FINANCIAL STABILITY REPORT

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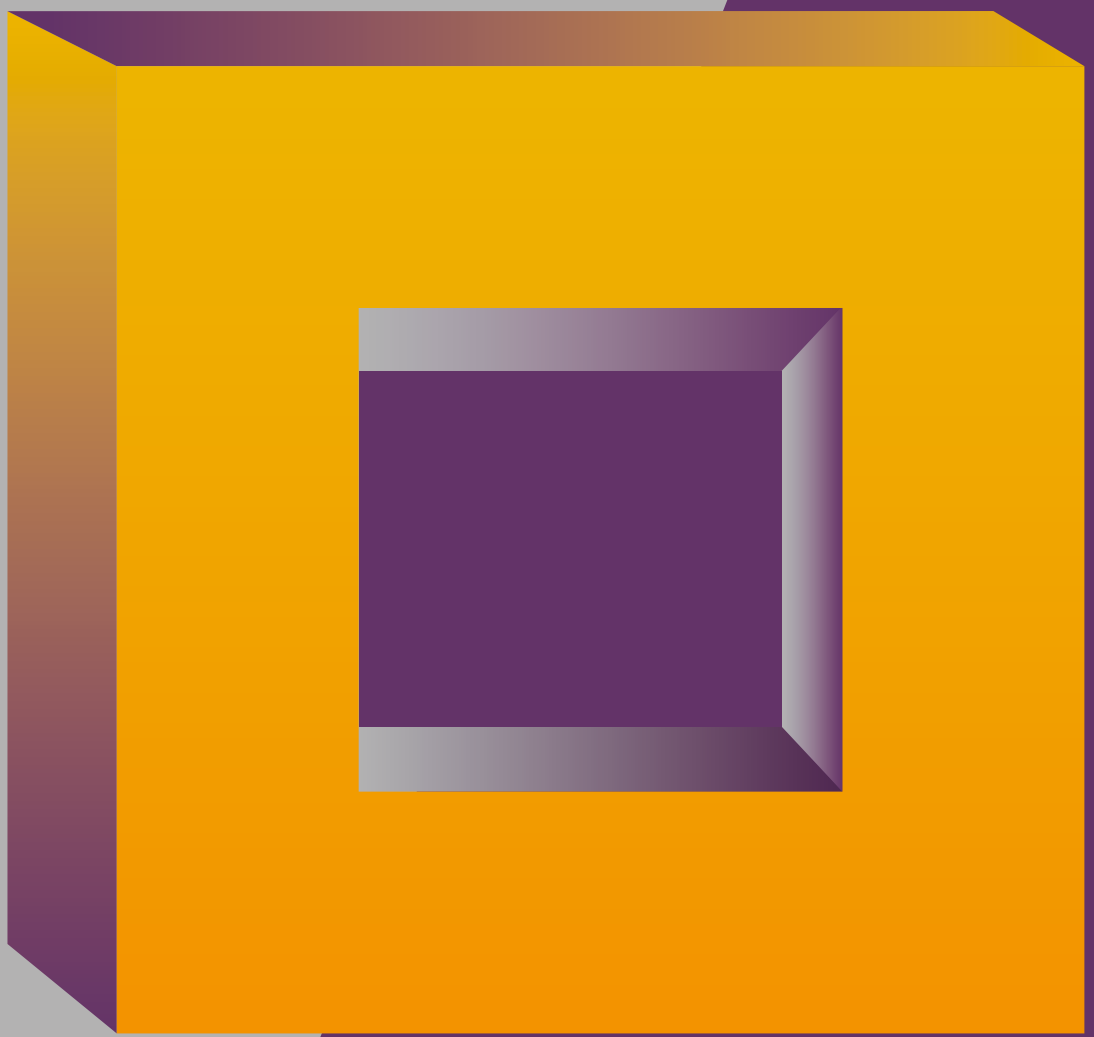

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FINANCIAL **STABILITY REPORT**

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FINANCIAL **STABILITY REPORT**

According to the Political Constitution of Colombia, *Banco de la República* is responsible for safeguarding the price stability of the economy. The proper implementation of this task depends crucially on maintaining financial stability.

Financial stability is understood as a general condition in which the financial system (financial institutions, markets, and infrastructures):

1. Assesses and manages financial risks in such a way that it facilitates the performance of the economy and the efficient allocation of resources;
2. is capable of autonomously absorbing, dissipating, and mitigating the materialization of the risks that may arise as a result of adverse events.

This Financial Stability Report (FSR) presents the Central Bank's appreciation on the recent performance of credit institutions and their debtors, as well as on the main risks and vulnerabilities that could affect the financial stability of the Colombian economy. The FSR intends to keep the participants in financial markets and the public informed, besides promoting public debate on the trends and risks related to the financial system. The results herein presented also serve as a basis for the monetary authority to make decisions that promote financial stability in the general context of the constitutional objectives of price and macroeconomic stability.

This FSR is complemented by the Payment Systems Report, published annually by *Banco de la República*, which reports on the performance of the financial infrastructures of the Colombian economy.

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Glossary

API: Application Program Interface
AT1C: Additional Tier 1 Capital
BCBS: Basel Committee on Banking Supervision
BDBR: Board of Directors of *Banco de la República*
BF: Brokerage Firms
BIS: Bank of International Settlements
bp: Basic Points
CDT: Term Deposit
CET1: Common Equity Tier 1 Capital
CI: Credit Institutions
CIF: Collective Investment Funds
CIR: Inter-sectoral Resolution Commission
CMA: Competition and Market Authority
COP: Colombian Pesos
CPI: Consumer Price Index
CSD: Central Security Depository
DD: Distance to Default
DSR: Debt-Service Ratio
EUR: Euros
FDI: Foreign Direct Investment
Fed: Federal Reserve of the United States
FNA: National Savings Fund
FSB: Financial Stability Board
FTD: Fixed-Term Deposit Effective Rate
GDP: Gross Domestic Product
IBR: Banking Benchmark Reference Rate
IC: Credit Intermediation
ICE: Indicator of Consolidated Exposure
IEFIC: Debt Service and Financial Education Survey
IFRS: International Financial Reporting Standard
IIE: Indicator of Individual Exposure
IMC: Foreign Exchange Market Intermediaries
IMC: Investment Management Companies
IMF: International Monetary Fund
IPS: Health Service Providers
LIH: Low Income Housing
LRI: Liquidity Risk Indicator
LSRR: Liabilities Subject to Reserve Requirements
MADR: Ministry of Agriculture and Rural Development
MER: Market Exchange Rate
MT: Maturity Transformation
NAFTA: North American Free-Trade Agreement
NBFI: Non-Banking Financial Institutions
NIM: Net Interest Margin
NLR: Net Liquidity Requirements
NPL: Non-Performing Loans
OB: Open Banking
PEF: Private Equity Funds
PFM: Pension and Severance Fund Managers
PILA: Integrated Template for Liquidation of Contributions
PUC: Single Accounting Plan
QRI: Quality Risk Indicator
ROA: Return on Assets
ROE: Return on Equity
IRPR: Indicator of Risk Perception by Rating
RUNEOL: Single National Registry of Payroll Deductible Loan Operators
RWA: Risk Weighted Assets
SB: Shadow Banking
SES: Superintendence of Solidary Economies
SFC: Office of the Financial Superintendent of Colombia
SMES: Small and Medium-Sized Enterprises
SS: Superintendence of Corporate Affairs
SYSMO: Systemic Stress Model
T2C: Tier 2 Capital
TC: Trust Companies
TES: Colombian Public Debt Bonds
TIB: Interbank Interest Rate
USD: US dollar
UVR: Real Value Unit
VAR: Vector Auto-Regression Model
WATM: Weighted Average Term to Maturity

Executive Summary and Heatmap

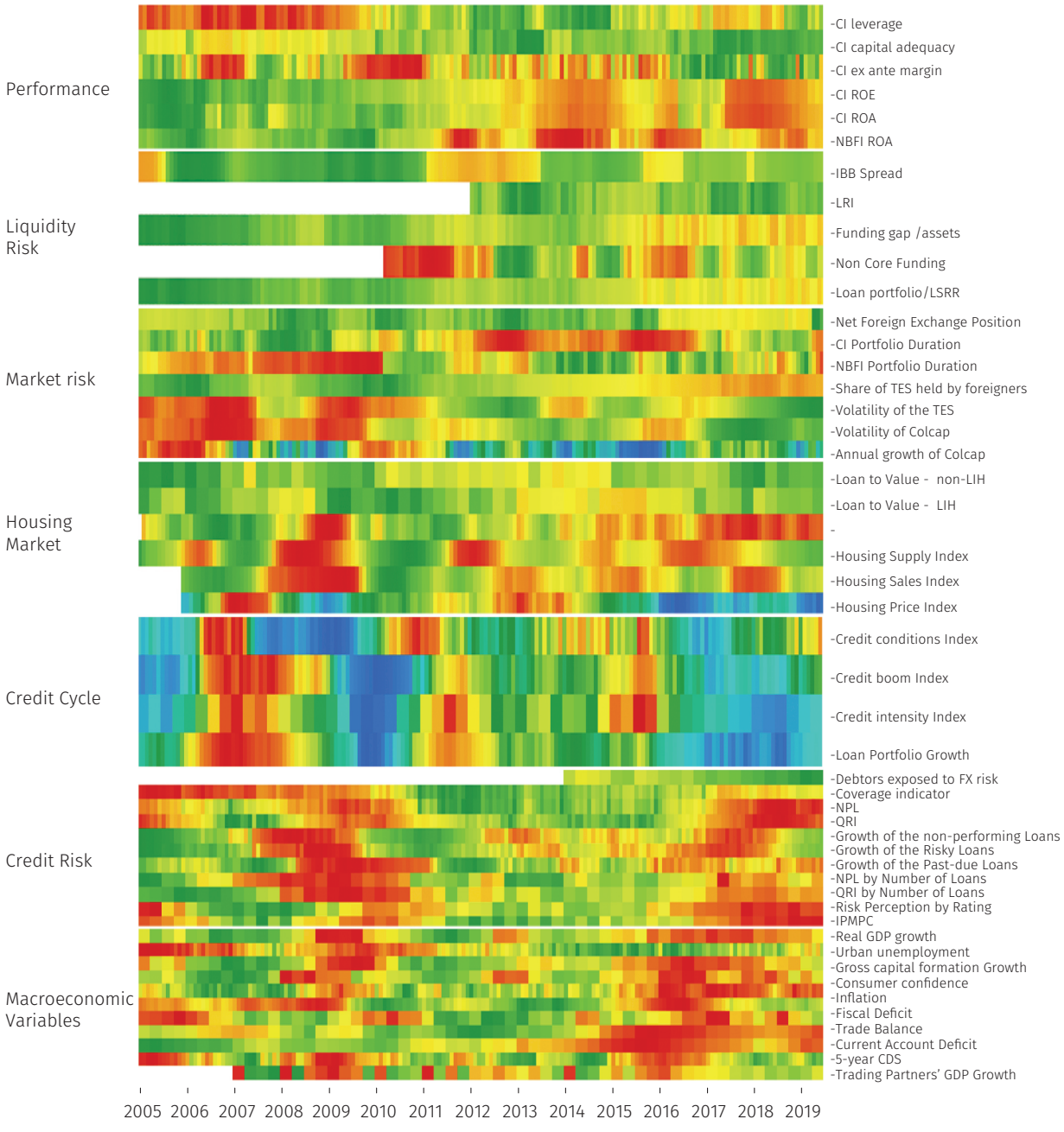
Over the course of 2019, the Colombian financial system established a trend towards recovery of profitability and credit growth, accompanied by slight improvements in the aggregate and sectorial indicators of portfolio quality. This reflects the lower materialization of credit risk that has been mentioned in past editions of this *Report,* mainly explained by the favorable change in the macroeconomic environment. In recent months, the indicators of capital adequacy and liquidity of financial institutions have remained persistently sound. These trends are reflected in the fading of red and blue shades in the areas of performance, credit risk, and credit cycle on the heatmap (Graph A)[1]. In this context, it is unlikely that credit conditions will become a source of macroeconomic disruption in the short term.

The recovery of credit observed in recent months has occurred in various categories in a mixed fashion, as it did in other credit cycles in the past. Specifically, while the commercial portfolio has barely begun to register positive real growth rates, the consumer and housing loan portfolios have registered nominal rates that exceed ten percent. In turn, the growth rate of the microcredit loan portfolio has not recovered. This is reflected in the variety of shades of color for portfolio growth on the map in Graph B. With respect to the housing loan portfolio, there has been a slight slowdown accompanied by growth in the non-performing loan portfolio during the most recent period. These observations contrast with the performance of the rest of the portfolios and are accompanied with unfavorable turnover rates and low growth in housing prices (in red and blue, respectively, on map A).

Although it is unlikely that credit conditions can threaten financial stability in the short term, this *Report* envisions two potential sources of vulnerability in the medium term. First of all, the trend towards a surge in the consumer loan portfolio is likely to generate an accumulation of risks that could come to fruition as losses should

1 *The technical details on the reading of, construction of, and variables used on the map are presented in Box 1 of the September 2017 Financial Stability Report.*

Graph A
Risk Heatmap of the Colombian Financial System

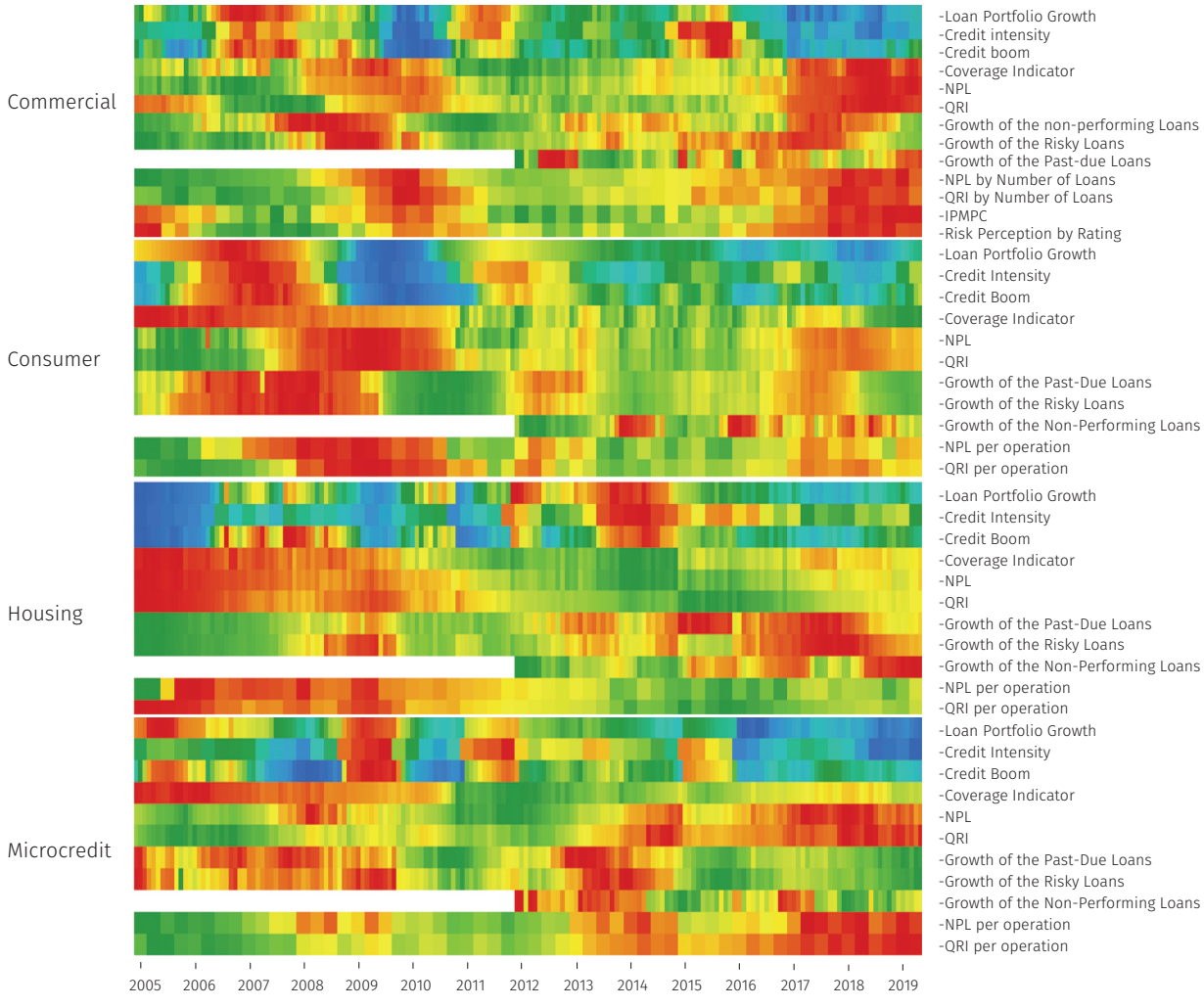


Source: *Superintendencia Financiera de Colombia* (hereinafter Office of the Financial Superintendent of Colombia), DANE, Fedesarrollo, Bloomberg, and *Banco de la República*, calculations by *Banco de la República*.

the macroeconomic environment be suddenly affected negatively. Secondly, if difficulties in external financing of the economy should arise unexpectedly, the adjustment in the economy required by the current account deficit would probably affect the stability of the financial system through the deterioration in the quality of the loan portfolio in a context of slower economic growth.

In order to adopt a prospective approach considering these vulnerabilities, this *Report* presents a stress test that assesses the resilience of the credit institutions in the event of an extreme hypothetical scenario. This scenario

Graph B
Map of Credit Risks



Source: Office of the Financial Superintendent of Colombia, DANE, Fedesarrollo, Bloomberg, and *Banco de la República*, calculations by *Banco de la República*.

includes a slowdown in the Colombian economy during the remainder of 2019 continuing into 2020 and 2021; difficulties regarding international financing; foreign investors withdrawing from the local public debt market; and a greater realization of credit risk in vulnerable sectors and in the consumer loan portfolio granted over the course of 2019. The results show that the aggregate indicators of overall and core capital adequacy would probably remain at levels exceeding the regulatory limits during the horizon of the scenario, despite the potential declines in profitability and in the volume of the loan portfolio.

Banco de la República, in compliance with its constitutional objectives, will continue to monitor the situation of the financial institutions and make decisions that will ensure that the levels of inflation and growth are consistent

with macroeconomic stability and long-term economic development. The analysis of the vulnerabilities presented in this Report constitutes a call to participants in the financial markets to make sure that the risks which they find themselves exposed to are appropriately and prudently assessed and managed.

Juan José Echavarría
Governor

01

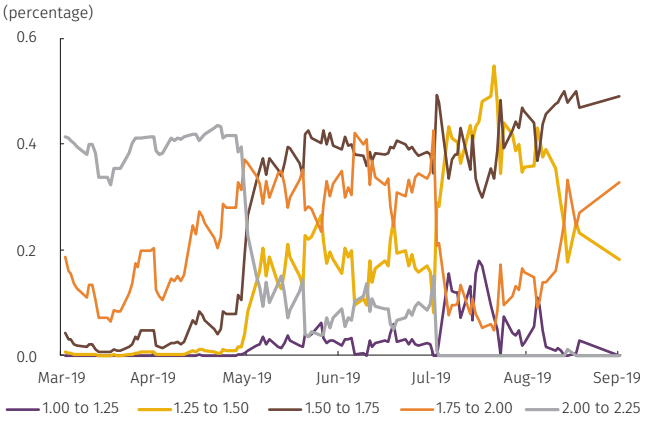
Macroeconomic Environment

The outlook for growth in the main economies for 2019 and 2020 is lower than in 2018. Latin America and the Caribbean, in turn, are expected to present a lower growth rate during 2019; in 2020, output is expected to recover and exhibit higher values than in 2018.

In recent years, the United States has registered a growth rate that is higher than its long-term rate, and its labor market shows a robust performance with an unemployment rate lower than 4.0%. Despite this statement , the Federal Open Market Committee (FONC) lowered its policy rate in September to a range of 1.75% to 2.00% due to the low inflationary pressure and the risks that lower global growth and uncertainty about tariff policies could generate for this economy as a result of the trade war with China. Furthermore, the market expects an additional reduction by the end of the year, reaching the range of 1.50% to 1.75% in December 2019 (Graph 1.1).

Moreover, slowdowns in the economic growth of the euro zone are expected (Table 1.1), mainly due to the greater negative contribution from net exports. In addition, inflation expectations suggest that this variable will continue below the 2.0% target over the next two years. Thus, the Governing Council of the European Central Bank (ECB) lowered the interest rate for deposits to -0.50% in September, while the interest rate on refinancing operations and loan facilities remained unchanged between 0.0% and 0.25%. The rate for targeted longer-term refinancing operations (TLTRO-III) was modified, and the 20 trillion euro-per-month asset purchase program started again on 1 November 2019. The announcement was made that rates would remain low until inflation expectations come close enough to 2.0%.

Graph 1.1
Probability by Ranges for the FOMC benchmark rate for December 2019



Source: Bloomberg.

In turn, lower growth rates are expected for China over the next two years. This is due to the direct and indirect effect of the trade and technology dispute between that country and the United States and the signs of weakness in their industrial and manufacturing sectors in the second quarter of 2019. These risks have been present in a context where the Chinese authorities have sought to foster growth with lower reserve requirements and higher public spending.

A slowdown with respect to the growth rate in 2018 is expected for 2019 in Latin America and the Caribbean due to the idiosyncratic shocks that occurred in Argentina, Brazil, Chile, Mexico, and Venezuela. The forecasts by the International Monetary Fund (IMF: *World Economic Outlook*) for 2020, in turn, suggest that Brazil and Mexico will exhibit recovery in their output, while Argentina and Venezuela will show smaller contractions (Table 1.2).

Table 1.1
Outlook for Annual Growth of the Major Economies (percentage)

	Share in Colombian Exports[a/]	1998 - 2007[b/]	2008 - 2017[b/]	2018[b/]	2019[c/]	2020[c/]
Advanced[d/]	33.7	2.8	1.3	2.3	1.7	1.7
United States	25.2	3.1	1.5	2.9	2.4	2.1
China	16.6	10.0	8.2	6.6	6.1	5.8
Euro zone	9.8	2.4	0.6	1.9	1.2	1.4

a/ Share in total Colombian exports for August 2019.
b/ Actual growth
c/ Expected growth.
d/ Based on IMF categories. Includes the United States, some countries in the Euro zone, and other advanced economies in Europe and Asia.
Sources: World Economic Outlook (October 2019) and Bloomberg.

The technical staff at Banco de la República increased its growth expectations for Colombia in 2019 to 3.2%. The growth of the annualized GDP for the second quarter of 2019 in Colombia registered a rate of 2.8%. By branches of activity, all of these sectors registered a positive growth rate, and most of these values were higher than those seen a year ago.

The growth rate of the annualized Gross Domestic Product (GDP)[1] in Colombia for the second quarter of 2019 was 93 basis points (bp) higher than the rate seen a year ago (Table 1.3). When assessing

1 The annualized GDP in period *t* corresponds to the sum of the quarterly GDP in *t*, *t*-1, *t-2 and t*-4.

Table 1.2
Outlook for Annual Growth of Latin America and the Caribbean
(percentage)

	Share in Colombian Exports[a/]	1998 - 2007[b/]	2008 - 2017[b/]	2018[b/]	2019[c/]	2020[c/]
Latin America and the Caribbean	24.3	3.1	2.1	1.0	0.2	1.8
Ecuador	5.3	3.1	3.4	1.4	-0.5	0.5
Brazil	4.2	3.0	1.6	1.1	0.9	2.0
Mexico	3.2	2.7	2.1	2.0	0.4	1.3
Peru	2.7	4.1	4.9	4.0	2.6	3.6
Chile	2.6	4.4	3.0	4.0	2.5	3.0
Argentina	1.0	2.8	1.6	-2.5	-3.1	-1.3
Colombia		3.1	3.6	2.6	3.4	3.6

a/ Share in total Colombian exports for August 2019.
b/ Actual growth
c/ Expected growth.
Sources: World Economic Outlook (October 2019) and Bloomberg.

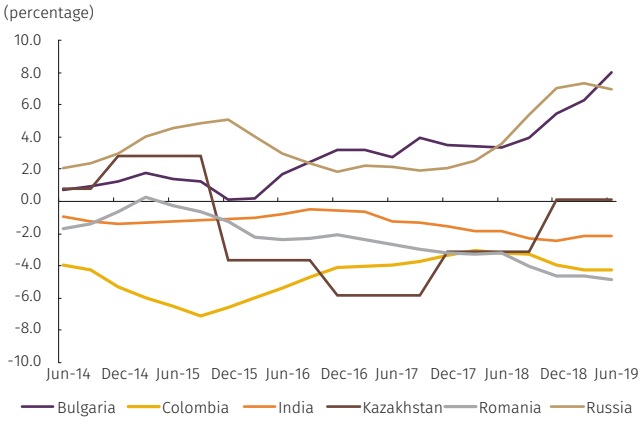
Table 1.3
Real Annualized GDP Growth by Branch of Economic Activity: seasonally adjusted
(percentage)

	Q2 2018	Q2 2019
Agricultural, forestry, hunting and fishing	3.2	1.2
Mining and quarrying	-3.9	3.1
Manufacturing industry	-0.3	2.0
Electricity, gas and water	3.1	2.9
Construction	-2.7	1.0
Trade, repairs, restaurants and hotels	2.6	4.0
Information and Communications	0.7	4.3
Financial and Insurance	5.1	4.0
Real estate	2.7	2.5
Professional, scientific, administrative, and support	3.5	3.5
Public administration, defense, education, and social services	3.9	3.7
Art, entertainment, and other services	1.7	2.2
Subtotal added-value	1.9	2.8
Taxes minus subsidies	1.9	2.8
GDP	1.9	2.8

Source: DANE.

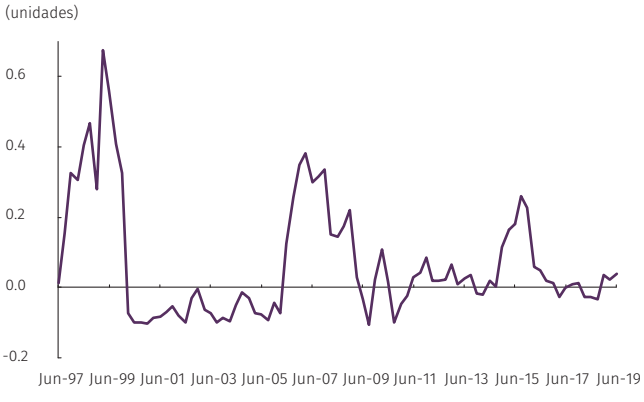
the performance by sector, it is evident that the branches with the highest growth rates were information and communication; financial and insurance; and commerce, repairs, restaurants, and hotels. Moreover, the sectors of manufacturing industry, mining and quarrying, and construction, which showed negative growth rates in the second half of 2018, surged and are now showing positive values. Last of all, the branch of agriculture, forestry, and hunting and fishing is the one that had the largest slowdown *vis-*

Graph 1.2
Current Account as a Share of the GDP Sample of Countries BBB - S&P



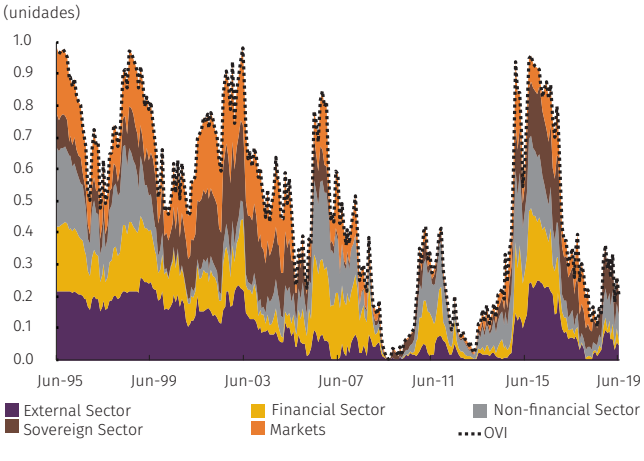
Source: Bloomberg.

Graph 1.3
"Extra" Probability of Low Growth Coming from Financial Weaknesses



Source: *Banco de la República.*

Graph 1.4
Overall Vulnerability Index



Source: *Banco de la República.*

à-vis a year ago. The forecasts calculated by the technical staff at *Banco de la República* point to a 3.2% economic expansion in 2019.

The greater sluggishness of our trading partners and the more loose global monetary policy stance could generate two opposing effects: first, lower demand could affect the performance of exports and prices of commodities; second, greater liquidity in the market could encourage the capital flows into the country.

The recovery of growth in Colombia has been accompanied by high foreign financing requirements in comparison to countries that share the same sovereign rating (Graph 1.2).[2] Although these values do not threaten Colombia's credit rating, they represent a potential source of vulnerability and, therefore, take a leading role in the stress-test scenario presented in Chapter 3 of this *Report*.

In line with the goal of identifying potential sources of vulnerability that could affect the normal operation of the financial system, the indicator of additional probability of low economic growth coming from financial weaknesses is analyzed (Graph 1.3)[3], and the overall vulnerability index is calculated (OVI: Graph 1.4).[4] Both variables suggest that vulnerabilities coming from the financial system are at low levels (compared to earlier episodes) and that the slight increases seen in the last six months are a result of the higher growth rate of the loan portfolio.

Even though it is unlikely that credit conditions could threaten financial stability in the short and medium terms, two primary sources of vulnerability can be seen in the medium term. First of all, the level of foreign indebtedness and the current account deficit could affect the stability

2 The information on sovereign rating from Standard & Poor's (S&P) is used.

3 For more detail on this indicator, see Box 1 of the *Financial Stability Report for* the first half of 2019.

4 For more detail on this indicator, see Box 2 of the *Financial Stability Report for* the first half of 2019.

of the financial system through deterioration in the quality of the loan portfolio in a context of slower economic growth resulting from difficulties to find financing abroad. Secondly, should this trend towards a surge in the consumer loan portfolio continue, this could possibly result in losses if the macroeconomic environment were to be affected negatively, as has been seen in previous phases of the Colombian credit cycle.

Thus, it becomes relevant to study the resilience of the Colombian financial system in an environment in which these risk factors could materialize. That is why this *Report* presents a stress test that calculates the potential impact of a hypothetical scenario including a more restrictive external environment (that involves a capital outflow) and lower economic growth over the medium term for our trading partners—conditions that would result in a domestic slowdown and the lower creditworthiness of some economic sectors. Likewise, it seeks to measure the appearance of a set of risks for the banking system as a result of that shock. The usefulness of the exercise lies in providing an estimate of the potential losses that could be seen in this scenario and reveal the possible transmission channels through which the vulnerabilities identified could end up affecting financial stability.

The results show a fall in the aggregate capital adequacy ratio of credit institutions that remains above the regulatory minimum at the end of the test. This is accompanied by a reduction in the levels of profitability and the strength of the portfolio. These results are obtained from a hypothetical scenario and the use of a set of restrictive assumptions. It is to be expected, therefore, that under shocks that are smaller in magnitude, or using weaker assumptions, the impact on financial stability will presumably be lower.

Box 1
Reflections on the Financial Stability Policy Framework

Daniel Osorio*

Banco de la República's Strategic Plan for 2017-2021 incorporates, among other things, the functions, services, and strategic direction of the entity for that period.[1] One of the strategic themes contained in the plan is efficiency, understood as the need to optimize the development of functions with "an overall vision that spurs the best use of resources". In this regard, in the area of services to the economy, the objective of the plan is to evaluate and update the Bank's instruments to contribute to financial stability. While the Bank does not have a specific mandate to preserve financial stability, it is clear that macroeconomic and price stability (the Bank's explicit mandates) are crucially dependent on it.

This specific objective of the strategic plan has been part of the work of the Financial Stability Department during 2019. In furtherance of this objective, the Department has received support from the Bilateral Assistance and Capacity Building Programme for Central Banks of the Secretariat for Economic Cooperation of the Swiss Confederation, both in terms of technical assistance and in the organization of a technical workshop on the subject held on the premises of *Banco de la República* in Bogotá.

The purpose of this box is to present some preliminary reflections on the policy framework for the Colombian economy's financial stability and on the considerations to be taken into account in the design of policy instruments to mitigate the associated risks. These reflections are partially the result of the aforementioned assistance and technical workshop, and will serve as a basis for the Department's analysis in meeting the strategic objective.

1. Policy framework for the financial stability of the Colombian economy

Financial stability is understood as a general condition in which the financial system (institutions, markets, and infrastructures): 1) assesses and manages financial risks in such a way as to facilitate economic performance and efficient allocation of resources, and 2) is capable of autonomously absorbing, dissipating and mitigating the materialization of risks that may arise as a result of adverse events.

The financial stability of the Colombian economy is the joint responsibility of different State authorities within a decentralized financial regulation system in which these institutions maintain a joint interest in the resilience of the system and in which the risks it faces are appropriately measured and managed.

According to the Constitution, the Congress of Colombia is in charge of "regulating financial, stock market, and insurance activities and any others related to the management, use and investment of the resources taken from the public."[2] At the same time, the Constitution stipulates that it is incumbent upon the President of the Republic "to exercise, in accordance with the law, the inspection, monitoring, and control over persons engaged in financial, stock market, and insurance activities and any others related to the management, use or investment of resources taken from the public."[3] These functions have traditionally been delegated to the Ministry of the Treasury and Public Credit (MHCP in Spanish)—the entity that establishes, for example, capital requirements and limits on the institutions' operations—and the Office of the Financial Superintendent of Colombia (FSC), the head of which is appointed by the executive branch of the State. The FSC has also served as the settlement authority. In the event that the FSC determines that a credit institution should be liquidated, the resolution and liquidation process is carried out in coordination with the Guarantee Fund for Financial Institutions (Fogafin), an entity that is also in charge of managing the public deposit insurance plan.

Finally, in accordance with the Constitution, the Board of Directors of *Banco de la República* (BDBR) is the credit authority for the economy, in addition to being the foreign exchange and monetary authority. Thus, establishing the mechanisms to control credit and foreign exchange regulation in accordance with the law and serving as lender of last resort for credit institutions are delegated by the Constitution to the BDBR.

These four institutions (MHCP, the Central Bank, FSC, and Fogafín) coordinate their activities formally and informally

* The author works in the Financial Stability Department of *Banco de la República*. The contribution of Robert Sheehy to this box is gratefully acknowledged. The opinions expressed here are the sole responsibility of the author and do not imply any commitment on the part of *Banco de la República* or its Board of Directors.

1 See https://www.banrep.gov.co/sites/default/files/paginas/plan-estrategico-2017-2021.pdf

2 Article 150, number 19, entry d.

3 Article 189, number 24.

through various mechanisms. In terms of formal mechanisms, the Constitution provides that the Minister of the Treasury should preside over the BDBR. The law also stipulates that the operational heads of the institutions make up the Coordinating Committee for Monitoring the Financial System (CCSSF in Spanish), which meets quarterly and has the mandate to serve as a conduit for the exchange of relevant information, the standardization and technical improvement of the institutions' procedures as well as encouraging the adoption of actions relevant to financial stability. The CCSSF plan was strengthened in 2014 as a result of the recommendations of the International Monetary Fund's Financial System Assessment Program (FSAP). Among the main changes was the possibility of modifying the work of the committee by decree, the creation of a technical support subcommittee, the fostering of communication mechanisms among members to be implemented in times of financial stress, and strategies for identifying warning signs (the regular reporting of systemic institutions and the identification of emerging risks were incorporated into the latter). All these adjustments have made it possible to achieve better coordination and exchange of information in support of the financial system's stability. Additionally, both the governor of the Central Bank and the financial superintendent are part of Fogafin's Board of Directors. As regards informal coordination mechanisms, the BDBR has invited the financial superintendent to its technical meetings whenever his/her opinion on financial stability has been required.

2. Objectives of the policy for financial stability:

A financial stability policy framework is a set of rules, actions by, and mandates of one or more state authorities that should strive to maintain the resilience of the financial system against shocks and to prevent institutions from collectively assuming excessive risk positions that could possibly affect the performance of the economy. These goals are equivalent to facing systemic risks that arise as a consequence of three externalities inherent to financial activity:

a. The tendency of financial institutions to amplify external shocks due to their dependence on leverage and a limited capital base;
b. The pro-cyclical nature of the relationship between asset prices and credit;[4]
c. The structural interconnections between financial institutions that are exacerbated when only a small set of institutions carry out critical functions for the system as a whole.

This reflection is relevant insofar as it is not clear that the objective of a financial stability policy framework is to mitigate all types of risk taking or to avoid the bankruptcy of any financial institution at all costs, but rather to focus on solving those relevant externalities inherent in financial activity. At the same time, a good financial stability policy framework is a complement to (not a substitute for) good financial regulation and sound macroeconomic policies since, if the latter are not in place, financial stability policy will be less effective. In other words, the policy framework for financial stability should not be designed to offset structural weaknesses in macroeconomic policy or in micro-prudential regulation. In this regard, the recent history of the Colombian economy offers two examples. The first of these is the use of marginal reserve requirements and loan-loss provisions as tools to contain the excessive accumulation of risks in financial institutions in the form of the rapid growth of credit in mid-2007.[5] Both tools, designed in coordination by the central bank and FSC, complemented a contractionary monetary policy, the transmission of which had been less effective than expected at that stage of the economic cycle. The second example is *Banco de la República*'s intensive use of tools to control foreign exchange risk and liquidity risk denominated in foreign currency. These tools are a natural complement to a flexible exchange rate regime that allows the nominal exchange rate to act as the primary absorber of external shocks.

Finally, the financial stability policy framework requires the design and maintenance of effective mechanisms of cooperation between authorities, a clear division of responsibilities, and a sufficiently strong mandate for these mechanisms so that the relevant authorities have the incentive and capability to act effectively.

3. Recent international experience: the case of Europe

As a result of the 2008-2009 international financial crisis in particular, some jurisdictions have made progress in designing policy frameworks that contribute to preserving the stability of the financial system. In Europe, this policy framework is part of the legal mandate of a single authority that carries out various functions in this regard. This significantly reduces the need for coordination between public bodies in different jurisdictions, but potentially hinders the independence and accountability of the single authority. For example, this is the case in Ukraine and the United Kingdom, whose central banks have a legal

4 Bianchi, Javier. 2011. "Overborrowing and Systemic Externalities in the Business Cycle." American Economic Review, 101 (7): 3400-3426.

5 Vargas, Hernando; Pamela Cardozo and Andrés Murcia, 2017. "The macroprudential policy framework in Colombia," BIS Papers chapters, in: Bank for International Settlements (ed.), Macroprudential policy frameworks, implementation and relationships with other policies, vol. 94, pp. 103-128, Bank for International Settlements.

mandate to maintain financial stability, to regulate large portions of the financial system, and to implement explicit macroprudential policies. To fulfill this mandate, these jurisdictions have financial policy committees that operate within the central banks and recommend relevant policies to their respective currency boards.[6]

With regard to jurisdictions where financial stability is the joint responsibility of multiple authorities (as in Colombia), the experience of some countries in the Monetary and Economic Union is indicative. In the Union, the European Systemic Risk Board (ESRB) was given explicit responsibility for regional macroprudential oversight by the authorities. One of the functions of the ESRB is to issue recommendations to national authorities in order to mitigate systemic risks that the European system could face. As regards the policy framework for financial stability, the ESRB has recommended[7] giving an explicit financial stability mandate, either to a single authority or to a committee composed of those authorities whose decisions could have a 'material impact on financial stability'.

As mentioned above, the United Kingdom adopted the recommendation by giving responsibility for the financial stability policy framework to the central bank. The recommendation to grant a mandate to a committee has been followed by Spain and France: the *Autoridad Macroprudencial y Consejo de Estabilidad Financiera* (Amcesfi), and the *Haut Conseil de Stabilité Financière* (HCSF) respectively. These councils include the regulators and supervisors of the financial system as well as the central banks and the ministries of finance, and their mandate has enabled them to take charge of some macroprudential instruments. Germany, in turn, adopted the recommendation in the form of giving a single authority other than the central bank (BaFin, the federal financial supervisory authority) responsibility for financial stability and extensive macro-prudential powers. Germany also has a coordination committee, whose functions are similar to the Colombia's CCSSF.

4. Conclusion:

As in any other jurisdiction, the financial stability policy framework in Colombia is in constant development. Within the system of decentralized financial regulation, the development of the framework requires the coordination and cooperation of multiple authorities. In the case of Colombia, the structures implemented for ensuring the stability of the financial system have the information exchange and coordination mechanisms needed to achieve their objective as well as the functions of each of the authorities defined, and in general, they have worked well. Even though there are formal and informal vehicles for coordination between authorities in Colombia, a future element to be analyzed is whether the responsibility (in the form of a legal mandate), the analytical work, and the proposals and decisions with regard to macro-prudential policy should be delegated to a single authority or to a committee similar to those established in some European jurisdictions. In any case, central banks in most countries play a key role within the financial stability policy framework.

6 In the case of Ukraine, there is also a Financial Stability Board, to which the Ministry of Finance and securities and financial market regulators are invited. The Financial Policy Committee of the National Bank of Ukraine has the explicit mandate to recommend relevant policy actions to the Financial Stability Board.

7 See https://www.esrb.europa.eu/pub/pdf/recommendations/ESRB_2011_3.en.pdf?da108dbb14efccdf98f4544534e2ef4e

02

Vulnerabilities of the Financial System

Given the potential risks that have been identified in Chapter 1, the exposure of financial intermediaries to these possible sources of vulnerability is evaluated in this section. An overview of the financial system and an analysis of the credit, market, liquidity, and trading book interest rate risks that financial institutions are exposed to are presented below.

2.1 Current Situation of the Financial System

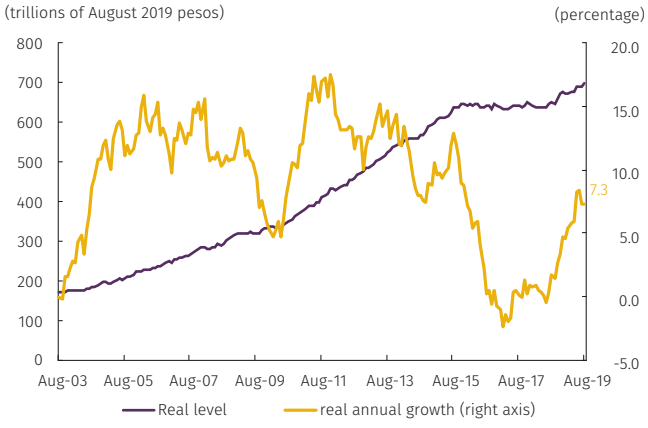
The balance sheets of credit institutions showed a recovery fueled by growing investments.

As of August 2019, the assets of credit institutions (CI) came to COP 700.1 trillion (t), which represented a real annual expansion of 7.3%.[5] This growth is higher than the average for the last five years and confirms the recovery trend observed over the past year (Graph 2.1). In line with the higher pace of asset expansion, liabilities grew at 6.4%, thus experiencing a 4.5 percentage-point (pp) increase in the rate with respect to August 2018.

The asset growth has been led by investments, which expanded 12.8%. These have been taking over a larger share of the balance sheets of CI and accounted for 20% of the total assets as of August

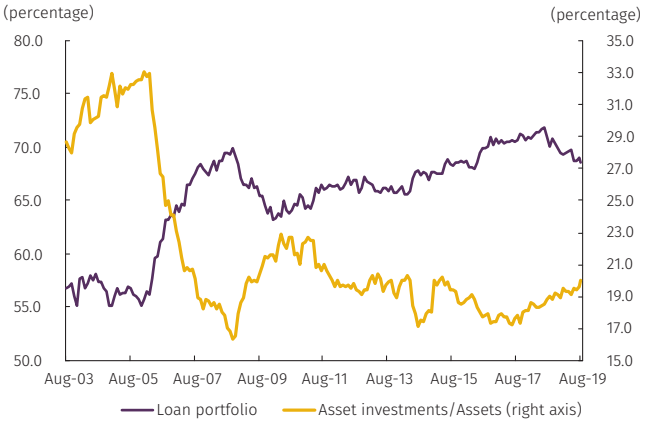
5 The real growth was calculated by using the consumer price index (CPI) excluding food.

Graph 2.1
CI Assets



Sources: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*

Graph 2.2
Percentage Share of Investments and Gross Loan Portfolio in Total Credit Institutions Assetso



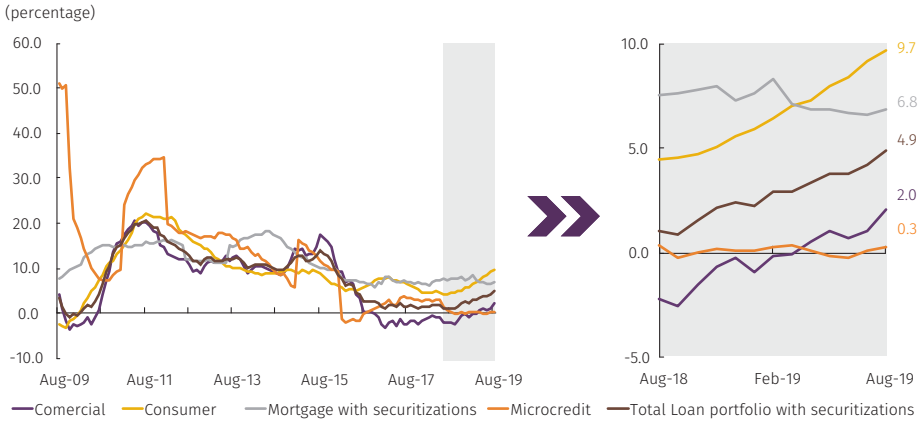
Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

2019. In contrast, the loan portfolio share continues to decline and has seen a 1.5 pp reduction over the last year (Graph 2.2).

As for the total loan portfolio, it registered a real annual growth of 4.9%, while a year ago it was expanding at a rate close to 0.0%. By type, all of the loan portfolios with the exception of microcredit showed an improvement, specifically the one granted to households. The consumer loan portfolio, in particular, registered the highest growth rate since the end of 2013. This has mainly been driven by personal loans. The commercial loan portfolio, in turn, went from registering decreases to showing an upturn of 2.0%. This reversed the negative trend seen in this segment since November 2016 (Graph 2.3). The aggregate performance of the loan portfolio has coincided with a greater demand for loans within the economy and with a trend towards reducing the requirements to be met before loans are granted (Graph 2.4).

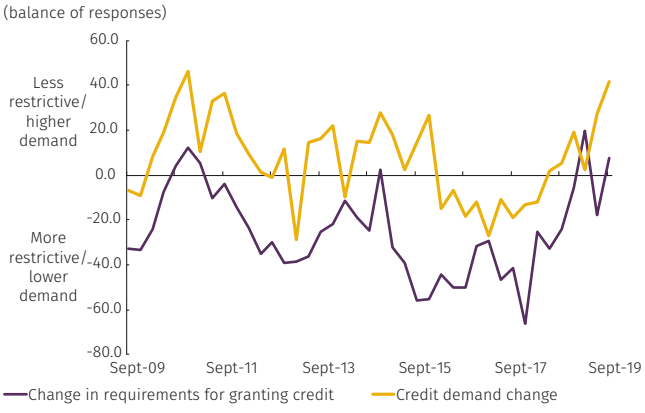
Credit risk indicators, in turn, showed improvements as a result of the downturn in the risky and non-performing loan portfolios.

Graph 2.3
Annual Real Growth of Loan Portfolios by Type



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

Graph 2.4
Perception Change of Credit Supply and Demand



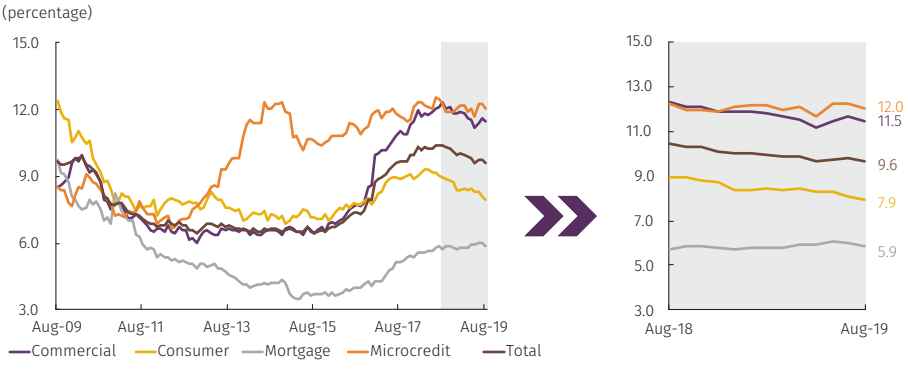
Note: The percentage of the balance of responses is calculated as the difference between the percentage of respondents who stated that the requirements were less restrictive and the demand for credit greater, and those who noted increased requirements and less demand for credit. A positive result in the balance is interpreted as that credit institutions are being less restrictive, and that the demand has grown.
Source: Report on the Credit situation in Colombia, *Banco de la República.*

During the last year, the quality risk indicator (QRI)[6] for the total loan portfolio showed a decline and stood at 9.6%. All loan portfolios showed improvements in their QRI with the exception of housing and microcredit, which remained relatively constant (Graph 2.5, panel A). This performance was due to the contraction of the risky portfolio, which went from growing at 8.7% to -3.2%, during the period under analysis.

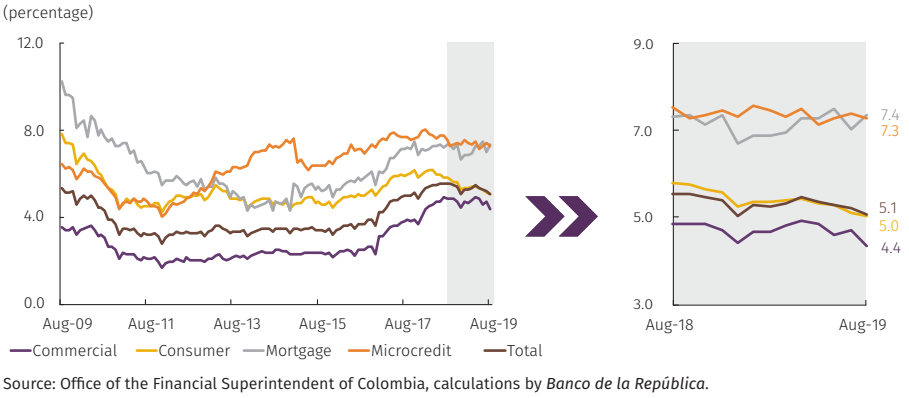
The non-performing loan indicator (NPL),[7] in turn, showed a pattern similar to the QRI and stood at 5.1%[8] as of August 2019 (Graph 2.5, panel B). The decrease in the indicator was mainly due to the fall of the NPL in the consumer and commercial portfolios.

Graph 2.5

A. Quality risk indicator (QRI)



B. Non-performing loan indicator (NPI)



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

6 The QIR is defined as the ratio between the risky and the total loan portfolios (the risky loan portfolio corresponds to the balance of the loans with ratings other than A on a scale from A to E where A is the best rating).

7 The QID is calculated as the ratio between the non-performing and total loan portfolios (the past-due portfolio includes the balance of the loans that have been in arrears for a period of more than 30 days).

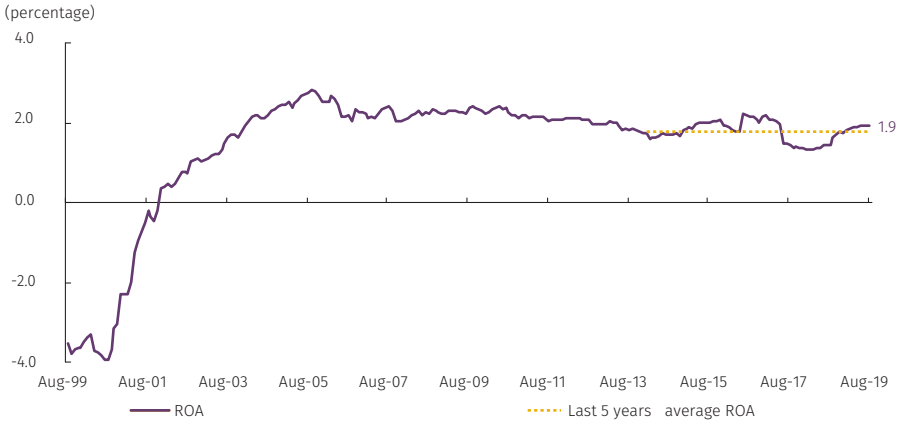
8 When the penalties are included in the calculation of the QID, the indicator amounts to 10.3%.

The profitability of CIs showed relative stability and stood slightly above the average for the last five years.

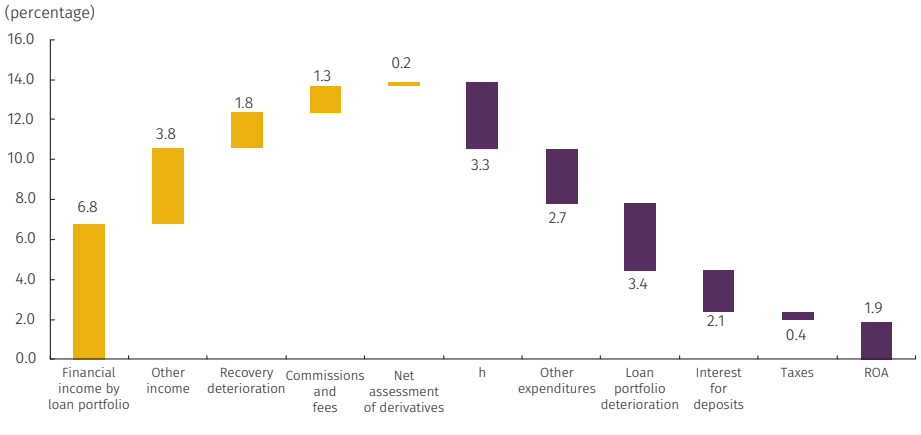
In August 2019, the return on assets (ROA) indicator stood at 1.9%, thus presenting a stable performance over the past seven months (Graph 2.6, panel A) and being above the average for the last five years.[9] The component that contributes most positively to the profits of CI was financial income, while the one that contributes negatively the most was loan-loss provision expenses. Nevertheless, the real annual growth rate of this last item has declined 15.3 pp over the past year (Graph 2.6, panel B). In terms of capital adequacy, both the core and total capital adequacy ratios show an ample margin with respect to the regulatory minimums[10] and stood at 11.0% and 15.7% respectively.

Graph 2.6
Profitability of Credit Institutions

A. A. Return on Assets (ROA)



B. B. Breakdown of ROA



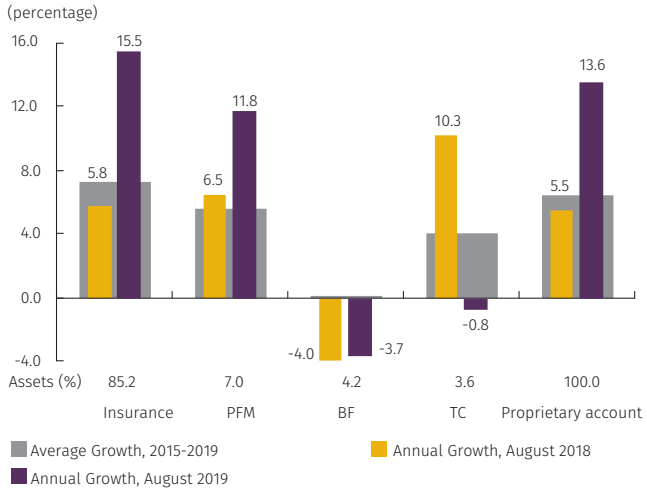
Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

9 The positive jump that was seen in June 2016 was due to the decision made by the Banco de Bogotá against consolidating Corficolombiana.

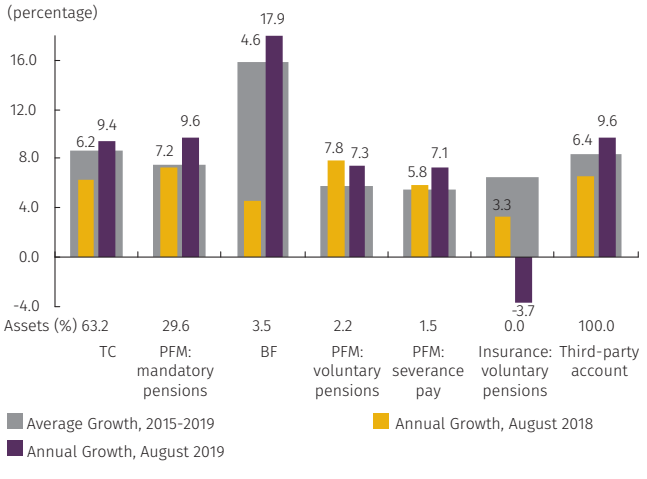
10 The regulatory limits for core and total capital adequacy ratios are 4.5% and 9.0%, respectively.

Graph 2.7
Growth of NBFI Assets

A. In proprietary account



B. In Third-party account



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

Assets that non-banking financial institutions hold in proprietary and managed accounts continued to show a growth rate higher than the historical average.

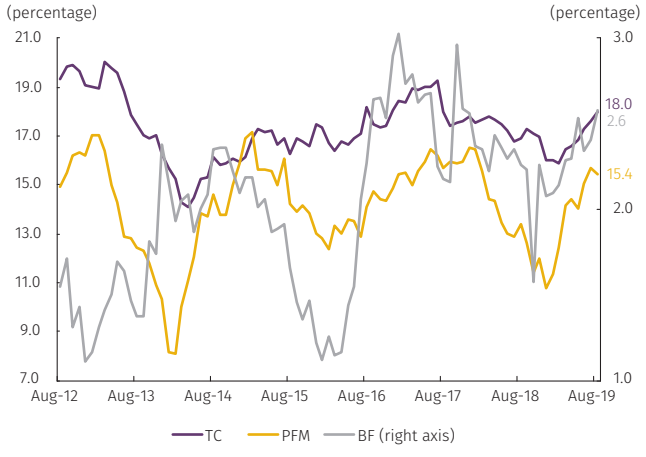
In August 2019, the assets in the proprietary account of the Non-banking Financial Institutions (NBFI) represented 5.3% of the financial system assets and grew 13.6%, a figure which is above their historical average (6.6%). The SBF continued presenting decreases as did the TC. These showed a change in the trend compared to a year ago. With respect to the breakdown of the assets in the proprietary position, the one for the insurance companies, which have a share close to 85%, represents the most, while the one for PFM, TC, SBF represents approximately 7.0%, 4.0%, and 3.6% respectively (Graph 2.7, panel A).

The balance of the portfolio managed by the NBFI represented 48.8% of the financial system assets and showed the same trend as the assets in the proprietary account. Therefore, it grew at a rate that was higher than in August 2018 and than its historical average. This was determined by the stronger growth of the portfolio managed by the TC and the mandatory pensions managed by the PFM that represent 14.4% and 30.8% respectively of the total financial system assets. In contrast, the voluntary pensions managed by insurance companies were the only item that registered a decline (Graph 2.7, panel B).

Between August 2018 and 2019, the ROA of the NBFI registered increases despite the fluctuations that occurred during the year as a result of the performance of the stock market. This indicator remains above the average of the last five years.

The ROA of the TC, PFM, and SBF stood at 18.0%, 15.4%, and 2.6% respectively. These figures are higher than the ones seen in August 2018 (Graph 2.8). With regard to the life insurance companies, the ROA registered a value of 3.5% while the ROA for general insurance remained stable and stood at 1.8%. In general, an improvement is seen in the NBFI's levels of profitability which surpass the average for the past five years and confirm the sector's recovery.

Graph 2.8
ROA of Trust Companies, Pension Fund Managers, and Brokerage Firms



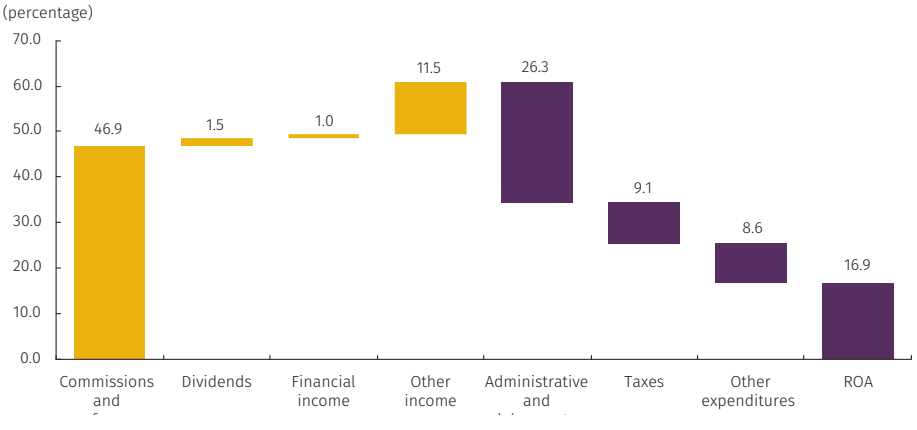
Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

When the type of institution with the greatest profitability among the NBFI was analyzed, it was clear that the ROA of the TC was driven mainly by their income from commissions and fees, while their main expenditure was labor, which is consistent with their business structure. Between August 2018 and 2019, this indicator rose 1.1 pp due to the growth in commissions and fees added to a slight improvement resulting from dividend income. In the area of expenditures, the administrative and labor (EAL) costs rose 0.8 pp while taxes were slightly reduced (Graph 2.9).

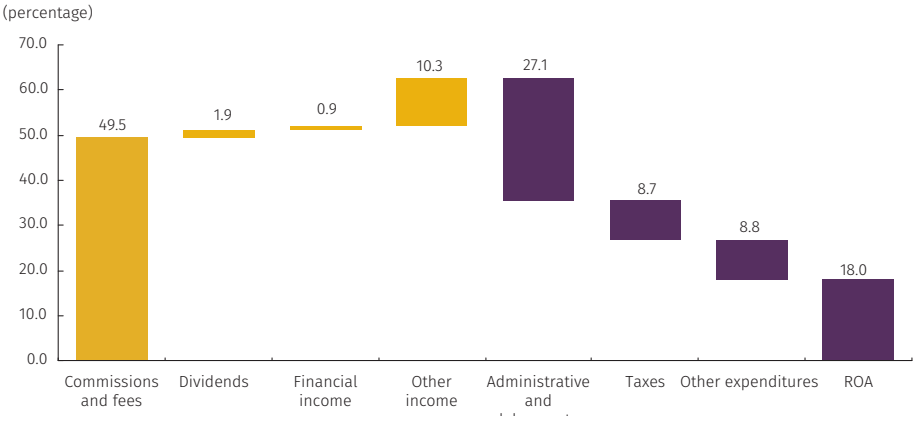
With respect to the type of institution with the lowest profitability, the income and expense structure of the SBF was seen to be more diversi-

Graph 2.9
Breakdown of Profitability of TC

A. August 2018



B. August 2019

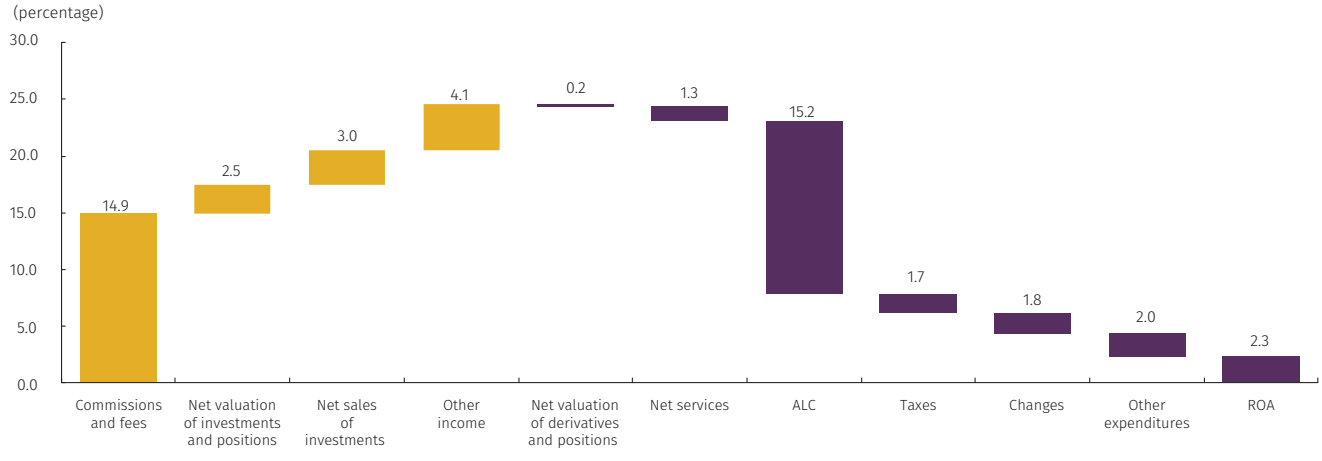


Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

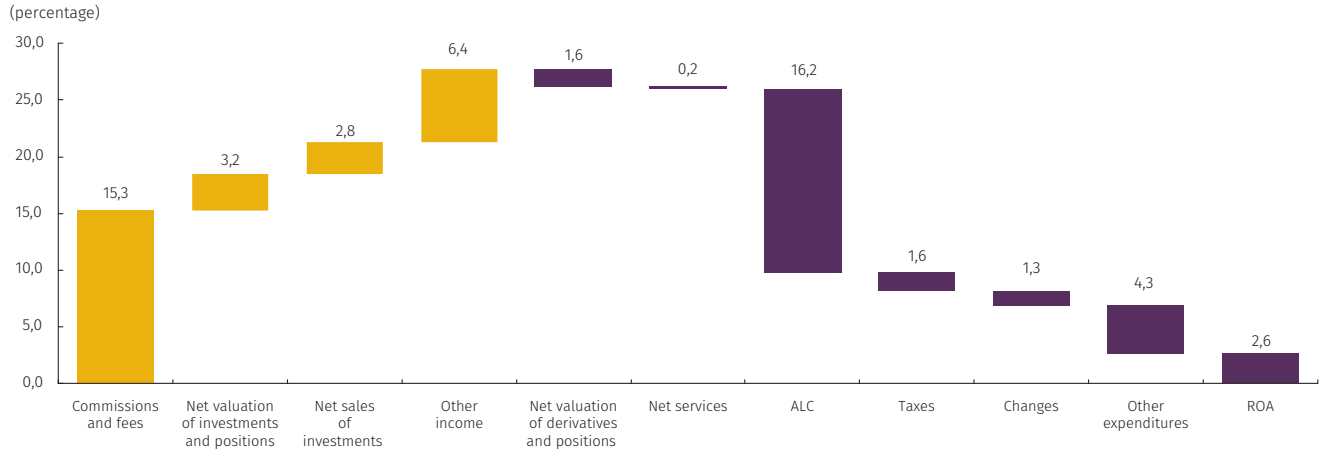
fied due to the structure of their business. During the period of study, the ROA for this group of institutions rose 0.3 pp and was mainly determined by income from commissions and fees and by administrative and labor costs. Between August 2018 and the cut-off date, the net assessment of investments and other income rose as a share while the net valuation of derivatives represented a higher expenditure of 1.4 pp. Regarding expenditures, there was a slight reduction in taxes and changes11 that was offset by the segment of other expenses (Graph 2.10).

Graph 2.10
Breakdown of Profitability of BF

A. August 2018



B. August 2019



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

2.2 Credit Risk

The credit risk analysis presented below is divided between the corporate sector and households. The development of corporate sector indebtedness and the perception and materializing of private companies' credit risk is analyzed by economic sector in the first subsection. Household indebtedness is identified in the second sub-section, and some risks related to the performance of this loan portfolio are presented.

2.2.1 Corporate Sector[11]

2.2.1.1 Change in corporate sector indebtedness

The corporate sector decreased its indebtedness as a percentage of GDP as a result of a fall in loans contracted with domestic financial institutions.

As of June 2019, the total indebtedness of the corporate sector as a share of the annualized GDP stood at 56.6% and showed a 66 bp reduction with respect to what had been seen six months ago. Of the total, the private corporate sector[12] contributed 49.0 pp. This sector showed a drop spurred mainly by less indebtedness to domestic financial institutions (Graph 2.11, panel A). Regarding the public corporate sector, there was evidence of a slight decline in indebtedness which was due to a smaller share of held bonds (Graph 2.11, panel B).

In terms of the breakdown of the debt by financing instrument, note that, as of the date of analysis, the private sector's main funding sources continue to be loans in legal currency with local financial institutions and in foreign currency from lenders abroad. In the case of the public sector, the instrument used the most is bonds issued in the external market. Likewise, note that the sources of financing that are used the least are, respectively, bonds issued abroad and foreign providers.

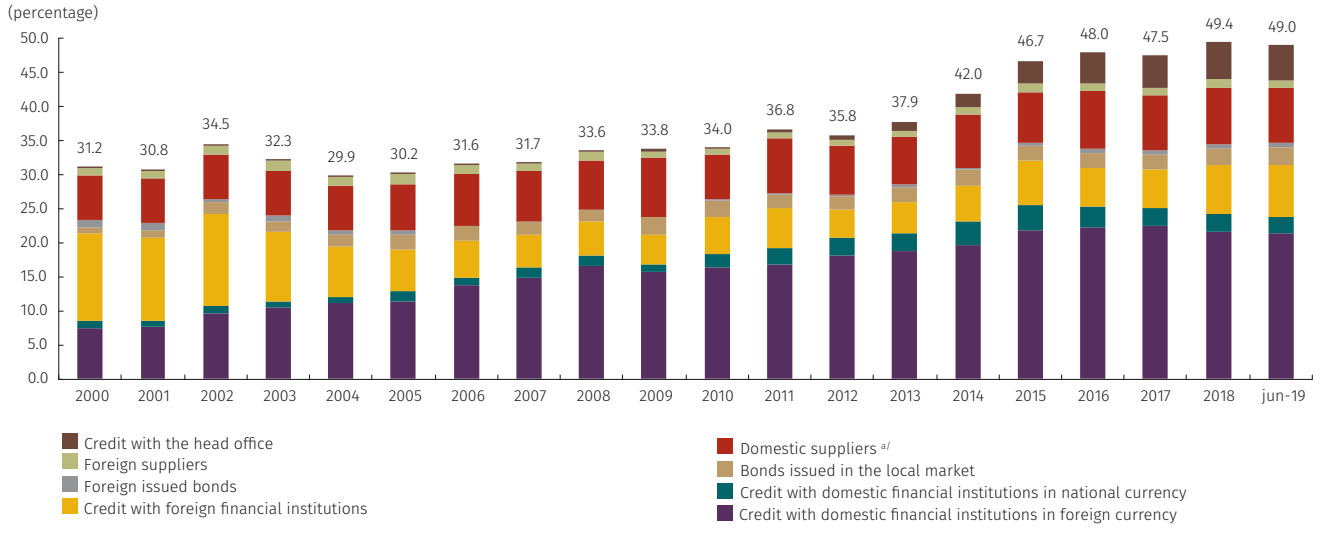
When indebtedness is analyzed by type of currency, it is evident that private companies still acquired the majority of their debt in pesos and the decrease in the total debt as a percentage of the GDP is due to the decline in debt denominated in local currency. In contrast, foreign currency debt remained stable between December 2018 and June 2019, in a context where the exchange rate decreased by 1.4%.

11 Due to availability of information from the FSC Format 341,"Individual Information by Debtor: Active Credit Transactions," the figures in this section were submitted as of June 2019.

12 Throughout the entirety of this section, the term "private corporate sector" refers to private companies and excludes those monitored by the FSC.

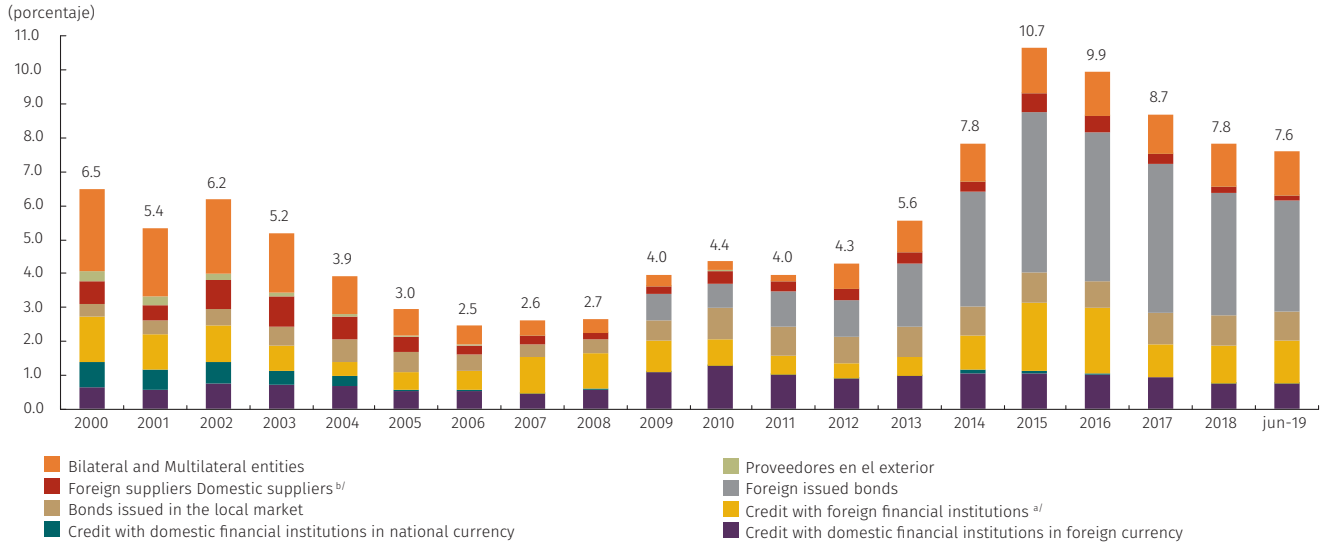
Graph 2.11
Corporate Sector Financial Debt as a Percentage of GDP by Instrument

A. Private corporate sector



a/ This only includes information from companies that report their financial statements to the Office of the Superintendent of Corporate Affairs. In 2018, all of the companies registered their financial statements using IFRS which did not make it possible to determine the balance of debt owed to national entities. Therefore, in order to do an approximation of the data from these companies, the average percentage that the short and long-term providers reported under current and non-current liabilities respectively, during this period, for the companies that reported between 2007 and 2015 using the UAP was calculated, and an equal percentage for the entities that submitted financial statements in 2018 was assumed. Based on data availability as of June 2017, a provider balance that is equal to what was estimated for December 2017 is assumed.
Sources: Office of the Financial Superintendent of Colombia, Office of the Superintendent of Corporate Affairs, and *Banco de la República*, calculations by *Banco de la República*.

B. Public corporate sector



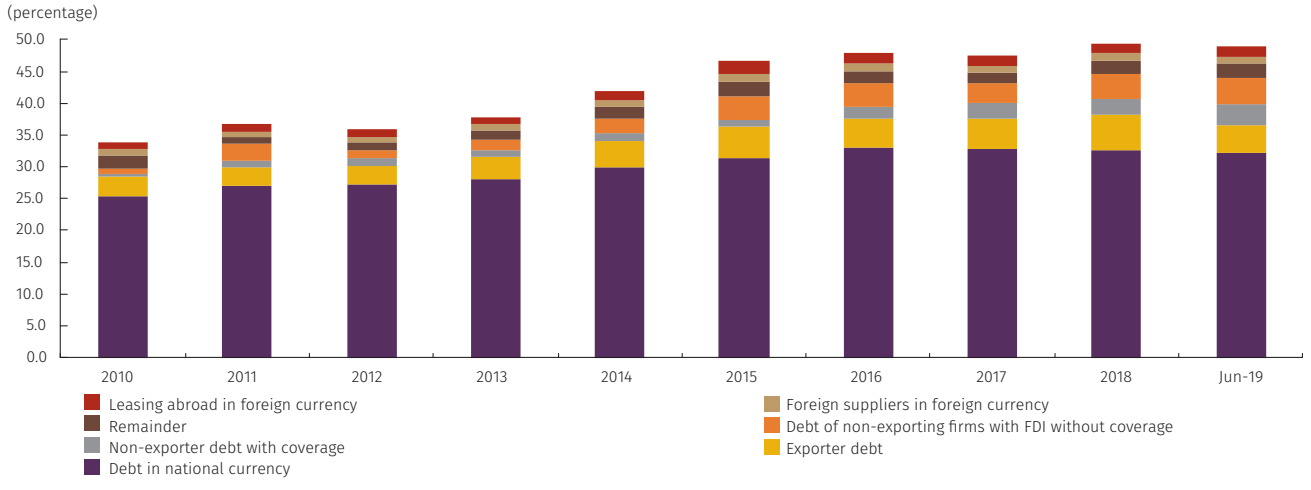
a/ Does not include financial leasing operations.
b/ Includes information from the account payable balance of the public sector non-financial companies.
Sources: Office of the Financial Superintendent of Colombia, General Accounting Office, Ministry of Finance and Public Credit; calculations by *Banco de la República*.

Debt denominated in foreign currency may be a source of vulnerability for the corporate sector to the extent that it exposes institutions to fluctuations in the exchange rate. Nevertheless, the exposure to exchange rate risk is mitigated if the company is an exporter, if it is hedged (through the use of derivatives), or if it has the backing of a

foreign entity (*i.e.*: through Foreign Direct Investment: FDI).[13] Based on information up until June 2019, Graph 2.12 shows the private corporate sector's financial debt by currency hedging and by the debtor's foreign trade as a share of the GDP. The share of hedged debt in foreign currency indebtedness is 70.6%, and this has followed a rising trend since 2010 at which time it represented 51.1%.

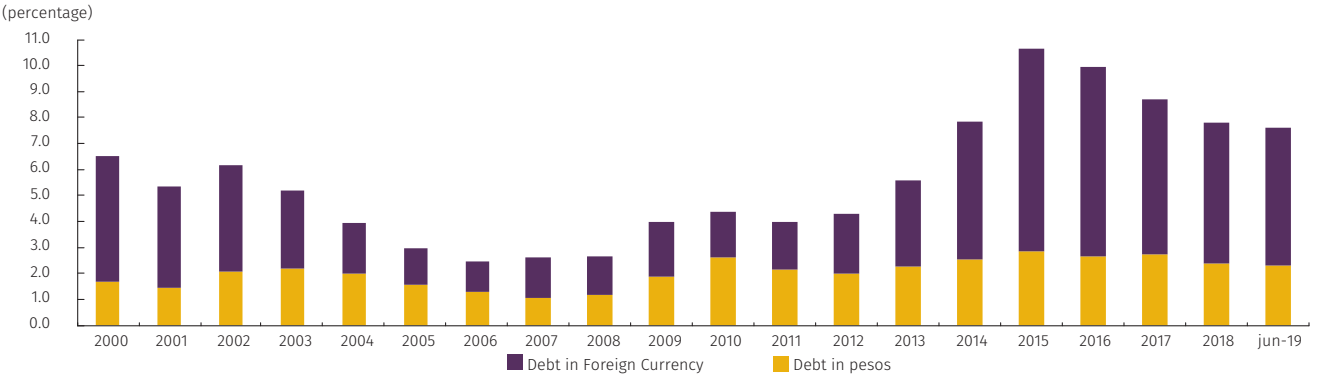
The public companies, in turn, continued to prefer borrowing in foreign currency. However, since 2015 this debt has declined by 2.4 pp of GDP (Graph 2.13).

Graph 2.12
Private Corporate Sector Financial Debt as a Share of GDP by Exchange Rate Coverage and Debtor Foreign Trade



Note: the debt of suppliers in foreign currency and leasing with entities abroad is not available by NIT and, therefore, it is not possible to identify whether or not this debt belongs to hedged companies.
Sources: Office of the Financial Superintendent of Colombia, DANE, and *Banco de la República*, calculations by *Banco de la República*.

Graph 2.13
Public Corporate Sector



Note: Prepared using the same information as on Graph 2.11, panel B.
Sources: Office of the Financial Superintendent of Colombia, *Contaduría general de la Nación* (General Accounting Office), *Ministerio de Hacienda y Crédito Público* (Ministry of the Treasury and Public Credit); calculations by *Banco de la República.*

13 When a foreign institution has FDI in a local company, the foreign exchange risk for the latter is mitigated due to the fact that it is assumed that the investor has an incentive to support the company in the case of a depreciation of the exchange rate. In addition, the mismatch that is seen in the local firm may not exist at the level of the group.

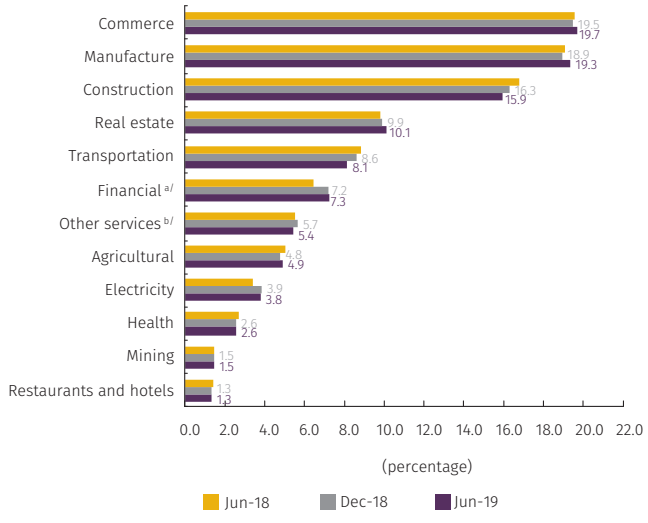
2.2.1.2 Sector Analysis[14]

The financial sector increased its share of the loan portfolio granted to private sector companies, while the portfolio for the construction sector lost representation.

The economic sectors with the largest share of the loan portfolio granted to private companies were commerce, manufacturing, and construction, which, as a whole, accounted for 55.0% of this portfolio as of June 2019. In contrast, mining, restaurant and hotels, and health sectors are the ones with the lowest share. With regard to what was reported a year ago, the financial and other service sectors[15] were the ones that gained a larger share, while transportation and construction were the ones in which it reduced the most (Graph 2.14).

The analysis of various indicators makes it possible to infer that restaurants and hotels, construction, and transportation are the economic sectors in which credit risk has risen, to a great extent.

Graph 2.14
Breakdown of Private Corporate Sector Loan Portfolio Balance by Economic Sector



a/ The financial and insurance sector excludes the loan portfolio granted to entities supervised by the Office of the Financial Superintendent of Colombia.
b/ 'Other services' groups firms belonging to the following economic sectors: public administration and defense; education; other community, social and personal service activities; private households with domestic servants; and the organizations and extraterritorial entities.
Sources: Office of the Financial Superintendent of Colombia, Office of the Superintendent of Corporate Affairs, and *Banco de la República*, calculations by *Banco de la República*.

When calculating the QIR by economic sector, one sees that restaurants and hotels, manufacturing, real estate, and the retail trade sectors were the ones whose indicators rose between June 2018 and 2019. However, the sector of restaurants and hotels has the smallest share in the portfolio balance, and the QIR for the commercial sector has remained relatively stable over the last six months (Graph 2.15, panel A). Construction is still the sector that contributes the most to the QIR of the total commercial portfolio (Graph 2.15, panel B).

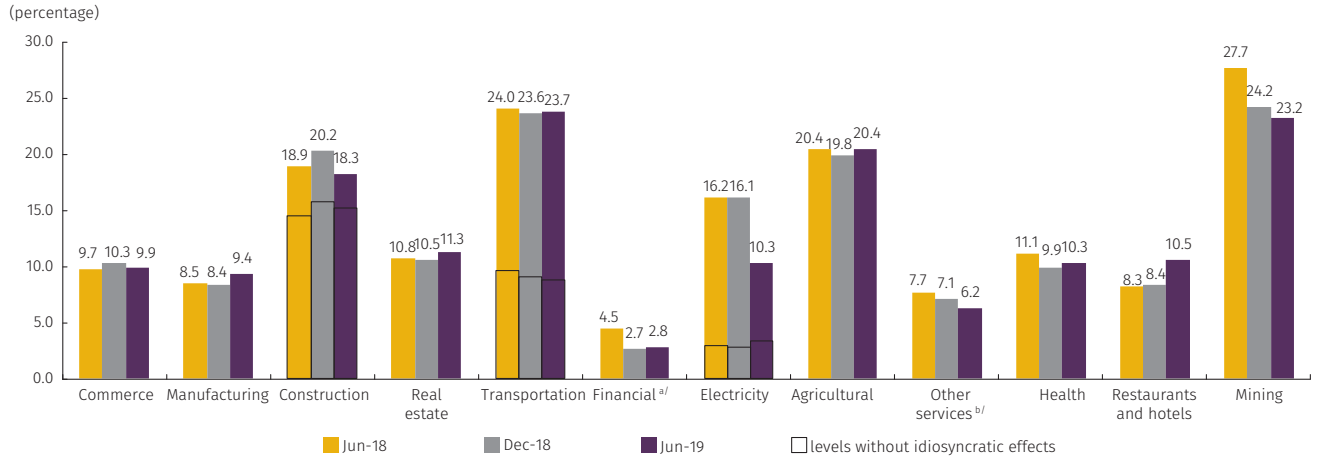
In the real estate sector, the subsectors that contribute the most to the increase in QIR are real estate with its own property (55 bp), advertising (49 bp), and car rental (15 bp). Although the agribusiness sector does not hold a large share of the total balance of the private corporate sector portfolio, the QIR in this sector has remained high since December 2017. The subsectors that contributed the most to

14 In this subsection, abbreviations will be used for the following sectors: 1) real estate, rentals and business: real estate; 2) agriculture, animal husbandry, hunting, forestry and fishing: agribusiness; 3) mining and quarrying: mining; 4) electricity, gas and water: electricity; 5) transportation, warehousing, and communications: transportation; and 6) financial intermediation: finance.

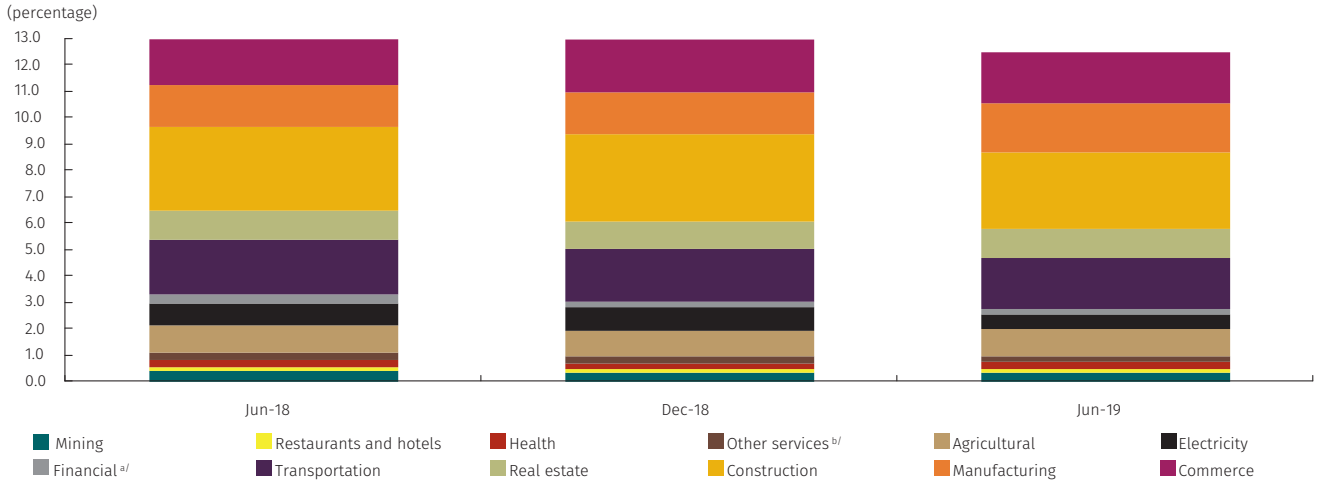
15 The firms that belong to the following economic sectors are grouped under other services: public administration and defense; education, health and social services; other community, social, and personal services; private households with domestic help; and extraterritorial organizations and institutions.

Graph 2.15
QRI of private corporate sector

A. QRI by economic sector[a/]



B. QRI contribution by economic sector



a/ The financial and insurance sector excludes the loan portfolio granted to entities supervised by the Office of the Financial Superintendent of Colombia.
b/ 'Other services' groups firms belonging to the following economic sectors: public administration and defense; education; other community, social and personal service activities; private households with domestic servants; and organizations and extraterritorial entities.
Sources: Office of the Financial Superintendent of Colombia, Office of the Superintendent of Corporate Affairs, and *Banco de la República*, calculations by *Banco de la República*.

the indicator as observed in June 2019 were mixed operations (3.4 pp), oil palm (3.3 pp), and cattle (3.1 pp).

The high levels of the risk indicators in the construction, electricity, and transportation sectors are largely due to idiosyncratic factors. The first sector has been affected by the situation of *Concesionaria Ruta del Sol S.A.S*; the second, by the loan portfolio of *Electrificadora del Caribe S. A.*;[16] and the last, by the performance of the

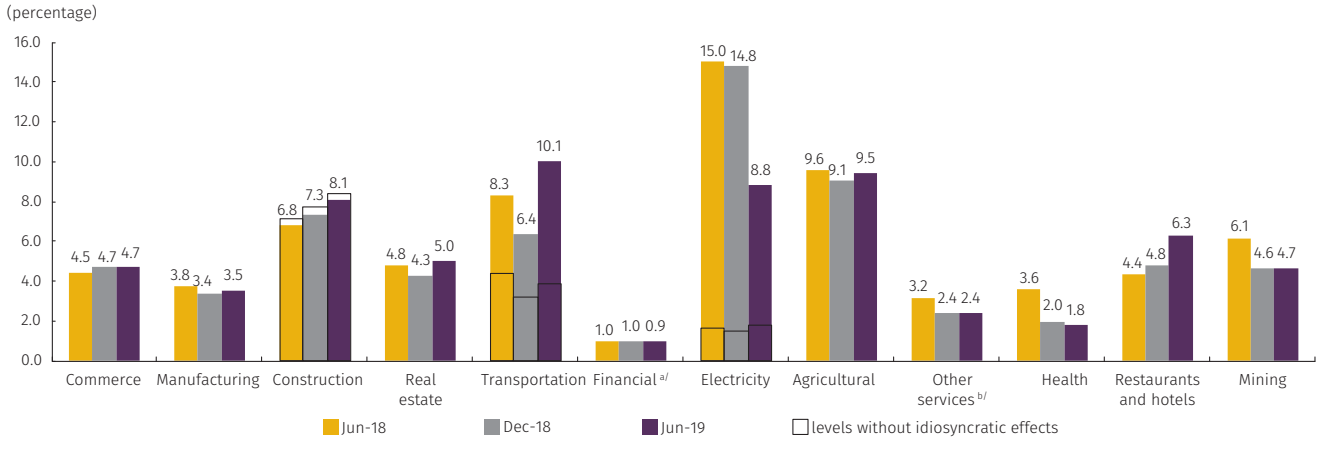
16 As of June 2019, the CIs had 99.8% of the *Electrificadora del Caribe S.A.* loan portfolio covered by loan-loss provisions. The fall in the credit risk indicators for the electricity sector is due to the penalties applied to this company's loans in some of the institutions in the banking system.

companies that provide mass passenger transportation. Ruling out these effects, it turns out that construction may continue to exhibit a significant effect on the deterioration of the QIR for the private corporate sector.[17]

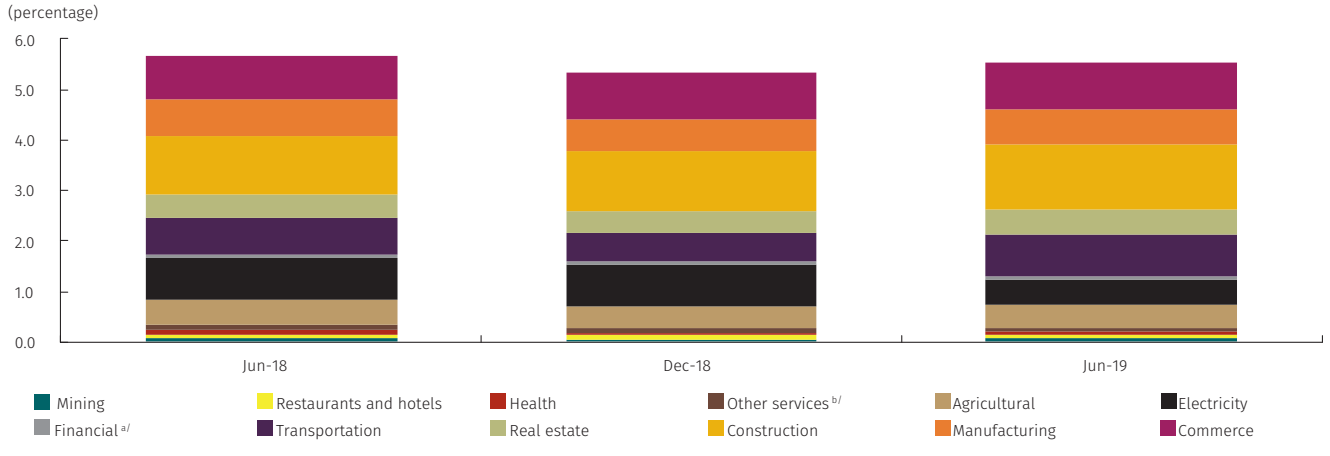
Assessing the QIDs, the sectors of restaurants and hotels,[18] transportation, and construction[19] are the ones that rose the most over the past year, and the last two were the ones that contributed the most to the growth of the indicator for the entire commercial loan portfo-

Graph 2.16
Private Corporate Sector NPL

A. NPL by economic sector[a/]



B. NPL contribution by economic sector



a/ The financial and insurance sector excludes the loan portfolio granted to entities supervised by the Office of the Financial Superintendent of Colombia.
b/ 'Other services' groups firms belonging to the following economic sectors: public administration and defense; education; other community, social and personal service activities; private households with domestic servants; and the organizations and extraterritorial entities.
Sources: Office of the Financial Superintendent of Colombia, Office of the Superintendent of Corporate Affairs, and *Banco de la República*, calculations by *Banco de la República*.

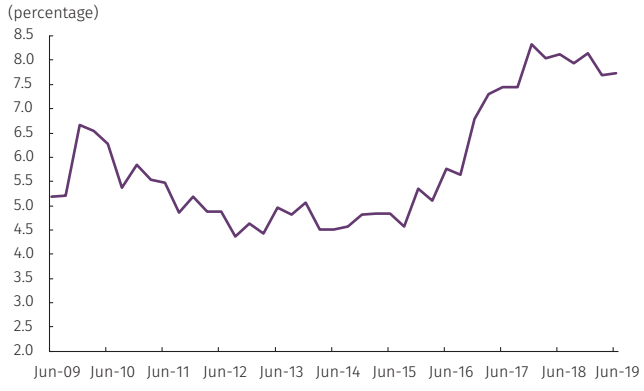
17 When ruling out the effect of the idiosyncratic components, note that the QIR for construction probably rose 0.7 pp between June 2018 and June 2019. Nevertheless, the indicator declined between December 2018 and June 2019.

18 The subsectors that spurred the growth of the QID for this sector were accommodation in hotels, dispensing of prepared meals, and other food service activities.

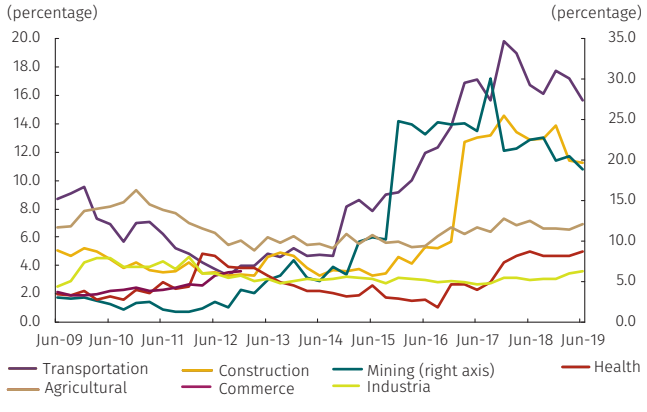
19 The subsector that explains growth in the QID for the construction sector to a greater degree was residential buildings.

Graph 2.17
Risk Perception Indicator by Rating

A. Corporate sector total loan portfolio



B. By economic sector



Office of the Financial Superintendent of Colombia; calculations by *Banco de la República.*

lio (Graph 2.16). Thus, the increases in perceived risks in the sector of restaurants and hotels measured by the QIR have materialized in higher levels of default.

In order to provide a more thorough analysis of the performance of loans disbursed to firms, two additional credit risk indicators were calculated which made it possible to identify episodes of major vulnerability for the CIs: the indicator of risk perception by rating (IRPR) and the weighted indicator of migrating to a worse rating.

The IRPR is defined as the percentage of loans, in terms of their balance, that have a worse rating than they would if only the days past due were taken into account.[20] The indicator stood at a lower level than the one reported a year ago after a downward trend throughout 2018. This contrasts with the growth performance that the IRPR has shown since December 2015 (Graph 2.17, panel A). By economic sector, the indicator for the real estate, retail trade, and industry sectors shows growth with respect to what had been seen the year before. Despite the improvements observed, transportation, construction, and mining are still the sectors with the highest indicators (Graph 2.17, panel B).

The weighted indicator of migrating to a worse rating is calculated by both balance and number of transactions.[21] Graph 2.18, panel A shows that the aggregate indicator by both balance and number of transactions has been showing a growth trend since the first quarter of 2012. However, the indicator per number

20 According to Chapter II, Appendix 1 of the Basic Accounting and Financial Circular issued by the FSC, if only the days past due were taken into account, the commercial loans should be rated as follows: 1) category A: loans that are past due by a month or less; 2) category B: loans that are past due by one to three months; 3) category C: loans that are past due by more than three and up to six months; 4) category D: loans that are past due by more than six and up to 12 months; and 5) category E: loans past due for more than 12 months.

21 This indicator is calculated by using quarterly information from the FSC format 341 (active credit transactions). The term $P(X_{t-1})$ is assigned to the probability that a credit transaction has been rated with the letter X during the quarter prior to the quarter being evaluated and $P(Y_t|X_{t-1})$ to the probability that a credit transaction could migrate to rating Y during the quarter being evaluated given the fact that it was rated with the letter X during the previous quarter. The ratings for the active credit transactions may correspond to any letter within the set $\{A, B, C, D, E\}$, where A is the best rating (least risk) and E is the worst (highest risk). Given this, the weighted indicator of migrating towards a worse rating during the quarter is calculated as: $P(B_t|A_{t-1})\times 1\times P(A_{t-1})+P(C_t|A_{t-1})\times 2\times P(A_{t-1})+P(D_t|A_{t-1})\times 3\times P(A_{t-1})+P(E_t|A_{t-1})\times 4\times P(A_{t-1})+P(C_t|B_{t-1})\times 2\times P(B_{t-1})+P(D_t|B_{t-1})\times 3\times P(B_{t-1})+P(E_t|B_{t-1})\times 4\times P(B_{t-1})+P(D_t|C_{t-1})\times 3\times P(C_{t-1})+P(E_t|C_{t-1})\times 4\times P(C_{t-1})+P(D_t|D_{t-1})\times 3\times P(D_{t-1})+P(E_t|D_{t-1})\times 4\times P(D_{t-1})+P(E_t|E_{t-1})\times 4\times P(E_{t-1})$. Note that this is a weighted indicator since the worse the rating that a loan migrates to is, the higher the weighting (which is between 1 and 4) is.

of transactions fell between June 2018 and June 2019. This suggests that the loans that migrated to worse ratings had larger balances than those that migrated in previous periods.

When this same analysis is done by economic sector, it can be seen that the agribusiness sector has shown increases in both indicators during the last year. For the industry, construction, and transportation sectors, there was a rise in the indicator calculated by balance and a fall in the indicator for number of transactions. This indicates that loans for larger amounts are migrating to lower ratings (Graph 2.18, panel B).

2.2.1.3 Financial Situation of the Private Corporate Sector[22]

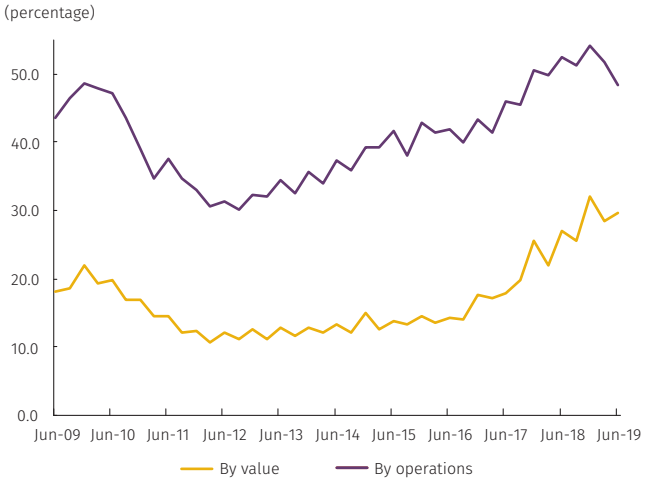
As of December 2018, the majority of the firms analyzed does not seem to register declines in their levels of indebtedness and profitability.

In order to analyze the financial situation of companies that registered information regarding their financial statements at the *Superintendencia de Sociedades* (Superintendence of Corporations) as of December 2018, ten indicators were calculated in order to measure different attributes of the companies (Table 2.1). This makes it possible to use different measurements to facilitate the assessment of their strengths and weaknesses.

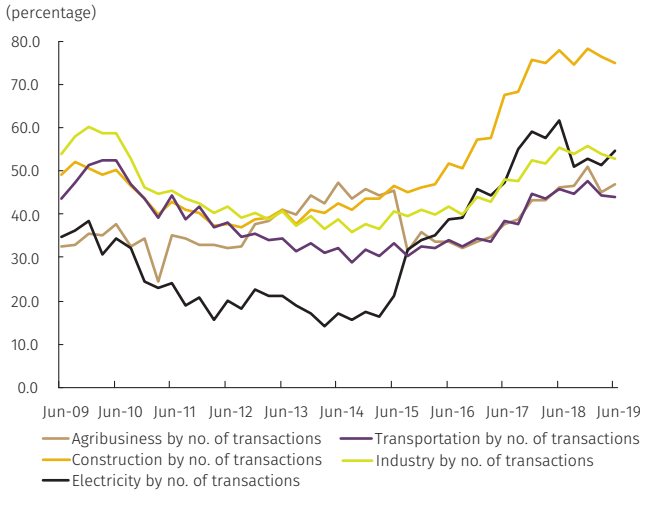
Out of the 15,559[23] corporations analyzed, 86.2% correspond to companies that did not have a past-due portfolio, risky loan portfolio, or other criterion of insolvency (*i.e.*, not vulnerable). In general, the indicators showed a surge in the companies' sales rates, which contrasts with the increase seen in the credit risk indicators. Despite the above, the

Graph 2.18
Weighted Indicator of Migrating to a Lower Rating

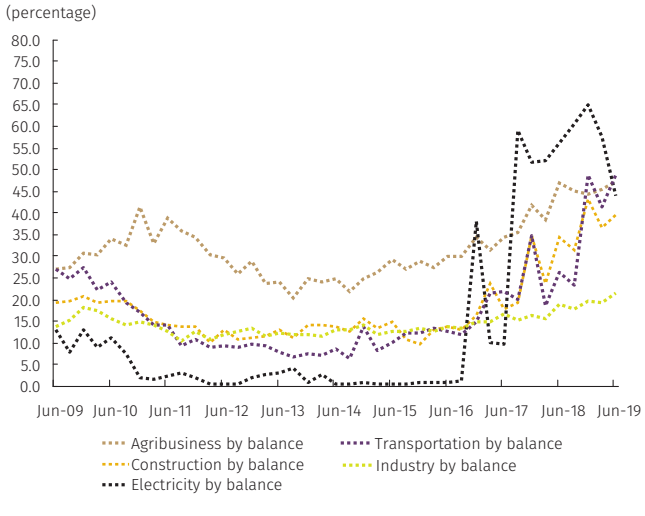
A. Corporate sector total loan portfolio



B. By economic sector and by no. of transactions



C. By economic sector and by balance



Source: Office of the Financial Superintendent of Colombia; calculations by *Banco de la República*.

22 For this subsection, the "private corporate sector" is defined as the set of companies monitored by the Superintendence of Corporations whose financial statements are available yearly on the website of this superintendence to 31 December every year.

23 After correcting the database due to information errors and outliers.

Table 2.1
Financial indicators of the Private Corporate Sector

Financial Indicators	Figure for 2017	Figure for 2018
A. Activity Indicators (percentage)		
Annual change in sales	1.9	4.0
B. Indicator of profitability (percentage)		
Return on assets (ROA)[a/]	2.2	2.1
Return on equity (ROE)[b/]	5.3	5.0
C. Indicators of indebtedness		
Ratio of total indebtedness [c/]	15.2	15.2
Leverage indicator [d/]	1.9	1.9
Indicator of interest hedging [e/] (number of times)	2.4	2.4
D. Liquidity indicators		
Current ratio [f/] (number of times)	1.7	1.7
E. Size Indicator		
Annual change in total assets	3.9	3.6
F. Risk Indicators (percentage)		
Quality indicator by risk (QIR) [g/]	7.4	9.3
Non Performing Loans (NPL) [h/]	1.9	3.1

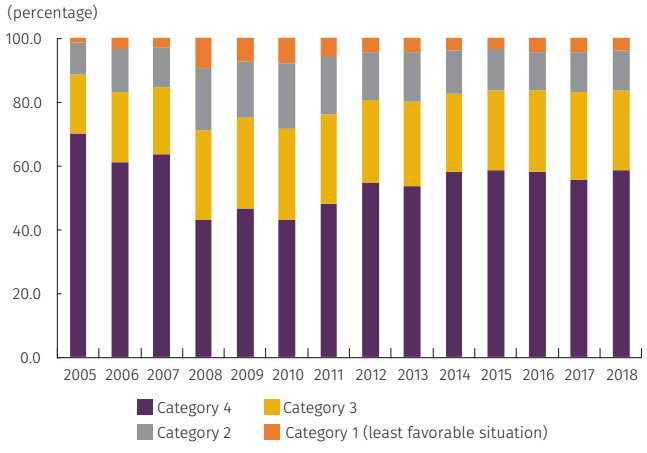
Note: The atypical observations were eliminated by financial indicator (percentiles 1 and 99) for each year and the median datum of the resulting sample was calculated, with the exception of the risk indicators that were calculated on an aggregate basis. The annual growth of the indicators were calculated using balanced samples.
a/ Measured as the ratio between the operating profit and total assets.
b/ Measured as the ratio between the operating profit and total equity.
c/ Measured as the ratio between financial obligations and total assets. d/ Measured as the ratio between total assets and total equity.
e/ Measured as the ratio between the operating profit and financial costs.
f/ Measured as the ratio between current assets (assets that can be converted to cash within a period of less than one year) and current liabilities (a period equal to or less than a year).
g/ The loan portfolio's quality risk indicator is measured as the ratio between the risky loan portfolio and the gross loan portfolio.
h/ The loan portfolio's non performing loans is measured as the ratio between the greater than 30-day delinquency portfolio and the gross loan portfolio.
Sources: Superintendence of Corporations, Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

profitability of companies did not change significantly during the period under analysis. In addition, the firms' debt and liquidity indicators were stable.

According to Meneses, Pirateque, and Segovia (2019), the assessment of companies' indebtedness and profitability through the analysis of three indicators (indebtedness ratio, debt over cash flow, and net margin) turns out to be relevant in terms of early identification of vulnerability situations within the corporate sector. Particularly in this document, the companies in the private corporate sector were classified as either vulnerable or not vulnerable based on a risk criterion[24], and by minimizing a loss function that a policy maker would face, some thresholds that allow the early forecasting of a

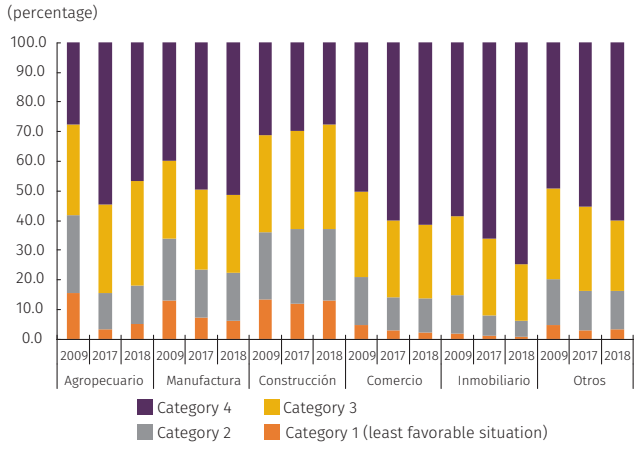
24 Based on the aforementioned document, three criteria were used to identify companies in vulnerable situations: 1) official cases of insolvency; 2) a credit rating less than or equal to B; and 3) institutions that have been in arrears in the timely payment of their financial obligations for more than 30 days.

Graph 2.19
Change in the Distribution of Non-vulnerable Firms



Sources: Superintendence Corporations, Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

Graph 2.20
Change in Distribution of Non-vulnerable Firms by Economic Sector



Sources: Superintendence of Corporations, Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

company's financial health were calculated per indicator and per period.[25]

Based on the results from the calculation of these three indicators, the following classification was made[26]:

a. Category 1: if the three indicators exceed their respective thresholds.
b. Category 2: If two indicators exceed their respective thresholds.
c. Category 3: If one indicator exceeds its respective threshold.
d. Category 4: If no indicator exceeds its respective threshold.

Graph 2.19 shows the distribution of non-vulnerable companies based on the above-mentioned categories. In 2018, a relative stability was seen in the group of companies with the highest likelihood of showing financial vulnerability, which contrasts with the levels observed during 2008-2010.

Based on what was mentioned in previous subsections and going by economic sector, the highest share of companies that are susceptible to a situation of vulnerability are seen to be in the field of construction followed by agribusiness. For the latter, although the percentage of companies in categories 1 to 3 has increased with respect to 2017, it has not reached the levels of vulnerability registered in 2009 (Graph 2.20).

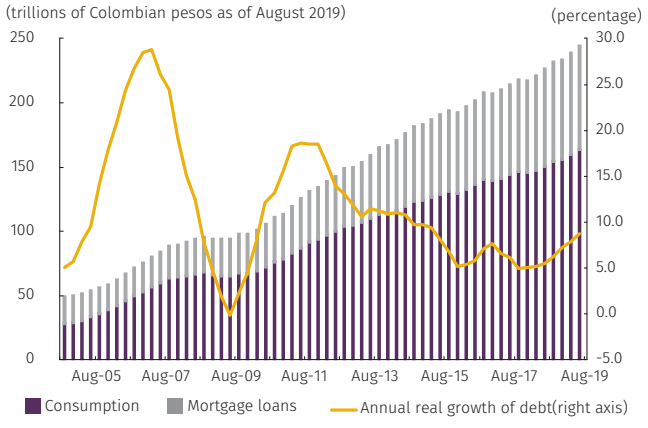
2.2.2 Households

The indebtedness of Colombian households continued its upsurge in line with what has been observed since September 2017. Unlike what has been registered over the past year and a half, the consumer loan portfolio drove this growth.

25 For more detail on the methodology, see "Indicadores de alerta temprana para el sector corporativo privado colombiano (Early warning indicators for the private Colombian corporate sector)," *Borradores de Economía*, No. 1084, *Banco de la República*.

26 By construction, the vulnerability direction of the net margin is opposite that of the other two indicators.

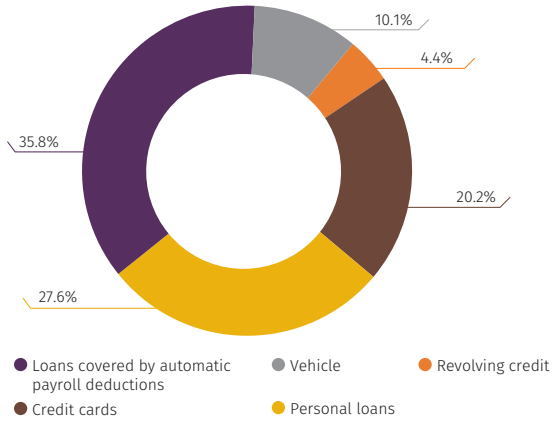
Graph 2.21
Household Debt composition and Annual Real Growth



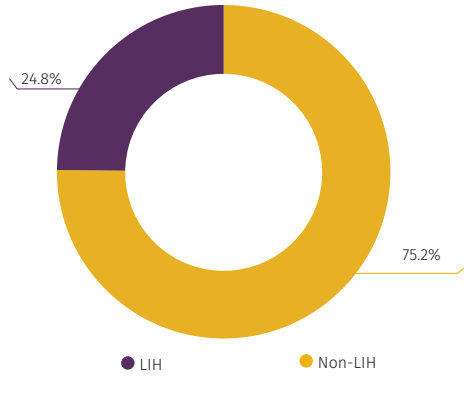
Sources: Office of the Financial Superintendent of Colombia, *Superintendencia de la Economía Solidaria* (Superintendence of Solidary Economy) and *Titularizadora de Colombia* (Colombian Securitization Office) *calculations by Banco de la República.*

Graph 2.22

A. Breakdown of Consumer Loan Portfolio Balance



B. Breakdown of Housing Loan Portfolio Balance



Sources: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

The loan portfolio allocated to households[27] stood at COP 243.9 t as of August 2019, thus registering a real annual growth rate of 8.7%, which is the highest since mid-2015. Approximately two-thirds of total indebtedness corresponds to consumer loans and the remainder to housing. Since April 2019, the growth of the consumer loan portfolio exceeded that of the housing portfolio, thus becoming more representative for the period under analysis (Graph 2.21).

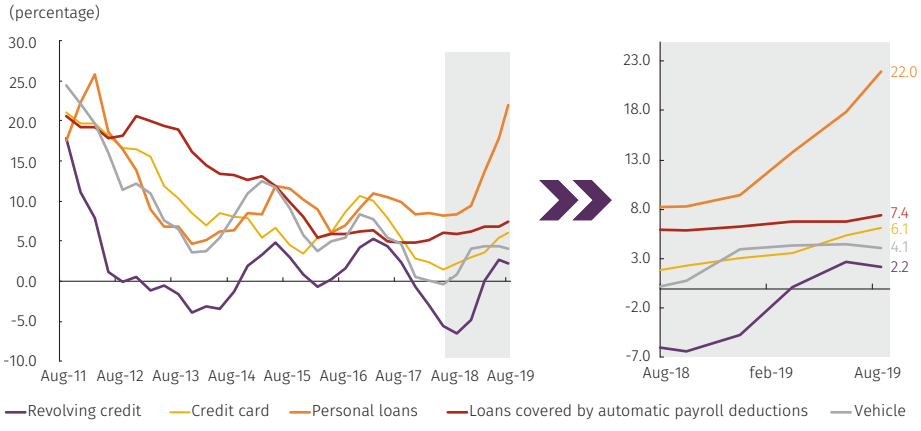
In terms of the breakdown of the consumer and housing loan portfolios, Graph 2.22, panel A shows that the category of loans covered by automatic payroll deductions is the most representative with a share of close to one third. Personal loans are in second place, while the last three categories are credit cards, vehicle, and revolving credit respectively. Furthermore, the category of non-low income housing (Non-LIH) represents nearly three quarters of the housing portfolio, and the modality of low income housing (LIH) represents the rest (Graph 2.22, panel B). By category, approximately 80% of the housing loan portfolio is denominated in pesos, while 20% is denominated in units of real value (UVR in Spanish).

During the period under analysis, the housing loan portfolio expanded 7.5%, a figure which is above the average for the past four years (7.2%). The consumer loan portfolio, in turn, showed a significant upswing as it registered a growth rate of 9.3% as of August 2019. This performance is due to the high growth registered by personal loans which have not shown such a high level since the first quarter of 2012 (Graph 2.23).

As for the housing loan portfolio, loans for LIH showed increases during the period under analysis while the Non-LIH loans remained relatively stable despite the fluctuations during the year (Graph 2.24). By type, UVR was seen to lead the

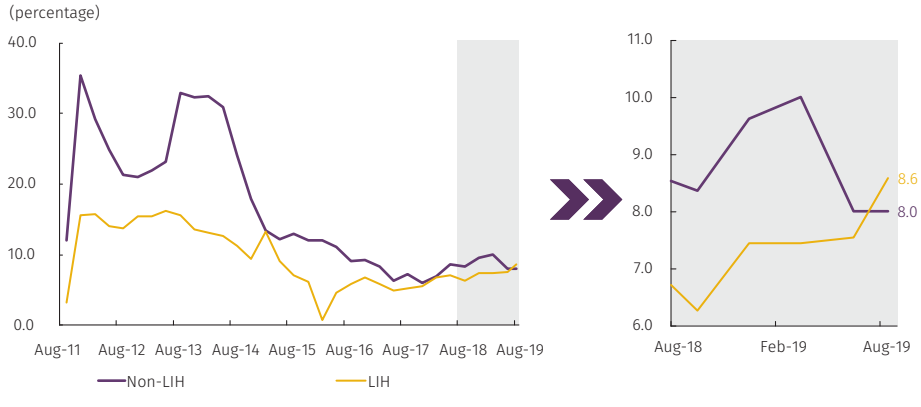
27 By loan portfolio allocated to households, the sum of the loan portfolios for consumption and housing with securitization granted by credit institutions, the National Savings Fund (FNA, in Spanish), savings and loan cooperatives, and employee funds is understood.

Graph 2.23
Annual Real Growth of Consumer Loan Portfolio by Credit Type



Sources: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

Graph 2.24
Annual Real Growth of Mortgage Loan Portfolio by Credit Type



Sources: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

growth of the loan portfolio while, in the case of loans denominated in pesos, growth remained constant.

Between August 2018 and 2019, the consumer NPL showed declines, while the housing NPL showed a mixed performance. The risk perception for the housing loan portfolio continues to rise.

Non-performing loans in the consumer loan portfolio registered a 4.6% contraction in August 2019 in comparison to the 2.3% growth seen 12 months ago. Thus, the portfolio of non-performing loans had a ten month period of accumulated decreases. All of the categories of portfolios registered real contractions with the exception of personal loans, which expanded 0.5% with respect to August 2018. For the housing loan portfolio, in turn, defaults remained stable in real terms, although there were mixed effects based on the category: at the same time, defaults for LIH grew 2.5%, and there were 1.1% contractions for non-LIH.

In terms of NPL, the upward trend seen for the consumer loan portfolio since the beginning of 2017 corrected itself (Graph 2.25, panel A)). The

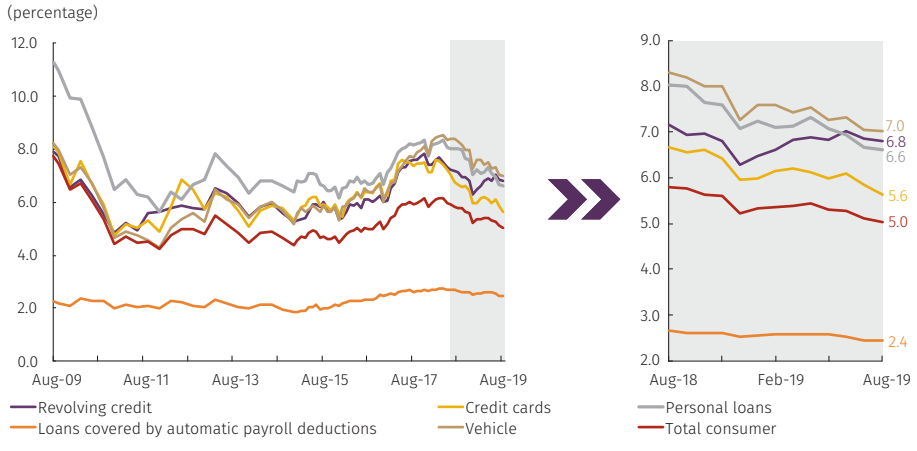
indicator, in turn, remained unchanged during the period under analysis for both the LIH loans and the non-LIH ones (Graph 2.25, panel B). In spite of the fact that the housing loans denominated in UVR continue to have a higher NPL, the indicator showed decreases over the past year.

In addition, the RPIR and the weighted indicator of migrating to a worse rating for the housing loan portfolio are analyzed.[28] The IRPR, in turn, deteriorated slightly and this spread across the two modalities for this loan portfolio. However, the RPIR remains below the historical peaks seen in 2009 (Graph 2.26).

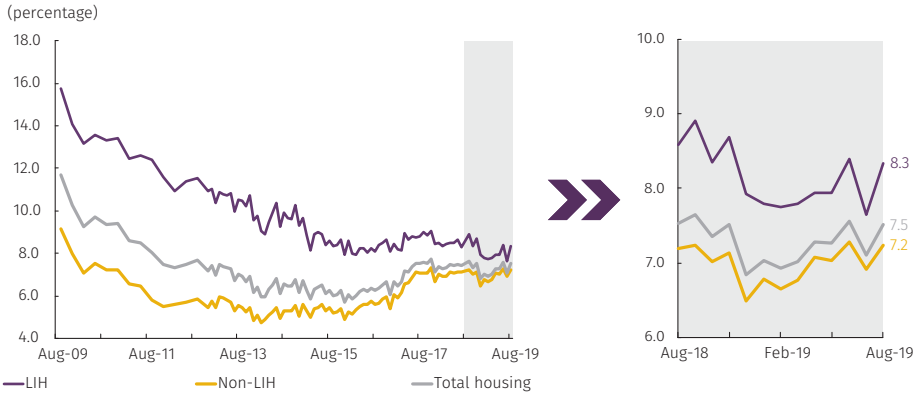
In line with the above, the weighted indicator of migrating to a worse rating exhibited a growth trend over the last year (Graph 2.27). The deterioration has been seen in both the LIH and non-LIH segments, although the trend is not homogeneous. On one hand, there was a higher level in the indicator for LIH per number of loans registered, which in-

Graph 2.25

A. Non-performing loan indicator (NPL)



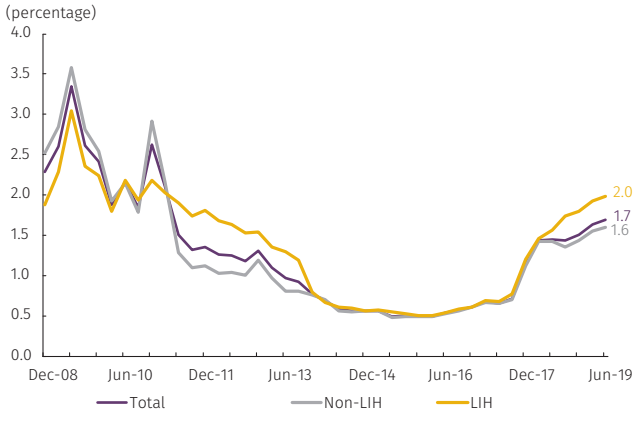
B. NPL for Mortgage loan portfolio



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

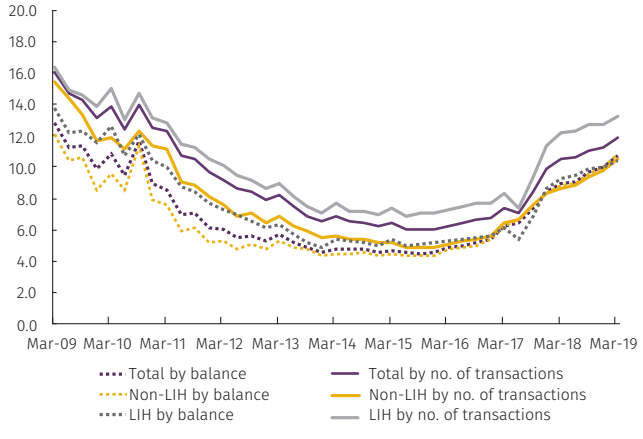
28 Both indicators registered stable performance for the consumer loan portfolio. Because of that, they are not presented in this edition of the *Report*.

Graph 2.26
Risk Perception Indicator by Rating for the Mortgage Loan Portfolio



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

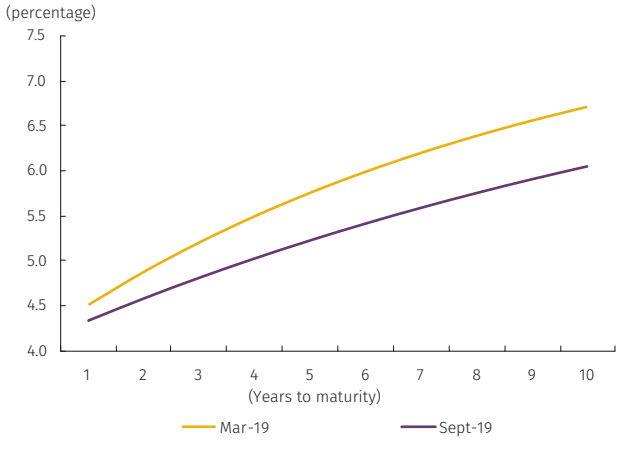
Graph 2.27
Weighted Indicator of Migrating to a Lower Rating for the Mortgage Loan Portfolio
(percentage)



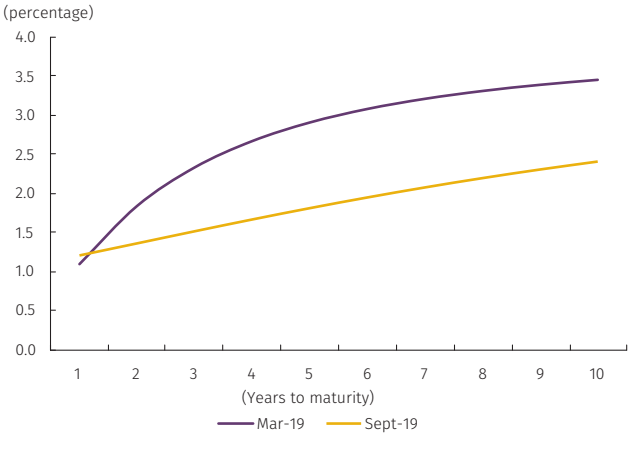
Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

Graph 2.28

A. Colombian pesos



B. UVR



Source: Precia, calculations by *Banco de la República.*

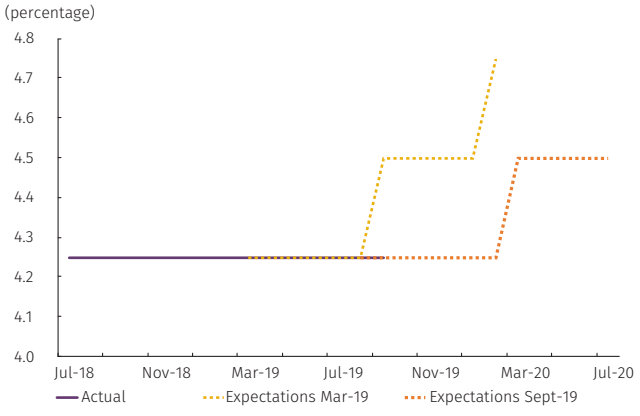
dicates that loans for larger amounts in this segment are not as likely to migrate to worse ratings as the loans for smaller amounts. In contrast, the indicators for non-LIH loans have shown almost identical results per number of loans registered and by balance which indicates that, on average, all of the loans have presented displacements of the same magnitude.

2.3 Market Risk

Peso-denominated and UVR-denominated public debt appreciated in a context where a stable monetary policy is expected.

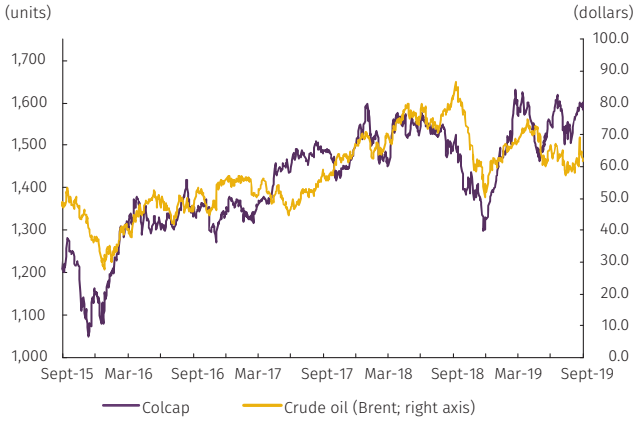
Between March and September 2019, the yield curve of the peso-denominated and UVR-denominated bonds continued to show a flattening trend due to an appreciation in the medium and long part of the curve. For the peso-denominated debt market, this was due in part to the more expansionary monetary policy stance taken by the Fed and an anticipated stability in the local policy rate (Graph 2.28, panel A). In the UVR market, this can be partly explained by a greater demand for these securities by foreigners, which led to a decrease in the rates of the yield curve for all maturities with the exception of the rate for securities with 1-year maturity (Graph 2.28, panel B).

Graph 2.29
Expectations of Policy interest rate



Source: Monthly Survey of Economic Expectations, calculations by *Banco de la República*.

Graph 2.30
Behavior of Colcap



Sources: Colombia Stock Market and Bloomberg; calculations by *Banco de la República*.

Table 2.2
Colcap Breakdown and Appreciation

Sector	Share (percentage)	Appreciation[a/] (percentage)
Consumer	9.5	6.1
Energy	13.8	-11.5
Financial	44.7	2.3
Industrial	1.3	-9.5
Materials	16.1	-5.9
Utilities	14.4	13.4
Communications	0.1	-19.6

a/ Between March 29 and September 27, 2019
Source: Colombia Stock Market and Bloomberg; calculations by *Banco de la República*.

In spite of the increasing trend in inflation over the course of the year, analysts do not forecast changes in the benchmark rate for what remains of the year, unlike what was seen in the last *Report,* when an increase was expected. At this time, based on the expectations from *Banco de la República's* survey of economic analysts, this increase is expected to take place in March 2020 (Graph 2.29). This is why no further depreciations in this market are expected from a more contractionary monetary policy in the short term, although inflation could affect it. A similar performance is expected for the private debt market since that market maintains a high correlation with the peso-denominated TES market.

In the meantime, the variable income market registered significant fluctuations during the period under analysis. This led the volatility of Colcap to remain at high levels.

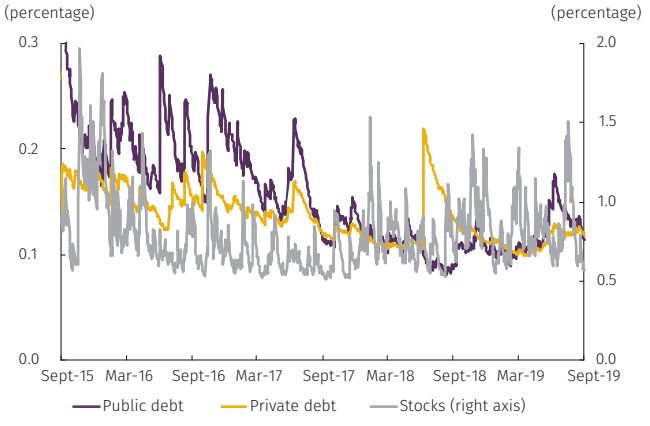
Between March and September 2019, the prices in the variable income market measured by the Colcap Index showed significant fluctuations and closed at the same values they had had at the beginning of the period under analysis (Graph 2.30). The influence of factors such as local and international economic uncertainty as well as the price of oil brought about two falls followed by periods of recovery that led this index to stand at around 1,600 units. The performance of crude oil prices had a direct impact on the price of Ecopetrol stocks (during this period, there was a 12.4% fall in the price) that was cushioned by an appreciation of the financial and utilities sectors, which registered 2.3% and 13.4% increases, respectively (Table 2.2).

Due to the index performance over the course of the period, there was a rebound in the volatility[29] of this market during March and August 2019. The latter figure corresponds to the

29 Volatility is calculated using a GARCH model (1.1). In the case of variable income, the daily returns of the Colcap index were used, whereas the daily differences in the first main component of each curve were used for fixed income.

maximum registered since February 2018 (Graph 2.31). This rise implies a higher market risk due to the increased uncertainty in the prices for these types of assets. In the meantime, the volatility in the price of private debt and public debt securities registered a peak for July of this year. This coincided with a greater demand in this market on the part of foreigners. These figures have tended to decline since then.

Graph 2.31
Conditional Volatility of Colombia's Fixed Income and Variable Income Markets



Sources: Office of the Financial Superintendent, calculations by *Banco de la República*.

The main exposure to market risk on the part of the financial institutions is concentrated in fixed income.

Exposure to fixed and variable income markets measured as an investment in securities exposed to market risk[30] is concentrated in fixed income securities, where the government bond market represents the largest share. However, insurance companies and pension fund managers (PFM) have a higher investment in private debt securities, which is why the NBFI aggregate shows a high exposure by this market. With regards to CIs, the highest share is found in the public debt market with banks being the type of entity which has the highest investment in these kinds of securities (Table 2.3).

There are risks in the future that, should they materialize, could affect the financial health of the system. The latent vulnerabilities in the external sector are likely to produce an increase in the risk premia. Therefore, these risks could result in a lower assessment of securities. These risk factors will be considered in the stress test presented in chapter 3 of this Report.

2.4 Liquidity and Trading Book Interest Rate Risk

2.4.1. Liquidity Risk

The short-term liquidity of the CIs, measured by the 30-day liquidity risk indicator, remained stable during the last half year despite the mixed performance of different types of institutions.

As of September 27, 2019, the aggregate liquidity of the CIs as measured by the FSC's 30-day liquidity risk indicator (LRI) remained stable after the decline registered at the end of March as a result of the

30 This balance is presented at market prices and is calculated according to the guidelines of the Basic Accounting and Financial Circular. The balance in shares was analyzed for the equity instruments of domestic issuers while, for debt securities, the ones that are marketable and available for sale were analyzed.

Table 2.3
TES (in Colombian pesos and Real Value Units, UVR), Private Debt Securities and Stocks Exposed to Market Risk

Type of entity	TES[a/]	Private debt	Stocks	Total	TES	Private debt	Stocks	Total
	(Balance in trillions of Colombian pesos)				(Percent variation in the last six months)			
Credit institutions	44.21	5.15	10.49	59.85	-6.57	7.74	10.47	-2.84
Commercial banks	41.24	4.86	0.00	46.10	-7.60	8.21	0.00	-6.16
Financial corporations	2.90	0.14	10.48	13.52	9.17	-27.58	10.47	9.59
Financing companies	0.08	0.11	0.00	0.20	96.54	82.39	7.18	85.91
Financial cooperatives	0.00	0.03	0.00	0.03	0.00	12.01	0.00	12.01
Non-banking Financial Institutions	10.05	14.26	6.55	30.85	-0.02	16.62	4.89	8.19
Pension fund managers: proprietary position	0.08	0.80	0.13	1.01	-35.49	28.81	33.59	19.59
Stock brokerage firms: proprietary position	1.26	0.26	0.20	1.73	-18.64	33.05	-9.03	-12.31
Trust funds: proprietary position	0.15	0.38	0.89	1.42	-38.51	4.33	5.89	-2.12
Insurance Companies	8.55	12.81	5.33	26.70	5.25	16.05	4.79	10.07
System: proprietary position	54.26	19.40	17.04	90.70	-5.43	14.12	8.26	0.65
Third-party Position								
Stock brokerage firms: third-party position	0.93	12.77	7.88	21.58	-19.43	20.64	9.43	13.94
Trust companies: third-party position [b/]	124.53	48.71	22.75	196.00	14.12	12.90	3.58	12.49
System	179.72	80.89	47.67	308.28	7.20	14.35	6.16	8.82

a/ The value of the proprietary position is obtained from "Investment Portfolio" on format 351. The value of the managed position is obtained from CSD data.
b/ Pension liabilities managed by trust companies are excluded.
Sources: *Banco de la República*, Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

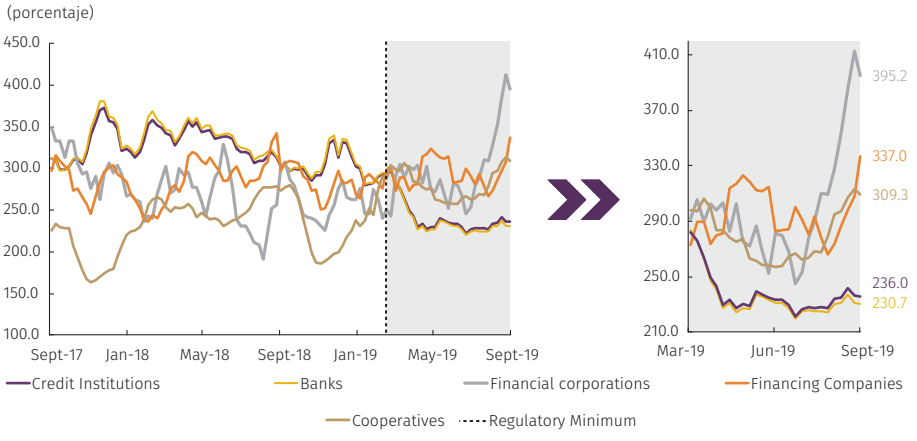
FSC's External Circular 009/2018 going into effect. This generated an increase in the net liquidity requirements for banks, especially those whose demand deposits come from more inconsistent depositors (Graph 2.32). The LRI of the different types of institutions suggests that they have enough liquid assets to meet their short-term obligations.

Like the LRI, the indicators of individual and consolidated short-term exposure remained stable. However, they showed a slight decrease in September.

When the liquidity of the institutions is assessed as a percentage of the corresponding net liquidity requirements (NLR) based on the indicators of individual (IIE) and consolidated (ICE) exposure,[31] it was

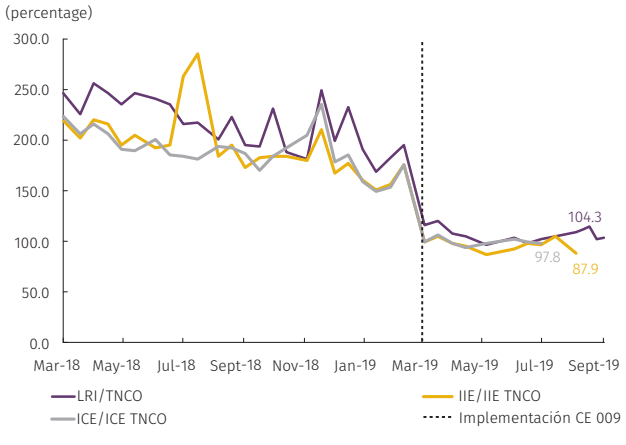
31 The IIE and the ICE indicators make it possible to measure the liquidity risk of the FEMI by currency over a 30-day horizon. For more information on the calculation of these indicators see *Banco de la República*'s External Regulatory Circular DODM-361.

Graph 2.32
Weighted Average 30-day Liquidity Risk Indicator (LRI) for CI [a/]



a/ Average that gives greater weight to the most recent data
Source: Office of the Financial Superintendent of Colombia; calculations by *Banco de la República*.

Graph 2.33
Short-term Liquidity Indicators as a Percentage of Total Net Cash Outflows [a/]



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

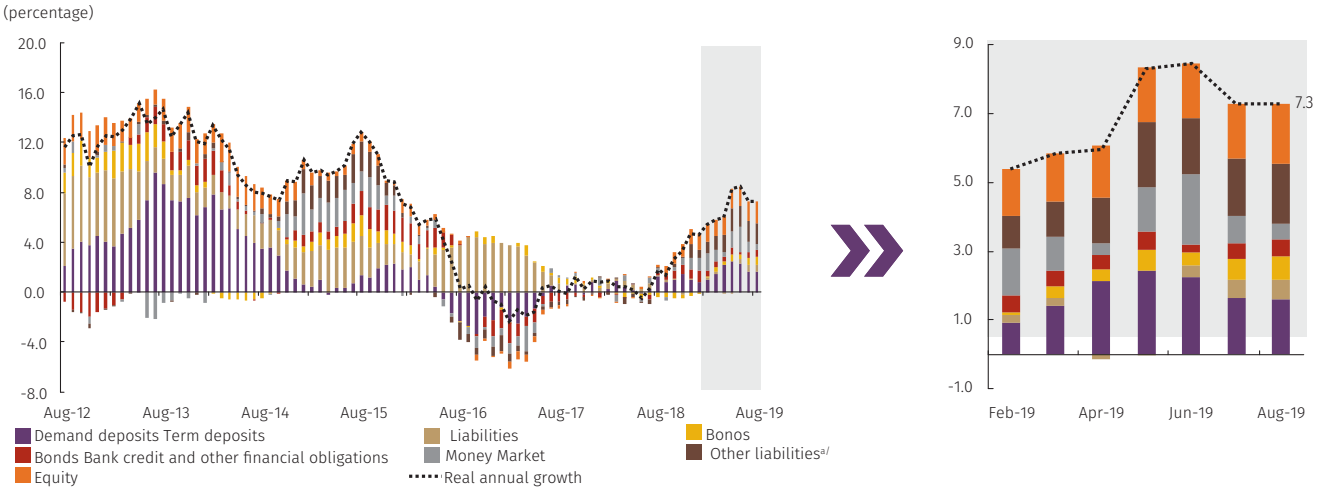
noted that both the 30-day IIE of the CI that are foreign exchange market intermediaries (FXMI) and the indicator for the FXMI that are required to consolidate balance sheets in accordance with the instructions from the FSC (ICE) represented on average the same amount as the NLR over the last half year.[32] This stable trend was sustained until September, when a slight decline in the indicators was registered (Graph 2.33).

In line with the performance of CI assets, funding registered a recovery over the last year and reached a growth rate not seen since the end of 2015.

In terms of structural liquidity, the funding of the CIs during the past year (understood as the sum of liabilities and equity) showed a recovery. The above was determined by the greater strength registered in almost all its components but, in particular, the one associated with equity, money market, and other liabilities. Along with demand deposits, these items have contributed the most to the growth of funding as of August 2019 (Graph 2.34).

32 As of the publication date of this Report, ICE data with a cut-off date of 30August 2019 were available.

Graph 2.34
Credit Institution Liabilities, Annual Real Growth, and Component Contribution

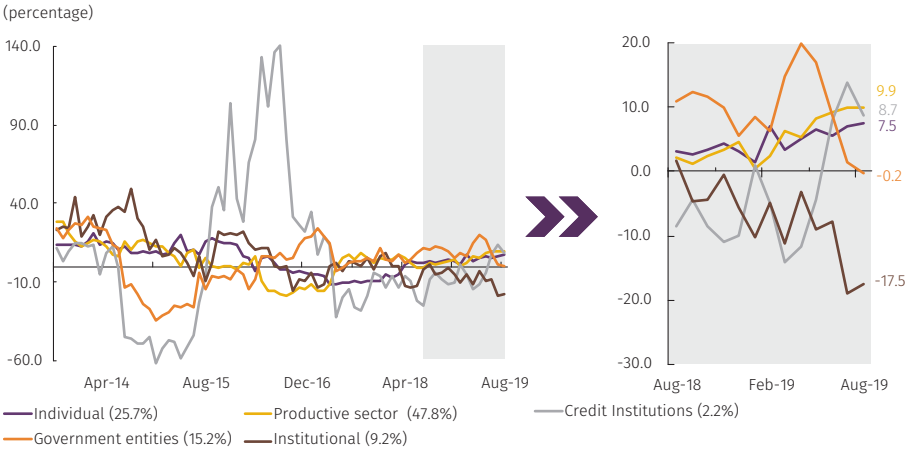


Note: other liabilities correspond to: outstanding acceptances and derivatives, capital contributions, banks and correspondents, bonds convertible into shares (Bocas for its Spanish acronym), bonds mandatory convertible into shares (Boceas for its Spanish acronym), Term savings certificates (CDAT for its Spanish acronym), accounts payable, electronic deposits, affiliate establishments, other deposits and current liabilities with and without amortized cost, labor obligations, provisions and collection services.
Source: Office of the Financial Superintendent of Colombia; calculations by *Banco de la República*.

Demand deposits, which are the most representative component of CI funding, were mainly determined by larger deposits made by companies.

Demand deposits, which represent 34.8% of the CI funding, registered a real annual 4.5% growth as of August 2019. Analyzing the trends of counterparty deposits, an upsurge in individuals, CIs, and the productive sector can be seen, while the public and institutional sectors registered annual contractions. Last of all, deposits by the real sector, which represent 47.8%, is the component that contributes the most to the expansion of demand deposits (Graph 2.35).

Graph 2.35
Real Annual Growth and Contribution by Counterparty of Demand Deposits



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

2.4.2 Banking Book Interest Rate Risk

The structure of the interest rates of the credit institutions' balance sheet is analyzed in this section as is their exposure to the banking book interest rate risk.[33] The measurement of this risk seeks to estimate how changes in the interest rates for assets and liabilities affect net interest income.

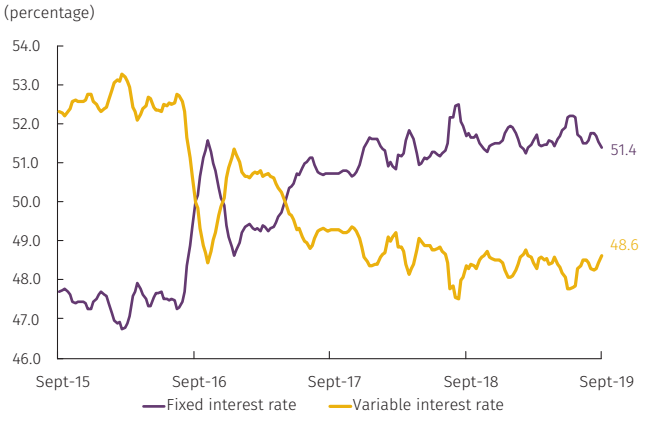
The share of assets and liabilities contracted at a variable rate registered stability in the last six months.

Between March and September 2019, the share of CI assets contracted at fixed or variable interest rates remained stable. Likewise, despite showing some fluctuations, the liabilities contracted at a variable rate as a share of the assets stood, as of September 2019, at levels similar to the ones they had registered six months earlier (Graph 2.36).

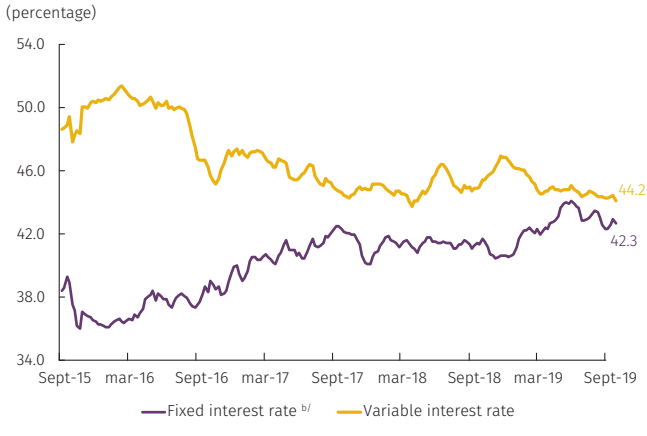
Analyzing the structure and components of the balance sheet items contracted at variable rates, it is evident that the asset positions indexed at the benchmark rates are more relevant than the ones associated with inflation,[34] which is the opposite of what happens with liabilities contracted at variable rates (Graph 2.37). These components remain stable over time. However, the share of the BBI in lending operations continues to become larger with respect to the share of assets tied to the DTF.

Graph 2.36
Evolution in Breakdown of Assets and Liabilities by Type of Interest Rate[a/]

A. Assets



B. Liabilities



a/ Liabilities at fixed and variable interest rates are presented as a share of the total assets.
b/ The amount of liabilities at fixed rate incorporates demand deposits of individuals while the demand deposits of legal entities and government entities are included in the liabilities contracted at variable rates.
Source: Office of the Financial Superintendent of Colombia (FSC), calculations by *Banco de la República.*

The exposure to trading book interest rate risk measured by the WATM gap did not register substantial fluctuations over the last half year.

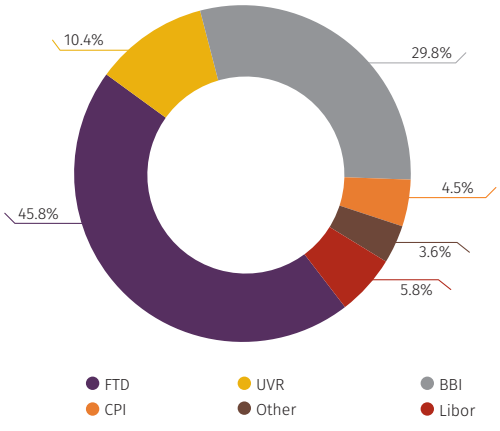
To measure the exposure to the banking book interest rate risk, the *weighted average term to maturity (WATM) gap* is computed. This is defined as the difference between assets and liabilities that are sen-

33 The interest rate risk has two dimensions: the first is analyzed in the section on market risk and refers to the risk of devaluations of the assets in the trading book in the event of interest rate movements; the second, which is analyzed in this section, corresponds to the ratio of the risk of interest rate changes to the institutions' net interest income based on the information in the banking book.

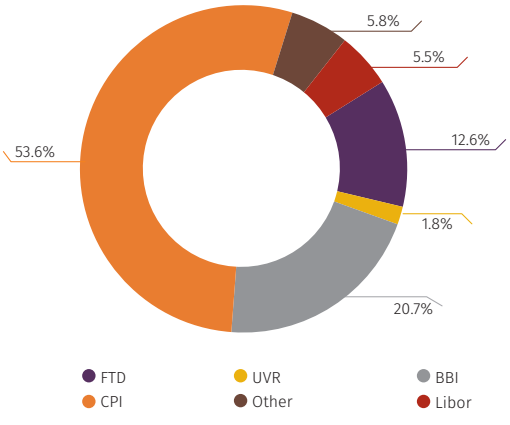
34 The benchmark rates correspond to DTF and BBI, while those associated with inflation are the UVR and CPI.

Graph 2.37
Breakdown of the Variable Interest Rate Assets and Liabilities by Type of Interest Rate, March 2019

A. Assets

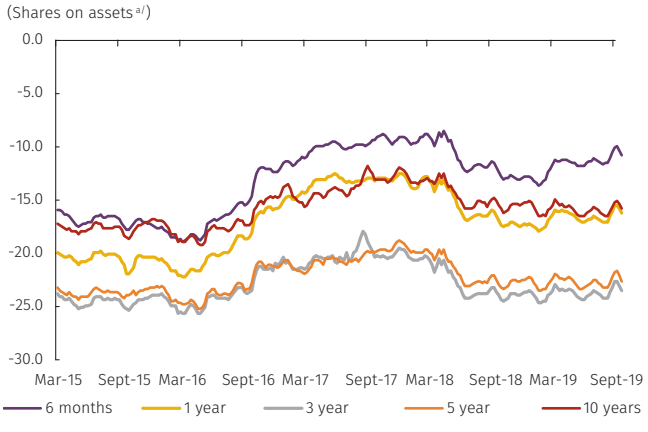


B. Liabilities



Source: Office of the Financial Superintendent of Colombia (FSC), calculations by *Banco de la República*.

Graph 2.38
WATM Gap



a/ These assets correspond to those that generate interest income.
Source: Office of the Financial Superintendent of Colombia (FSC), calculations by *Banco de la República*.

sitive to changes in interest rates for different periods. When this indicator takes on a negative value, it means that an increase of the same magnitude in lending rates and deposit rates would generate a reduction in the net interest income. This measurement of interest rate risk mainly depends on two factors: the share of assets and liabilities contracted at variable rates and the maturity of fixed-rate assets and liabilities.[35]

In Graph 2.38, the WATM gap is presented for five different periods. This measure remains at negative levels for all time horizons. Based on the structure of the balance sheet interest rates, the WATM gap registered stability for all of the time periods analyzed as of September 2019.

35 For more detail on the calculation of the *WATM Gap*, see the box "Interest Rate Risk of the Colombian Credit institutions' Trading Book" in the September 2015 *Financial Stability Report*.

Box 2

Activity Indicators in the Non-Residential Construction Sector

Dayana Camila Beltran
Juan Sebastián Mariño
María Fernanda Meneses*

1. Introduction

The construction sector has become one of the most dynamic branches of Colombia's gross domestic product. In the last ten years in particular, it was the branch with the third highest average growth, surpassed only by financial and insurance activities, and real estate. In spite of the above, the last three years have generated significant challenges for builders given an average downturn of 0.8% during this period.

Given the importance of the construction sub-branch of residential and non-residential building, which represented close to 50% of the sector as of June 2019, various reports (including the special financial stability report *Análisis de la cartera y del mercado de vivienda en Colombia* (*Analysis of the loan portfolio and housing market in Colombia*) which complements this *Report*) analyze the information related to the residential segment in detail. Specifically, this *Report* has found that the high accumulation of inventory and the fall in demand for housing in Colombia led to increases in selling times and, therefore, lower activity indicators.

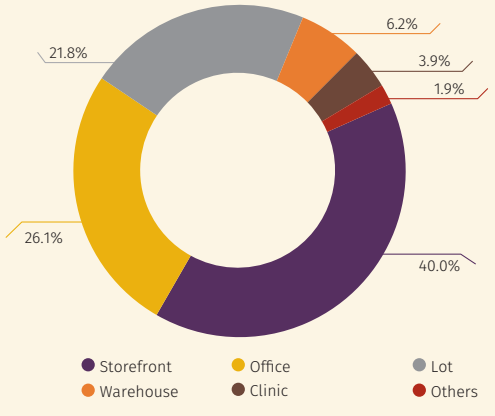
Despite the interest in this market, few documents analyze the activity in the non-residential segment. Due to the foregoing, demand, supply and price indicators are calculated in this box for this sub-branch using the *Coordenada Urbana* (Urban Coordinate) database of the Colombian Chamber of Construction (Camacol).

2. Database

Coordenada Urbana is a system that records georeferenced information on the construction sector, fed by a monthly census of new residential and non-residential buildings. The information on non-residential properties includes their characteristics, units sold and offered, offering price, etc. Data are available as of January 2008, and cover 18 Camacol regions[1] that monitor 144 cities. In spite of the wide coverage, about 70% of the observations are concentrated in Bogota, Cundinamarca, and Antioquia.

Graph B2.1 shows the breakdown of the database by property type using information as of June 2019. Note that storefronts are the most representative, followed by offices and lots. The least representative are warehouses, clinics, and other real estate[2].

Graph B2.1
Breakdown by Type of Non-residential Building



Sources: Camacol (Coordenada Urbana), calculations by *Banco de la República*.

3. Activity Indicators

In order to analyze the performance of the non-residential construction sector based on the information described above, turnover rates and prices were calculated for each type of property. The first one is defined as the ratio between the real estate supply and the quarterly average of its monthly sales, interpreted as the number of months required to sell the available supply all else being equal.

* The authors are part of the Financial Stability Department of *Banco de la República*. The opinions expressed here are the sole responsibility of the authors and do not compromise *Banco de la República* or its Board of Directors.

1 The regional areas covered are Antioquia, Atlántico, Bogota and Cundinamarca, Bolivar, Boyacá-Casanare, Caldas, Cesar, Cordoba, Cucuta-Northeast, Huila, Magdalena, Meta, Nariño, Quindío, Risaralda, Santander, Tolima, and Valle.

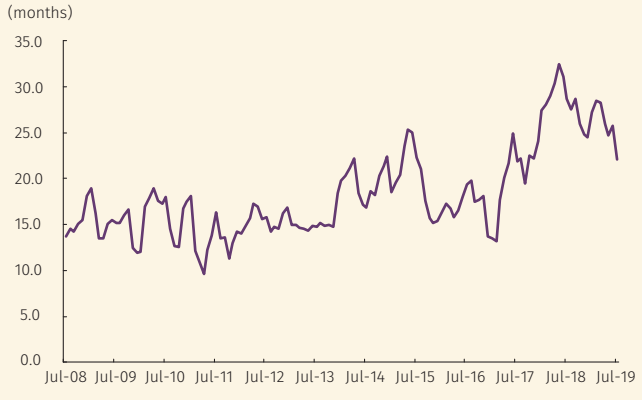
2 Other real estate includes housing, parking lots, industrial buildings, institutional buildings, service buildings, and commercial buildings.

The second is a price index calculated on the basis of the average price per square meter per month.[3]

Graph B2.2 shows the aggregate turnover index, which had a growth trend from the beginning of 2014 until mid-2018 and reached an indicator of 32.4 months. Since then, this measure has registered a decline and gone to 22 months. By type of property, warehouses are found to have the lowest turnover, reaching an index of 109.2 months, while clinics, which have an index of 12.2 months, are the ones with the highest turnover. The other types of buildings had turnover rates similar to those of the aggregate with an average of 22.5 months.

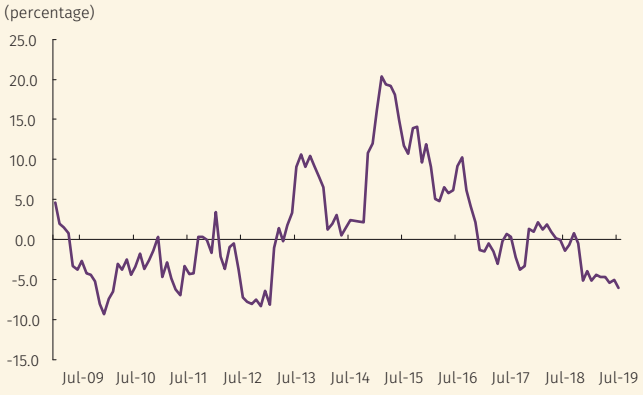
Graph B2.3, in turn, shows the real growth of the aggregate price index, which as of July 2019 registered a contraction of 6.0%, thus continuing the downward trend that has been registered since the first quarter of 2015. By type of property, the greatest decrease was presented by clinics (-12.5%), while lots saw the largest expansion (12.1%). Of the six types of properties analyzed, four (clinics, warehouses, storefronts, and offices) presented real contractions in their price index, while the lots and other properties showed a growth trend throughout the year.

Graph B2.2
Aggregate turnover Index



Sources: Camacol (Coordenada Urbana), calculations by *Banco de la República*.

Graph B2.3
Real Growth of Index of Aggregate Prices



Sources: Camacol (Coordenada Urbana), calculations by *Banco de la República*.

4. Conclusions

Non-residential real estate activity indicators in Colombia have shown weak performance in recent years. The turnover rate reached historical highs recently while price growth is at negative levels, a situation that has become generalized for most of the types of property analyzed. This is consistent with the performance of the housing market (which has shown more sluggishness in the recent past) and with that of the construction sector GDP. To the extent that inventory is sold out in the residential and non-residential housing market, improvements in the performance of this branch will be seen. This new information will facilitate the monitoring of this market in order to anticipate possible unfavorable situations that could affect the financial health of Colombian builders and, therefore, of the financial institutions exposed to them.

3 Within these indicators, observations of sales by area, which represented less than 1.0% of the data, were not taken into account.

Box 3
Historical Indicators for Non-Banking Financial Intermediation in Colombia

Jorge Cely
Eduardo Yanquen*

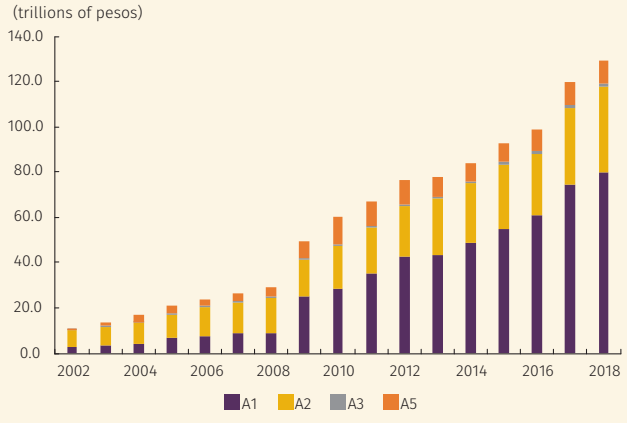
In the most recent *Global Monitoring Report*, the Financial Stability Board (FSB) changed the name of the credit intermediation activity carried out by institutions that are outside the banking system.[1] The term *shadow banking* was formerly used. However, this carried a negative connotation for the institutions classified in this group, so the decision was made to change the name given to this type of activity to *non-banking financial intermediation* (NBFI). This change is only nominal, i.e., it does not affect the substance nor coverage of the institutions being analyzed (FSB, 2019).

Cardozo, Cely and Jaulin (2018) present some risk indicators for the NBFI in Colombia based on the FSB methodology. In this box, the indicators are updated with the information available as of December 2018 and an analysis by activity is presented.

In order to facilitate the analysis and identification of the risks associated with this type of institution, the FSB proposes to split it into five activities, namely: investment funds subject to bank runs (A1), granting of loans with short-term financing (A2), securities intermediation (A3), facilitating the creation of credit (A4), and securitization (A5). At the end of 2018, the total assets quantified in accordance with this classification amounted to COP 129.6 t (Graph B3.1).

When assets are examined by kind of activity, it can be seen that A1 and A2 show a sustained upward trend: at the end of 2018, they reached a total asset balance of COP 79.6 and 38.1 t, respectively. A3 and A5, in turn, show a stable performance when the value of their assets for the last few years is analyzed with their balances standing at COP 1.3 and 10.6 t, respectively (Graph B3.2).

Graph B3.1
Assets of NBFI by Activity



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

In order to analyze the possible risks associated with each of these activities, the FSB has designed some indicators to see to what extent they may be generating risks for the financial system. These indicators are divided into:[2]

- **Credit intermediation (CI):** the CI1 indicator measures credit intermediation using any type of credit instrument, and CI2 only measures intermediation through loans.
- **Maturity transformation (MT):** the MT1 indicator measures the transformation of long-term assets and liabilities, and MT2 considers short-term.
- **Transformation of liquidity (TL):** measures the transformation in terms of liquid financial assets.
- **Leverage (L)**: measures the ratio of financial assets to equity.

Cardozo et al. (2018) show these indicators by institution for each type of activity. An historical analysis of the change in these indicators between 2016 and 2018 is done in this Box.[3]

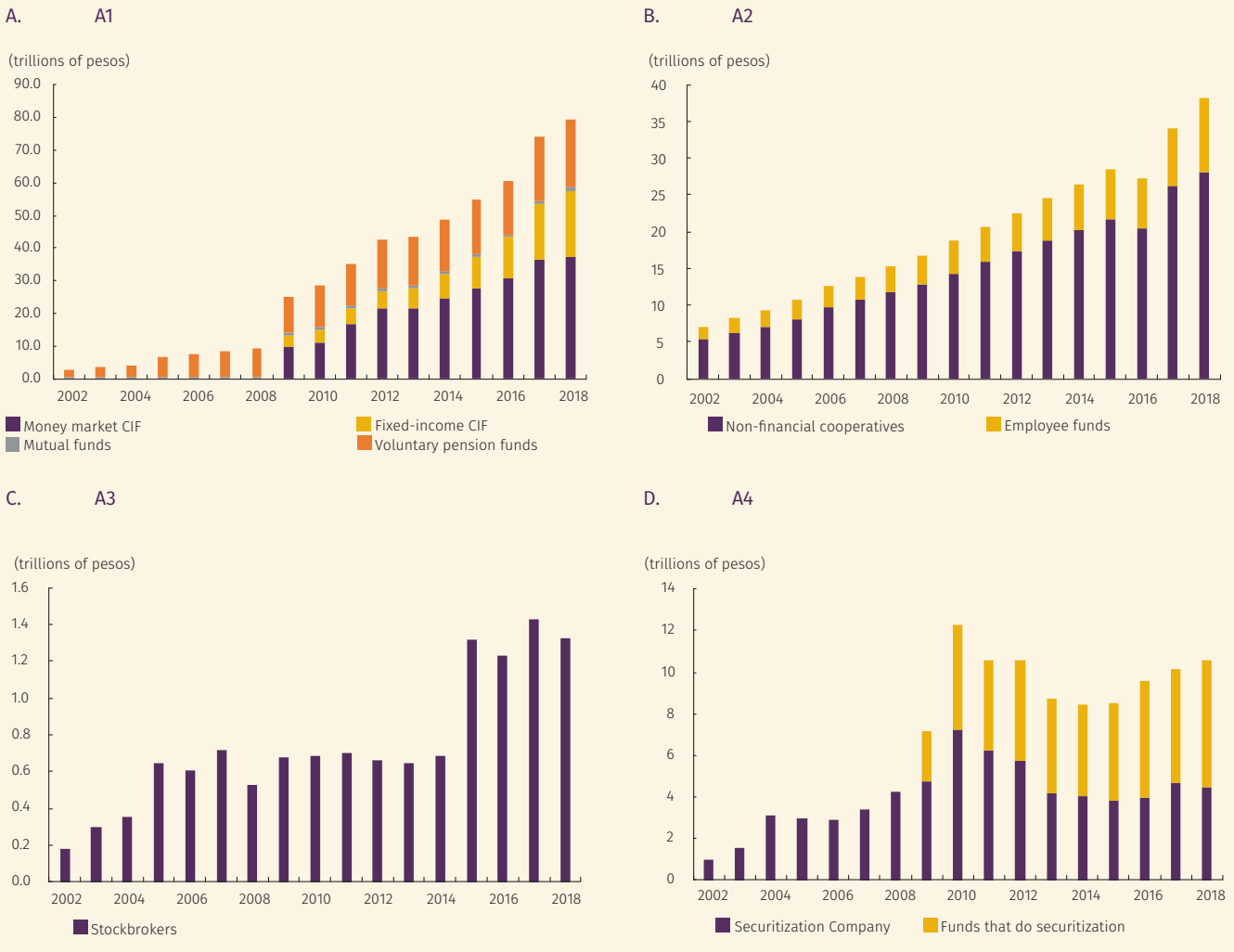
* The authors are members of the Financial Stability Department of *Banco de la República*. The opinions expressed here are the sole responsibility of the authors and do not compromise *Banco de la República* or its Board of Directors.

1 This does not mean that they are not controlled by the financial regulator in their respective jurisdiction.

2 For more information about each of the indicators please see Cardozo *et al.* (2018).

3 This period is chosen because it is the period for which information to construct the institutions' indicators is available.

Graph B3.2
Historical Change in Assets by Activities Based on FSB Classification

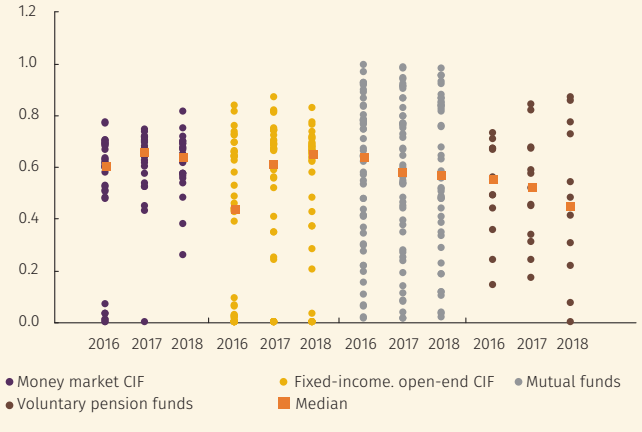


Note: no information is available for money market CIFs or fixed-income CIFs for years prior to 2015.
Sources: Office of the Financial Superintendent of Colombia, Superintendence of Solidary Economy, Titularizadora Colombiana (Colombian Securitization Company), calculations by *Banco de la República*.

When the indicator for institutions classified under A1 is analyzed, two different trends are observed: on the one hand, money market and fixed-income CIFs show an upward trend for this indicator, and there are fewer and fewer funds that refrain from brokering credit; on the other, the tendency to engage in this activity is decreasing in the case of mutual funds and voluntary pension funds although the dispersion in this type of entity remains broad (Graph B3.3).

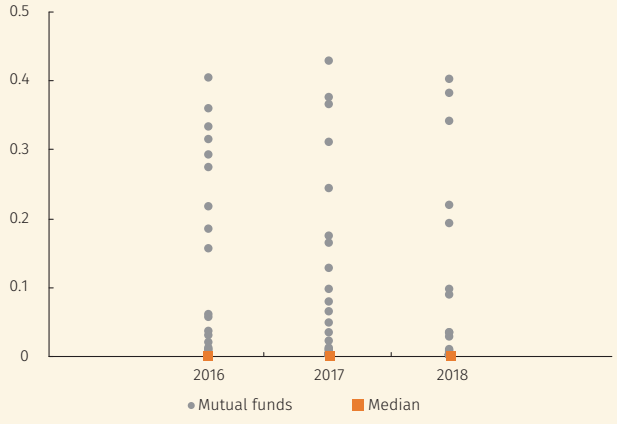
Within A1 activity, the only institutions that have loans are mutual funds. This indicator is stable for this type of entity during the three periods under analysis showing that, in general, they do not usually engage in this type of activity. In addition, those that are involved do not tend to do so intensively since the indicator does not show values close to 1 for any of the cases (Graph B3.4).

Graph B3.3
CI1 Indicator for Entities Classified under A1



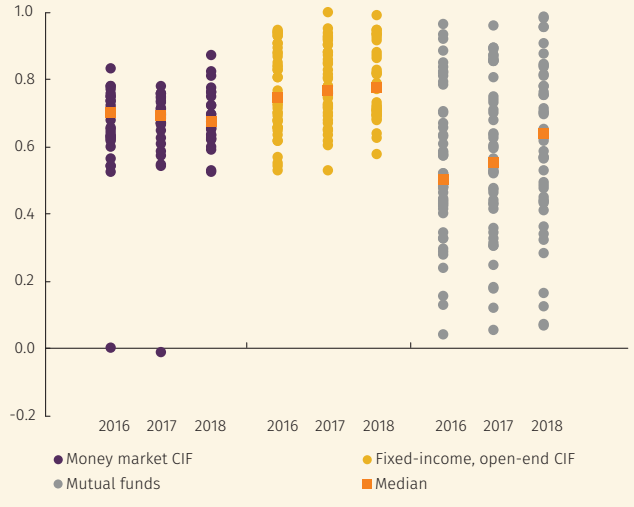
Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República*.

Graph B3.4
CI2 Indicator for Mutual Funds



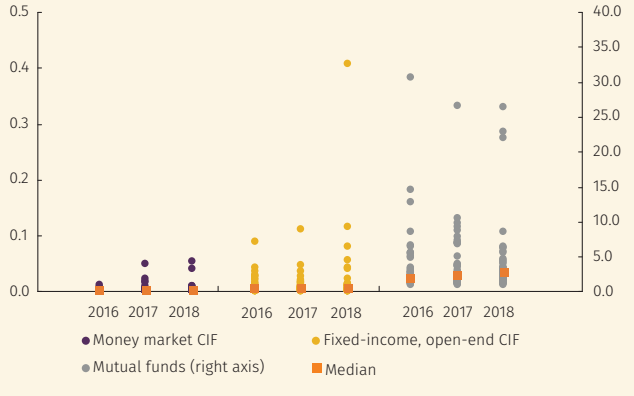
Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

Graph B3.5
MT1 Indicator for Entities Identified under A1



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

Graph B3.6
MT1 Indicator for Entities Identified under A1



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

In terms of liquidity transformation, it can be seen that institutions classified under A1 are usually involved in one way or another. The indicator for money market CIFs and fixed income CIFs is usually above 0.5 and, in particular, fixed income CIFs are usually the most active in this area. For mutual funds, there is greater dispersion in the indicator, but in no case is there an indicator at 0; furthermore, the median of these funds has a rising trend (Graph B3.5).

In contrast to the transformation of long-term maturity, the short-term transformation measured with TM2 shows that CIFs are the institutions that are least likely to engage in this type of activity. Mutual funds, in turn, show a fairly high indicator for most of their institutions, and a slight upward trend can be seen over the last two years (Graph B3.6).

When the indicator for A1 institutions is analyzed, voluntary pension funds and mutual funds are found to engage in liquidity transformation activities on a recurring basis. Moreover, the intensity with which the former do so has been increasing. Furthermore, money market CIFs and fixed income CIFs tend to do so as well, but on a less intensive basis (Graph B3.7).

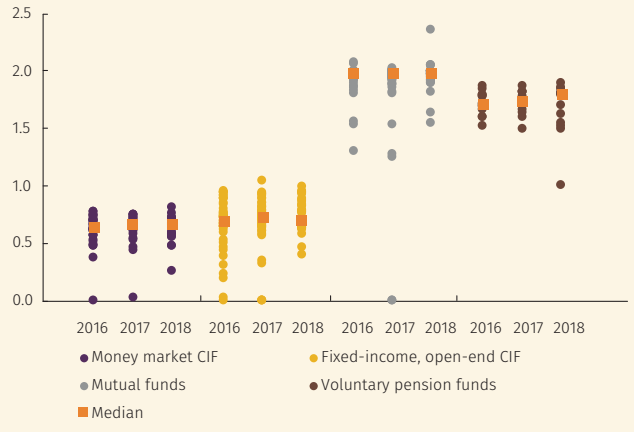
With regard to the leverage indicator, it is noticeable that these institutions show low levels of leverage and, in fact, in some cases, it could be said that such leverage does not exist for institutions classified as voluntary pension funds or mutual funds. However, it is the latter that show the highest values for the indicator (Graph B3.8).

For those classified in A2,[4] a stable performance is seen in credit intermediation measured with CI2. In the case of non-financial cooperatives, there is a wide distribution, where most of these institutions have high values in spite of the fact that this measurement has been decreasing for this set of institutions. When one assesses the same indicator for employee funds, one finds that the indicator is higher and the observed distribution of institutions shows that these types of institutions do more intensive intermediation work. Furthermore, no movement is seen in either the median value of the indicator nor in any of its percentiles over the years (Graph B3.9, panel A).

The degree of leverage of the institutions in A2 shows a wide dispersion between the two groups of institutions. On the one hand, employee funds turn out to be those with the highest degree of leverage. On the other, non-financial cooperatives are usually not leveraged, and for half of the institutions that are, the values seen for the indicator are not usually high (Graph B3.9, panel B).

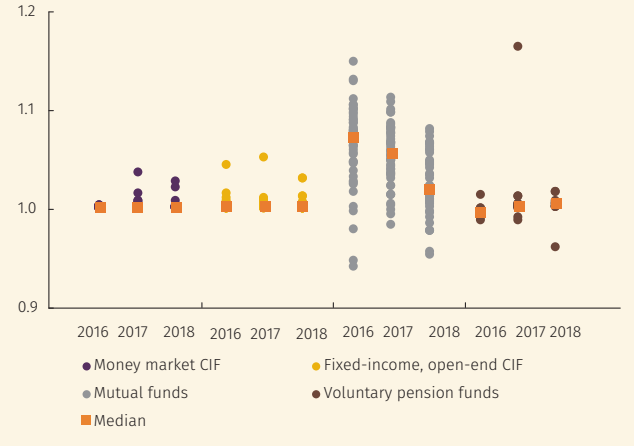
4 The number of institutions classified in A2 is high (e.g.: as of 2018, 1,632 non-financial cooperatives and 1,422 employee funds are considered). That is why the 10th, 25th, 75th, and 90th percentiles are used to describe the distribution of the indicators of these institutions instead of the specific indicators of each one.

Graph B3.7
TL Indicator for Entities Identified under A1



Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

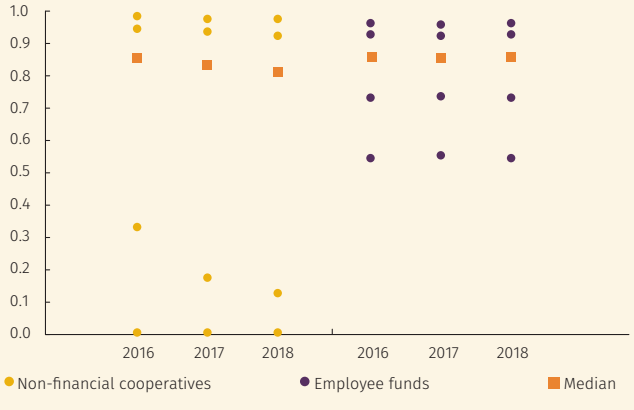
Graph B3.8
A Indicator for Entities Identified under A1



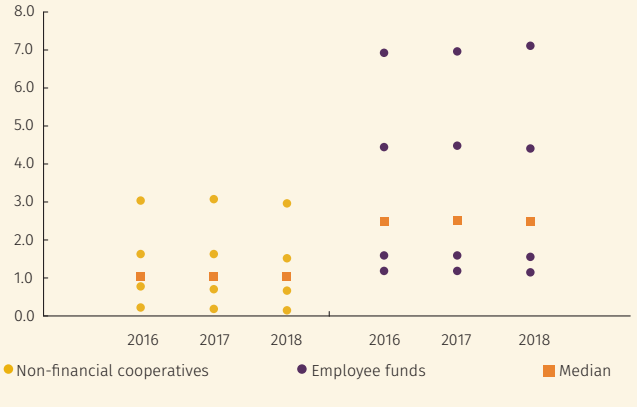
Source: Office of the Financial Superintendent of Colombia, calculations by *Banco de la República.*

Graph B3.9
Risk Indicators for Entities Classified under A2

A. CI2 Indicator for A2



B. A Indicator for A2



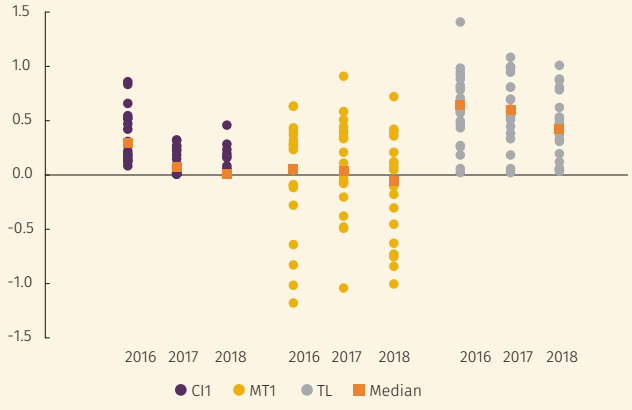
Source: Superintendence of Solidary Economy of Colombia, calculations by *Banco de la República.*

For brokerage firms, which are the only institutions classified within A3, decreases are seen in the majority of their risk indicators. The credit intermediation indicator has declined consistently since 2016, which indicates that commission agents carry out credit operations less and less frequently (Graph B3.10, panel A). With regard to the transformation of maturities, there is a preference for doing these types of short-term operations (the values of indicator TM2 observed are greater than those observed for indicator TM1), although the intensity with which this activity is carried out has fallen. In terms of leverage, there is a wide dispersion in those institutions that are leveraged despite the fact that extreme points are less and less frequent (Graph B3.10, panel B).

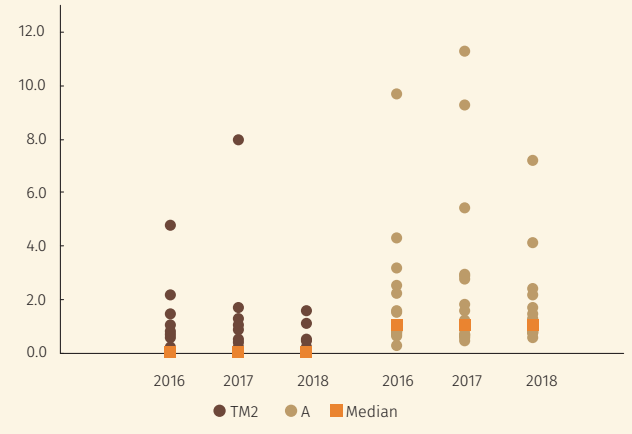
With respect to the institutions identified for A5, the Colombian Securitization Company and the funds they securitize have shown slight variations in their indicators. In the first place, the indicator shows that most of the universalities of the Colombian Securitization Company are highly concentrated in loans, while the situation for the funds that do securitization is the opposite, and as of 2018 none of these funds was working with credit intermediation (Graph B3.11, panel A). As for the leverage of the latter, the indicator shows that there has been a shift from a situation in which these funds were not leveraged to one in which they show moderate leverage (Graph B3.11, panel B).

Graph B3.10
Risk Indicators for Stockbrokers (A3)

A. CI1, MT1, and TL Indicators



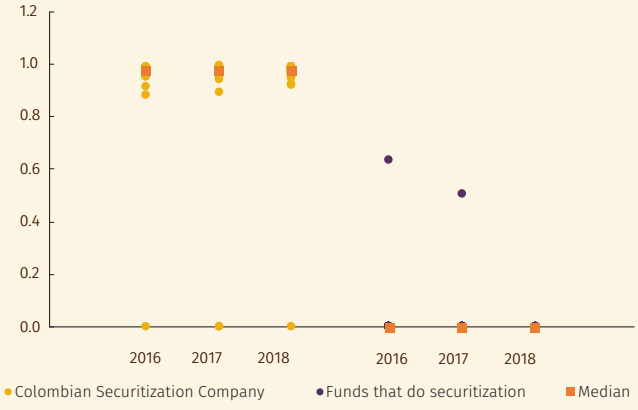
B. MT2 and A Indicators



Source: Superintendence of Solidary Economy of Colombia, calculations by *Banco de la República*.

Graph B3.11
Risk Indicators for Entities Classified under A5

A. CI2 Indicator



B. A Indicator

Source: Superintendence of Solidary Economy of Colombia, calculations by *Banco de la República*.

References

Cardozo, Cely, Jaulin (2018). "Box 1: Risk Indicators for *Shadow Banking* in Colombia," in the *Financial Stability Report* for the second half of 2018, November 2018.

FSB (2019). *Global Monitoring Report on Non-Bank Financial Intermediation, 2018*, February 2019.

03

Stress Test

This section describes the scenario and the results of the stress test on the credit institutions (CI) carried out by Banco de la República every six months. This test, known in the international literature as a stress test, seeks to measure the resilience of the CIs in the event of an unlikely, hypothetical adverse scenario. The results suggest that the aggregate indicators of the system's capital adequacy were not likely to show values lower than the regulatory limits in the scenario that was considered.

Considering the vulnerabilities identified throughout this *Report*, this chapter seeks to calculate the impact of a hypothetical scenario on the CIs in which the growth rate of the Colombian economy declines starting in the third quarter of 2019 and continuing until June 2021. The adverse scenario considered has been intentionally designed to reflect an extreme situation for the Colombian economy given that it incorporates a variety of shocks that would not be very likely, but would occur simultaneously. In this respect, the results of the test do not constitute any kind of forecast of future changes in the economy. Rather, the results should be interpreted as a quantitative assessment of the institution's resilience in the event of an extreme scenario based on their current financial conditions and under restrictive assumptions. Likewise, the exercise assumes that the economic authorities respond to the macroeconomic stress, but that there is no policy reaction to the deterioration of the institutions' financial statements nor preventive measures based on the monitoring of their risk management, which would presumably have made the impact of the adverse scenario smaller.

The usefulness of the test lies in providing an estimate of the potential losses that would be seen should the extreme scenario were to materialize. Furthermore, the test helps shed light on the possible transmission channels by means of which the vulnerabilities identified could affect financial stability.[36]

The results indicate that there would be negative effects on aggregate indicators of total and core capital adequacy although they would remain at levels above the regulatory limits during the period of the exercise. In addition, the loan portfolio and aggregate profitability of the CIs could exhibit significant deterioration, which would reflect the impact that the hypothetical adverse scenario could have on the ability of the institutions to grant loans and do their intermediation work.

3.1 Macroeconomic Scenario and Materializing Risks

The trajectories of the adverse scenario include a slowdown of the economy over the course of the analysis horizon.

The stress test seeks to capture the effects of an adverse macroeconomic context which would involve a sustained economic downturn between the third quarter of 2019 and the second quarter of 2021. Under this scenario, the trajectories of the aggregate variables in the Colombian economy are constructed by using a general equilibrium model. The scenario assumes a reduction in aggregate demand for the first year of the test that could be associated with restrictions on foreign financing accompanied by a depreciation of the exchange rate of the Colombian peso *vis-à-vis* the US dollar. For the second year, an intensifying downturn in demand is assumed that could be associated with a lower performance in the advanced economies. Under these assumptions, the model predicts a lower-than-expected economic growth, an increase in unemployment, and an increase in inflation.[37] With that, the monetary policy interest rate would remain relatively stable. In addition, it is assumed that the lending rates will rise gradually to levels that correspond to the maximum

36 The technical details of the model used in this test which include a description of the performance of the institutions in a hypothetical scenario and the channels through which their financial health could be affected are presented in the series *Borradores de Economía* no. 1028: "SYSMO I: A Systemic Stress Model for the Colombian Financial System", *Banco de la República*.

37 This macroeconomic scenario is constructed in such a way as to take into account the effects of feedback between the financial sector and the productive sector of the Colombian economy. The level of economic growth in the stressed scenario is determined by using a methodology that allows for the construction of a trajectory with a predetermined level of statistical probability. In order for the scenarios in different Reports to be comparable, the average rate of economic growth is fixed at a probability level of 3.0%. For more detail on this methodology, see Box 1 of the *Financial Stability Report for* the first half of 2018.

historical *spreads* with respect to the policy interest rate.[38] This is associated with a situation in which credit risk has a high chance of materializing.

A hypothetical scenario of a sustained economic slowdown and high interest rates could entail, during the first stage, the materialization of some of the risks (credit, market, and foreign exchange) that CIs face. The endogenous response of the CIs to the scenario could, at a second stage, unleash the materialization of additional risks that would be likely to have a direct impact on the financial statements of each institution (financing, liquidity, interest rate, and contagion risks).

Concerning credit risk, two elements are considered. For one thing, the natural consequence of a macroeconomic deterioration would be for the default rates of economic agents to increase. The hypothetical trajectories of the quality risk indicators of the four types of loan portfolios are presented in Graph 3.1:[39] the shaded area corresponds to the analysis horizon of the test. Moreover, it is assumed that the adverse scenario would trigger a gradual one-level displacement in the rating of some companies considered vulnerable within the commercial loan portfolio and of a sample from the consumer loan portfolio. For the first loan portfolio, vulnerable companies correspond to the ones that show any of the following characteristics: companies that are exposed to exchange rate risk;[40] those that have restructured or modified loans; [41] and those belonging to the agriculture and coal mining sectors, or to building and businesses related to that.[42] In addition, given the idiosyncratic behavior of certain companies in the infrastructure and transportation sectors, the total and partial displacement respectively towards lower ratings for

38 *The largest historical spreads of the commercial, consumer, housing, and microcredit loan portfolios were 7.6 pp (November 2016), 20.6 pp (February 2003), 13.5 pp (May 2004), and 31.1 pp (August 2016), respectively.*

39 In order to determine these hypothetical trajectories, a vector auto-regression (VAR) model was used for the quality risk indicator for each one of the types of portfolios.

40 The companies exposed to exchange rate risk are the ones that present a negative exchange rate mismatch (liabilities in foreign currency greater than assets in foreign currency) and which are classified as vulnerable, taking into account four indicators: 1) the value of the currency mismatches to total assets; 2) trade balance to operating income; 3) share of foreign capital in the total capital of the company; and 4), depreciation of the equity in the event of a 15% depreciation. Each one of these indicators is classified at a 1 to 3 level of risk based on specific thresholds for each with 1 being the highest risk level. Finally, the risk levels for each indicator are averaged out. If the average for a company is less than or equal to 2.5 and the exchange rate mismatch is less than or equal to -20.0% of the total assets, the company is considered to be vulnerable.

41 For more detail on restructured and modified loans, see External Circular 016/2019 of the Office of the Financial Superintendent of Colombia.

42 Companies related to the building sector correspond to companies that do installations, finishing work, and final touches, architectural work, and other related operations.

Graph 3.1
QIR Trajectory by Type of Loan Portfolio

Source: Office of the Financial Superintendent of Colombia (until June 2019); calculations by *Banco de la República* (September 2019 to June 2021).

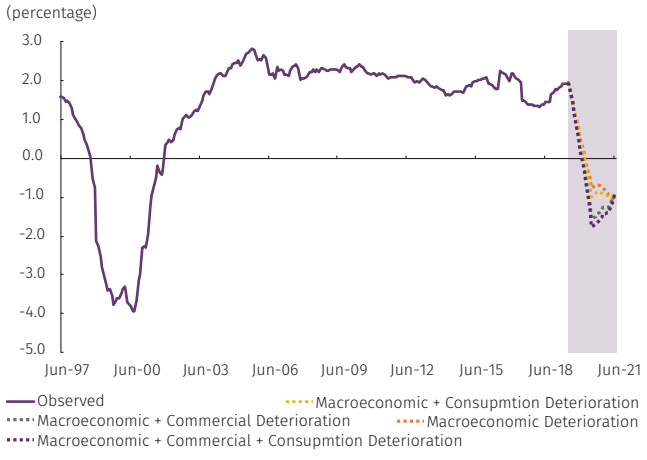
these debtors was assumed.[43] Moreover, given the recent increase in exposure to consumer loan portfolio, the test assumes that this would deteriorate in the adverse scenario, which would imply the partial displacement of the new loans granted during the first half of 2019.[44]

Concerning market risk, two elements are considered. For one thing, the macroeconomic trajectories of the hypothetical scenario generate displacements of the zero-coupon TES curve and the private fixed income curve. In addition, the exercise assumes that the general deterioration of macroeconomic conditions would cause a gradual and

43 As of June 2019, the portfolio granted to the group of vulnerable companies came to 34.2% of the commercial loan portfolio. The percentage of companies exposed to foreign exchange risk is 6.4%; the firms associated with the building sectors account for 22.7%; the companies with restructured or modified loans account for 1.7%; the companies in the coal and agricultural sectors account for 4.3%. The loan portfolio of specific companies in the infrastructure and transportation sectors, in turn, represents 0.5% of the total commercial loan portfolio, considering the fact that the CIs have set up 38.5% of the loan-loss provisions for loans granted to these companies.

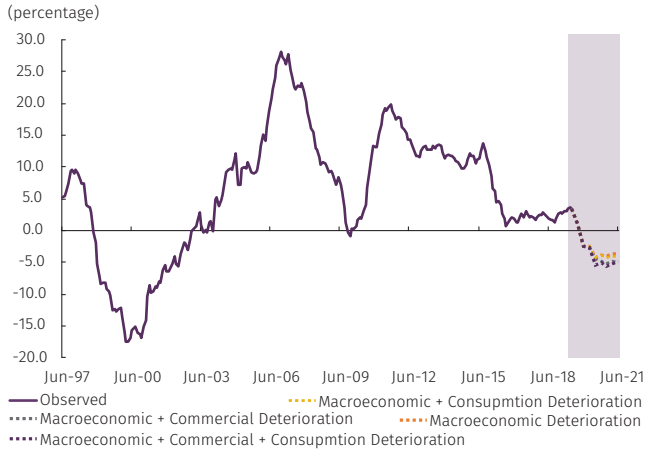
44 As of June 2019, the loans disbursed this year accounted for 28.1% of the total consumer loan portfolio.

Graph 3.2
Return on Assets (ROA)



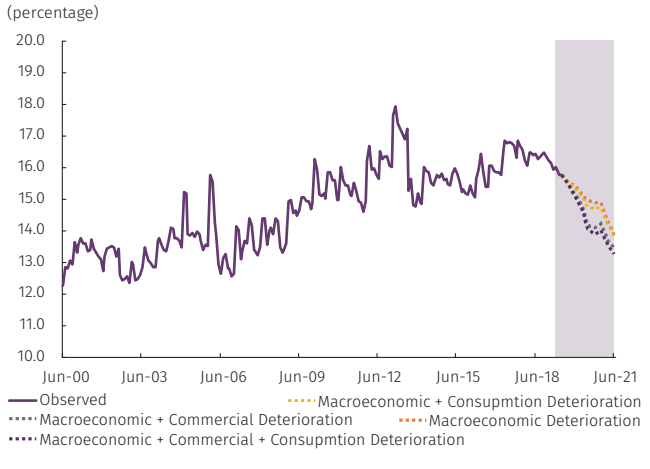
Source: Office of the Financial Superintendent of Colombia (until June 2019); calculations by *Banco de la República* (September 2019 to June 2021).

Graph 3.3
Annual Real Growth of the Loan Portfolio



Source: Office of the Financial Superintendent of Colombia (until June 2019); calculations by *Banco de la República* (September 2019 to June 2021).

Graph 3.4
Total Capital Adequacy Ratio



Source: Office of the Financial Superintendent of Colombia (until June 2019); calculations by *Banco de la República* (September 2019 to June 2021).

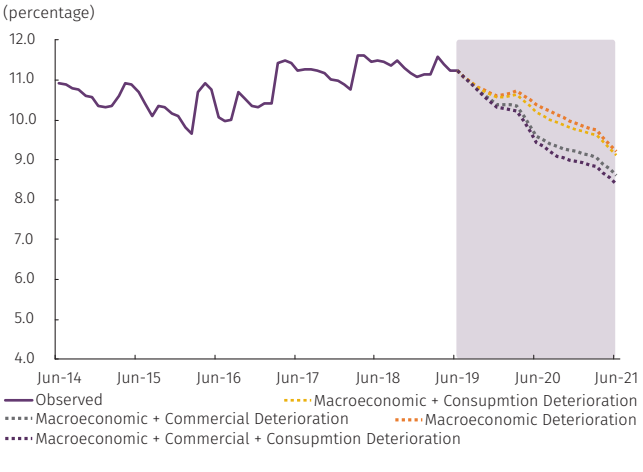
permanent exit of foreign bond holders from the local public and private debt market during the first year of the test. As a result, additional displacements are posited coming from the sale of the entire portfolio by foreign investors. Therefore, a widespread depreciation of the curves is generated with the highest magnitude in the longer periods, thus causing them to spike.

3.2 Results

This section shows the results of some of the CIs' aggregate financial variables based on different combinations of assumptions about the displacement of the portfolio considered vulnerable. The scenarios considered are: 1) deterioration associated with the macroeconomic scenario (dotted orange line); 2) deterioration at the macroeconomic level and of the firms defined as vulnerable (dotted gray line); 3) deterioration at the macroeconomic level and of the new consumer loans (dotted yellow line); and 4) the combination of macroeconomic deterioration and the deterioration of vulnerable sectors of the commercial and consumer loan portfolios (dotted purple line).

The trajectories of the CIs' aggregate variables are likely to develop in the stressed scenarios in line with what is shown in Graphs 3.2 to 3.5. The results suggest that, regrading profitabili-

Graph 3.5
Core Capital Adequacy Ratio



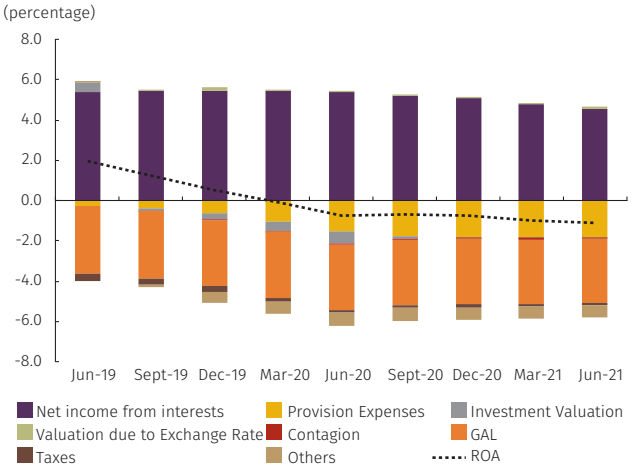
Source: Office of the Financial Superintendent of Colombia (until June 2019); calculations by *Banco de la República* (September 2019 to June 2021).

ty, ROA reached negative values that have only been seen during the financial crisis of the late 1990s in all the scenarios. The largest impact on the ROA (-1.8% at the end of the first year of the horizon) will probably be seen for scenario 4, which considers macro risks and commercial and consumer loan portfolio risks jointly. Scenarios 2, 3, and 1 follow in this order (Graph3.2). It can also be seen that the additional impact of including the displacements of the consumer loan portfolio would be more limited than the scenarios that include the deterioration in the commercial loan portfolio. With respect to the real growth of the loan portfolio, all of the scenarios share the same trajectory during the first year of the test. However, in line with ROA, the credit supply would be more restricted in scenario 4, coming to a minimum of -5.7% (Graph 3.3). As a consequence of the lower profits, the ratios of total and core capital adequacy would fall between 1.9 pp and 2.8 pp depending on the severity of the scenarios while remaining above the corresponding regulatory minimums in all cases (Graph 3.4 and 3.5).

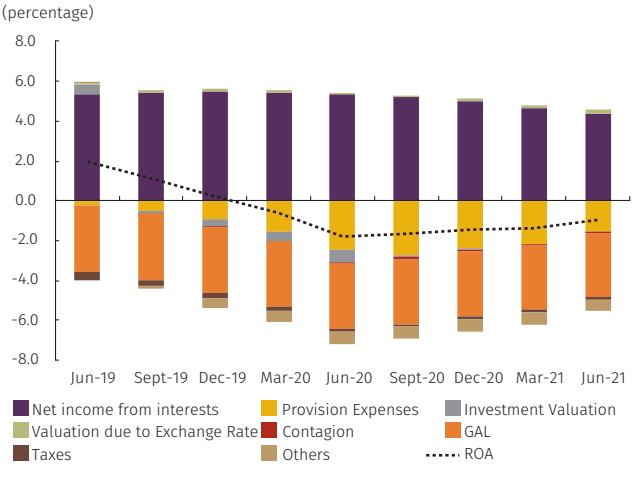
Graphs 3.6 and 3.7 show different breakdowns of ROA dynamics that would be observed in the least adverse scenario (panels A) and the most acid scenario (panels B). The first presents the development of the contribution by item over time, while the second analyzes the contribution of each item in the accumulated variation of the indicator from its initial point to the end of the horizon. In both scenarios, the greatest expense in loan-loss provisions is the item that most explains the fall in the profitability of CIs. The greatest severity of this item would be observed in the middle of the analysis horizon for scenario 4, which takes into account, in addition to the macroeconomic deterioration, the displacement of portions of commercial and consumption portfolios considered vulnerable. Lower net interest income is the second largest contributor to the fall in profitability, which would be reduced as a result of increases in lending and borrowing interest rates combined with the materialization of credit risk. With regard to market risk losses associated with the liquidation of securities held by foreigners, these contributed to the fall observed in the first year of the test. Exchange rate risk and contagion items exhibit a limited magnitude and, in the case of the former, it turned out to have a positive impact on ROA, thus showing that the CIs have a positive net foreign exchange position in the aggregate.

Graph 3.6
Breakdown of ROA

A. Scenario 1



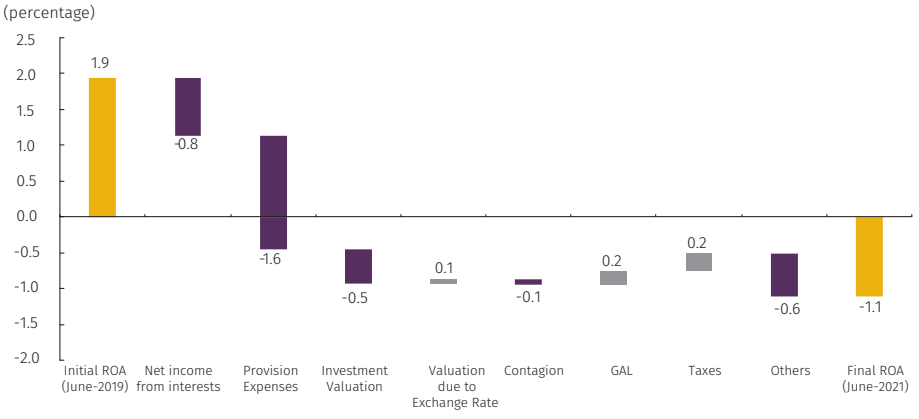
B. Scenario 4



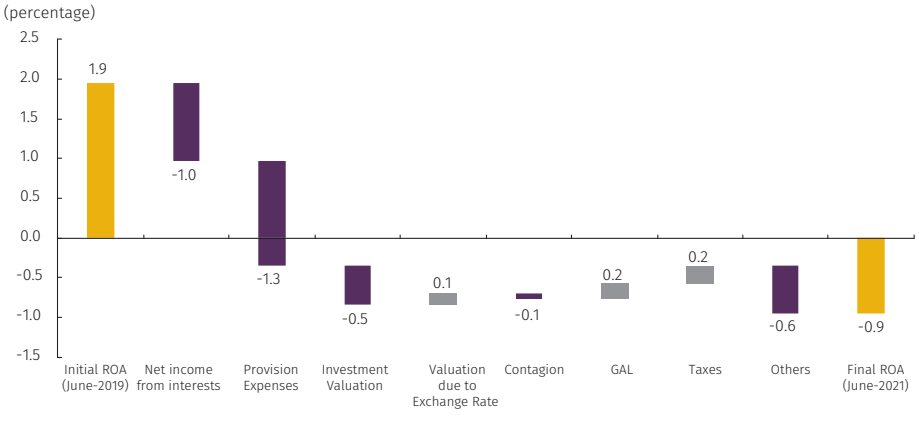
Note: components of the ROA are annualized.
Source: Office of the Financial Superintendent of Colombia (until June 2019); calculations by *Banco de la República* (September 2019 to June 2021).

Graph 3.7
Change in the ROA by Components

A. Scenario 1



B. Scenario 4



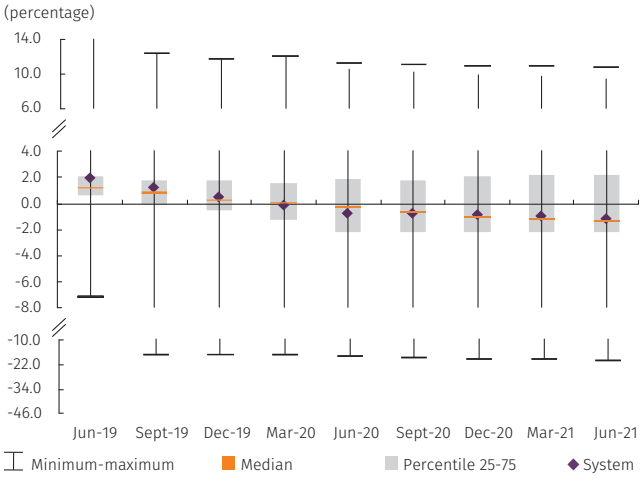
Note: components of the ROA are annualized.
Source: Office of the Financial Superintendent of Colombia (until June 2019); calculations by *Banco de la República* (September 2019 to June 2021).

Finally, even though the aggregate indicators of the CIs may have presented levels of deterioration that had a moderate impact with respect to the regulatory requirements, the results per entity are heterogeneous. In terms of ROA, note that in scenario 4 both the 25th and the 50th percentile will probably begin to decline more sharply earlier in the horizon under analysis. Likewise, despite the fact that aggregate ROA of the CIs shows a slight recovery at the end of the test for this scenario, as for individual ROA, it can be seen that the median and the 25th percentile will probably remain at lower levels (Graph 3.8).

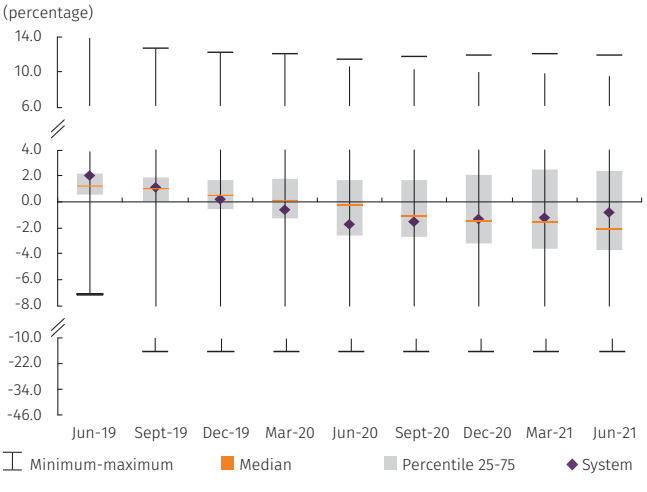
With respect to the capital adequacy ratio, in both scenarios 1 and 4, some institutions that account for 9.9% of the total loan portfolio would have a level that is lower than the regulatory limit. Given the additional shocks in scenario 4, this impact would begin to be seen starting the first year of the horizon under analysis, while in scenario

Graph 3.8
Distribution of the ROA

A. Scenario 1



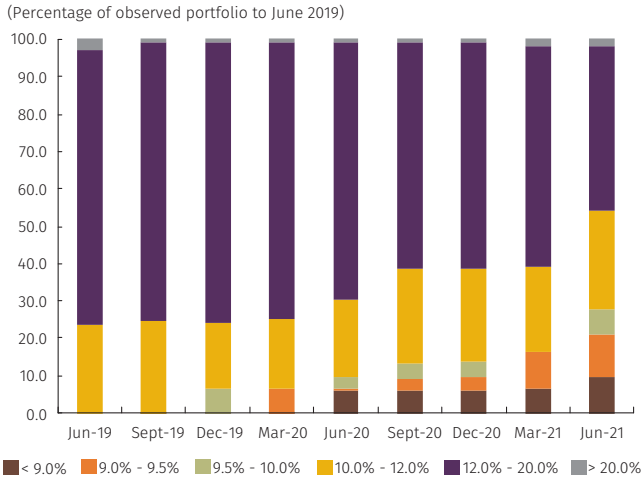
B. Scenario 4



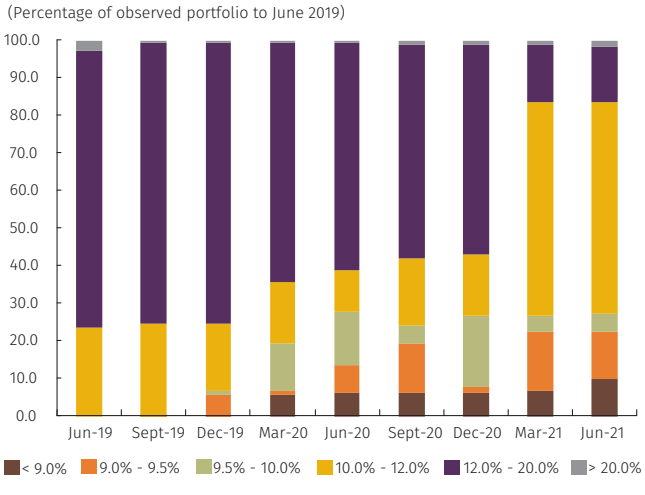
Source: Office of the Financial Superintendent of Colombia (until June 2019); calculations by *Banco de la República* (September 2019 to June 2021).

Graph 3.9
Distribution of Capital Adequacy by Share of Loan Portfolio ra

A. Scenario 1



B. Scenario 4



Source: Office of the Financial Superintendent of Colombia (until June 2019); calculations by *Banco de la República* (September 2019 to June 2021).

1 that impact would only occur at the end of the horizon (Graph 3.9). Based on these results, in order to keep the entire financial system solvent[45] over the horizon of the stress test, a capital injection of COP 2.5 t and COP 3.4 t would be necessary during the two years for scenarios 1 and 4, respectively.

3.3 Final Comments

The results of the exercise suggest that the majority of the CIs would be able to keep their aggregate total and core tier I capital adequacy ratios above the regulatory minima in spite of the severity of the

45 This means that, for each CI, the total capital adequacy remains above 9.0%, the basic capital adequacy above 4.5%, and the equity loss above 50%.

macroeconomic scenario and the resulting reduction in their profitability and ability to grant credit. That reflects the current resilience of the institutions in the event of a macroeconomic scenario such as the one described above.

As has been discussed, the stress test presented in this section is built on the basis of a set of assumptions that, by incorporating various simultaneous shocks, reflects an adverse situation and one that is very unlikely for the Colombian economy. For one thing, it assumes that the economic authorities do not take action in response to the deterioration of the CIs' financial situation. At the same time, the institutions' shareholders are presumed to be excessively passive to the degree that they only capitalize the profits without taking any other kind of strategic initiative in order to face the financial stress.[46] If, however, any one of these assumptions is eliminated, the size of the losses to the system would be expected to be cushioned so that the impact of the adverse scenario would presumably be smaller. Last of all, the starting point for the analysis is the individual capital adequacy ratios apart from any consolidated capital adequacy. Therefore, the consolidated results may differ from those presented here.

46 Specifically, the shareholders do not inject outside capital into the business operation, they do not seek synergies or mergers between the institutions, nor do they manage them in order to increase the efficiency of their operations.

04

Financial Regulation

Decree 704 of 24 April 2019 of the Ministry of the Treasury and Public Credit: liquidity risk of cooperatives supervised by the *Superintendencia de la Economía Solidaria* (Superintendence of Solidary Economy).

This modifies Decree 1068/2015, the Treasury and Public Credit Sector Unified Regulatory Decree, in relation to liquidity risk management of the organizations for social economy, which include credit unions, multi-active and integrated cooperatives with a savings and credit section, employee funds, and mutual associations.

Modifications seek to: i) implement the most recent international standards that involve stages of identification, measurement, control, and monitoring of liquidity risk exposure in both on and off balance sheet, in order to protect against sudden changes that might cause losses in their financial statements; ii) eliminate regulatory arbitrage by harmonizing their regulatory frameworks, and adopt international standards, as well as modifying the terminology used in Decree 1068/2015, Book 2, Part 11, Title 7, Chapter 1; and iii) optimize the operation and supervision of compliance with such provisions.

Specifically, the following modifications were made:

i. Management of the liquidity fund through a trust is no longer compulsory[47], and it was established that, when using a collective vehicle to invest such funds, they should be money market funds.

47 The liquidity fund represents 10% of the total deposits of organizations for social economy.

ii. Regarding permanent savings accounts, the liquidity fund associated with these accounts was set at 2.0% as long as the organization's bylaws stipulate that they may only be withdrawn at the time the associate's membership is definitely terminated.
iii. It established that, upon notifying the Superintendence of Solidary Economy of the use of the liquidity fund, the organization shall also describe a plan for reestablishing the fund within a specified term.
iv. Terminologies used in the Decree were harmonized.

The Superintendence of Solidary Economy issued and published the External Circular 6 of 24 October 2019 with the instructions for achieving compliance with in the liquidity risk regulation. It also set out an implementation schedule, considering the different levels of monitoring, features, and types of organizations, where the time limit shall be one year from the date of publication of the instructions.

Decree 1349/July 26, 2019 of the Ministry of the Treasury and Public Credit: regulatory capital of insurance companies.

This modifies Decree 2555/2010 with respect to the regulatory capital of insurance companies in order to progressively converge towards the international regulatory framework under which regulatory capital shall be greater than or equal to the required capital, and consistent with the risks to which they are exposed in their operation. This is to reduce the likelihood and severity of unexpected losses that might affect compliance with the obligations arising from the insurance contract in order to protect the policyholders' interests and beneficiaries of the policy.

Thus, an insurance company's capital consists of common equity tier 1 capital, additional tier 1 capital, and tier 2 capital, for which the criteria of belonging were established. The instruments that regulatory capital is made up of and some aspects of required capital for insurance institutions were also updated.

The FSC shall issue and publish the instructions that prove to be necessary to achieve compliance with the regulatory capital regime within six months from the date of publication of the decree. In any case, its implementation shall take place within 12 months following the date of publication of the instructions.

Decree 1420 and 1421/August 06, 2019 of the Ministry of the Treasury and Public Credit: required capital for third-party asset management companies and operational risk capital requirements for CIs.

This modifies Decree 2555/2010 regarding: i) required capital for third-party asset management companies: TC, PFM, and BF and ii) operational risk capital requirements for CI as a means of reducing the impact of unexpected or catastrophic losses.

In the first case, the existing regulation regarding required capital was adjusted for third-party asset management companies and the applicable regulations among them were standardized in order to avoid regulatory arbitrage.

Specifically, the following modifications were made:

i. For the TCs that are authorized to act as custodians of securities, the risk weight was set at 100/9 for market and operational risk exposures. This was done in order to standardize the calculation of the capital adequacy ratio for the TC.
ii. For BFs, the deduction of fixed asset and other assets was eliminated from the regulatory capital calculation. The latter include art and cultural goods, branches and agencies, and shares in social clubs.
iii. Some terminologies and expressions used for the calculation of the income from commissions were modified.

In the second case, capital requirements for operating risk were implemented for capital adequacy ratios and for conservation capital buffers, as a complement to standards of good practice relating to operational risk management.

The methodology for measuring operational risk proposed in the document "Basel III: Finalising post-crisis reforms" (BIS, 2017) has been implemented for the above.

The methodology defines the value of exposure to operational risks as follows:

$$VeR_{RO} = IN \times CRO \times IPI$$

Business Indicator (BI): is an approach to operational risk exposure that is calculated based on the balance sheet and income statement of credit institutions. This indicator depends on the three-year average values interest-bearing assets, net income from *leasing* operations, income and expenses from fees, operating income and expenses, net income from investment portfolios at fair value and amortized cost, net income from investments in subsidiaries, and income from dividends.

Business Indicator Component (BIC): this value adjusts the BI by multiplying it by 12%. In addition, and under the premise that larger institutions are more exposed to this kind of risk, the CI whose BI exceeds COP 3 trillion, should use a BIC marginal coefficient of 15% applicable to the amount that exceeds this threshold.

Internal Loss Multiplier (ILM): introduces the effect of the internal losses due to the entity's operational risk. It assumes that if a bank has experienced large operational risk losses in the past, it has a higher probability of incurring losses in the future. The ILM is defined as:

i. Operational risk losses[48] are multiplied by 15.
ii. The value of BI and CRO are multiplied.
iii. The ratio of i. to ii. is calculated, and a ILM is assigned based on Table 4.1[49]:

In conclusion, an entity with operational risk losses that are high compared to its business indicator will have an ILI that is above 1 and, as a result, shall be obliged to hold more capital.

Once the VeR_{RO} is obtained, capital adequacy ratios are calculated as follows:

$$Capital\ Adecuacy\ ratio\ = \frac{Regulatory\ capital}{AWRL + \frac{100}{9}\ (VER_{RM} + VER_{RO})} \geq 9\%$$

$$Tier\ 1\ capital\ ratio = \frac{OCE}{AWRL + \frac{100}{9}\ (VER_{RM} + VER_{RO})} \geq 4{,}5\%$$

$$Tier\ 2\ capital\ ratio\ = \frac{(OCE + ACE)}{AWRL + \frac{100}{9}\ (VER_{RM} + VER_{RO})} \geq 4{,}5\%$$

48 In line with the technical document that accompanies the Decree, this value is calculated from the difference between the accounts associated with losses (513300, 517200, 510297, 510397, 510497, 510597, 511397, 511497, 511597, 511697, 511797, 511897, 512097, 512197, 512297, 512497, 512597, 512697, 512797, 513097, 513197, 514097, 514597, 514997, 515097, 515197, 515297, 515397, 515497, 515597, 515697, 515797, 516097, 516397, 516597, 516997, 519097, 570597, 517497) and the accounts associated with recoveries (419100, 419300).

49 This classification arises from applying a non-linear function to the resulting ratio, as follows (Basel, 2017):

$$IPI = f\left(\frac{15*PO}{CRO*IN}\right)$$

Table 4.1
Methodology for IPI Calculation

Quotient (q)	Internal loss indicator
$0 < q < 0.2$	0.7
$0.2 < q < 0.4$	0.8
$0.4 < q < 0.7$	0.9
$0.7 < q < 1$	1.0
$1 < q < 1.4$	1.1
$1.4 < q < 1.8$	1.2
$1.8 < q < 2.3$	1.3
$2.3 < q < 2.9$	1.4
$2.9 < q < 3.6$	1.5
$3.6 < q < 4.4$	1.6
$4.4 < q$	1.7

Source: Ministry of Finance and Public Credit (Decree 1421 of 2019).

Where OCE corresponds to the common Equity tier 1 capital after deductions, ACE to the additional tier 1 capital, $AWRL$ to the risk weighted assets and VeR_{RM} to the market risk exposure.

Taking into account the operational and technological impact for CIs, they will have until 1 January 2021 to start complying with the above provisions. In the fourth quarter of 2019, the FSC will publish an external circular that will define the methodology and parameters for the operational risk calculation.

Decree 1351/July 26, 2019 of the Ministry of the Treasury and Public Credit: securities market.

This modifies Decree 2555/2010 related to securities lending operations (SLO) performed in the over-the-counter market (OTC), the role of custodian as securities lending agent, electronic information disclosure on the securities market, among other provisions.

Through these amendments:

i. Carrying out SLO in the OTC was made possible through bilateral agreements between the parties. SLO must be registered, compensated, and settled by following the rules in force on the subject.
ii. PFM and insurance companies were allowed to use pension fund entitlements and technical reserves, respectively, for SLO in a centralized exchange or in the OTC.
iii. It was established that the limit indicated in Decree 2555/2010, article 2.36.3.3.2, item 4, shall not be applicable to stocks subject to the SLO carried out in the OTC. This limit indicates that the maximum allowable ratio between the number of shares

of a certain stock that has been subject to repurchase or repo transactions, sell/buy-backs, and SLO on behalf of third parties, and its floating shares is 6.5%.

iv. A general framework which regulates the conditions under which custodians may act as transfer agents in SLO on behalf of the portfolios held under custodianship was included.

v. Advisories associated with procedures and transactions in the securities market[50] were allowed to be made in widely circulated national electronic newspapers.

External Circular 019/ July 23, 2019 by the Office of the Financial Superintendent of Colombia (SFC): implementation of the net stable funding ratio (NSFR)

In order to complement the measurement and management of liquidity risk, the SFC issued instructions related to the application of the Net Stable Funding Ratio (NSFR), which must be calculated by CE, high-grade cooperative institutions, and special official institutions indicated in the CBCF, chapter VI, item 5.2.1, literal i).

This indicator seeks to ensure that intermediaries maintain a stable funding profile relative to the breakdown of their assets. The NSFR, in particular, is calculated as the ratio between the available stable funding (ASF) and the required stable funding (RSF). The ASF is defined as the portion of capital and liabilities that will remain with the institution for more than one year. An ASF factor is assigned to the carrying value of each element of funding that grants a greater weighting to those items that will remain on the balance sheet for a period of more than one year. The RSF is the amount of stable funding that it is required to hold given the liquidity characteristics and residual maturities of its assets and the contingent liquidity risk arising from its off-balance sheet exposures.

This indicator shall be applied based on the following classification of the institutions: For group 1,[51] the NSFR must always be equal to or greater than 100%; for group 2,[52] it must be always equal to or greater

50 These include the intended voluntary cancellation of listing listings on the Colombian stock exchange, notification of the Colombian stock exchange's decision to cancel the registration of a stock, the general meeting of shareholders, and notice of a public takeover bid.

51 Group 1 corresponds to banking institutions whose assets represent 2.0% or more of the total banking sector assets as of December 31 of the year immediately prior to the cut-off date.

52 Group 2 corresponds to the banking institutions whose assets represent less than 2.0% of the total banking sector assets as of 31 December of the year immediately prior to the calculation cut-off date: finance companies, investment banks, financial cooperatives and IOEs, if and only if these institutions have loan and leasing portfolios as a significant asset group.

than 80%; and for group 3,[53] the NSFR shall be for purely informative purposes. However, the transition period for compliance with the regulatory minimum for Group 1 and Group 2 institutions shall be governed by the following schedule (Table 4.2):[54]

Table 4.2
NSFR Application Transition Periods
(porcentaje)

Regulatory Minimum		As of:
Group 1	Group 2	
80	60	31 March 2020
90	70	31 March 2021
100	80	31 March 2022

Source: Office of the Financial Superintendent of Colombia.

The first transmission of information will be done with data as of 31 December 2019.

External Resolution 6 and 7/July 26, 2019 of the Board of Directors of *Banco de la República*: it modifies External Resolution 3/2000 with respect to mandatory investments in Agricultural Development Securities (TDA in Spanish), and rules were issued regarding operations for regulating liquidity in the economy and facilitating the normal functioning of the payments system.

The indexing of the TDA yields to the interbank reference rate (IRR) was authorized; therefore, at least 50% of the mandatory investment must be allocated in Class A TDA indexed to DTF or IRR, and the remaining 50% in Class B TDA indexed to DTF or IRR. In order to determine the mandatory amount of the investment in Class A and B TDA indexed at each rate, the breakdown of the rediscounted portfolio balance by index rate and type of producer at the end of the respective calendar quarter of calculation must be taken into account.

The yield on the TDA shall be determined based on the annual DTF rate in effect at the beginning week of the corresponding quarter or the nominal three-month IRR in effect at the beginning day of the corresponding quarter, and will be fixed for that period.

53 Group 3 corresponds to banking institutions whose assets represent less than 2.0% of the total banking sector assets as of 31 December of the year immediately prior to the cut-off date: finance companies, investment banks, financial cooperatives, and IOEs, if and only if these institutions have investments and derivative operations as a significant asset group.

54 For the cut-off dates prior to 31 March 2020, the indicator will be informative.

This resolution goes in force as of the date of its publication and shall be applicable starting from the third quarter of 2019.

In addition, Finagro is allowed access to (i) perform transitory monetary tightening operations through repurchase agreements (repo) and ii) intraday repo operations and their *overnight* automatic conversion.

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