funding from retail customers in the second half of 2019, reinforcing the sources of funding considered more stable. On the other hand, due to the continued resumption of credit granting (in particular, on the part of private banks), the credit operations with residual maturity over one year grew more than the stable funding during this period. Such movements led the bank aggregate ILE to close 2019 at 1.13 (Graph 1.1.13), with a slight reduction (-0.03) in relation to the first half and in twelve months (-0.02). The ILE<sup>12</sup> is a measure of long-term liquidity risk assessment based on the Net Stable Funding Ratio (NSFR) methodology.

<sup>11</sup> The LCR is an index whose compliance is mandatory for all financial institutions in the S1 segment, pursuant to art. 2 of Resolution 4,553, of January 30, 2017, and in accordance with Resolution 4,616, of November 30, 2017. The indicator requires institutions to maintain high liquid assets to support cash outflows in the next 30 days, considering the stress scenario defined by the Basel Committee on Banking Supervision (BCBS) ([www.bis.org/publ/C238.htm](http://www.bis.org/publ/C238.htm)). In 2018, the minimum requirement was 90% and, since January 2019, it is 100%. Domestic regulation by CMN Resolution 4.401, of February 27, 2015, and by BCB Circular 3,749, of March 5, 2015.

<sup>12</sup> ILE aims to measure whether banks have enough stable funding resources (numerator) to finance their long-term activities (denominator). Thus, institutions with ILE equal to or greater than 1 are less susceptible to future liquidity problems. For details, see appendix Concepts and Methodologies, item b.

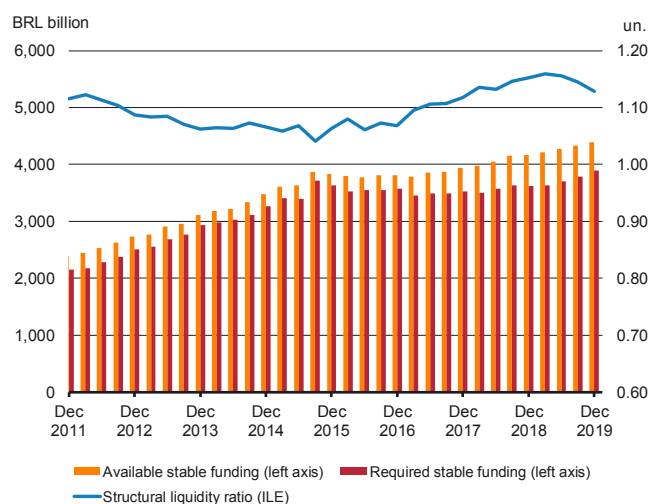
**Chart 1.1.12 – LCR**  
High, low and aggregate<sup>1/</sup>



<sup>1/</sup> Until Sep18: aggregate LCR and IL series comprise banks with more than BRL 100 bi in total assets. From Oct18 on: encompass banks in the S1 Segment.

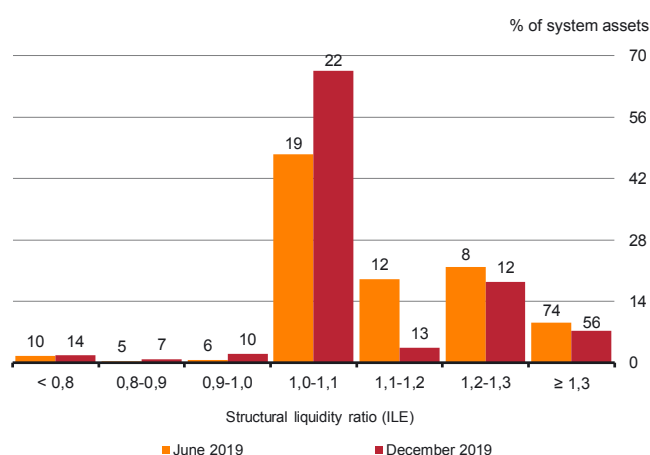
[Statistical annex](#)

**Chart 1.1.13 – Structural liquidity ratio (ILE)**



[Statistical annex](#)

**Chart 1.1.14 – ILE Frequency distribution<sup>1/</sup>**



<sup>1/</sup> The numbers above bars are the number of financial institutions with ILE within the corresponding interval.

[Statistical annex](#)

By analyzing the risk individually, there is a reduction in the ILE of domestic systemically-important banks in terms of total assets (Chart 1.1.14). Even so, at the end of 2019, 95.6% of the banking system assets were on bank balance sheets with enough available stable resources to provide long-term liquidity to institutions; that is, they had an ILE above one. Compared to June 2019, the number of institutions with an ILE lower than one increased from 21 to 31, all of which are banks with low representativeness in the financial system.

Concerning the NSFR,<sup>13</sup> all banking conglomerates subject to the regulatory ratio maintained it over the regulatory minimum (100%). The aggregated NSFR was at 123% in the end of 2019, nearly stable (+2 pp) in relation to the first half (Chart 1.1.15). Thus, both ILE and NSFR<sup>14</sup> indicate that those banks maintain assets and liabilities structures which reduce susceptibility to liquidity shocks in the future.

Jointly, the liquidity metrics suggest that banking institutions remained with good resilience to face unexpected periods of stress, such as the current one, with the advent of the Covid-19 pandemic.

## 1.2 Credit

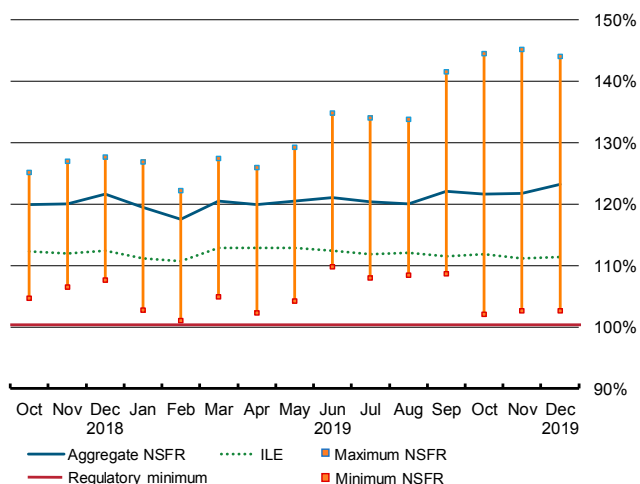
### 1.2.1 Introduction

Credit risk indicators remained relatively stable throughout the second half of 2019, with improvement in some portfolios. This evolution was in line with the process of gradual economic recovery in the period. As pointed out in the previous FSRs, the economic recovery movement occurred mainly in credit for individuals and granted by private banks, especially in non-earmarked loans. In the case of corporate credit, there was an increase of the bank credit to small and medium enterprises; however, the credit to corporates has retracted again. Nonetheless, for this type of borrowers, growth in capital market financing remained prominent. Considering domestic financing sources to

<sup>13</sup> The NSFR was introduced in Brazil by CMN Resolution 4,616, of November 30, 2017, with the methodology given by Circular 3,869, of December 19, 2017, having started its effects from October 1, 2018. It is a ratio that has a minimum regulatory amount of 100% and the compliance is mandatory for all financial institutions in the S1 segment, according to art. 2 of Resolution 4,553, of January 30, 2017.

<sup>14</sup> The ILE, despite being based on the NSFR methodology, has some parameters and definitions adapted by the BCB to better fit the available monitoring data, resulting in a more conservative number than the regulatory indicator.

**Chart 1.1.15 – NSFR**  
High, low and aggregate<sup>1/</sup>



<sup>1/</sup> NSFR and ILE series comprise FIs in the Segment S1 (nowadays: 6 banks).

[Statistical annex](#)

companies (bank credit and capital market), the balance remained with positive credit growth rates in the second half of 2019.

In line with the recent reduction in the basic interest rate of the economy, average interest rates of new credit operations fell throughout the second half of 2019 (average interest rate were 24.8% PY in June 2019 and 22.6% PY in December 2019). This interest rate drop occurred for both household and company loans; in the first case, average interest rate was 31.1% PY in June 2019 and 28.3% PY in December 2019; for companies, credit granting average interest rates were 15.0% PY and 13.5% PY, respectively on the same period. Total loan portfolio increased 5.4% PY between June and December 2019 (6.5% PY in 2019), with growth levels of 7.2% for credit to households (11.9% PY in 2019) and 2.9% PY (-0.1% PY in 2019) for credit to companies.

Given the uncertainty brought by Covid-19 pandemic, the federal government, the National Monetary Council (CMN) and the BCB announced many measures to release liquidity,<sup>15</sup> in order that financial institutions have enough available resources to face the increase in demand for loans and the ability to refinance the debts of borrowers most affected by the crisis. The other measures adopted to date are listed in Chapter 2, section 2.2.

The uncertainty brought by Covid-19 pandemic can change the recent evolution of the credit growth and the quality of the credit assets, leading to a possible raise in the problem assets level during 2020. However, the level of credit provisioning in the financial system is an important factor to support the losses throughout the year.

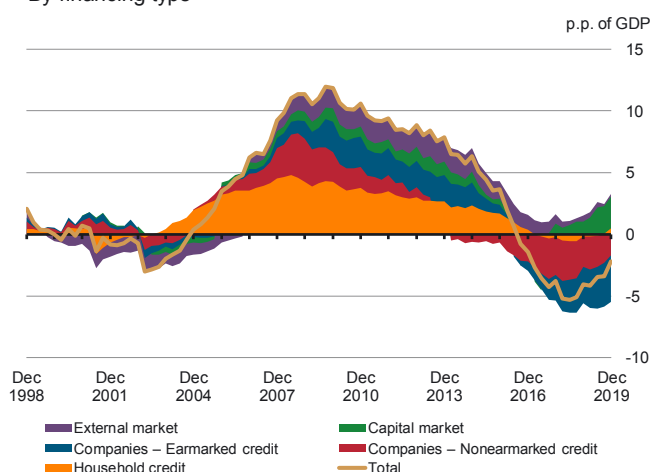
## 1.2.2 Broad credit and long run trend

BCBS and the international literature<sup>16</sup> use the credit-to-gross domestic product (GDP) gap to assess whether the growth of the credit outstanding in a country is sound regarding its long-term trend. This gap could signal an excessive increase in credit granted to companies and households, which could result in sudden

<sup>15</sup> For additional information, see section 2.2 – Measures to confront the crisis caused by the Covid-19 pandemic in the economy.

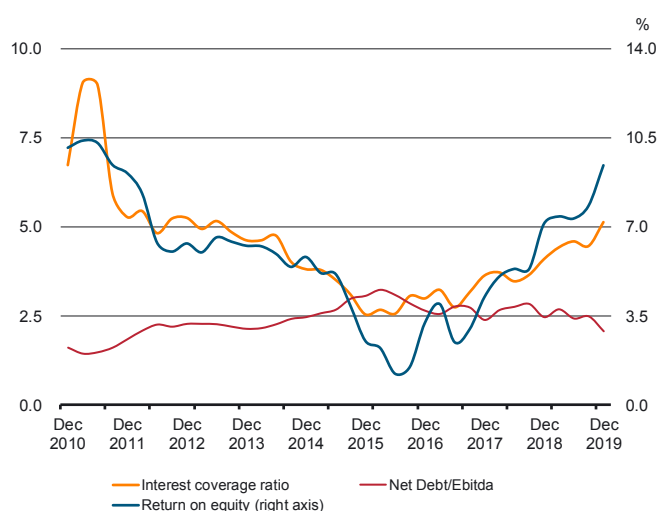
<sup>16</sup> Drehmann, M., Borio, C., and K. Tsatsaronis (2011): “Anchoring countercyclical capital buffers: the role of credit aggregates”, BIS Working Papers, no 355. Drehmann, M., and Juselius, M. (2011): “Evaluating early warning indicators of banking crises: Satisfying policy requirements”, BIS Working Papers, no. 421.

**Chart 1.2.2.1 – Credit/GDP gap without FX variation**  
By financing type



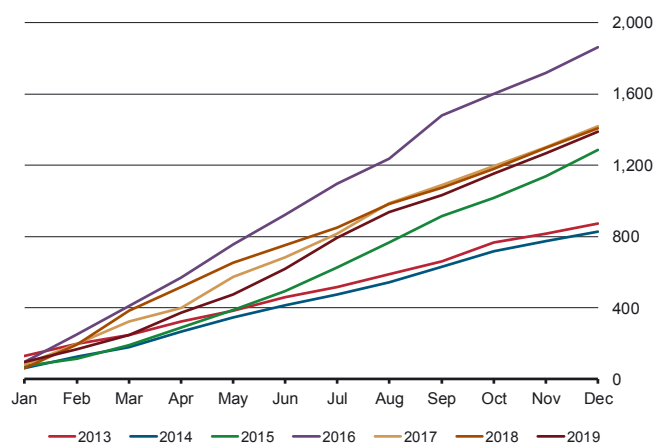
[Statistical annex](#)

**Chart 1.2.3.1 – Economic and financial indicators**



[Statistical annex](#)

**Chart 1.2.3.2 – Corporations in judicial recovery**  
Cumulative requests by year



Source: Serasa Experian

[Statistical annex](#)

adjustments. Therefore, BCBS suggests that countries with the aforementioned gap above 2.0 pp should consider adopting measures to reduce credit growth.

Currently, the credit-to-GDP gap is negative at 2.2 pp of GDP. Despite the credit granting improvement throughout last semester, the gap trend is expected to remain negative in the short run: the main contributions for this figure to remain below the long-term trend come from bank credit, especially earmarked loans to companies. Positive contributions come from the capital market, the external market, and bank loans to households, which became positive in 2019 (Chart 1.2.2.1).

### 1.2.3. Companies

Until late 2019, economic activity indicators pointed to the continuity of the gradual recovery process of the Brazilian economy, which may be strongly affected by the current Covid-19 crisis. The improvement in the economic environment had been reflected in the financial-economic indicators of the listed non-financial companies, with improvement in the profitability<sup>17</sup> and in the payment capacity of these companies in 2019 (Chart 1.2.3.1). Beyond that, the number of judicial recovery requirements fell in comparison with the previous year (Chart 1.2.3.2). However, despite the improvement over the previous year, the resumption of corporate credit was still slow;<sup>18</sup> especially due to large corporates, the domestic banking credit closed the year with a slight reduction in its balance (increase of 2.9% in the second semester). Yet, the capital market kept growing.<sup>19</sup> Overall, the domestic sources of financing – the sum of the banking credit and the capital market balance – to companies kept growing in the semester (5.9%).

Regarding the domestic banking credit, the behavior differed largely according to size. For Small and Medium Enterprises (SMEs),<sup>20</sup> credit grew 9.2% throughout

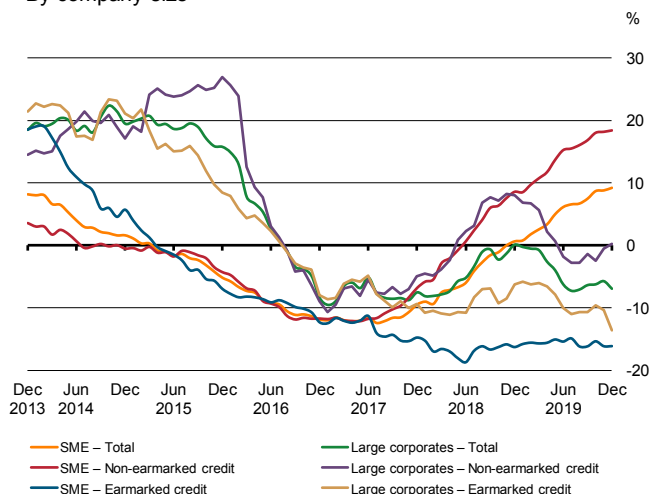
<sup>17</sup> Profitability in 2019 was affected by the International Financial Reporting Standards 16 (IFRS16), which increased Ebitda (acronym for Earnings before Interest, Taxes, Depreciation and Amortization) of some companies due to changes in the accounting of leasing operations expenses. Nonetheless, throughout 2019, the profitability registered upward trend, which reflects the improvement in the profitability of the companies.

<sup>18</sup> Disregarding the impact of exchange variation, the broad credit grew by 4.1% in 2019, versus 2.9% in the previous year.

<sup>19</sup> In this section, the computation of the capital markets balance includes only bonds (debentures) and commercial paper.

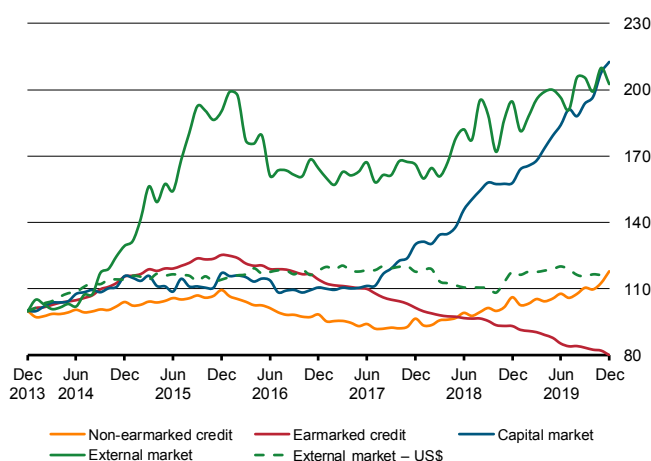
<sup>20</sup> The segregation by size uses the value of credit operations outstanding in the financial system as proxy. The SMEs are the companies whose debt are lower than BRL 100 million. Companies with debt greater than or equal to BRL 100 million are classified as large companies.

**Chart 1.2.3.3 – YoY credit growth**  
By company size



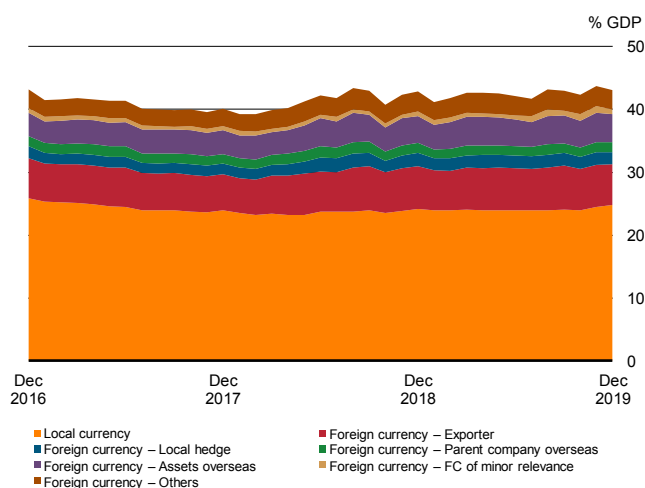
[Statistical annex](#)

**Chart 1.2.3.4 – Corporate indebtedness**  
Dec/2013 = 100



[Statistical annex](#)

**Chart 1.2.3.5 – Company debt**  
By currency and type of hedge



[Statistical annex](#)

2019 (7.1% in the second semester), influenced by the growth of the non-earmarked loans. The credit modalities that grew the most were working capital and vehicles financing, especially financing of new trucks. For large companies, credit decreased 6.9% in 2019 (reduction of 0.7% in the second semester). The earmarked loans intensified the downward trend in the second semester of 2019, and the retraction in credit for large companies in the year was not higher only due to a slight recovery in non-earmarked loans in the last quarter (Chart 1.2.3.3).

The capital market continued to be the highlight of 2019 (Chart 1.2.3.4), with an increase of 34.7% in the year (15.5% in the second semester). This growth, concentrated in large companies, occurred both in new companies<sup>21</sup> and in companies that had already reached the market and took advantage of more favorable conditions in the capital market to fund more, at the expense of the banking credit market. The most relevant economic sectors in this increase were “Energy” and “Petrochemical”.

Additionally, there was a significant growth in the balance of bonds kept in the portfolio of the financial institutions (25.1% in the second semester in comparison to 5.9% in the first semester of 2019). This movement, however, was concentrated in a few financial institutions and issuers. In the year, the stock of bonds held by domestic financial institutions and other bond holders registered a similar growth, and thus they both maintained the same share of the previous year.

The external credit of non-financial companies, when measured in US dollars, was almost stable during 2019 (fall of 2.0% in the second semester). However, the devaluation of the Brazilian currency (real) contributed for the increase of external debt in local currency in 2019, with an increase of 4.1% (3.1% in the semester), representing 18.7% of the GDP in December of 2019. However, when financial<sup>22</sup> and operational<sup>23</sup> hedges are considered, the balance of foreign currency debt of the companies for which not have been identified any source of foreign exchange protection<sup>24</sup> is restricted to only 3.1% of GDP (Chart 1.2.3.5).

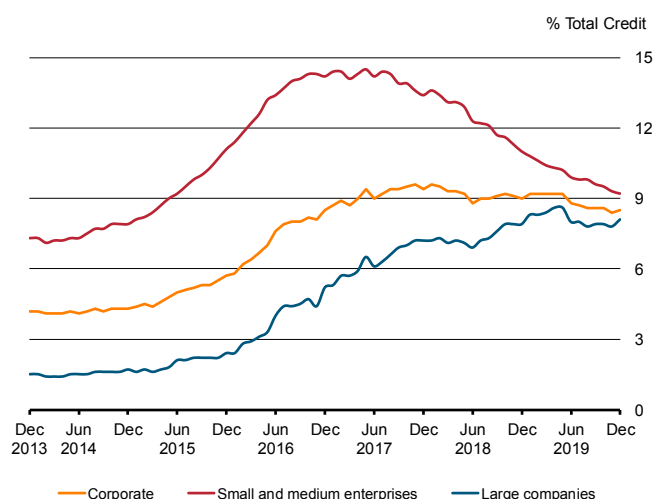
21 Companies or economic groups that did not have outstanding balance in the capital market in the last twelve months were deemed as new companies.

22 Long position in dollar options and forward contracts.

23 Exporting, financial aid from parent company and foreign assets.

24 For further information about the methodology, see Financial Stability Report published in September 2014, box “Evolução do endividamento das empresas não financeiras após a crise internacional de 2008”, at <https://www.bcb.gov.br/publicacoes/ref/201409>.

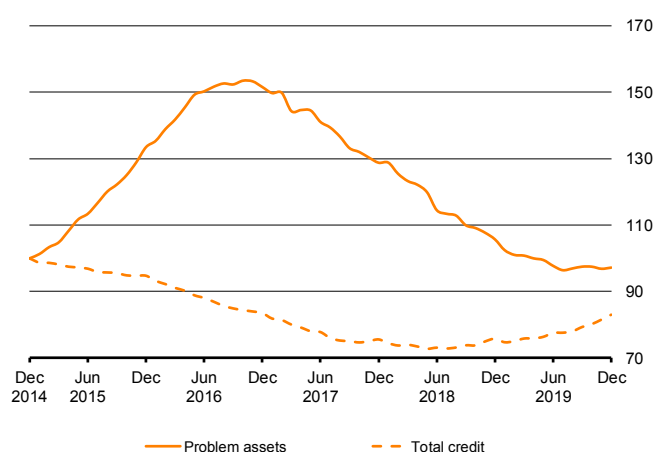
**Chart 1.2.3.6 – Problem assets**



[Statistical annex](#)

**Chart 1.2.3.7 – Problem assets**

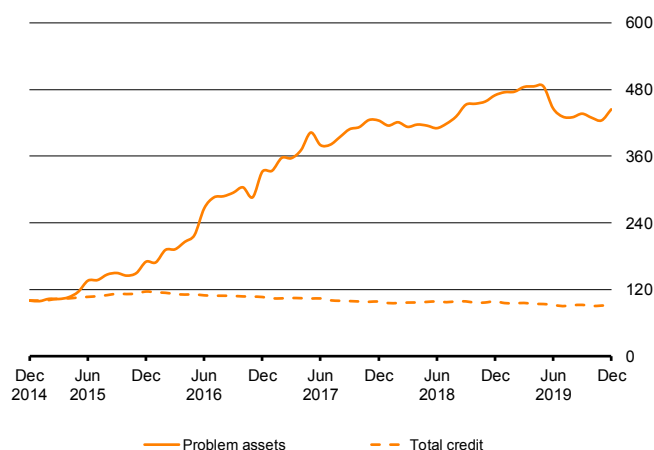
Small and medium enterprises (Dec/2014 = 100)



[Statistical annex](#)

**Chart 1.2.3.8 – Problem assets**

Large companies (Dec/2014 = 100)



[Statistical annex](#)

The expectation at the beginning of 2020 was the maintenance of the growth scenario of non-earmarked loans to SMEs, the decline of earmarked loans to large companies and the maintenance of the volumes of external credit denominated in US dollars. Regarding the capital market, the expectation was the continuity of growth of traditional fixed rate instruments to large companies, however, in a slower pace. Nevertheless, the impacts related to the Covid-19 crisis, whose effects are still unknown, may significantly change such expectations for the non-earmarked loans to SMEs and the continuity of growth of the capital market. Regarding large companies, bank credit should return to be the main source of financing, until domestic and international capital market return to normality. For SMEs, bank credit growth should lose strength and, in the next months, debt restructuring should be observed to adjust companies' payment capacity to the new reality.

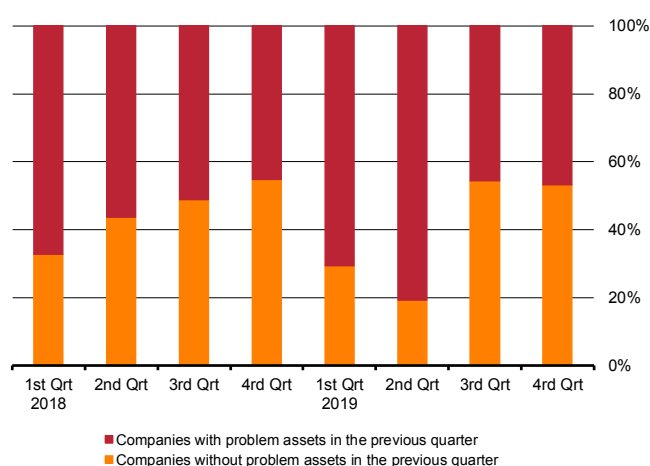
In relation to the risk indicators of the banking credit portfolio, the percentage of the problem assets registered an increase in the second semester and ended the year at 8.5% for the total of non-financial companies (in comparison to 9.0% in December of 2018 and to 8.8% in June of 2019). SMEs were the main responsible for this decline (Chart 1.2.3.6). In this segment, the share of problem assets fell 0.7 pp in the second semester and 1.7 pp in 2020. This decrease occurred due to the growth of the portfolio, given that the amount of problem assets remained stable in the second semester. This may be an indication that the downward trend observed since 2016 seems to have reached an end (Chart 1.2.3.7) and this trend can even be reverted if the growth of the SMEs' portfolio does not return to the levels of previous years.

In contrast, the proportion of problem assets of large companies, which was relatively stable since the drop observed in June of 2019, registered a slight increase in December of 2019. In nominal terms, the increase in the portfolio of problem assets occurred mainly in the sectors "Public Administration and NGOs" and "Others", because of an increase of the "E to H" rated loans (Chart 1.2.3.8 and Table 1.2.1). Due to the Covid-19 crisis, the evolution in the percentage of the problem assets of large companies is still uncertain: there are no elements to assure that the growth cycle of problem assets has ended, but the portfolio of large companies in the domestic banking credit can increase, given that those companies may seek the traditional banking as source of funding, which would cause an increase in the denominator of the percentage of problem assets, contributing for a possible reduction in the index.

**Table 1.2.3.1 – Problem assets by economic sector**

## Large companies

|                                        | % total credit outstanding |        |        |
|----------------------------------------|----------------------------|--------|--------|
|                                        | dec/18                     | jun/19 | dec/19 |
| Public administration and NGOs         | 2.0%                       | 1.9%   | 3.3%   |
| Agriculture                            | 3.8%                       | 5.5%   | 5.7%   |
| Food                                   | 4.0%                       | 3.5%   | 3.0%   |
| Financial activities                   | 0.2%                       | 0.1%   | 0.1%   |
| Automotive                             | 3.2%                       | 3.7%   | 3.4%   |
| Beverages and tobacco                  | 3.4%                       | 2.0%   | 2.0%   |
| Construction, wood and furniture       | 38.70%                     | 39.7%  | 39.4%  |
| Animal production                      | 2.2%                       | 1.7%   | 1.2%   |
| Electric and electronic components     | 1.1%                       | 0.5%   | 1.0%   |
| Energy                                 | 2.3%                       | 2.3%   | 2.9%   |
| Machinery and equipment                | 7.7%                       | 4.0%   | 1.0%   |
| Media and leisure                      | 4.8%                       | 3.2%   | 6.1%   |
| Others                                 | 21.3%                      | 17.7%  | 29.2%  |
| Pulp and paper                         | 0.8%                       | 0.7%   | 0.9%   |
| Petrochemical                          | 1.5%                       | 1.5%   | 1.6%   |
| Companies located overseas             | 27.4%                      | 8.3%   | 5.1%   |
| Chemicals, pharmaceuticals and hygiene | 0.1%                       | 0.3%   | 0.0%   |
| Health, sanitation and education       | 3.4%                       | 5.7%   | 4.9%   |
| Services                               | 7.9%                       | 9.7%   | 9.6%   |
| Metallurgy                             | 3.1%                       | 4.5%   | 4.2%   |
| Sugar cane                             | 20.3%                      | 22.9%  | 19.1%  |
| Telecommunications                     | 26.4%                      | 26.8%  | 30.5%  |
| Textiles and leather                   | 10.0%                      | 15.7%  | 13.4%  |
| Transport                              | 17.9%                      | 18.2%  | 18.0%  |
| Retail                                 | 1.4%                       | 1.5%   | 1.5%   |

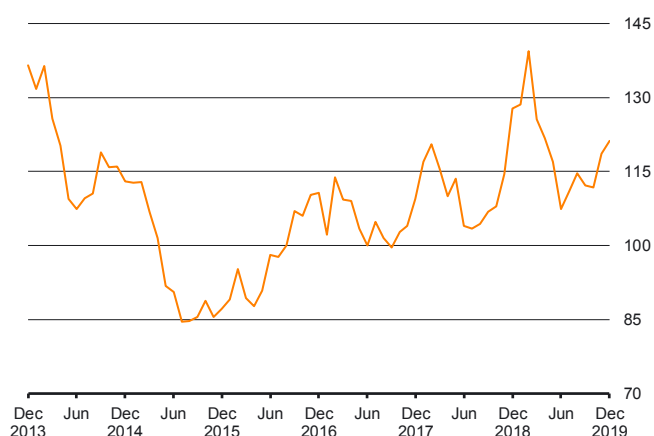
[Statistical annex](#)**Chart 1.2.3.9 – Problem assets inflow**  
Large companies[Statistical annex](#)

Still in relation to large companies' problem assets, the inflow of new operations onto problem assets in the last two quarters of 2019 occurred in the same proportion, both by the inflow of operations of companies that did not have problem assets in the previous quarter as well as by those that already had (Chart 1.2.3.9).<sup>25</sup>

Summing up, regarding the domestic banking credit, the growth of non-earmarked loans to the SMEs was offsetting the drop of earmarked loans to the large companies. The capital market continued to stand out as an alternative of companies' financing in the second semester of 2019, but the Covid-19 pandemic raises uncertainty to the continuity of this process in 2020. Concerning the risk, the downward movement in the portfolio of SMEs' problem assets (numerator of the problem assets indicator) seemed to have come to an end; due to Covid-19, an increase in next semesters is expected, and the indicator may exceed the peak reached

<sup>25</sup> Includes the companies that the percentage of problem assets in the SFN was greater than or equal to 1% in the previous quarter.

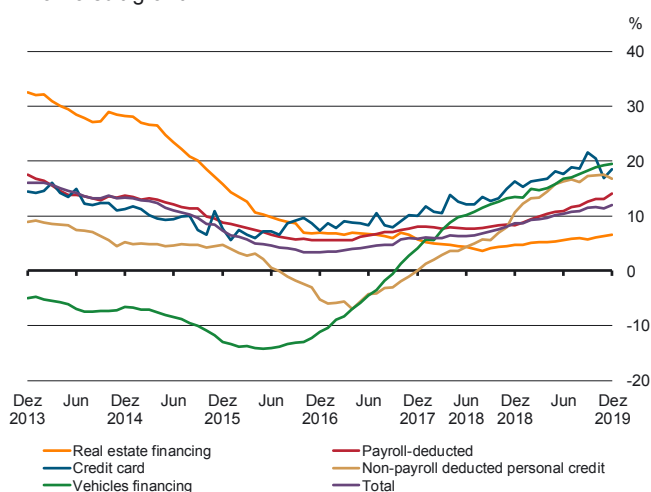
**Chart 1.2.4.1 – Consumer confidence index**



Source: Fecomércio

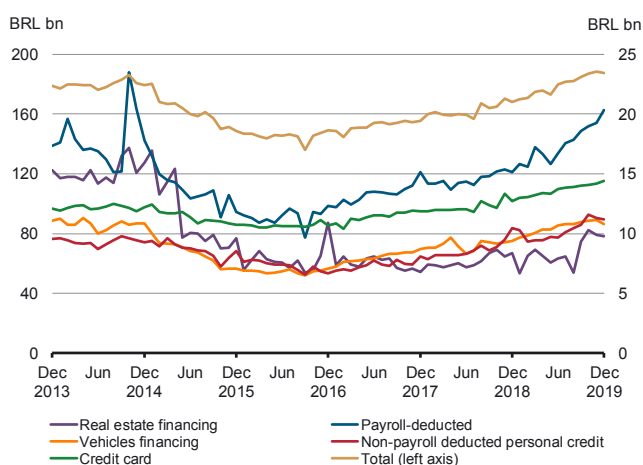
[Statistical annex](#)

**Chart 1.2.4.2 – Household credit facilities**  
YoY credit growth



[Statistical annex](#)

**Chart 1.2.4.3 – Deflated and seasonally adjusted credit grants**  
Main household credit facilities



[Statistical annex](#)

in 2017. For large companies, on the other hand, there are no evidence that the risk materialization cycle has come to an end. The impacts of the Covid-19 crisis are still uncertain and hard to measure, but they may affect the problem assets indicator in the future, either by increasing the risk or the total portfolio.

## 1.2.4 Households

Household credit growth in the second half of 2019 (7.2%) reflected the gradual recovery of the Brazilian economic growth seen until the end of 2019. In the year, household credit grew 11.9%. This reflects interest rates at historical low levels,<sup>26</sup> inflation within the target,<sup>27</sup> as well as unemployment rate,<sup>28</sup> household income,<sup>29</sup> and consumer confidence index slightly improving in the second semester (Chart 1.2.4.1); however, the household debt-service-to-income ratio<sup>30</sup> reverses its downward trend from the last years – but still far from the historical maximum seen in 2015.

Non earmarked credit outstanding increased by 9.5% in the semester, with facilities such as credit card purchases (20.3%), vehicles financing (10.5%), credit card revolving credit (8%) and payroll-deducted personal loans (6.9%) worth mentioning. Earmarked credit outstanding growth in the semester was lower, at 4.5%. Household credit outstanding was expected to grow, especially non earmarked credit facilities, given the trend of gradual economic recovery of the Brazilian economy; however, the current expectation is that, due to Covid-19, the previous growth trend might decrease in the next semesters, as well as that debt restructuring might increase to accommodate households' ability to pay.

New credit operations for all facilities increased throughout the second half of 2019, especially payroll-deducted and non-payroll-deducted personal credit loans. Regarding vehicles financing loans, after significant increase in the first half of 2019, credit grants decreased their growth in the second semester of the year (Chart 1.2.4.3).

26 BCB Time Series no. 4,390 – Brazilian Benchmark Interest Rate – Selic monthly accumulated.

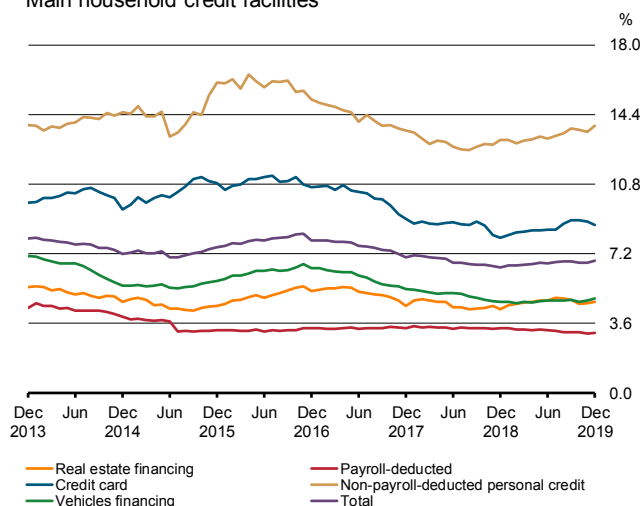
27 BCB Time Series no. 433 – Extended National Consumer Price Index (IPCA) – Brazilian Institute of Geography and Statistics (IBGE).

28 BCB Time Series no. 24,369 – Unemployment rate – Continuous National Household Sample Survey (PNADC).

29 BCB Time Series no. 24,382 – Real habitually average earnings of employed people – PNADC.

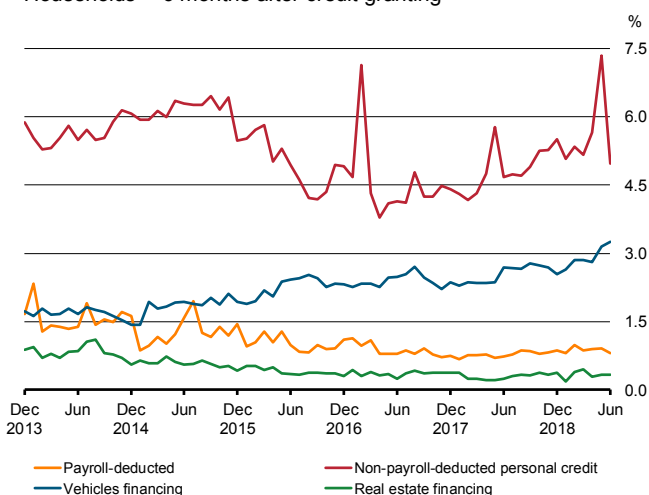
30 BCB Time Series no. 19,881 – Household debt service ratio – Seasonally adjusted data.

**Chart 1.2.4.4 – Problem assets**  
Main household credit facilities



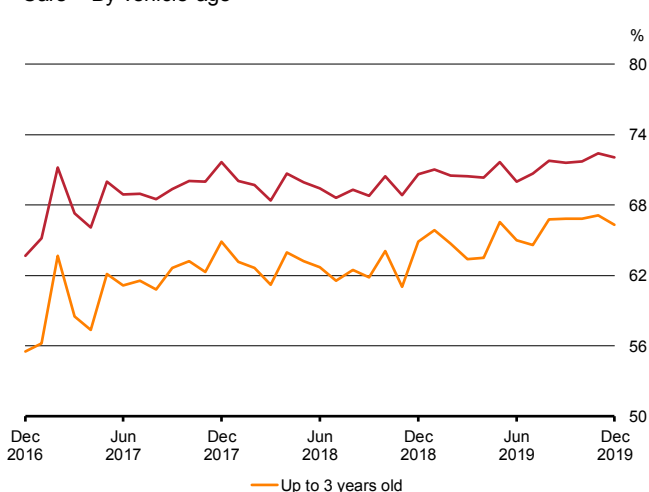
[Statistical annex](#)

**Chart 1.2.4.5 – Problem assets by cohort**  
Households – 6 months after credit granting



[Statistical annex](#)

**Chart 1.2.4.6 – Average LTV at origination**  
Cars – By vehicle age



Sources: BCB (SCR) and SNG.

[Statistical annex](#)

Similarly to the first half of 2019, the percentage of problem assets increased in the second semester for most credit facilities, despite being close to their historical minimum values. The percentage of household problem assets reached 6.8% at the end of the year, 0.3 pp above the value at the end of the first semester, and 0.5 pp above December 2018. The credit facility which most contributed to the increase of the numerator of the problem assets percentage (credit outstanding recognized as problem assets) was credit cards (Chart 1.2.4.4). Due to Covid-19, as seen with SMEs, increases in debt restructuring, 90 days past due loans and problem assets are expected in the next semesters. The value of this last indicator could even surpass its highest value, observed in 2016.

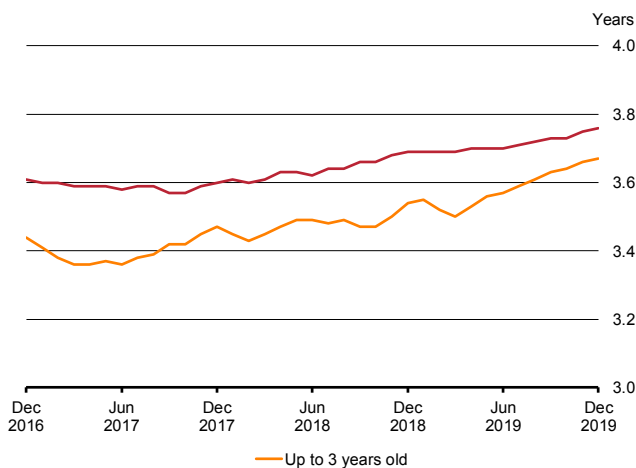
The analysis of problem assets by cohort<sup>31</sup> for the main credit facilities recognizes an upward trend for non-payroll-deducted personal loan and vehicles financing credit grants, especially from the second half of 2018. On the other hand, real estate financing and payroll-deducted personal loan credit grant cohorts appear relatively stable (Chart 1.2.4.5).

Specifically on vehicles financing, average granting loan-to-value (LTV) ratios and loan terms have increased in the last three years (charts 1.2.4.6 and 1.2.4.7), irrespective of the vehicle age. Even though the increases haven't been significant throughout the last year, the highest values of both series occurred in the second half of 2019.<sup>32</sup> However, a growing amount of loans would fulfill the requirements of Circular 3,515, of December 3, 2010, if such requirements were adopted today: at the end of 2019, almost 49% of credit grants for purchase of cars up to 3 years old, and 55.6% of credit grants for purchase of cars older than 3 years would fulfill the requirements of Circular 3,515 of 2010 and would be subject to a higher capital risk-weighting factor (Chart 1.2.4.8). These shares have grown throughout 2019, especially in the second

31 The chart uses six-month intervals for the analysis: for a given cohort, the ratio of problem assets after six months to the total of credit grants is calculated. A cohort consists of all credit loans registered at the Credit Information System (SCR) on a granular basis, whose month and year in the "Loan granting date" field, according to SCR Document 3040 layout ([www.bcb.gov.br/?doc3040](http://www.bcb.gov.br/?doc3040)), match month and year of the reference date. The definition of problem assets takes into account 90 days past due loans, restructured debt and "E to H" rated loans.

32 Data about vehicle type and age is only available from 2015 on, therefore these numbers should not be compared to those from 2010 and 2011, which refer to vehicles financing in general.

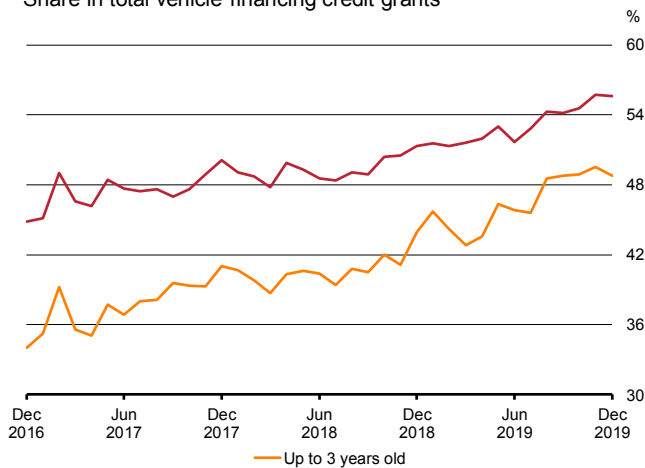
**Chart 1.2.4.7 – Average term at origination**  
Cars – By vehicle age



Sources: BCB (SCR) and SNG.

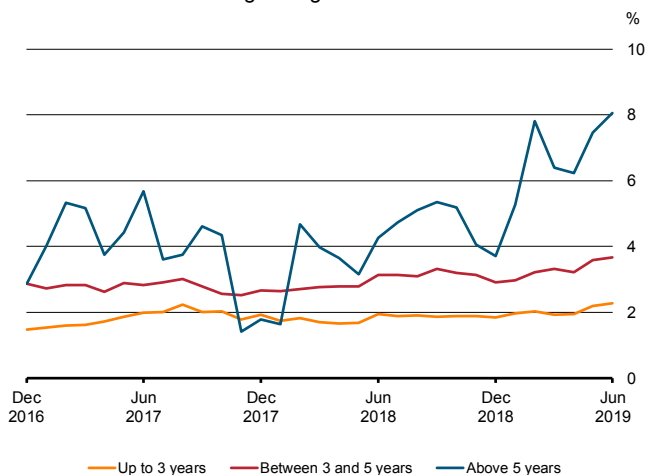
[Statistical annex](#)

**Chart 1.2.4.8 – Credit grants that fulfill the requirements of Circular 3,515 of 2010**  
Share in total vehicle financing credit grants



[Statistical annex](#)

**Chart 1.2.4.9 – Problem assets by cohort and loan term**  
Six months after credit granting



[Statistical annex](#)

semester.<sup>33</sup> For vehicle purchases in general, 50.9% of credit grants would fulfill the requirements of Circular 3,515 of 2010 in December 2019 (for comparison, 59.1% of credit grants fulfilled the requirements as of the enactment of the aforementioned Circular).

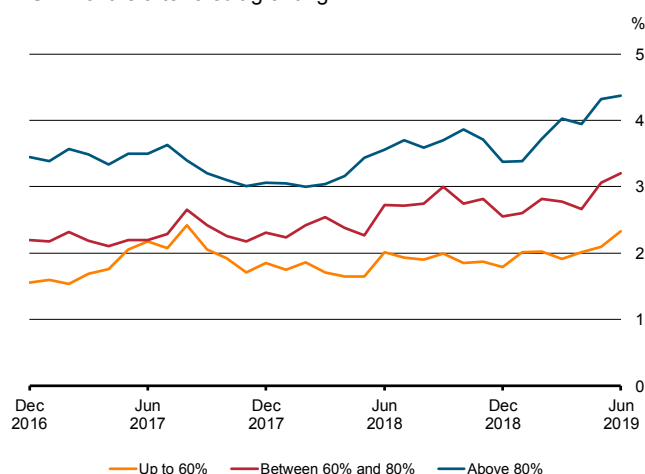
Indeed, the analysis of problem assets by cohort and different characteristics of vehicles financing loans shows that higher risks are associated with longer-term (Chart 1.2.4.9) and higher-LTV loans (Chart 1.2.4.10); such values increased for cohorts in the first half of 2019, more pronouncedly for loans longer than five years and with LTV ratios above 80%. Being an intersection of these characteristics, the loans that would fulfill the requirements of Circular 3,515 of 2010 show a higher risk increase in the first half of 2019, when compared to other operations: the former increased by 1.1 pp between December 2018 and June 2019, while the latter increased by 0.3 pp in the same period (Chart 1.2.4.11).

Household credit outstanding increased, especially in consumption-related facilities, with credit card and vehicles financing worth mentioning; regarding the latter facility, there seems to have been an increase in risk for more recent cohorts, even though its percentage of problem assets did not increase as a consequence of its credit outstanding growth throughout 2019. Despite the small increase in the percentage of problem assets, as well as the increase in household debt-service-to-income ratio, both remained in low levels when compared to each series history and do not constitute a relevant increase in risk for the financial system. The expectation of credit outstanding growth could be affected by the economic crisis started by the Covid-19 pandemic, given the uncertainty about both economic growth and delinquency caused by unemployment and reduced economic activity.

<sup>33</sup> In 2010, BCB increased the risk-weighting factor for long-term, high-LTV vehicle financing credit grants (Circular 3,515 of 2010). In 2010, according to estimates, 59.1% of credit grants in November of that year (in general, irrespective of vehicle age) fulfilled its requirements, the highest value of the series. For a historical analysis of vehicles financing, refer to section 2.2 of the FSR of April 2019, “Evolution of vehicle financing outstanding”.

**Chart 1.2.4.10 – Problem assets by cohort and LTV**

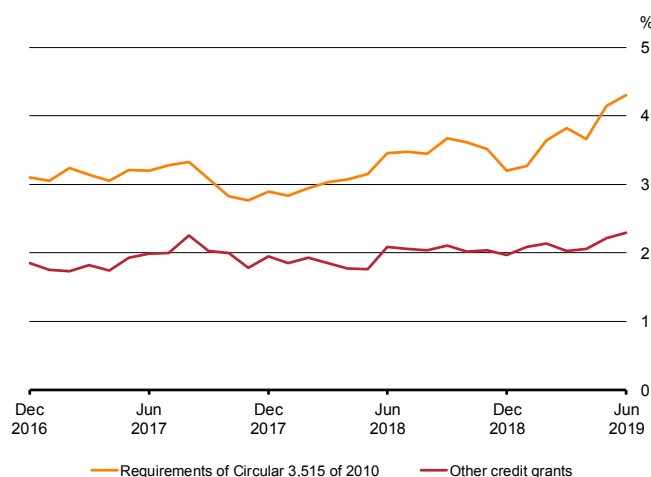
Six months after credit granting



[Statistical annex](#)

**Chart 1.2.4.11 – Problem assets by cohort**

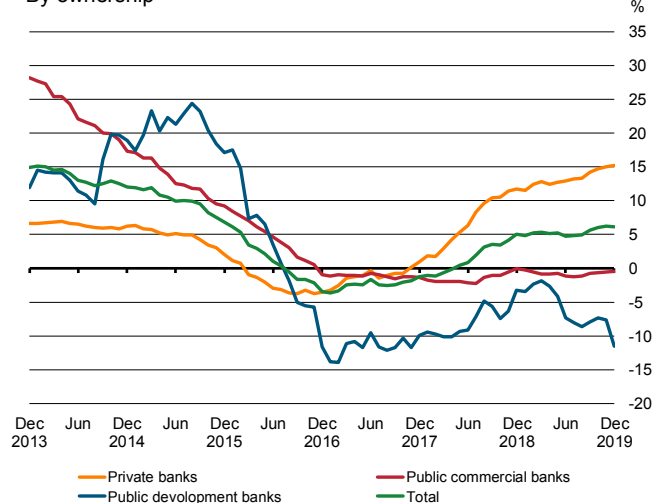
Six months after credit granting



[Statistical annex](#)

**Chart 1.2.5.1 – Year over year credit growth**

By ownership



[Statistical annex](#)

## 1.2.5 Domestic banking credit – By ownership

The domestic banking credit has maintained its uptrend at slightly higher rates compared with the previous semester. The nominal year over year credit growth<sup>34</sup> reached 6.1% at the end of the second semester of 2019, being positively influenced by the private banks whose portfolio registered a higher than 10% growth rate throughout the year, reaching 15.2% in December (Chart 1.2.5.1). Public commercial banks did not show any significant variation, and the public development banks registered a substantial negative variation in their domestic credit, mainly due to the early settlements of large corporate debt. Particularly in December, the reduction in the credit portfolio of development banks was also driven by the exchange rate variation.

Credit-lending maintained its upward trend in the second half of 2019, concentrated in private banks that reached levels like the period before the recession (Chart 1.2.5.2). In contrast to the private banks, the credit lending of public commercial banks and public development banks remained stable since the end of 2016.

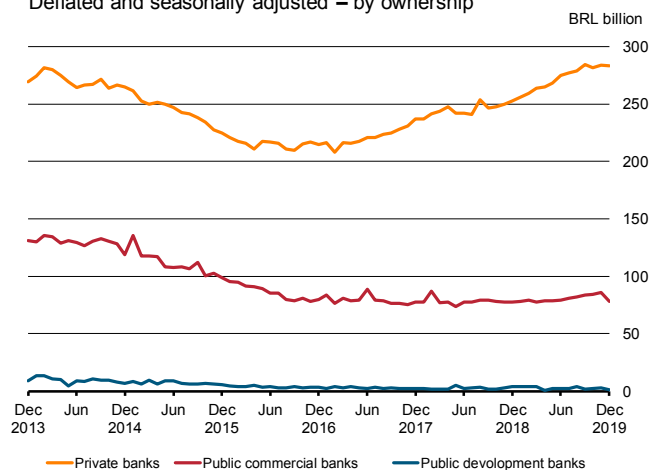
## 1.2.6 Risks and provisioning

Credit risk indicators remained stable in 2019. The problem assets ratio decreased by 0.10 pp compared to December 2018, reaching 7.31% (Chart 1.2.6.1). Following the same pattern presented in the previous FSR, despite the slight increase in the levels of problem assets in the household portfolio, the relative growth of this portfolio, which presents a lower problem assets ratio than the companies' portfolio, allowed the quality of the total portfolio to remain stable in the second half of 2019.

The problem assets ratio has presented different trends by type of ownership (Chart 1.2.6.2). The private banks have been keeping the downward trend of problem assets since 2017, but with reduced intensity, as a result of the reduction in the quality of the household portfolio whereas the public commercial banks' problem assets ratio remained relatively stable in the second half of 2019. The public development banks' level of problem

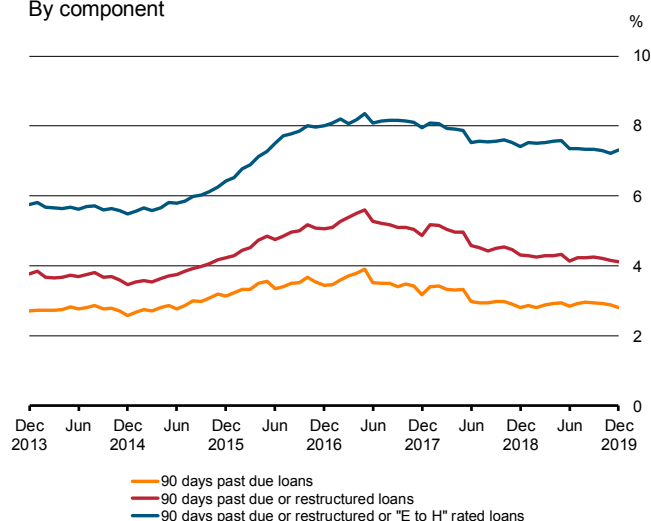
34 The numbers reported in this section are based on the 3040 document and may be different from other BCB publications. Information on the document can be found at <https://www.bcb.gov.br/estabilidade/financeira/srdoc3040> (in Portuguese).

**Chart 1.2.5.2 – Credit lending**  
Deflated and seasonally adjusted – by ownership



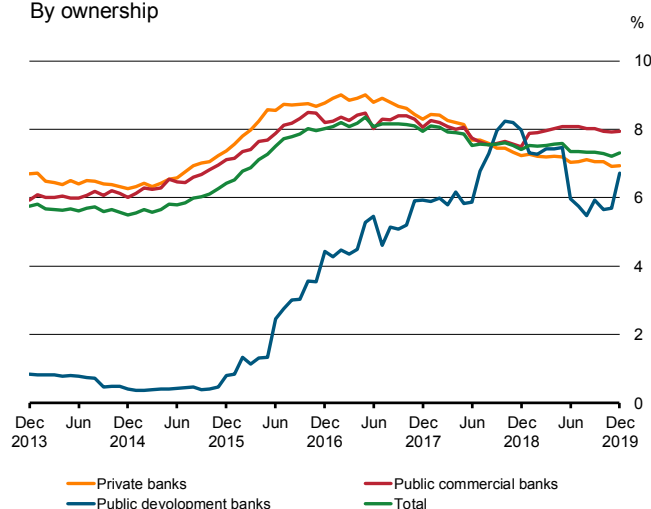
[Statistical annex](#)

**Chart 1.2.6.1 – Problem assets**  
By component



[Statistical annex](#)

**Chart 1.2.6.2 – Problem assets**  
By ownership



[Statistical annex](#)

assets fluctuated close to the value recorded at the end of the previous semester. However, the ratio increased to 6.7% at the end of 2019, influenced by the reduction in the credit portfolio that occurred in December.

As pointed out in the last FSR, the quality of the credit portfolio remained stable in the second half. By the end of 2019, the expectation was that the level of problem assets would remain stable in the coming months, as a result of two factors. The first would be the credit growth driven by private banks in the household portfolio, which showed a slight deterioration in credit quality, and the second would come up from SMEs, which has been improving its quality in the past few months. However, this scenario may be affected by the current crisis triggered by the coronavirus pandemic.

The coverage index (CI) of problem assets<sup>35</sup> remained above 80% (Chart 1.2.6.3). The trend of the last semester shows an increase in the indicator in December, as a result of the provisions made by private banks to mitigate the effects of the increase in the CSLL rate. The high level of provisioning maintained by financial institutions is an important mitigator of the potential effects caused by the coronavirus pandemic on the quality of credit assets throughout the first half of 2020.

## 1.3 Profitability

The profitability of the banking system continued its uptrend throughout 2019, after a small reduction at the end of 2018.<sup>36</sup> The uptrend continued despite a lower contribution of the main factors that had led to the growth in profitability in 2017 and 2018, which include reductions of loan-loss provisions (LLP) expenses and of funding costs as well as gains in operational efficiency.

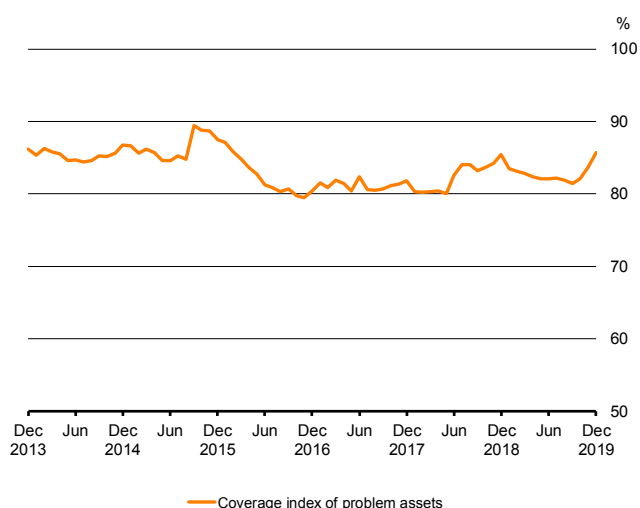
The gradual expansion of the loan portfolio (mainly by private banks), the changes in its composition (towards customers segments with larger spreads<sup>37</sup>) and the increase in earnings from equity investments in affiliates were the main factors contributing to the profitability of

35 CI of problem assets: is the ratio between the provisions to the credit of doubtful settlement made by financial institutions for their credit portfolio, according to Resolution 2,682, December 22<sup>nd</sup>, 1999, and the volume of problem assets estimated by the Central Bank of Brazil.

36 The reduction was influenced by an increase in provision expenses related to assets held for sale.

37 For further details, see section 1.2 of this Report.

**Chart 1.2.6.3 – Coverage index of problem assets**



[Statistical annex](#)

the system in 2019.<sup>38</sup> These factors were key to offset the pressure on interest margins, given the continuing cycle of reductions in the Selic rate over the period. In addition, the continued control of administrative expenses remained as a positive element for the profitability of banks, despite occasional growth of these expenses due to restructuring processes.

Increasing digitization of banking services, the closure of physical branches and reductions in the number of employees may lead to operational efficiency gains in the forthcoming periods. However, some factors could exert pressure on bank's profitability and may offset the aforementioned gains in efficiency. These factors include: a) readjustments in LLP to reflect changes in the risk profile of the credit portfolio (due to changes in the credit portfolio mix); b) pressure on net interest income in securities intermediation and on credit spreads<sup>39</sup> due to the low interest rate environment; c) the higher tax rate of the CSLL; d) increasing competition by innovative business models; and e) the regulatory interest rate cap on overdraft loans.

Overall, the outlook is for a reduction in the profitability of banks, especially considering the uncertainties and potential economic impacts of the Covid-19<sup>40</sup> pandemic on the financial system. Nevertheless, given the current levels of profitability and ROE risk premium,<sup>41</sup> an additional pressure on bank's profitability does not pose a significant threat to financial stability, but rather demands more attention to banking segments that have already been facing challenges due to structural changes in the financial system.

The banking system's Return on Equity (ROE)<sup>42</sup> increased to 16.5% in December 2019, a rise of 0.7 pp

38 The change in the CSLL rate and the one-off sale of assets by public banks were considered as non-recurring events and therefore their effects on the profitability of banks were adjusted for this Report.

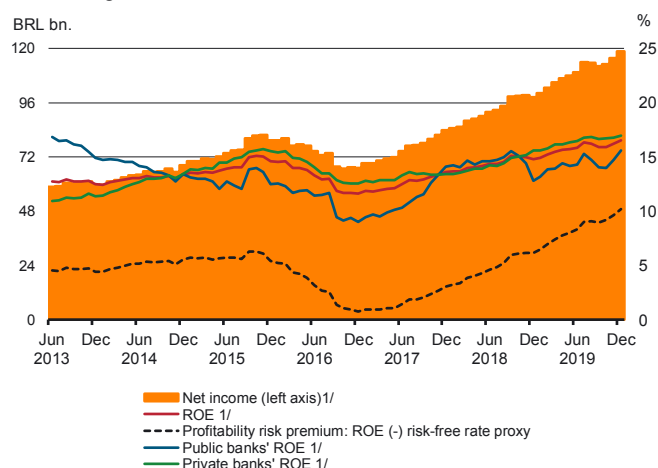
39 In this Report, credit spreads represent the difference between the estimated interest rate percentage return of the credit portfolio of each credit segment and the estimated interest rate percentage funding cost.

40 For further details and additional information about the actions in response to Covid-19, see section 2.2 of this Report.

41 In this Report, ROE risk premium represents the difference between the 12-month rolling ROE returns and 85% of the 36-month risk-free proxy (the Selic rate) rolling returns. The risk-free proxy rolling returns are multiplied by 85% to deduct tax effects and the 36-month period is used as it represents the average maturity of bank's credit portfolio (their main source of income).

42 For the purposes of this Report, the ROE is calculated excluding non-recurring events that affected bank's profitability during the period. Non-recurring events in the period include one-off sale of assets by public banks, income from adjustments on deferred tax (CSLL tax rate change) and extra provisions for assets held for sale.

**Chart 1.3.1 – Return on equity (ROE)<sup>1/</sup>**  
Trailing twelve months



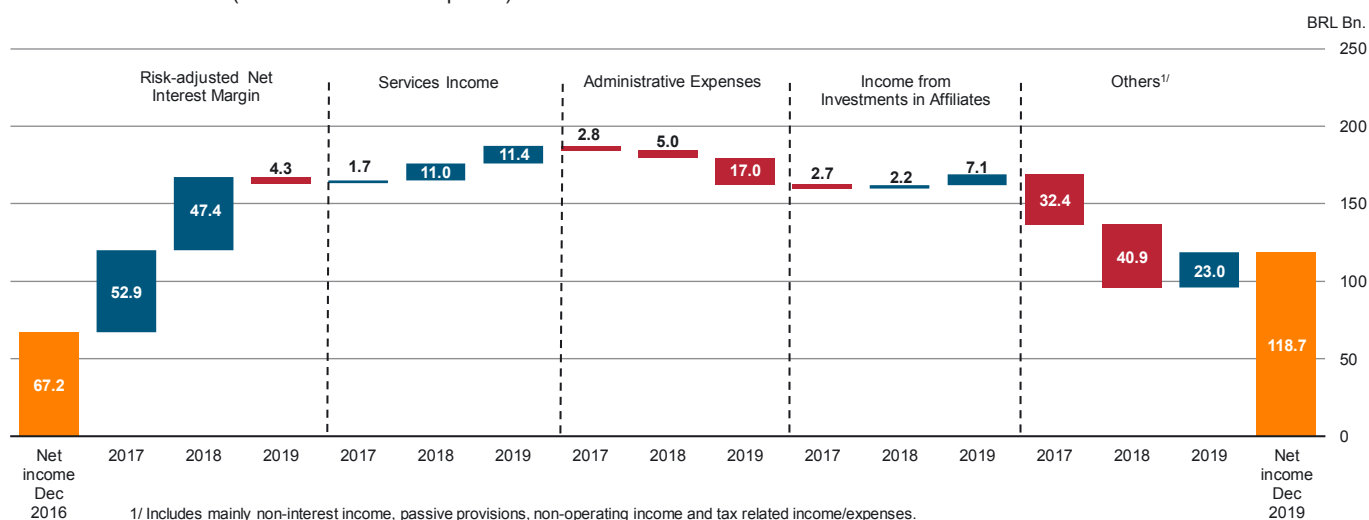
1/ Identified non-recurrent adjustments.

[Statistical annex](#)

when compared to June 2019 (Chart 1.3.1). The system's ROE risk premium remained in its recovery cycle started in December 2016, which has also been influenced by the reduction in the risk-free proxy.

The main drivers of the system's profitability were the growth in the credit portfolio with a more profitable credit portfolio mix (increase in net credit income), an increase in earnings from equity investments in affiliates<sup>43</sup> and a rise in the operational efficiency of public banks. Nevertheless, LLP expenses increased significantly in the semester and served to smooth extraordinary earnings that resulted from the change in the CSLL tax rate and its effects on deferred tax balances. The increase in LLP expenses caused risk-adjusted net interest margin to reduce in the semester (Chart 1.3.2).

**Chart 1.3.2 – Net Income – Cumulative effect by component**  
Dec/2016 to Dec/2019 (cumulative 12-month period)



1/ Includes mainly non-interest income, passive provisions, non-operating income and tax related income/expenses.

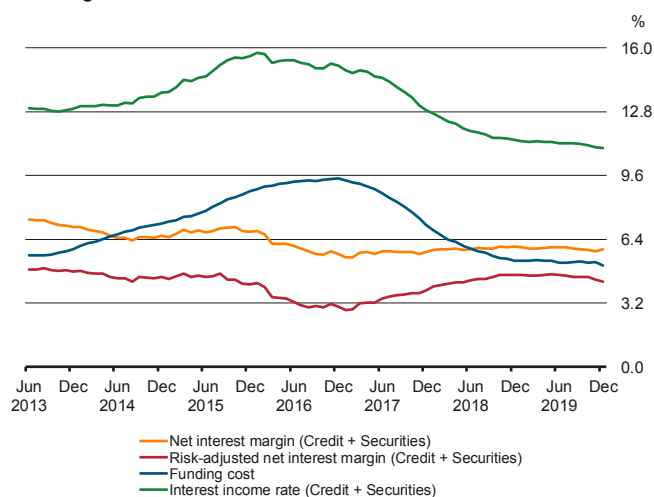
[Statistical annex](#)

Net interest margin<sup>44</sup> remained relatively stable, even with the pressure on credit spreads and on securities margins influenced by the reductions in the Selic rate throughout the second half of 2019. This stability resulted from increased participation of household and SME operations in the loan portfolio (typically with larger spreads when compared to corporate clients) which offset the reduction in spreads for each component of the portfolio. In this context, were it not for the change in the credit portfolio mix, the net interest margin would have declined more significantly.

<sup>43</sup> Accounted for under the equity method. Most of the earnings came from insurance and pension operations.

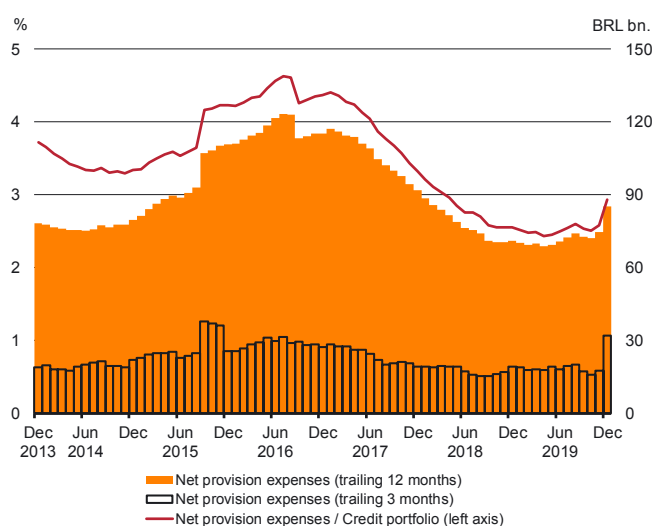
<sup>44</sup> Represents the difference between the interest income rate of the credit and securities portfolio and the funding cost.

**Chart 1.3.3 – Net interest margin**  
Trailing twelve months



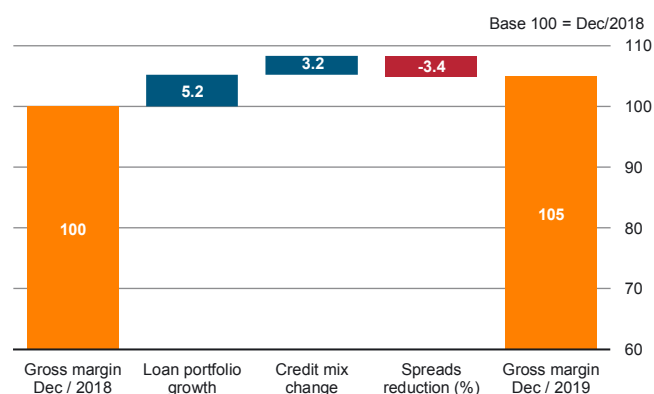
[Statistical annex](#)

**Chart 1.3.4 – Provision expenses**



[Statistical annex](#)

**Chart 1.3.5 – Credit gross margin – Cumulative effect by component**  
Dec/2018 to Dec/2019 (12-month period)



[Statistical annex](#)

Risk-adjusted net interest margin<sup>45</sup> decreased in the semester ended in December 2019 due to an increase in LLP (+14.5 billion). The increase in provisions is in line with the aforementioned changes in the credit portfolio mix and helped to strengthen the resilience of the system to withstand the impacts of Covid-19 on the economy. Furthermore, the addition in provisions<sup>46</sup> served to smooth the extraordinary income resulting from the CSLL tax rate increase (Charts 1.3.3 and 1.3.4).

Despite a reduction in spreads in most of the credit portfolio clusters, the change to a more profitable mix and the gradual resumption of credit were positive for the banking systems' credit income in 2019 (Chart 1.3.5). However, increased competition in the financial system and the development of capital markets (which is increasingly seen as an alternative source of funding for firms) may affect the earnings of the banking system in the coming periods. In addition, the credit growth which has been important to sustain banks' profitability at the current levels may have its dynamics affected significantly by the effects of the COVID-19 pandemic on the economy, which may also pressure banks' profitability in the following periods.

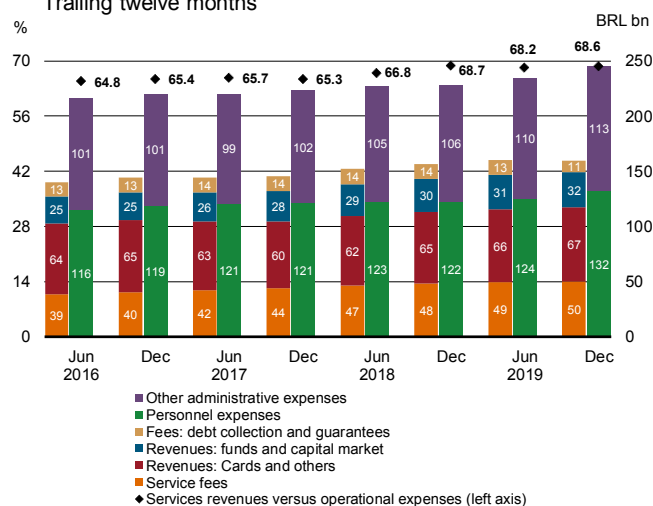
Services income increased in the semester ended in December 2019, when compared to the previous semester. The largest contribution came from capital markets revenues, which were driven mostly by equity (IPOs and follow-on transactions) and fixed income (mostly debentures) underwriting fees. Another key element for the increase in services income was the growth in revenues from asset management fees, which was mostly influenced by the gradual increase in assets under management. The revenue growth from these services helped to offset a reduction in income from acquiring services (credit and debit cards' market).

The ratio of services income to administrative expenses increased slightly in the semester ended in December 2019, as services income grew more (5.2%) than administrative expenses (4.5%) in the period (Chart 1.3.6). One-off expenses associated with new rounds of staff layoffs and restructuring processes negatively

<sup>45</sup> The only difference between the net interest margin and the risk-adjusted net interest margin is that, in the later, LLP expenses are deducted from the interest income from credit and securities before subtracting the cost of funds.

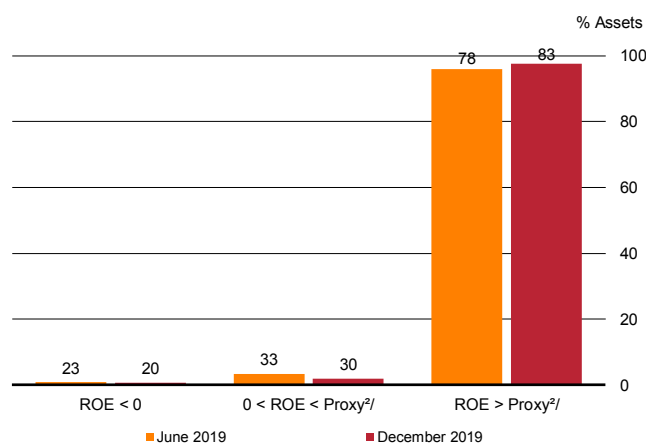
<sup>46</sup> According to the financial statements and other reports of the larger banks, about BRL15 billion in LLP expenses were added in the period. The increase in provisions helped to strengthen banks' resilience to credit risk and served to smooth the extraordinary income resulting from the CSLL tax rate increase.

**Chart 1.3.6 – Main components of administrative expenses and services income**  
Trailing twelve months



[Statistical annex](#)

**Chart 1.3.7 – Return on equity (ROE) frequency distribution<sup>1/</sup>**



<sup>1/</sup> Values above the bars represent the number of financial institutions in the correspondent ROE range.  
<sup>2/</sup> Risk-free rate proxy.

[Statistical annex](#)

affected the operational efficiency gains observed in previous periods (which resulted from administrative<sup>47</sup> restructuring policies). However, banks constant search for cost control, the digitization of banking services and the diversification of revenue sources sustain the prospect of gains in operational efficiency for the coming periods. It should be noted, however, that the current Covid-19 pandemic scenario may hamper growth in services income in the forthcoming months.

The number of banks with losses reduced from 23 to 20 between June and December 2019. Institutions that reported a loss in the previous period and closed their activities during the second semester of 2019 influenced this reduction. Excluding these events, the number of banks reporting losses would have remained stable. Additionally, there was an increase in the representativeness and the number of banks with ROE above the risk-free rate proxy, which reflects an increase in profitability also for small and medium-sized banks (Chart 1.3.7).

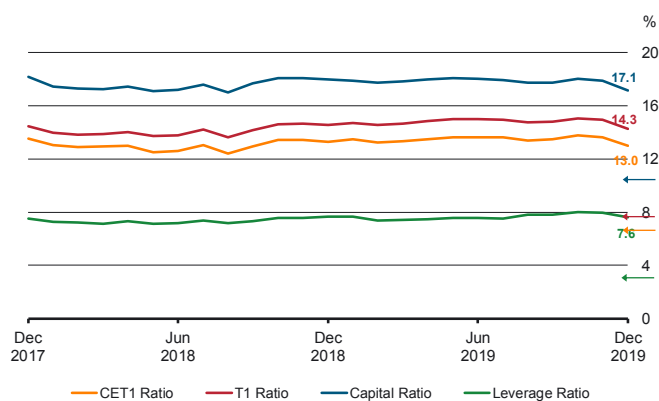
The economic environment throughout 2019 was largely positive for banks, including for those mostly affected by the recession in 2015 and 2016. Banks that operate in the “Corporate Credit”<sup>48</sup> segment continue to face challenges to grow their credit portfolios, especially as capital markets are increasingly seen as an alternative to meet the demand of large companies for funding. The segment of “Treasury and investment activities”<sup>49</sup> banks also faces pressure on their securities intermediation margins with the Selic rate reductions. However, the profitability of this bank segment improved since mid-2018 through revenue diversification and growth in services income (mainly driven by underwriting fees from IPOs and follow-ons). It is important to highlight that the development of digital platforms facilitates the performance of these two bank segments in other business niches (e.g. credit or services) and in new market regions, which is a positive factor in a market environment that is increasingly less dependent on face-to-face services.

<sup>47</sup> Refers mostly to voluntary severance programmes and the closure of branches.

<sup>48</sup> The “Corporate Credit” bank segment is comprised of banks and banking conglomerates that focus mostly on corporate consumers with outstanding credit balances of above BRL1 million.

<sup>49</sup> The “Treasury and investment activities” bank segment is comprised of banks and banking conglomerates with operations that rely more significantly on earnings from securities and trading activities (in bonds, repurchase agreements – repos – and other securities).

Chart 1.4.1 – Capital Ratios and regulatory requirements<sup>1</sup>

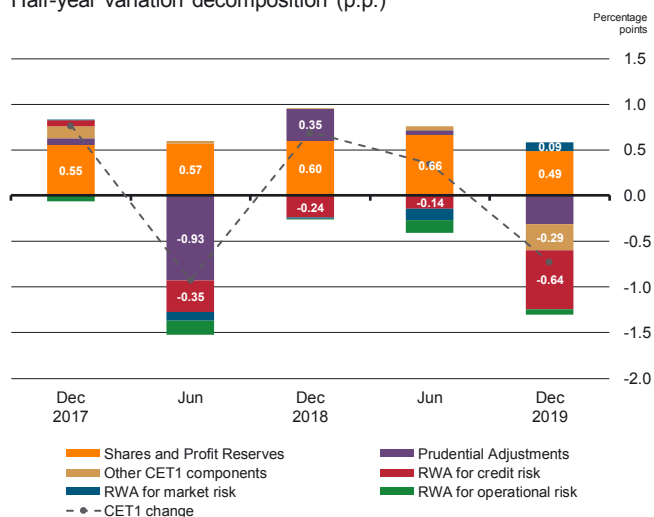


1/ The arrows represent the regulatory requirements for different capital tiers, including Conservation Buffer (7% for CET1 Capital, 8.5% for T1 Capital, 10.5% for Total Capital and 3.0% for Leverage ratio). The leverage ratio data considers only Commercial, Multiple, Foreign Exchange, Investment and Saving banks classified as S1 or S2, according to the Resolution BC no 4,615/17.

[Statistical annex](#)

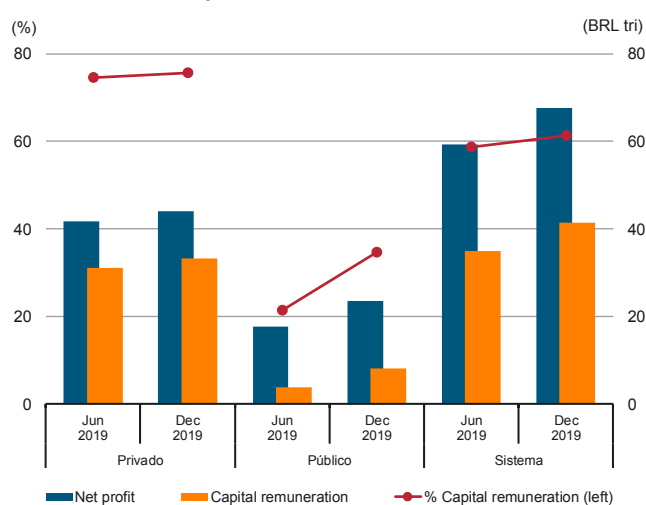
Chart 1.4.2 – CET1 variation dynamics

Half-year variation decomposition (p.p.)



[Statistical annex](#)

Chart 1.4.3 – Capital remuneration



[Statistical annex](#)

## 1.4 Solvency

The banking system continues presenting high capital ratios in the second half of 2019, a defense to the likely adverse effects from Covid-19 pandemic. Despite the slight decrease in the last half of the year, the indexes keep significantly above the minimum regulatory requirements (Chart 1.4.1). Policy measures announced by the CMN<sup>50</sup> and federal government<sup>51</sup> on March, specially the capital conservation buffer reduction, aim to reinforce the regular markets functioning and the credit availability to the real economy.

The system's CET1 ratio decreased to 13% versus 13.6% in June 2019, reflecting specially the average risk weight increase (6%) due to the credit portfolio growth, impacting the credit risk RWA (Chart 1.4.2).

The CET1 showed stability (+0.1%) given the retained earnings (BRL26.2 billions) was balanced by prudential adjustments<sup>52</sup> elevation and capital instruments redemption (BRL8.8 billions). Institutions enhanced the system earnings payout<sup>53</sup> amount and percentage from 58.7% to 61.3% (Chart 1.4.3). The other capital tiers presented similar trend<sup>54</sup> and the CET1, the best quality capital, accounts for 75.5% of total resources.

50 The Resolution 4,782, of March 17, 2020, established temporary criteria for credit restructuring. The Resolution 4,783, of March 17, 2020, reduced during a limited time the capital requirement of the Conservation Buffer (ACP<sup>Conservação</sup>), in line with measures adopted by other Basel III jurisdictions. The Resolution 4,784, of March 20, 2020, extends the period when deferred tax assets (DTA) due to overhedge of overseas investments may not be subject to prudential adjustment in the Common Equity Tier I calculus. Further information, see section 2.2.

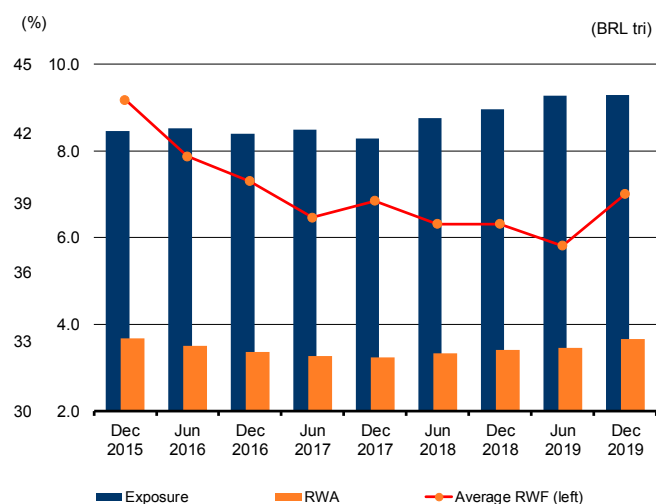
51 The Provisory Measure 930/2020 guarantees and gives liquidity provided by the Treasury until December 31, 2022, to overhedge DTA originated between January 1<sup>st</sup>, 2018 and December 31, 2020. Therefore, DTA will not rely on future profitability to be released and will not be susceptible to prudential adjustment until 2023.

52 The Prudential adjustments growth stems principally from temporary differences DTA – up BRL17.9 bi, 48.4% – influenced by Constitutional Amendment 103, of November 12, 2019, which increased the CSLL tax on banks from 15% to 20%. Desconsidering the tax increase, ceteris paribus, the system's CET1 ratio would be 12.6% instead of registered 13%.

53 Payout ratio comprises the percentage of net profit distributed to shareholders in the form of dividends and interest on own capital.

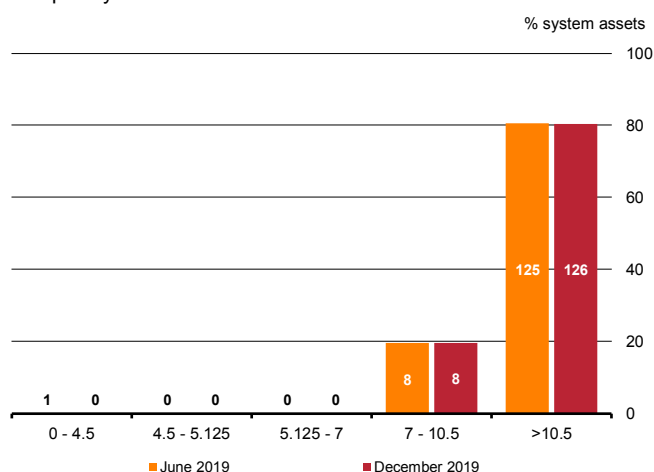
54 From January 2020 on, due to the Resolution 4,679, of July 31, 2018, 90%, at maximum, of constitutional funds issued before the Resolution 4,192/2013 and recognized as Tier II in June 2018, will be considered in total capital. These resources amount BRL66 billion in December 2019 and BRL64 billions constituted regulatory capital (8.4% of system total capital).

**Chart 1.4.4 – Average risk weighting factor**



[Statistical annex](#)

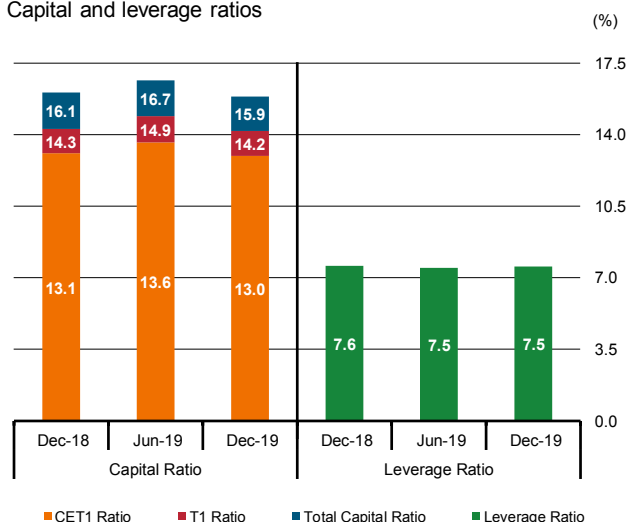
**Chart 1.4.5 – Common Equity Tier I (CET1) Frequency distribution**



1/ Inside the bars are the # of financial institutions in the correspondent CET1 ratio range.

[Statistical annex](#)

**Chart 1.4.6 – Fully-fledged Basel III – 2022\* Capital and leverage ratios**



\* Fully-fledged Basel III simulation excludes all capital instruments that have not been issued according to Resolutions BC nº 4,192/13 and nº 4,679/18. The leverage ratio data considers only Commercial, Multiple, Foreign Exchange, Investment and Saving banks classified as S1 or S2, according the Resolution BC nº 4,615/17.

[Statistical annex](#)

The RWA growth (5.2%, BRL228.1 billions) reflects in most part private institutions<sup>55</sup> credit risk and proceeds from the exposure increase to higher risk weights (Chart 1.4.4),<sup>56</sup> as credit and DTAs.<sup>57</sup> The market risk RWA share contracted from 7% to 6%, with expressive reduction in the foreign exchange coupon component (-48.7%). Meanwhile, the operational risk RWA presented evolution of 5.1% reaching 12.9% of the total RWA.

Reflecting the comfortable system solvency ratios, the CET1 histogram demonstrates all institutions comply with the 7% of the RWA capital requirement in December 2019 (Chart 1.4.5). Only one institution, which accounts for 0.1% of system assets, breaches some of the Basel minimum requirements.

Other capital ratios present small decrease, although perform significantly above the minimum regulatory requirements (Chart 1.4.6).

Prospectively, the sustainable profit generation and the capital surplus allow a credit portfolio expansion of, at least, BRL3,3 trillions,<sup>58</sup> considering the framework in course at the end of 2019. Including the effects of capital conservation buffer reduction and the postponing of prudential adjustment related to overhedge DTAs established in the Resolutions 4,783/2020 e 4,784/2020, respectively, to combat the adverse economic effects of Covid-19, the BCB estimates a BRL102 billions capital relief, increasing the credit concession potential<sup>59</sup> in approximately BRL1,2 trillion, paving the way for better conditions<sup>60</sup> in credit restructuring eventually required.

55 The RWA grew 7.1% and 1.3% in private and public institutions, respectively. Considering only the credit risk, these growth percentages were 9.2% for private and 1.1% for public.

56 Average risk weight went from 37.1% to 39.4% in the 2020 second half, accounting for 6.06 pp of the 6.18 pp growth in the credit risk RWA and the exposure stands for the residual share.

57 Consequence of the Constitutional Amendment 103/2019, as mentioned in the note 46.

58 The current credit portfolio is BRL3.3 trillions.

59 Capital conservation buffer reduction accounts for BRL56 billions capital relief and the overhedge DTA prudential adjustment postponing for BRL46 billions. These measures enhance the credit concession potential in BRL640 billions and BRL520 billions, respectively. For further information, see <https://www.bcb.gov.br/en/about/covid-19-measures>.

60 Approximately BRL3.2 trillions in credit portfolio would be open for restructuring.

## 1.5 Capital stress tests

Capital stress tests are financial stability tools that assess the resilience of the banking system related to its ability to absorb losses in adverse macroeconomic scenarios. The tests simulate effects on the banking system's capital adequacy ratios, stemming from extreme shocks in the main economic-financial variables. In addition, simulations of sensitivity analysis to the main risk factors undertaken individually and contagion among financial institutions<sup>61</sup> complement the analysis.

Results hereby presented considered the economic outlook as of December 2019. However, scenarios significantly changed over the first quarter of 2020 due to the Covid-19 pandemic. Possible impacts of the Covid-19 are analysed in chapter 2.

Stress tests results indicate that the banking system maintains its loss absorbing capacity against all simulated shocks, with no relevant capital shortfalls due to noncompliance<sup>62</sup> or insolvency events. The results are the consequence of the appropriate capitalization cushion, as well as the resilience of banks' profitability even under extreme scenarios.

Sensitivity analysis demonstrate that sudden FX rate shocks may generate capital shortfalls if an event stronger than the most extreme FX event recorded, in 1999,<sup>63</sup> materializes. Shocks on interest rates point to some risks arising from abrupt increases in rates. Regarding credit risk, the system showed a small increase in capital shortfalls compared to the previous simulation, as of June 2019. The sensitivity to residential real estate prices also demonstrated slightly higher capital shortfalls with respect to the December 2018 simulation, albeit not reflecting any relevant risks from exposures to mortgages on banks balance sheet.

---

61 The scope of the contagion simulation embraces all authorized institutions to operate by the BCB, except consortiums. The scope of macroeconomic stress tests comprehends only banks.

62 A financial institution is deemed non-compliant if it does not comply to at least one of the capital requirement ratios: total capital ratio, tier 1 and common equity tier 1.

63 Resolution 4,784, of 2020 and Provisional Measure 930 have mitigated these effects by postponing the deduction of deferred tax assets arising from a subset of FX positions; and altering the tax regime, respectively.

## 1.5.1 Scenario analysis – Macroeconomic stress tests<sup>64</sup>

Table 1.5.1.1 displays the economic variables for the different stress test scenarios: Baseline, Structural Break and Worst Historical. Each scenario brings different stressed values in each of the twelve quarters of the test horizon, and only the values of the last quarter are presented.

**Table 1.5.1.1 – Macroeconomic stressed scenarios (december/2022)**

| Variables                                                 | Scenarios |                             |                  |                  |
|-----------------------------------------------------------|-----------|-----------------------------|------------------|------------------|
|                                                           | Dec 2019  | Base Scenario <sup>1/</sup> | Structural Break | Worst Historical |
| Output (IBC-Br)                                           | 0.8%      | 2.5%                        | 1.2%             | -4.0%            |
| Domestic Interest Rates (Selic)                           | 5.9%      | 5.5%                        | 10.9%            | 9.2%             |
| Exchange Rate (BRL/USD)                                   | 4.12      | 4.06                        | 5.93             | 7.69             |
| Inflation (annual IPCA)                                   | 4.3%      | 3.6%                        | 6.8%             | 9.0%             |
| Unemployment (PNAD-C IBGE)                                | 11.0%     | 11.0%                       | 16.1%            | 14.2%            |
| Country Risk (Brazil EMBI+) <sup>2/</sup>                 | 231       | 231                         | 684              | 696              |
| Foreign Int. Rates (US G. Bonds Yield 10yr) <sup>4/</sup> | 1.8%      | 1.9%                        | 2.4%             | 2.3%             |

1/ Forecasts for GDP, SELIC, FX and inflation rates collected from the Focus survey published in December 31, 2019. Both unemployment and country risk remain constant.

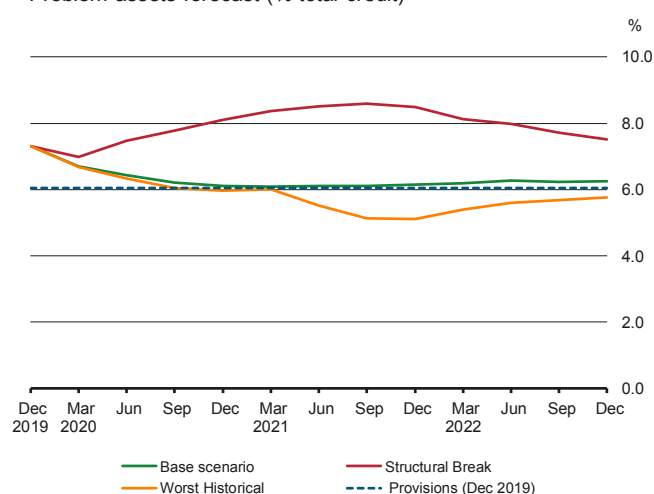
2/ The table shows the maximum values for the EMBI+Brazil in each scenario. For Structural Break scenario, the EMBI+Brazil peak of 684 is reached in June 2021. For the Worst Historical scenario, the maximum level is reached in December 2022.

3/ The method employed for building each scenario can be found in the annex Concepts and methodologies – Capital stress.

4/ For the Baseline scenario, the trajectory of the US G. Bonds Yield 10yr was extracted from the Federal Reserve (FED) Adverse Scenario in Dodd-Frank Act Stress Testing (DFAST) 2019 (<https://www.federalreserve.gov/newsevents/pressreleases/files/bcreg20190213a1.pdf>). For the Structural Break and Worst Historical scenarios, forecasts are based on historical behavior of the variable.

### Statistical annex

**Chart 1.5.1.1 – Macroeconomic stress test**  
Problem assets forecast (% total credit)



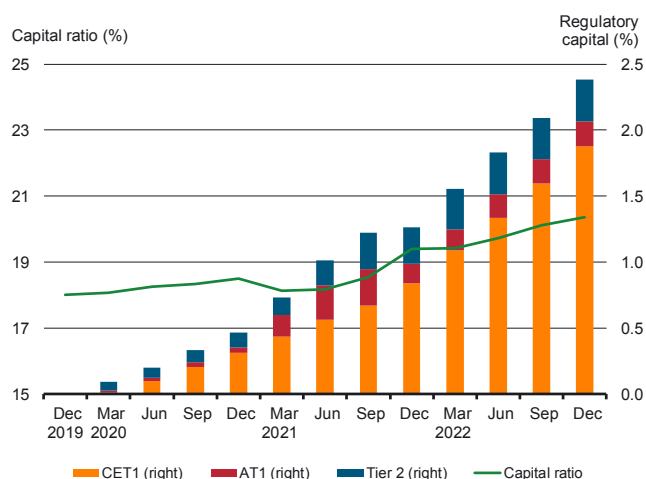
### Statistical annex

The Structural Break scenario is obtained by applying the observed changes of economic variables in previous periods on the current levels by means of a quarterly rolling window. The financial system's most unfavourable historic path within an eight-quarter horizon is chosen, for each variable independently. The Worst Historical scenario simulates the historical behaviour of each variable by choosing the patterns observed in a twelve-quarter rolling window since July 2003, which would result in the banking system's highest capitalization needed to replenish capital ratios to original status.

Chart 1.5.1.1 shows that under the worst-case scenario problem assets would reach 8.6% of the total loan portfolio.

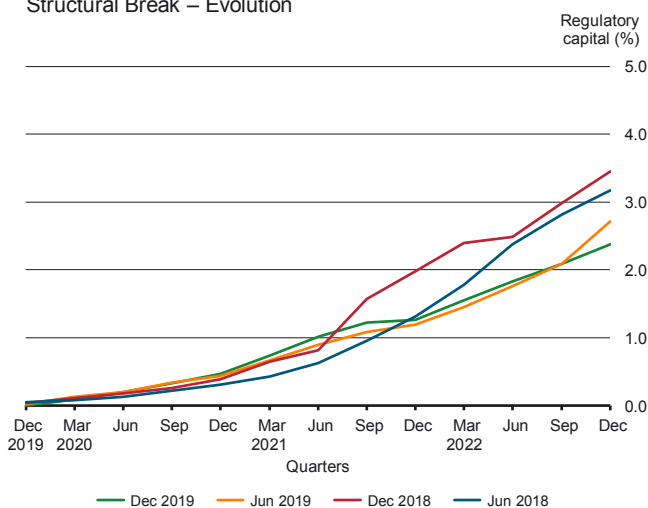
<sup>64</sup> The stress test assumptions are in accordance with the Resolution no 4,680, of July 30<sup>th</sup>, 2018.

**Chart 1.5.1.2 – Capital requirement gap and Capital ratio**  
Structural Break



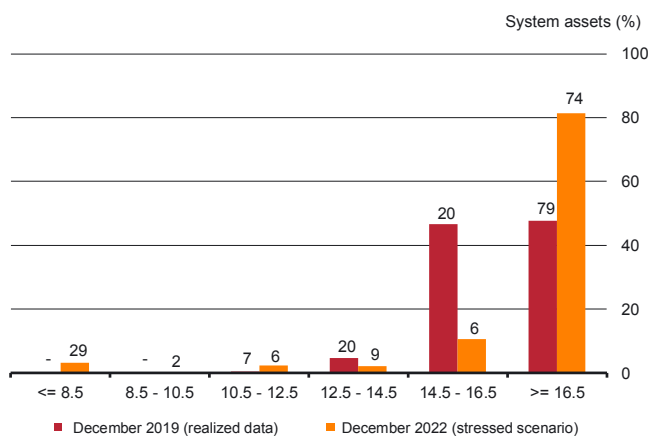
[Statistical annex](#)

**Chart 1.5.1.3 – Capital requirement gap**  
Structural Break – Evolution



[Statistical annex](#)

**Chart 1.5.1.4 – Macroeconomic stress test**  
Frequency distribution of system assets by Capital ratio band – Structural Break<sup>1/</sup>



<sup>1/</sup> The value above each bar represents the number of institutions per band.

[Statistical annex](#)

The estimated additional<sup>65</sup> capital to avoid both noncompliance as well as dividends distribution limitations amounts to 2.4% of the current regulatory total capital as shown in Chart 1.5.1.2. Compared to the three previous semesters, capital shortfall is lower (Chart 1.5.1.3). These results are reached using the same set of rules and methodologies in place by December 2019.

Dispersion analysis of the total capital adequacy ratios demonstrates that most of the institutions would keep ratios above the minimum regulatory requirements (10.5%). This group represents about 96% of the total assets of the banking system (Chart 1.5.1.4).

## 1.5.2 Sensitivity analysis

Sensitivity analysis measures impacts on the banking system's capital arising from incremental changes in interest rates, foreign exchange rates, problem assets and residential real estate prices, all of them independently and not assuming banks reactions to the changes and without considering future profitability. In the case of problem assets, only increases are considered; for mortgage prices, only decreases are analysed. For interest rates and FX (foreign exchange), both increases and decreases are simulated.

Shocks alter FX (foreign exchange) rates in steps of 10%, over a range of values with lower and upper bounds corresponding to 10% and 200% of the original values. Within this range, the system would need additional capital that amounts to 7.7% of current levels so that all institutions remain compliant with minimum requirements – which happens if exchange rate jumped 70%, to BRL6.80 per US dollar – the highest variation of the time series, occurred in December 2019. See Chart 1.5.2.1.

This FX sensitivity analysis assumes the effect of different tax regimes to foreign investments and corresponding hedge or overedge. Banks typically assume short FX positions more than their respective investments abroad, thus considered an 'overhedge'. If Provisional Measure no. 930 turns into permanent legislation, one key economic reasoning behind overhedge will no longer exist, fixing a taxation originated distortion.

<sup>65</sup> The concept of capital shortfall encompasses the amount necessary to avoid both minimum capital non-compliances as well as limitations on profits distributions imposed by Resolution 4,193, of March 1<sup>st</sup>, 2013, in which systemically important financial institutions are subject to the systemic buffer requirement (ACP<sub>Sistêmico</sub>).

**Chart 1.5.2.1 – Sensitivity analysis**  
Exchange rate risk

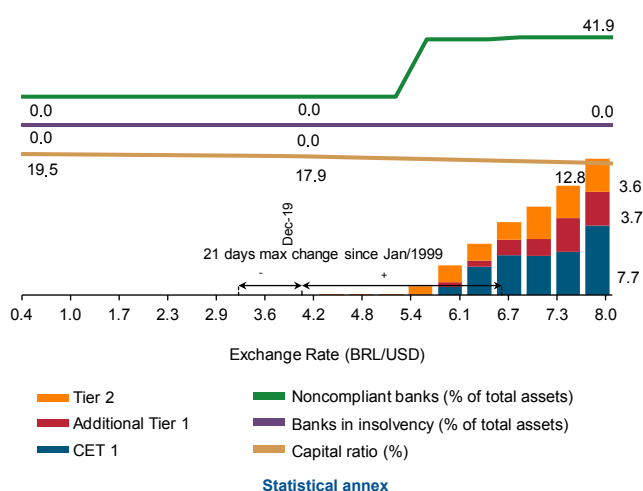


**Chart 1.5.2.2 – Sensitivity analysis**  
Interest rate risk

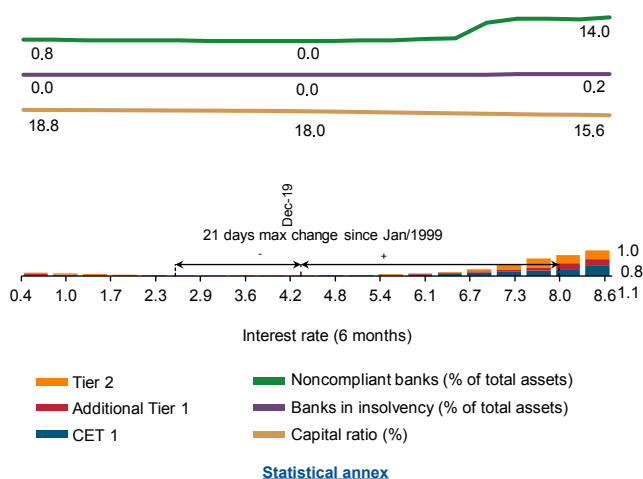
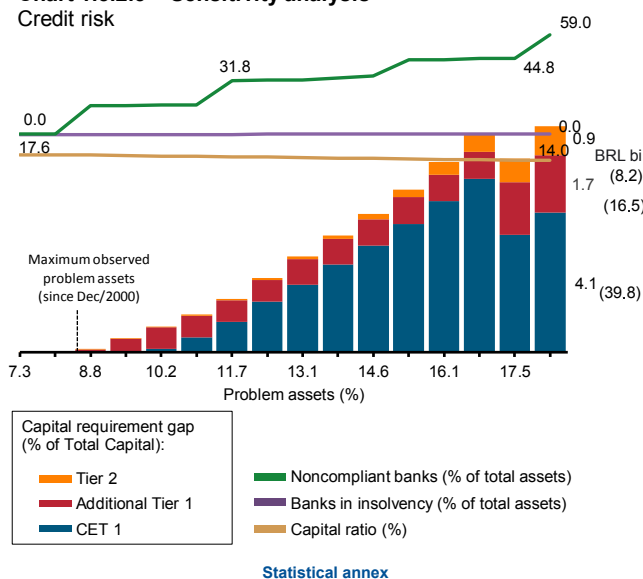


**Chart 1.5.2.3 – Sensitivity analysis**  
Credit risk



In the case of interest rates, variations have been applied to all vertices of the term structure. If rates repeat the most severe variation in the time series,<sup>66</sup> the additional capital needed to avoid non-compliance would amount to 2.9% of total regulatory capital. Affected banks would represent 14% of total assets of the financial system, as shown in Chart 1.5.2.2.

Results of the sensitivity tests to incremental credit risk shocks (Chart 1.5.2.3) indicate that problem assets would need to reach 9.5% of total loans portfolio so that the system required an additional 0.4% of total regulatory capital. This is a higher level than the maximum historical problem assets level of 8.55% seen in May, 2017.<sup>67</sup> Under extreme conditions, if problem assets reached 18.0% of total loans, there would be a capital shortfall equivalent to 6.7% of the total regulatory capital of the system, stemming from institutions that represent 59% of banks total assets.

The assessment of reductions in residential property prices indicates that there is no regulatory breaching or dividend distribution limitation for nominal price drops of up to 25%, like S&P Case-Shiller drop observed during the 2008 subprime crisis in the US market. Only price slumps of 30% or more would lead to insolvency, represented by negative CET1 (Chart 1.5.2.4).

In December 2019, the average loan-to-value (LTV) on mortgages outstanding balance was 61.6%, when revaluing collateral prices by the Residential Mortgage Collateral Value Index (IVG-R).<sup>68</sup> Credit granted with low LTV, in addition to the utilization of the Constant Amortization System that reduces LTV during the lifetime of the loan, are healthy features for the mortgage loans and contribute to improving the system's loss absorbing capacity under extreme scenarios.

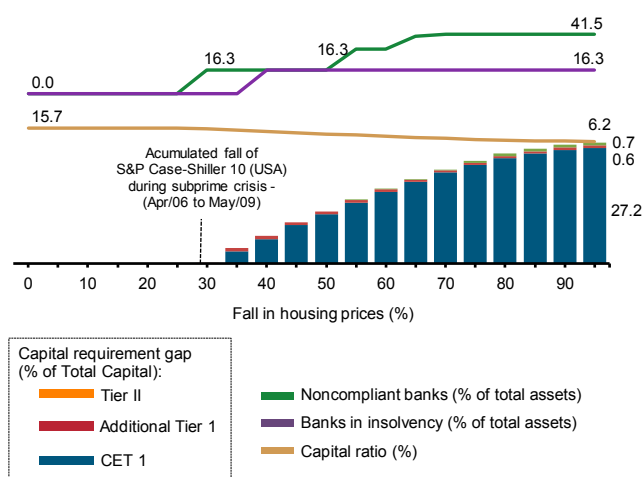
Therefore, sensitivity analyses confirm that the Brazilian banking system continuously presents sound loss absorbing capacity since relevant capital shortfalls would only happen under extremely adverse situations. The results of the stress tests simulations suggest that the banking system has an adequate capital cushion to withstand severe shocks stemming from the hypothetical worsening of economic fundamentals.

<sup>66</sup> Over a 21 days period, the six-month rate varied approximately 210% at its most severe period observed since 1999.

<sup>67</sup> Prior to January 2012, comparisons consider the weight of E-through H-rated loans to total loans.

<sup>68</sup> The IVG-R is calculated and disclosed by the BCB based on the values of realty used as real estate financing collateral.

**Chart 1.5.2.4 – Sensitivity analysis**  
Housing prices risk



[Statistical annex](#)

### 1.5.3 Simulation of direct interbank contagion

In addition to the macroeconomic and sensitivity stress tests, direct inter-financial contagion simulations take place, comprising all financial entities authorized by the Central Bank, except for consortiums. In this exercise, all direct national inter-financial exposures are considered, although second-order effects such as fire sales or liquidity are not considered.

In the assessment of direct inter-financial contagion, the individual failure of each financial institution is simulated, one at a time, and the impact on its counterparties is evaluated. If the failure of one institution leads to a breach on its counterparties, additional rounds are run until a new equilibrium is found (domino effect). The impacts stem from the write-off of exposures to different instruments, such as interbank deposits, granting of guarantees, OTC (over the counter) derivatives, or any other entailing credit risk, in which there are neither third-party guarantees nor collateral. With the bankruptcy simulation, the exposures identified cause losses to creditors, and the effects are evaluated from the perspective of the amount of capital required to recompose legal requirements.

Results show a low capital shortfall in case of default of each institution separately. In the worst scenario, the figure is less than 1% of the regulatory capital of the entire system. Two points help explain this result. Firstly, there is a regulatory cap of 25% on exposures to any single counterparty, as a proportion of the creditor institution's capital. Secondly, the great majority of inter-financial transactions occurs through repurchase agreements collateralized by federal bonds, which don't propagate contagion. The remaining operations, although small in aggregate volume in the financial system, may be relevant in specific cases, thus explain the above zero regulatory capital shortfall measured.

## 1.6 Financial Stability Survey

### 1.6.1 Introduction

The Financial Stability Survey (FSS) aims to identify and monitor risks to financial stability according to the perception of regulated entities. The survey is answered by executives responsible for the strategic risk management of these entities.

The sample of this FSS is formed by 55 financial institutions, which together hold 93.4% of the national financial system's assets as in December 2019. There are public banks, foreign banks, and private Brazilian banks with and without foreign shareholders in the sample. It encompasses institutions in the prudential regulation segments S1, S2, S3 and S4.

Since the last edition of the FSR, two surveys rounds have been carried out, from October 16<sup>th</sup> to 24<sup>th</sup>, 2019, and from January 27<sup>th</sup> to February 3<sup>rd</sup>, 2020, both with a 100% response rates. During the data collection period of the last FSS, the Covid-19 crisis was limited to regions in China. However, many financial institutions have voiced concern about the possibility of the virus spreading to other parts of the world, restraining economic activity and trade flow.

This section compares the results of these last two surveys with those from the survey carried out between July 29<sup>th</sup> and August 9<sup>th</sup>, 2019, published in the October 2019 FSR.

In the last FSS, the risks arising from the foreign scenario are still considered the most prominent, with emphasis on those related to the development of the coronavirus outbreak and of the trade tensions between China and the US.

In the domestic market, financial institutions still highlighted the risks related to the continuity of the reform agenda, in addition to political issues. Recently, they also have become concerned with the possible effects associated with structurally lower interest rates and increasing competition in the credit market.

The perception of economic and financial cycles remained moderately positive. The assessment of the economy being in the recovery phase remains predominant, with a growth in the number of citations classifying it as in the expansion phase. The perception of the credit gap with an upward trend has gained strength. Respondents perceived an increasing trend in the risk-taking appetite of financial institutions. The prevailing view of the level of asset prices in relation to the fundamentals of the economy has gone from low to high, although with an increasing number of perceptions of a downward trend. The upward trend in household leverage is gaining momentum. Regarding firms leverage, the view that still prevails is that it is in a low level, although with an increasing assessment of an upward trend.

Confidence in financial stability remains high, and the financial system ability to respond to relevant events is rated as satisfactory.

The significant majority of respondents expected and recommended that the value of ACCP<sub>Brasil</sub> should not be changed, which in fact happened, suggesting expectations alignment regarding the capital buffer necessary to ensure the stability of the financial system.

## 1.6.2 Risks to financial stability

Respondents described their perception of the main risks to financial stability over a three-year horizon, considering the probability of occurrence and impact on SFN.<sup>69</sup> The frequency of the four most cited risk categories<sup>70</sup> in the last FSS is shown in Table 1.6.2.1.<sup>71</sup>

**Table 1.6.2.1 – FSS – Average frequency of the most cited risks**

| Risk                              | Average frequency (citations/financial institution) |          |          | Probability | Impact |
|-----------------------------------|-----------------------------------------------------|----------|----------|-------------|--------|
|                                   | Aug 2019                                            | Nov 2019 | Feb 2020 | Feb 2020    |        |
| Foreign Scenario                  | 1.11                                                | 1.15     | 1.27     | Mid-High    | Medium |
| Political-Fiscal Risks            | 0.98                                                | 0.84     | 0.67     | Mid-High    | High   |
| Delinquency and Economic Activity | 0.49                                                | 0.44     | 0.40     | Mid-High    | Medium |
| Exclusively Political Risks       | 0.07                                                | 0.29     | 0.31     | Mid-High    | High   |

[Statistical annex](#)

Risks related to the foreign scenario continue to be the most cited. In February 2020, the average frequency of citations was 1.27 per institution, compared to 1.15 and 1.11 in November and August 2019, respectively. According to the financial institutions' perception, the main foreign-scenario concerns refer to the possibility of a reduction in the Chinese and global activity – especially in view of the new coronavirus – and to trade disputes between China and the US, with potential impacts on the capital flow to emerging economies. These risk factors could impose restrictions on the Brazilian economy

69 Question: “In the next three years, what are the risks to the financial stability that your institution considers most relevant considering probability and impact on the SFN? Describe the three risks in order of importance (the most important first, considering the combination of probability of occurrence of the event and the magnitude of the impact in terms of losses measured as a fraction of the total assets of the SFN)”.

70 Each institution describes three risks in a textual form, sorted by importance, given by the probability of occurrence of the risk and its impact in the case of materialization. These textual descriptions are then classified by the BCB into risk categories with the purpose of performing a systematic analysis.

71 Since the same institution can describe two or more risks that could later be classified into the same risk category (for example monetary policy in the US and trade war are classified as foreign-scenario risks), the average frequency of citations/financial institution can vary between zero and three.

recovery pace by increasing uncertainties, such as through increased volatility in asset prices and greater difficulty in accessing markets for tradable goods. It should be noted that the survey was conducted before the international financial markets stress that started in February 24<sup>th</sup>.

With the approval of the pension reform, the political-fiscal risks dropped significantly, with an average frequency of citation of 0.67 per institution in the last FSS (compared to 0.84 and 0.98 in the surveys of November and August 2019). However, there are still concerns with the continuity of the reform agenda.

The average frequency of citations of risks associated with delinquency and economic activity reduced moderately in the last three surveys, reaching 0.40 per institution in February 2020, reflecting expectations regarding the recovery pace in the activity level.

In the recent period, exclusively political risks related to governance have increased from an average frequency of citation of 0.07 per institution in August 2019 to 0.29 in November 2019 and then 0.31 in the last survey.

Although there are few citations to date, concerns about risks associated with structurally lower domestic interest rates and increased competition in the credit market have begun to emerge. Some respondents believe that these conditions could create imbalances in the credit market – such as an excessive increase in indebtedness and lower quality credit – and affect the profitability of institutions, especially small and medium-sized banks.

**Table 1.6.2.2 – FSS – Citation frequency of the most important risk**

| Risk                              | Frequency (%) |          |          | Probability | Impact |
|-----------------------------------|---------------|----------|----------|-------------|--------|
|                                   | Aug 2019      | Nov 2019 | Feb 2020 | Feb 2020    |        |
| Foreign Scenario                  | 31            | 51       | 53       | Mid-High    | High   |
| Political-Fiscal Risks            | 49            | 33       | 25       | Mid-High    | High   |
| Delinquency and Economic Activity | 15            | 7        | 7        | Mid-High    | High   |
| Exclusively Political Risks       | 2             | 5        | 7        | Mid-High    | High   |

[Statistical annex](#)

The above analysis remains valid in qualitative terms when only the risk classified as the most important among the three described by the respondents is considered (Table 1.6.2.2). For example, the risks associated with the foreign scenario continued to gain prominence and represent 53% of citations, compared to 31% in August 2019. In contrast, the citing frequency of political-fiscal risks reduced (25% compared to 49% in August

[illegible]

To represent the universe of concerns of respondents when describing the most important sources of risks, a “word cloud”<sup>72</sup> is compiled from a textual analysis of answers obtained in the last survey (Chart 1.6.2.1). This representation is complementary to the risk categorization presented above, as it facilitates the identification of the risk scenarios that are most often objects of attention and concern by respondents. In this chart, the font size of words is proportional to the frequency of their use.

Regarding the domestic scenario, concerns related to the continuity of the government's reform agenda and governance are often mentioned (“agenda”, “fiscal”, “reforms”, “government”, “political”, “continuity”, “tax”, “administrative” and “worsening”). Regarding economic activity and lower interest rates, the words “rates”, “interest”, “appetite”, “credit”, “inability”, “delinquency”, “companies” and “population” stand out.

April 2020 | Financial Stability Report | 42

[illegible]

The word “coronavirus” was frequently mentioned in the February 2020 survey, but was not mentioned in the previous two surveys, justifying its high relative importance (large font size) in FSS 2020-Q1. Additionally, concerns about the government’s agenda, domestic or US elections, foreign geopolitical tensions and ongoing administrative reform were more prominent in this survey in comparison to the previous ones. In contrast, in the August 2019 survey, respondents were relatively more concerned with the resumption of the economic growth and the approval of the pension reform than in subsequent surveys, when the pension reform had already been approved and optimism regarding the resumption of growth was increasing (the word “optimism” is plotted in green, showing that it is more important in FSS 2020-Q1). There are few words related to the foreign scenario (“war”, “UK”, “emerging” and “tariffs”), showing that, in general, the subject was relatively more important in previous surveys. In fact, the analyses of the FSS 2019-Q4, conducted shortly after the

- 1) For each FSS, the number of occurrences of all words is calculated;
- 2) The relative participation of each word occurrence in each FSS is calculated;
- 3) For each word, the average of the relative participation in the FSS obtained in the previous item is calculated;
- 4) For each word, the maximum (positive) deviation of their relative shares against the overall average is obtained, as well as the FSS to which this maximum refers;
- 5) Words are classified in decreasing order in terms of deviation, as calculated in the previous item;
- 6) The “word cloud” is then assembled with the first 150 words from the above classification. The word is plotted in the area corresponding to the FSS with greatest relative importance among all surveys. The font size of the letters is associated with and proportional to the maximum value calculated in item 4 for the word.

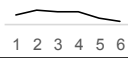
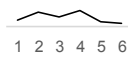
April 2020 | Financial Stability Report | 43

approval of the pension reform, showed that attention, previously focused on domestic risks, had turned to those related to the foreign scenario.

The cited risks identified as the most difficult to mitigate with the adoption of internal strategies<sup>75</sup> are those from the foreign scenario, with an average frequency of citation of 0.73 per institution in the last survey, compared to 0.62 in August 2019. Political-Fiscal risks fell from 0.49 per institution in August 2019 to 0.38 per institution in the last survey.

The most relevant transmission channels of high-impact events in the SFN pointed out by the respondents remained broadly stable in relation to the August 2019 survey, except for the reduction in the importance attributed to the channel “widespread credit rating downgrade, including sovereign ratings”, for which the median of the reported probabilities dropped from 4 to 3 in the last two surveys of the survey (Table 1.6.2.3).<sup>76</sup>

**Table 1.6.2.3 – FSS – Transmission channels of high-impact events**

| Transmission channel                                                                      | Aug 2019<br>(median) | Nov 2019<br>(median) | Feb 2020<br>(median) | Distribution<br>(last survey)                                                         |
|-------------------------------------------------------------------------------------------|----------------------|----------------------|----------------------|---------------------------------------------------------------------------------------|
| Contagion between markets and domestic institutions                                       | 4                    | 4                    | 4                    |  |
| Liquidity squeeze, including interbank markets and foreign credit                         | 3                    | 3                    | 3                    |  |
| Sharp decline in domestic financial asset prices, including collateral prices             | 4                    | 4                    | 4                    |  |
| Increase in risk aversion and uncertainty, affecting consumption and investment decisions | 4                    | 4                    | 4                    |  |
| Decline in depositors confidence, including flight-to-safety                              | 3                    | 3                    | 3                    |  |
| Capital flight or strong currency depreciation                                            | 4                    | 4                    | 4                    |  |
| Widespread credit rating downgrade, including sovereign ratings                           | 4                    | 3                    | 3                    |  |

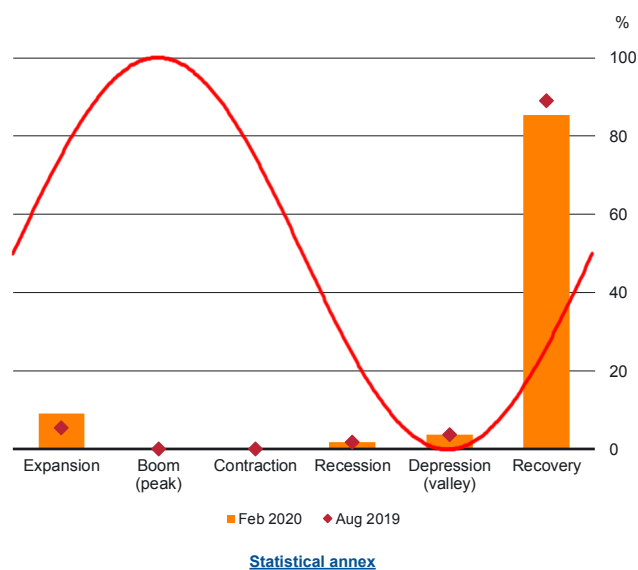
Very low **Probability** 1 2 3 4 5 6 Very high

[Statistical annex](#)

<sup>75</sup> Question: “Which of the risks listed above does your institution consider to be more difficult to mitigate with the adoption of internal risk management strategies by financial institutions without the assistance of measures of the BCB and/or the Federal Government?”. The response may involve more than one risk, so that the frequency of citation can reach values from zero to three.

<sup>76</sup> Question: “In the case of the occurrence of the most relevant event of high impact, what is the probability that this shock will be transmitted by the following channels?”. The reported numbers represent the median of the answers. The last column shows the distribution of responses from the last survey.

Chart 1.6.3.1 – FSS – Economic cycle



### 1.6.3 Financial and economic cycles

The clear majority of institutions maintained the perception that the economic activity continues in the recovery phase (85% of respondents, compared to 89% in the August 2019 survey). In the same period, there was an increase from 5% to 9% in the number of institutions that believed that the economy has entered the expansion phase (Chart 1.6.3.1).

Regarding the credit-to-GDP gap (Chart 1.6.3.2), the prevailing view remains that its level is low (73% of respondents, considering the three corresponding categories). However, the perception of an upward trend has become stronger, reaching 57% of respondents in February 2020 (an increase of 6 pp compared to the August 2019 survey).

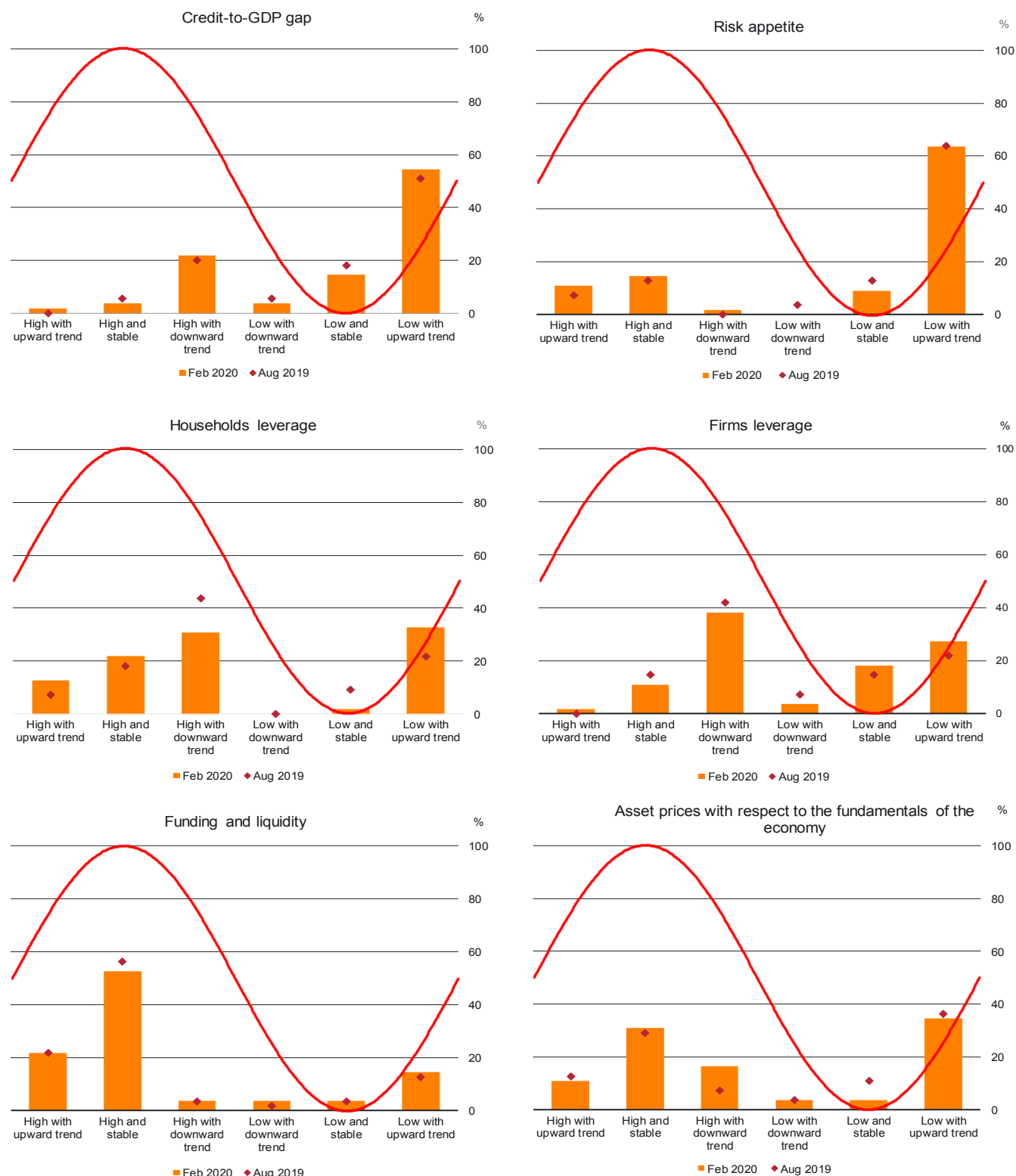
According to the survey, the willingness of financial institutions to take risks has become more positive. The share of institutions that considered the risk appetite to be low and stable decreased from 13% in the August survey to 9% in the February survey. The fraction of respondents who considered the risk appetite as high with an upward trend increased from 7% to 11% in the same period. The share of them who assessed it as high and stable reached 15% (an increase of 2 pp in relation to the August 2019 survey).

The household leverage is still considered high by 65% of respondents (reduction of 4 pp), and the assessment that the trend is upwards has become dominant, reaching 45% in the February 2020 survey compared to 29% in the August survey 2019.

Regarding firms leverage, 51% of respondents classified it as high (decrease of 5 pp). Although there is a predominance of the downward trend view (42% of respondents), the upward trend has become stronger. In the February 2020 survey, 29% of financial institutions believed that firms leverage would increase, compared to 22% in the August 2019 survey.

Most respondents continued to believe that the access to funding and liquidity remained high, with 78% of responses concentrated in the “high” classes in the last survey (reduction of 4 pp), with the prevailing view that this condition is stable (53%), followed by the perception of an upward trend (22%).

Chart 1.6.3.2 – FSS – Financial cycles

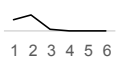
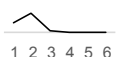


[Statistical annex](#)

Regarding the asset prices with respect to the fundamentals of the economy, there was an increase in the share of respondents who consider that prices are in the high phase of the cycle (58% in February 2019 compared to 49% in August 2019). At the same time, the view of a downward trend grew (20% in February 2020 compared to 11% in August 2019), although still a minority.

## 1.6.4 Resilience and confidence in the financial system stability

**Table 1.6.4.1 – FSS – Financial system capacity of reacting to high-impact events**

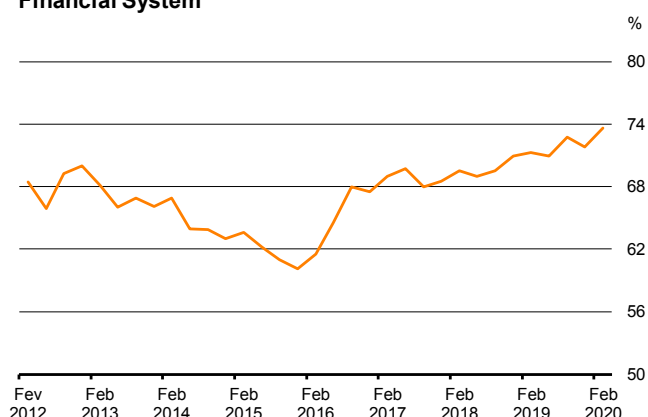
| Financial system resilience factors                                     | Aug 2019<br>(median) | Nov 2019<br>(median) | Feb 2020<br>(median) | Distribution<br>(last survey)                                                       |
|-------------------------------------------------------------------------|----------------------|----------------------|----------------------|-------------------------------------------------------------------------------------|
| Financial system capital adequacy                                       | 2                    | 2                    | 2                    |  |
| Financial system liquidity adequacy                                     | 2                    | 2                    | 2                    |  |
| Financial institutions monitoring and attention                         | 2                    | 2                    | 2                    |  |
| Government and Regulatory Agencies monitoring and attention             | 2                    | 2                    | 2                    |  |
| Instrumental availability for risk prevention and mitigation by the BCB | 2                    | 2                    | 2                    |  |

### Median of the distribution of reaction capacities

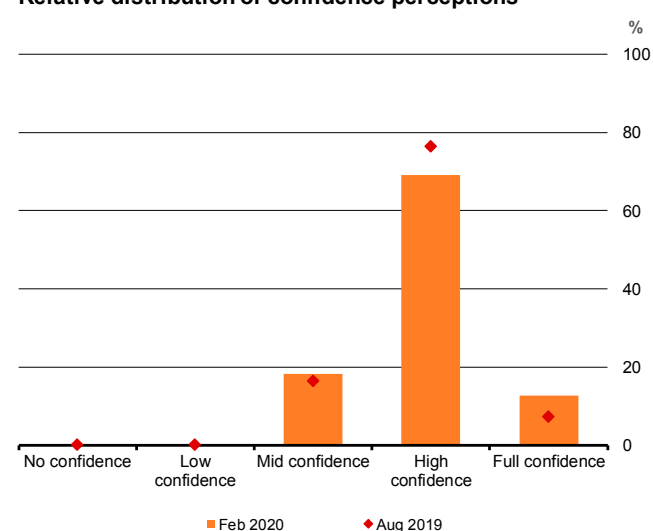
Satisfactory  Unsatisfactory

[Statistical annex](#)

**Chart 1.6.4.1 – FSS – Confidence in the stability of the Financial System**



**Relative distribution of confidence perceptions**



[Statistical annex](#)

The perception of the resilience of the SFN<sup>77</sup> remains positive (Table 1.6.4.1). The results show a high degree of agreement between the institutions on the adequacy and sufficiency of the instruments available to face a scenario of a serious financial crisis, in case of materialization.

The aggregate confidence index in the stability of the financial system<sup>78</sup> maintained the upward trend initiated in 2016, reaching a historical high of 74% in February 2020, compared to 73% in August 2019 (Chart 1.6.4.1). The share of respondents that state a full confidence in the financial system increased from 7% in August 2019 to 13% in February 2020, while the share of those who have high confidence decreased from 76% to 69%. There have been no records of negative assessments (“no confidence” and “low confidence” classes) in the past thirteen quarters.

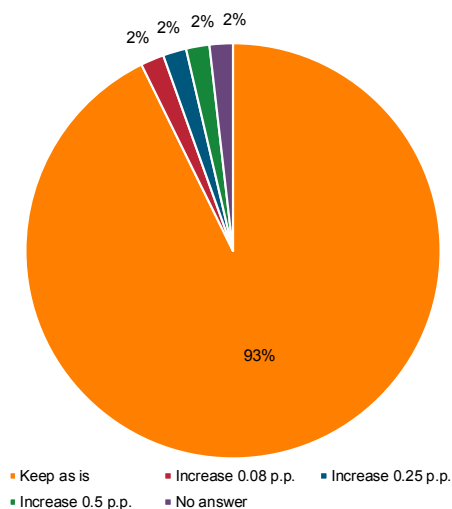
Therefore, although institutions perceived an increase in risks related to the foreign scenario, they trust on the resilience and stability of the financial system, which reinforces the market view that the SFN is well positioned to face the effects of the Covid-19 pandemic.

<sup>77</sup> Question: “How does your institution evaluate the responsiveness of the financial system to the event described in field 1.1? (Scale the degree of satisfaction from 1 to 6, with 1 being very satisfactory and 6 being very unsatisfactory)”.

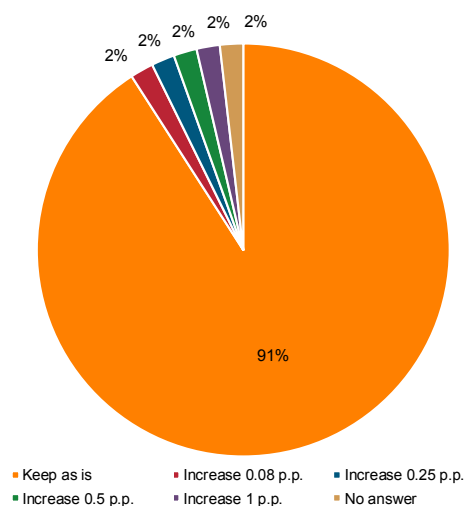
<sup>78</sup> Question: “What is the degree of confidence in the stability of the SFN in the next three years?”. The confidence index is calculated by weighing the responses according to the following weights (multiplied by 100): full confidence (1); high confidence (0.75); mid confidence (0.5); low confidence (0.25), and lack of confidence (0).

**Chart 1.6.5.1 – FSS – Expectations for the countercyclical additional capital**

Expectations for the countercyclical additional capital

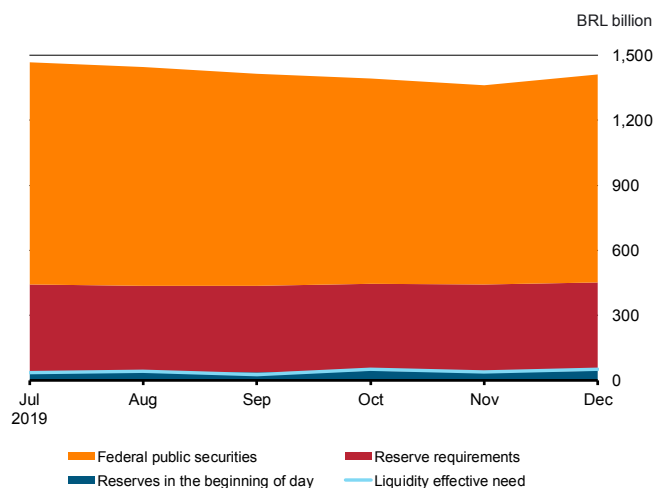


Suggestions for the countercyclical additional capital



[Statistical annex](#)

**Chart 1.7.1 – Effective liquidity needs**



[Statistical annex](#)

## 1.6.5 Expectations for the Countercyclical Capital Buffer

In line with the recommendations of the Basel Committee for Banking Supervision, known as Basel III, Brazil has a committee responsible for defining and communicating the value of the Countercyclical Capital Buffer to be used by the banking system in the country (Comef). In the February 2020 survey, most financial institutions expected (93% of answers) and recommended (91% of answers) that the value of ACCP<sub>Brasil</sub> were maintained at 0% (Chart 1.6.5.1). The decision of the Comef meeting on March 3, 2019 was to maintain the value at zero percent.

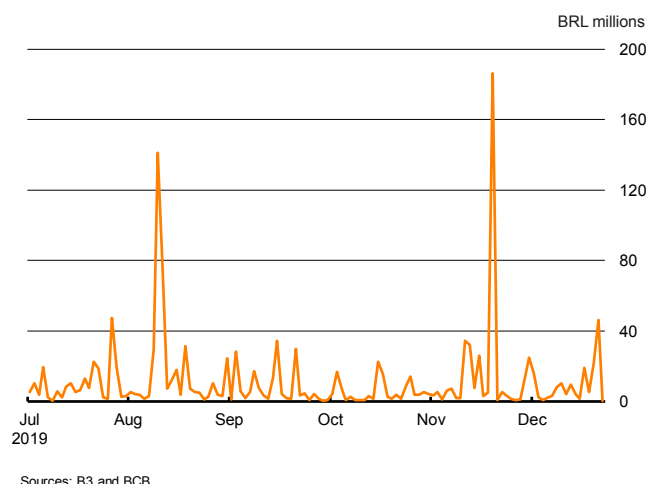
## 1.7 Systemically important financial market infrastructures

In the second half of 2019, the systemically important financial market infrastructures (FMIs) observed a safe and efficient operation. In the Reserves Transfer System (STR), the sole systemically important funds transfer system, the aggregate balance of funds available for payments and interbank transfers – named intraday liquidity – remained above the effective needs of participating financial institutions, assuring the smooth functioning of settlement operations. During the semester, on average, the need for funds – effective liquidity needs – of the system was 2,8% of the available liquidity, with a peak of 16,2% in the period.

Federal public securities (TPF) held by financial institutions in their portfolios and reserve requirements held at BCB contribute to the system's high liquidity level (Chart 1.7.1). Reserve requirements balances can be transferred to the reserve accounts and TPFs can be converted into central bank money by way of intraday repo operations, both with no intraday financial cost to the financial institutions. A high and stable level of intraday liquidity allows an uninterrupted flow of payments, removing incentives for liquidity retention and the risk of insufficient resources for the settlement of obligations throughout the day.

The BCB performs monthly backtesting analyses for securities clearing and settlement systems for transactions with securities, derivatives and foreign currency, in which there is an entity acting as CCP. The aim of these analyses is to establish (i) the adequacy of the amount

**Chart 1.7.2 – BM&FBOVESPA Clearinghouse**  
Net Financial Risk



[Statistical annex](#)

of additional<sup>79</sup> collaterals and safeguards to cover default of the two participants with the most critical financial exposure (credit risk) and (ii) the existence of liquid resources that guarantees the timely settlement of obligations assumed by the two participants with the highest financial obligations (liquidity risk) on each day of the period.

A participant's Net Financial Risk (NFR) is a metric used to assess its credit risk. It consists of the comparison between the financial result arising from the simulation of the closing of the positions<sup>80</sup> and the guarantees of a defaulting participant. Both systems evaluated – BM&FBovespa FX and BM&FBovespa Clearinghouse, operated by B3 S.A. – presented satisfactory results during the second semester of 2019. In both systems, the sum of the NFR of the two participants with the largest financial exposures did not exceed the value of the assets that make up the additional safeguards of that system.

In the BM&FBovespa Clearinghouse, the NFR of the two participants with the largest exposures corresponded to 13.77% of the additional safeguards available on the day it reached its maximum value (Chart 1.7.2). In the foreign exchange clearinghouse, the NFR was null every day.

**Table 1.7.1 – BM&FBOVESPA Clearinghouse**  
Primitive Risk Factors (PRF)

| Discrimination        | Low <sup>1/</sup> | High <sup>1/</sup> |
|-----------------------|-------------------|--------------------|
| Ibovespa spot         | 27%               | 22%                |
| USD spot              | 19%               | 24%                |
| Fixed rate 42         | 12%               | 2%                 |
| Fixed rate 126        | 12%               | 6%                 |
| Fixed rate 252        | 16%               | 7%                 |
| Fixed rate 756        | 14%               | 9%                 |
| DDI <sup>2/</sup> 180 | 13%               | 9%                 |
| DDI 360               | 12%               | 12%                |
| DDI 1080              | 16%               | 10%                |

Sources: B3 and BCB

1/ Second semester of 2019.

2/ Foreign exchange coupon.

[Statistical annex](#)

Still regarding the BM&FBovespa Clearinghouse, Table 1.7.1 shows that in the second half of 2019, two-day accumulated changes in main Primitive Risk Factors' value<sup>81</sup> remained within the limits established in their stress scenarios. The table shows the highest observed percentage in the period for the ratio between two-day accumulated return and the respective high or low scenario.

The accuracy estimate<sup>82</sup> of the risk model used by BM&FBovespa Clearinghouse remained above 99%, considered as a reference value<sup>83</sup> for CCPs (Chart 1.7.3).

79 Each system has a fund available for the CCP to deal with the credit risk that exceeds the value of the investors guarantees.

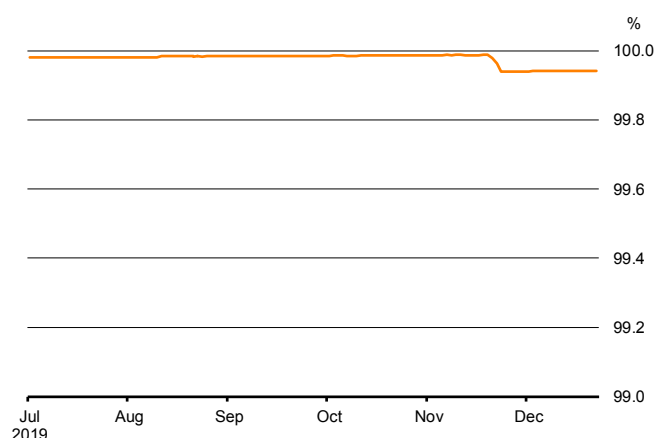
80 Calculated by the CCP based on the strategy for closure and on the actual variation of asset prices, assessed on the subsequent days.

81 The PRF associated with a derivative contract is the denomination given to the financial variables relevant to the contract's price formation.

82 The accuracy level is defined as the correctness ratio of a risk management model within a given period.

83 According to the Principles for Financial Market Infrastructures (PFMI – CPSS/IOSCO 2012), a CCP should use a 99% confidence level of the estimated distribution for future exposure when calculating the guarantees required for a participant or a portfolio. The accuracy estimate presented in Chart 1.7.3 is calculated in aggregated form for all individual portfolios, therefore being indirectly related to the PFMI recommendation.

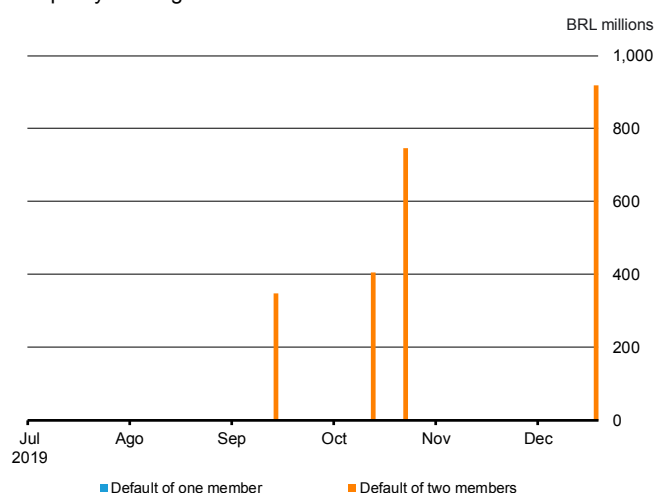
**Chart 1.7.3 – BM&FBOVESPA Clearinghouse**  
Credit risk\*



\* Accuracy estimates from the model for individual margin evaluation with a rolling window of the last three months (63 days).

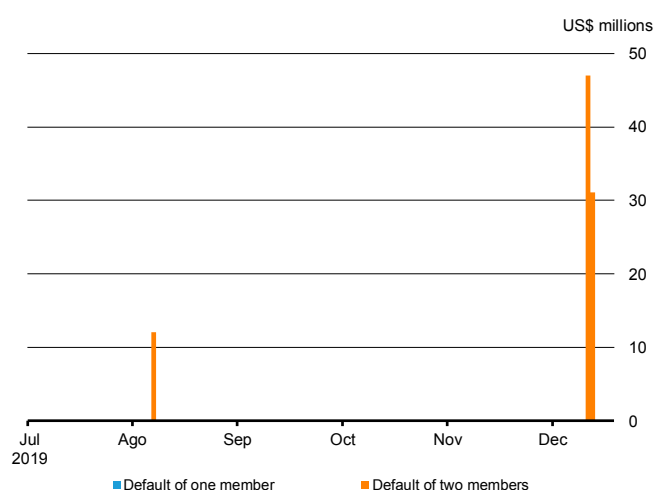
[Statistical annex](#)

**Chart 1.7.4 – BM&FBovespa-FX Clearinghouse**  
Liquidity shortage BRL



[Statistical annex](#)

**Chart 1.7.5 – BM&FBovespa-FX Clearinghouse**  
Liquidity shortage US\$



[Statistical annex](#)

Clearinghouses and other clearing and settlement providers must maintain liquid resources to guarantee at least the timely settlement of the participant's obligations with the highest debtor position.<sup>84</sup> In this respect, both BM&FBovespa-FX Clearinghouse<sup>85</sup> and BM&FBovespa Clearinghouse complied with the rules and followed international recommendations. Besides, although not required by regulation and by international principles, BM&FBovespa-FX Clearinghouse maintained enough liquid funds to guarantee the timely settlement of the two greatest debt positions, except for four days in the period for the settlement in reais (Chart 1.7.4) and three days for the settlement in dollars (Chart 1.7.5).<sup>86</sup>

<sup>84</sup> Resolution 2,882, of 8/30/2001.

<sup>85</sup> The PFMI adopted by BCB recommend that a CCP, such as the Foreign Exchange Chamber, keep liquid resources to ensure the settlement of the largest debtor position. In turn, CCPs that are considered systemically important in more than one jurisdiction or that have a complex risk profile should maintain sufficient liquid resources to ensure settlement of the two largest debtor positions.

<sup>86</sup> By way of comparison, in the first half of 2019, BM&FBovespa-FX (foreign exchange) Clearinghouse maintained sufficient liquid funds to guarantee the timely settlement of the two greatest debt positions, except for two days in the period for the settlement in reais (maximum value of BRL1 billion) and fourteen days for the settlement in dollars (US\$246 million).

### 2.1 Covid-19 Stress Test

Impacts of the Covid-19 on the economy are expected to be relevant despite the uncertainty that prevents a more precise evaluation. The Central Bank of Brazil (BCB) has performed a specific stress test as an attempt to estimate the effects on the financial system that a drop on the credit quality of potentially affected companies would provoke.

The selection of companies was based on an estimation of potential revenue frustration in the economic sector that each company operates. The growth of credit risk and the consequent raise in provisions was based on the evaluation of the individual payment capacity and guaranties offered by each company on the debt assumed before banks.<sup>87</sup>

The stress captured the sensitivity of bank balance sheets given a sudden raise in provisions. Other aspects of banks profitability were not considered, such as different business lines and future revenues.

The methodology adopted in evaluating the impact on the real economy and the contagion in the financial system was essentially the same used in the Lava Jato simulation, published in Financial Stability Report as of October 2015.

#### 2.1.1 Methodology

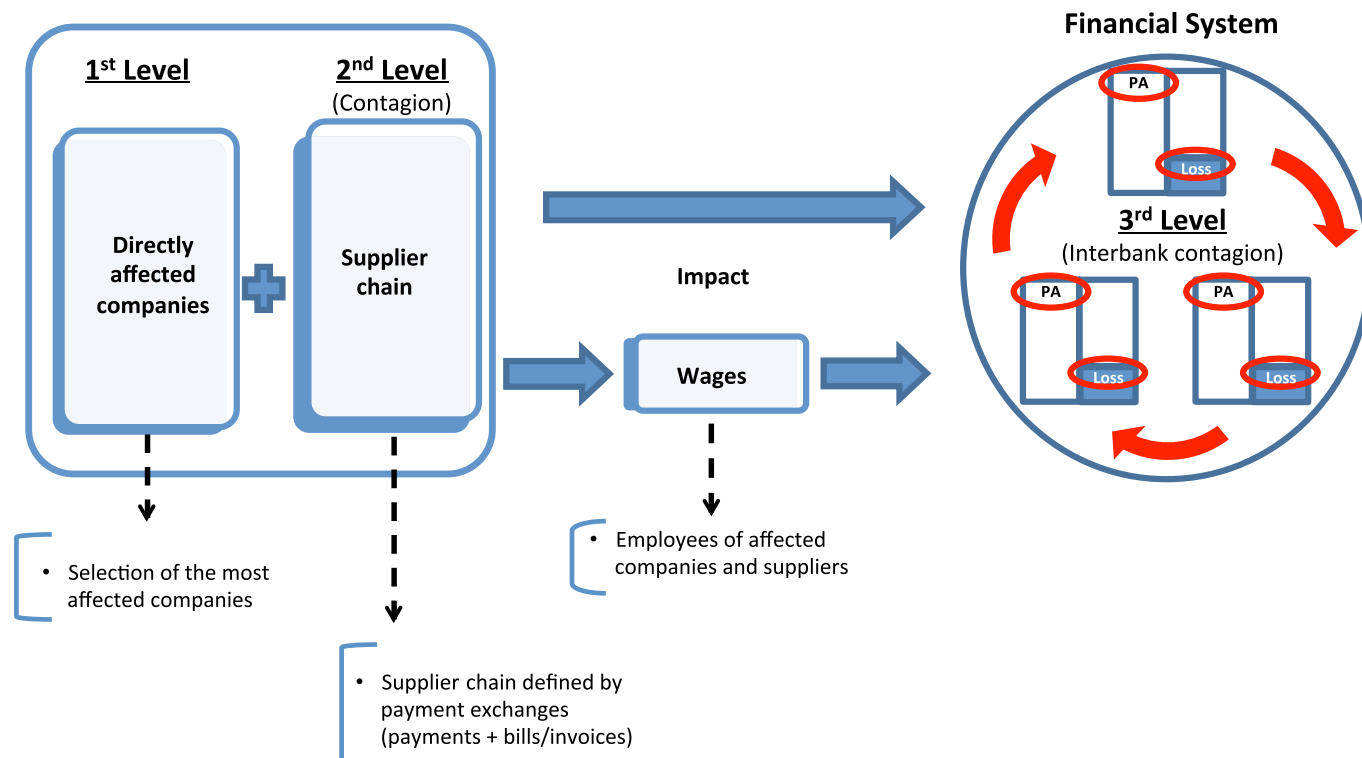
The first step consisted in building the interconnections between companies to evaluate how the applied shock would propagate in the network. If a given company defaults, it will very probably affect other companies that maintain an economic relationship with it. This relationship was established by gathering cashflows/

---

<sup>87</sup> Refer to Resolution 2,682/1999 to assess credit ranking and provisioning.

payments exchanged between companies for one year. To account for it, information was retrieved from the Brazilian Payments System and from bills and invoices registered in the Interbank Payments Clearing (1<sup>st</sup> and 2<sup>nd</sup> levels of Figure 2.1.1)

Figure 2.1.1



Based on this a proxy of the economic interdependency between companies was established and the criteria assumed to state high dependency was when a given company received 50% or more of all its payments from another individual company. That is, in the case of a default of a given firm it dragged all companies that had 50% or more from its payments coming from it. The process is then repeated with the new defaults and continues until no more defaults are observed. Once defaults are stable, wages on these companies are identified based on information provided by the Brazilian fiscal agency. Each worker then is assumed to default its eventual credit against the financial system. Completing this part of the simulation, all exposures are mapped into the financial system based on the Credit Information System (SCR), that monthly gathers all credit information from banks and is managed by the BCB.

The next step of the simulation was to evaluate the effect of the credit shock in the financial system. Besides identifying the consequences in each bank, a contagion network in

the financial system was used<sup>88</sup> to accomplish the effect of an eventual bank default motivated by the credit shock originally applied (3<sup>rd</sup> level of Figure 2.1.1).

Shocks were defined once the whole network was in place. For those companies directly affected a downgrade of 2 or 3 levels was applied depending on the expected intensity of the crisis on the company business. Such a drop on credit quality may imply that a given company has entered in default. Given that, if a company credit quality had dropped to “E” or lower, it was assumed a default (see footnote 1). Identified workers on defaulted companies were too assumed to default their eventual bank debts. For defaulted companies and workers, it was assumed a 100% loss on their credit operations, except for mortgages where a loss given default of 30% took place.<sup>89</sup> For the remaining, extra provisions were added according to the new credit rating.

Finally, the impact of those losses on bank balance sheets was evaluated, starting the 3<sup>rd</sup> level depicted in Figure 2.1.1. Interbank contagion is motivated by initially defaulted banks that, in turn, affect other banks due to interbank operations. Banks were assumed to default if their Level 1 capital dropped below 2.5% after losses were accounted and capital requirements recalculated.

## 2.1.2 Company selection

Companies were selected based on a series of studies that tried to identify potentially affected economic sectors by the current pandemic crisis.<sup>90</sup> Each identified sector was then associated to the National Classification of Economic Activities (CNAE) developed by the Statistics and Geography Brazilian Institute (IBGE). The CNAE is a code associated to every company presently operating in Brazil that identifies the economic sector that this company belong. Non-essential retail, tourism related activities, passenger air transport and automobile industry were among the selected sectors and activities.

---

<sup>88</sup> See section 1.5.3 for the details on interbank contagion.

<sup>89</sup> BCB estimation.

<sup>90</sup> <https://blogs.imf.org/2020/03/09/limiting-the-economic-fallout-of-the-coronavirus-with-large-targeted-policies/>.

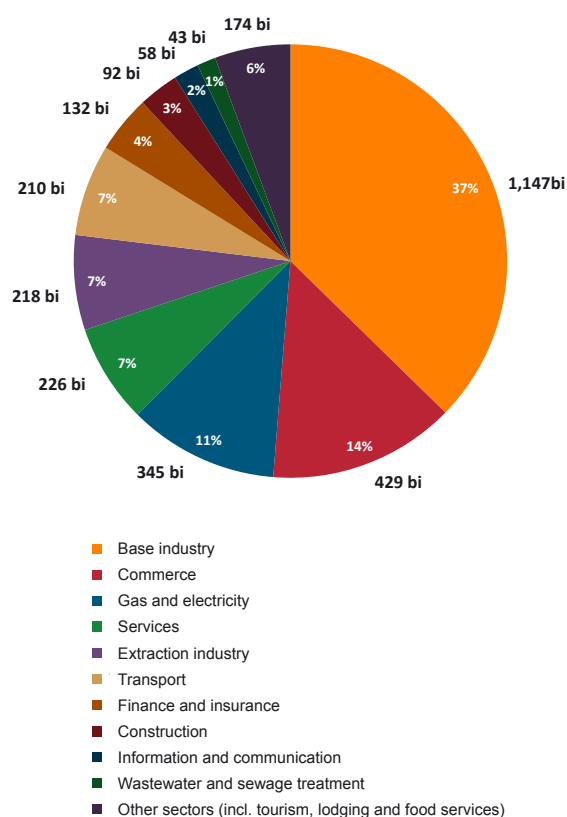
Novel Coronavirus (Covid-19) Update. Where are we now? What’s the impact? Where do we go from here? Fev/2020. Citi.

Aumento do Impacto da COVID-19 nas vendas de produtos de giro rápido no Brasil e ao redor do mundo. Nielsen Consultoria. Mar/2020.

Impactos no Varejo – COVID-19. Google Retail AIT. Mar/2020.

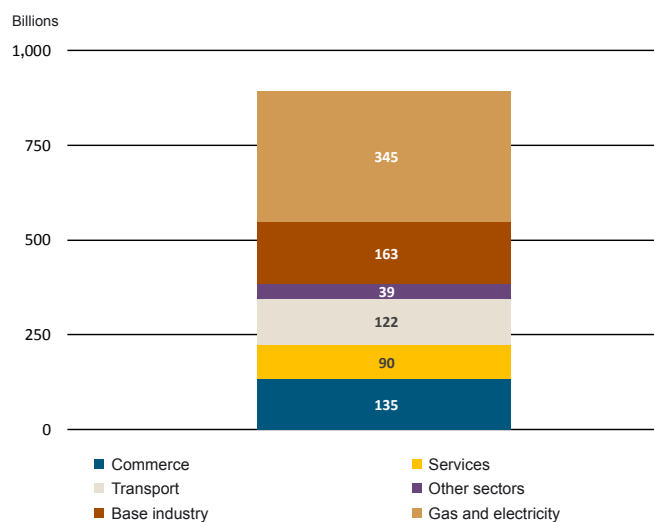
Impacto da COVID-19 no Varejo Brasileiro. Cielo. Mar/2020.

**Chart 2.1.2.1 – Total Debt of Identified Sectors**



[Statistical annex](#)

**Chart 2.1.2.2 – Debt of Affected Sectors**



[Statistical annex](#)

Total debt against the banking sector including bank credit, bonds and external internalized debts, reached BRL3.1 tri (Chart 2.1.2.1). Debt of selected companies was BRL893 mi, representing 29% of the global debt (Chart 2.1.2.2)

Identified companies were separated in two groups regarding the intensity of the shock. For those assumed to be more vulnerable to the crisis, a downgrade of 3 levels was assumed. The remaining suffered a 2 level downgrade. From a total of 311 CNAEs, 174 were placed in the more vulnerable group. The whole population of evaluated firms comprised 1.6 million (1.5 selected firms and 0.1 suppliers) and 9.9 million workers (7.5 from selected firms and 2.4 from suppliers)

Default was then appointed given the following criteria:

- average rating on the financial system equal to “E” or lower;
- more than 50% of total credit operations rated “E” or lower;
- small companies.

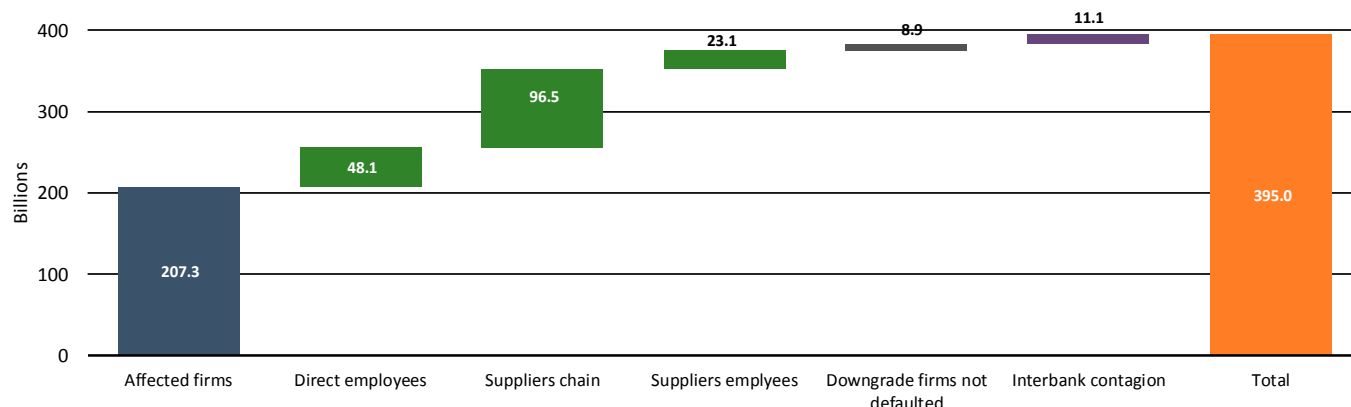
## 2.1.3 Results

Chart 2.1.3.1 displays the increase in provisions segregated by source of impact.

The amount of new provisions would imply capital losses of BRL70.0 bi, equivalent to 7.2% of total regulatory capital in place in the Brazilian financial system. This relatively low shortfall is due to the present capital cushion (or high Basle Ratio) in the system, as detailed in Chapter 1.

Should this hypothetical scenario become real, the financial system would go through a relevant impact. Aiming at reducing the pressure on financial institutions and allowing the regular operation of financial intermediation by mitigating the crisis effect, the Brazilian government has adopted a series of actions that are detailed in the next section.

Chart 2.1.3.1 – Increase in Provision



[Statistical annex](#)

## 2.2 Measures to confront the crisis caused by the impact of the Covid-19 pandemic in the economy

### 2.2.1 Introduction

Uncertainties regarding the duration and intensity of the Covid-19 pandemic and its impacts on the real economy have raised the degree of risk aversion of economic agents to levels rarely seen in history. In situations of risk aversion, companies and households behave more prudently than usual. The increase in caution is reflected in the financial markets in terms of waves of disinvestment by investors, from riskier to safer assets and in the direction of liquidity.

As these movements are executed simultaneously by most economic agents, prices may stop reflecting the fundamentals of the economy and start echoing panic. This scenario represents a threat to the normal functioning of financial intermediation and, ultimately, to the continuation of fundamental economic activities that depend on financial services.

There is also the risk of searching for solutions that try to solve the problems of households and companies in the very short term, but that might generate significant damage to the normal functioning of the markets in the future. An example of this would be those initiatives that imply breaches of contract such as the exemption from the obligation to pay debts, postponement of payments or revision of prices and tariffs. These initiatives usually result in an increase in legal uncertainty and, consequently, in an increase in risk premiums.

In view of this diagnosis, the CMN and the BCB, duly substantiated by federal legislation and by Provisional Measures published by the Federal Government, decided to act on three fronts to maintain the regular functioning of the markets and the supply of credit to the economy.

The first front consisted in temporarily reducing the regulatory requirements that demand capital and provisions from FIs to contemplate the risks they take in their transactions. The measures adopted on this front have the main objective of providing better conditions for FIs to continue supplying credit to companies and households and for them to also be able to acquire risky assets from those agents who wish to sell them. With greater excess of capital in relation to regulatory requirements, FIs will not be under pressure to decrease the volume of transactions. This represents a set of countercyclical measures, made possible by the good equity and liquidity status presented by FIs before the beginning of the crisis.

The second front dealt with the issue of the increasing demand from economic agents for liquidity and the preservation of the normal functioning of the markets. This group of measures seeks to provide the financial system with enough liquidity to meet the expansion of demand from households and companies for credit lines that may help them at a time of sharp decline in economic activity and scarcity of liquid resources to honor their routine obligations.

Finally, the third front of measures seeks to temporarily ease compliance with regulatory requirements that have become more challenging to comply with because most of the workforce of the institutions is operating remotely. At this moment, the BCB understands that there are costs of adapting institutions to the regime of working remotely that place a burden on their capacity to meet all established deadlines.

### **2.2.2 Main measures aimed at releasing regulatory capital for use by FIs**

In view of the prospect of increased risk aversion, the CMN and the BCB adopted the following measures to enable FIs to continue to originate credit for households and companies.

### **1. Encouragement of renegotiation of credit transactions in good standing**

FIs were authorized<sup>91</sup> to reclassify, to the credit rating they were classified on February 29, 2020, transactions refinanced between March 1 and September 30, 2020, as long as they were not more than fifteen days past due on February 29, 2020 and did not show evidence of the counterparty's inability to honor the obligation under the newly agreed conditions. These measures affect credit transactions that represent the amount of BRL3.2 trillion.

### **2. Reduction of the Capital Conservation Buffer (CCoB) and prohibition of payment of dividends, increase of bonuses and buyback of shares**

The CMN reduced<sup>92</sup> the capital conservation buffer from 2.50% to 1.25% of RWAs until March 2021, with another year for the gradual re-establishment of the CCoB, until March 31, 2022. Consequently, the measure aimed to eliminate the effect of reputation and the reluctance of banks to use the CCoB and thus promote its actual use. The measure released the core capital (Common Equity Tier 1 – CET1) of banks by BRL56 billion, an amount that could support lending of around BRL637 billion. This measure came in the wake of the maintenance of the Countercyclical Capital Buffer (CCyB) at 0%, decided by the Comef at its March 3 meeting.

The reduction in the CCoB was complemented by the prohibition of distribution of dividends, increase in bonuses to directors and buyback of shares, established in another measure.<sup>93</sup> In consequence, the consumption of important resources for the preservation of the flow of credit to the economy and for the absorption of occasional future losses is avoided.

### **3. Temporary computation of hedge/overhedge tax credits in the core capital**

The CMN allowed<sup>94</sup> the tax credits of fiscal losses arising from investment protection operations abroad (hedge/overhedge) to not be deducted from the core

---

91 Resolution 4,803, of April 9, 2020.

92 Resolution 4,783/2020.

93 Resolution 4,797, of April 6, 2020.

94 Resolution 4,784/2020.

capital of FIs until December 31, 2020. This measure increased core capital by around BRL46 billion in the SFN.

Hedge is an operation the result of which offsets losses in another operation. As investment abroad is only taxed at the time of its occurrence (sale), while the hedge operation in Brazil is taxed annually, FIs need a hedge operation of a higher value than the amount of the investment abroad to offset the tax impact on the result. The excess amount, which must be enough to cover taxes, is called an overhedge. When there are losses in the hedge/overhedge, a tax credit for tax losses is accumulated, to be used to deduct taxes on future gains. This tax credit will not be deducted from core capital until the end of 2020, due to the extension of the effects of Resolution 4,680, of July 31, 2018. It is worth mentioning that the use of overhedge will become unnecessary, due to changes in the tax legislation.<sup>95</sup>

#### **4. Reduction in the capital requirement for credit transactions with small and medium-sized companies**

The BCB reduced the regulatory capital requirement for credit transactions with small and medium-sized companies.<sup>96</sup> The objective is to reduce the cost of credit transactions for these companies, which are responsible for a large part of production and employment in Brazil. This measure may release about BRL3.2 billion for new transactions from the regulatory capital requirement of financial institutions. It also allows the restructuring of credit transactions for small and medium-sized companies up to BRL228 billion.

The Risk Weighting Factor applicable to these transactions is reduced from 100% to 85% and applies to new or restructured transactions hired between 4/1/20 and 12/31/20. The regulation includes companies with an annual gross revenue between BRL 15 million and BRL300 million.

---

<sup>95</sup> Provisional Measure 930/2020.

<sup>96</sup> Circular 3,998, of April 9, 2020.

### 2.2.3 Main measures aimed at increasing liquidity in the SFN and promoting the regular functioning of the markets

The CMN and the BCB adopted a group of measures to ensure the maintenance of adequate levels of liquidity in the SFN in the face of the growing demand for resources within the system itself and for financing by households and companies. These measures sought to expand the supply of liquidity in domestic currency and in US dollars, to ease the rules related to funding instruments that could expand the resources available to the SFN and to promote the regular functioning of the credit and foreign exchange markets.

#### 1. Additional reduction in reserve requirements on time deposits

The reserve requirement rate on time deposits was temporarily<sup>97</sup> reduced from 25% to 17%, as of March 30, 2020.<sup>98</sup> The release of BRL68 billion was the estimated impact, expanding the liquidity available to the SFN. This liquidity injection is added to the estimated amount of BRL49 billion released by the previous reduction of the rate, from 31% to 25%, which took effect on March 16, 2020,<sup>99</sup> and the estimated potential release of BRL86 billion as a result of the increase in the additional tranche of reserve requirements in the LCR,<sup>100</sup> as of March 2, 2020.

#### 2. New Term Deposit with Special Guarantees

The New Term Deposit with Special Guarantees (NDPGE) is an alternative fundraising instrument for all FIs associated with the Credit Guarantee Fund (FGC). More precisely, member institutions will be able to increase their funding by taking deposits of up to BRL40 million per account holder – in an amount corresponding exactly to their net worth, limited to BRL 2 billion. The expected impact is an expansion in the credit supply of approximately \$200 billion.

The CMN also allowed FIs to obtain DPGEs from member institutions of the FGC, which will guarantee

---

97 Until November 20, 2020.

98 Circular 3,993, of March 23, 2020.

99 Circular 3,987, of February 20, 2020.

100 Circular 3,986, of February 20, 2020.

funding up to a maximum amount of BRL400 million<sup>101</sup> of the total credits of each holding institution against the issuing institution or conglomerate. The measure aims to facilitate the flow of funds among member institutions in the financial system.<sup>102</sup>

### **3. Expansion of the funding base with the Agribusiness Credit Bill**

In order to guarantee more liquidity to the FIs that integrate the S3 and S4 segments, the regulation on funds raised through the Agribusiness Credit Bill (LCA) was adjusted.<sup>103</sup> The measure excluded BRL500 million from the calculation basis of the additional 35% of the funds raised by the LCA earmarked for rural credit from the FIs<sup>104</sup> of these segments and, therefore, enabled an increase in the volume of funding by up to BRL6.6 billion, the collateral of which are credit rights originating from business carried out with farmers.

### **4. BCB loans to FIs, backed by debentures**

The BCB was authorized<sup>105</sup> to grant loans in national currency backed by debentures through a Special Temporary Liquidity Line (LTEL). In addition to the debentures, this line establishes that the BCB will reserve, as an additional guarantee, the institution's reserve requirements in the same amount as that of the transaction, potentially making available BRL91 billion for such transactions. The objective of the measure is to increase liquidity in the secondary private debt market, to reduce the effects of the crisis on the capital market.

### **5. Increase in the limit for the repurchase of Financial Bills**

Currently, several funds in the market need to convert their portfolio bonds into cash. Specifically, for banks in the S1 segment, the CMN increased the maximum limit for the repurchase of Financial Bills (LFs) of

---

101 The limit was initially increased to BRL20 million by Resolution 4,785, dated March 23, 2020, and again elevated to BRL40 million by Resolution 4,799, of April 6, 2020.

102 Resolution 4,805, of April 22, 2020.

103 Resolution 4,787, of March 23, 2020.

104 PR1 equal to or less than BRL5 billion.

105 Resolution 4,786, of March 23, 2020.

their own issuance – from 5% to 20%<sup>106</sup>. The liquidity of these funds will increase, since the potential buyers are the issuing FIs themselves. In this context, the issuer will be able to satisfy the liquidity demand for its own papers, which implies a repurchase potential of BRL30 billion. The BCB started to allow the volume of repurchased own-issue LFs to be deducted from the reserve requirement on term resources, up to the limit of the repurchase of debentures<sup>107</sup> eligible to the LTEL.

## **6. Repurchase agreements with sovereign bonds denominated in dollars**

The BCB started to carry out repurchase agreements (repos) of Brazilian sovereign bonds denominated in US dollars (global bonds).<sup>108</sup> This measure seeks to ensure the smooth functioning of the markets, expanding liquidity in US dollars for institutions, at the moment when it is observed that the liquidity lines backed by sovereign bonds in the international market are being shut down. Between March 20, 2020 and April 6, 2020, four operations were carried out, totaling US\$5.5 billion.

## **7. Injection of longer-term funds by the BCB via repo operations backed by TPFs**

The BCB started to offer longer term repo operations at the donor end of funds through its open market operations. This measure seeks to increase the availability of liquidity for the SFN, at the moment when FIs may have difficulties in accessing liquid resources with longer terms. Thus, institutions can obtain long-term liquid resources as opposed to the demand, by market agents, for very short-term liquidity. The measure also facilitates the management of liquidity in the institutions' balance sheets, since it provides a reduction in the cost of maintaining a longer-term portfolio (cost of duration).

---

<sup>106</sup> Resolution 4,788, of March 23, 2020.

<sup>107</sup> Circular 4,001, of April 13, 2020.

<sup>108</sup> Circulars 4,990, of March 18, 2020; and 3,992, of March 19, 2020.

## **8. Loans to FIs through the issue of Guaranteed Financial Bills**

The BCB was authorized<sup>109</sup> to grant loan operations to FIs through LTELs, by means of direct acquisition, in the primary market, of LFs with collateral in financial assets or securities. This measure aims to provide liquidity for the SFN to meet the increased demand observed in the credit market.

## **9. Regulation of Emergency Employment Support Program loans**

The federal government established<sup>110</sup> the Emergency Employment Support Program (Pese), an emergency line of credit for entrepreneurs, business companies and cooperative societies, except those that provide credit, with an annual gross revenue over BRL360 thousand and under or equal to BRL10 million.

The funds will be used exclusively for payroll financing for a period of two months. In return, the beneficiary companies will not be able to dismiss employees without cause during the duration of the program.

Resources and risks will be shared between the Union and the participating FIs. The total amount of the emergency credit line is BRL40 billion, at BRL20 billion per month, of which 85% comes from the National Treasury Secretariat (STN) and the remaining 15% from participating FIs.

It is estimated that the Pese will benefit 12.2 million employees in 1.4 million SMEs.

The CMN regulated the granting of Pese loans,<sup>111</sup> and the BCB allowed the FIs participating in the program to deduct the amount used to finance the payroll from the reserve requirement on term resources.<sup>112</sup>

---

109 Resolution 4,795, of April 2, 2020.

110 Provisional Measure 944, of April 3, 2020.

111 Resolution 4,800, of April 6, 2020.

112 Circular 3,997, of April 6, 2020.

## **10. Increase in the economic capacity and liquidity of fintechs**

The CMN authorized Platform Lending Companies (SCDs) to issue credit cards, receive relending and obtain loans from the BNDES.<sup>113</sup> This measure creates yet another funding option for the SCDs segment, expanding the opportunities for these institutions to increase the offer of financial products and services, to foster vulnerable economic agents, especially SMEs. These segments constitute a niche of clients in which these IFs have specialized, particularly due to the capillarity provided by electronic platforms.

## **11. US dollar liquidity facility**

The BCB established, in cooperation with the Fed (the United States central bank), a liquidity swap line in US dollars in the amount of US\$60 billion. The line expands the potential supply of US dollars in the domestic market and does not carry economic policy conditionalities; if necessary, it may be used to increase the funds available for operations of the BCB in the foreign exchange market. The swap agreement between the BCB and the Fed is expected to remain in effect for at least six months.

### **2.2.4 Main adjustments required by force of the restrictions imposed by the pandemic**

Due to the pandemic, there is a probable overload on the human resources and information technology of the FIs. Employees are affected by the risks of contamination and involvement of Covid-19, themselves and their families, and by the increase in workload resulting from the accumulation of tasks not performed due to the search for solutions that allow the continuity of work processes and the breakdown of supply chains, goods and services.

In turn, the services provided through Information Technology (IT) were affected, due to the sharp increase in the demand for technological resources, particularly communication and internet infrastructures, as a result of the recommendations of public health authorities for the population to remain in quarantine or in lockdown, which implied the search for remote service channels structured in IT.

---

<sup>113</sup> Resolution 4,792, of March 26, 2020.

In view of these difficulties, as well as to ensure the maintenance of the complete functioning of the financial and payment systems in the country, the CMN and the BCB adopted a set of regulatory measures, with the intention of mitigating any deleterious effects of administrative and economic contingencies on the vital interests of FIs and consumers of financial products and services, whose main interests are described below.

### **1. Reduction in the spread of liquidity smoothing operations**

Spread of liquidity smoothing is the cost that FIs pay to the BCB at the end of the day to settle any momentary liquidity deficits, especially due to operational problems. With the reduction in the spread on these operations – from +65 pp to +10 pp –, FIs will be able to access the smoothing window at a lower cost. The measure seeks to avoid increasing the operational risk incurred by the difficulties imposed by the remote work of a large part of the workforce.

### **2. Postponement of entry into force of the rules for fighting money laundering and terrorist financing<sup>114</sup>**

The entry into force of the rules on the policies, procedures and internal controls to be adopted by institutions authorized to operate by the BCB, which seeks to prevent the use of the SFN for the practice of crimes of “laundering” or concealment of assets, rights and values, referred to in Law 9,613, of March 3, 1998, and the financing of terrorism, provided for in Law 13,260, of March 16, 2016, established by Circular 3,978, of January 23, 2020, was postponed from July 1, 2020 to October 1, 2020.

The postponement of Circular 4,005, of 4/16/2020, will provide FIs with more time to adapt their systems in accordance with the new regulation on this matter.

### **3. Postponement of procedures related to automatic debits**

The CMN postponed, until November, the deadline for the entry into force of the rules regarding automatic debits in deposit accounts and payroll accounts,<sup>115</sup>

---

<sup>114</sup> Circular 4,005, of April 16, 2020.

<sup>115</sup> Resolution 4,790, of March 26, 2020.

which were expected to come into effect on May 1, 2020.<sup>116</sup> These rules are intended to increase the transparency, efficacy and efficiency of the automatic debit procedure, as well as to reduce default. To achieve this objective, institutions are required to disclose information regarding authorized debits and future entries in the statements of accounts and to debit accounts of amounts in arrears, including partial ones, as long as there is an unequivocal manifestation of the borrower. The extension of the entry into force of these rules allows an adequate period for FIs to adapt their operating systems to the new rules, amidst an economic, social and political environment conditioned by the difficulties resulting from the Covid-19 pandemic.

#### **4. Postponement of procedures related to the portability of credit transactions**

From April to November, the CMN postponed the entry into force of the rules that modify the mechanism of portability of credit transactions.<sup>117</sup> This measure aims to allow the technological resources of FIs to be effectively allocated to the development of systems that contribute to coping with the crisis caused by the Covid-19 pandemic. The postponement allows FIs to concentrate human and technological resources on the demands generated by the pandemic, in addition to granting additional time for technological structures and operational procedures related to portability to be effectively developed and incorporated by institutions in their work processes.

#### **5. Flexibility in terms for export and import exchange operations**

The BCB eased regulatory requirements related to export and import exchange operations.<sup>118</sup> In the first case, the maximum period for settlement of foreign exchange contracts is now fifteen hundred days, counted from the date of signing. If the settlement of the exchange contract occurs on a date after the date of shipment of the goods or provision of the service, the period must be equal to the same fifteen hundred days between the date of shipment of the goods or provision of the service and the date of settlement

---

<sup>116</sup> Resolution 4,771, of December 19, 2019.

<sup>117</sup> Resolution 4,793, of April 2, 2020.

<sup>118</sup> Circular 4,002, of April 16, 2020.

of the foreign exchange contract. This flexibility can be applied to export exchange contracts entered as of March 20, 2020, or to those which, on that date, were in a regular situation concerning the shipment of the goods or the provision of the service. In the case of imports, there was an increase in the period allowed for advance payments, which was changed from 180 to 360 days - also applicable to payments already made. The changes give more time for the exporter to produce and ship the goods or provide the service, in addition to allowing greater flexibility for renegotiating payments related to foreign trade.

## **6. Delaying deadlines for the elaboration, remittance and publication of accounting documents**

In view of the operational difficulties resulting from the Covid-19 pandemic, the deadlines for sending accounting information to the BCB were postponed.<sup>119</sup> Likewise, the deadline for disclosure of the half-yearly and interim financial statements for the year 2020 was extended to 90 days after the respective base date.

In addition, the deadline for the disclosure of the annual financial statements for the year 2019 was extended to April 30, 2020, to allow time for institutions to adapt their operational routines to the contingencies arising from the health measures to fight Covid-19.

This group of measures also includes the postponement of the requirement to disclose the Pillar 3 Report.<sup>120</sup> The BC postponed for 30 days the delivery of the reports for the base dates of March 31, 2020 and June 30, 2020. Instead of 60 days, banks will have 90 days after those base dates to deliver the reports to the Central Bank.

### **2.2.5 Final remarks**

It is crucial to meet the most urgent needs of Brazilian households and companies to prevent the crisis resulting from the Covid-19 pandemic from causing further damage to the real economy. Historically, the SFN has functioned as an absorber of adverse shocks to the economy, whether of domestic or international origin.

---

<sup>119</sup> Circular 3,999, of April 16, 2020.

<sup>120</sup> Circular 4,003, of April 16, 2020.

Once again, the SFN fulfills this role by acting as a liquidity provider and as a risk buyer. It is important, however, to emphasize that the SFN's ability to absorb the impacts of the crisis is due to the maintenance, in normal times, of robust capital and liquidity buffers in the system, associated with the prudent behavior of financial intermediaries in the origination of credit.

In the current crisis, the measures adopted by the CMN and the BCB are unparalleled in Brazilian history. The measures directed towards adding liquidity to the system have the potential to reach an amount equivalent to 16.7% of GDP, while during the great financial crisis of 2008, measures that had the same objective reached 3.5% of GDP. In addition, measures for strengthening the capital of FIs have the potential to generate new credit transactions up to an amount equivalent to 16.4% of GDP (Table 2.2.5.1).<sup>121</sup>

**Table 2.2.5.1 – Comparison between 2020 x 2008**

| Measure                                               | Amounts involved     |                   |
|-------------------------------------------------------|----------------------|-------------------|
|                                                       | 2020                 | 2008              |
| <b>Liquidity support</b>                              |                      |                   |
| Reserve requirements + short-term liquidity (LCR)     | BRL 135 bi           | –                 |
| Additional reduction on reserve requirements          | BRL 70 bi            | BRL 82 bi         |
| Flexibility for the LCA                               | BRL 2.2 bi           | –                 |
| Loans backed by LFs guaranteed by credit transactions | BRL 670 bi           | –                 |
| Repos involving Brazilian sovereign securities        | BRL 50 bi            | BRL 25 bi         |
| New DPGE                                              | BRL 200 bi           | BRL 10 bi         |
| Debenture-backed loans                                | BRL 91 bi            | –                 |
| <b>Total</b>                                          | <b>BRL 1218.2 bi</b> | <b>BRL 117 bi</b> |
| <b>% of GDP</b>                                       | <b>16.7%</b>         | <b>3.5%</b>       |
| <b>Capital relief *</b>                               |                      |                   |
| Overhedge                                             | BRL 520 bi           | –                 |
| Reduction of ACCP                                     | BRL 637 bi           | –                 |
| <b>Total</b>                                          | <b>BRL 1157 bi</b>   | <b>–</b>          |
| <b>% of GDP</b>                                       | <b>16.4%</b>         | <b>0.0%</b>       |
| Waiver for provisioning in case of debt refinancing   | BRL 3200 bi          | –                 |
| <b>Other measures</b>                                 |                      |                   |
| Swap line with the US Fed                             | US\$ 60 bi           | US\$ 30 bi        |
| <b>% of GDP</b>                                       | <b>4.1%</b>          | <b>2.4%</b>       |
| Implementation of a special credit line for SMEs      | BRL 40 bi            | –                 |
| <b>% of GDP</b>                                       | <b>0.5%</b>          | <b>0.0%</b>       |

[Statistical annex](#)

<sup>121</sup> In order to follow and understand the measures taken by the BCB to face the effects of the health crisis, please go to the page [https://www.bcb.gov.br/acessoinformacao/medidasdecombate\\_covid19](https://www.bcb.gov.br/acessoinformacao/medidasdecombate_covid19).

The BCB remains watchful, closely monitoring the SFN to assess both the effectiveness of the measures it has already taken and the need for adopting additional measures in a timely manner. If necessary, the BCB has a large arsenal at its disposal and will not refrain from employing it.

# Appendix

---

## Central Bank of Brazil Management

## Acronyms

# Central Bank of Brazil Management

---

## Board of Governors

**Roberto de Oliveira Campos Neto**  
Governor

**Bruno Serra Fernandes**  
Deputy Governor

**Carolina de Assis Barros**  
Deputy Governor

**Fábio Kanczuk**  
Deputy Governor

**Fernanda Feitosa Nechio**  
Deputy Governor

**João Manoel Pinho de Mello**  
Deputy Governor

**Maurício Costa de Moura**  
Deputy Governor

**Otávio Ribeiro Damaso**  
Deputy Governor

**Paulo Sérgio Neves de Souza**  
Deputy Governor

# Acronyms

---

|                            |                                                                |
|----------------------------|----------------------------------------------------------------|
| ACCP <sub>Brasil</sub>     | Countercyclical Capital Buffer                                 |
| ACP <sub>conservação</sub> | Conservation Buffer                                            |
| ACP <sub>sistêmico</sub>   | Systemic Buffer Requirement                                    |
| AP                         | Troubled Asset                                                 |
| [B] <sup>3</sup>           | Brasil, Bolsa, Balcão                                          |
| BCB                        | Central Bank of Brazil                                         |
| BCBS                       | Basel Committee on Banking Supervision                         |
| BRL                        | Brazilian Real                                                 |
| CCP                        | Central Counterparty                                           |
| CCoB                       | Capital Conservation Buffer                                    |
| CCyB                       | Countercyclical Capital Buffer                                 |
| CDB                        | Bank Deposit Certificate                                       |
| CET1                       | Common Equity Tier 1                                           |
| CMN                        | National Monetary Council                                      |
| CNAE                       | National Classification of Economic Activities                 |
| Comef                      | Financial Stability Committee                                  |
| Covid-19                   | Corona Virus Disease – 2019                                    |
| CSLL                       | Social Contribution on Net Profit                              |
| DFAST                      | Dodd-Frank Act Stress Testing                                  |
| DI                         | Interbank Deposit                                              |
| DPGE                       | Term Deposit with Special Guarantees                           |
| DTA                        | Deferred Tax Assets                                            |
| EBITDA                     | Earnings before Interest, Taxes, Depreciation and Amortization |
| EMBI <sup>+</sup> Br       | Brazil's Country Risk Premium, calculated by J.P. Morgan Chase |
| FED                        | Federal Reserve                                                |
| FGC                        | Credit Guarantee Fund                                          |
| FI                         | Financial Institution                                          |
| FMI                        | Systemically Important Financial Market Infrastructures        |
| FSR                        | Financial Stability Report                                     |
| FSS                        | Financial Stability Survey                                     |
| FX                         | Foreign Exchange                                               |
| GDP                        | Gross Domestic Product                                         |
| IBC-Br                     | Index of Economic Activity of the Central Bank                 |
| IBGE                       | Brazilian Institute of Geography and Statistics                |
| ICP                        | Core Capital Ratio                                             |
| IFRS                       | International Financial Reporting Standards                    |
| IL                         | Short-Term Liquidity Ratio                                     |
| ILE                        | Structural Liquidity Ratio                                     |

|       |                                                 |
|-------|-------------------------------------------------|
| IPCA  | Extended National Consumer Price Index          |
| IPO   | Initial Public Offering                         |
| IT    | Information Technology                          |
| IVG-R | Residential Mortgage Collateral Value Index     |
| LCA   | Agribusiness Credit Bill                        |
| LCI   | Real Estate Credit Bill                         |
| LCR   | Liquidity Coverage Ratio                        |
| LF    | Financial Bill                                  |
| LLP   | Loan-Loss Provisions                            |
| LR    | Leverage Ratio                                  |
| LTEL  | Special Temporary Liquidity Line                |
| LTV   | Loan-to-Value                                   |
| NDPGE | New Term Deposit with Special Guarantees        |
| NEL   | Effective Liquidity Need                        |
| NFR   | Net Financial Risk                              |
| NSFR  | Net Stable Funding Ratio                        |
| OTC   | Over the Counter                                |
| PESE  | Emergency Employment Support Program            |
| PFMI  | Principles for Financial Market Infrastructures |
| PNADC | Continuous National Household Sample Survey     |
| PR    | Regulatory Capital                              |
| RC    | Regulatory Capital                              |
| RDB   | Bank Deposit Receipt                            |
| ROE   | Return on Equity                                |
| RWA   | Risk Weighted Assets                            |
| SCD   | Platform Lending Company                        |
| SCR   | Credit Information System                       |
| SELIC | Domestic Interest Rate                          |
| SGS   | Series Management System                        |
| SME   | Small and Medium Enterprises                    |
| STN   | National Treasury Secretariat                   |
| STR   | Reserves Transfer System                        |
| TPF   | Federal Public Securities                       |
| USA   | United States of America                        |
| USD   | United States Dollar                            |
| VAR   | Autoregressive Vector                           |
| YoY   | Year-over-year                                  |

## Concepts and Methodologies

---

- a) Short-term Liquidity Ratio (IL)** – conceptually like the Liquidity Coverage Ratio (LCR), it is the ratio between the stock of liquid assets held by the institution and the net stressed cash flows (estimated disbursements in the next 21 business days under a stress scenario). Therefore, institutions with IL above one (100%) have enough liquid assets to withstand this stress scenario.
- i. Liquid assets – liquid resources available for each conglomerate/institution to honor its stressed cash flows for the next 21 business days. It is the sum of highly liquid assets, release of required reserves (due to deposits run-off) and supplemental resources.
    - a. Highly liquid assets – These include: i) unencumbered Brazilian sovereign bonds held by the institution or received as a collateral in reverse repurchase agreement operations (reverse repos); ii) stocks listed in Ibovespa index; iii) liquid quotas of investment funds; iv) cash; and (v) free central bank reserves.
    - b. Release of required reserves – amount of the required reserves that would be released to the institution due to the deposit run-off estimated in the stressed cash flows calculation.
    - c. Supplemental resources – other options for monetization in the scenario's time-horizon, such as: Bank Deposit Certificate (CDB), Bank Deposit Receipt (RDB), Interbank Deposit (DI), long positions in box strategies (options), reverse repurchase agreements (reverse repos) backed by private securities.
  - ii. Stressed cash flows – an estimate of the amount of cash that the institution needs within the scenario's timeframe (21 business days) under a stress scenario. The analyses take into account retail deposits run-off, wholesale funding run-off, market stress and net contractual cash flows.
    - a. Retail deposits run-off – estimate of the necessary amount to cover the retail-customers withdrawals in demand deposits, time deposits, savings accounts, box strategies, securities issued by the bank, and repurchase agreements (repos) backed by private securities.
    - b. Wholesale funding run-off – estimate of the necessary amount to cover the possibility of early redemption of the liability positions from the three largest market counterparties.
    - c. Market stress – estimate of the necessary amount to cover losses arising from market movements affecting the liquid assets or others positions that may cause a cash outflow of the institutions in the

stress scenario. The losses comprise: i) margin calls; ii) pre-settlements of derivatives contracts; iii) losses on the marked-to-market values of the liquid assets.

- d. Net contractual cash flow – payments due in derivatives positions and in contractual cash flows (assets and liabilities positions) with market agents, maturing within the horizon of the scenario.

**b) Structural Liquidity Ratio (ILE)** – it is the ratio between the available stable funding (part of the equity and liabilities on which the institution can rely for a one-year horizon) and the required stable funding (part of the assets, including off-balance-sheet assets, which must be financed by stable funding because they have long maturities and/or low liquidity). Institutions with ILE equal or above one (100%) are less susceptible to future liquidity problems. The calculation methodology is based on the final version of the Net Stable Funding Ratio (NSFR), which was introduced as a minimum mandatory compliance in October 2018.

- i. Available stable funding – the funding that shall remain in the institution for at least a year. The main sources of banks' stable funding are the capital; non-redeemable liabilities with residual maturities above one year regardless of counterparty; and funding with no maturity or with a maturity of less than a year coming from retail customers.
- ii. Required stable funding – the amount of stable funding needed to finance the long-term activities of financial institutions. Therefore, it takes into account the liquidity and the maturity of the assets of the institution. The long-term assets are mainly the credit portfolio maturing in over a year; non-performing assets; less liquid or encumbered securities (i.e. margin requirement in clearings); fixed assets; and the items deducted from the regulatory capital.

**c) Total Capital Ratio** – Basel Committee on Banking Supervision international concept, consisting of the system regulatory capital (RC) divided by the system RWA. In Brazil, until September 2013, the minimum required ratio was the factor “F”, according to Resolution CMN 3,490, of 29 August 2007, and Circular BCB 3,360, of September 12, 2007. Until October 2013, financial institutions and other institutions authorized to operate should observe the 11% limit established by the BCB, except for individual credit unions not affiliated to central units. From October 2013 on, the minimum required ratio has been disciplined by the Resolution 4,193, of March 1, 2013, which defines a convergent calendar, requiring 11% of RWA from October 2013 to December 2015; 9.875% in 2016; 9.25% in 2017; 8.625% in 2018; and 8% from 2019 on. On top of this requirement must be added a capital buffer, as mentioned in the Common Equity Tier 1 (CET1) Ratio topic.

**d) Tier 1 Capital Ratio** – According the Resolution 4,193, of 2013, a Tier 1 Capital requirement became effective from October 2013 on, corresponding to 5.5% of RWA, from October 2013 to December 2014, and 6% from January 2015 on. On top of this requirement must be added a capital buffer, as mentioned in the Common Equity Tier 1 (CET1) Ratio topic.

**e) Common Equity Tier I Ratio (CET1)** – According the Resolution 4,193, 2013, a CET1 capital requirement became effective from October 2013 on, corresponding to 4.5% of RWA. In addition to this requirement, the Resolution established a capital buffer, composed by the following items: conservation, countercyclical and systemic. The conservation buffer requirement corresponds to the following RWA percentages: zero, until December 31, 2015; 0.625%, from January to December 2016; 1.25%, from January to December 2017; 1.875%, from January to December 2018; and 2.5% from January 2019 on. The countercyclical buffer requirement is limited to the following maximum RWA percentage: zero, until December 31, 2015; 0.625%, from January to December 2016; 1.25%, from January to December 2017; 1.875%, from January to December 2018; and 2.5% from January 2019 on. The systemic buffer requirement is limited to the maximum RWA percentage: zero until December 31, 2016; 0.5%, from January to December 2017; 1.0%, from January to December 2018; and 2.0% from January 2019 on.

- f) Leverage ratio (LR)** – Basel Committee on Banking Supervision international concept, consisting of Tier I Capital to Total Exposure ratio. In Brazil, the BCB Circular 3,748, of February 27, 2015, established the LR methodology. This index intends to complement the current prudential requirements, through a simple, transparent and non-sensitive risk metric. The leverage ratio minimum requirement of 3.0% was established by the Resolution CMN 4,615, of November 30<sup>th</sup>, 2017, which is effective from January 2018 on, applicable for institutions classified as S1 or S2, accordingly to the Resolution CMN 4,553, of January 1<sup>st</sup>, 2017.

## Concepts and Methodologies – Capital Stress

---

### 1.1 Stress test – Introduction

The stress tests executed in BCB comprise a macroeconomic stress test as well as sensitivity analysis to relevant risk factors. These exercises are simulations executed by the BCB to estimate potential losses and capital shortfalls in the banking system stemming from extreme adverse, but plausible, scenarios. It also provides assessment of the resiliency of either an individual institution or the banking system. Hence, it is possible to determine the impact on the capital of institutions taking into consideration unexpected, and thus, not provisioned losses caused by changes in macroeconomic variables.

For each stressed scenario new capital ratios (Basel Ratio, Tier 1 and CET1) are calculated. A financial institution is considered as non-compliant whether any of its capital ratios is below the minimum required and classified as insolvent in the case of total depletion of the CET1. The relevance of non-compliant and/or technically insolvent institutions is assessed and the additional capital required in order that no other bank could get non-compliant is calculated. The relevance of an individual entity is determined based on the representativeness of its Adjusted Assets with respect to the assets of the whole banking system.

The positive effects of the activation of the triggers related to Tier 2 and Additional Tier 1 capitals, in which values are converted into CET1 capital, are classified as income. Furthermore, the requirement of additional capital buffers, according to the Resolution 4,193 with the redaction given by the Resolution 4,443 from Oct. 29<sup>th</sup>, 2015, is taken into account in the calculation of capital shortfalls. And finally, the framework also considers the potential changes of registration and uses of deferred taxes and its implications on regulatory capital calculations, according to the Resolution 4,192, from Mar 1<sup>st</sup>, 2013, and posterior modifications.

### 1.2 Macroeconomic Stress Test

The macroeconomic stress test framework is an exercise that consists of the application of adverse macroeconomic scenarios and the simulation of how the balance sheet of each financial institution individually would behave under such scenarios. With that information in hands, capital shortfall of the whole system is calculated.

#### 1.2.1 Scenarios design

Three macroeconomic scenarios are designed, all of them with time horizon of twelve quarters, based on market information, having the following macroeconomic variables: 1) economic activity (Economic Activity Index measured by the BCB – IBC-Br); 2) exchange rate (Brazilian Real vs US Dollar parity); 3) Brazilian Benchmark Interest Rate (measured by the Selic rate); 4) inflation rate (measured by the Extended National Consumer Price Index – IPCA – accumulated in twelve months); 5) Brazil's country risk premium (EMBI+Br spread, calculated by J.P. Morgan Chase); 6) the 10-yr US Treasury Yield; 7) unemployment rate (calculated by the IBGE based upon the Continuous National Household Sample Survey – PNADC); and 8) commodities index (CRB index, calculated by Thomson Reuters/CoreCommodity). All variables are measured as a 3-month average.

The baseline scenario is built using the median of the market expectations (Focus report) for the following variables: economic activity, interest rates, FX (foreign exchange) rates and inflation. The GDP – Focus expectation – and the IBC-Br (VAR variable) are perfectly correlated. The Brazil's country risk premium, unemployment rate and commodity index are kept constant over the forecast horizon. On the other hand, the path of the 10-yr US Treasury Yield is defined according to the adverse scenario published by the Board of Governors of the Federal Reserve System in the report “2018 Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Act Stress Testing Rules and the Capital Plan Rule”.

The Structural Break scenario is obtained by verifying the historic periods in which each variable showed the greatest change (either positive or negative) through an eight-month interval. In each identified period, it is added the subsequent four quarters to form the total projection horizon (three years). Then, the changes between each quarter are calculated and applied onto the observed values of the variables in the reference date.

In the Worst Historical scenario, repetition of the macroeconomic variable's behavior is simulated, through a six-quarters rolling window since July 2003. Each window is plugged into dynamic panel data models and the historical scenario is the one with the lowest earnings before taxes.

### 1.2.2 Stress simulation

The stress simulation is done by projecting six basic groups of the income statement, trying to represent the operational performance of banks presented in the last income statement (net non-operational income is not considered in the test):

1. Net interest income: comprises net credit income, accrued income from bonds and securities and funding costs;
2. Non-interest income: mark-to-market effects, hedges and exchange rates variations;
3. Fees & commissions;
4. Non-consolidated companies;
5. Administrative expenses and;
6. Provisions expenses.

In the “net interest income”, credit and bonds/securities income as well as funding costs are modeled based on the Selic rate. The total funding is adjusted according to their credit portfolio volume, in the proportion of 1:1. Provision expenses are estimated based on the problem assets evolution, resulting from the macroeconomic scenario.

The non-interest group is modeled by applying a shock on market risk sensible positions observed in the starting date of the test. The stressed market risk factors are obtained out of the macroeconomic scenario and positions are then recalculated. The result is the difference between the stressed and the initial values. This amount is applied on the first quarter of projection and incorporated into the result.

The BCB changed the methodology used to capture the interest risk exposures. Hence, from the second semester of 2018 onwards this method will be different. Until recently the shocks were applied only on the trading book positions, all of them informed by banks, according to the Circular 3,354, from June 25<sup>th</sup> of 2007. However, this criterion is no longer in place and now the framework will encompass all the liquid positions, notably both government and corporate bonds as well as derivatives. The effect of this change is that the number of exposures subjected to these shocks have increased, which make the “non-interest” group more significant in the stress test.

The “Fees & Commissions”, “Non-consolidated companies” and “Administrative Expenses” groups are modeled by making use of dynamic panel data models, obtained with the same macroeconomic variables employed in the scenarios.

Besides the performance simulation, verified through the income statement, the Central Bank of Brazil has incorporated the inter-financial contagion into the macroeconomic stress test framework from the first semester of 2019 onwards. In each quarter of the stress test time horizon, there is a verification whether any institution falls below the minimum threshold of 4% of the Core Tier 1 capital ratio. If this is the case, the inter-financial contagion is estimated. The uncollateralized interbank exposures issued by that institution are assumed as losses in the creditors' balance sheet, and then capital is recalculated. If any financial firm also falls below that threshold, the process is repeated iteratively until there is no more institution below the threshold. The stress test continues with new affected capital levels and the process is repeated in all quarters of the projection, until the end of the time horizon.

### **1.3 Sensitivity Analysis – Introduction**

Sensitivity analysis complements the macroeconomic stress test framework. Its objective is to assess the individual effects of credit or market risk factors that might affect the regulatory capital of institutions, causing eventual capital shortfalls. Those analyses are conducted by applying incremental variations in such risk factors, keeping the other factors fixed.

#### **1.3.1 Sensitivity Analysis – Changes in market risk factors**

The exposures subjected to interest rate changes (e.g. fixed rates, currency coupons, price indexes and interest rates) listed in the trading book are stressed. The positions at all vertices (from 21 to 2,520 days) are recalculated after the application of shocks as well as the financial impact on banks' capital positions. Stressed exposures also affect risk weighted assets (RWA) components. In the case of fixed rates, new regulatory parameters of capital requirements are recalculated based on every new yield curve generated by a shock.

Exposures in foreign currency, gold and other instruments subject to changes in the exchange rates are also stressed, and their impacts on capital and RWA estimated. Here we assume that all exposures are revalued following the percentage points projected for the stressed USD/exchange rate.

We apply shocks individually in each factor, the interest rate and the exchange rate, starting at their current values, in steps of 10% in both directions, until it reaches 200% and 10% of its current value, on the upside and on the downside, respectively. After recalculating capital ratios, we evaluate both the regulatory capital adequacy ratios and the solvency of banks.

The calculation of interest rate shocks follows the same methodology as for the “non-interest” items of the macroeconomic stress test. For the other risk factors all the balance sheet positions are considered.

#### **1.3.2 Sensitivity Analysis – Increases in problem assets**

This analysis tries to measure the effect of problem assets increases over the regulatory capital of institutions. We increase problem assets up to 150% of its current level and compute the additional provision required. These additional provisions affect both banks' capital positions and the RWA component of the required capital. After recalculating capital ratios, regulatory capital adequacy and the solvency of banks are evaluated.

### **1.3.3 Sensitivity Analysis – Fall in housing prices**

The objective of this exercise is to estimate the impacts of fall in housing prices over the capital of financial institutions with outstanding mortgages. Prior to the simulations we proxy housing prices with the value of the updated collateral provided for the loan using the IVG-R index, adding the variations measured by the index since the date that the loan was generated until the date of simulation.

The analysis consists of reducing house prices, simulating a sequence of decreases in steps of 5 pp. In each step collaterals that become lower than 90% of the remaining loan are considered delinquent.

The loss of each delinquent loan is equal to the difference between the outstanding balance and the present value of the amount recovered from the foreclosure process. To calculate the recovered amount, we calculate new housing prices after shocks, net of taxes, maintenance fees and costs related to the foreclosure process. In addition, we consider that the sale in the foreclosure process is done with a discount proportional to the reduction of price due to the shock. The present value is obtained by discounting that sale amount by the 1-year future rate negotiated in the BM&FBovespa. New regulatory capital ratios of each institution are calculated considering the estimated losses to the related decline in housing price.

## **Working Papers about financial stability**

---

**508. Bank Competition, Cost of Credit and Economic Activity: evidence from Brazil**

Gustavo Joaquim e Bernardus Van Doornik

**505. Earmarked Credit and Monetary Policy Power: micro and macro considerations**

Pedro Henrique da Silva Castro

**504. Bailing in Banks: costs and benefits**

Sergio Rubens Stancato de Souza, Thiago Christiano Silva and Carlos Eduardo de Almeida

**503. Sectoral Countercyclical Buffers in a DSGE Model with a Banking Sector**

Marcos R. Castro

**499. Efeitos de Mudanças Regulatórias no Microcrédito sobre os Desempenhos Financeiro e Social das Cooperativas de Crédito**

Ana Lucia Carvalho Santos, Lucas A. B. C. Barros, Tony Takeda and Lauro Gonzalez

**498. Growth and Activity Diversification: the impact of financing non-traditional local activities**

Thiago Christiano Silva and Benjamin Miranda Tabak

**495. Fiscal Risk and Financial Fragility**

Thiago Christiano Silva, Solange Maria Guerra and Benjamin Miranda Tabak