

Banking Report 2021



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Banking Report

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Research Department (Depep – Coordinator)

(E-mail: reb.depep@bcb.gov.br);

Currency Management Department (Mecir);

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Banco Central do Brasil

SBS – Quadra 3 – Bloco B – Edifício-Sede – 2º subsolo

70074-900 Brasília – DF – Brazil

Contact us: <http://www.bcb.gov.br/?CONTACTUS>

Website: <http://www.bcb.gov.br/?ATENDIMENTO>



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Foreword

The Banking Report (REB) deals with a broad spectrum of issues related to the National Financial System (SFN) and the relations between institutions and their clients. This issue focuses on events occurring in 2021, presenting the main repercussions on the SFN of the second year of the Covid-19 pandemic, marked by the effects of the advance of vaccination, the resumption of economic activity, and the rise in interest rates.

The REB comprises seven chapters. Chapter 1 analyzes credit evolution in the SFN from different angles and presents the results of the Quarterly Credit Condition Survey (PTC) and projections for the credit market. Chapter 2 examines the composition and evolution of the financial system funding. Chapter 3 presents the breakdown of the Average Cost of Outstanding Loans (ICC) and its spread in terms of its determining factors: funding cost, delinquency, administrative expenses, taxes, the Credit Guarantor Fund (FGC), and ICC's financial margin. Chapter 4 deals with foreign exchange products offered by the SFN. Chapter 5 analyses the profitability –and its main drivers– of the financial institutions. Chapter 6 examines the evolution of concentration and competition indicators in the SFN, innovations in the industry, and the performance of the Banco Central do Brasil (BCB). Chapter 7 discloses actions taken in the context of the Agenda BC#.

Additionally, the REB brings a set of boxes focused on specific SFN themes. The boxes feature studies and research, describe and analyze the SFN, and address methodological issues.

Executive Summary

Credit in the National Financial System (SFN) grew strongly in 2021 for the second consecutive year, this time driven by the household segment, both in earmarked and non-earmarked credit lines.

The total balance of SFN loans and financing grew 16.3% in the year to BRL 4.7 trillion. The credit/GDP ratio remained stable at 53.9% by the end of 2021.

In the household segment, it should be initially highlighted the expansion of payroll-deducted credit and vehicle financing operations and, in the second half of the year, the sharp expansion of credit card and non-payroll-deducted personal credit operations. As interest rates dropped in 2020, real estate financing demand remained heated in the earmarked household credit portfolio. Rural credit also increased strongly, leveraged by high agricultural commodity prices and increased production costs, mainly of agricultural inputs, such as fertilizers.

The growth rate of the corporate credit balance slowed down in 2021 to nearly half of the 2020's value. Non-earmarked corporate loan operations (mostly discounting of trade bills and receivables and anticipation of credit card invoices) accelerated in March but earmarked credit stabilized and contributed to reduce the growth pace in this segment.

The balance of debts considering total credit to the non-financial sector totaled BRL 13.6 trillion (156.8% of GDP) in December 2021, an expansion of 13.9% in the year, against 16.8% in 2020. The sharpest expansions occurred in loans and financing (15.6%) and debt securities (14.4%). The balance of total credit granted to the general government corresponded to 43.8% of the total, up 10.9% in the year. The share of credit granted to non-financial corporations accounted for 34.7% of the total, up 14.3%. Household debts corresponded to 21.5% of the total, up 19.6% in the period.

The SFN credit granting grew 18.2% in 2021, the highest annual growth rate in the series that began in 2011. New household credit operations increased 22.7%, highlighting the 27.5% growth in credit card operations and the 1.6% drop in payroll-deducted credit. In the household segment, both earmarked real estate financing and rural credit showed a robust performance, with respective expansions of 45.2% and 42.0%. In the corporate segment, the 13.4% expansion in the volume of grants reflected a significant increase in the discounting of trade bills and receivables and in the anticipation of credit card invoices, coupled with a drop in working capital grants.

Regarding the corporate profile, similarly to 2020, it is noteworthy the significant expansion of credit to the segment of young companies with less than three years of foundation. As for the size of the companies, the credit portfolio of micro, small, and medium-sized enterprises grew 18.6%, while that of large enterprises grew 6.0%. The largest expansion was observed in micro enterprises (29.7%).

Although the banking credit delinquency rate of operations overdue for more than 90 days increased 0.2 p.p. over 2021, it remained close to the lowest value of the series reached in December 2020 (2.1%).

The new monetary policy stance, with a higher Selic rate as of March 2021, increased the cost of credit and moderately impacted spreads since the delinquency rate remained at historically low levels.

After reaching the historical minimum of the series by the end of 2020, the Cost of Outstanding Loans (ICC) indicator – the average cost of the entire financial system portfolio – increased 1.6 p.p. in 2021, reaching 18.3% p.a. in December. The ICC of non-earmarked operations reached 25.7%, being 15.5% for companies and 34.9% for households. However, it should be noted that the average ICC in 2021 was 0.85 p.p. lower than the 2020's average, in view of the monetary tightening cycle that took place throughout 2021.

All of the factors that compose the ICC, except the Taxes and Credit Guarantee Fund (FGC), contributed to the 0.85 p.p. drop in the ICC relative to 2020. The main factor underlying the ICC decline was the delinquency (-0.64 p.p.), followed by administrative expenses (-0.13 p.p.), financial margin (-0.07 p.p.), and funding cost (-0.03 p.p.). This fall in the delinquency share reflects, in addition to the various measures employed to reduce the effects of the pandemic, the economic recovery seen in 2021, with a GDP increase of 4.6%. Conversely, the component Taxes and FGC rose 0.03 p.p., mainly reflecting the increase in the Social Contribution on Net Income (CSLL) rate, from 20% to 25%, from July 1st, 2021, until December 31, 2021.

In 2021, the pace of expansion in the stock of the banking system funding (6.6%) was much lower than in 2020 (22%). It should be highlighted, among the instruments with growth, in absolute terms, are time deposits, and, with negative growth, savings deposits and financial bills.

Regarding the funding rate of financial institutions, an important component is the Interbank Deposit (DI) rate, which, in turn, is associated with the Selic rate. Due to the monetary tightening cycles, the DI rate rose strongly in 2021, following historical lows in 2020.

The average funding rate of the S1 segment remained around 100% of the DI rate. In the other segments, the average funding cost as a percentage of the DI rate declined. The downward trend of rates for the S4 segment, as a percentage of the DI, continued throughout the year, whereas it was concentrated in the first half of the year for the S2 and S3 segments.

Regarding the foreign exchange segment, the USD exchange rate increased 7.39% in 2021, with peaks of devaluation in the first and last quarters. When compared with a set of emerging countries' currencies, the BRL had a variation close to the average of these currencies, being surpassed in devaluation by the CLP (Chile), TRY (Türkiye), and ZAR (South Africa).

The ten largest institutions in the foreign exchange market – in terms of contracted volume – are banks, and they concentrate 79.0% in the primary market and 68.1% in the interbank market. Among other financial instruments, spot buying and selling operations with settlement terms of up to two business days accounted for 91.3% of the total value of the primary market and for 99.0% of the number of operations in 2021. The predominance of this type of settlement term arises from the characteristics of the underlying transactions related to the foreign exchange operations and their associated cash flows.

Futures transactions represented 8.7% of the total value of the primary market in 2021, showing a slight increase over the 2020 value, after two consecutive years of reduction. Grants of advances on exchange contracts for exports (Advances on Foreign Exchange Contracts – ACC and Advances on Foreign Exchange Delivered – ACE) increased 17.6% and represented 12.9% of the total exchange contracts for exports registered by the Ministry of Economy. The average term of the ACC and ACE contracts was 163 working days and their interest rates reduced relative to the previous year.

The banking system profitability continues to recover from the decline that occurred in 2020, returning to levels close to those seen before the pandemic. Loan loss provisions (LLP) expenses stabilized, and the level of provision coverage provides resilience to the system. Net income in 2021 was 49% higher than that recorded by the system in 2020 and 10% higher than that observed in 2019. Return on Equity (ROE) was 15%, which is close to pre-pandemic levels. The growth in interest margin, the reduction in LLP expenses, and the efficiency gains explain the improved results.

Credit margin was pressured by the significant monetary tightening that began in March 2021, which promoted a faster adjustment of the cost of funding relative to the return on credit and benefit the migration to a portfolio profile with a higher risk and expected return. Conversely, the higher interest rate environment resulted in new loans being granted at higher rates.

In 2021, service revenues grew 10%, driven by the improved economic activity. Despite rising inflation in 2021, banks managed to control cost increases, causing the 0.8 p.p. Increase in the Coverage Ratio of Administrative Expenses by Service Revenues. Also regarding cost control, reflecting the migration to digital service channels, the number of branches and employees in the banking system continued to fall in 2021.

However, the recovery in profitability was not homogeneous. The ROE of the “Complex” and “Regional and Public” banks, which have more diversified business models, showed the greatest recovery. Banks’ profitability in the “Credit” and “Other” segments did not fully recover.

The profitability of most banking systems in representative countries from different continents improved in 2021 when compared to 2020. Despite the improvement, half of the countries (including Brazil) did not exceed the level of ROE recorded in 2019, before the effects of the pandemic. The Brazilian banking system ROE was in the top half of the group of countries in 2021, lower than that recorded in such countries as Russia, Canada, and Mexico, but higher than that reported by Türkiye, the US, and Australia.

Measured by the Normalized Herfindahl-Hirschman Index (HHIn), the trend of decreasing concentration in the SFN between 2018 and 2020 continued in 2021, despite the evaluation of twelve mergers this past year. The reduction in concentration is observed in all accounting aggregates and, more intensely, in total deposits. Considering the references regarding the metrics used, the HHIn indicates low concentration regarding total assets and moderate concentration regarding total deposits and credit operations.

Regarding the degree of competition, Lerner index is used, in which a lower value indicates a higher degree of competition. This indicator is defined for each financial institution as the difference between the price and the marginal cost relative to the price charged by the institution when granting credit. In the first half of 2021, despite the decrease in marginal costs in the banking system, the reduction in prices was dominant, resulting in the continuing fall of the indicator, like in 2020. In the second half of the year, marginal costs and prices increased, but the effect of rising marginal costs offset the effect of falling prices, resulting in a further decrease in the Lerner index. The trajectory of marginal costs and prices in the period was mainly affected by the behavior of the Selic rate and the effects of the Covid-19 pandemic on the credit market and on the cost structure of the banks.

The Lerner index of the credit market in the credit union sector sector (b3) also maintained a sharp downward trajectory. In the second half of 2021 it reached less than half of the value of the corresponding period in 2019. The behavior in the non-banking sector active in the credit market (n1) was similar to that of the banking sector, with a reduction in 2021.

The Agenda BC# is a work agenda of the Banco Central do Brasil (BCB) that comprises strategic dimensions and actions based on the promotion of financial democratization. Through BC# Agenda, the BCB has been carrying out a wide range of reforms to expand access to financial products and services, extend the availability of cheaper credit to a more significant number of people and improve the transparency of SFN. Additionally, the Agenda BC# is focused on technological evolution to develop structural solutions for the SFN and facilitate the accountability of initiatives set for the short, medium, and long terms by the BCB.

The BC# Agenda has five dimensions: Inclusion, Competitiveness, Transparency, Education and Sustainability. In 2021, Agenda BC# comprised 52 initiatives (31% completed, 69% still in progress).

The approval of the new exchange and international capital law was the main initiative developed in the Inclusion dimension in 2021. This legislation has the purpose of modernizing, streamlining, and consolidating the current

legislation. Effective as of December 31, 2022, the law will consolidate more than 40 legal instruments that started to be published nearly one hundred years ago, with diffuse commands totaling more than four hundred articles. The new legislation is concise, comprising 29 articles and updated language, which will provide increased legal safety to encompassed issues.

Another relevant initiative in the Inclusion dimension was the improvement of the regulation for correspondents in the country. The key changes concerned the formal recognition of the possibility of the correspondent operate through an electronic platform and the improvement of the management of correspondents by which they are contracted. The previous regulation was based in a model of on-site operation, which was incompatible with innovations promoted by the Open Finance regulation.

The derivatives market also benefited from Inclusion initiatives. The possibilities of contracting derivatives abroad according to modalities regularly practiced on the international markets were expanded, thus allowing the enlargement of safeguarding instruments, including for direct investment liabilities and long-term financing, such as infrastructure projects.

In relation to credit unions, the BCB acted to simplify the process of financing lines for member services.

The main initiative in the Competitiveness dimension is the Pix progressive agenda. Pix is under continuous improvement to deliver increasingly broad, safe, and efficient service, fulfilling the population and business environment's needs, reaching a higher number of use modalities. Throughout 2021, several advances were implemented, among which are the integration of the institutions' apps with the contact list on smartphones to facilitate the identification of users within contact lists that have their phone numbers as a Pix key; Pix *Cobrança* (Pix Charge) which generates charges at a predefined due date and automatically computes fines, interest, discounts, or deductions, similarly to the *boleto* (banking payment slip); Pix *Saque* (Pix Cash out) and Pix *Troco* (Pix Change), which increase the efficiency of withdrawal services by reducing costs and improving supply and pricing conditions;

The Pix agenda also created the *Iniciador de Transação de Pagamento* (Payment Transaction Starter). This modality is aimed at financial or other institutions authorized to offer the starter service and that have the provision of financial services as their unique goal within the Pix framework. In addition to increase competitiveness, it makes the payment journey even more agile, strengthening the use of Pix, especially in the online commerce.

Another measure that stands out in the Competitiveness dimension is Open Finance, or open financial system, which allows the democratization of access to information about financial services through a secure and convenient environment for users. Open Banking is an important phase of Open Finance, because it allows the sharing of registration and financial information of customers of financial products and services, upon the consent of the interested parties, among the institutions regulated by the BCB. Moreover, it allows the contracting of financial services in an electronic environment of third parties and not only through the bank's app or homepage, in a safe, agile, and convenient way.

This dimension also comprises the 1st Cycle of the Regulatory Sandbox, in which the BCB selected 7 out of 52 registered projects. These new business models might be effectively implemented with the potential of modernizing the regulatory framework and develop new and better services to the SFN and SPB users.

Also, the guidelines for the potential development of the BRL in digital format were released.

In the Transparency dimension, an initiative to be highlighted was the revision and consolidation of normative acts under the BCB and National Monetary Council – CMN competence, in compliance with Decree 10,139, of November 28, 2019. Infra-legal regulation on rural credit and Proagro were streamlined, by reducing to less than half the amount of regulations.

The rules concerning household real estate operations and loans involving residential dwellings offered as collaterals were also improved.

It should be emphasized that, in 2021, the BCB released, for the first time, the Research Agenda 2021-2024, in compliance with the best international practices of central banks' research governance.

As for the Education dimension, an important initiative was the release of the second Financial Citizenship Report (RCF), which highlighted how the technological changes in the SFN, and the Covid-19 pandemic affects the financial life of the citizens.

The development of the Brazilian Financial Health Index (I-SFB/Febraban) is also noteworthy. This index was launched in July 2021 as a free access diagnostic tool that allows Brazilians to measure their own financial health over time and compare it to the Brazilian average. The index is also an essential tool for developing public financial education and inclusion policies as well as to design and offer adequate financial products to the citizens' needs.

The financial education platform "Meu Bolso em Dia" ("My wallet up to date") was made available in November 2021, also representing the technical cooperation between the BCB and the Febraban to promote financial education initiatives. Since its pilot phase, began in May 2021, until the end of the year, the platform registered 306 thousand distinct visitors.

Regarding the Sustainability dimension, the first edition of the BCB Report on Social, Environmental and Climate-related Risks and Opportunities (RIS) was released in September 2021. RIS aims to facilitate the integrated management of social, environmental, and climate risks together with other types of risk categories, contributing to discussions about this theme and accountability to the society.

The BCB established the Social, Environmental, and Climate Risks Document (DRSAC) with the goal of collecting, at financial institutions, information on the evaluation of social, environmental, and climate risks of their exposures, and their respective debtors. A wide mapping of these aspects associated with the SFN credit is expected, allowing to generate statistics and information about the evolution (time series and reports), in addition to consistency and comparative analyses.

Boxes summary

Box 1 – The role of national banks in the transmission of international capital flows to the domestic supply of corporate credit

This box presents a brief study of the response to international capital by banks in the country in terms of credit supply, and whether this effect is associated not only to foreign but also domestic banks. The results allow us to conclude that the inflow of international capital influences the supply of credit in the country and that domestic banks, including domestic public ones, also participate in this transmission.

Box 2 – Debt securities statistics

The purpose of this box is to present the statistics on debt securities which are now published by the BCB, following the international methodological standard, contributing to a broad and detailed view of the financing channels in the Brazilian economy and of the allocation of available resources in the various institutional sectors. The statistics cover public and private securities issued in the domestic market and abroad, which are included in the asset and liability positions of residents in the country. The data are presented with details of issuing and holding institutional sectors, maturity, classification by interest rate, reference currency, and issuing market (domestic or international). The use of international methodological standards in the compilation and publication facilitates integration with other sets of macroeconomic statistics and favors comparisons with other countries.

Box 3 – Effect of changing the credit card invoice layout

Credit cards were used by approximately 65 million citizens (almost 40% of the adult population) in 2021. Despite the convenience of a credit card as a means of payment, its use can be costly to the user. With average annual interest rates above 300%, revolving credit and installment payments are the most expensive types of credit in Brazil, and it is used mainly by people with incomes below two minimum wages. This box aims to present an experiment that investigated if different credit cards invoice layouts would improve the understanding of the product use conditions, potentially affecting payment decisions. The experiment was conducted online, with 3,022 participants that were randomly assigned to three groups (one control and two treatment groups). The treatment group prototypes tested the effect on participants' behavior of simplifying the language, reorganizing the information, and inserting highlights on invoices. The results were statistically significant and show that a more organized credit card bill with simplified language has the potential to lead consumers to better payment decisions. The treatment groups correctly answered an average of 2.1 to 2.3 more questions about the understanding of the invoice information, and the difference between control and treatment groups was even greater for respondents with a low educational level. When asked about payment decisions, treatment group respondents chose higher bill payment options that would lead to lower debt relative to control group respondents.

Box 4 – Issuance of sustainability-related bonds by Brazilian companies in the international and domestic markets

This box presents the evolution of Brazilian issuances of sustainable bonds, which grew significantly in the 2020-2021 period, in line with global issuances. Issuances in hard currency in the foreign market were predominant, with companies in the pulp and paper and food and beverage sectors standing out. Most of the issuances were non-investment grade. The securities most frequently issued were sustainability-linked bonds, unlike global issuances, in which green bonds predominated. Compared to conventional bonds, the cost (coupon) of sustainable bonds was lower in 2021, the year with the highest financial volume of issuances. Regarding sustainability-linked bond (SLB) issuances, all securities included step-up coupons as a penalty in case of failure to meet targets. The most frequent target was the reduction of greenhouse gases. Almost all issuances, in the domestic and foreign markets, were accompanied by second part opinion, a mechanism that contributes to lower risk of greenwashing.

Box 5 – Methodology update for the evaluation of competition in the SFN credit and services markets

In this report, the methodology for calculating the Lerner index for financial institutions has been updated. Improvements allow more robust calculations and more accurate analysis of the channels by which is established the market power of financial institutions, i.e., the prices and marginal costs channels. This box shows how such channels evolved for the credit and service markets in Brazil between 2015 and 2021, with emphasis on the pandemic period. During that period, the reduction in the Lerner index – which indicates increasing competition – occurred by both an increase in the marginal cost and a reduction of price in the first year of the pandemic, both contributing to reducing the indicator. This movement was widespread in the banking, credit union, and non-banking sector.

Box 6 – Covid-19 and local market power in credit markets

This box analyzes how the first year of the Covid-19 pandemic and digitalization affected the market power of Brazilian banks in local credit markets. It shows that Covid-19 reduced the market power of banks in locations most affected by the virus. This reduction was due to an increase in the marginal cost of banks in these locations, which occurred because banks could not adjust their costs quickly in response to the relative decline in lending. However, banks that invested more in Information Technology (IT) before the pandemic were able to better adjust their total local costs and expanded lending to customers in remote locations less affected by Covid-19, increasing their market power.

Box 7 – New competition dynamics in the SFN and the SPB

Box 7 contextualizes the significant transformations in the competitive landscape of the financial industry, resulting mainly from digitalization, the growth of e-commerce and the increased interest of fintechs focused on payment services, bigtechs and large retailers to enter or increase their scope of operations in the financial area. In contrast, the box highlights how incumbent institutions are reacting to the threats posed by these new entrants through changes in their strategies, business models, and new product and service offerings. Finally, it highlights the challenges faced by the regulator in accompanying this transformation process and adapting different business models within a single regulatory perimeter that respects the principle of neutrality and includes general rules on data privacy and cybersecurity, among others.

Box 8 – How Brazilians use TED and Pix

Pix achieved wide acceptance by Brazilians in a short period of time, promoting a process of inclusion in digital transfer services between different institutions. This box seeks to understand how the profile of users of the new instrument differs both from those who already made electronic transfers and those who still do not. There was a greater emphasis in this inclusion process for the Northern region and for the younger and lower income groups. At the same time as Pix started operating, there was a substantial expansion in the use of credit and the opening of accounts by the groups included.

Box 9 – Recent changes in the Brazilian rural credit

This box aims to present a brief overview of the evolution of rural credit, as well as the new compliance model adopted as of 2021, which is supported by new georeferencing technologies and by regulatory simplifications. The new System of Consultation and Authorization of Access to Rural Credit Operations (CACR), which allows rural producers greater transparency and ease of access to resources to finance their production, both inside and outside the financial system, is also highlighted.

Box 10 – Evaluation of the protective varnish on Brazilian real banknotes

Weather conditions and handling habits impregnate banknotes with dirt, increasing the speed of wear and tear and therefore leading to the need for replacement in a short period of time, generating costs. To protect banknotes from dirt and to extend their lifespan, many issuers applied a protective varnish. This study aimed to evaluate the efficacy of the protective varnish coat in the BRL 5.00 bills of the second family of the BRL, identifying possible differences regarding lifespan and wear and tear between varnished and unvarnished banknotes. Varnished BRL 5.00 bills and unvarnished BRL 10.00 bills were compared. Survival analysis showed that the varnish is a protective factor for the banknotes, reducing the hazard of wear and tear. However, the varnish protection loses efficiency over time and, after 24 months, there is no longer protective difference between varnished and unvarnished banknotes.

1.1 Credit aggregates

Credit in the National Financial System (SFN) registered strong growth in 2021 for the second consecutive year, this time driven by the household segment. With the progress of vaccination and the resumption of economic activity, there was a significant expansion in credit operations to households, both in earmarked and non-earmarked credit lines. As for companies, after the end of the emergency programs in early 2021, there was an increase in operations in the non-earmarked credit segment. Subsequently, earmarked credit was resumed with the return of the National Program of Support to Micro and Small Enterprises (Pronampe),² with great demand from those companies.

The change in monetary policy, with the increase in the Selic rate as of March 2021, increased the cost of credit, with a moderate impact on spreads since delinquency remained at historically low levels.

The balance of SFN's loans and financing grew 16.3% in 2021, compared with an expansion of 15.6% in 2020 (Table 1.1), amounting to BRL 4.7 trillion. The credit-to-GDP ratio stabilized, standing at 53.9% at the end of 2020.

Unlike in 2020, when the credit market grew driven by a more concentrated increase in loans to companies, the evolution of credit in 2021 reflected mainly the expansion of loans to individuals. Particularly noteworthy is the expansion of non-earmarked credit in this segment,

Table 1.1 – Credit evolution^{1/}

Discrimination	BRL billion			Variation (%)		
	2019	2020	2021	2019	2020	2021
Total	3,475.0	4,016.9	4,672.7	6.4	15.6	16.3
Non-earmarked resources	2,010.4	2,319.2	2,790.3	13.9	15.4	20.3
Companies	898.0	1,088.3	1,276.1	10.8	21.2	17.3
Households	1,112.4	1,230.9	1,514.1	16.5	10.7	23.0
Earmarked resources	1,464.6	1,697.7	1,882.4	-2.4	15.9	10.9
Companies	559.9	687.5	685.4	-14.0	22.8	-0.3
Households	904.7	1,010.1	1,197.0	6.6	11.7	18.5
Companies	1,458.0	1,775.9	1,961.5	-0.3	21.8	10.5
Households	2,017.0	2,241.1	2,711.1	11.9	11.1	21.0
	Share (%)			Variation (p.p.)		
Total/GDP	47.0	53.8	53.9	0.4	6.8	0.1

^{1/} Values refer to December of each year.

¹ The figures presented in this chapter, for the period 2019 to 2021, use the data available on August 19, 2022, unless otherwise stated.

² Law 14.161, of June 2, 2021, established Pronampe on a permanent basis. The resources destined to the program in 2021 made possible 334 thousand new credit operations between July and September, totaling BRL 25 billion.

initially with payroll-deducted credit³ and vehicle financing operations, and then, in the second half of the year, with intense growth in credit card and non-payroll-deducted personal credit operations.

The credit portfolio earmarked to households also presented a significant variation, driven by the reduction in interest rates in the previous year, which stimulated the demand for real estate financing. Rural credit also showed strong growth, leveraged by the level of agricultural commodity prices and by the increase in production costs, mainly of agricultural inputs, such as fertilizers.

The growth rate of the corporate credit balance slowed down in 2021, being approximately half of what it was in 2020. Expansion in 2020 was driven by credit borrowing for precautionary purposes and by emergency credit programs. Corporate non-earmarked credit borrowing accelerated in March 2021, mainly in short-term lines, such as the discounting of trade bills and receivables and anticipation of credit card invoices. Inflation was another factor that possibly contributed to the increase in the balance of these modalities by raising the nominal turnover of companies and generating a larger volume of receivables. At the same time, the precautionary credit contracted in March and April 2020 was being amortized, especially in the lines of working capital with a term of up to one year and export financing.

The end of the emergency credit programs in January 2021 and the return of financing repayments resulted in a change in the dynamics of earmarked credit, whose balance started to decrease in the first half of the year. The reactivation of Pronampe in mid-2021 generated BRL 25 billion in new credit operations and allowed the postponement of due and falling due installments for up to one year, which stabilized the balance of the earmarked credit portfolio, ending the year without any significant variation.

Thus, the household credit balance recorded an increase of 21.0% in 2021 (11.1% in 2020), with variations of 23.0% in non-earmarked credit (highlighting credit card operations) and 18.5% in earmarked credit (highlighting both rural credit and real estate financing). The corporate segment balance increased 10.5% (21.8% in 2020), reflecting the 17.3% growth in non-earmarked credit (highlighting discounting of trade bills and receivables,

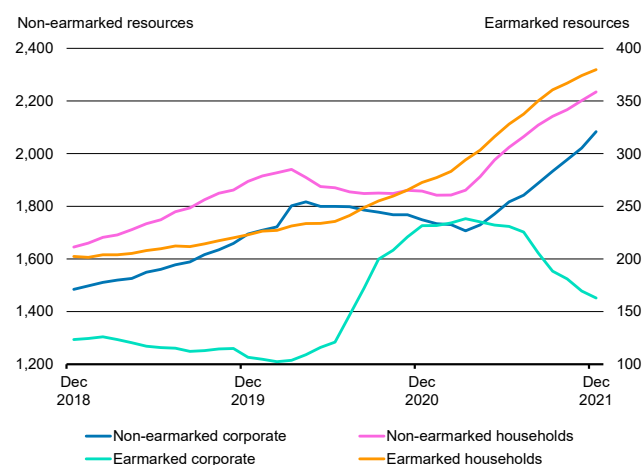
³ Law 14.131, of March 30, 2021, established a maximum borrowing bound percentage of 40% until the end of 2021 for public and private sector workers, as well as retirees and pensioners. This additional margin of 5% increased the debt capacity of people with access to payroll-deducted loans.

Table 1.2 – Broad credit evolution^{1/}

Discrimination	BRL billion			Variation (%)		
	2019	2020	2021	2019	2020	2021
Total	10,230	11,949	13,605	9.4	16.8	13.9
Government	4,541	5,372	5,957	9.7	18.3	10.9
Loans and financing	141	163	163	1.8	15.6	-0.1
Debt securities	3,684	4,354	4,815	10.7	18.2	10.6
External debt	716	854	979	6.4	19.2	14.6
Companies	3,476	4,127	4,718	7.8	18.8	14.3
Loans and financing	1,379	1,687	1,871	-0.3	22.3	10.9
Debt securities	752	747	1,028	38.5	-0.7	37.6
External debt	1,344	1,693	1,819	3.7	26.0	7.4
Households	2,213	2,451	2,931	11.2	10.7	19.6
Loans and financing	2,158	2,390	2,867	11.5	10.7	20.0
Securitization instruments	40	42	42	-1.1	3.9	-0.5
External debt	15	19	23	15.1	29.6	16.2
	Share (%)			Variation (p.p.)		
Total/GDP	138.5	160.0	156.8	4.9	21.6	-3.3
Credit to the government/GDP	61.5	71.9	68.6	2.4	10.5	-3.3
Credit to companies/GDP	47.0	55.3	54.4	1.0	8.2	-0.9
Credit to households/GDP	30.0	32.8	33.8	1.5	2.9	1.0

1/ Values refer to December of each year.

Figure 1.1 – Grants
Accumulated in 12 months – BRL billion



vehicle financing and advances on foreign exchange contracts). Earmarked credit decreased 0.3%, with the 3.9% drop in the balance of operations with the National Bank for Economic and Social Development (BNDES), offset by the 17.8% increase in the balance of rural credit and 2.2% increase in other earmarked credit (in which emergency programs are classified).

Considering the total credit to the non-financial sector⁴ (Table 1.2), the balance of debts totaled BRL 13.6 trillion (156.8% of GDP) in December 2021, up 13.9% in the year, against 16.8% in 2020. Loans and financing (15.6%) and debt securities (14.4%) presented a more accentuated growth. The balance of total credit granted to the general government corresponded to 43.8% of the total, up 10.9% in the year. The share of credit granted to non-financial companies accounted for 34.7% of the total, up 14.3%. Household debts corresponded to 21.5% of the total, up 19.6% in the period.

SFN credit granting grew 18.2% in 2021, the highest annual growth rate in the series that began in 2011. New household credit operations increased 22.7%, highlighting both non-earmarked (20.3%) and earmarked credit (39.3%) (Figure 1.1).

In non-earmarked credit, the highlight was the 27.5% growth in credit card grants and the 1.6% drop in payroll-deducted credit, the latter resulting from the decrease in operations with retirees (-17.9%), showing the effect of anticipating new credit contracts.⁵

In the earmarked credit to households, both real estate financing and rural credit showed robust performance, growing 45.2% and 42.0%, respectively.

In the corporate segment, credit grants increased 13.4% (9.9% in 2020), with a 19.1% expansion in non-earmarked credit and a 29.7% drop in earmarked credit. There was a significant increase in the discounting of trade bills and receivables and in the anticipation of credit card invoices, and a decrease in working capital. The drop in earmarked credit reflected the interruption in the flow of new emergency program operations, with the resumption

4 These statistics include, in addition to the balance of SFN credit operations, loans and financing granted by the other resident institutional sectors; the stocks of government and private securities and securitized instruments; and the loans and bond issuances whose creditors are non-residents.

5 The Provisional Measure 1,006, of 2020, authorized during 2020Q4 an additional 5% borrowing margin for the contracting of payroll-deducted loans by retirees and pensioners, which increased credit contracting by this public in that period.

Figure 1.2 – Interest rate with non-earmarked resources
% p.a.

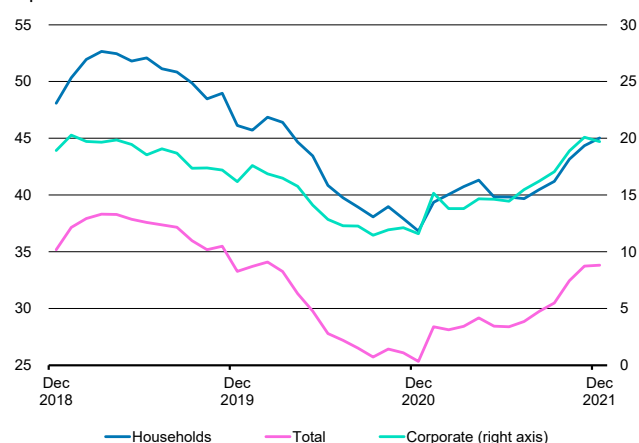


Table 1.3 – Average Cost of Outstanding Loans (ICC)^{1/}

Discrimination	% (p.a.)			Variation (p.p.)		
	2019	2020	2021	2019	2020	2021
Total	20.3	16.7	18.3	-0.1	-3.5	1.6
Non-earmarked resources	29.5	23.3	25.7	-1.7	-6.1	2.4
Companies	16.9	12.7	15.5	-2.2	-4.1	2.8
Households	40.6	33.5	34.9	-1.9	-7.1	1.4
Earmarked resources	8.6	8.2	8.2	-0.1	-0.4	-0.1
Companies	8.8	8.4	8.6	-0.2	-0.4	0.2
Households	8.5	8.2	7.9	-0.1	-0.4	-0.3
Companies	13.7	11.0	13.1	-0.7	-2.7	2.0
Households	25.2	21.5	22.3	-0.2	-3.8	0.8

1/ Values refer to December of each year.

of Pronampe operations in mid-2021 at a lower amount than in 2020, and the decline in BNDES grants.

The average interest rate on new credit operations increased 6.0 p.p. in 2021, reaching 24.3% p.a. in December, in line with the upward trend of the Selic rate.⁶ The average interest rate for non-earmarked credit closed the year at 33.8% p.a., a 8.5 p.p. increase in the period (Figure 1.2). The average rate of non-earmarked new operations with households reached 45.0% p.a. in December, increasing 8.2 p.p. in twelve months. The interest rate in the corporate non-earmarked segment reached 19.7% p.a. in December, increasing 8.1 p.p. in the year.

After reaching the historical minimum of the series by the end of 2020, the Average Cost of Outstanding Loans (ICC) – the average cost of the entire portfolio of the financial system – advanced 1.6 p.p. in 2021, registering 18.3% p.a. in December (Table 1.3). The ICC of non-earmarked operations reached 25.7% p.a., increasing 2.4 p.p. against the end of 2020. The ICC of non-earmarked corporate operations increased 2.8 p.p. to 15.5% p.a. in December, whereas household non-earmarked operations reached 34.9% p.a., increasing 1.4 p.p. in 12 months.

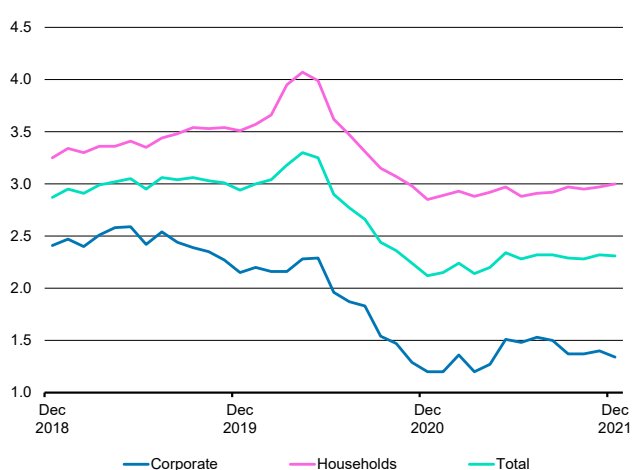
The banking credit delinquency rate of operations overdue for more than 90 days increased 0.2 p.p. over 2021, to 2.3% in December (Figure 1.3), after reaching the lowest value of the series in December 2020 (2.1%). The delinquency rate in the corporate portfolio increased 0.1 p.p., to 1.3%, and 0.2 p.p., to 3.0%, in the household portfolio.

1.2 Characteristics of loan operations and borrowers

Household credit by state⁷

The 21% expansion of household credit in 2021, referred to in the previous section, occurred with varying intensities among the geographic regions and states (UFs) (Figure 1.4 and Table A in Appendix B). The states that presented the highest growth in household credit in 2021 were mainly

Figure 1.3 – Delinquency rate
%



6 As of March 2021, the Monetary Policy Committee (Copom) adopted a tighter monetary policy to combat rising inflation, continuously elevating the Selic rate target per annum, which rose from 2% to 9.25% in December 2021.

7 Data presented here may differ from other BCB publications due to methodological differences in the construction of the series; however, it is noteworthy that the results of the analyses in this section are robust to such differences in those series.

Figure 1.4 – Variation in the balance of household credit operations by region



Figure 1.1 – Household credit density by state (BRL thousand)

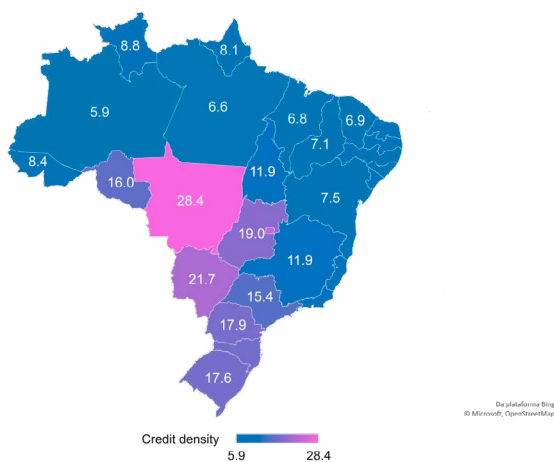
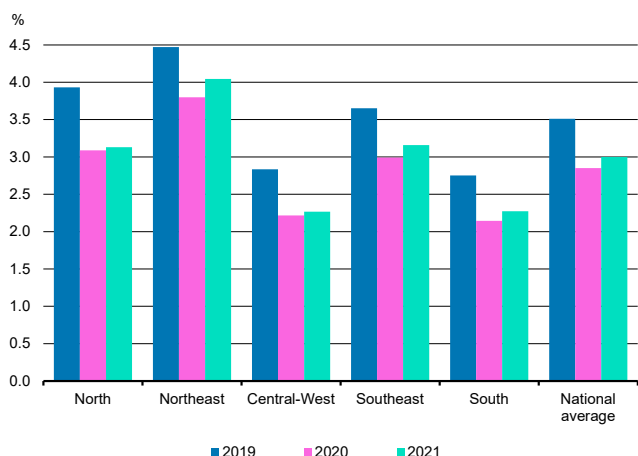


Figure 1.5 – Delinquency of household credit operations by region



located in the Northern Region, especially Tocantins (32.5%), Rondônia (32.1%), and Pará (31.6%).⁸

The state of São Paulo continued to present the highest balance of household credit operations, while the states of Roraima, Amapá, and Acre had the lowest one (Table A in Annex B). However, in terms of population size, the Central-western states are those with the highest densities of credit per inhabitant,⁹ followed by the Southern states (Figure 1.1 and Table B in Annex B). The states of Amazonas and Pará exhibited the lowest credit densities,

From 2020 to 2021, delinquency rates increased slightly,¹⁰ most noticeable in the Northeastern, Southeastern, and Southern regions (Figure 1.5). However, in all states but Rio de Janeiro, the rates were still well below those prevailing at the end of 2019. The Northeastern region, which already had the highest level of household delinquency rates in the country, showed the biggest increase (0.25 p.p.). Rio de Janeiro and Pernambuco were the states with the highest delinquency rates in 2021 (Figure 1.2 and Appendix B, Table C),

Household credit by gender

Similar to 2020, the year in which a pattern of behavior of previous years was reversed, credit for women showed slightly lower growth than that for men in 2021 (Table 1.4). Women’s share of the total credit balance remained at 38% in 2021. The small differential in women’s versus men’s delinquency in 2020 increased slightly in 2021, although delinquency rates remain very close to each other (Table 1.5).

Household credit by age groups

The 24-and-under age group, which had experienced the largest slowdown in credit growth in 2020, recovered substantially and was by far the most vigorous growth group in 2021, reversing the pattern of previous years (Table 1.6). The 60 and older age group, in turn, the most vigorous in 2019 and 2020, showed the lowest relative growth in 2021. The two youngest age groups showed an increase in delinquency in 2021, although rates were still at

⁸ Tables A and B of Annex B show data relative to household credit by state – total and normalized by the population size.

⁹ Mostly reflecting the role of rural credit.

¹⁰ Possibly influenced by the reduction in renegotiations. See the October 2021 Financial Stability Report, available at <https://www.bcb.gov.br/en/publications/financialstabilityreport/202110>.

Figure 1.2 – Delinquency rate of household credit operations by state (%)

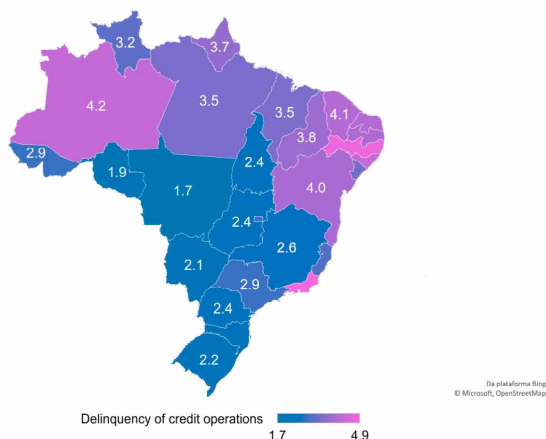


Table 1.4 – Evolution of credit balance for household by gender^{1/}

Gender	BRL billion					
	2019	2020	2021	Variation (%)		
				2019	2020	2021
Total	2,017	2,241	2,711	11.9	11.1	21.0
Men	1,242	1,387	1,682	11.0	11.7	21.2
Women	775	854	1,029	13.4	10.2	20.6

1/ Values refer to December of each year. Not identified genders are not considered.

Table 1.5 – Households delinquency by gender^{1/}

Gender	%		
	2019	2020	2021
Total	3.5	2.9	3.0
Men	3.5	2.8	2.9
Women	3.5	2.9	3.1

1/ Values refer to December of each year.

Table 1.6 – Evolution of credit balance for household by age group^{1/}

Age group	BRL billion					
	2019	2020	2021	Variation (%)		
				2019	2020	2021
Total	2,017	2,242	2,711	11.9	11.2	20.9
24-and-under	49	51	70	11.8	4.4	37.3
From 25 to 39	642	700	844	9.8	9.0	20.7
From 40 to 59	885	994	1,211	12.4	12.3	21.8
60-and-older	442	498	587	13.9	12.7	17.9

1/ Values refer to December of each year.

lower levels than in 2019. The increase in the 24-and-under age group partly offset the large reduction that occurred from 2019 to 2020 (Table 1.7). Delinquency rates of the two oldest age groups remained relatively stable in 2021.

Corporate credit by state

Total corporate credit expanded in 2021, with different intensities among the geographic regions in Brazil, ranging between 7.6% and 22.1% (Figure 1.6). The corporate delinquency rate remained relatively stable, around 1.2%, in the Central-western, Southeastern, and Southern regions (Figure 1.7). In the North and Northeast regions, the rate increased, reaching around 1.9%.

Corporate credit by enterprise age

In terms of the enterprise age, in 2021, a significant expansion of credit to enterprises less than three years age stands out, repeating what had happened in 2020 (Table 1.8). Credit growth was also significant in the four- to five-year old range, suggesting that part of the companies that took out credit in 2020 (in the immediately lower range) continued to receive new credit in 2021. In turn, the delinquency rate of these younger enterprises increased in 2021 (Table 1.9).

Corporate credit by activity sector

In 2021, the growth rate of all economic sectors decreased, and in the case of extractive industries, the rate was negative (Table 1.10). Noteworthy are the above average growths (10.5%) in credit in the following sectors, Agriculture, Livestock, Forestry, Fishing and Aquaculture (19.9%); Trade, Motor Vehicles and Motorcycles Repair (21.2%), and Other Services (15.2%). The decline of credit to the extractive industries in 2021 reflects the lower need for credit due to the high prices of commodities.

The delinquency rate varied differently among the sectors in 2021. The rate dropped in the Agriculture and Livestock, Manufacturing, Construction, and Public Utilities sectors and increased slightly in the Commerce, Transportation, and Other Services sectors (Table 1.11). There was a significant increase in delinquency rate in the Extractive Industries sector.¹¹

¹¹ The increase of the delinquency rate in the Extractive Industries does not reflect the general situation in this sector.

Table 1.7 – Delinquency rate evolution by age group^{1/}

Age group	%		
	2019	2020	2021
Total	3.5	2.9	3.0
24-and-under	8.4	5.9	6.9
From 25 to 39	3.9	3.0	3.4
From 40 to 59	3.2	2.6	2.5
60-and-older	3.1	2.9	2.9

1/ Values refer to December of each year.

Figure 1.6 – Variation in the balance of corporate credit operations by region

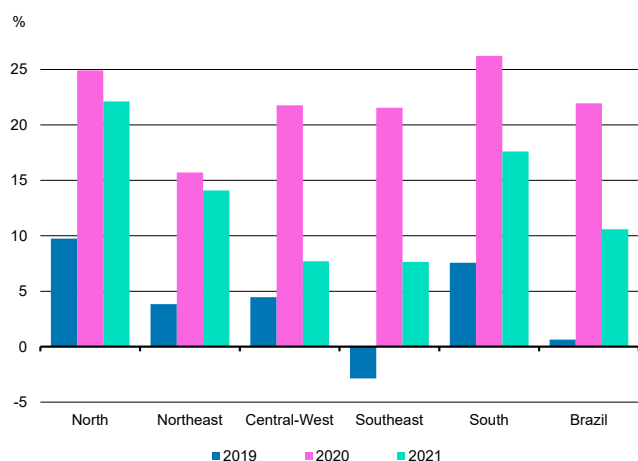


Figure 1.7 – Delinquency of corporate credit operations by region

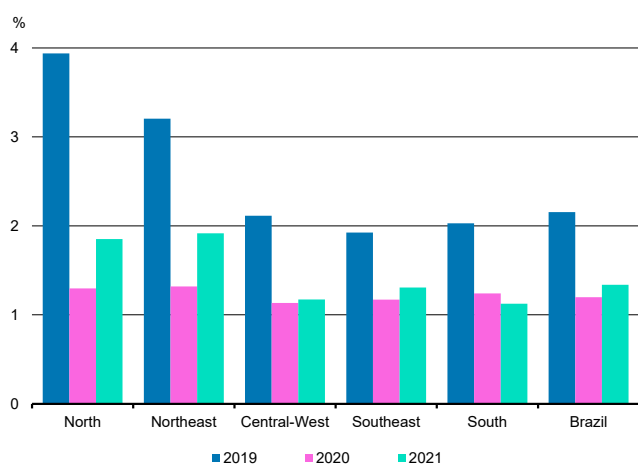


Table 1.8 – Corporate credit balance by enterprise age^{1/}

Enterprise age	BRL billion			Variation (%)		
	2019	2020	2021	2019	2020	2021
Total	1,458	1,776	1,962	-0.3	21.8	10.5
Up to one year	17	24	30	35.3	37.6	25.4
From 2 to 3 years	41	65	86	9.0	58.8	32.7
From 4 to 5 years	72	75	89	0.3	3.4	19.3
From 6 to 7 years	80	95	99	1.8	18.7	3.7
From 8 to 9 years	113	93	109	5.8	-17.2	17.1
Ten or more years	1,134	1,423	1,548	-1.7	25.5	8.7
Unidentified	0	0	0	-18.6	18.1	-26.0

1/ Values refer to December of each year

Corporate credit by enterprise size

This subsection analyzes the corporate credit balance and granting in 2021¹² according to enterprise size.¹³ Sizes are categorized as follows: (a) micro enterprise; (b) small enterprise; (c) medium enterprise; and (d) large enterprise. The methodology for measuring the enterprise size has changed since the 2020 Banking Report. As such, the data presented for each category in the current edition relative to years prior to 2021 may differ from the data presented in past publications.¹⁴

All four categories present nominal increase in credit balances in 2021 (Table 1.12). Credit balance variation, however, was lower than the variation observed in 2020, partly due to credit incentive programs that emerged during the pandemic that year, mainly for micro and small enterprises. Overall, the credit portfolio of micro, small and medium-sized enterprises (MSME) grew 18.6%, while that of large enterprises grew 6.0%. The biggest growth was in micro enterprises (29.7%).

The large enterprises maintained the biggest share of the total balance of the credit portfolio in 2021 (57.2%), but with a decline in recent years. The share of micro and small enterprises (MSE) increased from 14.5% of the total portfolio in 2019 to 18.9% in 2021 (Figure 1.8).

12 These data may differ from other BCB publications since they include operations transferred to institutions that are not part of the SFN and do not include credits generated abroad.

13 Enterprise size categories follow the criteria established by Complementary Law 123, of December 14, 2006: microenterprise is one whose annual gross revenue is equal to or less than BRL 360,000.00; small enterprise is one whose annual gross revenue is greater than BRL 360,000.00 and equal to or less than BRL 3,600,000.00; medium enterprise is one whose annual gross revenue is greater than BRL 3,600,000.00 and equal to or less than BRL 300,000,000.00, provided its total assets do not exceed BRL 240,000,000.00. large enterprise is one whose gross annual revenue is greater than BRL 300,000,000.00 or whose total assets are greater BRL 240,000,000.00, as established in Article 3, sole paragraph, of Law 11,638, of December 28, 2007.

14 The methodology for measuring the size of companies is described in the Concepts and Methodologies section of the Financial Stability Report, volume 20, number 2, October 2021, available at <https://www.bcb.gov.br/publicacoes/ref/202110>. <https://www.bcb.gov.br/en/publications/financialstabilityreport/202110>. Size is defined by an internal algorithm, which considers three sources of information: i) the label of micro and small enterprises in the Brazilian Federal Revenue Secretariat's register of legal entities; ii) the mode of size reported by financial institutions to SCR (in case of a tie, the size reported by the financial institution in which the borrower has the largest debt is considered); and iii) external funding value rates (bank credit, debentures, commercial notes, and internalized foreign debt) to delimit the size brackets. Criteria (i) and (ii) consider the annual gross revenue criteria of Complementary Law 123, of 2006, and of Complementary Law 11.638, of 2007. Criterion (iii) is used to classify enterprises that do not have a labeled size according to criterion (i) or that do not have size information according to criterion (ii). The previous methodology used only the mode, i.e. the size reported most often, informed to the BCB by financial institutions through the BCB's Credit System.

Table 1.9 – Corporate delinquency by enterprise age^{1/}

Enterprise age	2019	2020	2021	Variation (p.p.)			%
				2019 2020 2021			
				2019	2020	2021	
Total	2.2	1.2	1.3	-0.3	-1.0	0.1	
Up to one year	3.2	1.9	3.1	1.5	-1.3	1.3	
From 2 to 3 years	3.2	2.0	3.2	0.8	-1.2	1.2	
From 4 to 5 years	2.4	1.8	3.0	-0.5	-0.6	1.2	
From 6 to 7 years	2.5	1.9	2.2	-1.9	-0.5	0.3	
From 8 to 9 years	3.3	2.1	1.8	0.2	-1.2	-0.3	
Ten or more years	1.9	1.0	1.0	-0.2	-0.9	0.0	
Unidentified	0.0	0.0	0.0	0.0	0.0	0.0	

1/ Values refer to December of each year

In turn, the increase in credit granting to large enterprises stands out,¹⁵ with a 26.4% growth of 2021, higher than that seen in the two previous years (Table 1.13). The increase of credit granting to MSE was 5.5% in 2021, showing a downward trend in recent years (13.4% increase in 2020 and 18.1% in 2019).

Table 1.10 – Balance of corporate credit operations by activity sector^{1/}

Discrimination	BRL billion			Variation (%)			
	2019	#	2020	2021	2019	2020	2021
	Total	1,458		1,776	1,962	-0.3	21.8
Agriculture, livestock, forestry, fishing, and aquaculture	27		33	40	-2.1	22.9	19.9
Extractive industries	15		17	15	-13.7	9.2	-10.8
Manufacturing	358		436	455	-8.5	21.8	4.3
Construction	67		78	85	-11.2	15.9	9.3
SIUP - Public utility industrial services	182		209	218	-5.5	14.5	4.3
Trade and repair of motor vehicles and motorcycles	319		410	497	11.0	28.5	21.2
Transport, warehousing, and mail	139		170	183	9.2	22.1	7.9
Public administration, defense, and social security	141		163	165	1.8	15.6	1.5
Other services	198		263	303	9.2	32.6	15.2
Foreign-based or non-classified companies	10		0	0			

1/ Values refer to December of each year

Table 1.11 – Corporate delinquency rate by activity sector^{1/}

Discrimination	2019	2020	2021	Variation (p.p.)			%
				2019 2020 2021			
				2019	2020	2021	
Total	2.2	1.2	1.3	-0.3	-1.0	0.1	
Agriculture, livestock, forestry, fishing, and aquaculture	3.7	1.3	0.8	1.1	-2.4	-0.5	
Extractive industries	0.7	0.2	10.2	-0.4	-0.5	10.0	
Manufacturing	2.4	0.8	0.7	0.3	-1.6	-0.1	
Construction	6.6	3.7	2.9	-0.4	-2.9	-0.8	
SIUP - Public utility industrial services	0.1	0.5	0.1	-0.2	0.4	-0.4	
Trade and repair of motor vehicles and motorcycles	2.5	1.6	1.8	-0.5	-0.9	0.2	
Transport, warehousing, and mail	1.5	0.9	1.4	0.0	-0.6	0.5	
Public administration, defense, and social security	0.3	0.0	0.0	0.2	-0.3	0.0	
Other services	2.5	1.7	2.0	-1.3	-0.8	0.3	
Foreign-based or non-classified companies	3.8	1.0	1.6	2.4	-2.8	0.7	

1/ Values refer to December of each year

15 It is worth noting that the higher growth in credit granting to large enterprises is compatible with the respective reduction in the share of the credit portfolio in the SFN, because the balance of ended operations may exceed the amount granted in the same period. This can be seen by the greater share of short-term credits in the portfolio of large enterprises (27%) compared to medium-sized (19%) and micro and small enterprises (12%).

Table 1.12 – Corporate credit portfolio by enterprise size^{1/}

Discrimination	BRL billion					
	2019	2020	2021	Variation (%)		
				2019	2020	2021
Large	912.5	1,065.9	1,130.1	-4.1	16.8	6.0
Mid-size	336.6	409.5	472.8	1.7	21.6	15.5
Small	97.6	139.9	160.5	14.0	43.2	14.7
Micro	113.8	164.0	212.7	20.9	44.1	29.7
Total	1,460.5	1,779.2	1,976.1	-0.1	21.8	11.1

1/ Values refer to December of each year.

Figure 1.8 – Percentage of the SFN's corporate credit portfolio by company size

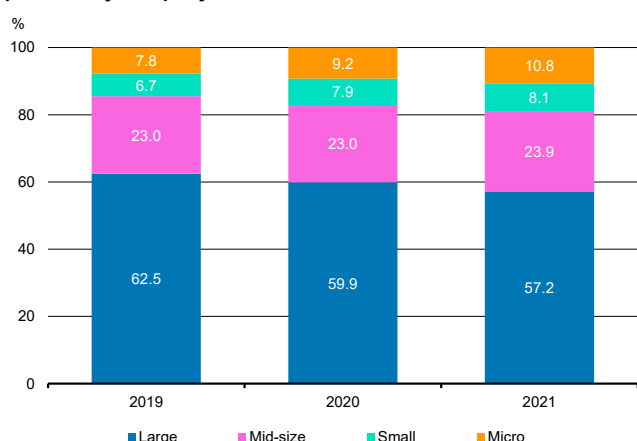
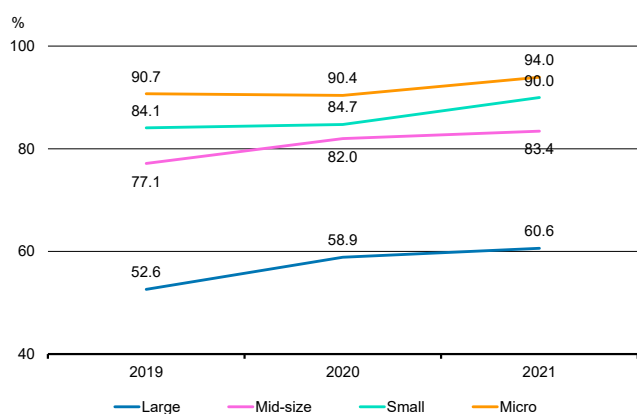


Table 1.13 – Corporate credit granting by enterprise size

Discrimination	BRL billion					
	2019	2020	2021	Variation (%)		
				2019	2020	2021
Large	860.5	992.2	1,254.2	10.7	15.3	26.4
Mid-size	548.2	559.5	575.1	10.1	2.1	2.8
Small	176.5	197.5	200.6	14.6	11.9	1.6
Micro	217.3	249.0	270.4	21.2	14.6	8.6
Total	1,802.5	1,998.2	2,300.3	12.1	10.9	15.1

Figure 1.9 – Percentage of the balance of the credit portfolio derived from non-earmarked resources, by size



The share of non-earmarked resources in the corporate credit balance expanded in all categories in 2021 (Figure 1.9). As for large enterprises, which until 2018 concentrated most of their portfolios in earmarked credit, the balance coming from non-earmarked credit operations accounted for 60.6% of the total in 2021. For micro and small enterprises, the percentage of non-earmarked credit operations exceeded 90% of the total balance. The expansion of these in the corporate portfolio can be attributed to the growth of working capital and accounts receivables financing.

In the micro and small enterprise segments, working capital and accounts receivables financing loans amounted to 63.0% of the credit portfolio in 2021 (Figure 1.10). For medium-sized enterprises, loans types amounted to 58.5% of the portfolio and, for large enterprises, 31.1% of the credit balance. Large enterprises ended 2021 with 43.5% of the portfolio in credit operations aimed at infrastructure, projects, or investments and 17.3% of the portfolio allocated to foreign trade operations.

In relation to the maturity of the operations, the large enterprises reduced the participation of long-term exposures (over twelve months), which went from 76% to 73% of the portfolio balance in 2021 (Table 1.14). The share of micro and small enterprises in the long-term credit also reduced in 2021, from 90% to 88%, unlike what happened in 2020.

In 2021, the delinquency rate decreased slightly for large and medium enterprises compared to 2020 (Figure 1.11). For large enterprises, delinquency fell from 0.6% to 0.4% of the portfolio, and for medium-sized enterprises, from 1.4% to 1.2%. Conversely, the delinquency rate increased in the period for micro and small enterprises. For small enterprises, delinquency rose from 2.4% to 3.3% of the portfolio, and in micro enterprises, they increased from 3.9% to 5.3%. However, it is worth noting that in all buckets of corporate size, delinquency rates in 2021 were lower than in 2019. This comparison gains relevance considering the fact that 2020 was atypical, both because of the broad process of renegotiations made more flexible by the BCB,¹⁶ and because of the other measures to face the pandemic, such as an increase in granting to micro and small enterprises and a lengthening of the average portfolio maturity.

16 Resolution 4,803, of April 9, 2020, allowed the reclassification of renegotiated operations to the level before the pandemic during that year.

Figure 1.10 – Share of credit modalities in the portfolio balance – 2021

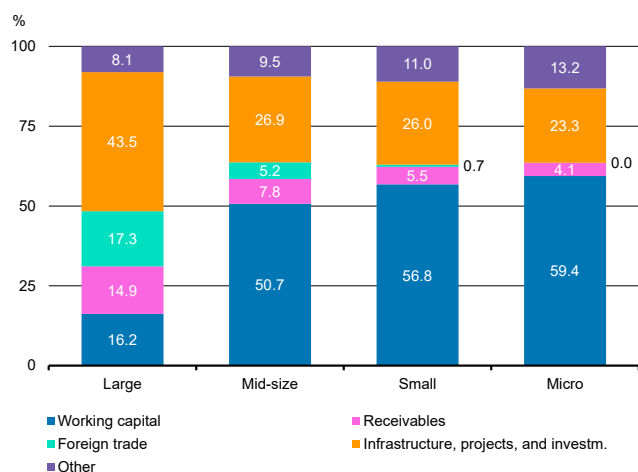
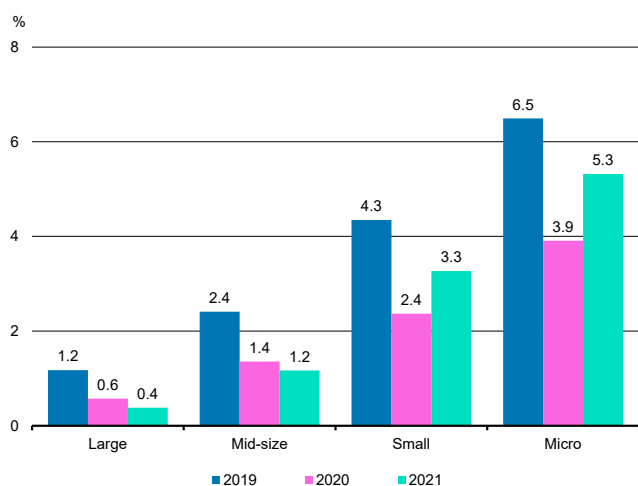


Table 1.14 – Portfolio share of large enterprise and MSE by maturity^{1/}

Maturity	2019	2020	2021	Δ
Large enterprise				
Short-term	23	24	27	
Long-term	77	76	73	
Micro and small (MSE)				
Short-term	18	10	12	
Long-term	82	90	88	

^{1/} Values refer to December of each year.

Figure 1.11 – Corporate delinquency by size



Thus, it is possible to conclude that the 2021 slowdown of the measures promoted to face the pandemic brought impacts to the segment of micro and small enterprises. Despite the nominal increase in the stock of credit, there was a relevant decrease in the share of corporate credit granting to micro and small enterprises, a shortening of the average portfolio maturity and an increase in the delinquency rate for these enterprises.

1.3 Credit portability

After reducing in 2020, credit portability grew again compared to the previous year, without surpassing, however, the maximum level of the series reached in 2019 (Figure 1.12).¹⁷ In 2021, a total of 4.42 million requests were made (up 19.6% over 2020), corresponding to BRL 49.3 billion in ported (effectively transferred) balance (up 14.7%). The joint rate of ported operations and renegotiations with the original creditor (operations retained) fell slightly, standing at 57.5% of total requests (Figure 1.13).¹⁸

Payroll-deducted credit remained the most prevalent type of portable loans in 2021, moving BRL 41.0 billion (Table 1.15), a significant value in the payroll-deducted credit market. By way of comparison, the value of portability was equivalent to 17.7% of the payroll-deducted credit grants in the same period.¹⁹

Having been in a continuous downward trend since the beginning of 2017, the average interest rates charged for new INSS payroll-deducted credit grants (which represent, on average, 75% of ported contracts) was

¹⁷ The amounts and values presented are based on the data from the Credit Transfer Center (CIP CTC) and refer to the order groupings, a method that groups the contracts according to the date of the request.

¹⁸ The portability market involves, in addition to the customer, two actors: the original lender – the institution that granted the original credit; and the proposer – the institution that will receive the ported contract. Frequently, a financial intermediary is also involved. Generally, portability requests can be classified into one of the following four situations: effected (the order is executed and the contract is transferred from the original lender to the proposer); canceled (at the request of the customer or, usually, at the proposer discretion – depending, for example, on the credit policy); retained (when the process stops at the request of the original lender, due to data inconsistency or renegotiation of the terms of the contract); and pending (request awaiting action; if the request is not completed or retained by the lender or canceled by the proponent, it will be canceled by the register institution). Since the retention due to renegotiation implies better contract conditions for the customer, the overall effectiveness of this instrument is considered to be the total of ported and renegotiated requests.

¹⁹ According to the Time Series 20671 – Non-earmarked new operations – Households – Payroll-deducted personal loans – Total – the value granted in 2021 in this credit facility totaled BRL 231.2 billion. Portability values are not part of the calculation basis of the grants.

Figure 1.12 – Portability requests
By status (accumulated in the year)

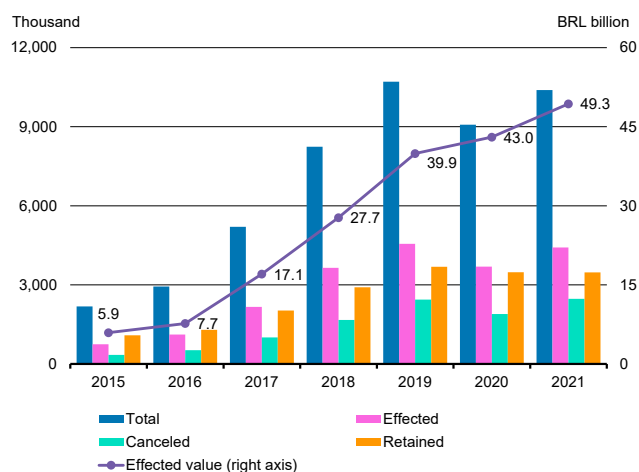


Figure 1.13 – Portability status
Evolution of participation by status

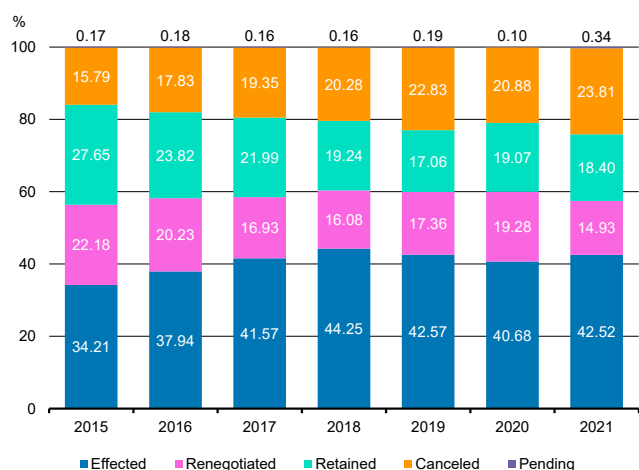


Table 1.15 – Portability by credit type

Discrimination	BRL million		Share (%)	
	2020	2021	2020	2021
Payroll-deducted	36,064.06	40,995.20	83.8	83.1
Real state	6,767.56	7,021.23	15.7	14.2
Home equity	45.08	55.44	0.1	0.1
Real estate development	0.42	0.85	0.0	0.0
Real state SFI	2,091.54	1,662.73	4.9	3.4
Real state SFH	4,630.52	5,302.21	10.8	10.7
Personal	74.01	1,140.55	0.2	2.3
Vehicles	106.17	183.82	0.2	0.4
Total	43,014.49	49,340.79	100.0	100.0

relatively stable for most of 2021. However, following the increase in the legal limit from 1.80% p.m. to 2.14% p.m. established by INSS Normative Instruction 125, of December 9, 2021, the average interest rates increased significantly in December (Figure 1.14). These factors, associated with the reduction in the INSS payroll-deductible limit from 40% to 35%, produced a sharp drop in the number of applications in the last month of 2021 (Figure 1.15).

The portability of real estate loans in 2021 was influenced by the variation in the Selic rate (Figure 1.16), as it was in 2020. The reduction in interest rates to historically low levels in 2020 highlighted the importance of the portability instrument for real estate loans, resulting in a significant growth in the number of requests and amount ported that year.

In 2021, portability requests remained at high levels until the beginning of the second half of the year, despite the higher volatility observed. The sequential hikes in the Selic rate resulted in the total reversal of the upward movement. The year ended with significant drops in requests, which returned to pre-pandemic levels.

This drop in portability requests also reversed the trend of real estate gaining share over payroll-deducted in the total portability, which had dominated all of 2020 (Figure 1.17). Still, about 80 thousand requests occurred in 2021 (up 17.1% over 2020). Over 25,000 contracts were effectively transferred (up 18.9%) and totaled BRL 7.02 billion in ported value (up 3.7%).

1.4 Quarterly credit conditions survey

The Quarterly Survey on Credit Conditions (PTC) collects the financial institutions' assessments on the banking credit conditions in four segments. Corporate credit is broken down in two parts, credit to large enterprises and to MSME. Household credit is split into consumption and real estate financing.

For each segment, respondents assess the change patterns of supply of and demand for credit lines observed in the last three months and the outlook for the following three months in. The assessment is made by indicating, on a five-level scale, the direction and intensity of the

Figure 1.14 – INSS payroll-deducted credit rates
Market rates vs legal limit

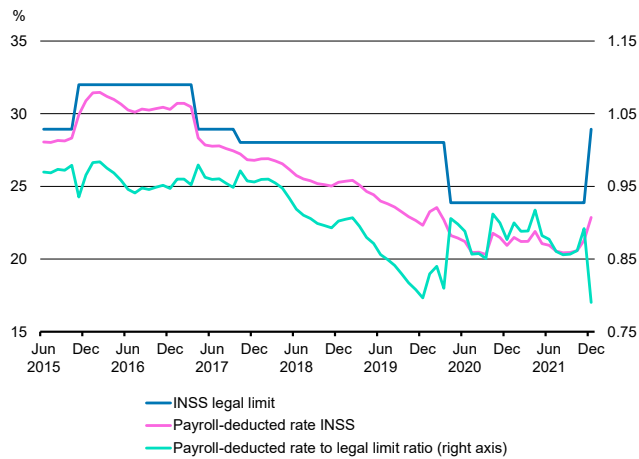


Figure 1.15 – Interest rates and portability
Jun 2015 = 100

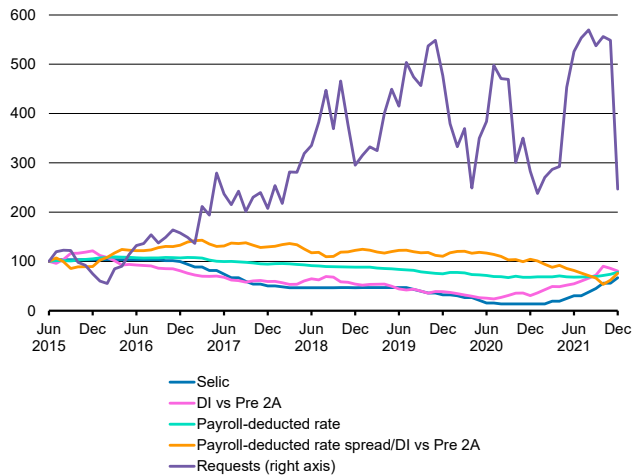
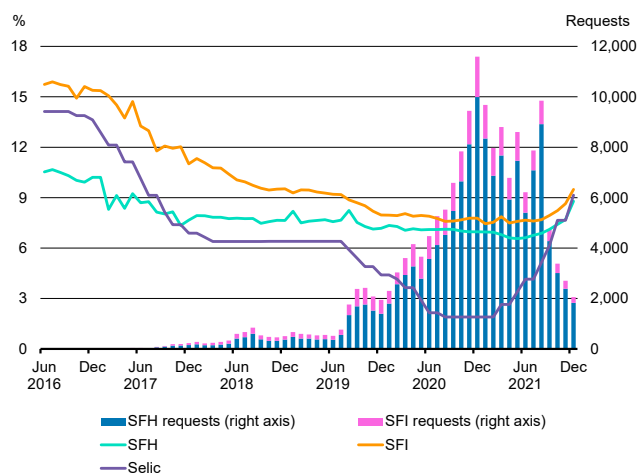


Figure 1.16 – Portability in the real estate market
Requests vs rates



observed or expected changes.²⁰ Respondents also assess a set of factors that affect supply and demand conditions. They assign each factor a score for its importance and indicate, on a five-level scale, the positive or negative effect on supply and demand conditions, considering the last three months and the outlook for the following three months.²¹ The ratings are converted into values between -2 and +2, and averages among respondents are calculated for each rated item. The graphs in this section show the evolution of these averages for the assessments referring to what was observed in the past three months, from 2019 to 2021.

Determining factors for the credit supply behavior

Figure 1.18 shows the assessments of quarterly changes in credit supply conditions from 2019 to 2021 in the four segments analyzed. The positive values correspond to more flexible approval standards, and the negative values to more restrictive ones. The assessments show that 2021 ended in relative stability after a period of intense variations due to the economic effects of the pandemic and the measures to mitigate the crisis in the previous year. The corporate segments had little variation over 2021, ending the year in relatively neutral conditions. Credit for households – which presented greater flexibility at the beginning of 2021 or at the end of 2020 – had a worse evaluation throughout 2021, ending with a slightly negative evaluation for consumer credit and weakly positive for real state credit.

Figures 1.19a to 1.19d describe, for each segment, how the assessments of the main factors that influence credit supply have evolved. Positive values indicate that they contributed to more flexible conditions, and negative values to more restrictive conditions.

20 The approval pattern, which represents the credit supply, can be assessed as “considerably more restrictive”, “moderately more restrictive”, “basically unchanged”, “moderately more flexible”, “considerably more flexible”. For the demand for credit lines, the alternatives are “substantially stronger”, “moderately stronger”, “same level”, “moderately weaker”, “substantially weaker”.

21 For the evaluation of supply factors, the alternatives are: “significantly induced more restrictive conditions”, “moderately induced more restrictive conditions”, “did not affect the supply”, “moderately induced more flexible conditions”, and “significantly induced more flexible conditions”. For the demand factors: “significantly induced a reduction in demand”, “moderately induced a reduction in demand”, “did not affect the demand”, “moderately induced an increase in demand” and “significantly induced an increased demand”.

Figure 1.17 – Portability share

Payroll-deducted x real estate – Amount of requests and ported value

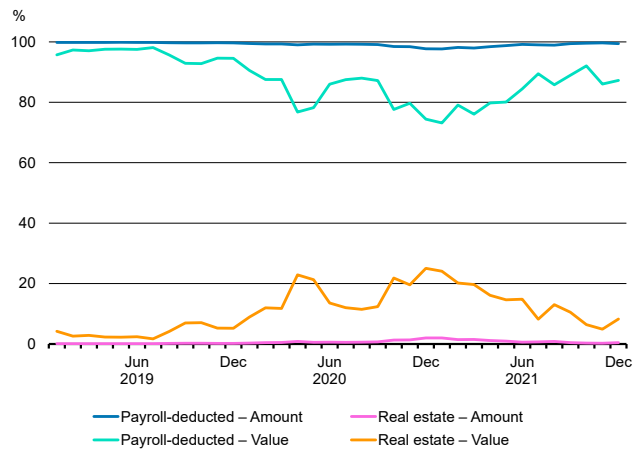


Figure 1.18 – Approval of credit lines

Average evaluations

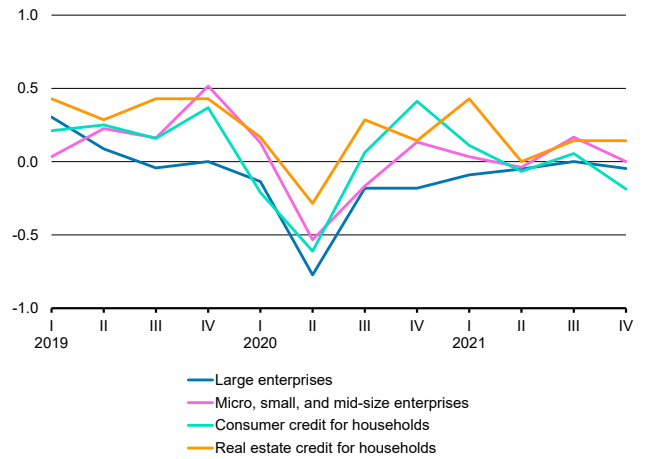


Figure 1.19a – Factors' contribution

Credit supply – Large enterprises

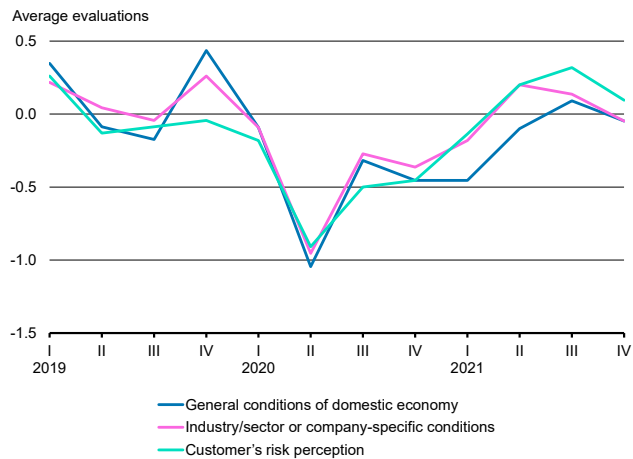


Figure 1.19b – Factors' contribution

Credit supply – Micro, small, and mid-size enterprises

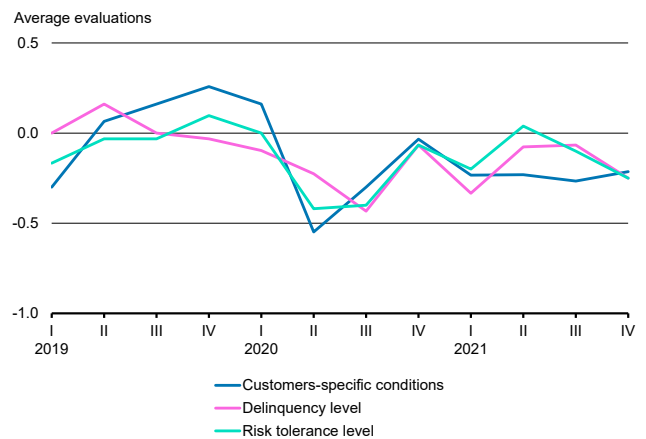


Figure 1.19c – Factors' contribution

Credit supply – Consumer credit for households

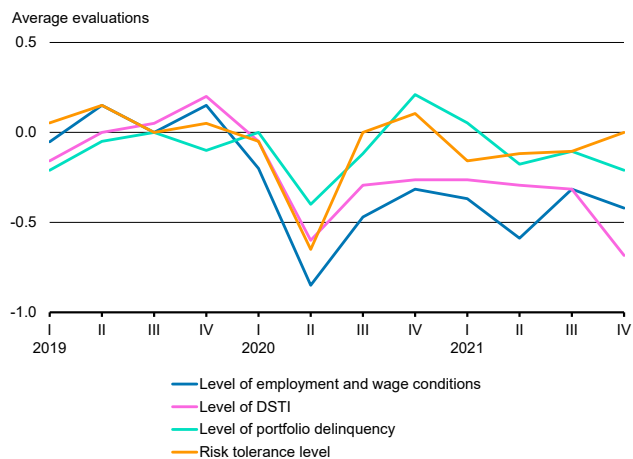
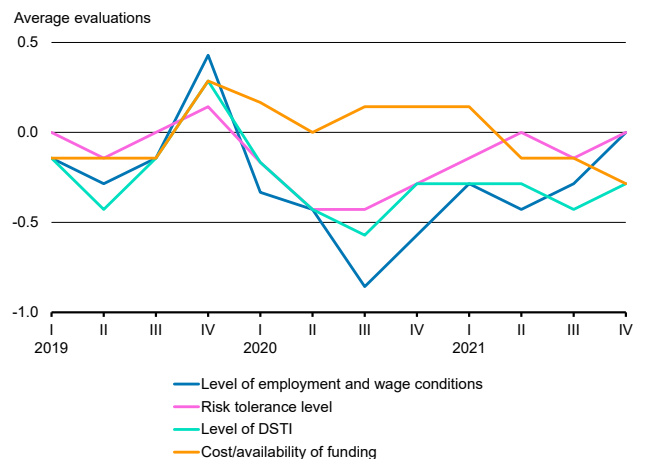


Figure 1.19d – Factors' contribution

Credit supply – Real estate credit for households



In the segment of credit for large enterprises (Figure 1.19a), supply factors, which in 2020 contributed to tighter credit, showed significant improvement in 2021. Although those factors reached the end of the year with assessments close to neutrality, they presented periods of positive contribution to the easing of supply, with emphasis on the factor related to the client's perception of risk.

In the MSME segment (Figure 1.19b), the improving trend in evaluations observed at the end of 2020 was not sustained. The supply of credit was mostly negatively affected by the factors in 2021. Among the three main factors pointed out as relevant in determining the supply behavior in the MSME segment – although all of them are related to concerns about delinquency – the factor “specific conditions of clients” was the most restrictive.

In the segment of credit to households, the main supply factors ended 2021 in neutrality or contributing to more restrictive conditions. In consumer credit (Figure 1.19c), the most restrictive factors were those associated with employment and income conditions and the level of debt service-to-income (DSTI) ratio, the latter with a more negative assessment in 2021Q4 than during the pandemic in 2020.

In real estate credit (Figure 1.19d), the cost or availability of funding – the only factor favorable to the easing of credit in 2020 – turned to the negative side and ended 2021 as the most restrictive factor on supply, along with the level of DSTI. The level of employment and wage conditions, the most important restrictive factor in 2020, reached the end of 2021 with a neutral evaluation.

Figure 1.20 – Demand for credit lines

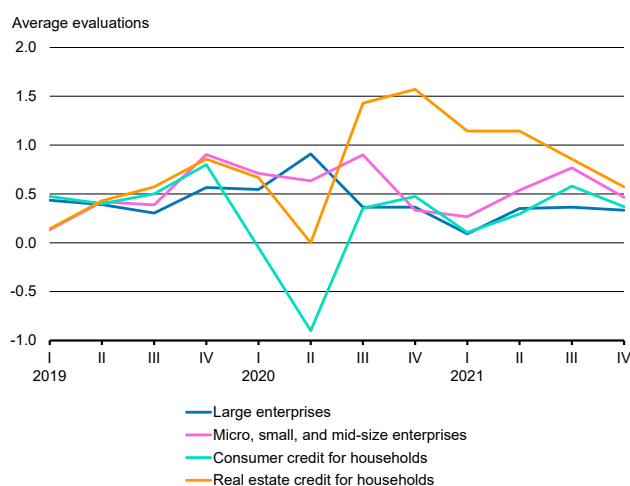
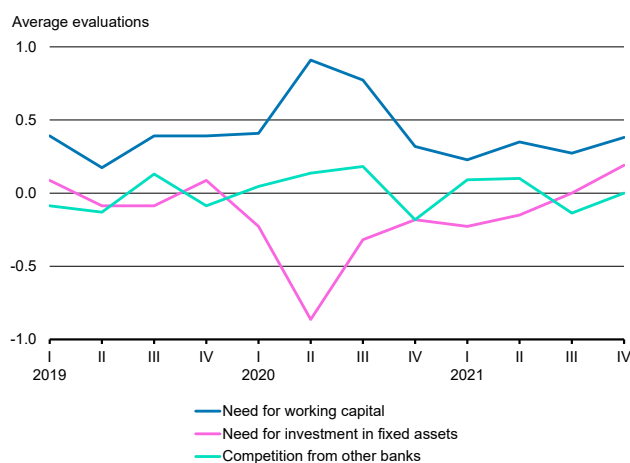


Figure 1.21a – Factors’ contribution
Demand for credit – Large enterprises



Determining factors for the credit demand behavior

Figure 1.20 displays assessments of demand changes in each quarter from 2019 to 2021. Positive values correspond to the perception of stronger demand, and negative values of weaker.

All segments presented a positive evaluation throughout 2021. The demand for real estate finance lost intensity throughout 2021, after having peaked in the end of 2020. The indicator for demand for credit in the MSME and consumer credit segments remained positive in 2021, although oscillating.

Figure 1.21b – Factors’ contribution
Demand for credit – Micro, small, and mid-size enterprises

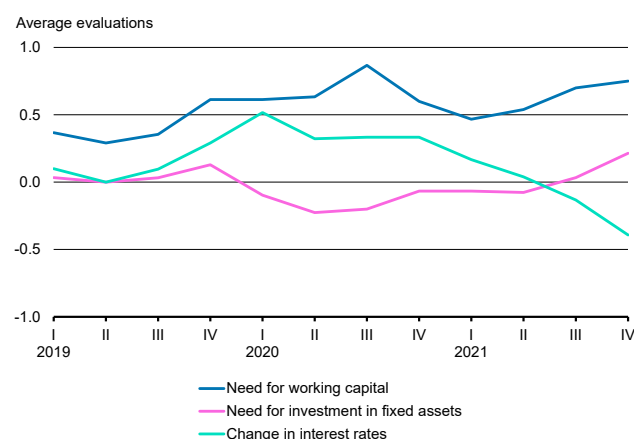


Figure 1.21c – Factors’ contribution
Demand for credit – Consumer credit for households

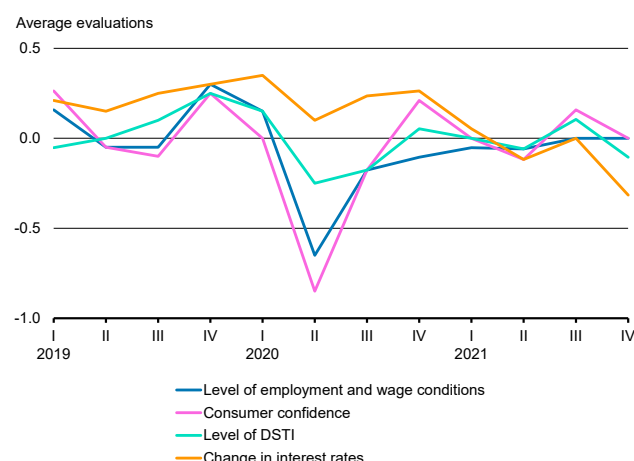
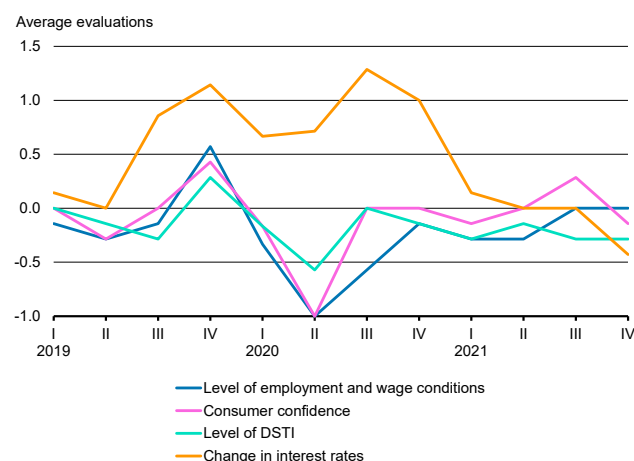


Figure 1.21d – Factors’ contribution
Demand for credit – Real estate credit for households



Figures 1.21a to 1.21d show respondents’ views on the evolution of factors affecting the demand for credit. In both segments of corporate credit, the need for working capital remained the main factor favoring growth in demand. With the reduction in uncertainties, the need for investment in fixed assets – the main negative factor in the previous year – began to contribute to the increase in demand. In the segment of credit to MSME, the role of interest rates flipped from being a factor that had increased the demand for credit to contribute to its reduction.

Similarly for the segment of household credit, changes in interest rates flipped from being the most relevant factor driving demand for credit in 2021Q1 to becoming its main reducing factor by the end of 2021. Consumer confidence oscillated over 2021. The level of employment and wage conditions is a factor which had had a negative assessment and became neutral in both segments. The level of DSTI fluctuated throughout 2021 for consumer credit, and it was a negative factor over the same period for real estate credit.

1.5 Credit prospects

The PTC demands institutions to inform their expectations about the variation in credit balance and delinquency in the SFN for the end of each year. In 2020, expectations were collected in the first two surveys whereas in 2021, they will be collected quarterly. Figures 1.22 through 1.29 show the realized value in 2020 and 2021, along with the expectations for 2020 and 2021 reported in the first survey of each year and the expectations for 2022 collected between July 18 and 29 of the same year.²²

In the corporate credit segment (Figures 1.22 and 1.23) in 2021, the observed 14.4% increase in the balance for large enterprises was much larger than the 5.0% median of expectations. For MSME, the 9.7% variation was slightly above the median of 8.0%.²³

In the household credit segment (Figures 1.24 and 1.25), the expressive 22.8% increase in the balance of consumer credit was well above expectations (median of 10.0%),

²² The square marks represent the medians of expectations, whereas the circles represent the observed values in 2020 and 2021. The bars indicate the interval between the 25 and 75 percentiles.

²³ Financial institutions follow quite heterogeneous criteria to classify companies by size, which do not necessarily coincide with the one used in the results presented in this report. As a result, it is natural that expectations for companies present a higher degree of dispersion of values than those for households, whose segmentation criteria are more homogeneous.

Figure 1.22 – Change in balance
Large enterprises

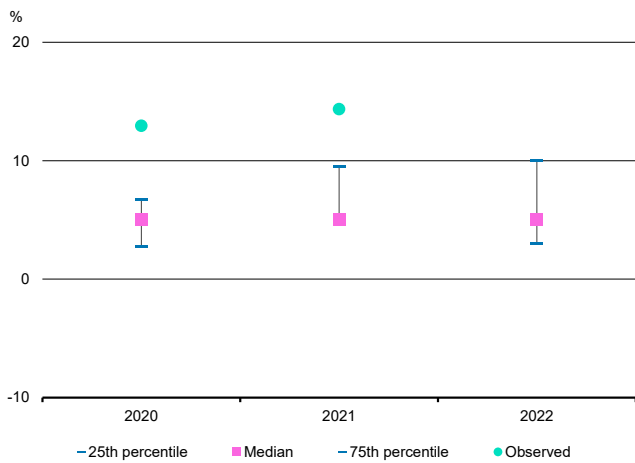


Figure 1.23 – Change in balance
Micro, small, and mid-size enterprises

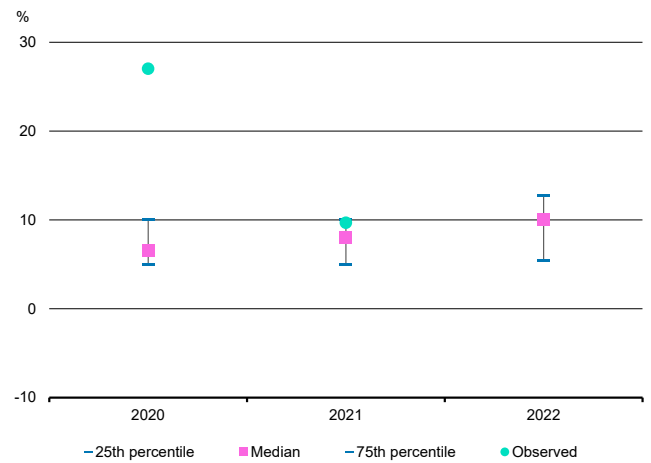


Figure 1.24 – Change in balance
Consumer credit for households

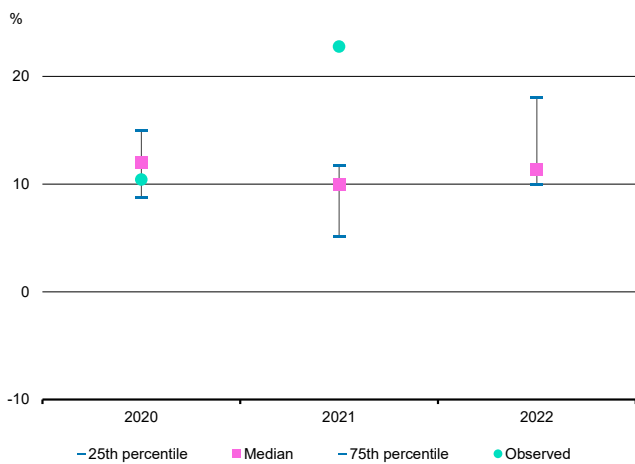


Figure 1.25 – Change in balance
Real estate credit for households

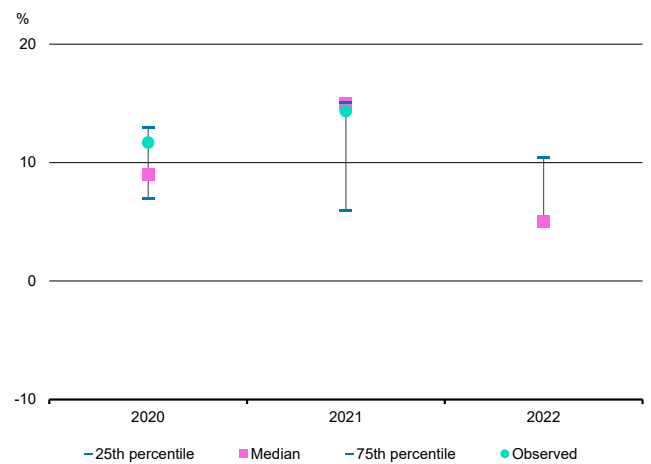


Figure 1.26 – Delinquency^{1/}
Large enterprises

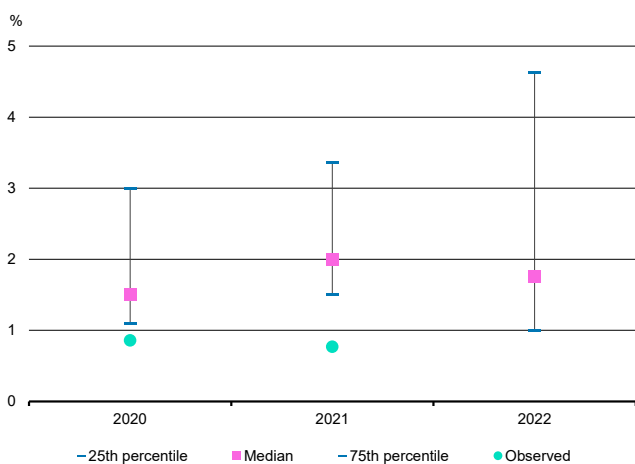
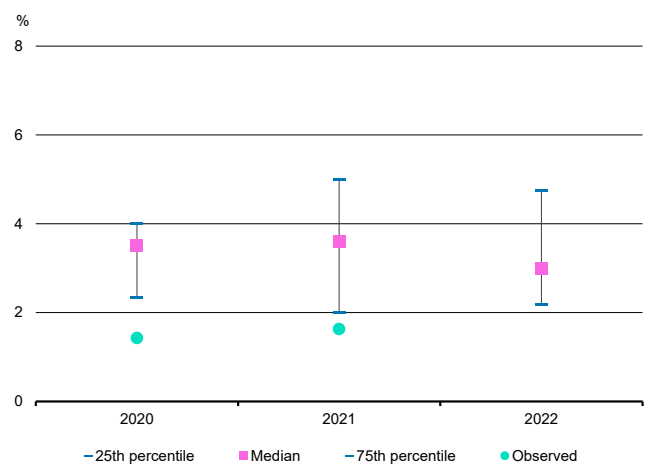


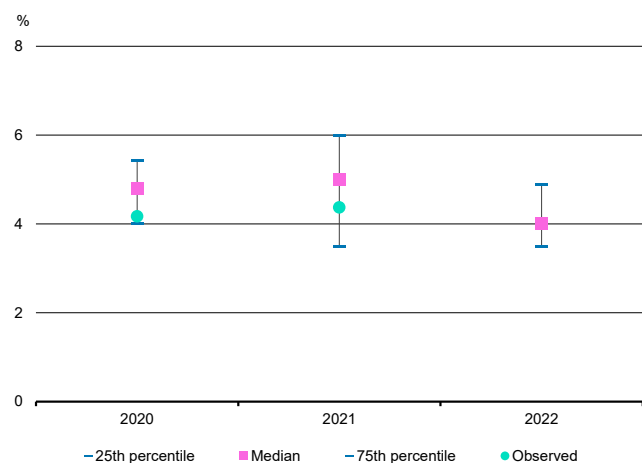
Figure 1.27 – Delinquency^{1/}
Micro, small, and mid-size enterprises



^{1/} Expectations of 0% in the delinquency rate were disregarded in the calculation of medians and quartiles.

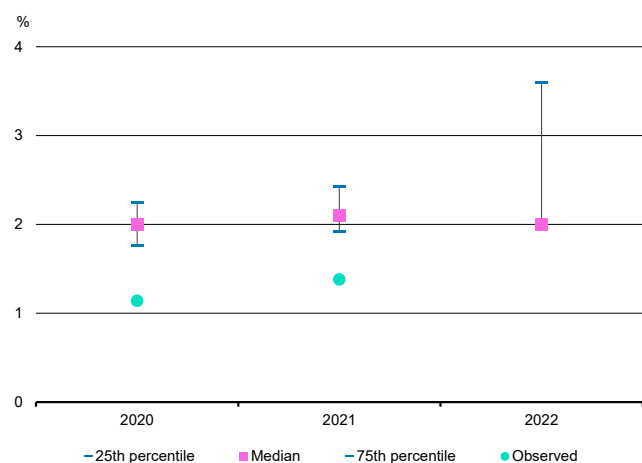
^{1/} Expectations of 0% in the delinquency rate were disregarded in the calculation of medians and quartiles.

Figure 1.28 – Delinquency^{1/}
Consumer credit for households



^{1/} Expectations of 0% in the delinquency rate were disregarded in the calculation of medians and quartiles.

Figure 1.29 – Delinquency^{1/}
Real estate credit for households



^{1/} Expectations of 0% in the delinquency rate were disregarded in the calculation of medians and quartiles.

while the 14.3% growth in the balance of real state credit was very close to expectations.²⁴

The observed delinquency rates in 2021 were below the medians of expectations in all segments (Figures 1.26 to 1.29). The biggest difference occurred in the segment of credit for MSME, where the realized rate of 1.6% was 2.0 p.p. lower than expected. The highest delinquency rate (4.4%) was observed in the segment of consumer credit for households, in which also occurred the smallest difference in relation to expectations (0.6 p.p.).

For 2022, the expectation of the responding institutions is for growth in credit balance, but with at a lower rate for most segments. The median of 5.0% for the growth in the balance of credit for large enterprises is below the 14.4% achieved in 2021, and that of 10.0% of credit for MSME is practically a repetition of the variation in 2021. In both household segments, there is the expectation of lower growth than that observed in 2021.

Figures 1.26 and 1.27 show an expected increase in delinquency rates for both large enterprises (median 1.75%) and MSMEs (median 3.0%). Figure 1.28 shows that, for households, the median of expectations for the delinquency rate on consumer credit represents a reduction in relation to that realized in 2021. In turn, Figure 1.29 shows that the median of expectations for the delinquency rate on real state credit represents an increase over that realized in 2021.

BCB's bank credit projections²⁵ for 2022 indicate a 14.2% growth in the total credit balance, as a result of an estimated 17.2% increase of in the balance of non-earmarked credit resources and an estimated 9.7% increase in the balance of earmarked credit (Table 1.16).

Table 1.16 – Projection for credit growth in 2022

Discrimination	%	
	Occurred Dec 2021	Projected Dec 2022
Total	16.3	14.2
Non-earmarked resources	20.4	17.2
Earmarked resources	10.9	9.7

²⁴ The results for households can be better compared with the time series released by the BCB. For the consumer credit segment, the reference for the credit balance is the series code 20,570, Non-earmarked credit operations outstanding – Households – Total (*Saldo da carteira de crédito com recursos livres – Pessoas físicas – Total*), and for the delinquency rate, the reference is the series code 21,112, Percent of 90 days past due loans of non-earmarked credit operations outstanding – Households – Total (*Inadimplência da carteira de crédito com recursos livres – Pessoas físicas – Total*). The reference for the real estate financing balance is the 20,612 series, named "*Saldo da carteira de crédito com recursos direcionados – Pessoas físicas – Financiamento imobiliário total*" (Earmarked credit operations outstanding – Households – Real Estate Financing Total). The reference for the delinquency rate is the 211.51 series, named "*Inadimplência da carteira de crédito com recursos direcionados – Pessoas físicas – Financiamento imobiliário total*" (Percent of 90 days past due loans of earmarked credit operations outstanding – Households – Real estate financing – Total).

²⁵ Estimates presented in the September 2022 Inflation Report.

The role of national banks in the transmission of international capital flows to the domestic supply of corporate credit

Introduction

There is a literature involving studies concerning a subject that has become known as the International Credit Channel. Within this literature, it can be mentioned, for example: Baskaya *et al.* (2017), who examine how bank size, capitalization, and liability composition affect the transmission of international capital flows to credit supply; Morais *et al.* (2019), who investigate whether monetary policies in the U.S. and Europe influence the supply of credit from foreign banks to local firms in Mexico; or Barroso *et al.* (2016), who study whether U.S. monetary policy influences the flow of international capital to Brazil, and its impact, among other issues, on credit supply.

However, regarding the transmission of international capital flows to the domestic credit, the International Credit Channel literature usually emphasizes the role of foreign banks (e.g., Cetorelli and Goldberg, 2011). However, domestic banks in Brazil are the largest providers of credit, accounting for 86.39% of credit operations in the country in late 2021. Therefore, it is interesting to find out whether they are relevant in the transmission of capital flows to credit. The purpose of this box is to answer this question. To this end, the next section presents the econometric methodology; then, the data are described; and finally, the results and conclusions are presented.

Methodology

Following Baskaya *et al.* (2017), the dependent variable in the estimations is the logarithm of the value of credit granted by a financial conglomerate or independent financial institution (referred to herein as FI) to a local firm in a given year and, as the explanatory variable of interest, a representative measure of international capital. Borrower \times time fixed effects are used to control for unobserved and time-varying characteristics of the firms – for example, financial constraints or firm quality – which are correlated with credit demand. The inclusion of the borrower \times time fixed effects also eliminates firms that only have one FI relationship in a given year.¹

Estimations also control for FI \times borrower fixed effects, which, in addition to considering the time-invariant characteristics of FIs, also control for unobservable variables whose relationship is stable between borrowers and FIs, e.g., the credit relationship. Moreover, the regressions consider variables at the FI level that change over time. The regressions use the estimator proposed in Correia (2017).

¹ In the sample used, more than 30% of the firms borrow, on average, from more than one FI.

The general specification is:

$$\log(\text{Credit}_{f,b,t}) = \alpha_{f,b} + \beta_{f,t} + \gamma \text{CapInt}_{b,t-1} + \delta \text{Control}_{b,t-1} + \varepsilon_{f,b,t}, \quad (1)$$

where *Credit* is the value of credit granted, *f* is an index referring to the borrower, *b* to the FI, and *t* to the time period; α and β represent fixed effects; *CapInt* is the measure of international capital; *Control* are controls of the FI, which include the size of the FI (measured by the logarithm of the value of assets), the share of capital in total assets, and the delinquency rate.

The following measure for the variable $\text{CapInt}_{b,t-1}$ was used:

$$\text{FIC}_{t-1} \times \frac{\sum_{t=2003}^{2019} \left(\frac{PE}{PT} \right)_{b,t}}{17}, \quad (2)$$

where PE is the FI's external liabilities, PT its adjusted total liabilities and FIC is the international flow of capital to Brazil.

A higher proportion of external liabilities in relation to total liabilities is associated with a greater FI dependence on funds in the international financial market.

Therefore, in estimating specification (1), the international capital flow to the country will be weighted by each FI's dependence on foreign liabilities. If a positive and significant result is found, there is evidence that the international flow of capital is a source of resources for FIs to meet the credit demands to which they are subject.²

Since the source of variation is at the FI's level and since firms' demand for specific FIs may vary by the FI's sector of specialization, the standard errors will be clustered at the FI's level and the four-digit Cnae economic sector of the borrower (cf. Cingano e Hassan, 2021).

Data

Data refer to year-end figures and cover the period from 2003 to 2019. A total of 156 different institutions from financial conglomerates and independent institutions were used over the sample period. The borrowers examined are exclusively non-financial system firms. The sample is composed of 7.47 million firms, of which 2.44 million distinct firms borrow from more than one FI in the estimations performed. On average, a firm uses 1.88 FI to obtain credit in the sample.

The values of credit and respective delinquency rate were obtained from the BCB's Credit Information System (SCR). These values were calculated in December of each year. For the credit value, the sum of the value of the credit limit and the amount to maturity of the operation was considered for the following modalities: loans; discounted credit rights; financing; export financing; import financing; financing with intervenience; rural financing; real estate financing; infrastructure and development financing; and other credits. Only non-earmarked resources and operations granted by the institution itself were examined.

² It seems that, if there is any endogeneity issue in the estimations, it is greatly mitigated, since α and β are fixed effects, and – following what is traditional in the literature – the control variables and the international capital flow variable have a lag of one period in relation to the dependent variable. Moreover, the foreign liabilities to total liabilities ratio is, for each FI, a fixed value throughout the sample period (cf. (2)).

FI's international liabilities data from the last quarter of each year are provided by the International Banking Statistics (EBI). Outstanding local positions of liabilities by residence of the counterparty and by currency of the operation were used for non-residents in different available currencies.

The source of the banks' capital and their total adjusted assets and liabilities was provided by the Accounting Standards of the Institutions Regulated by the BCB (Cosif). The international capital flow is the value of the Net Financial Account of the World Bank's World Financial Indicators.

Results

The estimates of equation (1) are presented in Table 1. Column (a) presents the results of the effects on credit supply in Brazil using the sample of all FIs; column (b) using only foreign FIs; column (c) only domestic FIs; and column (d) only domestic public FIs.

Table 1 – Domestic supply of credit and international capital, 2003-2019^{1/}

	(a)	(b)	(c)	(d)
	All FI	Foreign FI	Domestic FI	Domestic public FI
(International capital) _{t-1}	20.727*** (3.847)	8.695*** (1.844)	54.353*** (2.739)	88.791*** (3.241)
R-squared	0.846	0.875	0.847	0.827
EF FI x Companies	yes	yes	yes	yes
EF Companies x time	yes	yes	yes	yes
Controls of the FI	yes	yes	yes	yes
Number of observations	15,074,756	1,357,673	12,433,207	4,282,110

^{1/} The table presents the results of the regressions of equation (1) using annual data of corporate credit. Lagged values of the following bank controls are considered: assets logarithm, share of capital in total assets, and the percentage of credit delinquency. Standard errors are clustered at the FI level and at the four-digit CNAE economic sector of the company, and are in parentheses. *** Statistically significant at the 1% level.

A highly significant result was found in all estimations in the expected direction: an increase in the inflow of international capital to Brazil is associated with an increase in the credit supply in the country. This fact occurs either for the samples of foreign FIs or domestic FIs, as well as for its subsample of domestic public FIs.

Conclusion

At the beginning of this box, it was asked whether FIs in Brazil respond, in terms of credit supply, to international capital, and whether this effect is associated not only to foreign FIs but also to domestic FIs. After examining the supply of some corporate credit modalities, the box results allow us to conclude that the inflow of international capital influences the supply of credit in the country and that domestic FIs, including domestic public FIs, also participate in this transmission.

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Debt securities statistics

Introduction

The Banco Central do Brasil (BCB) has recently started compiling debt securities statistics in accordance with the international methodological standard outlined in the Handbook on Securities Statistics (HSS, 2015).¹ These new statistics are aligned with international initiatives for data compilation and dissemination – such as the G20 Data Gaps Initiative, and the International Monetary Fund (IMF) Data Dissemination Standard Plus (SDDS Plus). They expand the available information on the securities market, and contribute to a wider view on the funding instruments in Brazil. The standardized methodology also benefits the international comparison and aligns with the best practices of statistical compilation.

The compiled statistics cover both securities issued in the domestic market or abroad by an institutional unit² resident in Brazil (public and private) as well as securities held by residents in Brazil, whether issued by residents or non-residents in the domestic or external markets. The statistics comprise positions (stocks) of securities' issuers and holders, broken down by institutional sector, maturity, interest rate, reference currency, and issuance market.³

This box presents new debt securities statistics and their main characteristics, highlighting fundraising, from the issuers' perspective, and investment in securities, from the holders' perspective.

Securities statistics and main characteristics

Definition

According to the HSS 2015, which adopts the same definition of the System of National Accounts – SNA 2008, “debt securities are negotiable financial instruments serving as evidence of a debt”, paragraph 1.8.

Debt securities are security values issued by companies or governments to raise funds for carrying out investments or conducting their activities. The necessary conditions to be considered negotiable are:

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- 1 Document elaborated jointly by the Bank for International Settlements (BIS), the European Central Bank (ECB), and the IMF. Available at <https://www.bis.org/publ/othp23.htm>.
 - 2 In national accounts, institutional unit is the fundamental center of economic decision. It must have autonomy of decision in its main role and the elaboration of a thorough accountability must be possible for this entity.
 - 3 Series are available in the BCB Time Series Management System (<https://www3.bcb.gov.br/sgspub/localizarseries/localizarSeries.do?method=prepararTelaLocalizarSeries>), item Capital and financial markets – Securities statistics.

- the possibility to transfer the legal ownership from one institutional unit to another;
- standardization; and
- the ultimate holder must be bound only to the security issuer, with no right to appeal against previous holders.

Debt securities are distinguished from other negotiable instruments, as equities, fund shares, or derivatives. Debt securities earn interest and, therefore, holders have the right to an amount comprising principal plus interest. Equities pay dividends, and holders have the right to a residual value that will result from the payment of overall obligations assumed in the company's liabilities. Fund shares are issued by collective investment entities. Each share represents a portion of the collective investment portfolio and is remunerated by the investment income earned jointly with other instruments included in the portfolio. As for derivatives, there is no anticipation of neither the value of the principal to be paid by the issuer nor accrued interest.

Issuers and holders, issuance markets, and database source

Securities statistics compiled by the BCB depict the positions of resident institutional sectors in both issuing and holding securities.

Statistics compiled by issuers comprise securities issued by resident institutional units, which may occur in the domestic and external markets. For domestic issuances, the database source refers to liability positions in securities, registered in custody centrals (B3 and Selic) or calculated through the BCB database, as the share of bank deposit certificates not registered in the B3 but captured in the balance sheets of the banking system.

For issuances in the international market, the database source is the *Sistema de Registro Declaratório Eletrônico*, a module of the BCB's *Registro de Operações Financeiras (RDE-ROF)*, where basic information on issuances and fund inflows is recorded.

Statistics by holders comprise debt securities in the asset portfolio of resident institutional units and include securities issued in the domestic market and securities issued abroad by non-residents and purchased by residents. For domestic issuances, the same sources used for issuer statistics apply. As for securities issued by non-residents and purchased abroad by residents in Brazil, the database sources are international reserves and the Brazilian Assets Abroad (CBE) survey, of which participate both resident households and corporations.

Issuers and holders institutional sectors

The classification of institutional sectors in the securities statistics follows the standard applicable to the other macroeconomic statistics, under the SNA 2008.

The resident sectors are classified in:

- General Government: comprises the federal, state, and municipal government, excluding state-owned corporations. This sector is included as issuer and holder of securities;⁴
- financial corporations, classified in:

⁴ Government funds are included in statistics by holders.

- BCB: included as holder of securities only, since the issuance of securities is forbidden to the BCB;⁵
- Other Depository Corporations (ODC): banking and non-banking financial institutions supervised by the BCB that capture instruments included in the broad monetary aggregates.⁶ This sector is included as issuer and holder of securities;
- Money market investment funds: financial investment funds that invest a large share of resources in fixed income securities. Included as securities holders only;⁷
- Other Financial Corporations (OFC): institutions supervised by the BCB, not classified as ODC, such as leasing companies and payment institutions; investment funds primarily composed of variable income; other entities that provide services in the financial and capital markets, such as securitization companies. Most institutions included in this group are issuers and holders of securities; investment funds are holders only;
- insurance corporations and pension funds: insurance corporations are included as issuers and holders of securities, whereas pension funds are only holders;
- nonfinancial corporations: public and private nonfinancial corporations, included as issuers and holders of debt securities:
- households and Nonprofit Institutions Serving Households (NPISH) that provide services to households, included as debt securities holders only.

Non-resident sectors appear only as counterparties in securities statistics:

- in statistics by issuer, whose scope are securities issued by resident institutional sectors, are included securities held by non-residents, purchased in the domestic or external markets, consistent with external debt statistics;
- in statistics by holders, whose scope are securities held by residents, are included securities issued on the international market by non-residents and purchased by residents in Brazil.

Security pricing, maturity, interest rate, and currency

Securities statistics by issuer are priced at nominal value, based on the position in the last business day of each quarter. The nominal value, also referred as price of the yield curve, reflects the issuance price plus the amount of interest accrued throughout the period in which the security remains in the portfolio and deducted from paid or redeemed values.

Statistics by holder considers the market value, reflecting the portfolio position in the last business day of each quarter.

The classification by maturity considers the security's original maturity, in order to characterize the terms during which issuers are funding resources. Statistics are segmented in short-term securities (up to one year)

⁵ Article 34 of the Fiscal Responsibility Law (Complementary Law 101, of May 4, 2000).

⁶ Commercial and multiple banks; *Caixa Econômica Federal*; credit unions; investment and development banks; financing and investment credit societies; real estate societies; savings and loans associations, and mortgage companies.

⁷ Securities that compose the portfolio of investment funds are classified by holders, in the investment funds sector, regardless of the classification of institutional sectors that invest in the shares of these funds.

and long-term securities. The maturity of long-term securities is subdivided in: from 1 to 2 years; from 2 to 5 years; from 5 to 10 years; and above 10 years. For the analysis of the payment capacity, an additional opening is shown, relative to securities originally issued with a long-term maturity but that currently present a residual maturity of up to 1 year.

The segmentation by interest rate comprises securities issued with fixed and variable rates, the latter disaggregated in: inflation linked rate, interest rate linked rate; and linked to prices of specific assets, such as commodities and equities. It is noteworthy that there is no specific indexing factor related to the exchange rate variation. Therefore, securities issued with an exchange variation clause are classified as securities in foreign currency (even when settled with local currency) and, concerning the segmentation by type of interest rate, are classified according to the contracted interest rate (for instance, one security issued with an exchange rate variation plus a fixed interest rate is classified as a fixed interest rate security).

The segmentation by reference currency, domestic or foreign, is also presented in securities statistics. Securities issued with a variation referenced in a foreign currency, even when settled in BRL and issued in the domestic market, are classified as securities in foreign currency.

Categories of securities included in the BCB statistics

The categories of securities included in the BCB statistics are listed in Table 1, which illustrates the composition of securities statistics in the base date of December 2021. This list is subject to revision, according to the evolution of financial instruments. As criteria for the inclusion of securities are considered the negotiability, the issuance of certificates, and the regular pricing.

Table 1 – Debt securities included in the BCB statistics

Issuer category	Discrimination
Government	Government securities; Securities issued abroad
Other depositary corporations	Bank Deposit Certificate (CDB); Structured Operations Certificates (COE); Interbank Deposit Certificates (CDI); Financial Bills; Bills of Exchange; Mortgage bills; Real Estate Bills (LCI); Agribusiness Credit Bills (LCA); Guaranteed Financial Bills (LIG); Securities issued abroad
Other financial corporations and Insurance corporations	Debentures; Interbank Deposit Certificates (CDI); Financial Bills; Leasing bills (LAM); Real State Receivables Certificates (CRI); Agribusiness Receivables Certificates (CRA) Securities issued abroad
Non-financial corporations	Debentures; Commercial Notes; Securities issued abroad
Non-residents	International reserves securities; Securities acquired abroad declared at CBE

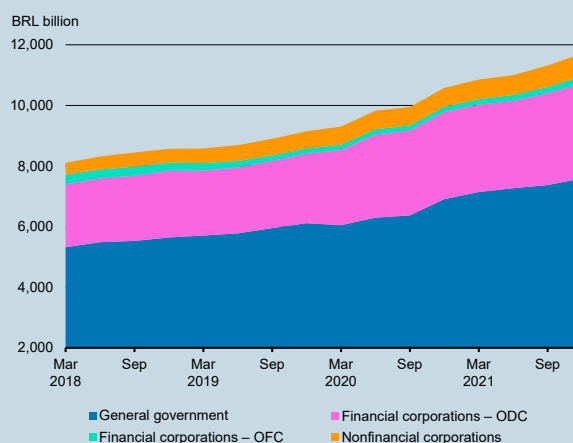
Not included in these statistics are non-negotiable securities (as securitized government securities, registered in the B3) and credit securities issued by financial and non financial corporations in the domestic market that generate double accounting as securitized instruments.

Main results

Balances of securities issued by residents⁸

In December 2021, the balances of debt securities issued by Brazilian residents totaled BRL 11.7 trillion (135% of the Gross Domestic Product – GDP). Out of this amount, 65% (BRL 7.6 trillion) were issued by the general government;⁹ 29% by financial corporations (BRL 3.4 trillion), of which 27% by ODC and 2% by OFC;¹⁰ and 6% by nonfinancial corporations (NFC) (BRL 752 billion). Figure 1 shows quarterly data from series begun in March 2018.

Figure 1 – Securities issued by residents, by issuer type



Issuances on the domestic market are preponderant in the stock of securities, corresponding to 96% of the December 2021 balance.¹¹ Among issuances on the international market, NFC are those holding the largest share of securities issued abroad (12% of their stock), followed by financial corporations (5%), and the government (3%).

In December 2021, as well as throughout the series, most of securities has issuance term above two years. The sector of financial corporations is that issuing the largest share of securities issued with shorter terms. Figures 2a and 2c show the distribution of the securities stock according to the original maturity in December 2021, by issuance sector.

⁸ The balances presented in this section refer to the nominal value of securities and comprise all securities issued in the domestic and external markets by residents in Brazil, involving both securities purchased by residents and non-residents.

⁹ Includes National Treasury securities in the BCB portfolio, non-earmarked or earmarked to repurchase contracts (held with the goal of implementing the monetary policy).

¹⁰ Includes securities issued by insurance corporations.

¹¹ This balance includes securities issued in the domestic market and purchased by non-residents that compose the foreign debt measurement. In December 2021, the balance of foreign debt securities totaled BRL 1.1 trillion, of which BRL 573 billion relative to issuances in the domestic market and BRL 487 billion to issuances in the international market.

Figure 2a – Securities issued by the general government
Maturity in years – December 2021

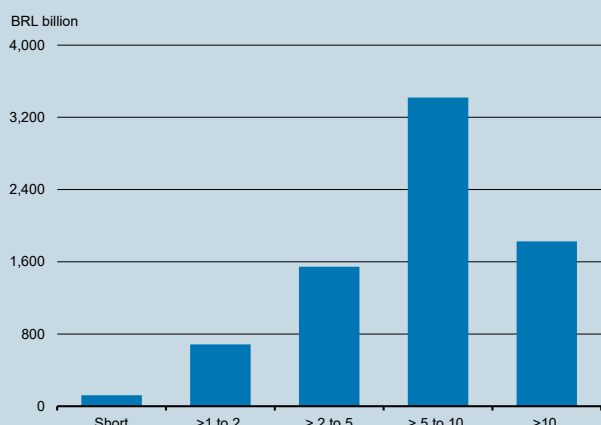


Figure 2b – Securities issued by nonfinancial corporations
Maturity in years – December 2021

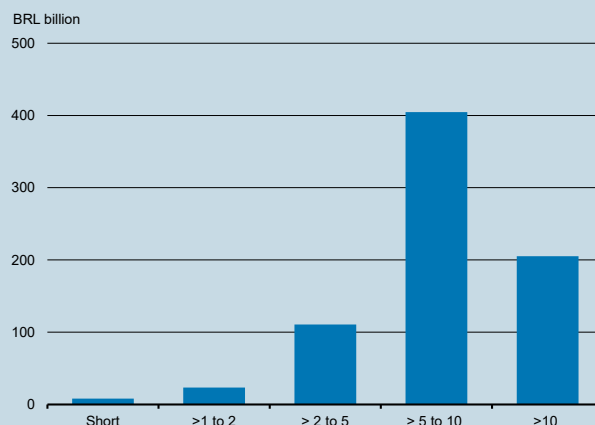
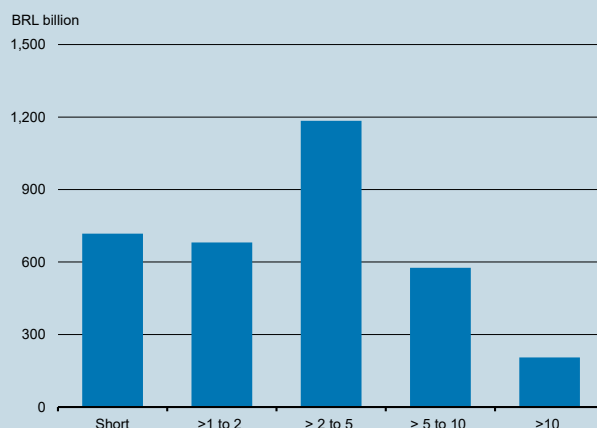


Figure 2c – Securities issued by financial corporations
Maturity in years – December 2021

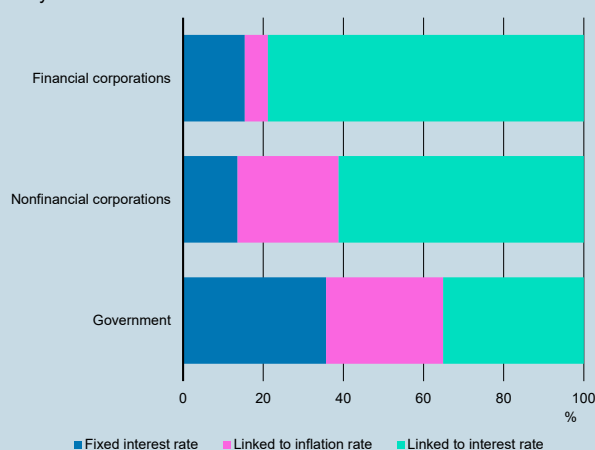


Throughout the series, one may observe an increase in the maturity of securities issued by NFC (99% of the balance classified as long-term in December 2021, compared to 97% in March 2018), relative stability in government securities maturities (98% long-term compared to 99%, in the same dates), and reduction in maturities of financial corporations funding (79% long-term in December 2021, compared to 83% in March 2018).

Most private securities (issued by financial corporations and NFC)¹² are indexed to variation in the basic interest rate. Within NFC issuances, the participation of instruments linked to inflation rates follows an upward trend. For government securities, the classification by indexing factors is aligned with the fiscal policy targets and is less concentrated (Figure 3).

¹² Private securities comprise securities issued by entities not classified as General Government. Therefore, they include issuances from public banks (financial corporations) and state-owned companies (NFC).

Figure 3 – Securities issued by index
% by issuer – December 2021



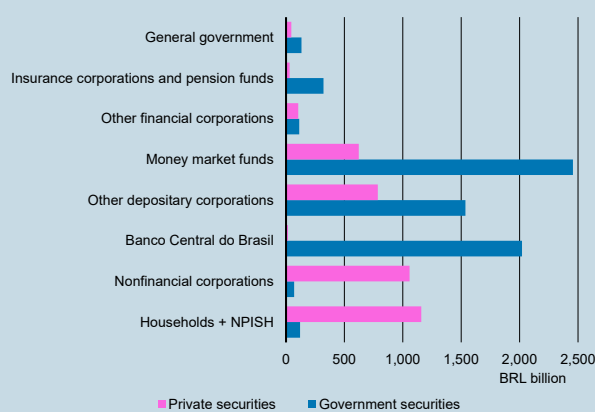
As for the classification according to the reference currency, securities in domestic currency are predominant (96% of the balance issued by all residents in December 2021).

Balances of securities in the portfolio of resident holders¹³

In December 2021, the stock of securities in the portfolio of resident holders reached BRL 12.3 trillion (141% of GDP). Out of this total, 86% (BRL 10.6 trillion) were issued by residents (in the domestic market) and 14% (BRL 1.7 trillion) by non-residents (in the international market).

Figure 4 shows the distribution by institutional sector of the balances of holders of securities issued in the domestic market.

Figure 4 – Distribution by resident holders, securities issued in the domestic market – December 2021



Main holders of government securities are money market funds (36% of total), followed by the BCB (securities targeted to the monetary policy implementation, 30% of total), and by ODC, 23% (mainly banks). As for private securities (issued by financial corporations and NFC), the main holders are NFC and households.

¹³ The balances presented in this section refer to the market value calculated in the last business day of each quarter. The nominal value was used for private securities issued in the domestic and external markets by residents, since there is no data relative to market value. It should be mentioned that the nominal value of private securities issued in the domestic market is similar to the market value, since most of these securities are indexed to interest rate variations.

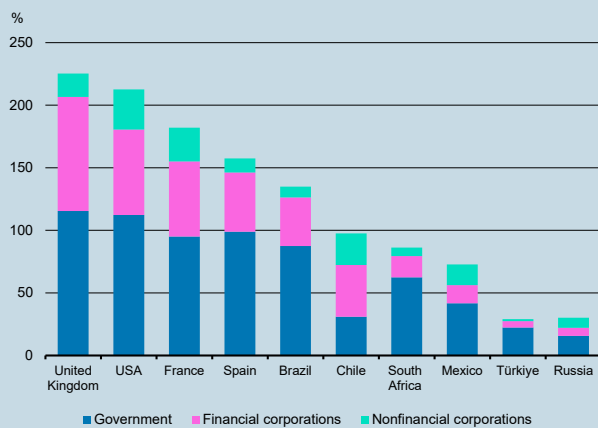
Most of securities issued by non-residents are included in the international reserves (BRL 1.6 trillion). The outstanding balance (BRL 54 billion) corresponds to securities purchased abroad by institutional units resident in Brazil, especially financial corporations, followed by households and money market funds.

Comparison with other countries

The following figures illustrate the issuance of securities in Brazil when compared with other countries. One may observe that the Brazilian securities market is quite significant, with a total volume of issuances equivalent to 135% of the GDP (Figure 5).

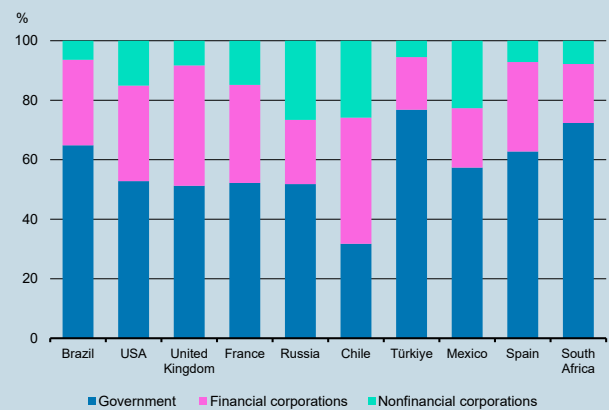
Although the issuance of private securities in Brazil follows an upward trend, most issuances refer to government securities, like in Turkey, South Africa, Spain, and Mexico (Figure 6). In December 2021, Brazilian issuances of government securities corresponded to 88% of GDP, whereas issuances of private securities accounted for 47% of GDP.

Figure 5 – Securities issued by residents
% GDP of each issuer – December 2021



Data source: BIS

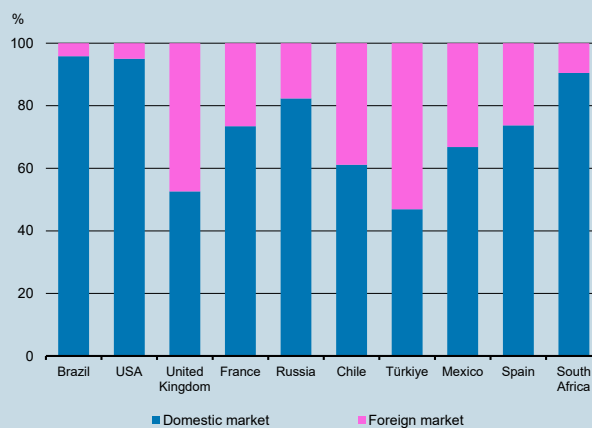
Figure 6 – Debt securities, participation by issuer – December 2021



Data source: BIS

One observes that Brazil and the U.S. present the largest participation of domestic issuances in this sample of countries (Figure 7).

Figure 7 – Debt securities, participation by issuance market – December 2021



Data source: BIS

Conclusion

Debt securities statistics compile data obtained from several official sources and custody and registration entities. These statistics comprise public and private securities issued in the domestic and external markets, which are included in the balance sheets of Brazilian residents. The use of an international methodological standard for data compilation and dissemination facilitates the integration with other series of macroeconomic statistics and benefits the comparison across countries.

These new statistics contribute to the consolidation of a wider and more detailed perspective on the financing channels in the Brazilian economy and highlight the importance of debt securities as a financing source for the nonfinancial sector (government and corporations) and as an alternative for the allocation of available resources across various institutional sectors.

Effect of changing the credit card statement layout

Accepted in many establishments as a means of payment, credit cards are widely used in Brazil. In 2021, approximately 65 million citizens, almost 40% of the adult population, carried out more than 200 million transactions monthly.

On average, households have about 30% of their debts with the National Financial System (SFN) on credit cards.¹ Despite the convenience of using a credit card as a means of payment, careless use can be costly to the user – for example, when someone fails to pay the full amount of the invoice and consequently uses the revolving credit, or the installment payment options. With average annual interest rates exceeding 300%, these credit types are the most expensive in Brazil, and are mainly used by people with income of less than two minimum wages.² In addition to carelessness, some factors that can lead to unwanted use of revolving credit or installment payments, such as the complexity of the product, the users' low level of financial literacy, and confusing statement. Therefore, the simplification of credit card statements is envisioned as a possible solution to improve the use of this instrument. In an experiment conducted in Mexico, Giné *et al.* (2019) concluded, from the number of correct answers on a questionnaire about the statement, that the simplification of the layout of credit card invoices increased consumers' knowledge by about 20%.

This box aims to describe an experiment that investigated whether different credit cards statement layouts would improve the understanding of the product use conditions, potentially affecting the decision of paying the invoice amount at once or in installments. The experiment has been conducted on an online platform by the BCB in partnership with the consulting and research firm Plano CDE, and financial support from the Fletcher School of Law and Diplomacy at Tufts University. This study falls within the scope of the BCB's promotion of Financial Citizenship, comprising the principles of financial inclusion and education, and protection of financial services consumers.³

The experiment presented different layouts of credit card statements to groups of participants. Then, the respondents completed a questionnaire about their understanding of statements and their decision-making process. The alternative statement designs compared to existing credit card statement layouts allowed for the testing of solutions based on behavioral science. Changes have been made in the way information is presented, highlighting some information and prioritizing, on the first page of the statement, only essential information for making the payment decision.

The Behavioral Economics literature indicates that the way information is presented may affect individuals' understanding and judgment when making a decision (e.g. KAHNEMAN, 2003 and THALER; SUNSTEIN, 2021). Considering this concept, different statements containing the same information, but organized in a distinct way, were presented to participants with the objective of encouraging them to choose the payment option that

1 These figures include credit card, installment credit card, and revolving credit card values.

2 For further details on credit type balance by income range, see the Financial Citizenship Report – RCF (2021), section “Use of savings and credit”.

3 For further details about the BCB's promotion of Financial Citizenship, see <https://www.bcb.gov.br/cidadaniafinanceira> (Portuguese only).

would result in lower interest payments. In this case, the salience concept, generally described as information that stands out from other, was also used (KAHNEMAN; THALER, 2006). In Mexico, salience, associated with limited attention and mental accounting, may explain consumers' lack of sensitivity to the price variation regarding credit cards (PONCE *et al.*, 2017).

In this sense, several studies (MULLAINATHAN; SHAFIR, 2013) suggest that people have a limited mental bandwidth,⁴ which is further narrowed when facing scarcity situations. When experiencing financial or other difficulties, it is more difficult to absorb and consider, from the statement, all relevant information for a conscious decision making. When only essential information is presented on the first page, it is easier to understanding what must be paid.

In this study, in addition to the main intervention related to credit card statements, it was also tested whether the anchoring effect⁵ or the default effect⁶ would impact decision making regarding the payment of financial obligations. Hence, a full or larger pre-filled amount on the payment screen could lead individuals to make higher payments, reducing the amount of fees and interest rates associated with the use of that financial product. As an example, an experiment in the UK compared the effect of different interfaces on credit card payment decision and found that, between two similar interfaces the one whose default payment amount was higher resulted in payments on average GBP 11.0 higher (BIT, 2018).

Hypotheses of the experiment

The experiment aimed to evaluate whether using credit card statements with simplified language and differentiated formatting would help people to make better financial decisions. The main idea is that the information on credit card statements is usually presented in a technical and confusing way, limiting the individual's understanding, and encouraging the payment of smaller amounts, increasing interest expenses. Therefore, it is expected that simplified statements will help people better understand how to use a credit card and the risks involved in using this financial product. It is expected that reorganized information gives additional incentives for payment decisions with higher value, thereby reducing interest costs and fees generally incurred by consumers.

The experiment's hypotheses were that:

1. simplified language and reorganized information improve understanding important information used by credit card users to make payment decisions;
2. modifications reduce the time users spend finding information;
3. simplified language and reorganized information lead to better quality payment decisions, minimizing interest payments;
4. highlighted information leads to better quality decision making; and
5. higher value anchoring and default-choice of the amount to be paid in the fill-in box leads to higher payments, reducing fees and interest.

4 The bandwidth is a way to directly measure mental capacity and is directly associated with the cognitive (fluid intelligence) and self-control (executive control) capacities of the agents (MULLAINATHAN; SHAFIR, 2013).

5 The anchoring effect is a cognitive bias that describes the human tendency to rely on, or "anchor" to, a characteristic or a piece information when making decisions (TVERSKY; KAHNEMAN, 1974).

6 Default is a pre-selected choice for a given problem, the path of least resistance (automatic). Usually, in difficult problems or problems where there is an overload of information and choices, people are more likely to select the option they already know, or default (JONHSON; GOLDSTEIN, 2003).

Methodology and data

To evaluate these hypotheses, individuals were randomly assigned to a control group (CG) and two treatment groups (TGs). The data were collected using an online panel system,⁷ which selected a balanced sample based on age, gender, and socioeconomic status ranges. Experimental measures were collected from those eligible to participate until 3,022 observations were reached. From this sample, 1,008 participants were randomly assigned to the CG, 1,008 to the TG1, and 1,006 to the TG2. No significant differences were found between the treatment and control groups before the intervention,⁸ suggesting that randomization was successful, which is an important requirement for making causal inferences.

The CG received a statement similar to the credit card statements currently available in Brazil. The TG1 was presented with an improved statement that partially changed the formatting and wording of the document to convey better financial information regarding credit card costs and fees. The TG2 statement incorporated the same changes and additionally highlighted the lower interest payment options (salience). In both cases, the statements included the same set of information as usual statements, presenting interest rates and other charges similar to those normally charged by financial institutions.

Participants provided demographic information at the beginning and at the end of the survey, as well as answered questions that measured their level of financial literacy and their financial behavior characteristics. The hypothetical credit card statement amounts have been customized to correspond to approximately 17% of the reported income level. The scenarios for payment decisions were presented to the respondents after the initial demographic questions and were customized based on the reported income.

All participants were asked to decide about how to pay the invoice in two different scenarios. In the first, they were told they had enough money to pay the full statement, that is, it was feasible to pay the entire amount. In the second, they were told they did not have enough money to pay the total amount of the invoice, they could pay-up to 60% of the total invoice, by choosing between revolving credit or installment options. In the second scenario, they were also asked to explain their choice. After answering about the decision-making questions, participants were asked about their understanding about credit card.

Fourteen questions were asked about the understanding of credit card, covering basic information (date, limit, amount to avoid paying interests and amount not to be overdue), information on debt (consequences of revolving credit, installment plans, and total amount of debt), and information on credit card costs (annuity, other products, and services). Annex 2 shows these questions.

The fifth hypothesis, about anchoring and default choice effects, was also tested on the payment decision screens. For this purpose, half of the participants from all groups (CG, TG1 and TG2) were presented to a screen pre-filled with value “0.00” (zero) for them to inform the amount to be paid. Meanwhile for the other half, the credit card statement presented the total amount.

⁷ Research panels take place by inviting and registering people of different socioeconomic profiles on a digital platform. A specific stratified sample was delimited, considering the profile of revolving credit users analyzed in the Credit Information System (SCR). Also, invitation links were sent to a random number of people within these specifications. When the quotas for specific segments were filled, new qualifying respondents from these segments could no longer proceed with the survey. Additional quality control protocols create barriers to participation in surveys of similar topics within a six-month interval. Respondents sign up for online survey panels due to the benefits offered by the platform. Each survey response is converted into points that can later be redeemed for products or cash. The number of points varies according to the length of the survey and average responses, and the specificity of the sample. Respondents must give explicit consent to the points system when applying to the panel.

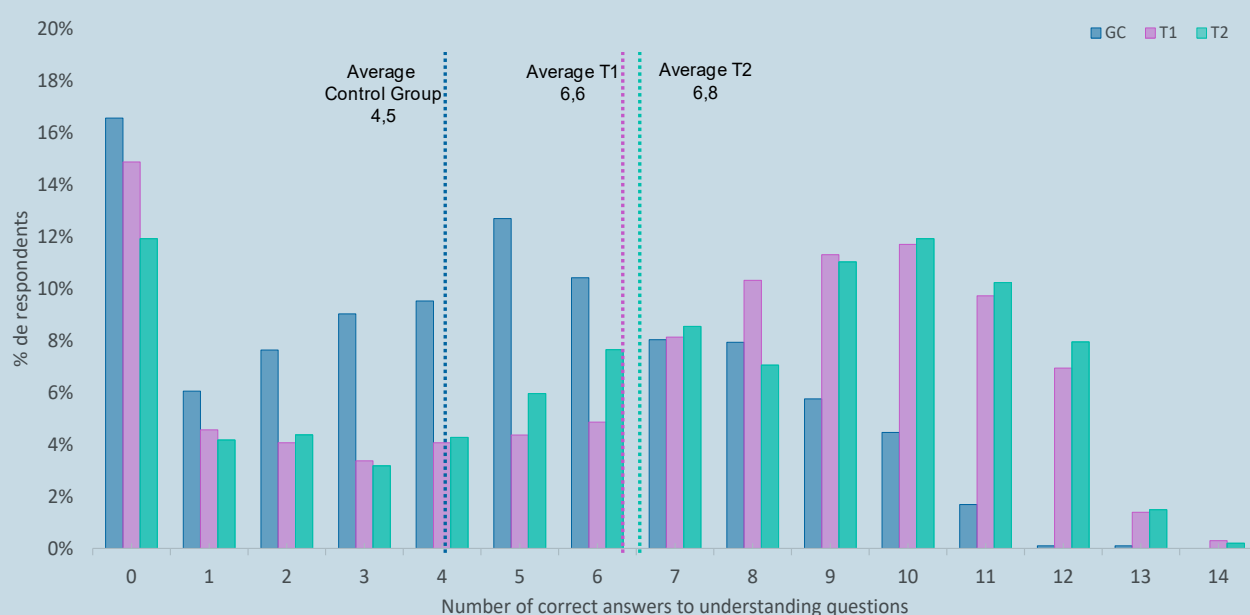
⁸ The results of the balance test of the experiment are available at the Annex 1 of this box.

Results

The experiment provided valuable information about how people understand different statements and how the information presented influences their decisions. In some analyses, the TGs have been aggregated, as the difference between the two treatment groups was inexpressive.

The experiment showed⁹ that participants who received statements with new layouts better understood the data presented and were better informed so as they could identify the consequences of accepting revolving credit or installment plans. Of the fourteen questions, on average the CG participants got 4.5 answers right. This average was 6.6 and 6.8 in TG1 and TG2, respectively. In general, it is worth noting that in all groups, the percentage of correct answers was low, and some respondents did not get any question correct. Figure 1 shows the percentage of respondents who got each number of correct answers by group.

Figure 1 – Percentage of correct answers by group



Basic information, such as total amount due and credit limits, showed a high percentage of correct answers in both the CG and the TGs, with a higher percentage of statistically significant correct answers for the TGs. For the total amount due, 75% of the CG participants gave the correct answer. In turn, 78% of the aggregated participants from both TGs answered correctly. In addition, the difference in correct answers for the credit limit used was 14 p.p. (55% correct answers in the CG and 69% in the TGs).

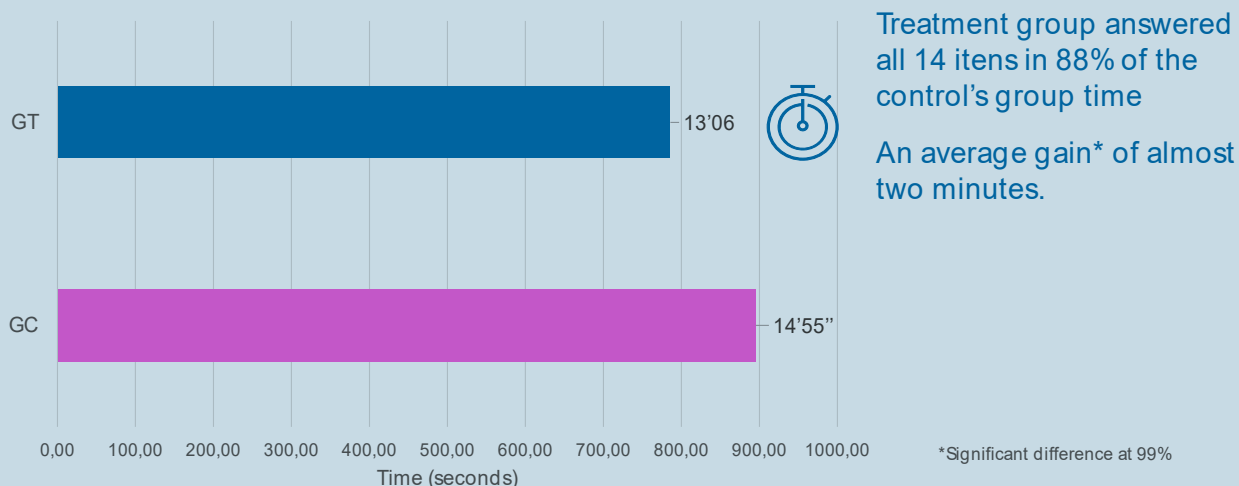
When asked about the total interest cost associated with the revolving credit option, the difference between the groups was accentuated. In the CG, only 1% of respondents answered correctly, while in the TGs, 34%. Regarding the questions about the consequences of choosing the installment plan, the TGs participants also got significantly more correct answers than the CG participants.

It is worth noticing that the effects of the new layouts were even greater for lower educational levels participants. Such results suggest that the adoption of credit card statements based on behavioral studies may positively impact the choices of those with low educational levels.

⁹ The results were reported by using the test of means for the treatment and control groups. Since this was a randomized controlled experiment, in which balance between treatment and control groups was verified, the difference between groups can be related to the intervention. See Annex 3.

The experiment also measured the time taken by participants to answer the set of 14 questions on credit card costs and operation. Overall, participants in both TGs took significantly less time to answer the entire set (88% of the CG's time, as shown in Figure 2). When analyzed individually, it was possible to observe significant differences in eight questions. In six of them, the TGs participants answered faster, and in two, slower. Furthermore, the TGs participants answered correctly more questions than the CG participants.

Figure 2 – Questions response time by group



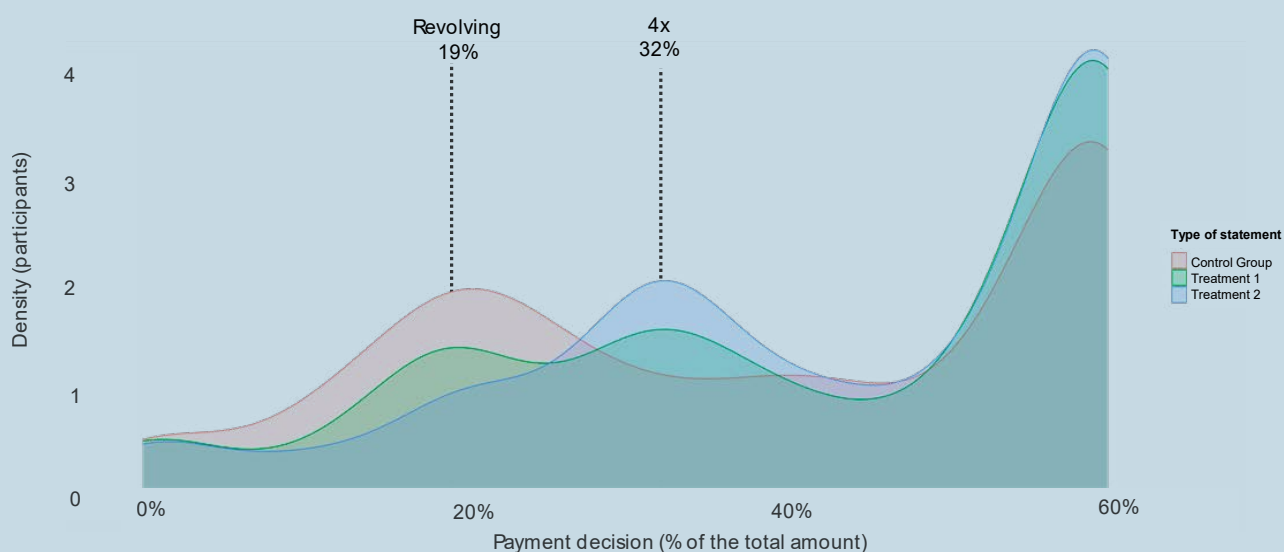
Regarding the two decision scenarios, with and without enough resources to pay the total invoice amount, the treatment effect was measured in percentage points and was considered positive when people decided to pay larger amounts. For the first scenario, treatment had a statistically significant effect¹⁰ of 2.8 p.p. on average. The CG participants decided to pay, on average, 82% of the invoice amount, and the TGs participants decided to pay, on average, 85% of the invoice amount. In the second scenario, in which the resources were enough to pay up to 60% of the invoice amount, the CG participants decided to pay, on average, 38% of the invoice, whereas those in the TGs decided to pay, on average, 42% (an statistically significant differential effect of 3.9 p.p.¹¹).

Figure 3 shows the density curve of the amounts chosen for payment by participants in each group. For the CG, the value peaks close to the minimum amount that allow someone to choose the revolving credit system. For the TGs participants, a peak closer to the maximum amount that would be possible to be paid in this scenario was observed, an available option in which they would pay less interest. Another peak was observed exactly in the four installments payment option what correspond to approximately 32% of the invoice each month. This option was explicit on the first page of the statement for TG2. With this choice, the interest paid by the consumer would be lower than with the minimum payment on revolving credit. Thus, the higher peak in this option for TG2 indicates that information on the first page of the statement tends to have a greater weight in consumers' decisions.

10 Statistically significant at the 95% confidence level.

11 Statistically significant at the 99% confidence level.

Figure 3 – Payment decision density curve by group (scenario with available balance for 60% payment of the invoice)



Finally, the default choice/anchor effect introduced for testing on the payment screen also showed positive effects on payment decisions. In the first scenario, those who had the response box pre-filled with the total amount on average decided to pay 91% of the total invoice amount, while participants in the group where the box was pre-filled with “0.00” on average decided to pay 77% of that amount, a difference of 14.6 p.p., statistically significant at the 99% level. In this scenario, the default choice effect seems to have had a significant influence, with 81% of the “full amount” group having chosen to pay exactly the pre-filled amount. In the second scenario, in which participants did not have enough resources to pay the full balance of the invoice, this difference was 3.1 p.p. The group that had the full amount of the invoice pre-filled decided to pay on average 42% of the total, while respondents in the group that had the “0.00” amount pre-filled decided to pay on average 39% of the bill.¹²

Conclusions

This box presents the results of a randomized controlled experiment, which aimed to identify the effects of adopting credit card statements with simplified language layouts that highlights relevant information for payment decision making. Results indicate that credit card statement layouts that present clear and more organized information to consumers are likely to improve the understanding of the financial product, encourage better financial decisions, and reduce debt. These effects seem to be even greater for less educated people.

It was also observed that the participants of the TGs, which were exposed to the new layout, answered the questions that required understanding of the information on the statements more quickly and correctly. These results suggest that new layouts require less mental bandwidth to interpret the information available on the invoice and may result in better payment decisions.

Finally, it was also observed that the insertion of a higher pre-filled value on the payment screen had a strong influence on the payment decision. This shows that, in general, by anchoring or default choice mechanisms, the value that appears in this box at the time of payment influences the consumer’s payment decision.

¹² Statistically significant difference at the 99% level.

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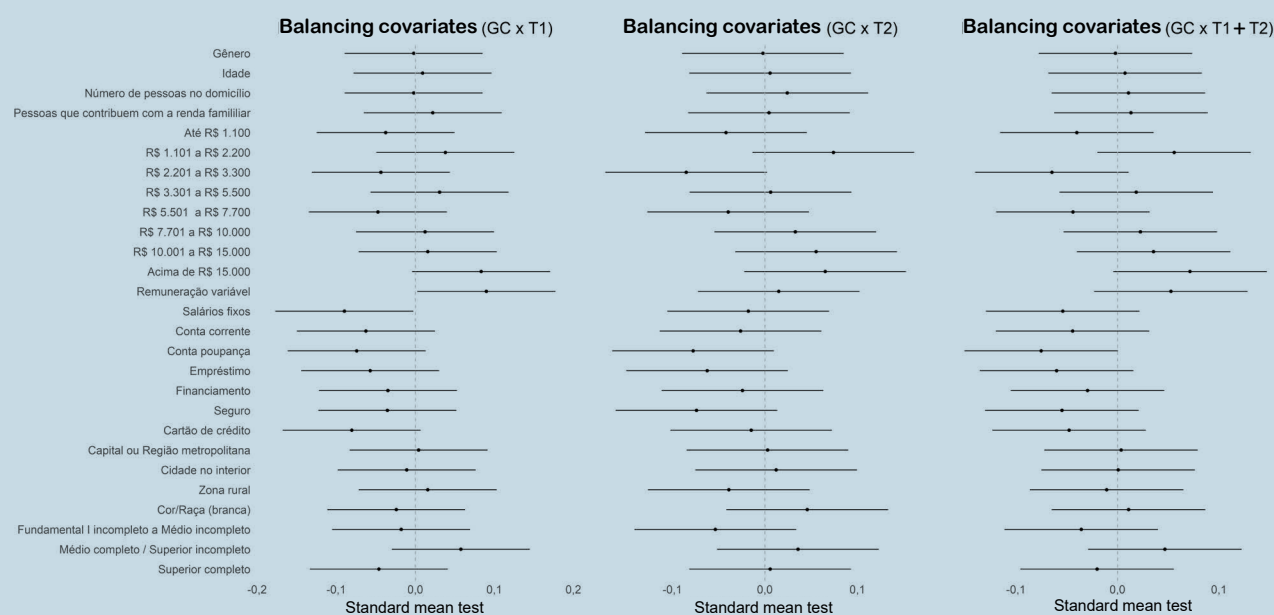
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Annexes

Annex 1 – Balance of the characteristic variables between the control and the treatments groups



Annex 2 – Questions about the understanding of credit card invoice

6. What is the deadline for paying the statement?
7. How much should you pay to avoid interest charges?
8. Are there payment options so you do not fall behind with the bank and you can still use your credit card to make purchases next month? On this invoice, what is the lowest amount you should pay not to fall into arrears?
9. What is the limit that the bank has released for you on this credit card?
10. How much of the limit provided by the bank have you already used?
11. According to your current statement, what is the maximum amount you could spend on your card next month?
12. If you pay the minimum revolving amount on this invoice, how much will you pay in total for this invoice?
13. If you pay only the minimum revolving amount this month, how much interest and charges in BRL should you pay next month?
14. What is the total annuity for this card?
15. What is the cost of maintaining your credit card this month, regardless your spending?
16. If you want to pay this invoice in twelve installments, how much should you pay this month?
17. If you pay this invoice in twelve installments, how much will you pay for this installment plan after all twelve installments are paid?
18. If you pay this invoice in twelve installments, how much will you pay in interest and charges at the end?
19. By using a credit card to pay purchases and invoices in installments, a debt to be paid in the coming months is accumulated. What is the total current value of this accumulated debt that will have to be paid in the coming months?

Annex 3 – Difference in means for questions about the understanding

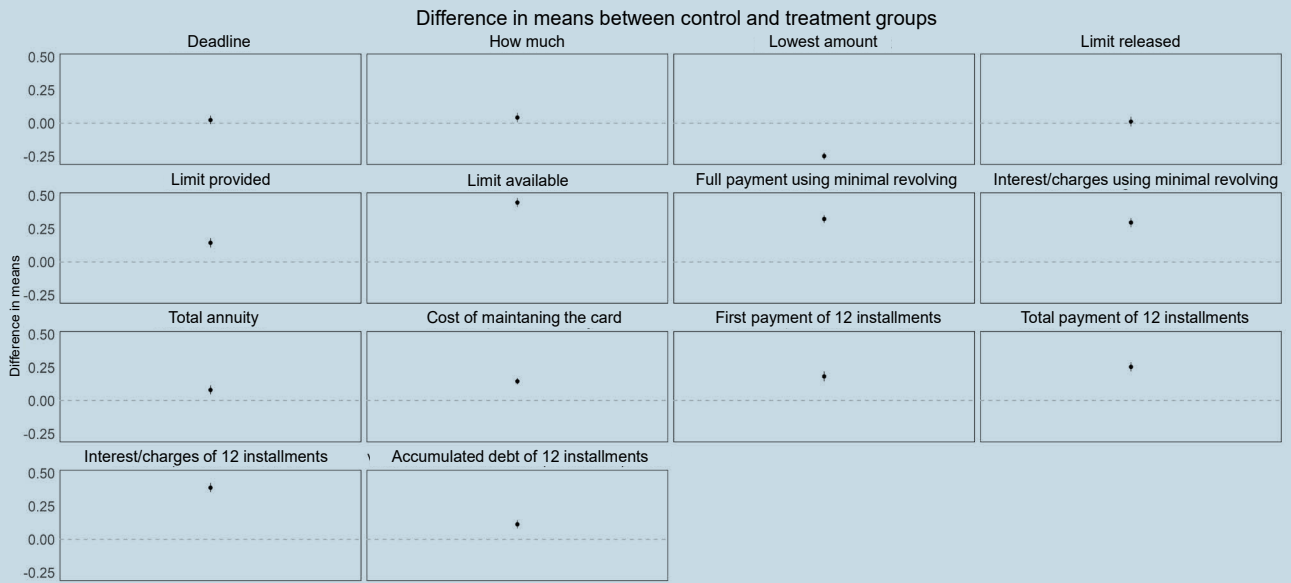
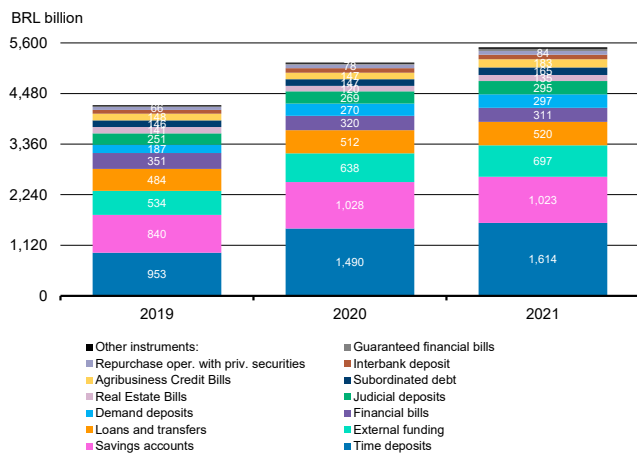


Figure 2.1 – Funding profile by instrument^{1/}
Banking system



Sources: BCB, B3

^{1/} Time deposits: bank deposit certificates, bank deposit receipts, time deposits with special guarantees from the Credit Guarantor Fund (FGC). Subordinated debt, bank deposit certificates with subordination clause, financial bills with subordination clause, and instruments eligible for capital composition. Other instruments: structure operations certificate (COE), bills of exchange, mortgage bills, box operations. Repurchase operations: only repurchase operations with private securities.

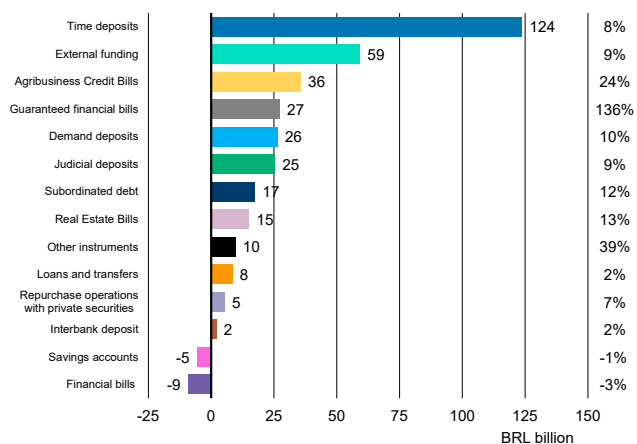
2.1 Funding profile by instrument types

The pace of expansion of funding stock in 2021 (6.6%) was much lower than in 2020 (22%) (Figure 2.1). This decline is associated with the reduction of uncertainties concerning the Covid-19 pandemic due to the progress of vaccination and the consequent gradual recovery of economic activity. This scenario led lower funding effort by the banking system and a lower propensity of economic agents to accumulate banking funding instruments. The conclusion or reshaping government measures adopted since the outbreak of the pandemic also contributed to the year's result.

Among instruments with growth in absolute terms, it should be highlighted time deposits, with BRL 124 billion (Figure 2.2). It should be noticed that the apparently high growth of external funding reflects, to a great extent, the exchange rate variation in the year. In other words, out of the BRL 59 billion expansion in the stock of external funding, nearly BRL 48 billion refer to the USD price change (corresponding to 7.4% of the total 9.3% relative growth). In relative terms, it should be mentioned the performance of Agribusiness Credit Bills (LCA), Real Estate Bills (LCI), and Guaranteed Financial Bills (LIG), which are instruments exempt from the income tax for households and that provide good profitability to clients and lower financial costs to banks.

Savings accounts and financial bills registered a negative performance in 2021. As for savings accounts, negative net inflows reached BRL 36 billion (Figure 2.3), as opposed to positive values observed in the previous four years. Since it is a typical instrument for households, the performance of savings accounts is sensitive to the macroeconomic scenario, of increasing Selic rate starting in March 2021 and high inflation.

Figure 2.2 – Funding instruments – Stock variation^{1/}
December 2020 to December 2021



Sources: BCB, B3

^{1/} Time deposits: bank deposit certificates, bank deposit receipts, time deposits with special guarantees from the Credit Guarantor Fund (FGC). Subordinated debt, bank deposit certificates with subordination clause, financial bills with subordination clause, and instruments eligible for capital composition. Other instruments: structure operations certificate (COE), bills of exchange, mortgage bills, box operations. Repurchase operations private securities: only repurchase operations with private securities.

Figure 2.3 – Savings accounts
Breakdown of stock variation

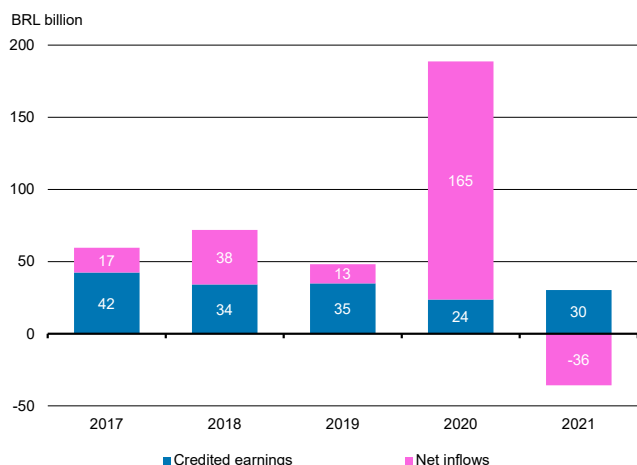


Figure 2.4 – Evolution of the DI overnight rate

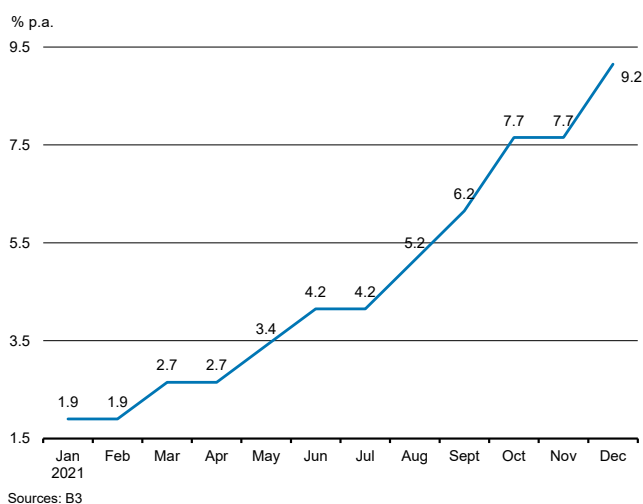
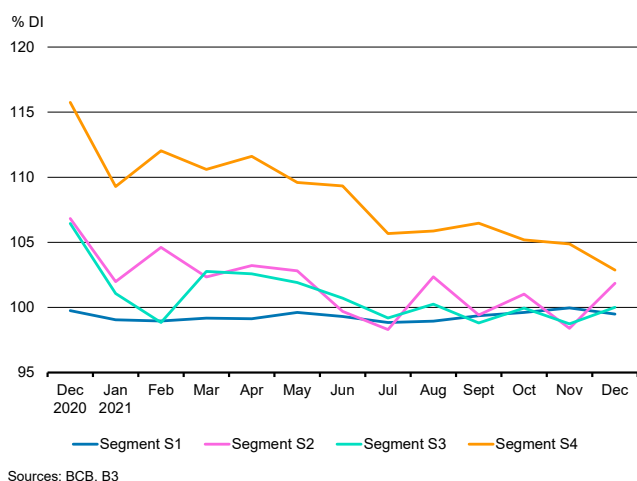


Figure 2.5 – Average monthly funding rates as a percentage of DI by segment^{1/}



^{1/} Weighted average rate of the following instruments: bank deposit certificates, bank deposit receipts, time deposits with special guarantees from the Credit Guarantor Fund (FGC), interfinancial deposits, agribusiness credit bills, real estate credit bills, financial bills (including those with a subordination clause), real estate secured bills.

2.2 Funding rates

An important component of the funding cost is the Interbank Deposit (DI) rate, which, in turn, is associated with the Selic rate. Due to the monetary tightening cycles, the DI rate rose strongly in 2021, following historical lows in 2020 (Figure 2.4).

The average funding rate of the S1 segment kept around 100% of the DI rate. In the other segments, the average funding cost as a percentage of the DI rate declined. The downward trend of rates in the S4 segment, as a percentage of the DI, continued throughout the year, whereas, in the S2 and S3 segments, was concentrated in the first half (Figure 2.5).^{26, 27}

Concerning Bank Deposit Certificates (CDB), the average funding rates, as a proportion of the DI, remained stable throughout 2021, except in the S4 segment, for which the downward trend persisted until late 2021, dropping nearly 6% in comparison with 2020's rates (Figure 2.6). This decline observed in the S4 segment is mainly due to the reduction in the rates of intermediated operations,²⁸ whose volume was relevant for this segment, as opposed to the other segments. These operations accounted for nearly 32% of the funding in the S4 segment in December. For this group of operations, a migration was observed in the period, in relative terms, from fixed to post-fixed operations.

As for average funding rates of financial bills with no subordination clause, as a proportion of the DI, they closed the year with average rates lower than in 2020 in all segments (Figure 2.7). The downward trend was stronger in the S2, S3, and S4.

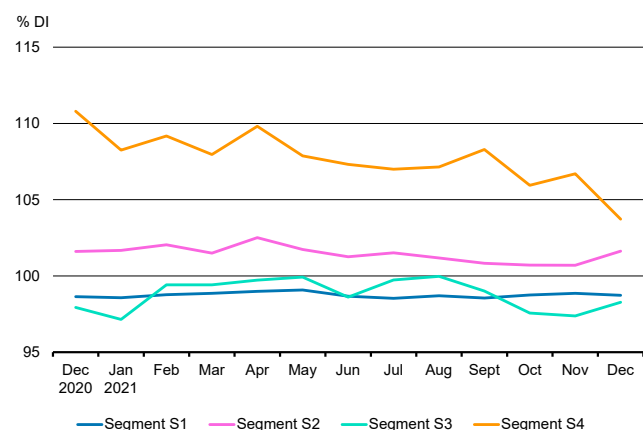
Regarding LCA and LCI (Figure 2.8), one observes, as of the beginning of the upward interest rate cycle, the declining trajectory of funding rates as a proportion of the DI in the S2, S3, and S4 segments, with some volatility in the S4 segment.

²⁶ S1 to S4 refer to the segments of the set of financial institutions and other institutions authorized to operate by the BCB, in compliance with the proportional application of the prudential rule, pursuant to Resolution 4,553, of January 30, 2017.

²⁷ Due to the greater use of this instrument, repo operations with private securities are not included in the series of Figure 2.5. LFG are not included in the series of Figures 2.5 and 2.7. These securities are used as collaterals for BCB loans to financial institutions aiming to assure adequate levels of liquidity in the financial system.

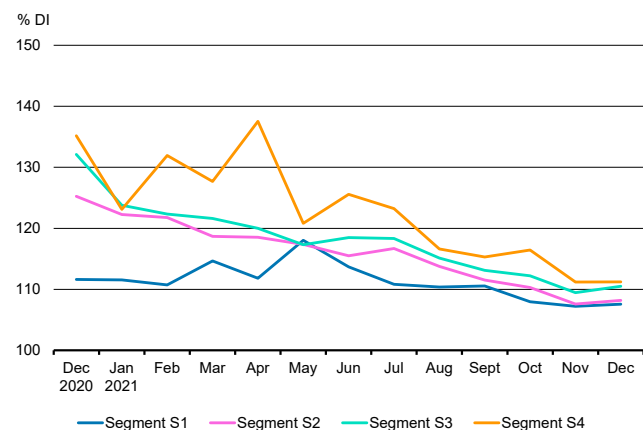
²⁸ Operations in which clients (households and companies) of a given financial institution (intermediate institution) hold in their portfolio securities issued by other financial institution (issuing institution).

Figure 2.6 – Average funding rates as a percentage of DI by segment
Bank Deposit Certificate – CDB



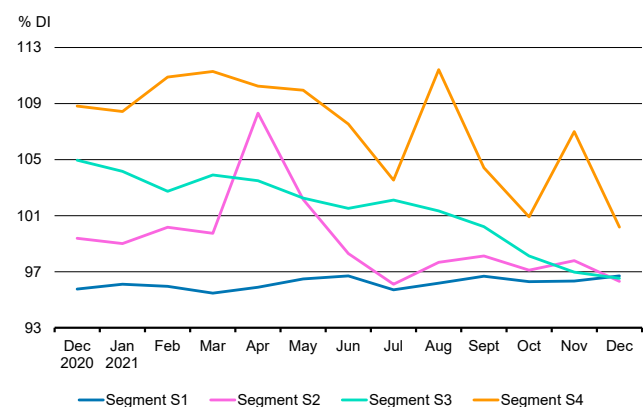
Sources: BCB, B3

Figure 2.7 – Average funding rates as a percentage of DI by segment (excluding LFG)
Financial Bills with no subordination clause



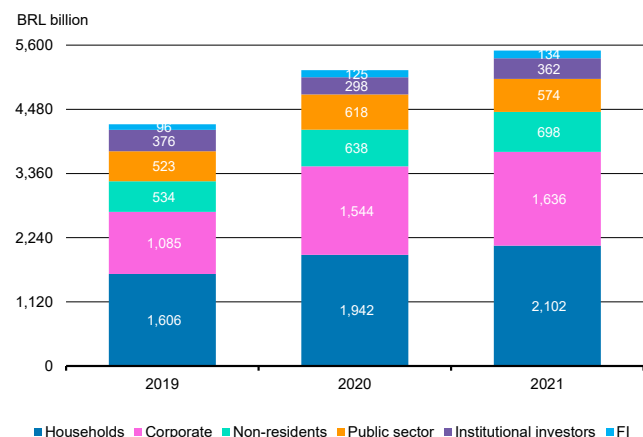
Sources: BCB, B3

Figure 2.8 – Average funding rates as a percentage of DI by segment
Agribusiness Credit Bills (LCA) and Real Estate Bills (LCI)



Sources: BCB, B3

Figure 2.9 – Funding profile
By investor type – Banking system



Sources: BCB, B3

2.3 Investor type

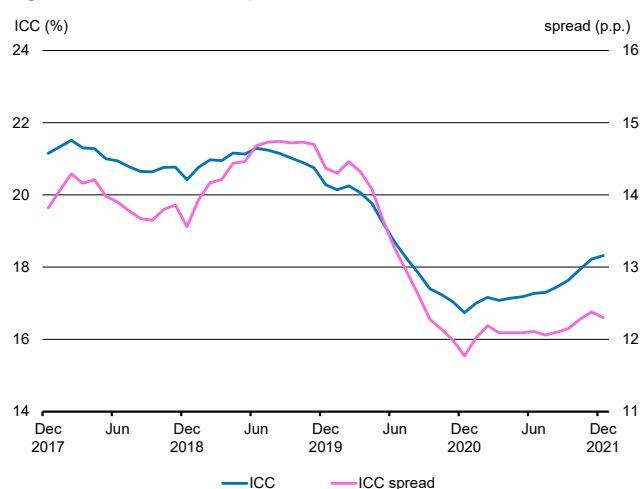
In December 2021, households and companies not classifiable as institutional investors or non-resident continued to be the main banking system funding source, accounting for 68% of the total stock (Figure 2.9). Non-residents and the public²⁹ sector complete the relevant funding sources for the banking system, with respective participations of 13% and 10%. It is noteworthy, in the year, the 21% expansion in funding raised from institutional investors, in line with the recovery of the funds industry, especially fixed income, in the same period.³⁰

²⁹ Mostly corresponding to the intermediation of financing from governmental programs or credit lines (Housing, Rural Credit, Machinery and Equipment, Urbanization, Innovation etc.). As of the base-date of June 2020, also includes LFG held by the BCB.

³⁰ The distribution of judicial deposits between households and companies was estimated by applying to cash deposits the same percentage obtained for the aggregate portfolio of instruments for which the BCB has available information.

Credit Cost and Spread Decomposition

Figure 3.1 – ICC and its spread



This chapter presents the decomposition of credit cost in Brazil, as measured by the Average Cost of Outstanding Loans (ICC), published by the BCB since April 2017. The ICC estimates the average cost of credit for outstanding operations from the borrower's perspective, at a given moment, regardless of the contract date. Therefore, the ICC includes information from both recently signed contracts and previous ones still in force.

In line with several measures aimed at monetary easing and credit stimulus adopted to combat the effects of the Covid-19 pandemic, the ICC dropped sharply throughout 2020 (Figure 3.1). In 2021, an upward trend began, reflecting the start of the normalization process of the monetary policy, growing from 16.7% p.a. in December 2020 to 18.3% at the end of 2021, although still below the 20.3% observed in December 2019. Nevertheless, it is noteworthy that the average ICC in 2021 was lower than the 2020's average.

The ICC spread is obtained by excluding from the ICC the share corresponding to the funding cost.³¹ In 2021 the ICC spread also increased, from 11.8 p.p. at the end of 2020 to 12.3 p.p. at the end of 2021. As observed in ICC averages, the average ICC spread in 2021 was lower than the 2020's average. This trajectory reflected the decline in the average ICC in the period when compared with a relative stability in the funding cost of financial institutions.

³¹ Represents the funding financial cost to maintain the credit portfolio. It is the average of the funding rates for each month, weighted by the respective shares in the remaining portfolio balance. The estimated funding cost of the resources invested in each loan type considers the interest rate "equivalent to a fixed rate" corresponding to the original operation's term. Further methodological details on the ICC estimation, including the section on the funding cost, in the BCB Technical Note 45 (Portuguese only) "Indicador de Custo de Crédito", of June 2018.

Table 3.1 – ICC composition

Discrimination	p.p.		
	2019	2020	2021
A.1 – Average ICC	20.96	18.49	17.50
A.2 – Capitalization method adjustment	1.78	1.41	1.27
A – Average adjusted ICC (A.1 - A.2)	19.18	17.08	16.23
B.1 – Funding cost	6.46	5.37	5.34
B.2 – Capitalization method adjustment	0.18	0.13	0.13
B – Adjusted funding cost (B.1 - B.2)	6.28	5.24	5.21
C – Spread (A - B)	12.91	11.85	11.02
D – FGC expenses	0.04	0.05	0.05
E – IOF	0.48	0.36	0.29
F – Contributions to PIS and Cofins	0.53	0.49	0.47
G – Administrative expenses	3.78	3.41	3.28
H – Loss estimate	3.00	2.76	2.27
I – Interest not received from operations overdue for 60 or more days	0.71	0.55	0.45
J – Granted discounts	0.28	0.31	0.25
K.1 – Interest paid to equity owners	0.58	0.39	0.42
K.2 – Income tax on interest paid to equity owners	0.10	0.07	0.07
K – Interest expenses on interest paid to equity owners (K.1 + K.2)	0.68	0.46	0.49
L – ICC margin before income tax and CSLL (C - D - E - F - G - H - I - J - K)	3.40	3.46	3.48
M – Income tax and CSLL	1.36	1.53	1.65
N – ICC financial margin (L - M + K.1)	2.61	2.32	2.24

3.1 ICC decomposition

The ICC decomposition aims to identify and measure the main determinant factors to the cost of credit for borrowers.³² Table 3.1 presents the items used to calculate the decomposition, which is carried out based on the average adjusted ICC for the year, calculated by using a capitalization method adjustment. These items are grouped into five components, as follows (between brackets, the corresponding lines in the table):

1) **Funding Cost (B)**: estimates the interest paid by financial institutions on their funding, as in the case of time deposits;

2) **Delinquency (H + I + J)**: captures losses arising from non-payment of debts or interest, in addition to discounts granted;

3) **Administrative Expenses (G)**: captures diverse administrative expenses such as personnel and marketing, incurred by financial institutions when performing their credit operations;

4) **Taxes and FGC (D + E + F + K2 + M)**: reflects taxes on credit paid by borrowers and financial institutions. Customers pay the Tax on Financial Operations (IOF). Financial institutions pay contributions to the Social Integration Program (PIS), Contribution for Social Security Financing (Cofins), Income Tax (IR), Social Contribution on Net Income (CSLL)³³ and also withhold the income tax (IRRF) on interest paid to equity owners. All these taxes, directly or indirectly, affect the ICC. In addition, all institutions associated to the Credit Guarantor Fund (FGC) shall monthly contribute to the fund with a certain percentage of the guaranteed accounts balance³⁴;

32 The ICC decomposition methodology uses information from the Cosif (FGC, Administrative Expenses, and Taxes), as well as information from financial institutions (IOF) and the Credit Information System (funding and delinquency rates). Taxes are obtained through the application of rates on the respective calculation bases, whereas administrative expenses are calculated by a proportional allocation to the profitability of bank products. Further details can be found in the box 5 “Credit cost and spread decomposition methodology”, of the Banking Report 2017, and boxes concerning methodological improvements in subsequent reports – “Credit cost and spread decomposition methodology: improvements and decomposition by credit segment”, of the Banking Report 2018, and “Credit cost and spread decomposition methodology: improvements and decomposition by credit segment, including credit unions”, of the Banking Report 2019.

33 It should be mentioned that the CSLL rate of 20% effective in 2017 and 2018 was reduced to 15% for the entire 2019 and January and February 2020. On March 1st, 2020, the rate returned to 20% and, as of July 1st, 2021, rose to 25% until December 31, 2021.

34 Further details on the institutions associated to the Credit Guarantor Fund (FGC) and collaterals are available at <https://www.fgc.org.br/>.

Figure 3.2 – ICC decomposition
Average 2019 to 2021

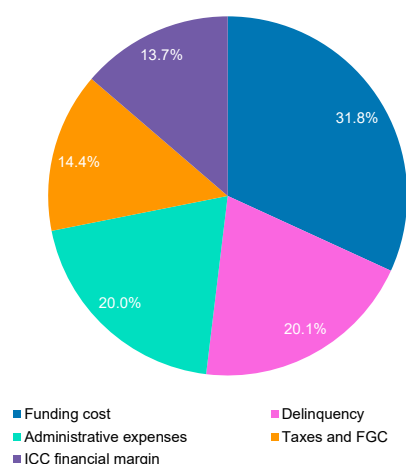


Table 3.2 – Average adjusted ICC decomposition

Discrimination	p.p.			
	2019	2020	2021	Average
1 – Funding cost	6.28	5.24	5.21	5.58
2 – Delinquency	3.99	3.61	2.97	3.52
3 – Administrative expenses	3.78	3.41	3.28	3.49
4 – Taxes and FGC	2.51	2.49	2.52	2.51
5 – ICC financial margin	2.62	2.32	2.25	2.40
Average adjusted ICC (1 + 2 + 3 + 4 + 5)	19.18	17.08	16.23	17.50

Table 3.3 – Average adjusted ICC decomposition

As a proportion of average adjusted ICC

Discrimination	%			
	2019	2020	2021	Average
1 – Funding cost	32.74	30.68	32.10	31.84
2 – Delinquency	20.80	21.14	18.30	20.08
3 – Administrative expenses	19.71	19.96	20.21	19.96
4 – Taxes and FGC	13.09	14.64	15.53	14.42
5 – ICC financial margin	13.66	13.58	13.86	13.70
Average adjusted ICC (1 + 2 + 3 + 4 + 5)	100.00	100.00	100.00	100.00

5) ICC Financial Margin (N): includes the portion of the ICC that remunerates the shareholders' capital of financial institutions for credit activity and other factors not mapped by the methodology, including errors and omissions in the estimates.

In 2021, with except for the component Taxes and FGC, all ICC components contributed to the 0.85 p.p. decline when compared with 2020 (Table 3.2). The main factor underlying the ICC decline was the delinquency (-0.64 p.p.), followed by administrative expenses (-0.13 p.p.), financial margin (-0.07 p.p.), and funding cost (-0.03 p.p.). Conversely, the component Taxes and FGC rose 0.03 p.p., mainly reflecting the increase in the CSLL rate, from 20% to 25%, by July 1st, 2021, until December 31, 2021. Although the Selic rate target has closed 2020 and 2021 at 2.00% p.a. and 9.25% p.a., respectively, the yearly average rose from 2.89% in 2020 to 4.54% in 2021, a difference of only 1.65 p.p. The average funding cost remained relatively stable (dropped from 5.24 p.p. to 5.21 p.p.).

The highlight in the comparison between 2021 and 2020 is the delinquency behavior, which, in addition to still being influenced by some of the measures adopted to reduce the pandemic effects, was also mitigated by the economic recovery seen in 2021, with a GDP expansion of 4.6%.

When the percentage participation of several ICC components is considered, the decline in delinquency was once again the highlight, with a reduction from 21.1% in 2020 to 18.3% in 2021. This means that, for the first time since 2015, when the first ICC decomposition was carried out, delinquency was not the second most important ICC component, with this position shifting to administrative expenses (Table 3.3). However, considering the average in the 2019-2021 period, a measure more stable and less subject of cyclical components, *Delinquency* (average of 20.1%) continues to be the second most important factor, just behind the *Funding cost* (average of 31.8%) (Figure 3.2). It was followed by *Administrative Expenses* (an average of 20.0%), *Taxes and FGC* (an average of 14.4%) and, finally, *ICC Financial Margin* (an average of 13.7%).

It should be emphasized that, in order to estimate the ICC impact from changes in some of its components, it is necessary to consider the direct and indirect effects on the other components. Thus, the increase or reduction in the value of some specific component may not be reflected with the same value in the ICC.

Figure 3.3 – ICC components
Non-earmarked, earmarked, and overall credit
Average 2019 to 2021

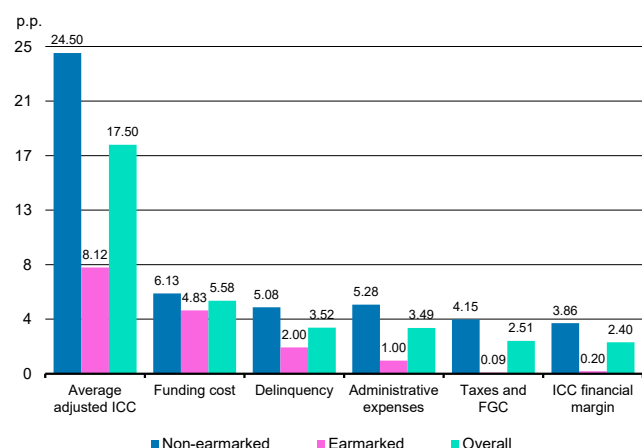


Table 3.4 – ICC composition by modality
Average from 2019 to 2021

Discrimination	p.p.		
	Non-earmarked	Earmarked	Overall
A.1 – Average ICC	27.49	8.43	18.98
A.2 – Capitalization method adjustment	2.99	0.31	1.49
A – Average adjusted ICC (A.1 - A.2)	24.50	8.12	17.50
B.1 – Funding cost	6.31	4.94	5.72
B.2 – Capitalization method adjustment	0.18	0.11	0.15
B – Adjusted funding cost (B.1 - B.2)	6.13	4.83	5.58
C – Spread (A - B)	18.37	3.29	11.93
D – FGC expenses	0.05	0.03	0.05
E – IOF	0.64	0.02	0.38
F – Contributions to PIS and Cofins	0.75	0.13	0.50
G – Administrative expenses	5.28	1.00	3.49
H – Loss estimate	3.46	1.61	2.68
I – Interest not received from operations overdue for 60 or more days	1.20	0.19	0.57
J – Granted discounts	0.42	0.20	0.28
K.1 – Interest paid to equity owners	0.46	0.46	0.46
K.2 – Income tax on interest paid to equity owners	0.08	0.08	0.08
K – Interest expenses on interest paid to equity owners (K.1 + K.2)	0.54	0.54	0.54
L – ICC margin before income tax and CSLL (C - D - E - F - G - H - I - J - K)	6.03	-0.44	3.45
M – Income tax and CSLL	2.64	-0.18	1.51
N – ICC financial margin (L - M + K.1)	3.86	0.20	2.39

The ICC decomposition separately for the non-earmarked and earmarked portfolios reveals that the average ICC continues significantly lower for the earmarked credit,³⁵ reflecting the cap imposed on rates due to specific regulations, as well as all of its components (Table 3.4 and Figure 3.3). Similarly to previous years, the financial margin of earmarked credit remained around zero.³⁶

In the YoY comparison (Table 3.5), one notices that the variations of the ICC components in the earmarked credit are relatively small, causing fluctuations in the overall result to be mostly determined by the non-earmarked segment. However, in 2021, the delinquency variation in the earmarked credit segment also contributed more strongly to the decline in the participation of this factor in the ICC variation of overall credit. It should also be mentioned that the ICC financial margin of the earmarked credit segment increased, from 0.15 p.p. in 2020 to 0.48 p.p. in 2021.

3.2 ICC spread decomposition

The decomposition of the ICC spread – given by the difference between the ICC and the funding cost – allows to identify the factors determining the credit cost for borrowers, leaving out market conditions effects related to the cost of funding resources, such as the level of the Selic rate.

³⁵ It should be noticed, however, that the larger the disaggregation of the credit portfolio for purposes of calculating the participation of components that influence the ICC formation, the more inaccurate becomes the allocation of administrative expenses.

³⁶ It is noteworthy that for the capital of financial institutions allocated to credit obtain risk-adjusted returns that make it a viable financial product, it is necessary that the profitability of the non-earmarked loan portfolio compensates for the low margin of the earmarked credit segment.

Table 3.5 – ICC Decomposition by modality

	p.p.								
	Non-earmarked			Earmarked			Overall		
	2019	2020	2021	2019	2020	2021	2019	2020	2021
Funding cost	7.15	5.55	5.70	5.17	4.81	4.52	6.28	5.24	5.21
Delinquency	5.78	5.18	4.28	2.35	2.10	1.56	3.99	3.62	2.97
Administrative expenses	5.86	5.10	4.87	1.04	0.98	0.97	3.78	3.41	3.28
Taxes and FGC	4.44	4.06	3.95	-0.13	0.07	0.32	2.51	2.50	2.53
ICC financial margin	4.52	3.69	3.36	-0.04	0.15	0.48	2.61	2.32	2.24
Average adjusted ICC (1 + 2 + 3 + 4 + 5)	27.75	23.58	22.16	8.39	8.11	7.85	19.17	17.09	16.23

Table 3.6 – ICC spread decomposition

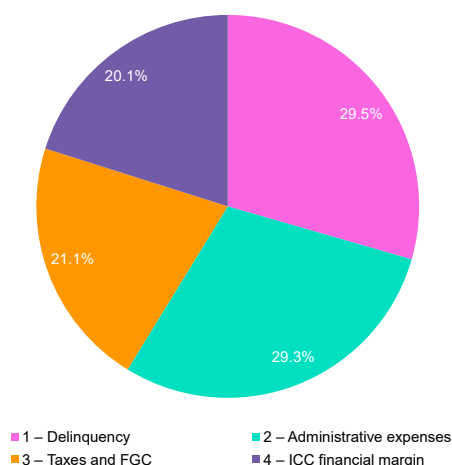
Discrimination	p.p.			
	2019	2020	2021	Average
1 – Delinquency	3.99	3.61	2.97	3.52
2 – Administrative expenses	3.78	3.41	3.28	3.49
3 – Taxes and FGC	2.51	2.49	2.52	2.51
4 – ICC financial margin	2.62	2.32	2.25	2.40
ICC spread (1 + 2 + 3 + 4)	12.90	11.83	11.02	11.92

Table 3.7 – ICC spread decomposition

As a proportion of spread

Discrimination	%			
	2019	2020	2021	Average
1 – Delinquency	30.93	30.52	26.95	29.47
2 – Administrative expenses	29.30	28.83	29.76	29.30
3 – Taxes and FGC	19.46	21.05	22.87	21.12
4 – ICC financial margin	20.31	19.61	20.42	20.11
ICC spread (1 + 2 + 3 + 4)	100.00	100.00	100.00	100.00

Figure 3.4 – ICC spread decomposition
Average 2019 to 2021



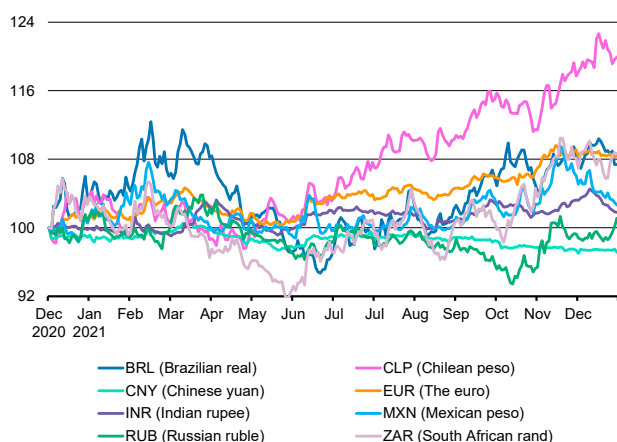
The comparison between 2020 and 2021 reveals that all components but Taxes and the FGC contributed to the ICC spread reduction, especially *Delinquency* (Table 3.6).³⁷ It is noteworthy that the methodology employed to estimate the effect of delinquency on the ICC spread decomposition uses measures that estimate losses by observing how much can be written-off in the balances of financial institutions. Throughout 2020, relevant provisioning for credit losses were observed in the balance sheets of financial institutions and, throughout 2021, new provisioning started to return to pre-pandemic levels. However, since these provisions are only estimates, they may underestimate or overestimate the effective losses with credit assets, even though their accounting record has already taken place. Therefore, the delinquency rate in 2020, and mainly in 2021, should be carefully analyzed, since unobserved losses in the year, due to the measures of the public sector and the private financial sector to mitigate the pandemic effects, may occur in the subsequent years, depending on the evolution of the economic outlook.

When considering average values between 2019 and 2021, Delinquency accounted for 29.5% of the ICC spread, closely followed by Administrative Expenses (29.3%), Taxes and FGC (21.1%), and right after, ICC Financial Margin (20.1%) (Table 3.7 and Figure 3.4).

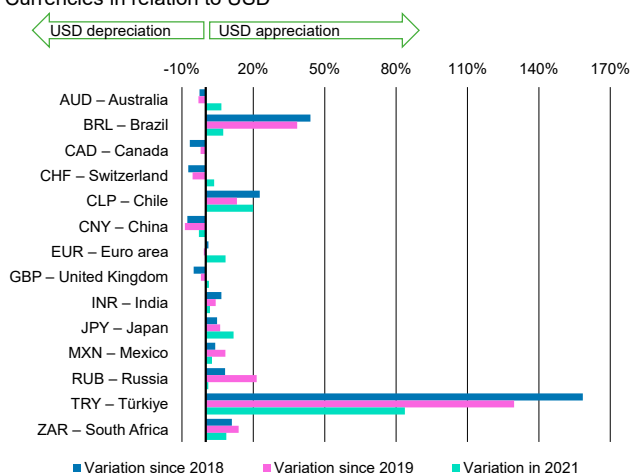
³⁷ The contributions in percentage points are the same as those reported for the ICC decomposition, but the percentage shares of all components (Table 3.6) increase due to the exclusion of the funding cost.

Foreign Exchange Products

Figure 4.1 – Foreign exchange market
Evolution of USD related FX rates in 2021
Index = 100 in 12/31/2020



Figures 4.2 – FX rates variation
Currencies in relation to USD



4.1 Introduction³⁸

The USD exchange rate varied by 7.39% in 2021³⁹ (Figures 4.1 and 4.2), showing peaks in 2021Q1 and 2021Q4. When compared with a set of emerging countries' currencies, BRL had a variation close to the average of these, being surpassed in devaluation by CLP, TRY and ZAR.

Spot buying and selling operations⁴⁰ with settlement terms of up to two business days accounted for 91.3% of the total value of the primary market (against 92.5% in 2020), and for 99,0% of the number of operations in 2021. This type of settlement predominates due to the characteristics of the underlying transactions related to the foreign exchange operations and their associated cash flow.

Transactions with future settlement⁴¹ represented 8.7% of the total value of the primary market in 2021, showing a slight increase over the value of 2020 (7.5%), after two consecutive years of reduction. The granting of advances on foreign exchange contracts (Advances on Foreign Exchange Contracts – ACC and Advances on Export

38 The analyses were carried out based on the operations registered in the Foreign Exchange System (“Sistema Câmbio”) of the Banco Central do Brasil (BCB). Institutions authorized to operate in the foreign exchange market carry out registrations in the day of occurrence, but the exchange contract can be retroactively changed at any time. The amounts reported in this chapter were calculated in February 2022 and include operations with a symbolic (i.e., not effective) delivery of currencies. Values may differ from the foreign exchange rate series released every Wednesday by the BCB, which do not encompass retroactive registrations.

39 Comparison of the Ptax of December 31st, 2020, with December 31st, 2021.

40 In these cases, institutions authorized to operate in the foreign exchange market negotiate with their customers the final price of the foreign currency, with no adjustments being made at the time of settlement.

41 Export Shipment Documents Operations for settlement over two business days are considered as future contracts. The foreign exchange rate used is the spot rate at trade date, and an adjustment in relation to the future rate of the foreign currency is negotiated between the parties.

Figure 4.3 – ACC and ACE
Average cost

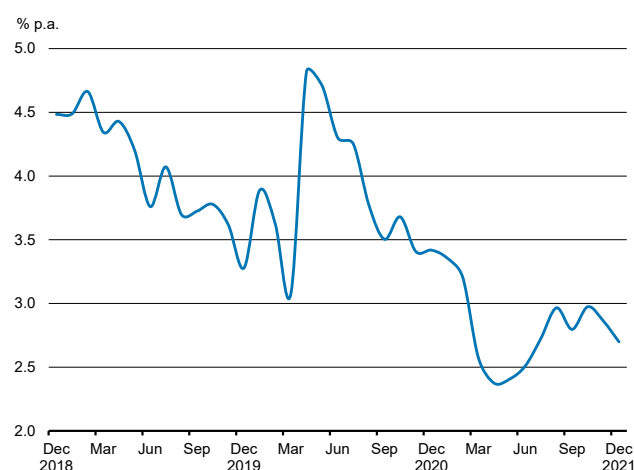
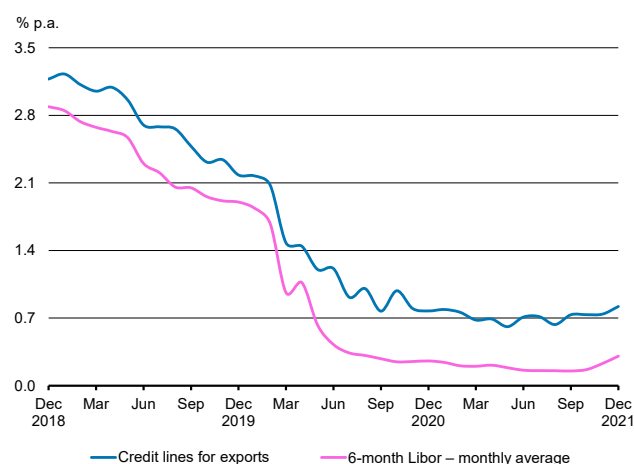


Figure 4.4 – External credit lines for exports
Cost



Shipment Documents – ACE),⁴² in the amount of USD 28.9 billion in 2021, corresponded to 12.9% of the total of USD 223.7 billion of foreign exchange contracts (+0.5 p.p. over 2020) and 10.3% of USD 280.8 billion physical exports (-1.0 p.p. over 2021) registered by the Ministry of Economy – Industry, Foreign Trade, and Services (ME-SECINT).

The volume of outstanding ACCs and ACEs increased 17.6%, from USD 13.4 billion in December 2020 to USD 15.7 billion in December 2021. The value of new operations also increased during the year (23.6%), the result of the combination of both the increase in the volume of export-related foreign exchange contracts (17%) and in the exporters' demand for this type of financing. The average term of ACCs and ACEs was 163 business days. The interest rates of these operations decreased in relation to the previous year, going from 3.42% p.a. in December 2020 to 2.70% p.a. in December 2021.

The variation was not constant during the year, with a reduction of 1.08 p.p. during the first four months and partial recomposition during the rest of the year (Figure 4.3). The main funding source used by financial institutions for the concession of export related ACC/ ACE contracts were the specific credit lines raised with banks abroad. Considering all external funding aimed at promoting Brazilian exports, the nominal cost at the end of 2021 was 0.82% p.a., almost the same as the one at the end of 2020 (Figure 4.4).⁴³

The foreign exchange operations with future settlement without the granting of advances reached USD 39.3 billion in export-related contracts (+68.5% over 2020) and another USD 67.0 billion in other classifications (+19.3% over 2020). The increase in other classifications is mainly associated with an increase in the value of contracts related to long-term direct loans with non-resident creditors, profit remittances on foreign direct investment, and imports.

42 Exports foreign exchange operations may be traded previously or after the shipment of goods, with the anticipation of the domestic currency to the Brazilian exporter by the bank authorized to operate in foreign exchange, against future receipt of the foreign currency. The anticipation of the domestic currency is intended to provide the exporter with the capital necessary to finance its industrial or commercial cycle. ACC occurs when the exporter receives the domestic currency before the shipment of goods. ACE occurs when the exporter receives the domestic currency after the shipment of goods.

43 Figure 4.4 considers all external funding aimed at promoting Brazilian exports, not only the resources used in ACC and ACE operations.

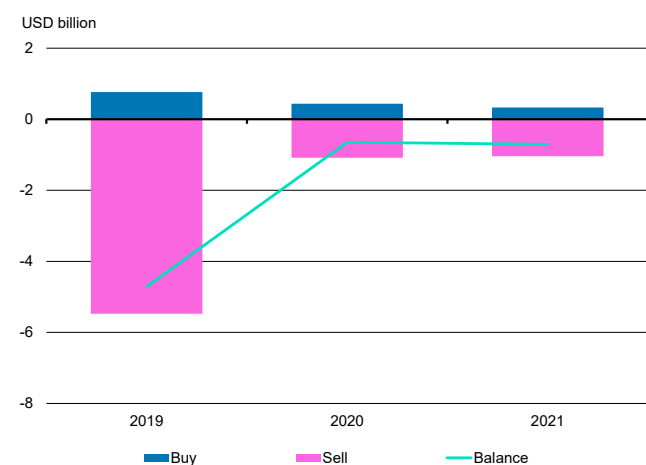
Table 4.1 – Exports and imports

Advances

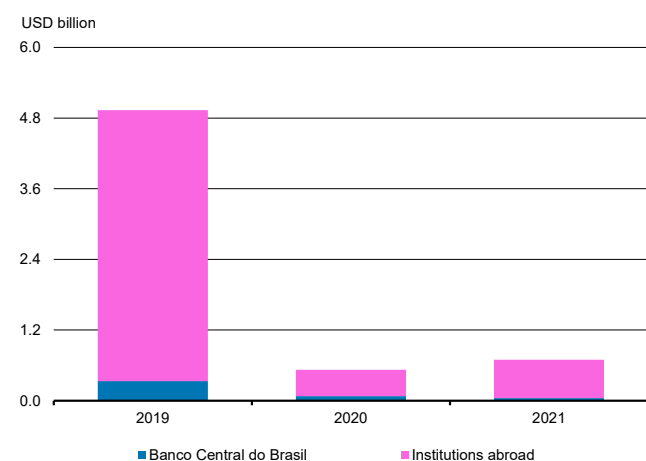
	2019		2020		2021	
	USD billion	%	USD billion	%	USD billion	%
Exports	197.9	100.0	191.8	100.0	223.7	100.0
Early delivery	59.3	30.0	70.6	36.8	54.8	24.5
Short-term	25.3	12.8	29.4	15.3	30.3	13.5
Long-term	34.0	17.2	41.2	21.5	24.5	10.9
Other modalities	138.6	70.0	121.2	63.2	168.9	75.5
Imports	175.1	100.0	164.8	100.0	207.5	100.0
Prepayment	16.3	9.3	16.5	10.0	26.8	12.9
Other modalities	158.8	90.7	148.3	90.0	180.7	87.1

Figure 4.5 – Foreign currency in cash

Buy (+) and sell (-) to customers

**Figure 4.6 – Foreign currency in cash**

Origin concerning the supplier



Operations regarding exports prepayment totaled USD 54.8 billion in 2021, the lowest percentage share in total exports in the last three years (Table 4.1). This external financing modality is mostly used by multinational export companies which raise funds from their affiliated companies abroad for future shipment of goods.

Prepayment of imports represented 12.9% of the total imports (Table 4.1). This type of operation shows large concentration: 0.6% of the total clients accounted for half of the operated value. The biggest clients are oil/fuels, energy, and fertilizers companies. In 2021, agencies related to the health sector also stood out, due to the import of equipment, vaccines, and supplies related to the Covid-19 pandemic.

Operations involving foreign currency in cash and traveler's checks amounted to USD 1.1 billion in sales to clients and USD 330.8 million in purchases (Figure 4.5). Strongly dependent on the international tourism segment, cash transactions repeated, in 2021, the low performance of 2020 regarding volumes traded, especially in the first five months of the year, a period in which there was a significant increase in the number of people infected by Covid-19.

The volume of cash currency purchased by Brazilian travelers is usually much higher than the volume sold by foreign tourists in the country. The difference is covered by the import of foreign currency in cash by banks⁴⁴ and, complementarily, by the BCB, which also imports foreign currencies in cash to supply the market (Figure 4.6).

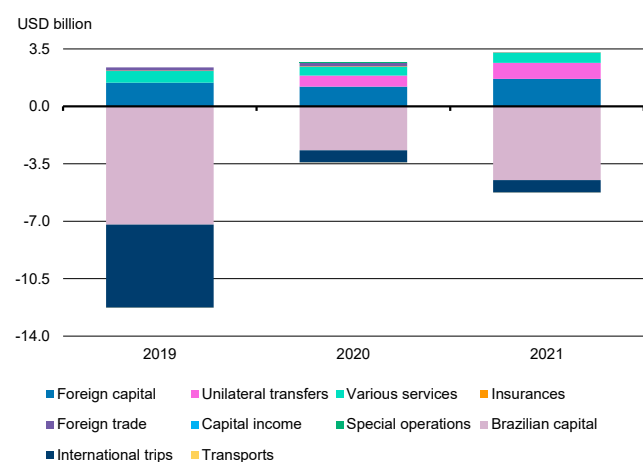
4.2 Characteristics of clients and of foreign exchange operations

Transactions carried out by households are characterized by their low average value and are concentrated in the Southeast region, in a combination of population and income *per capita* above the average of the other regions⁴⁵ (Table 4.2). Households continued to account for the

44 The supply of foreign currency in cash and its distribution throughout the national territory involves complex logistics, which begin with international transportation, usually by cargo plane, customs clearance at Brazilian airports, transportation by a specialized company to the place of custody and, subsequently, distribution to the points of sale (bank branches, foreign exchange posts, correspondents). These logistics imply costs that impact the spread charged by authorized institutions via the fees or exchange rate used in the operations.

45 The distribution per region is based on the address registered at the Brazilian Federal Revenue Secretariat (RFB) of the client of the foreign exchange transaction recorded in the BCB's database. For companies, the place of production and shipment may be different from the location of the office that contracts the foreign exchange operation (headquarters and branches).

Figure 4.7 – Household operations
Balances by accounts



largest number of foreign exchange operations in the spot market (78.7% of total), despite the drop compared with the pre-pandemic period, due to the reduction in international travel. The increase in net remittances related to Brazilian assets stood out in 2021 although at a level significantly lower than in 2019 (Figure 4.7). This increase was mainly due to Brazilian investments in companies and funds abroad. Net remittances related to deposits and available funds and spending abroad on international trips remain well below those seen in 2019.

Companies have a higher average transaction value than households. Their participation in the primary market volume represented 98.0% (Table 4.2), despite accounting for only 21.3% of the number of operations. The total volume transacted in the primary market raised 26.0% for households and 11.4% for companies compared with 2020.

In this market, the few high-value transactions account for most of the total value traded. In 2021, approximately 0.7% of the total amount of transactions had a value above USD 1 million, but they accounted for 84% of the transacted volume (Table 4.3).

Table 4.2 – Primary market

Value and quantity of contracts by region and type of client

Region	2019		2020		2021	
	USD billion	Qt. (x1,000)	USD billion	Qt. (x1,000)	USD billion	Qt. (x1,000)
North	20.1	1,255	18.1	1,059	23.6	1,277
Households	0.8	1,166	0.6	969	0.7	1,179
Companies	19.3	89	17.4	90	22.9	99
Northeast	42.7	2,498	35.8	1,709	42.4	2,183
Households	2.5	2,303	1.8	1,525	2.3	1,976
Companies	40.2	195	34.0	184	40.1	207
Central-West	54.2	1,515	50.1	1,156	66.7	1,772
Households	2.6	1,388	1.7	1,040	2.0	1,457
Companies	51.6	127	48.4	116	64.6	315
Southeast	1,344.6	13,029	1,189.2	9,325	1,298.0	11,367
Households	21.7	10,149	16.2	6,644	20.6	8,422
Companies	1,322.9	2,880	1,173.0	2,681	1,277.4	2,945
South	89.9	3,829	86.5	2,859	109.3	3,454
Households	4.1	3,038	3.0	2,097	3.8	2,559
Companies	85.8	791	83.6	762	105.6	895
Abroad	9.1	1,729	5.9	1,091	6.3	936
Households	1.4	1,725	1.4	1,088	1.6	930
Companies	7.7	4	4.5	3	4.7	5
Total	1,560.8	23,855	1,385.5	17,199	1,546.4	20,988
Households	33.3	19,769	24.6	13,363	31.0	16,523
Companies	1,527.5	4,086	1,360.9	3,836	1,515.3	4,465

Foreign exchange operations related to foreign trade corresponded to nearly 27.9% of the total volume of operations in the primary market (Table 4.4). In turn, the operations linked to non-residents⁴⁶ portfolio investment corresponded to 34.7% of that market.

⁴⁶ These are operations regulated by Resolution 4,373, of September 29, 2014, predominantly investments in stocks, federal government bonds, funds, and depositary receipts. Before carrying out operations, the non-resident investor must constitute a representative and a custodian in the country and be registered in the Brazilian Securities and Exchange Commission (CVM).

Table 4.3 – Primary market

Cumulative values per band

Accumulated band	2019		2020		2021	
	USD billion	Qt. (x1,000)	USD billion	Qt. (x1,000)	USD billion	Qt. (x1,000)
Up to USD 3,000	11.7	20,391	7.5	13,973	9.0	17,187
Up to USD 100,000	72.2	23,246	64.8	16,620	76.6	20,285
Up to USD 1 million	216.4	23,716	203.5	17,072	245.2	20,842
Up to USD 10 million	565.9	23,830	526.5	17,177	618.3	20,964
Up to USD 100 million	1,190.9	23,854	1,075.7	17,197	1,245.1	20,987
Up to USD 1 billion	1,507.8	23,855	1,333.0	17,199	1,486.5	20,988
Total	1,560.8	23,855	1,385.5	17,199	1,546.4	20,988

Table 4.4 – Primary market

Values by type of contract

Type of contract	2019		2020		2021	
	USD billion	%	USD billion	%	USD billion	%
Exports	197.9	12.7	191.8	13.8	223.6	14.5
Imports	175.1	11.2	164.8	11.9	207.4	13.4
Financial – Portfolio Invest. – Non-residents	633.7	40.6	527.9	38.1	536.2	34.7
Financial – Portfolio Invest. – Residents	36.6	2.3	61.2	4.4	74.3	4.8
Financial – Other	517.5	33.2	439.8	31.7	504.8	32.6
Total	1,560.8	100.0	1,385.5	100.0	1,546.4	100.0

Table 4.5 – Foreign exchange market

Number of institutions by segment

Institutions that registered operations	2019	2020	2021
Authorized institutions – Banking	92	92	92
Universal banks	64	64	64
Commercial banks	13	14	14
Investment banks	5	5	5
Foreign exchange banks	5	4	4
Development banks	2	2	2
Cooperative banks	2	2	2
Savings banks	1	1	1
Authorized institutions – Non-banking	81	71	71
Foreign exchange brokers	55	48	48
Securities brokerage houses	13	12	13
Securities dealers	13	11	10
Total	173	163	163

4.3 Institutions authorized to operate in the foreign exchange market

By the end of 2021, 183 institutions were authorized to operate in the foreign exchange market, of which 103 were banking⁴⁷ and 80 non-banking institutions.⁴⁸ The number of institutions that actually carried out foreign exchange operations did not change from 2020 to 2021: 163, of which 92 were banking and 71 non-banking institutions (Table 4.5). The banking segment institutions predominated in the volume traded, with 99.2% of the total (Table 4.6).

Regarding foreign exchange correspondents,⁴⁹ the number of institutions registered in the System of Information on Entities of Interest to the Banco Central do Brasil (Unicad), at the end of 2021, was 4,427. Over 2021, 911 of these institutions conducted foreign exchange transactions, representing a 20% drop compared with 2020 (Table 4.7). This drop was mainly due to the continued low activity in the international tourism sector, the focus of these institutions.

Of the total of transactions carried out in the primary market, about 14.8% were intermediated by non-banking institutions. Table 4.8 shows the annual evolution of intermediated values and the number of institutions that acted as intermediaries.

The ten largest financial institutions in terms of transacted volume are from the banking segment.⁵⁰ In the primary

47 The banking segment institutions may carry out all kinds of foreign exchange transactions provided for in the foreign exchange regulations, of any value, except for the development banks, which may only carry out specific operations authorized by the BCB.

48 The non-banking segment institutions, in their operations with clients (primary market), are limited to spot operations (with a settlement term of up to two business days) and a maximum value per transactions of USD 100,000.00 (or its equivalent in other currencies) for payment institutions, and up to USD 300,000.00 (or its equivalent in other currencies) for the other institutions of this segment. The payment institutions authorized to operate by the BCB may also, as of January 1, 2023, be authorized to operate in the foreign exchange market, in accordance with the Resolution BC 231, of July 27, 2022.

49 Institutions authorized to operate in the foreign exchange market, except payment institutions, may engage correspondents when performing the following operations, up to the limit of USD 3,000.00 for each operation, or its equivalent in other currencies: i) purchase and sale of foreign currency in cash, check and traveler's check, as well as foreign currency recharge of prepaid cards; and ii) unilateral transfers from or to overseas. It is worth noting that correspondents can also receive and forward proposals for foreign exchange transactions, later carried out by the contracting institution.

50 Six are foreign controlled banks, three are privately-owned domestic banks, and one is a state-owned bank.

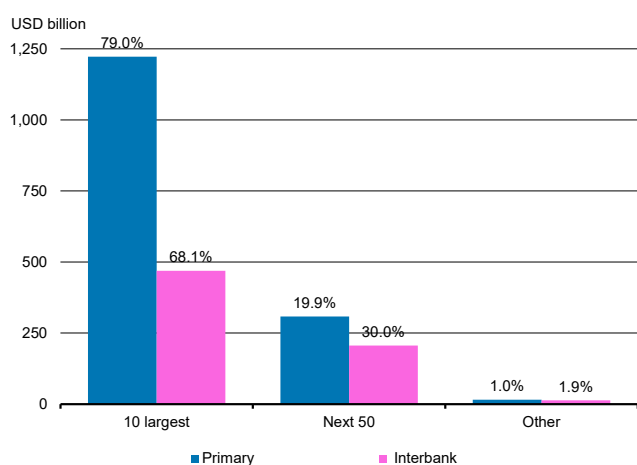
Table 4.6 – Primary and interbank foreign exchange market

Volumes traded

	USD billion		
Institutions authorized to operate in foreign exchange by segment	2019	2020	2021
Banking sector	2,443.5	2,063.3	2,216.0
Universal banks	2,311.3	1,961.3	2,075.5
Commercial banks	34.5	36.0	54.5
Foreign exchange banks	27.5	27.2	38.1
Investment banks	45.9	29.0	25.0
Banco Central do Brasil	0.2	0.2	15.1
Savings banks	11.1	3.7	2.9
Development banks	11.6	4.8	2.6
Cooperative banks	1.4	1.3	2.4
Non-banking sector	23.6	15.4	18.8
Foreign exchange brokers	18.3	12.9	16.6
Securities dealers	3.8	1.5	1.4
Securities brokerage houses	1.5	1.0	0.9
Total	2,467.1	2,078.7	2,234.8

Table 4.7 – Annual evolution of foreign exchange correspondents

	2019	2020	2021
Number of correspondents	1,403	1,145	911
Number of operations (million)	5.7	3.0	2.5
Unilateral transfers (USD million)	985.8	606.2	438.8
Purchase	179.4	132.3	159.3
Sale	806.4	473.9	279.5
International trips (USD million)	1,992.6	455.9	292.8
Purchase	254.3	148.3	100.8
Sale	1,738.4	307.6	192.0

Figure 4.8 – Foreign exchange market
Market share in 2021

market, the top ten operators concentrated 79.0% of the value. In the interbank market,⁵¹ this percentage was 68.1% (Figure 4.8).

Almost the entire volume transacted in the primary market (99.3%) is concentrated in the banking segment (Table 4.9). In an intra-segmental analysis, one observes that the top ten banking institutions concentrate 80.4% of the volume transacted in 2021, and this participation has shown continuous drops in the last three years, totaling -3.2 p.p. in this period. The non-banking segment is less concentrated, as the top ten institutions were responsible for 72.1% of the transacted volume in 2021. However, an increase in concentration in the last three consecutive years, by a total of 13.6 p.p. over the period, was observed.⁵²

In the interbank market, the banking segment accounted for 98.8% of the volume transacted in 2021, close to the participation of the previous two years. The intra-segmental analysis shows that the relative concentration of the top ten institutions had a small reduction in 2021 in the banking segment (1.9 p.p.), accompanied by an increase in the non-banking segment (4.7 p.p.), reaching 69.0% and 67.6%, respectively (Table 4.10).

4.4 Forms of foreign currency delivery

The most common way of delivering foreign currency is by wire transfer. Cash transactions hold the second place in terms of number of operations, but, as they are mostly carried out by households, they hold only the sixth place in terms of volume (Table 4.11). In the “symbolic” form of delivery, which presents a relevant amount, a pair of same value purchase and sale foreign exchange transactions is registered, representing a change in the status of local assets owned by non-residents or

51 Although carried out in the interbank market, arbitrage operations (in which two foreign currencies are swapped) and exchanges between bank money and cash were not included in this report. In these operations, two foreign currencies or even one single foreign currency are traded with no counterpart in BRL. In the latter case, with different delivery forms (cash × bank transfer).

52 In 2021, there was a 15% reduction in the volume of cash, traveler’s checks, and prepaid card operations (modalities most associated with international travel), traded by non-banking institutions, accompanied by a 35% increase in operations involving other forms of foreign currency delivery. Since, among the ten largest non-banking institutions, the weight of cash, traveler’s checks, and prepaid card operations (4% in 2021) is much smaller than that for the rest of these institutions (22% in 2021), these ten largest institutions ended up increasing their share in the non-banking segment last year.

Table 4.8 – Evolution of the intermediaries

Values traded in foreign exchange from 2019 to 2021

	2019	2020	2021
Number of intermediaries	49	43	41
Number of operations (thousand)	652.1	557.3	598.8
Purchase	152.8	133.8	138.6
Sale	499.3	423.5	460.2
Value of operations (USD billion)	235.3	193.4	228.8
Purchase	103.6	85.2	100.4
Sale	131.7	108.2	128.4

resources abroad owned by residents carried out without an effective exchange of currencies. These registries enable the statistical accounting of these changes, as well as the update of the respective records in the BCB's foreign capital registration systems.

When analyzing the participation of the banking and non-banking segments in the primary market, the relevance of the non-banking sector in the total market value is low (0.67% in 2021). However, when analyzing only operations where the foreign currency is delivered in the forms of cash/traveler's checks and prepaid currency cards, this segment becomes relevant regarding the number of transactions, representing 67% and 55% of the market, respectively. These are operations in which small values prevail, traded with households, and classified as "International Travel".

In 2021, the participation of the "Deposit account" and "Exporter deposit account held in a bank abroad" modalities in the total amount continued to grow, albeit with lower magnitude. While in the former the increase was due almost exclusively to operations regarding foreign investment in equities, the increase in the latter was mainly due to exports by the agribusiness sector.

The increase in these two modalities contrasted with the reduction in the "Wire transfer" modality. The "Cash/traveler's checks" and "Prepaid cards" modalities showed no recovery in the year, maintaining values close to those of 2020 when they suffered sharp declines due to the impacts of the Covid-19 pandemic (Table 4.12).

4.5 Traded currencies

The traded currency is the currency defined between the parties involved in the transaction. In the foreign exchange position of each authorized institution, the balances resulting from all foreign exchange transactions carried out in the interbank and primary markets are recorded.

Transactions using USD prevailed in foreign exchange contracts registered in the primary market in 2021, with an 89.99% participation in the total value, followed by EUR, with 7.82% (Table 4.13). It is the first time since 2011 that the USD share has fallen below 90%. The average share of this currency has been 91% since 2016. It is also worth mentioning the inflow of Special Drawing Rights in an amount equivalent to USD 15 billion, accounted in the SDR currency.

Table 4.9 – Primary marketShare in total contracted volume^{1/}

Rank	2019	2020	2021	%		
	Banking segment	99.3	Banking segment	99.4	Banking segment	99.3
1	Citibank S.A.	15.8	Citibank S.A.	15.8	Citibank S.A.	16.2
2	Bradesco S.A.	13.7	Santander (Brasil) S.A.	14.3	Santander (Brasil) S.A.	14.1
3	Santander (Brasil) S.A.	12.0	Bradesco S.A.	11.4	Itaú Unibanco S.A.	12.1
4	Banco J.P. Morgan S.A.	10.4	Itaú Unibanco S.A.	10.8	Banco J.P. Morgan S.A.	8.9
5	Itaú Unibanco S.A.	10.0	Banco J.P. Morgan S.A.	9.8	Bradesco S.A.	8.4
6	Banco do Brasil S.A.	7.3	Banco do Brasil S.A.	6.9	Banco do Brasil S.A.	6.9
7	Société Générale Brasil S.A.	3.9	Bank of America Merrill Lynch Banco Múltiplo S.A.	4.0	Bank of America Merrill Lynch Banco Múltiplo S.A.	4.6
8	Bank of America Merrill Lynch Banco Múltiplo S.A.	3.9	ABN Amro S.A.	3.7	ABN Amro S.A.	4.0
9	BNP Paribas Brasil S.A.	2.9	Société Générale Brasil S.A.	2.5	BTG Pactual S.A.	2.6
10	Goldman Sachs do Brasil Banco Múltiplo S.A.	2.9	BNP Paribas Brasil S.A.	2.4	BNP Paribas Brasil S.A.	2.6
	Other	17.1	Other	18.3	Other	19.6
	Non-banking segment	0.7	Non-banking segment	0.6	Non-banking segment	0.7
1	Western Union Corretora de Câmbio S.A.	11.1	Advanced Corretora de Câmbio Ltda	11.9	Advanced Corretora de Câmbio Ltda	12.7
2	B&T Corretora de Câmbio Ltda.	9.8	B&T Corretora de Câmbio Ltda.	11.9	B&T Corretora de Câmbio Ltda.	12.0
3	Advanced Corretora de Câmbio Ltda	8.1	Western Union Corretora de Câmbio S.A.	10.4	Western Union Corretora de Câmbio S.A.	9.0
4	Cotação Distribuidora de Títulos e Valores Mobil. S.A.	6.9	Fair Corretora de Câmbio S.A.	6.9	Wise Brasil Corretora de Câmbio Ltda	7.6
5	Confidence Corretora de Câmbio S.A.	6.6	Guitta Corretora de Câmbio Ltda.	6.1	Fair Corretora de Câmbio S.A.	6.6
6	Fair Corretora de Câmbio S.A.	5.9	AGK Corretora de Câmbio S.A.	6.1	Guitta Corretora de Câmbio Ltda.	6.0
7	AGK Corretora de Câmbio S.A.	4.3	Cotação Distribuidora de Títulos e Valores Mobil. S.A.	4.5	AGK Corretora de Câmbio S.A.	5.8
8	Guitta Corretora de Câmbio Ltda.	4.0	Dourada Corretora de Câmbio Ltda.	3.7	Treviso Corretora de Câmbio S.A.	4.7
9	Broker Brasil Corretora de Câmbio Ltda.	2.6	Treviso Corretora de Câmbio S.A.	3.6	Cotação Distribuidora de Títulos e Valores Mobil. S.A.	4.1
10	LevyCam – Corretora de Câmbio e Valores Ltda.	2.5	Broker Brasil Corretora de Câmbio Ltda.	3.6	Broker Brasil Corretora de Câmbio Ltda.	3.7
	Other	38.2	Other	31.2	Other	27.9

1/ The percentages by segment refer to the total of the primary market; the percentages by institution refer to the total of the segment.

Table 4.10 – Interbank marketShare in total contracted^{1/}

Rank	2019	2020	2021	%		
	Banking segment	98.7	Banking segment	99.0	Banking segment	98.8
1	Santander (Brasil) S.A.	20.0	Santander (Brasil) S.A.	20.7	Banco J.P. Morgan S.A.	14.4
2	BTG Pactual S.A.	10.7	BTG Pactual S.A.	11.1	Santander (Brasil) S.A.	13.5
3	Banco J.P. Morgan S.A.	9.6	Banco J.P. Morgan S.A.	9.7	BTG Pactual S.A.	10.7
4	Citibank S.A.	5.7	Itaú Unibanco S.A.	6.9	Itaú Unibanco S.A.	6.9
5	Itaú Unibanco S.A.	5.7	Bradesco S.A.	5.5	Bradesco S.A.	5.5
6	Bradesco S.A.	5.5	Citibank S.A.	4.6	Citibank S.A.	4.5
7	Goldman Sachs do Brasil Banco Múltiplo S.A.	3.8	Banco do Brasil S.A.	3.6	Banco do Brasil S.A.	4.2
8	Bank of America Merrill Lynch Banco Múltiplo S.A.	3.4	Bank of America Merrill Lynch Banco Múltiplo S.A.	3.4	Bank of America Merrill Lynch Banco Múltiplo S.A.	4.0
9	Banco do Brasil S.A.	3.1	Morgan Stanley S.A.	2.8	Morgan Stanley S.A.	2.7
10	Morgan Stanley S.A.	3.1	Votorantim S.A.	2.5	Goldman Sachs do Brasil Banco Múltiplo S.A.	2.6
	Other	29.4	Other	29.1	Other	31.0
	Non-banking segment	1.3	Non-banking segment	1.0	Non-banking segment	1.2
1	B&T Corretora de Câmbio Ltda.	14.4	B&T Corretora de Câmbio Ltda.	16.7	Advanced Corretora de Câmbio Ltda	13.2
2	Advanced Corretora de Câmbio Ltda	9.2	Advanced Corretora de Câmbio Ltda	13.8	B&T Corretora de Câmbio Ltda.	11.4
3	Coluna S/A Distribuidora de Títulos e Valores Mobil.	7.4	Fair Corretora de Câmbio S.A.	5.9	Wise Brasil Corretora de Câmbio Ltda	8.8
4	Western Union Corretora de Câmbio S.A.	5.0	Guitta Corretora de Câmbio Ltda.	4.9	Fair Corretora de Câmbio S.A.	6.9
5	Fair Corretora de Câmbio S.A.	4.7	AGK Corretora de Câmbio S.A.	4.5	Treviso Corretora de Câmbio S.A.	5.8
6	Confidence Corretora de Câmbio S.A.	4.5	OM Distribuidora de Títulos e Valores Mobil S.A.	4.5	Guitta Corretora de Câmbio Ltda.	5.6
7	Cotação Distribuidora de Títulos e Valores Mobil. S.A.	4.4	Broker Brasil Corretora de Câmbio Ltda.	3.6	AGK Corretora de Câmbio S.A.	5.6
8	Invest Corretora de Câmbio Ltda.	3.5	LevyCam – Corretora de Câmbio e Valores Ltda.	3.1	Broker Brasil Corretora de Câmbio Ltda.	4.1
9	Guitta Corretora de Câmbio Ltda.	2.7	Treviso Corretora de Câmbio S.A.	3.1	OM Distribuidora de Títulos e Valores Mobil S.A.	3.5
10	AGK Corretora de Câmbio S.A.	2.6	Dourada Corretora de Câmbio Ltda.	2.7	Confidence Corretora de Câmbio S.A.	2.7
	Other	41.7	Other	37.1	Other	32.4

1/ i) the natures of arbitrage and exchanges between bank money and cash were not considered; ii) the percentages by segment refer to the total of the primary market; the percentages by institution refer to the total of the segment.

Table 4.11 – Primary foreign exchange market

Forms of foreign currency delivery – 2021

Form of delivery	Segment:		Total
	Banking	Non-banking	
Volume (USD million)			
Wire transfer	1,137,430	8,806	1,146,236
Deposit account	235,484	364	235,848
Symbolic	132,821	331	133,152
Exporter deposit account held in a bank abroad	26,905	7	26,912
Letter of credit – forward	1,441	0	1,441
Cash and/or traveler's checks	547	825	1,371
Letter of credit – demand	1,127	0	1,127
Check	126	11	136
Prepaid card	53	73	125
Securities	13	1	13
Agreement on Reciprocal Payments and Credits (CCR)	0	-	0
Total	1,535,946	10,416	1,546,362
Number of operations			
Wire transfer	12,350,754	5,173,434	17,524,188
Cash and/or traveler's checks	671,642	1,345,385	2,017,027
Deposit account	1,061,104	81,076	1,142,180
Prepaid card	89,853	111,048	200,901
Symbolic	56,267	11,947	68,214
Check	7,719	6,105	13,824
Exporter deposit account held in a bank abroad	11,379	48	11,427
Letter of credit – forward	8,182	1	8,183
Letter of credit – demand	1,762	1	1,763
Securities	530	27	557
Agreement on Reciprocal Payments and Credits (CCR)	33	-	33
Total	14,259,225	6,729,072	20,988,297

Table 4.12 – Primary foreign exchange market

Forms of foreign currency delivery	USD billion		
	2019	2020	2021
Wire transfer	1,185.7	1,035.1	1,146.2
Deposit account	208.9	208.2	235.8
Symbolic	149.3	119.3	133.2
Exporter deposit account held in a bank abroad	8.1	19.3	26.9
Letter of credit – forward	1.3	1.1	1.4
Cash and/or traveler's checks	6.2	1.5	1.4
Letter of credit – demand	0.5	0.7	1.1
Check	0.1	0.0	0.1
Prepaid card	0.5	0.1	0.1
Securities	0.1	0.0	0.0
Agreement on Reciprocal Payments and Credits (CCR)	0.1	0.1	0.0
Total	1,560.8	1,385.5	1,546.4

The concentration in USD is lower from the perspective of the quantity of operations in the primary market. This is mainly due to the higher number of transactions in currencies other than USD with a low value, related to international travel operations and resident maintenance transfers.

In 2021, the participation of the USD reduced, while the share of the EUR increased, the opposite of what occurred in 2020, when the sharp decrease in operations related to international trips reached more significantly the number of transactions in EUR, CAD, GBP, and ARS. However, the 2021 reversal was only partial and insufficient for USD and EUR shares to return to pre-pandemic values.

In the interbank market, the share of the USD in the value of contracts was even higher (98.54%),⁵³ while the EUR represented 1.33%, showing a recovery compared with 2020, but still lower than in 2019 (Table 4.14). Regarding the number of operations, the concentration is lower than in the primary market, since operations with the USD accounted for about 61% of the total, while the EUR was the currency of nearly 23% of the operations.

⁵³ Considering all types of interbank market operations in the calculation, the participation of the USD in this market in 2021 would be 80.3%. However, the data presented in this document only consider types with a high participation of the USD, such as operations with the BCB (where the participation is 100%) and purchases/sales among institutions (participation of 98.5%). Arbitrage operations, where the USD is usually exchanged for another currency and, therefore, its participation is 50%, and operations where bank money is exchanged with cash, or vice versa, where the average participation of the USD in 2021 was 89.3%, are not considered in this report.

Table 4.13 – Primary foreign exchange market

Traded currency	2019		2020		2021	
	USD billion	%	USD billion	%	USD billion	%
Value of contracts	1,560.75	100.00	1,385.55	100.00	1,546.36	100.00
USD – US dollar	1,426.17	91.38	1,265.03	91.30	1,391.51	89.99
EUR – Euro	109.12	6.99	99.08	7.15	120.92	7.82
SDR – Special Drawing Rights	0.00	0.00	0.00	0.00	14.99	0.97
JPY – Yen	6.42	0.41	5.29	0.38	5.22	0.34
GBP – Pound sterling	6.68	0.43	4.24	0.31	4.20	0.27
CHF – Swiss franc	8.04	0.52	7.44	0.54	3.06	0.20
HKD – Hong Kong dollar	0.00	0.00	0.00	0.00	1.45	0.09
CAD – Canadian dollar	1.22	0.08	0.91	0.07	1.30	0.08
MXN – Mexican peso	0.36	0.02	0.72	0.05	1.29	0.08
CNY – Renminbi	0.35	0.02	0.58	0.04	0.85	0.06
Other	2.38	0.15	2.24	0.16	1.56	0.10
	Qt.	%	Qt.	%	Qt.	%
Number of contracts	23,854,953	100.00	17,198,616	100.00	20,988,297	100.00
USD – US dollar	17,773,925	74.51	14,410,392	83.79	16,994,386	80.97
EUR – Euro	4,301,764	18.03	2,089,032	12.15	3,129,731	14.91
GBP – Pound sterling	359,003	1.50	156,540	0.91	198,633	0.95
CAD – Canadian dollar	297,318	1.25	124,522	0.72	192,879	0.92
PYG – Guaraní	135,599	0.57	56,595	0.33	85,251	0.41
CHF – Swiss franc	84,252	0.35	58,316	0.34	70,011	0.33
MXN – Mexican peso	45,323	0.19	21,679	0.13	50,696	0.24
AUD – Australian dollar	85,832	0.36	40,234	0.23	46,234	0.22
JPY – Yen	72,094	0.30	40,082	0.23	44,220	0.21
ARS – Argentinian peso	381,463	1.60	102,492	0.60	40,808	0.19
Other	318,380	1.33	98,732	0.57	135,448	0.65

Table 4.14 – Interbank foreign exchange market

Traded currency	2019		2020		2021	
	USD billion	%	USD billion	%	USD billion	%
Value of contracts	906.31	100.00	693.13	100.00	688.48	100.00
USD – US dollar	887.54	97.93	686.12	98.99	678.44	98.54
EUR – Euro	16.78	1.85	6.01	0.87	9.16	1.33
GBP – Pound sterling	0.83	0.09	0.41	0.06	0.27	0.04
CHF – Swiss franc	0.15	0.02	0.09	0.01	0.15	0.02
CAD – Canadian dollar	0.47	0.05	0.12	0.02	0.14	0.02
JPY – Yen	0.08	0.01	0.12	0.02	0.14	0.02
ARS – Argentinian Peso	0.18	0.02	0.15	0.02	0.07	0.01
AUD – Australian dollar	0.14	0.02	0.04	0.01	0.03	0.00
SEK – Swedish crown	0.01	0.00	0.01	0.00	0.02	0.00
CNY – Renminbi	0.01	0.00	0.01	0.00	0.02	0.00
Other	0.12	0.01	0.05	0.01	0.04	0.01
	Qt.	%	Qt.	%	Qt.	%
Number of contracts	1,050,203	100.00	490,077	100.00	540,139	100.00
USD – US dollar	474,235	45.16	296,451	60.49	329,115	60.93
EUR – Euro	261,514	24.90	99,948	20.39	122,650	22.71
CAD – Canadian dollar	74,534	7.10	21,470	4.38	22,822	4.23
GBP – Pound sterling	74,020	7.05	22,908	4.67	18,918	3.50
MXN – Mexican peso	13,510	1.29	5,338	1.09	9,300	1.72
CHF – Swiss franc	15,894	1.51	6,040	1.23	8,846	1.64
AUD – Australian dollar	28,530	2.72	9,106	1.86	4,912	0.91
JPY – Yen	16,214	1.54	5,408	1.10	4,822	0.89
AED – UAE dirham	1,954	0.19	1,094	0.22	2,968	0.55
COP – Colombian peso	8,174	0.78	2,878	0.59	2,338	0.43
Other	81,624	7.77	19,436	3.97	13,448	2.49

Issuance of sustainability-related bonds by Brazilian companies in the international and domestic markets¹

Introduction

Sustainability-related bonds, or sustainable bonds, are part of the suite of financial instruments used to finance environmental, social, or governance (ESG) projects by companies, banks, and governments. For the purposes of this box, they encompass Green, Social, Sustainability, and Sustainability-linked (GSSS) bonds. Global issuance of these instruments has grown significantly in the last two years. The amount issued during the biennium 2020-2021, according to Environmental Finance Data,² was approximately USD 1.6 trillion, almost double the issuance in the previous five years.

This box aims to answer some questions in the context of sustainable bond issuances by Brazilian issuers:³ What are the most used financial instruments? Who are the issuers? What is the main placement market for the bonds? How has the issuance of sustainable bonds by Brazilian issuers evolved? What are the risks associated with these instruments?

The focus of the study is the sustainable bonds issued by Brazilian non-financial companies in the domestic and foreign markets, highlighting bonds and notes in foreign issuances, and debentures in domestic issuances. The characteristics of bank issuances are presented for comparison purposes with corporate ones.

What are the most used financial instruments in financing through sustainable bonds?

The most common types of sustainable financial instruments include loans and debt securities.⁴ The International Capital Market Association (ICMA) classifies sustainable bonds into use-of-proceeds and general-purposes, as

1 The data in this study use the nationality concept, differing from the scope of international statistics (BPM6, IIP and External Debt), which adopt the concept of residence. The difference between these two approaches in the analysis of foreign issues is addressed in the March 2015 Inflation Report, in the Box “Issues of subsidiaries of companies headquartered in Brazil in the international market.” Data source displayed in the box: 1) Brazilian issuer of a sustainable bond in the foreign market: Refinitiv; 2) Brazilian issuer of a sustainable bond in the domestic market: NINT; 3) Global issuer of a sustainable bond: Environmental Finance Data; 4) Brazilian issuer of a sustainable + conventional bond in the domestic market: Anbima; and 5) Brazilian issuer of a sustainable + conventional bond in the foreign market: Refinitiv with a consistency check via the company's website.

2 Environmental Finance Data survey. <https://efdata.org/>.

3 The importance of information regarding sustainability, including data on sustainable financial instruments, for central banks to exercise their mandates, is addressed in BIS – Sustainable finance data for central banks. IFC Report 14. December 2021.

4 Among the eligible financial instruments, the Climate Bond Initiative (CBI) listed: standard use-of-proceeds bonds, revenue bonds, project bonds, securitized bonds, convertible bonds or notes, *sukuk*, *schuldschein*, loan facilities commercial papers, debt instruments issued by a green bond fund, covered bonds, and green deposits – <https://www.climatebonds.net/files/files/climate-bonds-standard-v3-20191210.pdf>.

described in Table 1. According to ICMA, in 2020, approximately 97% of the sustainable bonds issued were aligned with the principles and guidelines published by the association.^{5,6}

Table 1 – Types of sustainable bonds, as defined by ICMA^{1/}

<i>Use-of-proceeds</i>	<i>Green, Social, Sustainability Bonds (GSS)</i>	Use-of-proceeds bonds are those whose funds raised are applied exclusively in the financing or refinancing, in part or in full, of eligible new or existing projects. They may be green bonds, social bonds, or sustainability bonds, ^{2/} and are aligned with the four main components of GSS bonds. ^{3/}
<i>General-purposes</i>	<i>Sustainability-Linked Bonds (SLBs)</i>	General-purposes bonds, unlike the use-of-proceeds ones, are those in which the resources of the issuance do not have a specific destination, that is, the money is not "earmarked", and can be used for general purposes. In turn, general-purposes bonds contemplate ESG ^{4/} targets to which the financial and/or structural characteristics of the bond are tied. Failure to meet these targets implies changes in these characteristics, such as an increase in the coupon. The major components of SLBs are distinct from those of GSSs. ^{5/}

1/ Based on ICMA's Principles and Guidelines.

2/ Eligible green projects, in the case of green bonds; eligible social projects for social bonds; and a combination of both for sustainability bonds:

- eligible green projects: renewable energy; energy efficiency; pollution control and prevention; environmentally-sustainable management of living natural resources and land use; land and water biodiversity; clean transportation; sustainable water and wastewater management; climate change adaptation; products, technologies and production processes adapted to the circular economy; green buildings;
 - eligible social projects (the most common types): affordable basic infrastructure; access to essential services; affordable housing; employment generation and programs to prevent and/or reduce unemployment resulting from socio-economic crises; food security and sustainable food systems; socio-economic advancement and empowerment.

3/ The four main components of GSSs are: earmarking information, project evaluation and selection process, issuance resources management and information reports.

4/ Objectives measured using predefined key performance indicators (KPIs) and assessed against predefined sustainability performance targets (SPTs).

5/ Key components of SLBs: selection of KPIs; calibration of SPTs; bond characteristics; reporting and verification.

In addition to ICMA-aligned bonds, other securities have been adopted in the financing of sustainable projects by Brazilian issuers, such as transition bonds,⁷ which are a type of use-of-proceeds bond. As defined by the CBI, this is a bond designed for large greenhouse gas emitters to finance the transition to more sustainable operations.

Until 2020, sustainable bonds issued in the foreign market were predominantly green bonds. The first SLB issuance is from 2019. The issuances of SLBs in 2021 exceeded, in quantity and amount issued, the total amount of green bonds issued since 2015. Green bonds predominate among bank issuers (Figure 1),⁸ while for non-financial companies, SLBs stand out (Figure 2).⁹

5 <https://www.icmagroup.org/assets/documents/Sustainable-finance/GBP-Infographic-040521.pdf>.

6 ICMA – Green Bond Principles (GBP) – Voluntary Process Guidelines for Issuing Green Bonds – June 2021; ICMA – Social Bond Principles (SBP) – Voluntary Process Guidelines for Issuing Social Bonds – June 2021; ICMA – Sustainability bond Guidelines – June 2021; ICMA – Sustainability-Linked Bond Principles – Voluntary Process Guidelines. June 2020.

7 Climate Bond Initiative (CBI). Latin America & Caribbean – State of the Market. 2021, p. 15.

8 The first issuances of sustainable bonds by banks in the foreign market are from 2017, which is why Figure 1 is limited to that time interval, while those by companies start in 2015.

9 Although companies have not issued social bonds, both sustainability and SLBs can include social objectives: projects, in the case of the former, and targets, in the case of SLBs.

Figure 1 – Types of sustainable bonds issued by Brazilian banks in the foreign market from 2017 to 2021

Percentage distribution of financial volume

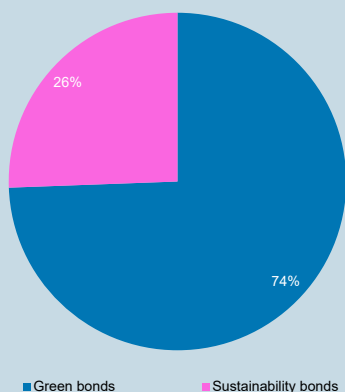
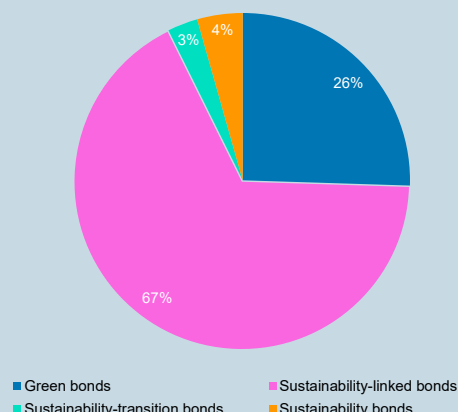


Figure 2 – Types of sustainable bonds issued by Brazilian companies in the foreign market from 2015 to 2021

Percentage distribution of financial volume



The debentures issued by non-financial institutions and the financial bills¹⁰ issued by banks in the domestic market have predominantly green bond characteristics (Figures 3 and 4). The sustainable bonds issued in the country have greater variety compared to those issued in the foreign market; they include CRAs, CRIs, FIIs, FDICs, and loans. These instruments accounted for 24% of sustainable bonds issued in the domestic market since 2016; debentures were 68% and financial bills, 8%.¹¹

Figure 3 – Types of sustainable bonds issued by Brazilian banks in the domestic market from 2016 to 2021

Percentage distribution of financial volume

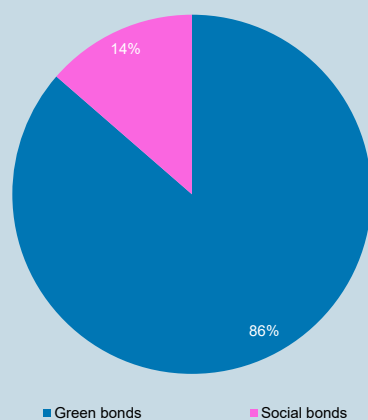
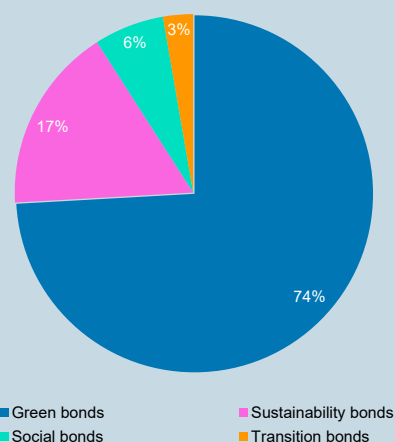


Figure 4 – Types of sustainable bonds issued by Brazilian companies in the domestic market from 2016 to 2021

Percentage distribution of financial volume



Who are the Brazilian issuers of sustainable bonds?

Non-financial companies predominate in domestic and foreign issuances, accounting for 88% of the amount issued since 2017 in the foreign market (Figure 5) and 89% of that issued in the domestic market (Figure 6). The pulp and paper and food and beverage sectors are predominant in the foreign market issuances (Figure 7), while the electric power sector stands out in the domestic market (Figure 8).

¹⁰ The financial instruments issued by banks in the domestic market are financial bills, while notes and bonds are issued in foreign markets.

¹¹ Survey from the NINT database.

Figure 5 – Distribution of the financial volume of corporate and bank issuances of sustainable bonds in the foreign market
Issuances since 2017

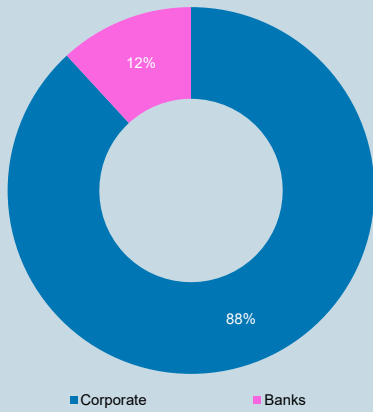


Figure 6 – Distribution of the financial volume of corporate and bank issuances of sustainable bonds in the domestic market
Issuances since 2017

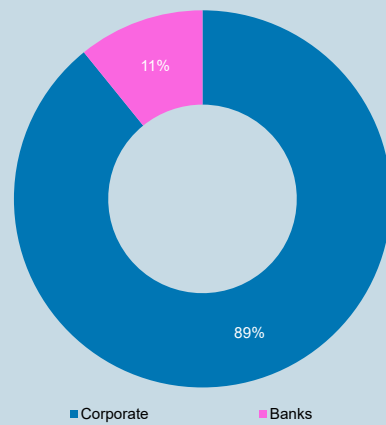


Figure 7 – Distribution of the issuances of sustainable bonds in the foreign market by economic sector

Issuances from 2015 to 2021

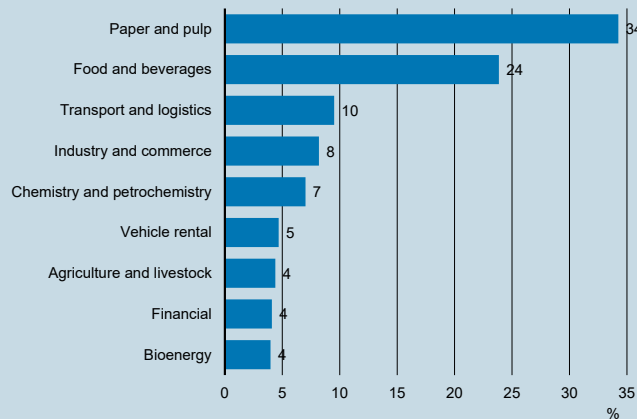
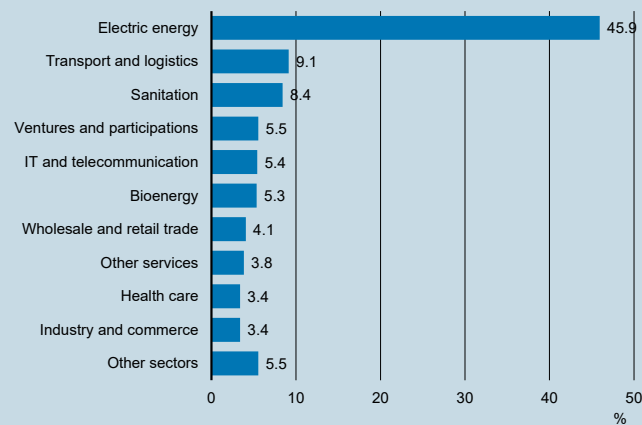


Figure 8 – Distribution of the issuances of sustainable bonds in the domestic market by economic sector

Issuances from 2016 to 2021



What is the main placement market for sustainable bonds by Brazilian issuers?

The foreign market is the main destination of sustainable bonds issued by Brazilian companies, hosting more than 70% of the amount issued since 2015 (Figure 9). In 2021, this market concentrated 59% of the quantity and 65% of the amount of sustainable bonds issued since 2015. The representativeness of the issuances of sustainable bonds in relation to conventional ones is lower in the domestic market compared with the foreign market. In 2021, about only 7% of issuances in the domestic market had sustainability characteristics (Figure 11), while this proportion was 47% in the case of foreign issuances (Figure 10).

Figure 9 – Distribution of the financial volume of sustainable bonds issuances in the foreign and domestic markets
Issuances since 2015

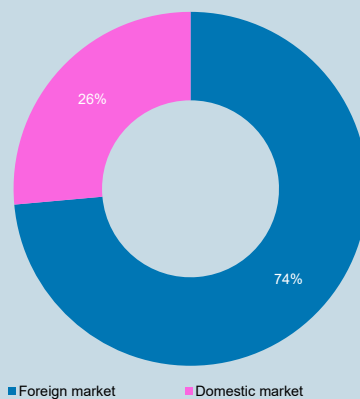


Figure 10 – Distribution of the financial volume of conventional and sustainable bonds issued in the foreign market

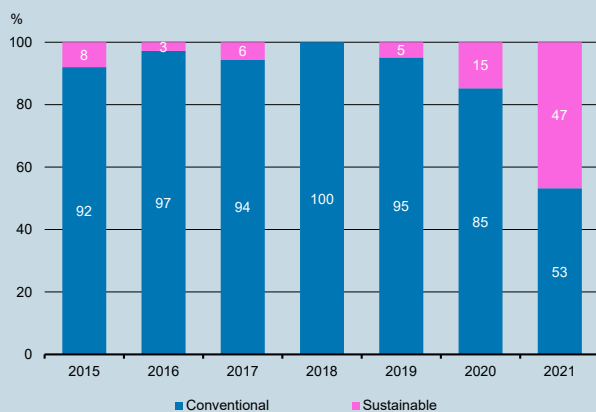
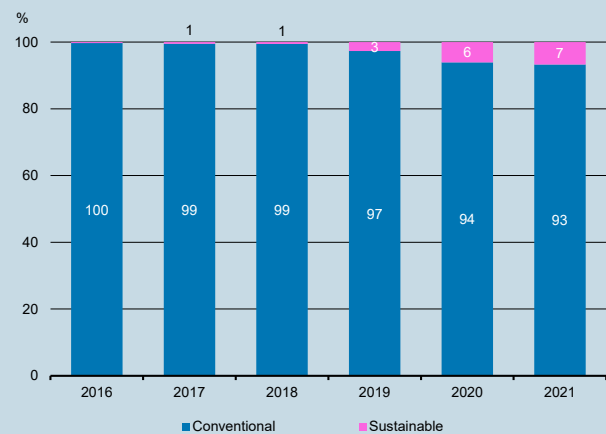


Figure 11 – Distribution of conventional and sustainable bonds issued in the domestic market



How has the issuance of sustainable bonds by Brazilian issuers evolved?

According to a survey by Environmental Finance Data,¹² the global sustainable bond issuances in the 2020-2021 biennium was approximately USD 1.6 trillion, almost double the issuances between 2015 and 2019 (Figure 12). In Brazil, in the same time interval, Brazilian issuers raised approximately USD 20 billion¹³ through financial

¹² Environmental Finance Data Survey. <https://efdata.org/>.

¹³ Estimate based on data released by NINT – Natural Intelligence – <https://bit.ly/basedados-titulosverdes>.

instruments with sustainability characteristics (Figure 13). This is three times the amount issued between 2015 and 2019. In the same vein, the number of issuers rose considerably in 2021 (Figure 14).¹⁴ Brazilian issuances of sustainable bonds¹⁵ represent just over 1% of global issuances.¹⁶ Brazil is the second largest issuer in Latin America,¹⁷ second only to Chile.

Figure 12 – Global issuances of sustainable bonds

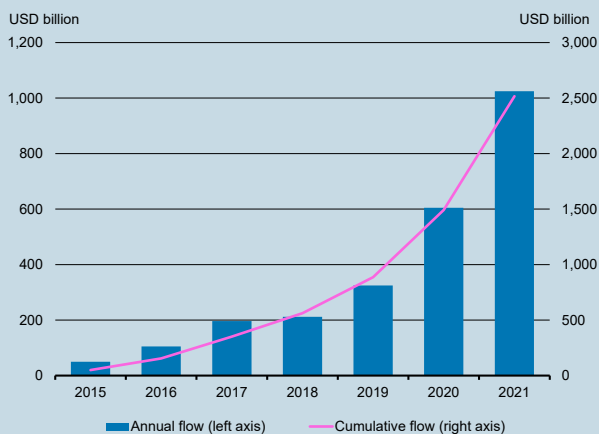


Figure 13 – Sustainable bond issuances by Brazilian issuers

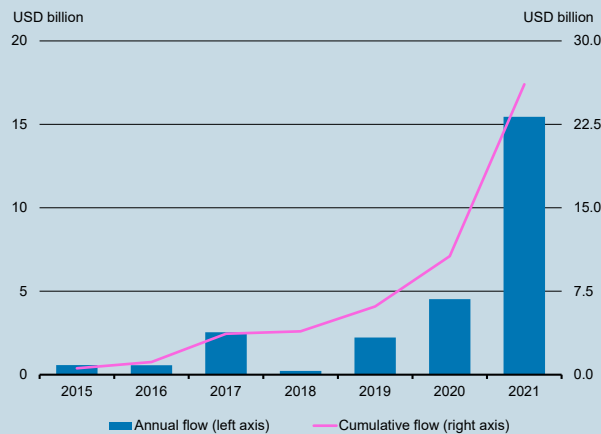
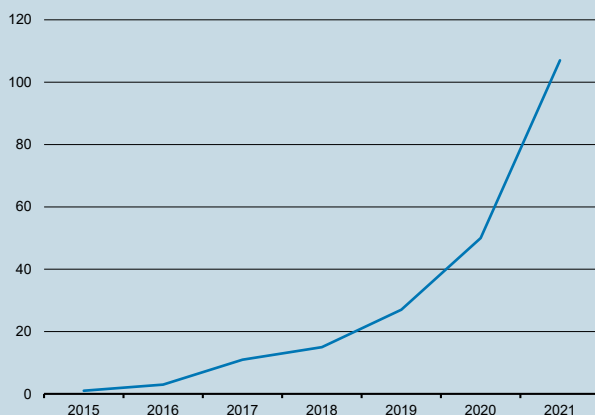


Figure 14 – Number of issuers of sustainable bonds in the domestic and foreign markets
Cumulative data since 2015



The significant growth in financing through sustainable bonds is consistent with the 2015 Paris Agreement¹⁸ and highlights the importance of Sustainable Finance¹⁹ for the transition to a zero-carbon economy. Bonds with

14 Figure 14 includes issuances of bonds and notes (by banks and companies) in the foreign market, and debentures (companies) and financial bills (banks) in the domestic market. A sustainable bond issuer in both the foreign and the domestic market was counted once in each market. Data for the domestic market use the NINT database as source, and for the foreign market, the Refinitiv's information system.

15 It covers the stock of issuances by companies and banks, in the domestic and foreign markets. Until 2021, the sovereign issuer had not issued bonds with sustainability characteristics. In the 2021 Annual Financing Plan (PAF), the National Treasury (STN) announced its intention to develop a framework for sustainable sovereign issuance in the foreign market. The 2022 PAF reported continuity in the development of the framework in 2022.

16 Estimate based on data released by NINT – <https://bit.ly/basedados-titulosverdes>.

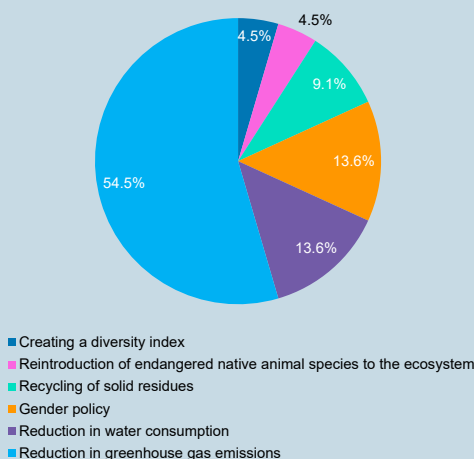
17 According to a survey by the Climate Bond Initiative (CBI) – Latin America & Caribbean – State of the Market. 2021 – https://www.climatebonds.net/files/reports/cbi_lac_2020_04e.pdf.

18 The Paris Agreement, signed as part of COP-21 in 2015, advocates the need for collective efforts to combat climate change and adapt to its effects. This implies the need to reduce greenhouse gas emissions to limit the increase in global temperature and achieve neutrality by 2050. <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>; https://unfccc.int/sites/default/files/english_paris_agreement.pdf.

19 Sustainable finance from a broader perspective encompasses incorporating ESG aspects in financing and investment decision making (concept adapted from GIZ: Sustainable Finance, An Overview (*Finanças Sustentáveis, Um Panorama*), 2021, p. 6. – https://www.climatebonds.net/files/reports/cbi_lac_2020_04e.pdf.

sustainability characteristics contribute to this objective through the destination of the issuance proceeds for investment in environmental and climate projects – in the case of use-of-proceeds bonds, or the commitment to sustainable targets – in the case of general-purposes ones. Figure 15 illustrates the targets²⁰ adopted by Brazilian issuers of sustainable bonds in the foreign market. The foreign market comprises 2/3 of the sustainable bonds issued by Brazilian issuers. More than half of the targets refer to the reduction of greenhouse gas emissions.

Figure 15 – Sustainability targets for SLB issuances



The growth in the use of instruments with sustainability characteristics is the result of the action of several agents, among them: (i) regulators, institutional and market associations that establish rules and taxonomy for sustainable practices and instruments; (ii) certification bodies and second party opinion issuers that contribute to information reliability and market transparency; and (iii) the distribution system, including asset and intermediation managers, that finance sustainable projects directly or by purchasing the bonds.

What are the risks associated with sustainable bond issuances?

In 2021, sustainable bonds issued in the foreign market presented a smaller spread²¹ than conventional ones (Figure 16).²² The lower cost for the issuer is corroborated by the yield curves (Figure 17).²³

20 Sixteen SLBs were issued between 2015 and 2021. Reopenings were considered as new issuances and repeat the targets of the original ones. The targets were consulted in the issuances' framework or in the SPO (Second Party Opinion) document.

21 Spread in relation to the risk-free rate (10Y US Treasuries) + country risk (Brazil 5 years CDS).

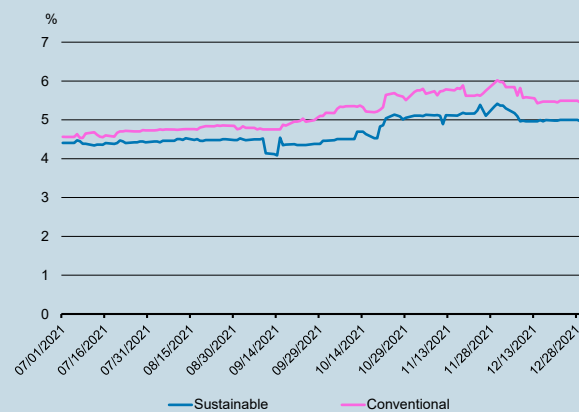
22 Figure 16 refers to the issuances of the use-of-proceeds and general-purposes bonds issued by Brazilian companies and subsidiaries abroad between 2019 and 2021.

23 Figure 17 encompasses sustainable bond issuances in 2021, including general-purposes (87% of the year's issuances) and use-of-proceeds bonds (13%). Despite the lower cost to the issuer compared to conventional bonds, and therefore lower coupon received by the investor, sustainable bonds showed higher returns for the investor compared to conventional ones. The change in the yield to maturity (YTM) provided by sustainable bonds issued in the year was lower than that by conventional ones, i.e. the loss in value for conventional bonds was higher for a six-month window. The six-month window comprised the second half of 2021 and was adopted to contemplate as many issuances as possible, since almost 60% of the amount of foreign sustainable bond issuances are from 2021.

Figure 16 – Spread on issuance for conventional and sustainable bonds



Figure 17 – Median yield to maturity (YTM) of bonds issued in the foreign market, sustainable and conventional



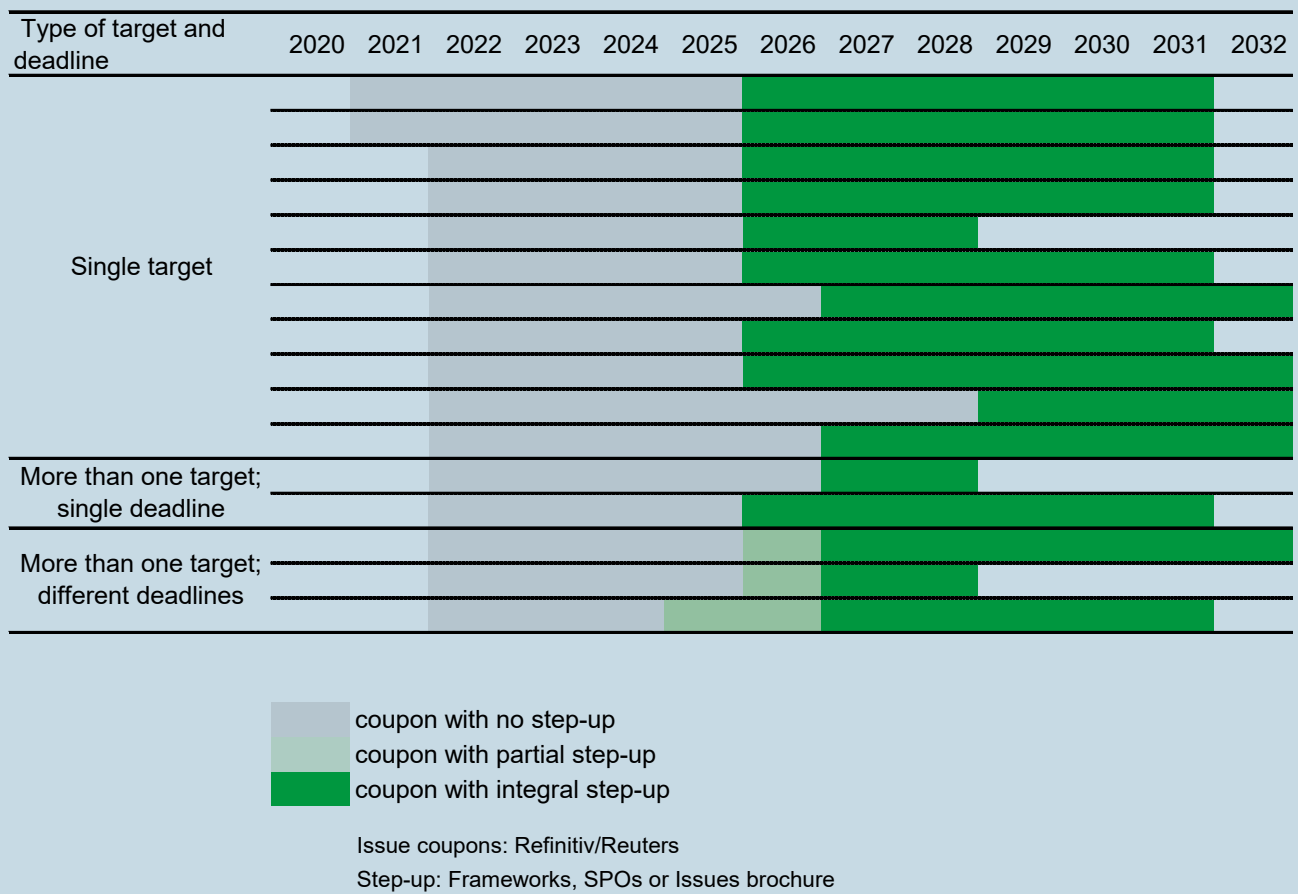
However, sustainability-linked bonds (SLBs), though representing lower financing costs for the issuer, carry the risk of higher debt costs if sustainability targets are not met. This potential increase in the debt cost would happen because, according to the principles of the ICMA SLBs, these instruments must contain a provision for a financial impact (for example, a step-up in the coupon) and/or an impact on the structure of the bond (for example, a change in the maturity) in the event of non-compliance with the targets to which they are linked.

SLBs account for more than half of the sustainable bond stock of Brazilian companies and were predominant in 2021. Companies have favored step-ups in coupons (i.e., adding basis points to the coupon) rather than altering the bond's structure.

Figure 1 represents the time distribution, for each of the issuances, between the deadline for meeting the target and the period of incidence of step-ups (in case the target is not reached).²⁴ The gray area represents the deadline for achieving the target, and in this time interval there is no step-up in the paid coupons. The green area represents the period of incidence of step-ups in the event of non-compliance with the target. The lighter green area represents the period of incidence of a “partial” step-up, due to the existence of more than one target and different deadlines for fulfillment.

²⁴ Deadlines for sustainability targets: issuance framework or SPO. Step-ups: issuance framework, SPO or prospectus.

Image 1 – Map of coupon step-ups for the stock of SLBs issued in the foreign market



In the event of non-compliance with the target for each of the 16 SLBs’ issuances, the total step-up cost for the USD 11.48 billion stock of SLBs would be USD 168 million (Figure 18), or 1.5% of the amount issued (Figure 19). The coupons paid in the period would total USD 4.88 billion without step-ups, and USD 5.05 billion with step-ups.²⁵

Figure 18 – Estimated cost of not meeting SLB stock targets

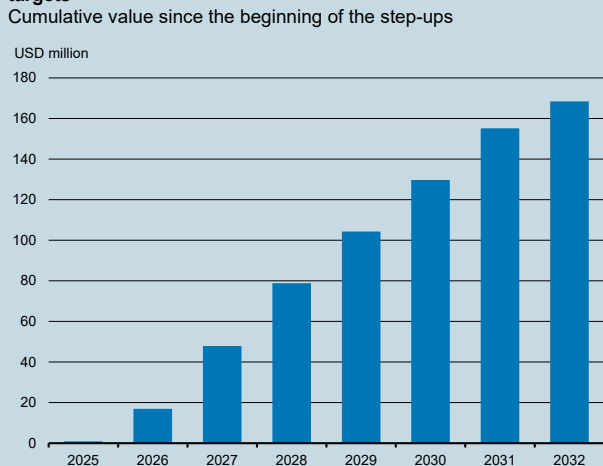


Figure 19 – Annual cost of the SLB stock



²⁵ The estimate of the cost of the step-up for SLBs’ issuances by Brazilian companies assumed non-compliance with the target for every issuance, with the incidence of the step-up beginning the year after the target deadline. For issuances with intermediate deadlines, the reference for the application of the step-up was the first year. For issuances with more than one target, the step-up assignment complied with the deadline and the step-up associated with each one.

Another risk associated with the issuance of sustainable bonds or other instruments aimed at mobilizing resources for financing ESG projects is the risk of greenwashing, which can be associated with exaggerating or misrepresenting the impact of projects of this nature.²⁶ Among the existing self-regulatory mechanisms²⁷ to mitigate this practice, the second party opinion (SPO) stands out. The SPO is an opinion provided by an external reviewer that confirms the alignment of the bond with internationally accepted issuance and disclosure standards.²⁸

Through the SPO, the link between the bond and the sustainable project financing (in the case of GSSS bonds) or the target fitting to the strategy (in the case of SLBs) is confirmed by the providing company: 93% of issuances in the domestic market and 100% of those in the foreign market²⁹ present a SPO.

Conclusion

The growth in the issuance of sustainable bonds in the last two years – 2020/2021 – emphasizes the importance of these instruments in the context of Sustainable Finance for the climate transition, since the use of resources or targets associated with the issuance of GSSS bonds is aimed at mitigating factors with a negative impact on the climate and environment. The commitment to reduce greenhouse gases is present in more than half of the Brazilian companies' issuances in foreign markets.

Besides the benefits clearly associated with the destination of the funds raised or the sustainable targets pursued, which contribute to climate objectives, sustainable bonds bring other benefits: (i) to the issuer, because they grant access to a broader investor base and have a lower cost than conventional bonds; (ii) to the domestic market, because they have the potential to contribute to its development given the global interest of investors; and (iii) to the cost and access to external financing in a context of change in the monetary policy direction of developed countries: sustainable bonds can mitigate the effects of a restrictive policy, due to the growing demand and the lower cost compared to conventional ones.

Despite the benefits associated with the adopted greenhouse gas reduction targets, the analysis of the SLBs' targets may lead to the question whether they could be more ambitious or more closely related to the transition strategy needed by the sector that the company is part of, so that it actually contributes to the Brazilian climate objectives, set out in its Nationally Determined Contribution (NDC) under the Paris Agreement.

In counterpoint to the benefits highlighted, financing through sustainable bonds presents some risks, among them the financial risk and the image one. The financial risk arises from the increase in the debt cost (step-up in coupons) in the event of non-compliance with targets when financing takes place via SLBs. The image risk can be associated with both non-compliance with SLBs' targets and greenwashing, a practice that jeopardizes the very reputation of the sustainable issuances market.

26 Definition adapted from Moody's – Sustainable bonds on course to top \$1 trillion annual issuance in 2021.

27 Other mechanisms include: (i) taxonomies regarding the definition of what is sustainable for the purposes of financing through financial instruments or resources mobilized with the denomination "sustainable"; (ii) principles and guidelines that guide the issuance of financial instruments; and (iii) certification of bonds. Regarding taxonomy, there are still no globally accepted standards – Tandon (2021) lists and analyzes the main ones (Transition finance: Investigating the state of play: a stocktake of emerging approaches and financial instruments – OECD Environment Working Papers 179). ICMA has been releasing principles and guidelines for sustainable financial instruments since 2014 (references cited in note to Table 1). CBI performs certification of the bonds (<https://www.climatebonds.net/certification>).

28 CBI and ICMA are among the institutions that publish internationally accepted standards. CBI confers an approved verifier "stamp" on SPO providers that assess issuances aligned with the standards it publishes. Four companies concentrate the providing of SPOs for domestic market issuances (data collected from the NINT database). One of these companies, accounting for 6% of the SPOs provided, does not have this stamp, while the other three, responsible for the remaining 94%, are approved verifiers. All five SPO providing companies for foreign market issuances have CBI approval. The search for the existence of the approved verifier "stamp" was performed by the name of the SPO providing company at: <https://www.climatebonds.net/certification/approved-verifiers>. An OECD study compares classification and disclosure standards issued by public and private institutions – OECD (2021). *Transition finance: Investigating the state of play: A stocktake of emerging approaches and financial instruments*. OECD Environment Working Papers 179.

29 No SPOs were found in the case of reopenings of bonds for which the initial issuance presented a SPO.

Profitability

Figure 5.1 – Net income and ROE
12-month accumulated

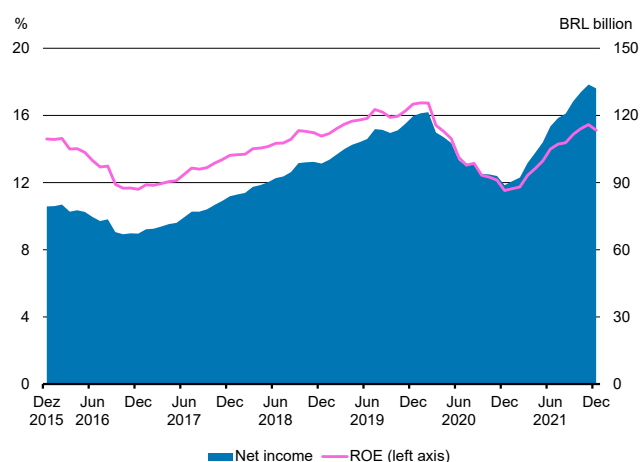
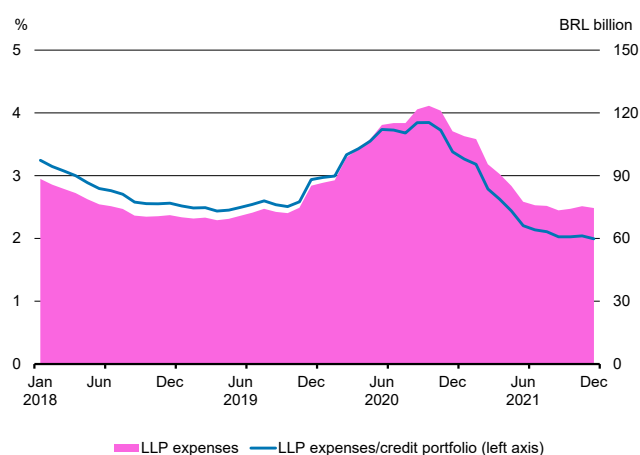


Figure 5.2 – LLP expenses
12-month accumulated



5.1 System Profitability

The profitability of the banking system continues to recover from the 2020 decline and has returned to levels close to those seen before the pandemic. Loan loss provisions (LLP) expenses have stabilized, and the level of provision coverage provides resilience to the system. The net income of BRL 132 billion in 2021 was 49% higher than that recorded by the system in 2020 and 10% higher than the one observed in 2019. Return on Equity (ROE) was 15%, close to pre-pandemic levels (Figure 5.1). The growth in Net Interest Income (NII), the reduction in LLP expenses, and efficiency gains explain the improved results.

After consistently reducing since mid-2020, LLP expenses have returned to pre-pandemic levels⁵⁴ (Figure 5.2). Given the less favorable economic scenario envisaged for 2022, it is expected a moderate rise in delinquency (toward pre-pandemic levels). This delinquency movement and the migration of portfolios to a higher risk mix may increase the level of problem assets throughout the year. This potential increase should not, however, bring greater difficulties for the system, since the current level of provision coverage can be used to absorb all or part of it.

The credit margin⁵⁵ was pressured by the significant monetary tightening that began in March 2021, which promoted a faster adjustment of the cost of funding

⁵⁴ LLP expenses reduced by 33% in 2021 compared to 2020, since initial forecasts regarding the effects of the adverse economic scenario on delinquency did not materialize.

⁵⁵ The credit margin is calculated by the difference between the return on credit (credit income accumulated in 12 months divided by the portfolio's average stock in the period) and the cost of funding (funding expenses accumulated in 12 months divided by the average stock of funding in the period). To obtain the risk-adjusted credit margin, LLP expenses are subtracted from the credit income used to calculate the credit margin. The concept of credit margin is different from the concept of ICC spread presented in Chapter 3. For further details, see Chapter 3.

Figure 5.3 – Credit margins
12-month accumulated

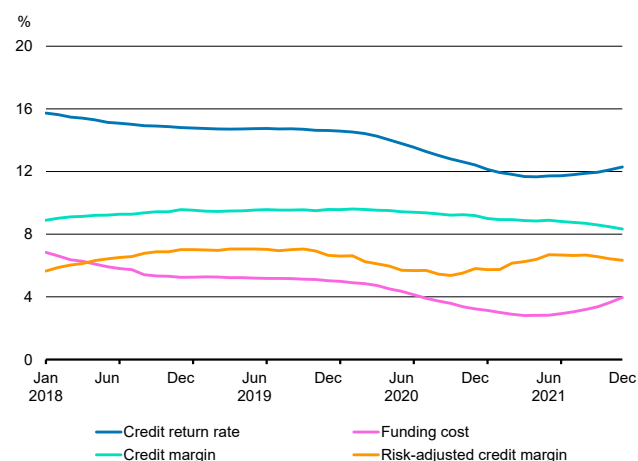


Table 5.1 – Services revenues composition

Accumulated in each year

Groups of services	BRL billion				
	2019	2020	Variation (%)	2021	Variation (%)
Total	165.6	169.4	2.3	185.9	9.8
Total fees	50.3	48.6	-3.5	46.3	-4.6
Households fees	38.0	36.4	-4.2	34.1	-6.2
Corporate fees	12.3	12.2	-1.3	12.2	0.1
Investment funds adm.	15.1	15.8	4.2	16.3	3.1
Constitutional funds and lotteries	10.6	8.0	-24.7	8.2	2.2
Collection services	7.1	6.9	-2.4	7.0	0.7
Provided guarantees	1.9	1.9	-1.1	3.4	76.6
Capital market	10.5	14.4	36.4	17.2	20.0
Payment services	21.9	25.4	15.6	32.5	28.2
Other revenues from services	48.0	48.5	1.0	55.1	13.6

Table 5.2 – Administrative expenses composition

Accumulated in each year

Discrimination	BRL billion				
	2019	2020	Variation (%)	2021	Variation (%)
Total	247.9	260.2	5.0	282.8	8.7
Personnel	132.2	133.8	1.2	143.5	7.3
Data processing telecommunication	19.9	21.8	9.8	24.6	12.5
Facilities	15.6	15.8	1.1	15.4	-2.0
Outsourced services	27.5	29.0	5.4	33.0	13.9
Advertisement and promotion	6.2	6.3	1.6	7.8	23.4
Depreciation, amortization, and impairment ^{1/}	16.3	19.8	21.3	21.4	8.3
Payment services	4.3	7.6	74.9	9.7	28.0
Other	25.8	26.2	1.4	27.4	4.5

^{1/} Does not include amortization of goodwill on acquisitions

relative to the return on credit.⁵⁶ The risk-adjusted credit margin recovered during the first half of 2021, given the decrease in LLP expenses as a result of the good behavior of delinquency in the period (Figure 5.3). The environment of higher interest rates, however, favors the granting of credit at higher rates. The migration to a portfolio profile of higher risk and expected profitability, which began in 2021 and possibly should continue into 2022, also tends to favor credit profitability throughout the year. The combination of these effects should be positive for the system's credit margin in the coming quarters.

After increasing at a slower pace in 2020, service revenues grew by 10% in 2021, driven by improving economic activity (Table 5.1). Despite the rise in inflation in 2021, banks have managed to control the increase in costs. Administrative expenses increased by 9%, while inflation measured by the Extended National Consumer Price Index (IPCA) was 10% in 2021 (Table 5.2). Inflation should continue to put pressure on the costs of institutions in 2022. With the recovery of service revenues and cost control, the Coverage Ratio of Administrative Expenses by Service Revenues increased by 0.8 p.p. in 2021 (Figure 5.4).

The number of branches and of employees in the banking system continued to decline in 2021 (Figure 5.5). This trend is likely to continue in the coming years with the increasing use of digital service channels by institutions and clients alike. At first, the migration to digital channels demands greater investments in technology and personnel to, in the future, reduce costs and increase the operational efficiency of financial institutions.

5.2 Profitability by type of control, size, and activity

There has been a recovery in profitability in all types of bank control. Foreign-controlled banks remained the most profitable in 2021 (Figure 5.6), while private and public banks showed similar levels of ROE. The NII growth, the reduction in LLP expenses, and gains in efficiency were the main factors responsible for the improvement in the institutions' profitability in the period. The NII was boosted mainly by the credit growth and the increase in revenues from securities portfolios. In the YoY comparison, LLP expenses decreased by 33%,

⁵⁶ Given the greater concentration in floating rate instruments and the shorter funding average term, the cost of funding tends to respond more quickly to Selic variations than credit returns.

Figure 5.4 – Service revenues to administrative expenses ratio

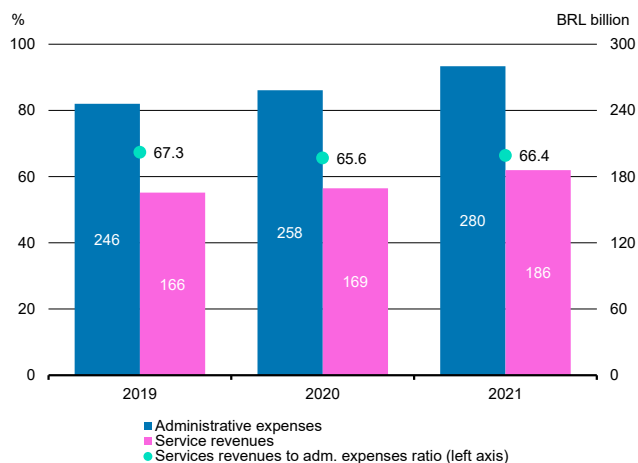
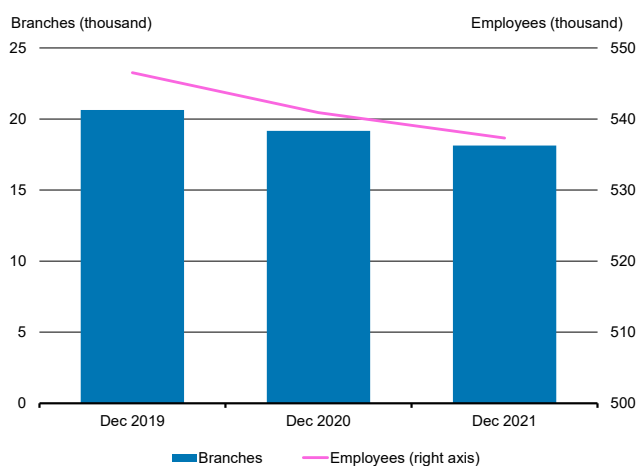
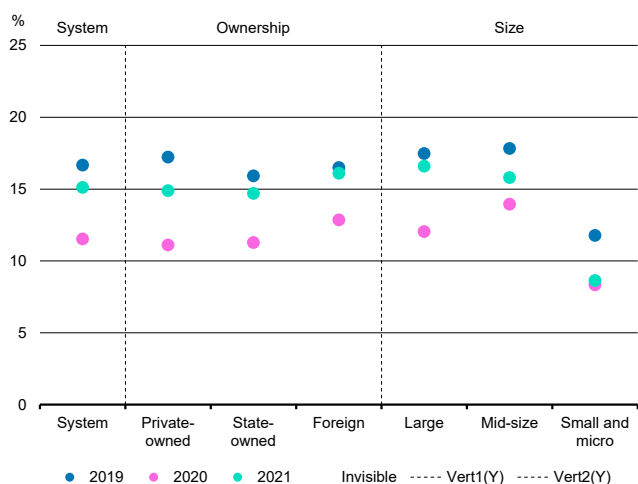


Figure 5.5 – Evolution of branch network and employees



The evolution in the number of employees was estimated from the RAIS/Caged data. The number of branches is reported to the BCB. The series have scope adjustments due to reconciliations with numbers released by banks that represent the system.

Figure 5.6 – ROE by control type and size



20%, and 15% at private, public, and foreign-controlled banks, respectively. Service revenues grew more than costs at both private and foreign-controlled banks. In public banks, despite controlling expenses, service revenues practically did not grow in the period, which affected the efficiency of this group of institutions.

Regarding size, the distinction in profitability levels between large and medium-sized banks, on the one hand, and small and micro banks, on the other, remains (Figure 5.6). The difference may be related to gains in scale, a more diversified offer of products and services, as well as a greater insertion in retail, which allow large and medium-sized banks to operate with proportionally lower costs and obtain a greater return on their operations. Small and micro banks did not show a recovery in profitability in 2021, a result of a lower earnings growth and of an increase in the capital base of some institutions in the period. Smaller institutions exhibit a heterogeneous behavior individually, but may as a whole continue to face greater challenges to regain profitability ahead in the face of greater competition, less diversified business models, and fewer opportunities for gains of scale.

With regard to the financial institution’s type of activity,⁵⁷ the recovery in profitability was distinct among segments (Figure 5.7). The ROE of the “Complex” and “Regional and Public” banks, which have more diversified business models, showed the greatest recovery, returning to the 15% – 20% range. The profitability of banks in the “Credit” and “Other” segments showed practically no recovery. Regarding the former, profitability was already the lowest among the segments since 2019. The pandemic shock further harmed the situation of these banks. In relation to the “Others” segment, the recovery was hampered by the performance of institutions whose

⁵⁷ The segmentation by activity consists in grouping banking conglomerates according to the profile of their operations, defined by the selection of qualitative or quantitative attributes that reflect similar characteristics among banking entities, as follows: a) complex banks – with multiple operations and products, such as credit portfolio, demand and time deposits, capital market, fund management, among others, besides an extensive branch network and diversified client profile; b) regional state-owned banks – under federal or state control that operate regionally and have a branch network and a relevant number of clients where they operate, with diversified funding; c) industrial banks – linked to industrial or commercial groups, focused on promoting the group’s productive chain d) credit banks – mostly operating with credit operations and credit risk exposures, such as guaranties and endorsements, with operating income more dependent on credit intermediation; and e) treasury and business banks – predominantly treasury and business operations (securities, repo operations and investments), with greater dependence on these operations to generate their income.

Figure 5.7 – ROE by type of activity

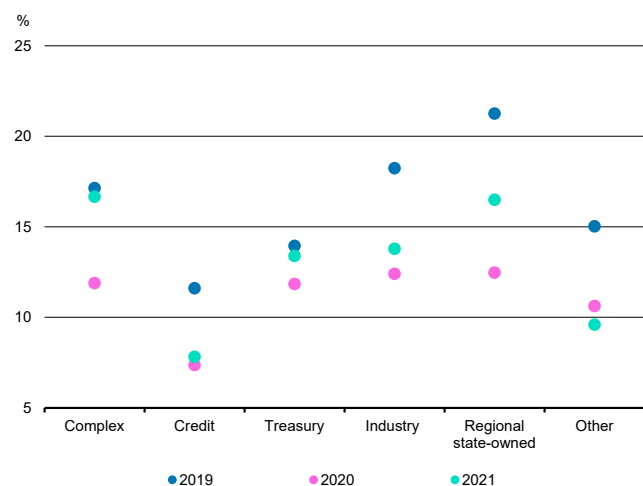
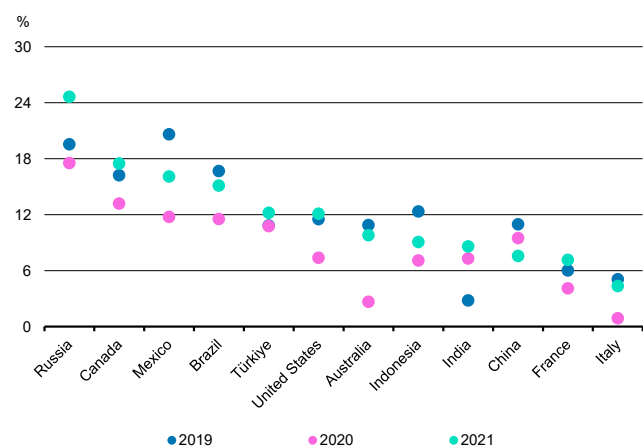


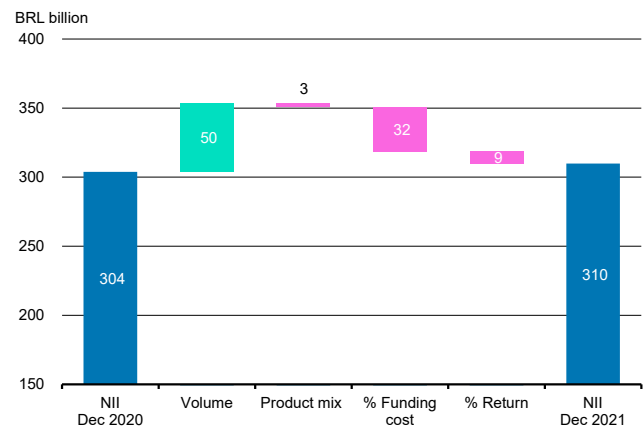
Figure 5.8 – Annual ROE International comparative^{1/}



Sources: ROE (FMI - Financial Soundness Indicators)
^{1/} Last available data

Figure 5.9 – Net interest income from credit operations

Contributions to the variation
 Dec 2020 versus Dec 2021 – 12-month accumulated



operations are more concentrated in services provision.⁵⁸ In this subgroup, there were decisions to increase capital over 2021 at the same time as there was a reduction in profits when compared to the previous year.

Most banking systems in countries representing different continents⁵⁹ showed an improved profitability in 2021 when compared to 2020. Despite the improvement, half of the countries (including Brazil) did not exceed the level of ROE recorded in 2019, before the effects of the pandemic (Figure 5.8). The ROE of the Brazilian banking system was in the top half of the group of countries in 2021, lower than that recorded in such countries as Russia, Canada, and Mexico, but higher than that reported by Türkiye, the U.S., and Australia.

5.3 Credit margins

The NII from credit⁶⁰ (in BRL billion) showed a slight growth in 2021, despite the increase in funding expenses. The main positive contribution in the period was the growth in the credit portfolio (Figure 5.9). Without such growth, the margin would have reduced. The change in the loan portfolio composition was not very representative for the credit NII variation in the period. The cost of funding has increased in line with the rise in the Selic rate, while the return on credit has declined because credit revenues have not grown at the same pace as the portfolio.

Following, the contribution of the different types of credit to the credit margin and its risk-adjusted form is analyzed. The credit margin⁶¹ by credit type reflects the difference between the gross return on credit that each credit type generated, on the one hand, and the cost of funding required to support the respective credit balance, on the other. The risk-adjusted credit margin, in turn, also considers the effect of LLP expenses associated with each credit type.

Credit margin from both household and corporate credit came under pressure in 2021, mainly because of the rising cost of funding (Figure 5.10). Risk-adjusted credit

58 A bank is classified as a “Service” bank if service revenues represent more than half of its operating revenues, considering the average behavior over the last few years.

59 Data provided by countries and available on the Financial Soundness Indicators (FSI) developed by International Monetary Fund (IMF).

60 This concept refers to the difference between interest income on loans and interest expenses on funding.

61 For further details on methodology, see the box “Methodology for calculating the credit margin by subgroups of the portfolio”, of the 2018 REB.

Figure 5.10 – Credit margin – Household versus corporate
12-month accumulated

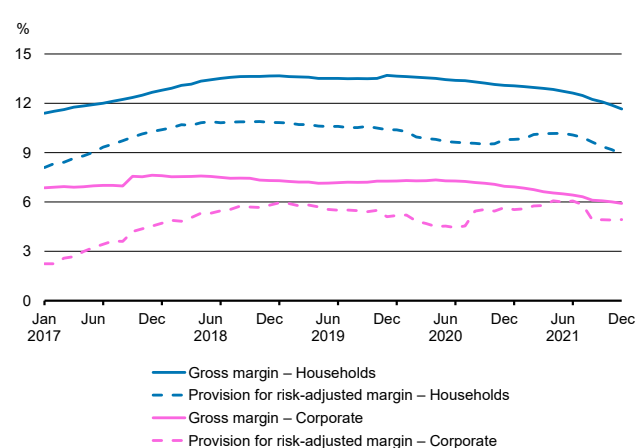


Figure 5.11 – NII profile
Households versus corporate

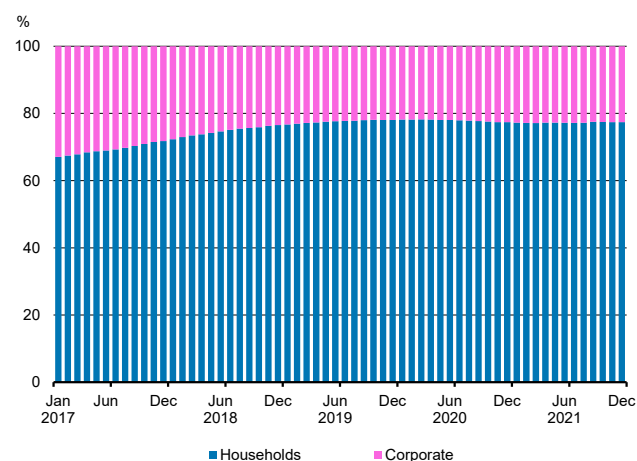
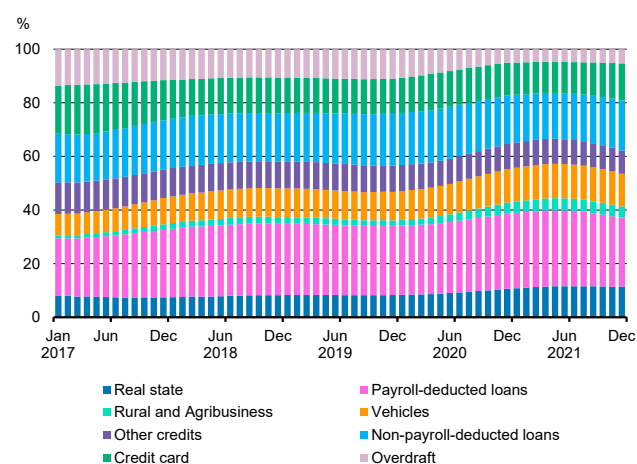


Figure 5.12 – Credit NII by product
Households



margin showed a small increase in the first half of the year, given the drop in LLP expenses, and then remained influenced by the increase in the cost of funding until the end of the period.

The ratio between household and corporate credit NII remained virtually stable throughout 2021 (Figure 5.11). The household portfolio remained the most relevant in the system (about 64% of total outstanding loans), and household clients continued to account for most of the credit NII generation (about 77%).⁶²

In 2021, there was an increase in the percentage of operations with higher risk and return (+3 p.p.) in the household credit NII (overdraft, credit card and non-payroll-deducted loans). The only exception was real estate credit, a lower risk line, whose share in the household credit NII grew 0.83 p.p. in the year, resulting from the increase in the portfolio. The increase of higher risk and expected return operations in the share of household credit NII is in line with institutions' strategy to improve the profitability of the credit portfolio after the expressive growth of lower risk lines in 2020.

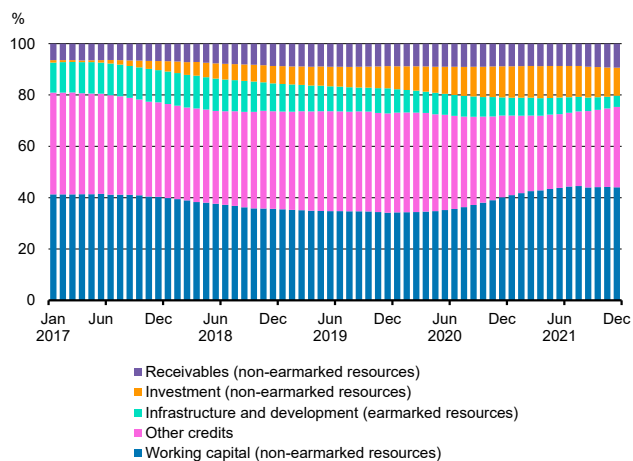
Despite being less significant to the total outstanding loans, such higher risk lines make a relevant contribution to the system results. This occurs because of the higher interest rates charged in these credit types. In 2021, 38% of the NII from household credit resulted from these operations (Figure 5.12), despite representing only 11% of the total outstanding loans. "Credit card" and "installment credit card" lines⁶³ are not included in these calculations, as they are considered payment services and not granted credit in the current analysis (these credit types do not bear interest for the financial institutions). Revolving credit card operations are included in this inventory.

As for the generation of corporate credit NII, "working capital" was the line with the largest growth (+ 4 p.p.) in the share of the portfolio throughout the year (Figure

62 The contribution of each credit type to the credit NII cannot be considered as the participation of a certain product in the final net income, since the methodology does not consider the apportionment of such indirect expenses as administrative, processing and control, commercial, and taxes. Depending on the commercial, technological, and administrative structure required for each type of credit, participation in possible apportionments can be very different. Additional details of the methodology and its limitations can be found in the box "Methodology for calculating the credit margin by subgroups of the portfolio" (Portuguese only), of the 2018 REB.

63 Although they do not bear interest, the "credit card" and "installment credit card" operations bear the risk of default on the installments. For this reason, financial institutions need to set up a provision for credit losses related to these receivable balances.

Figure 5.13 – Credit NII by product
Corporate



5.13). Such growth resulted from the increase in the stock of this line, which was more than enough to offset spread reductions on these operations, resulting from the increase in the cost of funding.

Considering the segmentation between non-earmarked and earmarked credit, the former maintained a relevant share in the formation of the system’s intermediation result (Figures 5.12 and 5.13). In household credit, about 64% of the credit NII referred to non-earmarked resources in 2021. This category includes “payroll-deducted and non-payroll deducted loans”, “overdraft”, and “credit card”. As for corporate credit, working capital alone contributed to approximately 44% of the NII in the period.

6.1 Concentration indicators⁶⁴

To systematically monitor concentration levels in different segments of the National Financial System (SFN), the Banco Central do Brasil (BCB) has been using, since the 2017 Banking Report, the Normalized Herfindahl-Hirschman Index (HHIn), the “HHIn equivalent number” (E.N.), and the Concentration Ratio of the Five Largest Financial Institutions (CR5) considering accounting aggregates of total assets, credit operations and total deposits in Brazil.

This REB issue introduces innovations. The first is the adoption of a concept traditionally employed in the literature,^{65, 66} and by multilateral organization,⁶⁷ which is the Concentration Ratio of the Four Largest Financial Institutions (CR4) instead of the CR5.⁶⁸ The second innovation is the inclusion of additional segments in the market share calculation: non-banking institutions active in capital markets (n2) and payment institutions (n4). The third one is the segmentation of market shares by type of capital control – state-owned financial institutions (SOFIs)⁶⁹ or privately-owned financial institutions (POFIs)⁷⁰ – and by origin of resources – earmarked or non-earmarked.

64 Information regarding the evolution of the National Financial System is available at: <https://www.bcb.gov.br/estabilidadefinanceira/evolucaosfnmes>.

65 For a discussion about concentration measures, see: Bain, Joe S. (1951). Relation of profit rate to industry concentration: American Manufacturing, 1936-1940. *The Quarterly Journal of Economics*, 65(3), 293-324. <https://doi.org/10.2307/1882217>.

66 Tabak, B. M., Li, D. L., Vasconcelos, J. V. L., & Cajueiro, D. O. (2013). Do capital buffers matter? A study on the profitability and funding costs determinants of the Brazilian banking system [Working Paper 333, p. 1-36]. Banco Central, Brasília, DF.

67 Organization for Economic Co-operation and Development. (OCDE). *Directorate for Financial and Enterprise Affairs Competition Committee*, 20 April 2018. Available at: [https://one.oecd.org/document/DAF/COMP/WD\(2018\)46/en/pdf](https://one.oecd.org/document/DAF/COMP/WD(2018)46/en/pdf). Access on: August 3, 2022.

68 For comparability with previous REB issues, the table with the CR5 is available in Appendix C (Table A).

69 State-owned banks under federal or state control.

70 Foreign-controlled private banks, and private Brazilian banks with and without foreign shareholders.

Besides these changes, the analysis of the concentration of credit operations is now done for each relevant market, that is, for each set of close substitute products.⁷¹ The following relevant markets are considered:⁷² rural and agriculture and livestock financing (households + companies),⁷³ housing financing (households + companies),⁷⁴ infrastructure and development financing (companies),⁷⁵ commercial receivables acquisition operations (companies),⁷⁶ working capital (companies),⁷⁷ payroll-deducted personal loans (households),⁷⁸ and credit cards (households + companies).⁷⁹ This type of analysis contributes to greater transparency of the environment in which competition takes place in the SFN and to the improvement of the BCB's role in defending competition. Together, the relevant markets analyzed represent 71.8% of the total credit operations in the SFN on December 31, 2021.

Domestic and international antitrust authorities use the HHI as a tool to assess economic concentration. In its normalized version, the HHI is obtained by the sum of the square of each financial institution's market share in the decimal form, resulting in a number between 0 and 1. According to the guide *Análise de Atos de Concentração envolvendo Instituições Financeiras* (Analysis of Acts of Concentration involving Financial Institutions – Guide, 2012),⁸⁰ the BCB considers that markets that report HHI values:⁸¹

71 For details on the definition of relevant market, see Annex I to Statement 22,366, of April 27, 2012 (Guide for the Analysis of Concentration Acts involving Financial Institutions and other institutions authorized to operate by the BCB).

72 For the modalities analyzed, data come from Document 3040 – Credit Risk Data, whose information is incorporated into the Credit Information System (SCR) database.

73 The sub-modalities covered are 801 (costs and pre-costs), 802 (investment and working capital for agribusiness financing), 803 (sale and pre-sale), and 890 (project financing).

74 The sub-modalities covered are 901 (housing financing from the Housing Finance System – SFH) and 902 (housing financing – mortgage portfolio).

75 The sub-modalities covered are 1101 (infrastructure and development financing), 1190 (project financing) and 490 (project financing – BNDES). Sub-modality 490 includes other types of BNDES operations, besides those directly related to infrastructure and development.

76 The sub-modalities covered are 250 (loan-receivables acquisition), 450 (financing-receivables acquisition) and 1350 (other receivables acquisition).

77 The sub-modalities covered are 215 (working capital with maturity lower than 30 days) and 216 (working capital with maturity exceeding 30 days).

78 The sub-modality 202 (payroll-deducted personal loan) is covered.

79 The following sub-modalities are covered: 204 (revolving credit linked to a credit card); 210 (purchase, invoice in installments or withdrawal financed by the card issuer institution); 406 (purchase or invoice in installments financed by the card issuer financial institution), 1304 (purchase and purchase in installments financed by the store) and 218 (not migrated).

80 Annex I to Statement 22,366, of April 27, 2012.

81 On the 2010 Horizontal Merger Guidelines, the U.S. Department of Justice (USDOJ), the Federal Trade Commission (FTC), and the US antitrust agencies consider HHI ranges to be between 0 and 0.15 (low concentration), above 0.15 to 0.25 (moderate concentration), and above 0.25 to 1 (high concentration).

- a) between 0 and 0.10 are of low concentration;
- b) above 0.10 to 0.18 are of moderate concentration;
and
- c) above 0.18 to 1 are of high concentration.

The “HHIn equivalent number” (E.N.) indicates which would be the number of financial institutions (FI) with equal share in the market that would generate the same observed HHIn ($IHHn = 1/E.N.$).

CR4 measures the degree of concentration by summing the shares of the four largest FI in a given market.

Table 6.1 presents the share of each segment (b1+b2, b3, b4, n1+n2 and n4),⁸² the share of SOFIs and POFIs, as well as the HHIn, the E.N. and the CR4 for the balance of domestic operations on the base dates of December 31, 2019, 2020, and 2021, for each of the accounting aggregates.⁸³ The composition of the three accounting aggregates considers the following adjustments:

- a) for total assets, the Adjusted Total Assets (ATA) is used, which excludes investments in interbank deposits, interbank transfers, and investments in institutions authorized to operate by the BCB;
- b) total deposits are obtained by total deposit (–) interbank deposits (+) Agribusiness Credit Bills (LCA) (+) Real Estate Bills (LCI) (+) Financial Bills and, in case of the non-banking segment (b3+b4+n1+n2+n4), Bills of Exchange are included; and
- c) for credit operations, the balances of the institutions’ outstanding portfolio of all credit operations are considered.

82 Segment (b1) comprises commercial banks, multi-commercial banks, and savings banks; segment (b2), universal banks that do not have a commercial portfolio, investment banks, and foreign exchange banks; segment (b3), credit unions; segment (b4), development banks; segment (n1), non-banking credit institutions; segment (n2), non-banking institutions active in capital markets; and segment (n4), payment institutions.

83 The monetary values of the accounting aggregates considered the IF.data prudential conglomerate concept, available at <https://www3.bcb.gov.br/ifdata/>. Besides the institutions that are part of the financial conglomerate, prudential conglomerates comprise: i) consortium management agencies; ii) payment institutions; iii) companies that carry out credit operations acquisition, including real estate credit or credit rights; iv) other companies headquartered in the country that have as their exclusive corporate purpose the share in the entities mentioned above; and v) investment funds in which the entities integrating the prudential conglomerate substantially assume or retain risks and benefits.

Table 6.1 – Summary of the SFN concentration indexes

	Total assets			Total deposits			Credit operations		
	2019	2020	2021	2019	2020	2021	2019	2020	2021
Participation by segment (%)									
b1+ b2	88.1	88.1	87.0	94.3	93.5	92.2	86.5	86.4	86.2
b3	3.3	3.8	5.3	4.7	5.3	6.0	4.3	5.1	6.1
b4	7.7	7.0	6.3	0.3	0.2	0.2	8.1	7.4	6.3
n1+ n2	0.9	1.1	1.4	0.7	1.0	1.6	1.1	1.1	1.4
n4	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0
Participation by control type (%)									
State-owned	42.4	40.6	38.0	39.8	34.9	32.6	47.6	45.6	43.5
Private-owned	57.6	59.4	62.0	60.2	65.1	67.4	52.4	54.4	56.5
Concentration indicators									
HHIn	0.1070	0.0981	0.0928	0.1263	0.1103	0.1032	0.1124	0.1069	0.1034
E.N.	9.3	10.2	10.8	7.9	9.1	9.7	8.9	9.4	9.7
RC4	0.600	0.573	0.560	0.672	0.627	0.601	0.606	0.594	0.593

The downward trend measured by the HHIn in the SFN concentration between 2018 and 2020, observed in the previous REB, continued in 2021. The reduction in concentration is observed in all accounting aggregates and, more intensely, in total deposits. Considering the references regarding the metrics used (Guide, 2012), the HHIn indicates low concentration regarding total assets and moderate concentration regarding total deposits and credit operations.

From 2019 to 2021, the E.N. rose from 9.3 to 10.8 in total assets, from 7.9 to 9.7 in total deposits, and from 8.9 to 9.7 in credit operations, considering a universe of 1,063 active institutions in the credit market.

CR4 also reduced in all accounting aggregates between 2019 and 2021, from 60.0% to 56.0% in total assets,⁸⁴ from 67.2% to 60.1% in total deposits,⁸⁵ and from 60.6% to 59.3% in credit operations.⁸⁶ In line with the behavior of the E.N., there is a sharper fall in the share of the four largest institutions in total deposits.

The reduction in concentration occurred even though twelve mergers were evaluated in 2021. Four of these

84 The four largest institutions in total assets, in descending order, are Caixa Econômica Federal, Banco do Brasil, Bradesco, and Itaú.

85 The four largest institutions in total deposits, in descending order, are Banco do Brasil, Bradesco, Itaú, and Caixa Econômica Federal.

86 The four largest institutions in credit operations, in descending order, are Caixa Econômica Federal, Banco do Brasil, Itaú, and Bradesco.

mergers directly involved at least one bank and some modality of credit among the affected relevant markets.⁸⁷

Regarding market shares, between 2019 and 2021, the banking segment (b1+b2) declined from 88.1% to 87.0% in total assets; from 94.3% to 92.2% in total deposits; and from 86.5% to 86.2% in credit operations. The increase in the market share of the non-banking segment (b3+n1+n2+n4) in all accounting aggregates is mainly due to the increase in the share of the credit union segment (b3) in the period.

Also noteworthy is the reduction in the share of institutions under federal or state capital control, which, between 2019 and 2021, went from 42.4% to 38.0% in total assets, from 39.8% to 32.6% in total deposits and from 47.6% to 43.5% in credit operations.

Regarding the degree of concentration in credit operations, Table 6.2 presents the concentration indicators (E.N. and CR4) by relevant market and the respective number of effective institutions⁸⁸ in the last three years. Indicators refer to credit operations granted with both non-earmarked and earmarked resources,⁸⁹ for the banking and non-banking segments (b1+b2+b3+b4+n1+n2+n4).^{90,91}

Table 6.2 – Concentration indexes of the balance of SFN credit operations, by relevant market

Relevant markets	Concentration indexes								
	HHIn equivalent			RC4 (%)			Effective FI		
	2019	2020	2021	2019	2020	2021	2019	2020	2021
Rural and agribusiness financing (households and companies) ^{1/}	3.2	3.3	3.5	68.6	66.7	64.2	445	437	435
Real estate financing (households and companies) ^{1/}	1.9	2	2.1	92.7	92.2	92.3	57	69	73
Infrastructure and development financing (companies) ^{1/}	2.2	2.2	2.2	94.7	94.3	93.9	53	54	56
Operations with receivables (companies)	6.1	6.9	7.8	73.1	69.3	65.9	43	50	57
Working capital (companies)	10.9	10.4	10.8	55.3	55.8	56.9	795	792	786
Payroll-deducted personal loans (households)	7.7	7.9	8.1	65.9	66.5	65.2	709	712	736
Credit card	6.3	6.9	7.5	71.2	68.4	66.0	257	293	300

^{1/} Considered, unlike the other relevant markets, in addition to non-earmarked resources, earmarked resources.

⁸⁷ The following mergers stand out: the acquisition by Itaú Unibanco Conglomerate of a significant share of the total equity and voting capital of XP Inc. and, indirectly, of the total equity of XP Investimentos S.A.; and the acquisition by Banco BTG Pactual S.A. (BTG Pactual) of all common shares issued by Banco Pan S.A. (Pan) held by Caixa Participações S.A. (CaixaPar), a wholly owned subsidiary of Caixa Econômica Federal.

⁸⁸ Effective institutions are those that have a balance greater than zero in their credit portfolio in the respective credit modality.

⁸⁹ Credit operations granted with non-earmarked resources, except for housing financing, rural and agriculture and livestock financing, as well as infrastructure and development financing with earmarked and non-earmarked resources.

⁹⁰ Figures C.1 to C.7 in Appendix C present the share of the five leading institutions in each relevant credit market considered.

⁹¹ Tables B to H in Appendix C show the evolution of relevant markets by type of control and by origin of funds.

Concentration, as measured by E.N. and CR4, has decreased in the following relevant credit markets between 2019 and 2021: rural and agriculture and livestock financing (households + companies), housing financing (households + companies), commercial receivables acquisition operations (companies), payroll-deducted personal loans (households) and credit card (households + companies).

There is also an increase in the number of FI offering housing financing (households + companies), infrastructure and development financing (companies), commercial receivables acquisition operations (companies) and, especially, payroll-deducted personal loans (households) and credit cards (households + companies).⁹²

In particular, the reduction in concentration in the credit card market reflects the increase in the share of payment institutions. Among the relevant credit markets considered, the most expressive decrease in concentration occurred in the commercial receivables acquisition operations (companies).

In turn, an increase in concentration is noticeable in working capital (companies).

Considering the references of the Guide (2012), the level of concentration remains high in rural and agricultural and livestock financing (households + companies), housing financing (households + companies) and infrastructure and development financing (companies). A moderate degree of concentration is observed in the commercial receivables acquisition operations (companies), payroll-deducted personal loans (households) and credit card (households + companies). Concentration in credit granted through working capital (companies) remains low.

Among the markets with high concentration, in which earmarked credit prevails, the share of SOFIs is higher than that of POFIs between 2019 and 2021, as shown in Tables B, C and D of Appendix C. Among markets with moderate concentration, characterized by non-earmarked resources, the share of private banks prevails.

92 Based on tables B to H in Appendix C, it is worth noting that the b3 segment increased its share in rural and agriculture and livestock financing (households + companies), housing financing (households + companies), working capital (companies), personal loans with payroll consignments (households) and credit card operations (households + companies) between 2019 and 2021.

Conclusion

HHIn, E.N. and CR4 results suggest that SFN concentration decreased between 2019 and 2021 in the accounting aggregates considered, especially in total deposits. Banking segment (b1+b2) and development banks (b4) share has decreased, while the share of the non-banking segment (b3+n1+n2+n4) and POFIs has increased. HHIn indicates low concentration regarding total assets and moderate concentration regarding total deposits and credit operations, considering the Guide's references (2012).

The decrease in concentration was observed in the relevant markets of rural and agriculture and livestock financing (households + companies), housing financing (households + companies), payroll-deducted personal loans (households), credit card (households + companies) and, mainly, commercial receivables acquisition operations (companies). The level of concentration, however, remains high in rural and agriculture and livestock financing (households + companies), in housing financing (households + companies) and in infrastructure and development financing (companies), whose resources are predominantly earmarked.

6.2 Competition

In this section, the Lerner index is used to analyze competition in the SFN credit and financial services markets from 2015 to 2021. The methodology employed to estimate this index was improved for this REB issue and is described in the box "Methodology update for the evaluation of competition in the SFN credit and services markets".⁹³

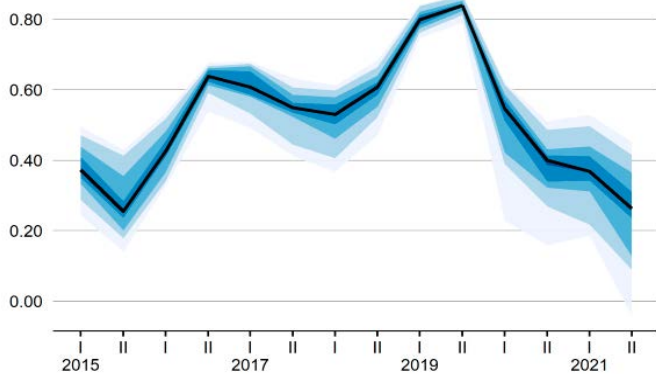
93 As of this REB issue, the Lerner index's assessment is based on the flow of credit grants in the half-year period, instead of considering the stock of credit grants at the end of that period, even those made in previous periods, as was done until the last edition of the REB. The main advantage of this new computation methodology is to provide more accurate information for the assessment and interpretation of credit market conditions. Changes in the credit volume and pricing calculations mean that the values of the Lerner index released in previous editions of the REB are not comparable to the values in this edition. The methodology previously used can be found in the box "Estimation of Competition Indicators" of the 2018 REB.

Competition in the credit market

Initially, the Lerner index⁹⁴ is used to assess competition in credit markets. This index is defined for each FI as the difference between the price and the marginal cost (markup) relative to the price⁹⁵ charged by the FI when granting credit. For a monopolistic competitor optimizing profits, the Lerner index is inversely proportional to the price-elasticity of demand. In the financial sector, the lower the sensitivity of demand to interest rate variations, the higher the Lerner index, and, therefore, the higher the market power, and the lower the degree of competition.

In the banking sector (b1+b2), the Lerner index for the credit market had an upward trajectory between 2015 and 2019 and sharply decreased during the pandemic period, reaching a median of 0.26 in 2021, close to the historical minimum of the series (Figure 6.1.a). In 2020, the fall in the index reflected both the reduction of prices and the increase in marginal costs. In the first half of 2021, despite the decrease in marginal costs, the reduction in prices was dominant, resulting in the continuing fall of the indicator. In the second half of the year, marginal costs and prices increased, but the effect of rising marginal costs dominated over that of falling prices, resulting in a further decrease in the Lerner index. The trajectory of marginal costs and prices in the period was mainly affected by the behavior of the Selic rate and the effects of the Covid-19 pandemic on the credit market and on the cost structure of the banks.⁹⁶

Figure 6.1.a – Credit Lerner (banking sector)



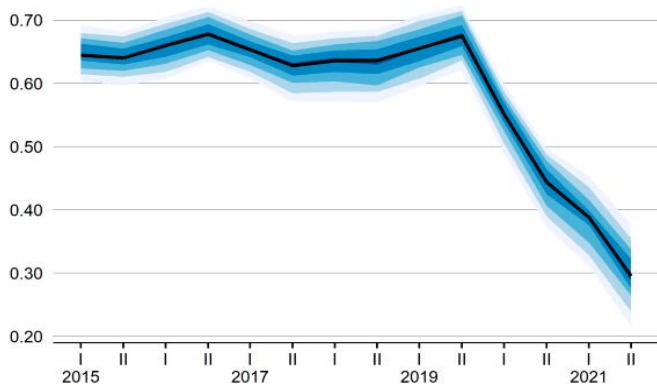
Meanwhile, the Lerner index of the credit market in the credit unions sector (b3) was relatively stable until the second half of 2019. During the pandemic, as in the case of the banking sector, a sharp downward trajectory was also observed, reaching a median of 0.30 at the end of 2021, which is less than half of the median at the end of 2019

94 The figures of the credit Lerner index in this section show different percentiles of the FIs distribution. The 50 percentile (median) is indicated by the black line. The percentiles are shown up in the range of 25 to 75 and identified by distinct colors every 5 points, with darker colors as one approaches the median. Data showed on these figures are smoothed to one-year windows averages to mitigate seasonality effects. All the above specifications also apply to the figures of the Lerner index for the financial services market.

95 The term “price” has been adopted in this section to designate interest rates on credit operations similar to the terminology used in the Lerner index literature. Additionally, the price is net of losses due to delinquency and other factors, according to the methodology described in the box “Methodology update for the evaluation of competition in the SFN credit and services markets” of this REB.

96 For example, some banks have more flexible IT structures, facilitating credit granting to online borrowers. For others, cost rigidities may have been a problem. The box “Covid-19 and local market power in credit markets” of this REB analyzes the effects of some of these factors.

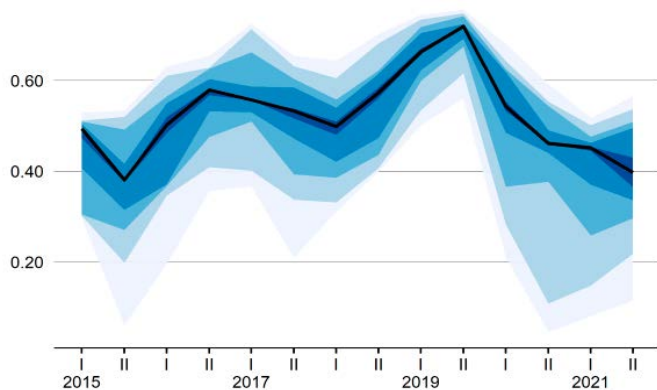
Figure 6.1.b – Credit Lerner (credit unions sector)



(Figure 6.1.b). Specifically for this sector, the behavior of marginal costs and prices is similar to that seen in the banking sector, with the difference that the marginal costs median rises uninterruptedly from 2019 on, resulting in a sharp drop in the indicator over the period.

The behavior of the credit Lerner index for institutions in the non-banking sector (n1) was similar to that of the banking sector, increasing from 2015 to 2019 and decreasing in 2020 and 2021 (Figure 6.1.c). However, the variations in the Lerner index of the non-banking sector institutions were relatively less intense, with a peak of around 0.72 in 2019 and an average of around 0.40 in 2021. This behavior reflected the rise in marginal costs and less intense increase in prices relative to marginal costs in 2020 with a fall in 2021.

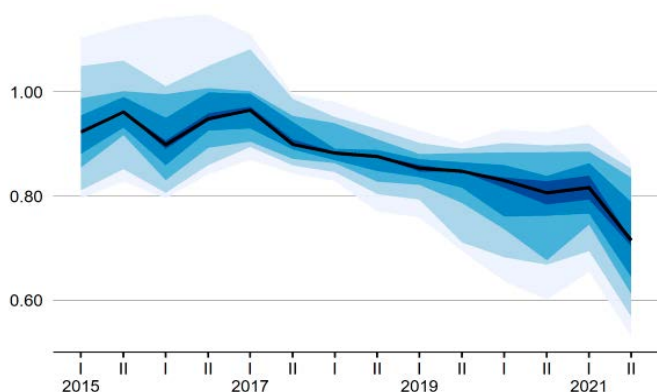
Figure 6.1.c – Credit Lerner (non-banking sector)



Competition in the financial services market

The Lerner index for the financial services market in the banking sector (b1+b2) has shown a downward trend since the first half of 2017 (Figure 6.2), reaching 0.71 in 2021. In the same period, marginal costs increased, while prices showed a mixed behavior, rising at the beginning of the period and decreasing from 2019 on. The increase in marginal costs had a dominant effect in determining the drop in the Lerner index for the financial services market over the period.

Figure 6.2 – Financial services Lerner (banking sector)



6.3 Financial innovations and the role of the BCB

Convergence of the Brazilian accounting standards to the international accounting standards

The CMN and the BCB concluded the process of convergence of the Brazilian accounting standards set out in the Accounting Standards of the Institutions Regulated by the BCB (Cosif) to the international accounting standards issued by the International Accounting Standards Board (IASB), adopted in the world's main markets.

The convergence of the accounting standards applicable to the Brazilian financial institutions to the international standard improves the quality of the accounting information and allows these institutions to be more competitive in the international scenario, since their financial statements are

prepared and presented based on the same accounting rules adopted in other countries, which facilitates comparability for the user of the information.

The alignment with international accounting standards considers the characteristics of the Brazilian market and prudential issues, i.e., it reconciles the need for disclosure and comparability of information with measures that ensure the soundness of the SFN, in accordance with the BCB's mission. Based on these principles, the CMN and the BCB issued a series of accounting standards aligned with the international standards, making prudential adjustments when necessary.

CMN Resolution 4,966, of November 25, 2021, stands out among the regulations published. It covers on the concepts and accounting rules applicable to financial instruments, which represent a large part of the assets and liabilities of financial institutions. This resolution determines the accounting classification, measurement and recognition of the financial instruments. Besides, it establishes rules for institutions to set up provisions for expected credit losses, a fundamental measure for the soundness of the institutions and the financial system as a whole. This regulation also applies to hedge accounting, which consists of using certain financial instruments to protect from oscillations in the values of other assets and liabilities of the institution, a strategy that aims for greater stability of the institutions' earnings.

The accounting standards applicable to investment assets and to non-financial assets acquired for investment purposes or for future sale and generation of profits based on the variations of their market prices were also harmonized with the international standards. For these types of assets, the criteria set out respectively in IAS 40 (Investment Property) and IAS 2 (Inventories) were adopted, through CMN Resolution 4,967, of November 25, 2021. Thus, non-financial assets that previously did not have a specific accounting treatment in Cosif are now treated as such, in accordance with their intrinsic characteristics.

CMN Resolution 4,975, of December 16, 2021, was also issued on the accounting standards applicable to leasing operations. Accompanying the regulatory evolution on the subject that has occurred globally in recent years, this resolution aligns the accounting standards applicable to these operations with the pronouncement IFRS 16 (Leases), issued by IASB, by means of the receipt of Technical Pronouncement CPC 06 (R2) Leases, from the Brazilian Accounting Pronouncements Committee (CPC) – equivalent in Brazil to IFRS 16.

It is also worth mentioning the issuance of CMN Resolution 4,924, of June 24, 2021, which consolidated the general principles for recognition, measurement, accounting and disclosure by FI, and accepted, among others, Technical Pronouncement CPC 47 (Revenue from Contracts with Customers), the Brazil's standard to IFRS 15 (Revenue from Contracts with Customers) from IASB.

Convergence to the best international practices of corporate governance

The CMN and the BCB have been improving the regulatory framework that rules the corporate governance of FIs and other institutions authorized to operate by the BCB. The objective is to align the national rules to the best international practices, considering the principle that a robust system of internal controls is essential for the ongoing concern of the institution and for maintaining the soundness and efficiency of the SFN.

Over the last few years, several regulations have been issued with the purpose of ensuring the efficacy of the rules concerning governance and risk management, such as CMN Resolution 4,595, of August 28, 2017, which provides for the compliance policy; CMN Resolution 4,879, of December 23, 2020, related to internal audit; and CMN Resolution 4,878, of December 23, 2020, which provides for succession planning policy.

In this context, to maintain a robust set of governance and risk management rules, the standards that set out the internal control systems of financial and other institutions authorized to operate by the BCB, previously defined mainly by CMN Resolution 2,554, of September 24, 1998, have been improved.

Therefore, CMN Resolution 4,968, of November 25, 2021, increased the alignment of the rules applicable to FIs and other institutions authorized to operate by the BCB with the best international practices, especially those provided in the Framework for Internal Control Systems in Banking Organizations, from the Basel Committee, and Internal Control – Integrated Framework, from the Committee of Sponsoring Organizations of the Treadway Commission (Coso).

This Resolution, besides detailing the responsibilities of the board of directors, has improved the rules related to the responsibilities attributed to senior management, especially the executive board, as well as determines that institutions designate a director responsible for internal control issues.

This Resolution also specifies the essential characteristics of internal control systems regarding aspects related to control culture; risk identification and assessment; activities of control and segregation of functions; information and communication; and monitoring, highlighting several aspects related to fraud: prediction, prevention controls, detection, investigation, and correction.

This Resolution concluded the regulation convergence process applicable to financial and other institutions authorized to operate by the BCB to the best international practices of corporate governance.

Preventing fraud in the provision of payment services

BCB Resolution 142, of September 23, 2021, established procedures and controls to prevent fraud in the provision of payment services. These procedures must be observed by financial and other institutions authorized to operate by the BCB, as well as payment institutions comprising the Brazilian Payment System (SPB). The set of measures set out in this Resolution aims to increase the protection of clients, contributing to reduce the incentive to commit illicit acts against people using means of payment.

Among the implemented measures, institutions must limit the total value of payment transactions between individuals – between 8 pm and 6 am – to BRL 1,000.00. This limit applies to transactions related to deposit accounts and prepaid payment accounts, and may be changed at the customer's request, observing a minimum period of 24 hours for the execution of the request of limit increasing which must be formalized through electronic service channels.

Additionally, institutions must:

- I) implement, in the case of institutions that act as acquirers, procedures aimed at assessing the client before offering the service of prepayment of receivables; and
- II) carry out daily records of fraud or attempted fraud occurrences in the provision of payment services.

To ensure and monitor the efficacy and effectiveness of procedures and controls, institutions must prepare a monthly report on the occurrences and the preventive and corrective measures adopted, which must be forwarded

to the internal audit, to the Board Executive Officers and, if applicable, to the audit and risk committees and the institution's Board of Directors.

These measures aim to increase customer security, without, however, significantly altering the experience and benefits in the use of payment products and services offered by the institutions.

Regulatory Sandbox

The CMN and the BCB have been seeking to create a regulatory environment within the limits of the law that welcomes the growing application of new technologies in the financial and payment markets. To this end, acting in a flexible way is essential to foster innovation, diversity of business models, and competition among providers of financial products and services. At the same time, the needs of the users of the SFN and the SPB must be met, guaranteeing protection for clients and investors, and the safety, soundness and efficiency of the institutions that make up the system.

With this aim, in late 2020, the guidelines for the operation of the Controlled Test Environment for Financial and Payment Innovations (Regulatory Sandbox) were defined, as well as the conditions for the supply of products and services in the context of this environment within the SFN and the SPB.⁹⁷ The Regulatory Sandbox is a test environment controlled by the BCB, in which innovative projects in the financial or payment areas can be tested, observing a specific set of regulatory provisions that support the delimited performance of their activities.

The first cycle of the Regulatory Sandbox, regulated by BCB Resolution 50, of December 16, 2020, started in December 2021 and lasted for one year, with the possibility of being extended for an equal period. Fifty-two projects were presented, seven of which were selected, in accordance with the criteria established in the regulation, such as fitting the concept of innovative project and the areas of competence of the CMN and the BCB. The seven projects selected were the following:

- I) financing with real estate collateral, with payment on maturity and without periodic amortizations, combined with the contracting of specific insurance to reduce pertinent risks;

⁹⁷ Defined by the CMN Resolution 4,865 and BCB Resolution 29 both issued on October 26, 2020.

- II) technological solution for the execution of instructions of multi-currency payments, of exclusive use between institutions authorized to operate in the foreign exchange market by the BCB with the purpose of immediate exchange of reserves;
- III) execution of payment transactions with credit granting, revolving or in installments, using functionalities of the Pix payment arrangement;
- IV) platform for the issue and secondary trading of private fixed income securities;
- V) development of a secondary market for Bank Credit Notes (CCBs), a type of credit instrument issued in favor of financial institutions;
- VI) implementation of a network of physical points offering the service of transfer of funds in cash; and
- VII) a platform capable of moving money between two or more accounts, by transferring values to temporary or settlement accounts, on demand, to carry out a transaction under previously agreed conditions.

The next steps will consist of monitoring the execution of these projects and, if successful, the CMN and the BCB will be able to make possible adjustments to the regulation to enable these new financial products and services to be offered on a permanent basis to the customers and users of the SFN and the SPB.

Open Finance

Open Finance – initially called Open Banking – is one of the initiatives that the BCB has promoted to increase competition and the supply of financial products and services through the sharing of customers’ registry and financial information, if authorized by them, among different regulated institutions. The system allows the contracting of financial services in a third-party electronic environment, as well as making payments without the client needing to directly access his account. These features reduce friction, make the payment experience faster and easier, and enable the emergence of a greater diversity of business models, especially related to e-commerce.

Open Finance is based on the recognition that the personal data of clients, whether households or companies, belongs to them, and not to the institutions with which they have a relationship. Thus, in Open Finance, the consumer has full control over his data and the right to share it with other institutions for his own benefit, in an agile, secure, and frictionless environment. Thus, the conditions are created to reduce information asymmetry and to increase the diversified supply of financial products that are better suited to clients' needs, at a lower cost.

In 2020, the general rules for what was then Open Banking were defined, and the initial structure responsible for the governance of this system was established in Brazil. In 2021, technical specifications for the standardized sharing of data and services were defined and implemented, the first solutions developed by the market were provided, and the process of sharing clients' data started, as well as the beginning of the transition from Open Banking to Open Finance, starting with the expansion of the project's scope to include other financial services such as investments, insurance, foreign exchange, acquiring, and pension plans.

The technical specifications of the sharing standards were defined by technical groups composed of representatives of the various segments participating in Open Finance. To ensure compliance with the objectives proposed for this system, non-discriminatory access, and the representativeness of the participating segments, the BCB has representatives in all technical groups (GTs), as well as in the deliberative board of the initial governance structure, its decision-making body. Based on the proposals formulated by the governance structure, the BCB issued normative acts containing the technical requirements for sharing data and services in Open Finance in the four phases of the project.

In operation since February 2021, phase 1 comprises, in an open format, data sharing from the participating institutions about their service channels, characteristics of products and services offered and made available (location of points of attendance, contractual terms and conditions, fees, interest rates, among others). This information enabled the development of solutions based on the comparison of products and services available for consumers to hire.

To ensure security and stability to the implementation process and to allow the necessary adjustments, the following phases, which are significantly more complex

due to the sharing of data and services by consumers, had staggered deliveries. Phase 2, which refers to the sharing of register and transactional data from traditional banking and payment services, subject to consumer consent, started implementation in mid-August 2021 and has been operational since the end of that year. Throughout 2021, the technical specifications for the first deliveries of phases 3 (payment initiation through the Pix payment arrangement) and 4 (open format data sharing for acquiring, insurance, pension plans, investments and foreign exchange) have been defined. The participating institutions ended the period with the completion of security certification processes and the start of functional tests for its operationalization throughout 2022.

With the expansion of its scope in phase 4, which involved sharing information on financial products other than traditional banking products in coordination with other regulators and interested parties, the project ended 2021 close to what specialized literature calls Open Finance. Given the broad scope of data as well as the number of participating institutions (currently about 800), the Brazilian initiative was considered, in 2021, a global reference regarding the theme.

Nevertheless, the BCB remains vigilant, intervening, when necessary, in the project implementation process to ensure the construction of an environment that stimulates competition, benefiting consumers.

Methodology update for the evaluation of competition in the SFN credit and services markets

Central banks and the academia have used the Lerner index (Lerner, 1934) to assess competition in banking systems and the market power of financial institutions (FI).¹ The BCB has used this indicator to evaluate competition in the credit and financial services markets at the national level since the first edition of the Banking Report (REB), in 2017.² The methodology employed since then was published in the box “Estimation of Competition Indicators” of the REB 2018.

The aim of this box is to describe the improvements introduced in the methodology for calculating the Lerner index of FI in this REB, based on the conceptual and methodological framework of Silva *et al.* (2021). The improvements make the calculations more robust and allow a more accurate analysis of the channels through which the FI market power is established, i.e., the prices and marginal costs channels. The following improvements stand out:

- the more accurate identification of credit market conditions focused on recent credit operations (in the half-year period under analysis) rather than on the entire credit volume in the FI’s portfolio.
- better estimation of the price of recent credit operations, mainly regarding very short-term operations; and
- better specification of the cost function employed in the estimation of the marginal cost.

Using these methodological improvements, this box presents the estimates of prices and marginal costs of credit operations carried out in each half-year from 2015 to 2021 by institutions of the banking, credit union, and non-banking sectors, to illustrate information and the channels that influenced Lerner indexes shown in section 6.2. The trends underlying the evolution of Lerner indexes calculated with the current and previous methodologies are similar, although those calculated with the current methodology are higher. These differences are possibly due to the changes listed above, especially those related to the selection of credit operations in the half-year period and the estimation of prices.

1 The World Bank uses the methodology of Demirgüç-Kunt and Martínez Pería (2010) as a reference to calculate the Lerner index of banking systems of several countries at the national level. Lerner indexes are also widely employed by international organizations and central banks, such as, for instance, the IMF (Tan *et al.* 2020), the Bank of England (De-Ramon *et al.*, 2018), the Banco de España (Cruz-García *et al.* 2018), and Shaffer and Spierdijk (2020).

2 This initiative is aligned with guidelines defined in the BC# Agenda to promote greater access to cheaper credit for the population.

Methodology

The Lerner index is defined as the ratio of the mark up (the difference between the price and the marginal cost) to the price. The indicator's calculation considers that banks³ maximize their profits by adjusting the prices of their products above the marginal cost in oligopolistic or monopolistic markets. The Lerner index is employed as a proxy of the bank's market power and the level of competition. In markets with perfect competition, the profit is maximized when the price is equal to the marginal price, being the Lerner index equal to zero. If competition is not perfect, the maximum profit will be obtained with a price above the marginal cost, when the Lerner index will be greater than zero. This interpretation is reinforced by the fact that this indicator is proportional to the inverse of the demand elasticity. In credit markets, financial institutions with larger market power can obtain greater profits, since an increase in credit prices leads to a comparatively lower reduction in the credit demand.

This means that a higher value for the Lerner index implies greater market power and, consequently, lower competition. The methodology herein presented assumes that each FI maximizes profits by offering simultaneously all its products and services in different markets at the national territory. Different credit products are aggregated in only one market at the national level, calculating the credit volume granted and prices, and estimating the FI's marginal cost for this aggregated market, as detailed in the following section. The same treatment is given to financial services.

Model definition

The estimation of the Lerner index for a FI participating in the market of credit or services requires two pieces of information: (i) the price (observable variable); and (ii) the marginal cost (unobservable variable) of the product. To estimate the marginal cost, the banking literature employs a total cost function modeled from a translog production function of the FI.⁴

This function associates the amounts of inputs and produced volumes by a FI at the national level during one time unit, herein considered as one half-year. Next, this function is used to minimize the production costs of a basket of products, given the prices of inputs. This is done through the cost function, which, based on data and parameters of the production function, associated with the technology employed by the FI, allows to calculate its total cost. To estimate the Lerner index, one relies on the values of the FI total cost, but not on its technology (which would have to be estimated), from which are defined the parameters of the cost function, used to calculate the marginal costs. To obtain these parameters, the cost function is estimated from the model's observable variables: prices of inputs, produced amounts, and the total cost incurred in the process.⁵ After estimating the coefficients from observable variables, one may calculate the marginal cost associated with each product, defined as the derivate of the total cost function, with the parameters obtained for the produced amount of each product under analysis.

3 Originally the Lerner index were developed in the context of the Theory of the Firm. Later, they were adapted to assess the market power of banks by the banking literature.

4 Shaffer and Spierdijk (2020) list more recent studies that use the translog functions to calculate the aggregate and specific Lerner index for products in several countries.

5 One example of these variables could be, in the case of prices of inputs, the funding interest rate. As for the produced amounts, one could consider, for credit operations, the average outstanding portfolio in the period.

The Lerner index for the FI i in the period t is calculated from the following expression:

$$L_{it}^{(p)} = \frac{P_{it}^{(p)} - CM_{it}^{(p)}}{P_{it}^{(p)}} \quad (1)$$

where $P_{it}^{(p)}$ and $CM_{it}^{(p)}$ are, respectively, the average price⁶ (average rate) of operations and the marginal cost of the FI i in the period t relative to the banking product p in the national market. The products focused on this box are credit granting and provision of banking services. According to Equation (1), the Lerner index might be affected by the price and marginal cost channels. Increases in the price channel alone might lead to an increase in the Lerner index, indicating reduced competition. By contrast, increases in the marginal cost channel alone would lead to a reduction of the Lerner index, indicating increased competition. Effects of joint variations of both channels are defined by Equation (1).

A total cost function in the dimension FI-period is employed to estimate the marginal cost. Considering that CT_{it} denotes the total cost, the total cost function is described from the following expression:

$$\begin{aligned} \ln\left(\frac{CT_{it}}{W_{it}^{(1)}}\right) = & \alpha_i + \sum_{p=1}^M \beta_p \ln Q_{it}^{(p)} \\ & + \frac{1}{2} \sum_{p=1}^M \sum_{k=1}^M \beta_{pk} \ln Q_{it}^{(p)} \ln Q_{it}^{(k)} + \sum_{j=2}^N \delta_j \ln \frac{W_{it}^{(j)}}{W_{it}^{(1)}} \\ & + \frac{1}{2} \sum_{j=2}^N \sum_{k=2}^N \delta_{jk} \ln \frac{W_{it}^{(j)}}{W_{it}^{(1)}} \ln \frac{W_{it}^{(k)}}{W_{it}^{(1)}} + \sum_{p=1}^M \sum_{j=2}^N \gamma_{pj} \ln Q_{it}^{(p)} \ln \frac{W_{it}^{(j)}}{W_{it}^{(1)}} + \varepsilon_{it} \end{aligned} \quad (2)$$

where i and t index FI and period, respectively. $W_{it}^{(j)}$ where $Q_{it}^{(p)}$ and represent the price of the j -th input and the produced amount of the p -th product of FI i during the period t . The FI uses N inputs and produces M products. In Equation (2), the total cost CT_{it} and prices of inputs $W_{it}^{(j)}$, $j \neq 1$, are divided by the price $W_{it}^{(1)}$ to ensure the linear homogeneity of the estimated cost function.⁷ In addition, $\beta_{pk} = \beta_{kp}$, $\forall p, k$ and $\delta_{jk} = \delta_{kj}$, $\forall j, k$ are considered. The term ε_{it} is the stochastic error.

The econometric model is saturated with FI fixed effects α_i to capture specific unobservable characteristics and invariants of time of the FI that affect its total cost. In addition, it is assumed that the cost function may also differ due to the size of the FI (large, medium, small, micro), due, for instance, to particularities related to complexity and regulatory requirements that depend on the FI size (prudential segmentation).

To account for these size specifications, each size class is associated to a specific set of coefficients β_p , β_{pk} , δ_j , δ_{jk} and γ_{pj} in the cost function in Equation (2). According to the same reasoning, these coefficients are made flexible to consider the influence of time in the cost function, such as the introduction of technological improvements or improved FI production process.

In the previous model's version, only fixed effects of time were adopted. In the current version, the introduction of fixed effects related to the FI enhanced the accuracy of estimations, also considering the improved quality of data related to the model's variables.

6 In this box, the term "price" is adopted for interest rates of credit operations and to harmonize the terminology used in the literature on Lerner indexes, as usually done in other Banking Reports.

7 That is, this equality should hold if prices and the cost are multiplied by a constant and the other parameters remain unchanged. To make this division, the price of a relevant input for the banking activity is chosen, for example, funding rates, for reasons of numeric stability.

To calculate the marginal costs of the FI i associated with the product p in the period t , the total cost in Equation (2) is derived in relation to the produced amount of the product p by the FI i during the period t , replacing the coefficients obtained in the estimation above in the following equation:

$$CM_{it}^{(p)} = \frac{\partial CT_{it}}{\partial Q_{it}^{(p)}} = \left(\frac{CT_{it}}{Q_{it}^{(p)}} \right) \left(\beta_p + \beta_{pp} \ln Q_{it}^{(p)} + \sum_{\substack{k=1 \\ k \neq p}}^M \beta_{pk} \ln Q_{it}^{(k)} + \sum_{j=2}^N \gamma_{pj} \ln \frac{W_{it}^{(j)}}{W_{it}^{(1)}} \right) \quad (3)$$

The marginal cost in (3) is interpreted as the value in BRL spent by the FI i to increase by one unit the banking product p during the period t (half-year). As for financial products, the unit of product considered is one unit of stock of outstanding operations of the product, i.e., the outstanding credit portfolio in the half-year, the outstanding credit portfolio before the half-year, the stock of operations with bonds and securities (TVM), or the stock of operations with other assets, according to the case. As for services, the marginal cost is the value spent to provide services to an additional client.

Model's observable variables

In this section it is described the calculation of the model's observable variables used in the total cost function – Equation (2) and in the Lerner index – Equation (1). Observable variables of Equation (2) are the prices of inputs j , $W_{it}^{(j)}$, the produced amounts of the product p , $Q_{it}^{(p)}$ and the total cost CT_{it} . For the estimation of Equation (1), the prices of products p , $p_{it}^{(p)}$ are also necessary. Table 1 presents the variables employed in the calculation of the Lerner index and the respective employed databases.

Table 1 – Data sources for calculating the Lerner index

Variables	Database		
	Cosif	SCR	RAIS
Prices of inputs			
Funding prices	X		
Personnel prices			
Personnel expenses	X		
Number of employees			X
Prices – Other administrative resources	X		
Total cost			
Funding expenses	X		
Administrative expenses	X		
Produced amounts			
Credit granted in the half-year period		X	
Credit granted before the half-year period		X	
TVM	X		
Other assets	X		
Number of clients		X	
Product prices			
Credit granted in the half-year period		X	
Credit granted before the half-year period		X	
Produced services			
Average service revenues	X		
Number of clients		X	

The databases mentioned in the table are:

- Cosif: refer to data used by the BCB in the banking supervision compiled from the Accounting Standards of the Institutions Regulated by the BCB. Cosif data are available at the national level by banking conglomerate or independent institution;⁸
- SCR: used for the extraction of identified data of household and corporate credit operations in Brazil, from the BCB Credit Information System (SCR). Data allow to identify credit granted within a given half-year and the prior half-year by credit modality and FI, as well as the average price of the operations.
- RAIS: database containing identified data of formal job links from the Annual Report on Social Information (Rais) and the General Registry of Employed and Unemployed Persons (Caged), both maintained by the Ministry of Labor and Social Security. From these databases the number of formal employees in each Brazilian FI is obtained.

Prices of inputs $W_{it}^{(j)}$

Prices are calculated every half-year. Therefore, expenses correspond to the sum of values incurred in the half-year, whereas the stock of funding, total employees, and adjusted total assets are the averages in the half-year of the monthly values of variables. This convention applies to flows and stocks concerning the other variables.

Funding prices: are calculated from Equation (4) with Cosif data. Expenses and stocks of funding refer, among others, to deposits, TVM, and repurchase operations.

$$W_{it}^{(1)} = \frac{\text{Funding expenses}_{it}}{\text{Stocks of funding}_{it}} \quad (4)$$

Personnel expenses by employee:⁹ obtained from Equation (5) with data from FI personnel expenses extracted from Cosif and the total number of employees obtained from the Rais.

$$W_{it}^{(2)} = \frac{\text{Personnel expenses}_{it}}{\text{Total employees}_{it}} \quad (5)$$

Prices of other administrative resources: obtained from Equation (6). It consists of administrative expenses except personnel expenses incurred in the management of the FI total adjusted assets.

$$W_{it}^{(3)} = \frac{\text{Administrative expenses}_{it} - \text{Personnel expenses}_{it}}{\text{Total adjusted assets}_{it}} \quad (6)$$

Produced amounts $Q_{it}^{(p)}$

Credit operations are among the main FI products. Some credit modalities have longer terms. Therefore, the volume of the balance of the FI's credit portfolio is mainly composed of old operations, often granted under market conditions typically distinct from those observed in current credit markets.¹⁰

8 In addition to Cosif accounts, supervision variables computed from Cosif accounts above level 3, which is classified information, are also employed. In both cases, Cosif will be indicated as the data source.

9 In the previous methodology version, personnel expenses were divided by total assets. Now they are divided by the number of employees, obtained from the Rais.

10 For instance, real estate financing operations may have terms up to thirty years, whereas revolving working capital may have terms of less than one month.

Contractual conditions of credit granting – including volume and rate – occurred in the half-year are a better representation of the competition environment in the credit market than the contractual conditions of previous half-years. In addition, incurred costs for granting credit are different from those for monitoring the same operations, which is reflected in differences in the marginal cost associated with credit operations within and in the previous half-year.

The separation of recent credit granting (in the current half-year) from the old (before the current half-year) is the main methodological improvement in relation to the previous methodology for calculating the competition situation with Brazilian data. To better capture competition in each period (half-year), the credit volume of each credit modality is broken down into credit volume granted in the half-year and that granted before it.¹¹

Therefore, in this new model, each FI is assumed to produce five products: $Q_{it}^{(1)}$: volume of credit granted in the half-year; $Q_{it}^{(2)}$: volume of credit granted previously (both obtained from the SCR); $Q_{it}^{(3)}$: TVM operations, represented by the balance of these operations in the Cosif; $Q_{it}^{(4)}$: operations with other assets;¹² and $Q_{it}^{(5)}$: services provided to clients, represented by the number of clients receiving these services.¹³ As for services, each FI client is assumed to receive the average by client of services provided by the FI.

Total cost CT_{it}

The total cost CT of the FI i in the half-year t is calculated from Equation (7):

$$CT_{it} = \text{Funding expenses}_{it} + \text{Administrative expenses}_{it} \quad (7)$$

Prices of credit products granted within the half-year $P_{it}^{(1)}$

The banking literature normally uses the ratio of revenue from credit operations to the credit volume as a proxy for the price or average rate of credit,¹⁴ obtaining the average rate net of losses due to delinquency, since it effectively measures the flow of revenues received by the FI in its credit operations.¹⁵

This box follows the banking literature and calculates the average credit price granted by the FI i in the period t as the ratio of the income flow of credit granted within the half-year (SCR) to the average outstanding portfolio of these operations in this period (SCR). This price is denominated the effective price ($P_{it}^{(1)}$) of operations granted within the half-year in a given half-year/year t for the FI i . This price is calculated from the income flows of new credit operations (R) and the outstanding portfolios before receiving these flows (CA) in each month by the FI according to:¹⁶

11 These volumes are obtained from single operations data extracted from the SCR. In the previous version of the methodology, in which this subdivision was not present, the balance of FI credit operations, obtained from the Cosif database, was used.

12 The value “Other assets” is calculated by exclusion: deducting from the current and long-term assets the value of availabilities, interbank liquidity investments, TVM, interbank operations, operations between branches, and credit and leasing operations.

13 The proxy for the number of clients of a FI in a given period, for financial services provision purposes, is the number of clients with credit operations (SCR) with that FI in that period.

14 See, for example, Shaffer and Spierdijk (2020) and Erler *et al.* (2017).

15 In the previous version of the methodology, the prices of credit products were calculated from accounting information on revenues and balances of credit operations. In the current version, this calculation is only required for credit operations granted within the half-year, which demands data for individual operations of each FI with this characteristic.

16 This equation is employed to correct a distortion. Since there is a significant volume of very short-term credit (less than one month), considering end-of-month accounting data generates a positive bias in the average price of each operation, since, at the end of the month, the corresponding stock will not be included in the outstanding portfolio (the operation will have matured), whereas the corresponding revenue will have been added to the credit operations revenue. To correct this problem, instead of calculating the average price considering the outstanding portfolio at the end of the month, the calculation considers the value of the outstanding portfolio before the month’s receipts, i.e., interest, amortizations, and settlement of the operation.

$$P_{it}^{(1)} = \frac{\sum_{k \in S_t} R_{ik}}{\frac{1}{6} \sum_{k \in S_t} CA_{ik}} \quad (8)$$

where S_t is the group of months in the half-year t . The price obtained refers to a half-year price.

Prices of produced services $P_{it}^{(5)}$

The price of services provided to clients is calculated from the half-year's services revenue divided by the number of the FI's clients i – (Equation (9)). The services revenue is obtained from the sum of the Cosif accounts “Revenues from the provision of services” and “Revenues from provided guarantees”.

$$P_{it}^{(5)} = \frac{\text{Services revenue}_{it}}{\text{Number of clients}_{it}} \quad (9)$$

Market power channels

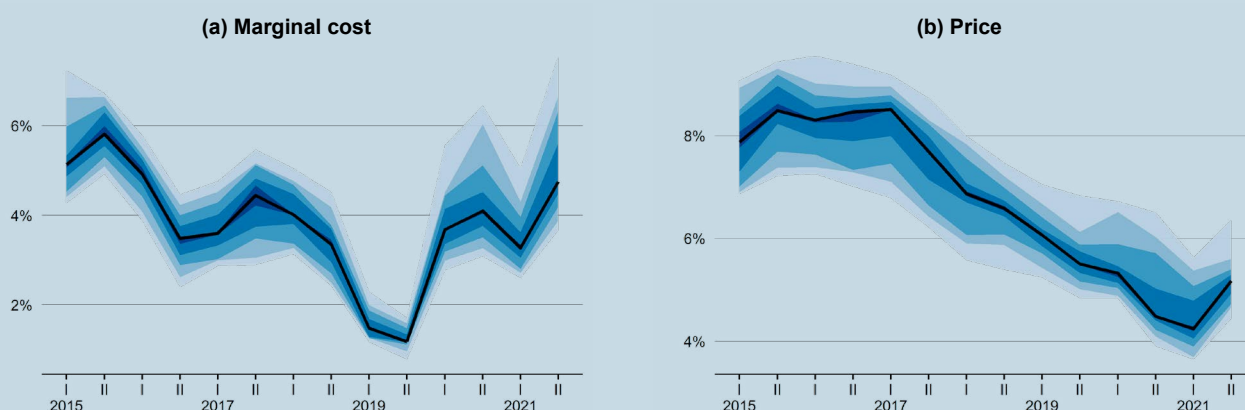
This section presents the evolution of price and marginal cost channels that influence the Lerner index (Equation 1). Lerner indexes, calculated for the credit and financial services markets, for FI by banking, credit unions, and non-banking sectors, are presented in Chapter 6, section 6.2, of this Banking Report. These indicators are presented by using figures that show the distribution of Lerner indexes of different FI around the median values, between percentiles 25 and 75. In this section, similar figures for marginal costs and prices are presented, both for credit operations within the half-year, for the same markets and FI sectors. This provides a better understanding of variations in the Lerner indexes presented in section 6.2 of this Banking Report from the price and marginal cost channels by which it is composed. Data cover the period from January 2015 to December 2021.¹⁷

Banking sector (credit market): figures 1(a) and 1(b)¹⁸ show the evolution of marginal cost and price channels that compose the Lerner indexes described in Section 6.2 for the credit market of the banking sector. Section 6.2 shows that the Lerner index grows until the second half of 2019, as a result of lower competition. During the pandemic, the indicator decreases sharply, mainly in 2020, pointing to increased competition.

17 The sample is limited to 2015 because there was no data available to calculate the prices of credit operations according to the current methodology before that year.

18 As for credit markets, the analyses refer to total credit operations of each FI within the half-year corresponding to each analysis date in the period. Therefore, to calculate the price, the numerator and denominator of Equation (8) are calculated for each operation aggregated at the bank level before the division. Similarly, for the calculation of marginal costs, an equation is defined for each FI and period in the estimation of the model specified in Equation (2). Next, the distribution of values relative to Lerner indexes and of the marginal costs and prices obtained for each FI in each period is calculated and plotted in the figures.

Figure 1 – Channels affecting the Lerner index for the credit market – Banking sector



Regarding marginal costs, Figure 1 (a) shows a downward trend from early 2015 until the second half of 2019, then increasing onwards. A component that affected this decline is the funding cost, which followed a downward trend in the period, related to the Selic rate downward trajectory. During the early pandemic period, the box “Covid-19 and local market power in credit markets”¹⁹ of this REB shows the increase of the marginal cost of banks in locals with greater incidence of Covid-19 at the same time of lower credit granting, finding evidence that “banks are not able to reduce their total costs, possibly due to the economic rigidity of cost factors, as well as legal barriers”.

As of March 2021, the Selic rate begins an upward cycle, contributing to the raise of the funding cost in the second half of the year.

As for the effective price, Figure 1 (b) shows a relative stability at the 8% range by half-year until the first half of 2017, decreasing at a relatively steady rate until the first half of 2021 and increasing in the second half. This curve is highly correlated with the Selic rate trajectory in the period.

For the first year of the Covid-19 pandemic, the box “Covid-19 and local market power in credit markets” did not find evidence that the pandemic impacted the effective credit price,²⁰ but showed that its components, that correspond to the numerator and denominator of Equation (8), were affected. As mentioned in the box, “there were relevant changes in its components: more affected localities experienced a significant reduction in credit revenue and credit granted”.²¹

Comparing the trajectory of the Lerner index in the period from the second half of 2019 shown in Section 6.2 of Chapter 6 of this REB, with the trajectory of corresponding prices and marginal costs, one observes that, in 2020, the indicator’s decline in this period is mainly due to the reduction of prices. In the first half of 2021, the reduction of prices contributed to the reduction of the Lerner index, whereas the drop of the marginal cost contributed to its increase, with the predominance of the prices channel over the marginal cost channel. In the second half, these variables inverted direction, but with the predominance of the marginal cost over the reduction of prices, leading to a new reduction in the Lerner index.

19 Studies described in this box refer to credit granted by the banking sector.

20 It should be highlighted that the analysis carried out in that box used the methodology of “differences in differences”, being interpreted, therefore, in relative rather than absolute terms. As for the effective credit price, the observed variation between localities with different Covid-19 intensity was not statistically significant, although Figure 1.b, which represents the aggregation of localities at the national level, shows a decline in absolute terms (and not relative, as the analysis in that box) of this variable in the pandemic period.

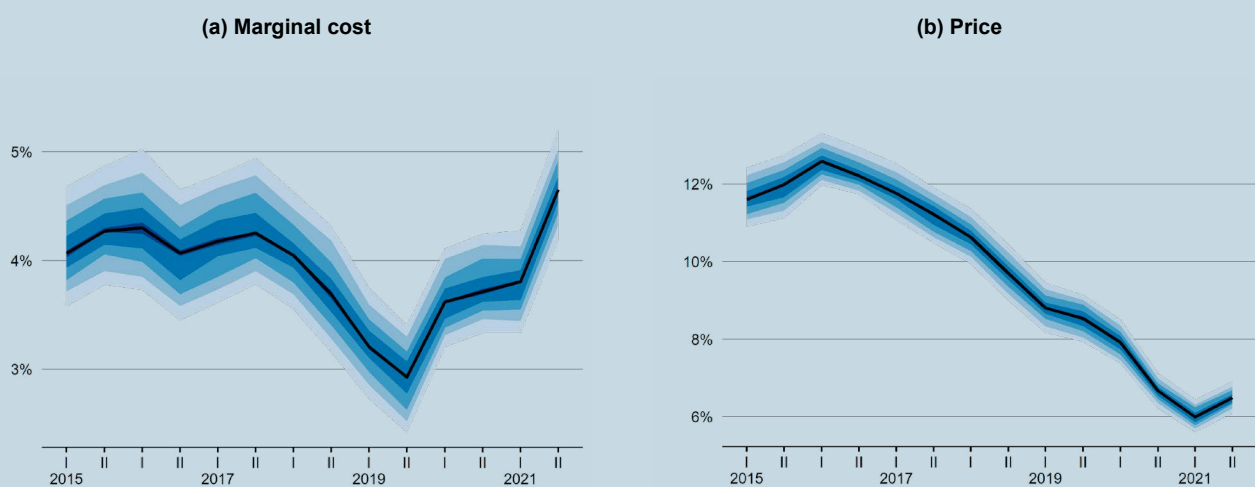
21 It consists in the same analysis for the effective credit price, i.e., when a reduction in the credit granting is mentioned, for instance, it is always relative. In view of the sharp increase in credit granting in the period, these reductions probably represent lower magnitude increases.

Credit unions (credit market): figures 2(a) and 2(b) show the evolution of marginal cost and price channels for credit operations in the credit union sector. In this sector, Section 6.2 of Chapter 6 shows that the median of the Lerner index remained relatively stable during the pre-pandemic period. During the pandemic, the Lerner index dropped consistently.

Similarly to the banking sector, the reduction of the Lerner index in 2020 is explained by contributions of both price and marginal cost channels. This means that the reduction of the Lerner index is explained by both the price reduction and the marginal cost increase.

This trend continued to be observed in the first half of 2021. The credit union sector, as opposed to the banking sector, exhibited a further increase in the marginal cost in that period. In the second half of 2021, the marginal cost channel was predominant over the price channel: the increase in the marginal cost was higher than the increase in the price, thus explaining the reduction in the Lerner index in that period.

Figure 2 – Channels affecting the Lerner index for the credit market – Credit union sector

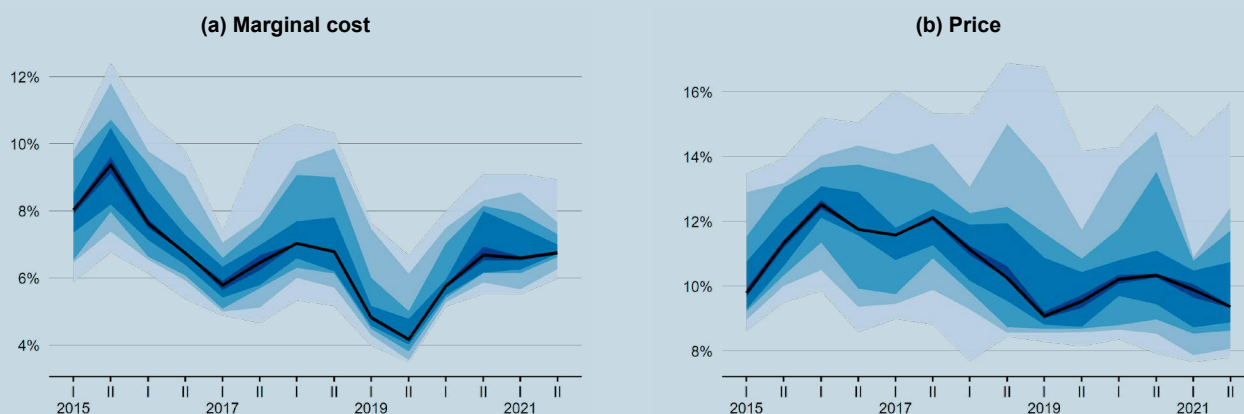


Non-banking sector²² (credit market): figures 3(a) and 3(b) show the evolution of marginal cost and price channels for credit operations in the non-banking sector. In this sector, the Section 6.2 shows that the median of the Lerner index grows until late 2019. In the first year of the pandemic, there is a substantial reduction in the Lerner index. In 2021, the indicator continued to decline, but at less strong pace.

There is a significant difference that explains the reduction of the Lerner index in the first year of the pandemic for the non-banking sector in relation to the banking and credit unions sectors. As in the latter sectors, the non-banking sector registered an increase in the marginal cost. By contrast, the effective price also increased. Therefore, the reduction of competition in 2020 measured by the increase of the Lerner index is due to the preponderance of the marginal cost channel over the price channel. In the first half of 2021, both marginal cost and price dropped. The reduction in the Lerner index (relative price-cost margin) points to the preponderance of the price reduction over the marginal cost reduction. In the second half of 2021, the marginal cost increased again, and the price, as opposed to the other sectors, fell. Therefore, both channels contributed to the reduction in the price-cost relative margin observed in the credit market of the non-banking sector, suggesting increased competition in this sector.

22 The non-banking sector is made up by credit, financing, and investment societies, fostering agencies, savings and loans association, real estate credit companies, mortgage companies, micro and small entrepreneur credit societies, leasing companies, direct credit companies, and peer-to-peer loan companies.

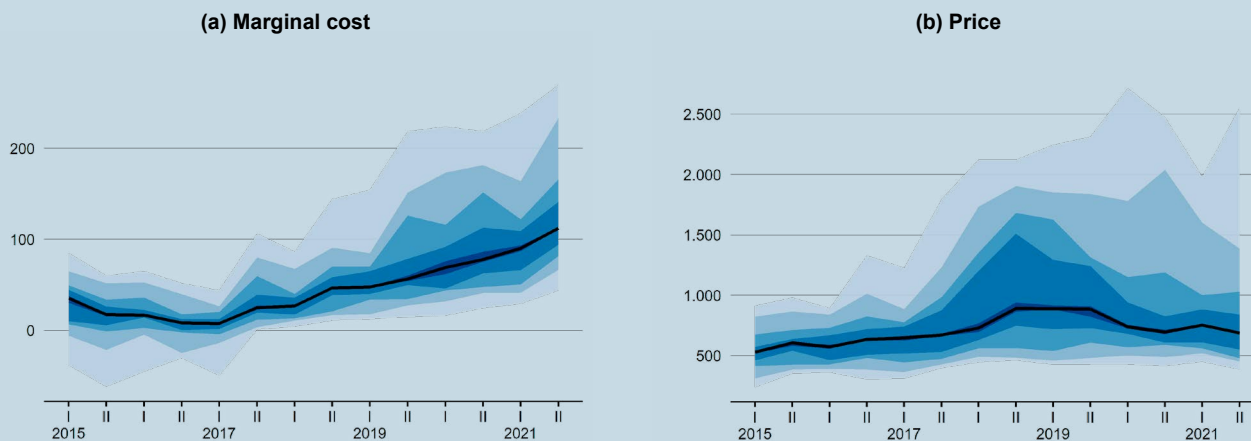
Figure 3 – Channels affecting the Lerner index for the credit market – Non-banking sector



Banking sector (market of services): figures 4(a) and 4(b) show the evolution of marginal cost and price channels for the market of services in the banking sector. In this sector, Section 6.2 shows that the median of the Lerner index declines since 2017 until late 2021. During the pandemic period, the marginal cost of services increased continuously. Prices fell in 2020, rose in the first half of 2021, and dropped again in the second half.

In that period, the reduction of the Lerner index reflected the increase in the marginal cost, and, in some moments, also the reduction of prices. In the first half of 2021, the effect of the increase in the marginal cost is preponderant over the effect, on the opposite direction, of the increase in prices, leading to the reduction of the Lerner index. In turn, in the second half of 2021, both the marginal cost and price channels contributed to the reduction of the Lerner index.

Figure 4 – Channels affecting the Lerner index for the market of services – Banking sector



Final remarks

This box describes the methodological improvements in the calculation of FI Lerner indexes in the credit and services markets. Among key improvements, it is noteworthy the more accurate identification of credit market conditions by focusing on recent credit operations. This methodological change is justified from the economic perspective because it avoids considering older credit operations, which were possibly granted at market conditions quite different from those referred to by the indicator.

Although this improvement produces indicators that are not quantitatively comparable with those calculated with the previous methodology, the methodological change did not affect the evolution of the Lerner index

curves in the 2015-2020 period. Therefore, it did not change the conclusions about the evolution of competition in the period for the analyzed credit market sectors. Furthermore, the employment of the new methodology enhances the quality of information about the competition in the credit and services market at the national level, facilitating the monitoring and elaboration of policies in the scope of the BC# Agenda .

This box also illustrates the importance of including in the analysis of competition not only the Lerner index, but also the components encompassed by this indicator: price and marginal cost. Therefore, the understanding of variables observed in the competition indicator is facilitated.

For instance, this box analyzed how these channels evolved in Brazil from 2015 and 2021, with emphasis on the pandemic period. The reduction in the Lerner index occurred by both an increase in the marginal cost and a reduction of price in the first year of the pandemic, both contributing to the indicator's decline. This movement was widespread across the banking, credit union, and non-banking sectors. However, in 2021, the movements observed in these channels diverged in the sectors under analysis.

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Covid-19 and local market power in credit markets¹

Introduction

In 2020, the Covid-19 pandemic affected the global economy, causing recessions, company bankruptcies, and increased unemployment. Governments have adopted several economic measures to combat these effects, such as stimulative monetary policy, recomposition of household income through transfer programs, corporate credit incentive programs, release of capital and liquidity, and interventions in the exchange and interest markets.² In addition to the direct impacts on the economy, the pandemic and the public policies adopted may also be changing or accelerating trends, with significant indirect impacts (Ceylan *et al.*, 2020). These direct and indirect effects can be heterogeneous across regions and economic agents, leading some companies to bankruptcy and strengthening others, and potentially increasing market power in some sectors.³

An important factor contributing to the disparity of Covid-19 economic effects is the possibility of using digital platforms and technologies. On the one hand, they facilitate homework, allowing companies to continue operating while their employees and customers maintain social distance. On the other hand, they can increase market power. For example, retail giants have further expanded their market power, while small offline companies have faced financial difficulties (Criscuolo, 2021). These heterogeneous effects of Covid-19 may also have happened in the banking industry, due to differences in technological innovation among banks.

Prior to the Covid-19 outbreak, the SFN was already undergoing a substantial digitalization process. With the introduction of public health measures discouraging personal contact, this process has accelerated in both the financial and real sectors. Aghion *et al.* (2005) show that competition encourages leading companies to invest in innovation while discourages followers to do the same. These changes may have widened the gap between leading and trailing banks, increasing the participation and market power of the banks best prepared to deal with the adverse effects of the pandemic.

Additionally, the pandemic may have affected the banks' performance heterogeneously due to the banks' exposure to borrowers in locations affected by Covid-19 in different degrees. Figure 1.a shows that credit granting increased in all regions in the first year of the pandemic. However, this increase was heterogeneous across locations,⁴ which may have affected banks' local market power (Figure 1.b).

1 This box is based on the BCB Working Paper n. 558 (Silva *et al.*, 2021).

2 The International Monetary Fund (IMF) summarizes the responses to the Covid-19 pandemic of 197 economies in "Policies Responses to COVID-19", available at <https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19>. Cantú *et al.* (2021) provide information on central bank responses to Covid-19 effects in 39 economies.

3 Examples of heterogeneity of impact and economic changes triggered by pandemic are: Clark (2016) and Pamuk (2007) (Black Death); Barro and Ursua (2008), Fornasin *et al.* (2018), Rao and Greve (2018) (Spanish flu), Muggenthaler *et al.* (2021), and del Rio-Chanona *et al.* (2020) (Covid-19).

4 Çolak and Özde Öztekin (2021) show a lower decline in credit supply in places with greater capacity to implement pandemic containment measures and sufficient hospital capacity to meet the increased demand.

Figure 1.a – Variation in credit granting
Regional level

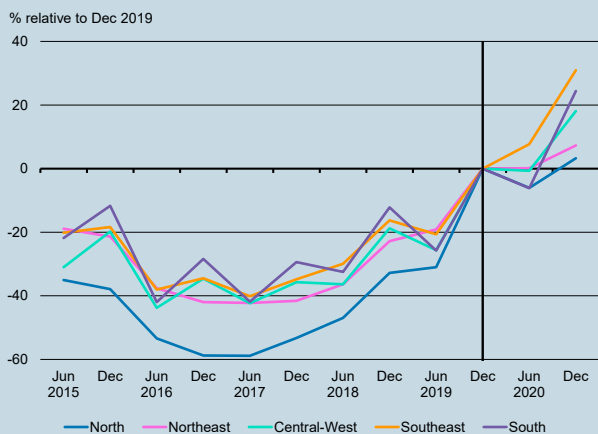
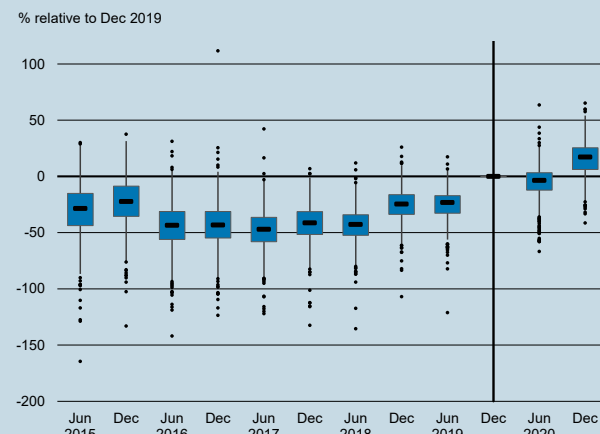


Figure 1.b – Variation in credit granting
Local level^{1/}



^{1/} The boxplot presents: the median (dash inside the box), the first and third quartiles (bottom and top of the box), the outliers (dots), the minimum value without the outliers (end of the bottom line segment), and the maximum value without the outliers (end of the top line segment). The minimum is calculated as the first quartile minus 1.5 times the interquartile range. The maximum is calculated as the third quartile plus 1.5 times the interquartile range.

Note: Figure 1.b displays, for each half-year, the boxplot of the distribution of the variation at the location level of grants relative to December 2019.

The purpose of this box is to analyze how the first year of the pandemic affected banks' local market power in the credit market and which was the role of bank digitalization as a mitigator of the pandemic's adverse effects on credit. Digitalization was measured herein by the ratio of Information Technology (IT) investment to total cost prior to the pandemic.

The Lerner index was used to measure local market power defined as the relative mark-up, that is, the ratio of the mark-up and the price. Besides being a direct measure of market power, the Lerner index allows the analysis of the channels through which Covid-19 affects banks' market power: price or marginal cost channels. To separate the effects of government crisis relief actions from the specific effects of the individual behavior of each bank, the empirical strategy compares the local market power of the same bank whose branches operate in locations with different levels of Covid-19 intensity (within-bank and across-locality empirical strategy). This configuration allows to control for factors arising from bank-specific changes in the supply of credit over time, allowing specific conditions from different locations to vary.

Results show that bank branches in the locations most affected by Covid-19 experienced reductions in credit revenue and loan granting compared to bank branches, of the same bank, in less affected regions. It was found that the average effective price – measured by the ratio of credit revenues to new credit grants – does not change, indicating that the decreases in revenues were accompanied by reductions of the same intensity in credit grants. In contrast, due to the economic rigidity of their cost factors, banks are unable to adjust their spending in the short term, raising their marginal cost. However, more digitalized banks mitigate these effects by increasing their participation outside their location. The conclusion is that the context of the beginning of the pandemic reduced the market power of Brazilian banks, mainly by increasing their marginal costs in regions more affected by the pandemic, and that banks with greater investment in IT before the pandemic were less affected.

Methodology

This box uses semiannual data for 2019 and 2020 from several data sources.⁵ The information regarding banks' credit and costs originates from the BCB and comes from the following databases: Credit Information System (SCR), Accounting Standards of the Institutions Regulated by the BCB (Cosif), Information System on Institutions of Interest of the BCB (Unicad), and Monthly Bank Statistics by Municipality (Estban). There are also proprietary data from the Brazilian Federal Revenue Secretariat (RFB). Information related to geographic locations from the Brazilian Institute of Geography and Statistics (IBGE), and labor information identified in the Annual Report on Social Information/General Registry of Employed and Unemployed Persons (Rais/Caged) from the Ministry of Labor and Social Security. Finally, information regarding the pandemic encompass the Ministry of Health's epidemiological bulletins and public data of Emergency Aid Beneficiaries from the Transparency Portal – Office of the Comptroller General (CGU).⁶

Local market power measure: The IBGE's definition of Immediate Geographic Region⁷ is used to delimit the local credit market. For simplicity, the term locality refers to the Immediate Geographic Region. The local credit market is defined as the set of banks in a locality providing a particular credit modality.⁸ Consistent with the production/cost function, the locality of the credit is established as the locality of the branch of the granting bank, regardless of the location of the borrower. Considering that many localities have more than one branch of the same bank, it is used a representative branch of each bank that operates in the locality.

Market power is measured by the Lerner index, calculated for bank b in locality l in period t for credit modality m from the following expression:

$$L_{blt}^{(m)} = \frac{P_{blt}^{(m)} - CM_{blt}^{(m)}}{P_{blt}^{(m)}}, \quad (1)$$

in which $P_{blt}^{(m)}$ and $CM_{blt}^{(m)}$ are the average price (average rate in the period) and the marginal cost of credit operations of modality m , performed by bank b in location l in period t (half-year).

In this box, the average price of credit of modality m granted by the FI i in locality l in period t (half-year) is calculated as the ratio of the income flow of credit grants of the modality within the half-year period to the average outstanding portfolio of these grants in that period, in line with the banking literature procedure:⁹

$$P_{blt}^{(m)} = \frac{\text{Income flow of credit}_{blt}^{(m)}}{\text{Average outstanding portfolio}_{blt}^{(m)}}. \quad (2)$$

5 Analyses in this box encompass banks in the b1 banking segment. Even for segment b1, some banks' local data are not available. Thus, it is adopted a strategy of apportioning this data from bank to branches, as published in box "Banking competition in regional credit markets" of the 2020 REB, and in Silva et al. (2021). It is also adopted the strategy of assessing credits granted within the current half-year, as detailed in those papers.

6 Data available at <https://www.portaltransparencia.gov.br/download-de-dados/auxilio-emergencial> (Portuguese only).

7 These regions are strongly connected urban networks, comprising a local and central urban center and nearby peripheral urban centers connected by relationships of economic dependence and frequent commuting of the population in search of goods, work, health and education services, and the provision of public services such as judicial, welfare, and social security.

8 The credit modalities considered in this box are: household credit (payroll-deducted loans; non-payroll-deducted loans; housing; rural and agribusiness; vehicles; and other credits) and corporate credit (working capital; revolving working capital; funding for infrastructure, development, projects, and other credits; housing; investment; operations with receivables; rural and agribusiness; and other credits).

9 See, for example, Shaffer and Spierdijk (2020) and Erler et al. (2017).

The price defined in Equation (2) is named *effective price* ($P_{blt}^{(m)}$), because its value is net of losses arising from the materialization of risks, e.g., delinquency, effectively reflecting the income flow received by the financial institution in its credit operations.

The marginal cost, in turn, is estimated from the bank's production function, defined using the inputs and outputs of the representative branch in the locality. Inputs include the costs of funding, taxes, personnel and other administrative costs. Banking products are considered to be credit, securities, and other assets. The product credit is subdivided into modalities, with a distinction being made as to whether the credit was granted in the half-year of the analysis or prior to it.

The Lerner index allows to identify the channels through which local market power is affected: (i) effective price channel; and (ii) marginal cost channel. The impact on the Lerner index will depend on which of these two channels the Covid-19 shock is predominant.

Building the Covid-19 Local Intensity Indicator: Figure 2.a shows the evolution of the percentage of the population affected by Covid-19 in Brazilian municipalities, calculated as the ratio of the number of new Covid-19 cases to the total population. The figure shows that from April 2020 to August 2020 the capital cities were hit first, and the pandemic spread to the inland cities subsequently. Figure 2.b shows that virtually all Brazilian municipalities had recorded Covid-19 cases as of August 2020. However, Image 1 shows that there is a great variation in the share of the local population affected even between adjacent municipalities, which makes it possible to compare the local Covid-19 shock between different localities.

Figure 2.a – New cases of Covid-19
Percentage of the local population

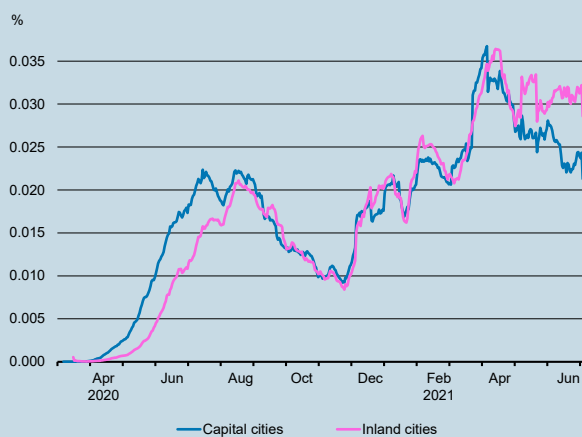


Figure 2.b – Municipalities with, at least, one case of Covid-19 registered
Percentage of municipalities affected in the region

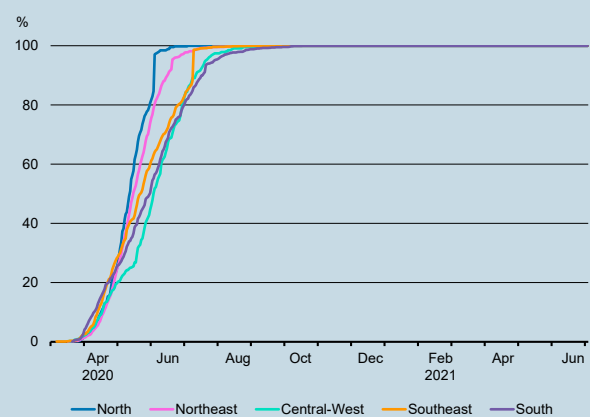
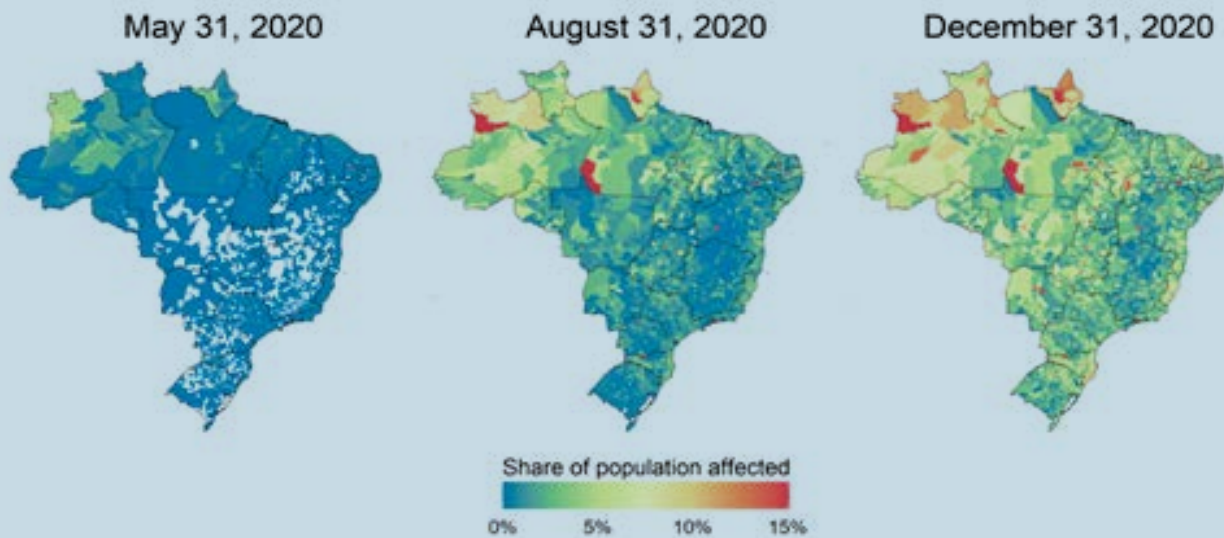


Image 1 – Total number of cumulative Covid-19 cases in May, August, and December 2020 as a percentage of the municipality's population



The development of the Covid-19 intensity indicator in a locality uses the average of the proportion of confirmed Covid-19 cases relative to the population over the months of 2020 in Brazilian municipalities, that is:

$$\% \text{ Population Affected by Covid-19}_l = \frac{1}{12} \sum_{t=Jan-2020}^{Dec-2020} \frac{Covid-19 \text{ Cases}_{lt}}{Population_l} \quad (3)$$

Since Covid-19 was an exogenous shock, this measure is used as a continuous treatment variable to assess the Covid-19 intensity specific to a locality in the regressions.

An important concern is that the Covid-19 local intensity measure can be systematically correlated to locality-specific characteristics. However, when comparing localities with similar levels of wealth and within the same macro-locality,¹⁰ one finds that the Covid-19 intensity measure is not correlated with observable socio-demographic conditions of those localities.¹¹ Among them, the measure is not correlated with economic development, population, local predominant activity (agricultural, industrial, or service) and distance to the capital city. Such findings are important to support the causal interpretation of the results.

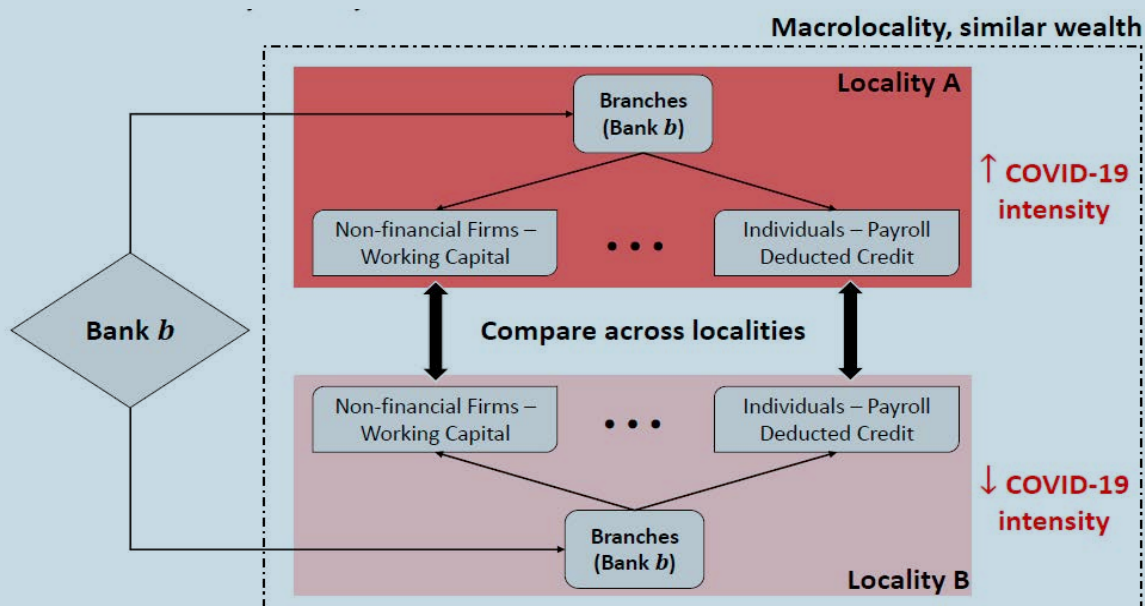
Covid-19 effect on credit market power

The methodology used in the box employs the difference-in-differences (DiD) technique and is an adaptation of the model presented in Silva *et al.* (2021). Image 2 illustrates the empirical setup designed to estimate the effect of Covid-19 on the local market power of banks. Next, the identification challenges that are mitigated or resolved with this empirical setup are discussed.

10 The term “macro-locality” is used as a synonym for the IBGE’s Intermediate Geographic Region, defined as a set of Immediate Geographic Regions articulated by a higher hierarchy pole differentiated by private and public management flows and by the existence of more complex urban functions. Intermediate Geographic Regions correspond to an intermediate scale between the states and the Immediate Geographic Regions.

11 Details of the regression results and a case study to examine the parallel trends hypothesis can be found in Silva *et al.* (2021).

Image 2 – Empirical setup to estimate the effect of Covid-19 on the local market power of banks



The first empirical challenge is to isolate variations in credit supply from each bank. Ideally, it is necessary to control the bank’s supply of credit while observing specific variations in each local market resulting from changes on the demand side. This specific variation in each location should be due to differences in the local intensity of Covid-19 only, so that changes in the market power of banks can be attributed to the pandemic.

For this, a within-bank and across-locality comparison is performed. Thus, market power-related variables observed for the same bank in different locations that were hit with different intensities by Covid-19 are compared. Since comparisons are relative to the same bank, control is made for credit supply and identify changes identified in market power variables from differences in Covid-19 intensity levels in different localities.

In this empirical setup, the Covid-19 shock is interpreted as a local demand shock. Since credit modalities are substantially different, market power variables for the same credit modality in different localities (of the same bank) are compared.¹²

Another empirical challenge is to isolate from the effects of government measures taken to mitigate the economic impact of Covid-19 on households and companies, which may influence borrowing decisions. To this end, covariates are included: (i) the average emergency aid volume in 2020 over Gross Domestic Product (GDP) in each locality; and (ii) the amount of Small and Medium Enterprises (SMEs) at the end of 2019 in each locality that received financial support in the form of renegotiations and specific credit lines. Regulatory changes that impacted banks during the pandemic – such as reductions in reserve requirements and in the Capital Conservation Buffer – are not a problem in the econometric specification, since market power variables observed in different localities are compared for the same bank.

12 Comparisons are made between different localities (Immediate Geographic Region) that belong to the same macro-locality (Intermediate Geographic Region) and which have a similar level of wealth. For example, a comparison is made between branches of Banco do Brasil operating in Limeira, SP, and Rio Claro, SP, both in the macro-locality of Campinas, SP, in the working capital credit market for companies.

Given the empirical framework in Image 2, the following DiD specification is used to investigate the effect of Covid-19 on market power in Brazilian localities:¹³

$$y_{b,m,l,t} = \alpha_{b,m,g(l),t} + \alpha_l + \beta \cdot \text{Covid-19}_t \cdot \% \text{ Population Affected by Covid-19}_l + \gamma^T \cdot \text{Covid-19}_t \cdot \text{Controls}_{b,m,l} + \epsilon_{b,m,l,t}, \quad (4)$$

where b , m , l , and t refer to bank, credit modality, locality, and time (semiannually), respectively. The dependent variables are those related to market power: average effective price, marginal cost, Lerner index, credit revenue, and volume of credit granted in the half-year period. The value of the binary variable Covid-19_t is worth one if $t = 2020$ and zero otherwise. The continuous variable $\% \text{ Population Affected by Covid-19}_l$ follows Equation (3). The vector $\text{Controls}_{b,m,l}$ denotes a set of controls, sub-classified into two subgroups. The first one consists on variables prior to the pandemic, covering number of SMEs, distance from the capital city, population, local market share, provisions such as share of outstanding credit, average maturity, and average ticket. In the second one there is a variable contemporary with the pandemic, represented by the average emergency aid volume in 2020 as a proportion of local GDP.

The introduction of fixed effects that vary over time $\alpha_{b,m,g(l),t}$ allows to interpret the estimates of the same bank b operating in a set of similar localities $g(l)$ – that is, localities of similar wealth levels within the same macro-locality – for the same credit modality m . In addition, locality fixed effects α_l were used to absorb unobservable locality-specific factors that did not vary over time. The numerical variables were standardized. Following Abadie *et al.* (2020), errors are clustered at the locality level, which coincides with the level of change of the variable of interest that measures the local Covid-19 intensity.

13 As a general note, lower order terms are included for all interactions introduced in the empirical specifications. For instance, if a covariate represents the interaction of three terms, then all pairs of these terms and the marginal terms will also be covariates in the regression (provided they are not collinear with fixed effects). For the sake of clarity, all these lower order interactions are neither explicitly presented in the written specifications nor showed in the regression tables, except when a certain lower order term is a coefficient of interest. In any case, the notes in the regression tables are complete and will explicitly indicate the specific particularities of each regression.

Table 1 – Main result: Has Covid-19 affected market power and bank lending behavior in Brazilian cities?

Dependent variables:	Effective price _{bmit}	Marginal cost _{bmit}	Lerner _{bmit}	Credit revenue _{bmit}	Credit granting _{bmit}
Model:	(I)	(II)	(III)	(IV)	(V)
<i>Variable of interest</i>					
Covid-19 _i . Pop. affected by Covid-19 (%) _i	-0.0032 (0.0037)	0.0187*** (0.0062)	-0.0221*** (0.0076)	-0.0058** (0.0028)	-0.0231*** (0.0062)
<i>Controls</i>					
Covid-19 _i . Emergency aid benefit/GDP _i	-0.0106 (0.0110)	-0.0302* (0.0169)	0.0131 (0.0196)	0.0032 (0.0069)	0.0121 (0.0096)
Covid-19 _i . Number of SME _i	0.0033 (0.0041)	0.0260*** (0.0077)	-0.0239*** (0.0090)	-0.0023 (0.0032)	-0.0356*** (0.0062)
Covid-19 _i . Distance from state capital _i	0.0011 (0.0063)	-0.0050 (0.0104)	0.0056 (0.0107)	-0.0018 (0.0050)	-0.0027 (0.0086)
Covid-19 _i . Population _i	0.0017 (0.0021)	0.0135** (0.0063)	-0.0022 (0.0068)	-0.0055 (0.0051)	0.0083 (0.0156)
Covid-19 _i . Average market share _{bi}	0.0222*** (0.0069)	0.0407*** (0.0074)	-0.0463*** (0.0097)	-0.0180*** (0.0065)	-0.0112 (0.0069)
Covid-19 _i . Provision/Average Credit _{bi}	-0.0035 (0.0104)	-0.0234** (0.0099)	0.0102 (0.0100)	-0.0055 (0.0035)	-0.0094** (0.0044)
Covid-19 _i . Average Credit Maturity _{bi}	-0.0256 (0.0200)	0.0428* (0.0257)	-0.0204 (0.0415)	-0.0222 (0.0146)	0.0377* (0.0192)
Covid-19 _i . Average ticket-size of credit _{bi}	-0.0016 (0.0024)	0.0038 (0.0061)	-0.0201 (0.0181)	-0.0197* (0.0111)	-0.0404 (0.0479)
<i>Fixed effects</i>					
Locality	Yes	Yes	Yes	Yes	Yes
Time . Bank . Modality . . Macro location . Per capita GDP(3)	Yes	Yes	Yes	Yes	Yes
Number of observations	78,535	78,535	78,535	78,535	78,535
R ²	0.9242	0.7674	0.7691	0.7367	0.7494

Notes: This table reports the coefficient estimates of the specification given in Equation (4) using semiannual data from 2019 to 2020 at the bank-modality-location-time level. The following dependent variables are used: average effective cost (Espec. I), marginal cost (Espec. II), Lerner (Espec. III), Credit granted revenue within the half-year period (Espec. IV) and Credit granted in the half-year period (Espec. V). All specifications have location-specific controls with pre-pandemic values, distance to the capital and population. Controls for government programs to combat the economic effects of Covid-19: volume of emergency relief as a proportion of local GDP (2020 average) and number of SME (firms with no more than three employees) (December 2019 values). Specific controls from the representative local branch are also added (fixed with December 2019 values): credit market share, ratio of accounting provisions to credit volume, average credit maturity and average credit ticket-size. Fixed effects per capita of location and time-bank-modality-macro location-GDP (discretized into tertiles) are used. Coefficients are interpreted in terms of standard deviations from the sample mean. Errors have been clustered at the location level (in parentheses). *, **, *** denote statistical significance of 10%, 5%, and 1%, respectively.

The coefficient of interest in (4) is β . It captures the relative effect, observed for the same bank and same credit modality, on the dependent variable for an increase of one standard deviation in local Covid-19 intensity in one locality, compared to the same variable in another locality with local Covid-19 intensity equal to the sample mean.

Table 1 reports the coefficient estimates for Equation 4. Even though there is no evidence that the pandemic has impacted the effective price of credit (Specification I), there were relevant changes in its components: localities that were more affected experienced a significant reduction in credit revenue (Specification IV) and

credit granted (Specification V).¹⁴ The statistically non-significant effect of the pandemic on the effective price indicates changes of the same magnitude in the two components used in its calculation: income flow and volume of new credit grants. That is, the substantial reduction in credit revenue was offset by a corresponding decrease in local credit granting (see Equation 1).

Specification II shows that an increase in local Covid-19 intensity leads to increased banks' marginal costs. The increase in marginal costs, even in the face of a reduction in the volume of credit granted, suggests that banks are unable to reduce total costs, possibly due to the economic rigidity of their cost factors, and to frictions from legal barriers as well.

To test this hypothesis empirically, the investigation addresses whether the total cost of bank branches $CT_{b,l,t}$ is reduced in the localities most affected by Covid-19, that is, in those with a greater relative reduction in credit granting. To this end, the following econometric specification at the bank-locality-time level is used:

$$CT_{b,l,t} = \alpha_{b,g(l),t} + \alpha_l + \beta \cdot Covid-19_t \cdot \% Population Affected by Covid-19_l + \gamma^T \cdot Covid-19_t \cdot Controls_{b,l} + \epsilon_{b,l,t}, \quad (5)$$

in which b , l , and t refer to bank, locality, and time, respectively.

Fixed effects $\alpha_{b,g(l),t}$ allow the results to be interpreted in terms of the same bank operating $g(l)$ in different but similar locations (within the same macro-locality and with similar GDP per capita levels) over time. The coefficient of interest, β , quantifies the effect of an increase of one standard deviation in local Covid-19 intensity on the total cost of the bank branch compared to other branches of the same bank in similar localities, but with a Covid-19 intensity level equal to the sample mean. Controls at the local representative branch level are similar to those in Equation (4). Errors are clustered at the locality level.

Specification I in Table 2 reports the estimates of the coefficients in Equation (5). Findings are that the local intensity of Covid-19 does not relate to the total bank branch cost at the locality, suggesting that bank branches in locations more affected by Covid-19 are unable to adjust their total local costs in response to the reduction in credit granting in these localities (see Specification V, Table 1). This finding reflects the rigidity of bank branch cost factors, which cannot be easily adjusted in the short term.

In short, the analyses show that income flow and new credit granting registered equivalent reductions in localities most affected by Covid-19. Consequently, effective prices – measured by the ratio of revenues to average outstanding portfolios of new credit grants – were not affected by the pandemic. Marginal costs increased substantially due to a combination: (i) of reduced credit granting in localities most affected by Covid-19; and (ii) of the rigidity of cost factors that bank branches are not able to adjust quickly. In net terms, considering the Lerner index, the Covid-19 pandemic reduced the local market power of Brazilian banks by leading to an increase in marginal costs without a corresponding increase in prices.

¹⁴ It is important to highlight that the analysis in this box uses the DiD methodology, and, therefore, the interpretation relies on relative rather than absolute terms. When a reduction in credit granting is mentioned, for example, it is always relative. Given the substantial increase in credit granting, such reductions in credit revenue could be increases of smaller magnitude.

Table 2 – How does Covid-19 affect totals costs of banks' branches? Does IT investment before the pandemic provide cost flexibility?

Dependent variable: Model:	Cost Local Total _{blt}					
	(I)	(II)	(III)	(IV)	(V)	(VI)
<i>Variable of interest</i>						
Covid-19 _t . Pop. affected by Covid-19 (%) _l	0.0029 (0.0053)	0.0031 (0.0057)	-0.0011 (0.0069)	0.0034 (0.0055)	-0.0012 (0.0060)	0.0087 (0.0062)
Covid-19 _t . Pop. affected by Covid-19 (%) _l . Cost factor (%) _{bl}		0.0072 (0.0323)	0.0025 (0.0274)	-0.0006 (0.0095)	-0.0144 (0.0090)	-0.0116** (0.0053)
<i>Controls</i>						
Covid-19 _t . Cost factor (%) _{bl}		0.0396 (0.0347)	0.0416 (0.0273)	0.0201* (0.0107)	0.0493** (0.0214)	-0.0357*** (0.0125)
Covid-19 _t . Emergency aid benefit/GDP _l	-0.0285 (0.0221)	-0.0245 (0.0217)	-0.0242 (0.0214)	-0.0280 (0.0217)	-0.0281 (0.0220)	-0.0263 (0.0219)
Covid-19 _t . Number of SME _l	0.0507*** (0.0140)	0.0466*** (0.0139)	0.0451*** (0.0139)	0.0479*** (0.0141)	0.0505*** (0.0141)	0.0503*** (0.0139)
Covid-19 _t . Distance from state capital _l	-0.0080 (0.0116)	-0.0081 (0.0112)	-0.0085 (0.0112)	-0.0086 (0.0114)	-0.0063 (0.0115)	-0.0078 (0.0114)
Covid-19 _t . Population _l	0.0101 (0.0144)	-0.0133 (0.0166)	-0.0182 (0.0153)	-0.0025 (0.0155)	0.0008 (0.0161)	0.0116 (0.0139)
Covid-19 _t . Average market share _{bl}	0.0075 (0.0104)	0.0015 (0.0111)	0.0045 (0.0104)	0.0109 (0.0111)	-0.0031 (0.0117)	0.0083 (0.0103)
Covid-19 _t . Provision/Average Credit _{bl}	0.0022 (0.0057)	0.0034 (0.0058)	0.0029 (0.0057)	0.0022 (0.0057)	0.0024 (0.0057)	0.0029 (0.0057)
Covid-19 _t . Average Credit Maturity _{bl}	-0.0990*** (0.0287)	-0.0950*** (0.0285)	-0.0953*** (0.0284)	-0.0992*** (0.0286)	-0.0954*** (0.0286)	-0.0998*** (0.0287)
Covid-19 _t . Average ticket-size of credit _{bl}	0.0133*** (0.0044)	0.0133*** (0.0043)	0.0133*** (0.0043)	0.0139*** (0.0044)	0.0118*** (0.0044)	0.0134*** (0.0044)
Cost factor	---	<i>Funding</i>	Taxes	Personal	Other adm.	IT
Cost factor projection	---	Place	Place	Place	Place	National
<i>Fixed effects</i>						
Place	Yes	Yes	Yes	Yes	Yes	Yes
Time . Bank . Macro location . Per capita GDP(3)	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	7,788	7,788	7,788	7,788	7,788	7,788
R ²	0.9196	0.9209	0.9199	0.9202	0.9201	0.9201

Notes: This table shows the estimated coefficients of the specification indicated in Equations (5) (Espec. I) and (6) (Especs. II to VI) using semiannual data from 2019 to 2020 at the level bank-locality-time. The dependent variable is the total cost of the bank's branch, which is the sum of the following local cost components: funding cost, taxes, personnel, and other administrative costs. Triple interactions of the local Covid-19 intensity, the binary variable Covid-19, and the bank's cost factors (as shares of the total cost) are introduced. The following cost factors are used (fixed at December 2019 values): funding (Espec. II), taxes (Espec. III), personnel (Espec. IV), other administrative costs (Espec. V), and IT (Espec. VI). The first four cost factors vary at the local level (specific of a given bank branch), while the latter varies at the national level (specific of a bank). One adds controls for local intensity of government programs to fight the economic effects of Covid-19 (Volume of the emergency aid benefit/GDP and number of SMEs, both specific of the locality), the distance to the state capital, and the locality's population. Specific controls from the representative local branch are also added (fixed at December 2019 values): credit market share, ratio of accounting provisions to credit volume, average credit maturity, and average credit ticket-size. Controls are interacted with the binary variable Covid-19. Fixed effects per capita of location and time-bank-modality-macro location-GDP (discretized into tertiles) are used. Coefficients are interpreted in terms of standard deviations from the sample mean. Errors have been clustered at the location level (in parentheses). *, **, *** denote statistical significance of 10%, 5%, and 1%, respectively.

The role of digitalization in market power during the pandemic

This section reports empirical findings on how bank digitalization – measured by the proportion of pre-pandemic IT spending relative to total bank spending – influenced how Covid-19 affected credit market power in Brazilian localities. Three IT-related aspects are addressed: cost flexibility, credit granting flexibility, and the role of IT in influencing how Covid-19 affected credit granting and market power.

Unlike the previous section, which dealt with the causal effect of Covid-19 on local market power, econometric analyses that relate how banks with different levels of digitalization behaved during Covid-19 cannot be interpreted as a causal relationship. This happens because the proportion of IT spending in the pre-pandemic period for each bank may be related to unobserved factors specific to each bank. For instance, banks with greater local market adaptability might invest more in IT than less flexible banks. In addition, better bank management can boost IT spending with the purpose of using more efficient advertising campaigns. In this box, digitalization is a feature that amplifies or mitigates Covid-19 effect on market power (heterogeneity analysis).

IT and cost flexibility: the analysis of the Covid-19 effect on local or national costs is expanded by surveying whether there are cost factors that provide the bank with greater flexibility to adjust itself to the Covid-19 shock. **Local cost factors** include costs for funding, tax, personnel, and other administrative components. The **national cost factor** covers IT expenses. Each cost item is always relative to the local total cost, when the item is a local cost factor, or by the total cost when it is a national cost factor.

Empirically, the model in Equation (5) is used as basis, with the inclusion of a three-way interaction of the Covid-19 local intensity measure, the binary variable indicating the Covid-19 shock, and each of the cost factors listed above. Thus, the specification is given by:

$$\begin{aligned} CT_{b,l,t} = & \alpha_{b,g(l),t} + \alpha_l + \\ & + \beta \cdot \text{Covid-19}_t \cdot \% \text{ Population Affected by Covid-19}_l \\ & + \lambda \cdot \text{Covid-19}_t \cdot \% \text{ Population Affected by Covid-19}_l \cdot \text{Cost Factor}_{b,l} \\ & + \gamma^T \cdot \text{Covid-19}_t \cdot \text{Controls}_{b,l} + \epsilon_{b,l,t}, \end{aligned} \quad (6)$$

where $\text{Cost Factor}_{b,l}$ is one of the following cost factors: funding, taxes, personnel, other administrative costs, or IT. The coefficient of interest in Equation (6) is λ , which captures whether banks with cost factors above the sample mean adjust their local total cost faster during Covid-19 when compared to other branches of the same bank with the average value of that cost factor.

Specifications II to V in Table 2 show that the patterns of local costs with funding, taxation, personnel, and other administrative costs prior to 2020 are not related to a bank branch's greater (or lesser) ability to adjust its local total cost in the short run during the pandemic, suggesting rigidity of these factors. However, Specification VI shows that banks with high IT investment prior to the pandemic succeeded to better adjust their local total cost, suggesting that highly digitalized banks had greater cost flexibility.

IT and flexibility in credit granting: It is reasonable to assume that the flexibility conferred by IT investments is not limited to costs. Banks that are more digitalized provide greater convenience and enable customers to operate the financial channel electronically, regardless of the locality of access. It is assumed that banks with large IT investments in the period prior to Covid-19 (more digitalized) probably owned more developed and reliable online systems during the pandemic, allowing customers to continue making their transactions remotely.

Therefore, it is expected that highly digitalized banks could more easily replace, or even complement, their borrowers in localities most affected by Covid-19 with other borrowers, possibly in less affected localities, i.e., Covid-19 would affect highly digitalized banks to a lesser extent.

If such a hypothesis holds, there should be a shift in borrower concentration between different localities: the share of borrowers outside (inside) the locality should increase (decrease) after the bank branch locality is affected by Covid-19. To test this hypothesis, the location of the bank branches and of the borrower of each credit operation are inspected. Next, the total amount of credit granted to borrowers outside the physical locality of the bank branch relative to the volume granted is calculated, as well as the share of borrowers living outside the locality of the bank branch. These are the two dependent variables in Equation (5).

Table 3 – Additional benefits of digitalization: banks become less conditioned by local borrowing factors and can lend in other localities

Dependent variables:	Credit granted outside location (%)		Clients granted outside location (%)	
Model:	(I)	(II)	(III)	(IV)
<i>Variable of interest</i>				
Covid-19 _t . Pop. affected by Covid-19 (%) _t	-0.0350** (0.0137)	-0.0385*** (0.0146)	-0.0121 (0.0087)	-0.0149 (0.0096)
Covid-19 _t . Pop. affected by Covid-19 (%) _t . IT expenses (%) _{bt}		0.0373*** (0.0132)		0.0198** (0.0093)
<i>Controls</i>				
Covid-19 _t . Emergency aid benefit/GDP _t	-0.0045 (0.0313)	-0.0116 (0.0308)	-0.0092 (0.0340)	-0.0130 (0.0341)
Covid-19 _t . Number of SME _t	-0.0062 (0.0143)	-0.0044 (0.0143)	0.0053 (0.0134)	0.0062 (0.0135)
Covid-19 _t . Distance from state capital _t	-0.0177 (0.0241)	-0.0188 (0.0240)	-0.0078 (0.0174)	-0.0085 (0.0177)
Covid-19 _t . Population _t	0.0108 (0.0086)	0.0082 (0.0086)	0.0019 (0.0044)	0.0003 (0.0051)
Covid-19 _t . Average market share _{bt}	-0.0216 (0.0275)	-0.0245 (0.0275)	-0.0182 (0.020)	-0.0200 (0.020)
Covid-19 _t . Provision/Average Credit _{bt}	-0.0124 (0.0191)	-0.0126 (0.0190)	0.0086 (0.0104)	0.0082 (0.0108)
Covid-19 _t . Average Credit Maturity _{bt}	0.0784** (0.0391)	0.0802** (0.0391)	0.0020 (0.0238)	0.0033 (0.0238)
Covid-19 _t . Average ticket-size of credit _{bt}	0.0056 (0.0242)	0.0057 (0.0243)	-0.0052 (0.0084)	-0.0054 (0.0083)
<i>Fixed effects</i>				
Place	Yes	Yes	Yes	Yes
Time . Bank . Macro location . Per capita GDP(3)	Yes	Yes	Yes	Yes
Number of observations	7,788	7,788	7,788	7,788
R ²	0.6559	0.6568	0.7123	0.7124

Notes: This table reports the coefficient estimates of the specification given in Equation (5) (Espec. I e III) and (6) (Espec. II e IV) using semiannual data from 2019 to 2020 at the bank-location-time level. Dependent variables are: the volume of credit granted to borrowers outside the locality of the physical bank branch relative to the total credit granted (Espec. (I) and (II)) and the number of borrowers outside the locality of the physical bank branch relative to the total amount of credit borrowers in that half-year/year. One adds controls for local intensity of government programs to fight the economic effects of Covid-19 (Volume of the emergency aid benefit/GDP and number of SMEs, both specific of the locality), the distance to the state capital, and the locality's population. Specific controls from the representative local branch are also added (fixed at December 2019 values): credit market share, ratio of accounting provisions to credit volume, average credit maturity, and average credit ticket-size. Controls are interacted with the binary variable Covid-19. Fixed effects per capita of location and time-bank-modality-macro location-GDP (discretized into tertiles) are used. Coefficients are interpreted in terms of standard deviations from the sample mean. Errors have been clustered at the location level (in parentheses). *, **, *** denote statistical significance of 10%, 5%, and 1%, respectively.

To establish a base model regardless of each bank's level of IT spending, Specifications I and III in Table 3 show the coefficient estimates when using the share of credit volume and the amount of borrowers outside the branch locality, respectively. On average, most loans to local borrowers are carried out by bank branches in localities most affected by Covid-19, i.e., in the same physical locality as the branch. The number of borrowers outside and in the same locality as the branch is not related to the local intensity of Covid-19.

Specifications II and IV in Table 3 estimate Equation (6) by assuming the cost factor as the proportion of IT spending prior to the pandemic. Banks with the largest IT spending before the pandemic increased the volume of credit to customers outside the bank branch locality after the Covid-19 outbreak. The number of customers outside the physical branch locality also increases for banks with the largest IT spending. Findings indicate that higher levels of digitalization mean lower sensitivity of bank branches to local customer conditions.

IT and its role in influencing how Covid-19 affected market power: the advantages in the cost components and in credit granting mentioned previously suggest that banks that were more digitalized were less adversely affected by Covid-19 than less digitalized ones. To test this hypothesis, the model in Equation (5) is revisited, with the addition of a triple interaction with the proportion of IT spending relative to the total cost observed in the pre-crisis period. The expanded model takes the form:

$$\begin{aligned}
 y_{b,m,l,t} = & \alpha_{b,m,g(l),t} + \alpha_l + \\
 & + \beta \cdot \text{Covid-19}_t \cdot \% \text{ Population Affected by Covid-19}_l \\
 & + \lambda \cdot \text{Covid-19}_t \cdot \% \text{ Population Affected by Covid-19}_l \cdot \% \text{ IT Spending}_b \\
 & + \gamma^T \cdot \text{Covid-19}_t \cdot \text{Controls}_{b,l} + \epsilon_{b,m,l,t}
 \end{aligned} \tag{7}$$

The coefficient of interest is λ , which measures how an increase of one standard deviation in the proportion of IT spending relative to total spending on the dependent variable changes the effect of Covid-19 on the dependent variable.

Digitalization does not change the observed lack of effect between local Covid-19 intensity and the average effective price charged (Table 4 – Specification I). Nevertheless, banks that are more digitalized are able to grant a larger amount of credit than less digitalized ones (Specification V) and, consequently, earn higher credit revenues (Specification IV).

The increase in the volume of credit granting by highly digitalized banks suggests that the increase in customers and volume of credit granted to customers outside the bank branch locality investigated in Table 3 works as a complement rather than a replacement of local bank branch customers with remote customers. By contrast, highly digitalized banks mitigate the increase in marginal cost during the pandemic in localities most affected by Covid-19 (Specification II), which corroborates the flexibility conferred by IT discussed earlier.

The net effect of these two channels is that banks that are more digitalized can capitalize on the advantages gained by their digitalization in the pre-pandemic period to boost their positioning in the credit market, increasing their market power – measured by the Lerner index – compared to less digitalized banks.

Table 4 – Role of digitalization in the local market power during the pandemic

Dependent variables:	Effective price _{bmit}	Marginal cost _{bmit}	Lerner _{bmit}	Credit revenue _{bmit}	Credit granting _{bmit}
Model:	(I)	(II)	(III)	(IV)	(V)
<i>Variable of interest</i>					
Covid-19 _t . Pop. affected by Covid-19 (%) _l	-0.0055 (0.0043)	0.0221*** (0.0066)	-0.0251*** (0.0077)	-0.0075** (0.0033)	-0.0259*** (0.0060)
Covid-19 _t . Pop. affected by Covid-19 (%) _l . IT expenses (%) _{bl}	0.0049 (0.0044)	-0.0171*** (0.0061)	0.0146** (0.0071)	0.0090** (0.0043)	0.0119** (0.0057)
<i>Controls</i>					
Covid-19 _t . Emergency aid benefit/GDP _t	-0.0114 (0.0110)	-0.0279* (0.0169)	0.0112 (0.0194)	-0.0012 (0.0059)	0.0105 (0.0095)
Covid-19 _t . Number of SME _t	0.0035 (0.0041)	0.0254*** (0.0077)	-0.0233*** (0.0090)	0.0070* (0.0039)	-0.0352*** (0.0061)
Covid-19 _t . Distance from state capital _l	0.0013 (0.0063)	-0.0050 (0.0104)	0.0056 (0.0107)	0.0041 (0.0048)	-0.0027 (0.0085)
Covid-19 _t . Population _l	0.0011 (0.0019)	0.0147** (0.0059)	-0.0033 (0.0065)	-0.0159*** (0.0043)	0.0074 (0.0155)
Covid-19 _t . Average market share _{bl}	0.0220*** (0.0069)	0.0410*** (0.0074)	-0.0465*** (0.0097)	-0.0193*** (0.0063)	-0.0114* (0.0069)
Covid-19 _t . Provision/Average Credit _{bl}	-0.0036 (0.0104)	-0.0234** (0.0099)	0.0102 (0.010)	-0.0027 (0.0047)	-0.0094** (0.0044)
Covid-19 _t . Average Credit Maturity _{bl}	-0.0254 (0.020)	0.0428* (0.0257)	-0.0203 (0.0415)	0.0337* (0.0189)	0.0377** (0.0191)
Covid-19 _t . Average ticket-size of credit _{bl}	-0.0017 (0.0025)	0.0037 (0.0061)	-0.0200 (0.0181)	-0.0396* (0.0231)	-0.0403 (0.0479)
<i>Fixed effects</i>					
Place	Yes	Yes	Yes	Yes	Yes
Time . Bank . Modality . . Macro location . Per capita GDP(3)	Yes	Yes	Yes	Yes	Yes
Number of observations	78,535	78,535	78,535	78,535	78,535
R ²	0.9242	0.7674	0.7691	0.7999	0.7495

Notes: This table reports the coefficient estimates of the specification given in Equation (7) using semiannual data from 2019 to 2020 at the bank-modality-location-time level. Pop. affected by Covid-19 (%)_l . IT expenses (%)_{bl} and the double Covid-19 interaction $\beta_{l,bl}$. IT expenses (%)_{bl} Errors have been clustered at the location level (in parentheses). *, **, *** denote statistical significance of 10%, 5%, and 1%, respectively.

Conclusion

This box analyzes the impact of the first year of the Covid-19 pandemic on the market power of Brazilian banks in local credit markets. It shows that a higher local Covid-19 intensity reduced the market power of banks. This reduction stems from the increase in the bank's marginal cost in these localities. The box provides empirical evidence that this increase occurred because the branches were unable to rapidly adjust their costs in response to the relative decline in credit granting. Furthermore, despite the increased volume of credit granted in all Brazilian regions, the box finds evidence of a reduction in both revenue and credit granting in the localities most affected by Covid-19 relatively to the least affected ones.¹⁵ These reductions were similar, so the effect on the effective price (ratio of the two previous amounts) was not statistically significant.

The box also points out that banks with the largest IT investments before the pandemic are able to better adjust their local total costs. Moreover, the number of customers residing outside the branch's locality and the volume of credit granted increased relatively. This possibly occurs because these banks rely on more developed systems and more reliable digital channels, making it easier for their branches to expand into credit markets outside their locality. Such behaviors mitigated the effects of the marginal cost increase, leading these banks to improve their position in terms of market power relatively to banks with less IT investment.

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15 The DiD model used in this box features relative estimations. For instance, let's consider two groups: the first is the control group, with low Covid-19 prevalence and an absolute increase in credit granting during the pandemic. In the second, the prevalence of Covid-19 is high, and grants also increased in absolute terms, but by a smaller magnitude than in the former group. In the DiD model, it will be seen that grants in the most affected areas decreased relatively to the least affected areas, although credit granting has risen in both groups.

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The new competition dynamics in the SFN and the SPB

The organizational structure of the National Financial System (SFN) and the Brazilian Payment System (SPB) has undergone significant transformation in recent years. This transformation directly impacts the landscape of competition among financial agents as fintechs, bigtechs, large retailers, non-financial companies, and foreign investors intensify their activities in this area. In contrast, incumbent financial institutions (FI) and payment institutions (PI) seek to react through changes in strategies and business models, increasing the supply and improving the quality of their products and services.

The purpose of this box is to present an overview of how this process of change has evolved, describing the movements of new entrants and the possible reactions of institutions already active in the SFN/SPB. Therefore, it is addressed how firms that initially choose to offer payment services enter the market. The box describes the business models of these new players and explains how digital innovations have driven their growth. Next, it is shown how some of these institutions have started to offer other financial products and services, notably credit, to diversify their portfolios and increase the monetization of their customer bases. Finally, the strategies adopted by incumbent institutions to adapt to the new competitive environment brought about by digitalization are reported.

Institutionally, the BCB efforts to promote competition in the SFN and SPB with regulatory actions and initiatives have enabled the entry of new institutions into the market, which offer increasingly innovative and inclusive financial products and services. Among the BCB's initiatives to promote innovation and increased competition are the normative and legal framework that regulates the activity of payment institutions and payment arrangements; the establishment of two new types of institutions – Direct Credit Company (SCD) and Peer-to-Peer Loan Companies (SEP) – which enabled greater legal security for the operation of fintechs in the credit market;¹ the launch of the instant payment system (Pix); the regulation and implementation of Open Finance; and the organization of the first cycle of the regulatory sandbox.²

In addition to these initiatives, the Covid-19 pandemic has accelerated changes in the way how many Brazilians carry out their financial transactions, stimulating the digitalization process. As a result, a significant share of financial and payment institutions has structured their business models and strategies focusing on the increased demand for digitalization and convenience of financial services. Smartphones are the main service channel through which several financial and payment products and services are offered, as well as the most relevant e-commerce channel, which favors a continuous evolution towards the model of applications (apps) that integrate several services in a single platform.³ These apps aim to retain the customer in the same ecosystem, generally providing more complete solutions and better user experiences.

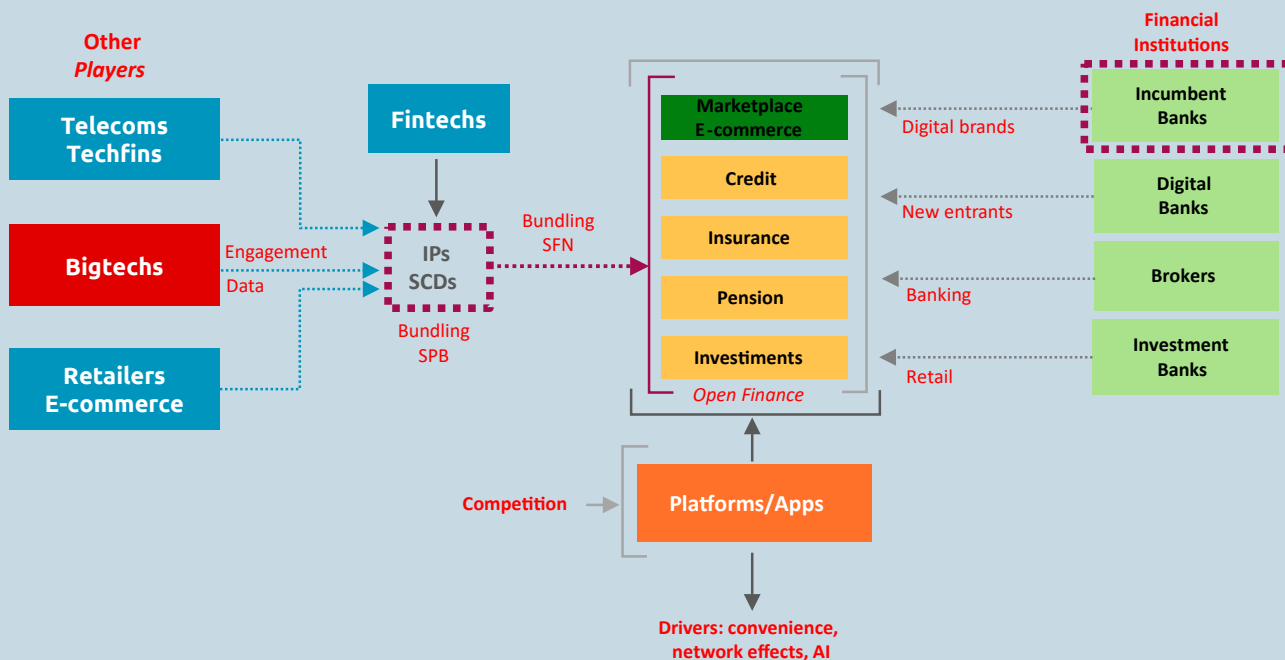
1 By December 2021, 64 SCD and 10 SEP were authorized.

2 Seven projects were selected for this first cycle.

3 In 2021, 69.5% of financial transactions were carried out by mobile phones.

The main gateway for new digital players has been the provision of payment services. Payment institutions, in particular, enhance their business models by adding new financial products and services in a process known as bundling⁴ (Image 1). This process represents the movement towards bundling financial services brought about by fintechs, without the resulting conglomerate necessarily obtaining a banking financial institution license

Image 1 - Economic agents' convergence to the platforms' concept



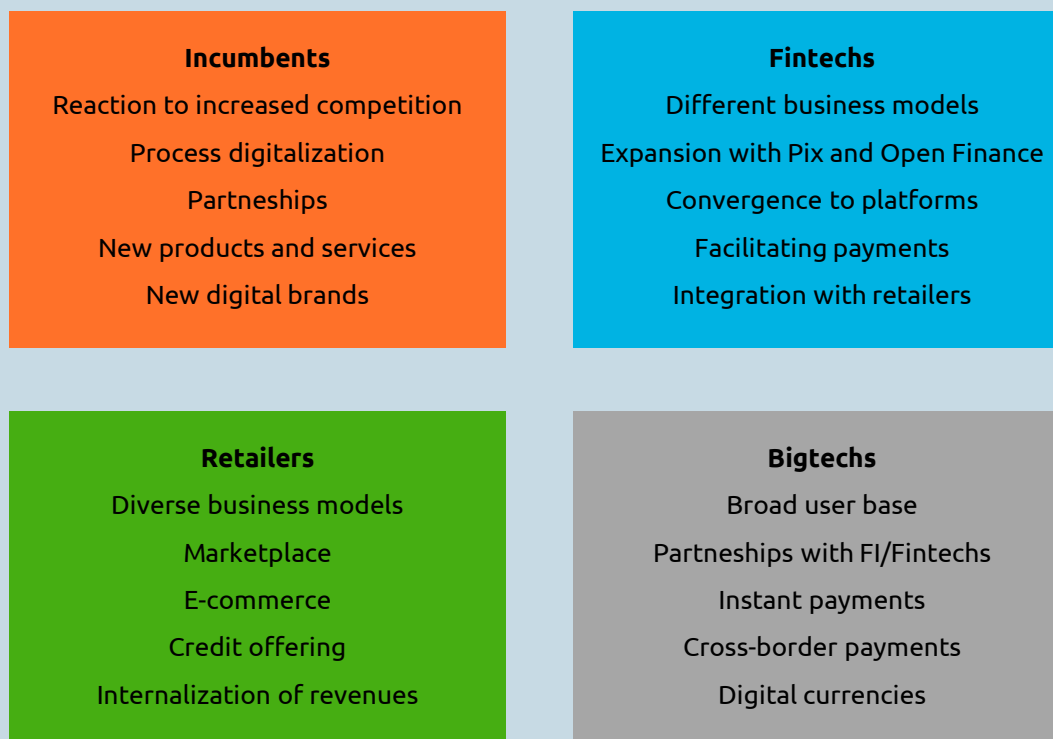
The payments market has also attracted large retailers, techfins companies,⁵ telecommunications companies and transportation and delivery platforms, which identify potential for generating and internalizing financial revenues, as well as reducing their transaction costs by entering into this segment. As a result, some of these new players are setting up payment institutions, credit fintechs or making partnerships to offer payment accounts, prepaid cards, credit cards, and other financial services. The goal is to retain the funds transacted in their ecosystem, generate greater customer engagement and expand business volume and revenue sources, which brings a new dynamic to the payments industry (Image 2).

In parallel, some bigtechs and large retailers are stepping up in the payments and credit area, leveraging their large customer bases, significant amounts of data, and advanced analytical technologies to monetize their businesses and reduce entry barriers to financial services.

4 Box 14 of the Banking Report 2020, entitled “Transformation of payment service providers into financial services conglomerates”, provides further detail on this process in the scope of the SFN/SPB.

5 Techfins: a technology and data company that offers customized and more competitive financial services to help companies overcome business challenges.

Image 2 – Trends in the payments industry



Among payment services, the main focus of new competitors in the SFN/SPB has been the provision of credit cards. Included in this group are not only the players mentioned above, but also companies with a large customer base (telephone companies, automakers, airlines, electronics manufacturers). Through partnerships with traditional financial institutions, these companies see the opportunity to diversify their sources of revenue with additional gains from payment services and other products and services linked to the credit card (for example: insurance, installment credit, etc.). To encourage greater use of credit cards and generate more engagement, most issuers have intensified the offer of benefits to their customers through annuity waivers, loyalty programs, and cashback⁶ or investback⁷ strategies.

In addition to the growth in the use of credit cards, the popularization of Pix and prepaid accounts has brought a new dynamic to the payments market, significantly increasing the number of digital transactions in recent years.⁸ As, in general, maintenance fees are generally not charged in payment accounts, payment institutions monetize their operations mainly through interchange fees.⁹ As a complementary source of revenues, some institutions have sought to diversify product and the adoption of cross-selling¹⁰ and up-selling¹¹ strategies.

Besides the payments market, new players are interested in more profitable products, notably credit. Thus, fintechs are progressively gaining representativeness and increasing the provision of products and services offered, currently facilitated by greater convenience and agility resulting from the digitalization process. The most common option for these companies to operate in the credit market has been through partnership with

6 A modality offered by postpaid card issuers whereby a percentage of the spending on the credit card is returned to the customer's account or credited on the next card invoice.

7 A modality offered by postpaid card issuers whereby part of the spending on the credit card invoice is returned to the customer as an investment in exclusive funds.

8 Digital payment transactions have grown 28% on average between 2018 and 2021.

9 The interchange fee is set by the payment scheme owner, usually levied on the value of a transaction. It is payable by the acquirer to the issuer (FI or PI) in postpaid arrangements (credit cards), prepaid (prepaid cards) or deposit account (debit cards) arrangements.

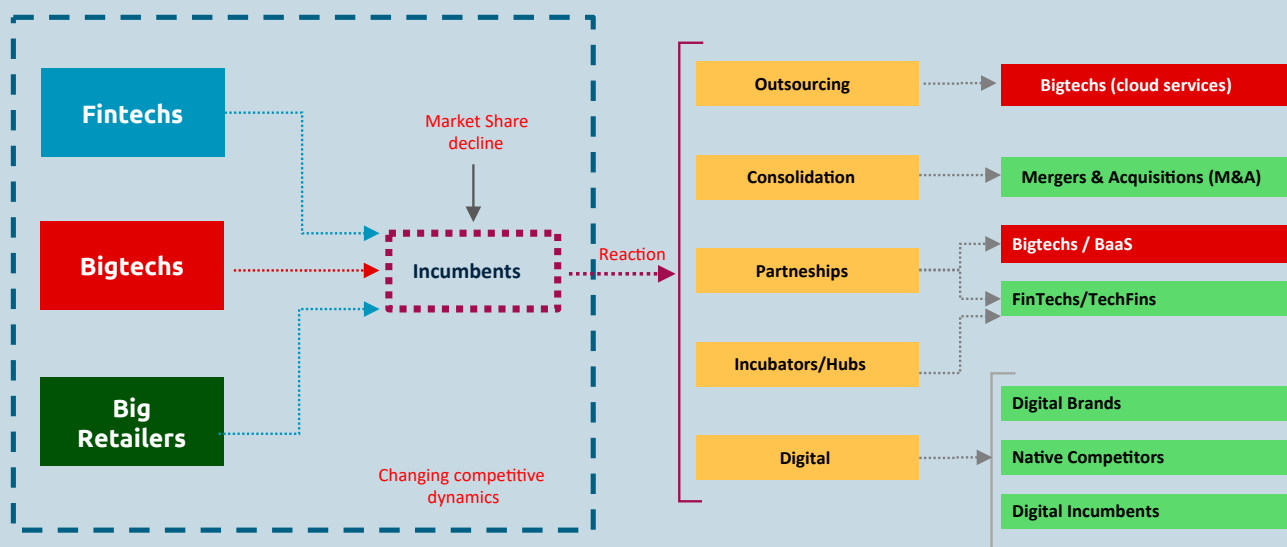
10 It refers to the sale of related and complementary products or services based on the customer's interest or purchase of a product.

11 It refers to a sales strategy that involves encouraging customers to purchase a more sophisticated product or service compared to what was originally intended to buy.

financial institutions or to set up their own SCD and structure business models based on the transfer of credit operations to receivables investment funds (FIDC) and other investment instruments.

As a consequence of increased competition in the credit and payments areas, incumbent banks are reacting through different strategies. Among these strategies it is noteworthy the digitalization of processes and customer channels, the creation of digital brands, mergers and acquisitions, the development of financial education platforms and the establishment of partnerships aimed at improving user experience and providing better products and services (Image 3).

Image 3 – Incumbents’ reaction to increased competition in the SFN12



The digitalization and the growth of e-commerce have spurred digital banks and traditional financial institutions to invest in upgrading their systems, as well as in the integration of their platforms with retail chains and companies in several sectors with the aim of earning additional revenues from online purchases of products and services made by their customers.

to retain customer funds on their platforms, investment banks and brokerage houses have sought additional revenues in the retail segment by offering credit cards and credit lines.¹³ In general, these products are partially or totally guaranteed by their clients’ own financial operations. Strategically, these institutions are intensifying the acquisition of asset managers, fintechs, and other financial institutions to accelerate the growth of their customer bases.

The movement of partnerships, mergers and acquisitions of incumbent financial institutions occurs in parallel with greater investments in technology and outsourcing, notably in the hiring of cloud computing services, in which some bigtechs predominate as suppliers. The establishment of accelerators, incubators/hubs of fintechs and other startups has also been a strategy to add cutting-edge technologies and innovations to the ecosystem of these institutions, to complement the capabilities and skills required to compete in this new dynamic of financial digitalization.

12 Banking as a service (BaaS) is a set of technological solutions that allow any company to provide financial products with no need of a bank or even being a financial institution.
 13 In the case of securities brokerage houses, the credit lines are offered by other financial institutions within the same financial conglomerate, which have a specific license for this purpose.

Global bigtechs,¹⁴ although still operating on the competitive fringe of the SFN and SPB, already have some initiatives, such as, for example, offering payment initiation services and digital wallets.¹⁵ Along with fintechs, these companies envision a growth opportunity in the financial area with the advance of open finance¹⁶ in the coming years, which may bring greater competitive pressure on incumbent financial institutions.

In summary, some aspects have intensified competition in the SFN/SPB, generating more choice alternatives with the offer of new products and services, efficiency, and benefits to customers. In particular, it should be mentioned the accelerated process of digitalization, which intensified during the pandemic crisis; the reduction of barriers to entry, with greater encouragement from the regulator for efficiency and competition; the introduction of new payment technologies, such as Pix; and the entry into the financial activity of large companies coming from other markets. Therefore, these changes increasingly challenge the regulator, since there is a redesign of the structure and organization of the financial system and greater complexity to fit different business models under a single regulatory perimeter. Among the issues that have arisen with the increased digitalization of the industry are those dealing with data privacy, cybersecurity, interoperability, competitive neutrality, and antitrust conduct.

14 It refers to companies such as Facebook, Amazon, Google, Apple, and Microsoft, among others with global operations.

15 It refers to a solution that allows to pay for products and services with prepaid cards, debit and credit cards, or even electronic currency, stored in digital media such as mobile phones, computers, and other devices.

16 Open Finance is the next step of the Open Banking implementation. Besides sharing data and information from traditional banking services, it encompasses other services, such as insurance and pension plans.

This chapter presents the initiatives implemented in the context of the Agenda BC#. The Agenda BC# is a work agenda of the Banco Central do Brasil (BCB) that comprises strategic dimensions and initiatives based on the promotion of financial democratization – lower interest rates, better financial services, and inclusive participation in the financial market. Through Agenda BC#, the BCB has been carrying out a wide range of reforms to expand access to financial products and services, extend the availability of cheaper credit to a greater number of individuals and improve the transparency of the National Financial System (SFN). Additionally, the Agenda BC# is focused on technological evolution to develop structural solutions for the SFN and facilitate the accountability of short-, medium-, and long-term BCB initiatives.

The BC# Agenda has five dimensions: Inclusion, Competitiveness, Transparency, Education, and Sustainability. Each dimension encompasses several strategic initiatives, concluded or in progress. They are developed in a simultaneous, articulated, and harmonic way. The annual evolution of implemented measures is described in the previous Banking Reports.

In 2021, the Agenda BC# comprised 52 initiatives (31% completed, 69% still in progress). Sections 7.1 to 7.5 illustrate the main achievements in each of these dimensions. Section 7.6 deals with some initiatives still in progress.

7.1 Inclusion

The Inclusion dimension seeks to facilitate overall access to the financial markets, either by small and large users, investors and borrowers, Brazilians and foreigners.

Initiatives in this dimension aim to expand the credit unions sector; simplify and modernize the foreign

exchange and international capital regulations; develop changes that allow the full development of the Brazilian capital market, based on the free market; and deepen access to financial services and to the microcredit.

The means to achieve this goal include promoting digital platforms, reducing bureaucracy, and simplifying procedures. In particular, BCB initiatives seek to increase the market share of private financing sources to reduce the government participation.

The approval of the new exchange and international capital law was the main initiative developed in the Inclusion dimension in 2021.⁹⁸ This legislation has the purpose of modernizing, streamlining, and consolidating the current legislation. Effective as of December 31, 2022, the law will consolidate more than forty legal instruments that started to be published nearly one hundred years ago, with diffuse commands totaling more than four hundred articles. The new legislation is concise, comprising 29 articles and updated language, which will provide increased legal safety to encompassed issues.

The new exchange and international capital law contributes to:

- greater insertion of Brazilian companies in global value chains;
- increase inflows of foreign capitals, both for investments in the financial and capital markets and direct investment, including long-term and infrastructure and concession investments.
- expansion of the international use of the BRL, facilitating the use of the domestic currency in international financial operations, as in the permission for the receipt and remittance of payment orders in BRL from accounts in BRL held by foreign institutions in banks in the country;
- reduction of operational and legal structures for the exchange market participants, increasing the efficiency of operations and provision of information stipulated by the BCB;
- freely non-professional negotiation of foreign currency among individuals with a ceiling of up to USD 500;

98 Complementary Law 14,286, of December 29, 2021.

- extension (to USD 10 thousand or its equivalent in other currencies) of the ceiling from which the traveler entering or leaving Brazil must declare the possession of currency.

Still in the exchange market framework, the exchange and international capital regulation was improved to increase the competitiveness, financial inclusion, and innovation in the sector. These measures are aligned with the priority granted by the G20 to the improvement of international payments concerning cost, time, transparency, and access. These measures were effective as of October 1st, 2021, except the permission for authorizing payment institutions to operate in the exchange market, which will be effective as of January 1st 2023.⁹⁹

Another relevant initiative in the Inclusion dimension was the improvement of the regulation for correspondents in the country. The key changes concerned the formal recognition of the possibility of the correspondent operate through an electronic platform and the improvement of the management of correspondents by which they are contracted. The previous regulation was based in a model of on-site operation, which was incompatible with innovations promoted by the Open Finance regulation.¹⁰⁰

The derivatives market also benefited from Inclusion initiatives. The possibilities of contracting derivatives abroad according to modalities regularly practiced on the international market were expanded, thus allowing the enlargement of safeguarding instruments, including for direct investment liabilities and long-term financing, such as infrastructure projects. This measure contributed to reduce market inefficiencies, increase the integration between the domestic and international financial markets, reduce the costs of operations with derivatives abroad, and diversify the supply of financial instruments.¹⁰¹

7.2 Competitiveness

The Competitiveness dimension aims to seek fair pricing through instruments for competitive access to markets. This dimension comprises three themes: innovation, market efficiency, and international reserves.

⁹⁹ CMN Resolution 4,942, of September 9, 2021; BCB Resolution 137, of September 9, 2021; and BCB Resolution 148, of September 29, 2021.

¹⁰⁰ Resolution CMN 4,935 of July 29, 2021.

¹⁰¹ Resolution CMN 4,948 of September 30, 2021.

The technological development allows several innovations to come out, potentially encouraging the competitiveness in the Financial and Payment Systems. Initiatives developed in this dimension boost the growing digitalization of the means of payments in the country.

The main initiative in this dimension concerns the evolution of the Pix agenda. Pix is under continuous improvement to deliver increasingly broad, safe, and efficient service, fulfilling the population and business environment's needs, reaching a higher number of use modalities. Throughout 2021, several advances were implemented:

- The possibility of adjusting information related to the Pix key, thus facilitating, for instance, the adjustment for the change of an individual's name due to marriage or in a company's name;
- Pix Cobrança (Charge) for generating charges at a stipulated deadline the automatic calculation of fine, interest, discounts, or deductions, like the boleto (banking payment slip);
- Pix Saque (Withdrawal) and Pix Troco (Change), which increase the efficiency of withdrawal services by reducing costs and improving supply and pricing conditions;
- Pix accessibility to individuals with visual and hearing impairment included in the document Minimum Requirements for the User Experience.

The BCB also implemented several measures that increased even further Pix safety, such as:

- improvement concerning the cap rules, as the possibility of customizing the start time at night; possibility of establishing different caps for registered accounts; and definition of parameters for stipulating value caps by each transaction and period;
- cautionary block of resources at the time of crediting the individual user's account until 72 hours in the case of suspected fraud;
- Special Devolution Mechanism, which standardizes the rules and procedures for optimizing the devolution of values in the case of proved suspicion of fraud or in situations of operational failure in the systems of institutions involved in the transaction;

- obligatory notification of infraction, which was extended to transactions in which the payer and the payee hold an account in the same institution and for transactions rejected due to proved suspicion of fraud;
- obligatory adoption by institutions of protective mechanisms regarding Pix keys' data;
- increased responsibility of institutions offering Pix in their Regulation.

Also, a new modality for participating in Pix was also offered: the Payment Transaction Starter. This modality is aimed to financial institutions or other institutions authorized to offer the starter service and that have, within the Pix framework, as their unique goal the provision of this service. In addition to increase the competitiveness, it makes the payment journey even more agile, strengthening the Pix use, especially in the online commerce.

Another initiative to be highlighted in the Competitiveness dimension is the Open Finance, or open financial system. The Open Finance is one of the cornerstones for building the future financial system and allows to democratize the access to information on financial services by means of a safe and convenient environment for users. With this initiative, the possibility of generating new solutions for supplying and contracting more integrated, personalized, and accessible financial services and products is further enlarged, always focusing decisions on the consumer.

An important phase of the Open Finance is the Open Banking, since it allows the share of registered financial information of clients of financial services and products, upon the consent of the interested parties, among institutions regulated by the BCB. Moreover, it allows the contracting of financial services in an electronic environment of third parties and not only through the bank's app or homepage, in a safe, agile, and convenient way.

Shared information may comprise data on exchange, registering service, investment, insurance, social security, and capitalization, which establishes the start of the Open Finance phase, broadening the Open Banking boundaries beyond the traditional bank world. The implementation of the Open Finance is planned in four phases, of which the fourth started in December 2021.¹⁰²

¹⁰² Further information on the BCB's homepage: https://www.bcb.gov.br/en/financialstability/open_finance

Open Finance: time schedule

Open finance numbers in its first year:

- 3.3 million consents and 221 million calls via APIs.
- About 800 participating institutions.

PHASE 2: since August/2021

Objective: sharing of customer registration and transactional data related to traditional banking services (accounts, credit card and credit operations).

Sharing is already in full operation.

Improvements in credit analysis and customer onboarding processes are already observed as well as new financial planning and counseling solutions.

PHASE 4: since December/2021

Objective: sharing of financial products data related to foreign exchange, accreditation, insurance, investment, and supplementary pension plans, eventually evolving into transactional data.

Progressive launch with institutions conducting tests for their API certification.



PHASE 1: since February/2021

Objective: sharing of FIs data (service channels and traditional banking services).

Developers of aggregation and comparison platforms for products and services and the FIs themselves already have initiatives using this information.



PHASE 3: since October/2021

Objective: sharing of services, starting with Pix transaction initiation.

The BCB has regulated the payment initiator, which enables customers to make payments without accessing his account. Initiator institutions are finalizing the onboarding process and the service should be available to the public soon.



As for the 1st Cycle of the Regulatory Sandbox, the BCB selected seven out of 52 registered projects. These new business models might be effectively implemented with the potential of modernizing the regulatory framework and develop new and better services to the SFN and SPB users. Operations of the 1st Cycle projects begun in the first quarter of 2022, and will last for one year, to be extended once for an equal period.¹⁰³

The 4th edition of the Financial and Technological Innovation Lab (LIFT-Lab), an initiative coordinated by the BCB in partnership with the National Federation of Associations of BCB Servants (Fenasbac) was carried out with the purpose of developing prototypes of innovative products. All projects are proposed by the society, which makes the LIFT an open environment for the society's direct participation in the promotion of innovation in the SFN. In 2021, 11 out of 43 proposed projects were selected.

Also, the guidelines for the potential development of the digital BRL were released. Furthermore, the BCB promoted a series of webinars with the goal of discussing the general guidelines of a digital currency for Brazil. The following table presents the guidelines for the potential development of a Brazilian digital currency.

¹⁰³ Further information on the BCB's homepage: <https://www.bcb.gov.br/en/financialstability/regulatorysandbox>.

Guidelines for the potential development of a Brazilian digital currency:

- Emphasis on the possibility of developing innovative models based on technological advancements, such as smart contracts, the Internet of Things (IoT), and programmable money.
- Anticipation of use in retail payments.
- Ability to conduct online operations and, eventually, offline operations.
- Issuance by the Banco Central do Brasil, as an extension of physical currency, with public distribution mediated by custodians of the National Financial System (SFN) and the Brazilian Payment System (SPB).
- Absence of remuneration.
- Assurance of legal security in its operations.
- Adherence to all principles and rules of privacy and security as determined, especially by Complementary Law 105 of 2001 (banking secrecy) and the General Data Protection Law (LGPD).
- Technological design that allows full compliance with international recommendations and legal norms on preventing money laundering, financing of terrorism, and financing the proliferation of weapons of mass destruction, including compliance with court orders to track illicit operations.
- Adoption of a solution that allows interoperability and integration for conducting cross-border payments.
- Adoption of resilience and cybersecurity standards equivalent to those applicable to critical financial market infrastructures.

The new Liquidity Financial Lines (LFL) were implemented in 2021, allowing the BCB to carry out financing with financial institutions using as collateral private credit securities, debentures, and commercial papers, in a permanent and automatized way. These new lines provide the BCB with new efficient and safe tools. In addition, they allow enhanced settlement by financial institutions in the SPB framework and to cope with likely market malfunctioning, by opening pre-approved limits for financial institutions through an automatized technological platform.¹⁰⁴

Moreover, a deduction on compulsory reserves on time resources was established based on the total financial limit of institutions for operations of the Forward Liquidity Lines (LLT), one of the LFL modalities. In practical terms, institutions with collaterals represented by LFL continue with a rate of 17% in this type of compulsory reserve.¹⁰⁵ The regulation defines rates of 20% for those institutions with no collaterals represented by LFL.

The increased easiness of financial institutions to access the BCB liquidity in a safe and efficient way will allow to improve the efficiency of the financial system. The levels of compulsory reserves tend to fall with the growing use of these new lines, reducing the cost of financial institutions' operations.

¹⁰⁴ BCB Resolution 110, of July 1st 2021.

¹⁰⁵ BCB Resolution 145, of September 24, 2021.

A series of positive effects is also expected for the market of debentures and commercial papers itself. By integrating the list of assets accepted as collaterals in the BCB's current operations, these private securities gain better perception about their liquidity, providing the market with new information and parameters in their negotiation. Therefore, the companies issuing debentures benefit from the reduction of costs in this funding source.

Another relevant initiative was that the BCB started accepting voluntary time deposits of financial institutions, enlarging and improving the instruments for the monetary policy conduct. This increased the BCB operational autonomy. This instrument helps regulating the volume of currency in circulation, since the money no longer circulates when it becomes a voluntary deposit at the BCB. It also contributes to better controlling the short-term interest rate.¹⁰⁶

Regulation on payment arrangements were also improved. Thus, the regulatory cost on small-scale payment arrangements or those meeting specific markets was reduced, providing a more equitable treatment to participants that perform the same activity in these arrangements. These initiatives contribute to strengthen an environment of payments more susceptible to innovation and competitiveness, increasing the efficiency in the authorization process, with no damage to the SPB safety, and provide more equitable treatment to several agents performing a similar activity in the scope of a payment arrangement.¹⁰⁷

The BCB also issued, in 2021, a regulation establishing the measures to be adopted by institutions for preventing frauds in the provision of payment services. Among these measures, institutions must define a cap of BRL 1,000, on the account of deposits or pre-paid payment, for the total amount of payment transactions carried out in the framework of the same payment arrangement in the period between 8 p.m. and 6 a.m. between different individuals, except individual entrepreneurs.¹⁰⁸

The regulation for contracting credit cards and pre-paid payment accounts was improved. New rules seek to adequate the supply of innovative financial services to the need of the Brazilian population, taking into account the digitalization of the means of payment.¹⁰⁹

106 Law 14,185, of July 14, 2021; BCB Resolution 129, of August 19, 2021.

107 BCB Resolution 89, of April 22, 2021, which was consolidated by BCB Resolution 150, of October 6, 2021.

108 BCB Resolution 142, of September 23, 2021.

109 BCB Resolution 96, of May 19, 2021.

In 2021, the BCB also evaluated the result of the cap imposed to the exchange tariff that the credit card issuer determines to be paid by the registering agent (the owner of the credit card equipment) to the issuer institution in payment transactions carried out with debit cards. The tariff was stipulated at 0.5% for the average value weighted by the value of transactions and 0.8% for the maximum value to be applied in any transaction. The caps imposed on this tariff may benefit consumers that resort to the debit card, since in Brazil it is permitted to differentiate the prices of goods and services in function of the payment instrument.¹¹⁰

An evaluation study carried out by the BCB showed that the lower exchange tariff reduced the rate to retailers, not affecting the supply of debit cards. Since there was no increase in the volumes transacted, the revenue of issuers were reduced in the same proportion of the reduction in the tariff.¹¹¹

In 2021, several BCB initiatives were implemented aiming to improve open market operations carried out for the conduct of the monetary policy. Among these initiatives, the highlights are:

- i. the improvement of electronic auction modules used in repurchase operations offered by the BCB;
- ii. the establishment of a preliminary measurement report of auctions to support the decision-making process;
- iii. the improvement of reports for monitoring the operational conditions of the federal public securities market.

Over 2021, the entire regulatory framework concerning the BCB operation in the exchange market was revised and updated. In addition, several regulations dealing with operations no longer used were revoked, thus facilitating the research and guidance of market participants about how the BCB can operate with exchange.¹¹²

In 2021, the BCB also carried out adjustments in the International Reserves benchmark seeking to maintain the reserves management aligned with the international guidelines, in compliance with the cornerstones of safety,

¹¹⁰ Circular 3,887, of March 26, 2018.

¹¹¹ Further details at Estudo Especial 106/2021, “Avaliação do resultado regulatório da introdução de limites para a tarifa de intercâmbio de cartão de débito” (Portuguese only).

¹¹² BCB Resolution 76, of February 23, 2021; BCB Normative Instruction 140, of August 12, 2021; and BCB Normative Instruction 141, of August 12, 2021.

liquidity, and return of investments. In this process, the BCB also considered the aspects of sustainability, advancing in the definition of investment parameters that include elements of environmental, social, and corporate governance.

7.3 Transparency

The Transparency dimension involves the dissemination of market and BCB information to the entire population and to market participants, allowing to improve the price formation process.

This dimension focus on the improvement of BCB communication initiatives, including those concerning the Monetary Policy, the assessment of results, and the reduction of information asymmetries.

To this end, the relationship with parliamentarians, international portfolio investors, and the public is fundamental. The BCB works to ensure that information flows transparently in all operations, especially in the channeling of real estate and rural credit, and in financial services in general.

An initiative to be highlighted was the revision and consolidation of normative acts under the BCB and CMN competence, in compliance with Decree 10,139, of November 28, 2019. Infra-legal regulation on rural credit and Proagro were streamlined, by reducing to less than half the amount of regulations. With this measure, 1,692 normative acts of the Rural Credit Manual (MCR) were consolidated into 779. Another 376 were revoked. Moreover, the oversight model was streamlined, aggregating efficiency to procedures, both from the point of view of the quality of controls and operational costs involved.¹¹³

The rules concerning household real estate operations and loans involving residential dwellings offered as collaterals were also improved. This initiative has the purpose of assuring greater transparency in the charge of interest in credit operations having dwellings as collaterals and will be effective as of June 2022.¹¹⁴

The BCB also issued the regulation that obliges the elaboration and implementation of an institutional policy of relationship with clients and users of products

113 CMN Resolution 4,895, of February 26, 2021.

114 CMN Resolution 4,925, of June 24, 2021.

and services of consortium management agencies and regulated payment institutions.¹¹⁵

Another initiative to be highlighted is the updating of the register of data of the Focus Survey. The change updates the structure available to participant institutions of the Focus survey and provides new management information. The new structure provides greater flexibility to the system, facilitating eventual changes, without compromising the quality of information.

It should be emphasized that, in 2021, the BCB released for the first time the Research Agenda 2021-2024,¹¹⁶ in compliance with the best international practices of central banks' research governance. Research in the BCB plays a fundamental role for supporting the monetary, financial stability, and banking efficiency policies. The release of the Agenda represents a gain of transparency by informing society about the research themes of interest by the BCB.

In addition, the release of the Minutes of the Financial Stability Committee (Comef) and the Comef Regulation were also reformulated. The release of the Comef Minutes was defined for up to five business day after each meeting. The improved timeliness of communication makes the minutes an additional instrument of macroprudential policy, since it also permits to alert market participants about the dynamics that might increase the vulnerabilities of the financial system.¹¹⁷

Still regarding the Comef regulation, the evaluation of the SFN efficiency was included as one of the Committee's competences. Therefore, the BCB decision-making process for the adoption of policies will be supported by a broader set of information, and society will gain access to more accurate information about the SFN efficiency.

To strengthen its transparency and communication with the society, the BCB made available in its homepage the BCB Menu of Services, which includes information about its services registered in the Portal gov.br., among them: to register a request of information or complaint against a supervised entity in the Contact us; to carry out declarations through the Registration of Brazilian Foreign Liabilities, the System of Brazilian Assets Abroad (CBE) and the Censo of Brazilian Foreign Liabilities; to send documents through the BCB Digital Protocol;

115 BCB Resolution 155, of October 14, 2021.

116 Available at: https://www.bcb.gov.br/en/publications/research_agenda_2021

117 BCB Resolution 173, of December 9, 2021.

to see the list of institutions authorized to operate by the BCB, the Ranking of complaints and how to register a complaint against a bank, among others. There is also the possibility of checking how to issue negative certificates and personal reports in the Registrato.

The BCB communication with citizens was streamlined and made more agile, by making available a website to facilitate the signing of feeds. The use of this tool allows the user to know, in real time, eventual updating of news, regulations, quotations, indicators, and studies released in the BCB homepage.

The BCB also modified its rankings of Complaints and the Ombudsman Quality to improve and provide further information to the population about the bank or financial institution with which a relationship is maintained or is wished to be maintained. Information about rankings released periodically allow citizens to be aware of the most often complaint financial institutions, as well as the more frequent subjects discussed.

The BCB started releasing the Payment Statistics of Retail and Credit Cards in Brazil through a homepage with more intuitive graphic language,¹¹⁸ which brings information on the number of transactions and values related to Pix, TED, DOC, payment slip, check, credit cards, and other payment instruments. The purpose of this initiative is to allow the monitoring of the retail payment market in a more timely and friendly manner, facilitating the analysis of the use of several means of payment.

The BCB also made available in its homepage (Portuguese only) the SCR.data – Panel of Credit Operations. Through this panel, researchers, students, and the society in general can research, in a single environment, SCR data.

The BCB carried out its first Analysis of the Regulatory Impact (AIR), under the terms of Decree 10,411, of June 30 2020, to estimate the impacts on the SFN of measures for contracting correspondents in the country by institutions authorized to operate by the BCB. The result of this analysis is consolidated in the Analysis of the Regulatory Impact Report, available in the BCB homepage.¹¹⁹

AIR is a procedure aimed at increasing the transparency in relation to the options contemplated by the regulator to deal with regulatory issues. AIR is mainly justified by

118 See: <https://www.bcb.gov.br/en/financialstability/paymentssystemstatistics>.

119 See (Portuguese only) https://www.bcb.gov.br/content/publicacoes/air/AIR_Correspondentes_no_Pais.pdf.

regulatory policy recommendations by the Organization for Economic Cooperation and Development (OECD) and legal regulations – Decree 10,411, of June 30, 2020.

The rules concerning the authorization processes of financial institutions, payment institutions, payment arrangements, and other institutions authorized by the BCB were also improved. These regulations about the authorization processes contribute to greater rationality and speed in the authorization processes by the BCB, and help promoting a more efficient and competitive SFN, in addition to assure the soundness and resilience of participating institutions. As of July 2022, the evaluation of requests might be simpler and, consequently, faster and cheaper, depending on the request, type of institution, nature of operation, and involved risks.¹²⁰ Moreover, specifically regarding payment institutions, the streamlining of authorizations requests is already in progress since May 1st, 2021.¹²¹

7.4 Education

This dimension of the Agenda BC# aims to make citizens aware so that everyone participates in the market and cultivates financially healthy habits, such as the habit of saving, of responsible use of credit and the control of a balanced domestic budget. For that purpose, it is important the participation of market and government agents, credit unions, and microcredit agents.

The program *Aprender Valor*¹²² is the highlight in this dimension. Its goal is to support Education Secretariats and schools to implement the teaching of financial education and how to consume in elementary public schools. In the second half of 2021, this program was expanded to the entire country, allowing the participation of all elementary public schools in all federation units, with a potential to reach, in the future, up to 22 million students in elementary public schools.

The 8th edition of the National Week of Financial Education (Enef Week), another important initiative aimed to promote financial education, was held on

¹²⁰ CMN Resolution 4,970, of November 25, 2021.

¹²¹ BCB Resolutions 80 and 81, of March 25, 2021.

¹²² *Aprender Valor* follows the guidelines of the National Common Curriculum Base (BNCC) and integrates, in a transversal way, the financial education to the obligatory curriculum disciplines, especially mathematics, Portuguese language, and geography. The program is supported by resources of the Fund for the Defense of Diffuse Rights (FDD) of the Ministry of Justice and Public Security.

November 8-14, 2021 period. This event proposed thousands of free initiatives concerning financial, security, social security, and fiscal education promoted by public and private entities. With the theme “Planning, savings, and aware credit: the PLA-POU-CRÉ and your financial health”, the purpose was to provide citizens with information about how organizing finance (planning), keep for the future (saving), and use credit for the own benefit (aware credit).

Another initiative in this dimension was the release of the second Financial Citizenship Report (RCF). It is report released every three years seeking to identify developments, gaps, and main challenges in the promotion of financial citizenship in Brazil. In addition to show how the Brazilian financial citizenship has evolved over the last three years, this RCF edition highlighted how technological changes in the SFN and the Covid-19 pandemic have been impacting the citizens’ life.

The development of the Brazilian Financial Health Index (I-SFB/Febraban) is also noteworthy. This index is an analytical tool that allows Brazilians to measure their financial health over time, compare it with the average of Brazilians, and identify own vulnerabilities, to be improved with financial education initiatives. Launched in July 2021, this is the largest measurement ever carried out in Brazil about this theme, involving more than five thousand individuals. The Index is calculated in a scale from 0 to 100 points, with the average Brazilian index reaching 57. The index is also an essential tool for developing public financial education and inclusion policies as well as to design and offer adequate financial products to the citizens’ needs.

The financial education platform Meu Bolso em Dia was made available in November 2021, also representing the technical cooperation between the BCB and the Febraban to promote financial education initiatives. This is a free tool, targeted to the entire population, offering personalized learning paths according to the citizen’s Financial Health Index. Since its pilot phase, began in May 2021, until the end of the year, the platform registered 306 thousand distinct visitors. As of 2022, incentives to the participation in this initiative will be offered.

It was also launched by the Febraban, with the BCB support, the acceleration program Meu Bolso em Dia. Twenty financial education projects with high potential gains of scale were selected. Overall, participants

received a total of financial investment support of BRL 1 million. The five winner projects were: Iara-Barkus, Jornada Youngers, Mooney, Plano Fintech, and TinDin. This initiative reinforces the financial sector commitment to the promotion of the financial education agenda.

The 4th version of the Financial Information Booklet for Refugees and Migrants was launched in November 2021, in partnership with the Ministry of Justice and Public Security (MJSP), the United Nations High Commissioner for Refugees (ACNUR), and the International Organization for Migration (OIM). The purpose of the document is to help migrants and refugees to access information about financial products and services, thus expanding the financial inclusion of this vulnerable part of the population. The booklet is available in Portuguese, English, Spanish, French, and Arab in the BCB Financial citizenship homepage.

The BCB made available the virtual access to its expository rooms in 2021: BCB's Money Museum, Galeria de Arte, Salão Nobre de Reuniões, and the Galeria dos Ex-Presidentes. The tour, now carried out at a distance, presents images of objects and currencies at 360 degrees, allowing the visualization of every single detail of artifacts, in addition to audios and pop-up windows containing images of panels and exhibitors.

Furthermore, the BCB and the Google Cultural Institute celebrated a contract for hosting contents and services to make available online the cultural collection under custody of the Museu de Valores through the Google Arts & Culture platform.

7.5 Sustainability

This dimension of the Agenda BC# recognizes the importance of Sustainability in the economy and in the SFN. It deals with the promotion of sustainable finance, the adequate management of socio-environmental and climate risks in the economy and in the SFN, besides integrating sustainability variables in the BCB's decision-making process.

The theme plays a fundamental role in the channeling of resources to the development of a more sustainable, dynamic, and modern economy.

The role of central banks and the financial market in sustainable finance and in mitigating the effects of socio-environmental risks is a rapidly developing theme in Brazil and worldwide.

As the regulator of the SFN, the BCB has developed a series of initiatives and rules on the subject over the last few years. The initiatives included in the Sustainability dimension encompass socio-environmental and climatic responsibility measures directed to both the financial system and the BCB itself.

The 1st Edition of the BCB Report on Risks and Social Opportunities (RIS) was released in September 2021. RIS aims to facilitate the integrated management of social, environmental, and climate risks together with other types of risk categories, contributing to discussions about this theme and accountability to the society. This report is aligned with recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), established in 2015 by the Financial Stability Committee (FSB).

The BCB replaced the generic concept of socio-environmental risk by specific definitions for the social risk, the environmental and the climate risk, and released several regulatory improvements that update and enlarge the previous regulation about this theme, i.e.:

- improvement of the rules for the management of social, environmental, and climate risks applicable to financial institutions of the S1 to S4 segments and the simplified management of the social, environmental, and climate risks for institutions of the S5 segment;¹²³
- improvement of the rules for establishing a Social, Environmental, and Climate Responsibility Policy (PRSAC) and the initiatives to be implemented, by financial institutions, to guarantee its effectiveness. Both PRSAC and initiatives should be disclosed by financial institutions;¹²⁴
- establishment of the requirements for the release of the Report on Social, Environmental, and Climate Risks and Responsibilities (GRSAC Report), concerning information about how social, environmental, and climate issues are dealt with by financial institutions.¹²⁵

123 CMN Resolutions 4,943 and 4,944, of September 15, 2021.

124 CMN Resolution 4,945, of September 15, 2021.

125 BCB Resolution 139, of September 15, 2021.

The BCB conducted a public consultation about proposed regulations concerning sustainability criteria applicable to the granting of rural credit. The first outcome was the release of a regulation that consolidated legal and infra-legal acts governing situations that prevented the granting of rural credit operations, enhancing the understanding by financial institutions and rural credit borrowers.¹²⁶

The BCB established the Social, Environmental, and Climate Risks Document (DRSAC) with the goal of collecting, at financial institutions, information on the evaluation of social, environmental, and climate risks of their exposures, and their respective debtors. A wide mapping of these aspects associated with the SFN credit is expected, allowing to generate statistics and information about the evolution (time series and reports), in addition to consistency and comparative analyses.¹²⁷

Furthermore, still in 2021, the “Sustainability Seminar” was held in the 50th Cycle of Financial Mercosur Meetings. The purpose was to present an updated perspective about the sustainability issue in the framework of the international financial system and promote the discussion about opportunities to financial regulators in Latin America to contribute to fight climate challenges.

The second phase of the campaign for national awareness about the selective collection of residues in all BCB premises was also carried out in 2021. Discarded recyclable residues are donated to cooperatives or associations of collectors of recyclable materials in the entire country. These initiatives provide the benefits of promoting the environmental preservation and social inclusion of collectors.

7.6 On-going initiatives

Since the announcement of the Agenda BC#, several initiatives have been concluded and another 36 of great relevance are in progress. Part of this set of ongoing initiatives is under discussion in the National Congress because it depends on legal changes, while others depend on the collaboration with other government agencies, with infra-legal changes. Among those initiatives, the highlights are:

¹²⁶ BCB Resolution 140, of September 15, 2021.

¹²⁷ BCB Resolution 151, of October 06, 2021.

- Real estate collaterals: deals with the main collaterals in real estate operations (chattel mortgage and real estate mortgage), mitigating distortions identified in the market, in addition to increase its potential use through specific mechanisms (extension of the chattel mortgage and right of acquisition of real estate), ultimately benefiting the real estate credit market (lenders and borrowers);¹²⁸
- Bank Resolution Law: proposes a new legal framework for resolution in case of failure of large institutions involving systemic risk, including federal state-owned banks, stock exchanges, and depository centers. This law is part of the commitment signed by Brazil in the G-20 to provide the BCB with more efficient instruments to deal with financial crises;¹²⁹
- Relationship BCB-Cade: deals with the defense of competitiveness in the scope of operations of financial institutions and other institutions subject to the BCB surveillance or vigilance. It aims to establish forms of cooperation and the sharing of competencies between the BCB and the Administrative Council for Economic Defense (Cade) on competition matters;¹³⁰
- Credit Unions: proposes to change the Complementary Law 130, of April 17, 2009, with the purpose of stimulating an increasing the participation of credit unions in the SFN, and thus expand financial inclusion, leverage, and boost cheaper credit;¹³¹
- Transnational payment systems: seeks to streamline the process for celebrating international payment systems with other central banks, allowing the BCB to establish new agreements for faster, cheaper, and inclusive transnational transfers to the benefit of the real economy;
- Rural credit insurance instrument: proposes the integration of the Proagro and the PSR. It makes part of the programs for mitigating climate risks managed by the Ministry of Agriculture, Livestock and Food Supply, with the gradual migration of beneficiaries and Proagro budget to the PSR;
- Bill for the Financial Market Infrastructure: aims to consolidate and update the legal norms applicable to financial market infrastructure and the respective

128 Complementary Law Bill 4,188, of November 25, 2021.

129 Complementary Law Bill 281, of December 23, 2019.

130 Complementary Law Bill 499/2018 was annexed to the PLP 265/2007.

131 Complementary Law Bill 27, of March 10, 2020. Complementary Law 196, of August 24, 2022.

operating entities, making them clearer and safer, in line with the best international practices;

- Bill of the Authorizations Law – revision of articles of the Law 4,595, of December 31, 1964: proposes the modernizing of processes of authorization, surveillance, and organization of the SFM, providing greater proportionality in authorization requests, regulating the participation of new institutions in the financial market and providing new competences to the CMN and the BCB to regulate and carry out authorization and surveillance procedures more aligned with the promotion of stability, competitiveness, and financial inclusion.

How Brazilians use TED and Pix

In 2002, a major structural reform of the Brazilian Payment System (SPB) contributed to a significant risk reduction and to keep the National Financial System (SFN) among the most modern in the world. The Electronic Available Funds Transfer (TED), a new financial instrument was developed within this reform. TED enabled same-day financial transfers between accounts in different banks, having advantages over checks and Credit Documents (DOC). Twenty years later, a new milestone in the SFN is established with the Pix launch in November 2020. Pix brought huge benefits to the Brazilian population regarding the use of digital means of payment, such as transfer of funds within seconds, transfers of funds from individuals with no costs, 24/7 availability, all year long, including non-business days, and ease use through the creation of Pix keys, as well as the possibility of starting the operation scanning QR Codes.

Pix was widely accepted by the Brazilian population in a short period. In just over an year, significant milestones have been reached: i) about 61% of the adult population has at least one registered Pix key;¹ ii) about 100 million people have made at least one payment using Pix; and iii) more than 1.4 billion transactions per month, of which 72% between individuals.² At the center of the contribution under analysis are the approximately 50 million people who did not make transfers via TED in the twelve months prior to the Pix launch but started using the new instrument.

The objective of this box is to understand how the profile of users of the new instrument differs both from those who already have made wire transfers and from those who continue not to do so. For this purpose, adult citizens were grouped according to their respective use profile of Pix and TED between November 2019 and December 2021. Next, the groups were compared as to their demographic characteristics (age, gender, and location) and income characteristics (formal job and participation in *Cadastro Único* and in *Bolsa Família* Program). The comparison of the groups regarding these characteristics helps to understand where these people are and how they are characterized.

Definition of groups

Two variables were used to group adult population: i) TED use³ in the 12-month period prior to the Pix launch (November 2019 to October 2020); and ii) TED and Pix use in the 14-month period since the Pix launch (November 2020 to December 2021).⁴ Thus, adult Brazilian population was classified into the following groups:

- 1 Adult population was defined as people over 15 years of age with an active Individual Taxpayer Registration (CPF). The total number is 178.6 million people (source: Federal Revenue Secretariat – SRF)
- 2 Data from April 2022.
- 3 The use of DOC was not analyzed in this study due to the unavailability of individualized data by CPF, which makes it impossible to evaluate the socioeconomic profile of the population. When Pix was launched in November 2020, the use of DOC represented 9% of the transactions, dropping to 4%, in December 2021, considering only TED and DOC.
- 4 For this study, regarding operations initiated by individuals, all TED and only Pix carried on the Instant Payment System (SPI) were considered. Pix carried on the same participating institution (booktransfers) or between indirect participants that use the same settling institution (direct participant), were not considered, due to the unavailability of data. From the aggregate information provided by financial and payment institutions, booktransfers are known to correspond to approximately 16% of the Pix transactions, so the use of this instrument is even greater than the estimated in this box.

- **Pix inclusion:** people who have not made any TED 12 months before or 14 months after the Pix launch and who have made at least one Pix payment.
- **Pix/TED inclusion:** people who have not made any TED in the 12-month period prior to November 2020 and who have made at least one Pix and one TED payment between November 2020 and December 2021.
- **Partial Substitution:** people who have made at least one TED in the 12 months prior to the Pix launch and at least one Pix and TED payment from November 2020 to December 2021.
- **Total Substitution:** people who have made at least one TED in the 12 months prior to the Pix launch and at least one Pix payment but no TED payment from November 2020 to December 2021.
- **Non-Adherent to Pix:** people who made at least one TED between November 2019 and December 2021 but did not make any Pix payment between November 2020 and December 2021.
- **Pix/TED non-users:** people who did not use either TED or Pix in the evaluated period.

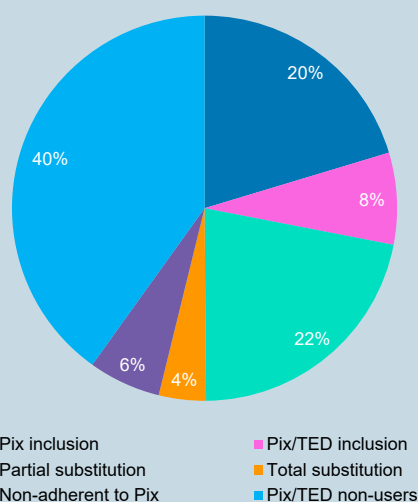
The above classification is summarized in Table 1.

Table 1 – Use of TED and Pix – Classification by groups

Nov 2019 to Oct 2020		Nov 2020 to Dec 2021		Classification
Before the Pix launch		After the Pix launch		
Use of TED	Use of TED	Use of Pix		
Yes	Yes	Yes	Yes	Partial substitution
		No	No	Non-adherent to Pix
	No	No	Yes	Total substitution
		No	No	Non-adherent to Pix
No	Yes	Yes	Yes	Pix/TED inclusion
		No	No	Non-adherent to Pix
	No	Yes	Yes	Pix inclusion
		No	No	Pix/TED non-users

Using this classification, one can observe that 60% of the adult Brazilian population (107 million people) used at least one of the two instruments and 54% (96 million people) adopted Pix (Figure 1). Among the more than 120 million people who did not use TED before Pix was launched, 36 million (20% of the adult population) started using Pix exclusively, while 13 million (8% of the adult population) started using both instruments. Considering the last group (“Pix/TED Inclusion”), one can see that there is a concentration of choices on Pix use, as the average number of Pix transactions per month is five per person while the number of transactions using TED is only 0.3 (Table 2).

Figure 1 – Classification of the adult population according to the use of TED and Pix^{1/}



Source: BCB, SRF

^{1/} Classification based on the use of Pix and TED from November 2019 and December 2021

In all groups, it is observed that TED is used for higher value transactions. The groups that used Pix presented average transaction values between BRL 171.00 and BRL 411.00, while TED transfers in the period after the Pix launch presented average values between BRL 2,047.00 and BRL 6,506.00 (Table 2). For the "Partial Substitution" group (which starts using Pix without discontinuing the use of TED), there is a 59% increase in the average TED ticket, from BRL 2,265.00 to BRL 3,601.00, while the average Pix value is the highest among all groups (BRL 411.00). The group of those not adhering to Pix presents the highest average TED values, which went from BRL 6,226.00 to BRL 6,506.00 before and after the Pix launch, respectively.

Table 2 – Use of TED and Pix by population groups

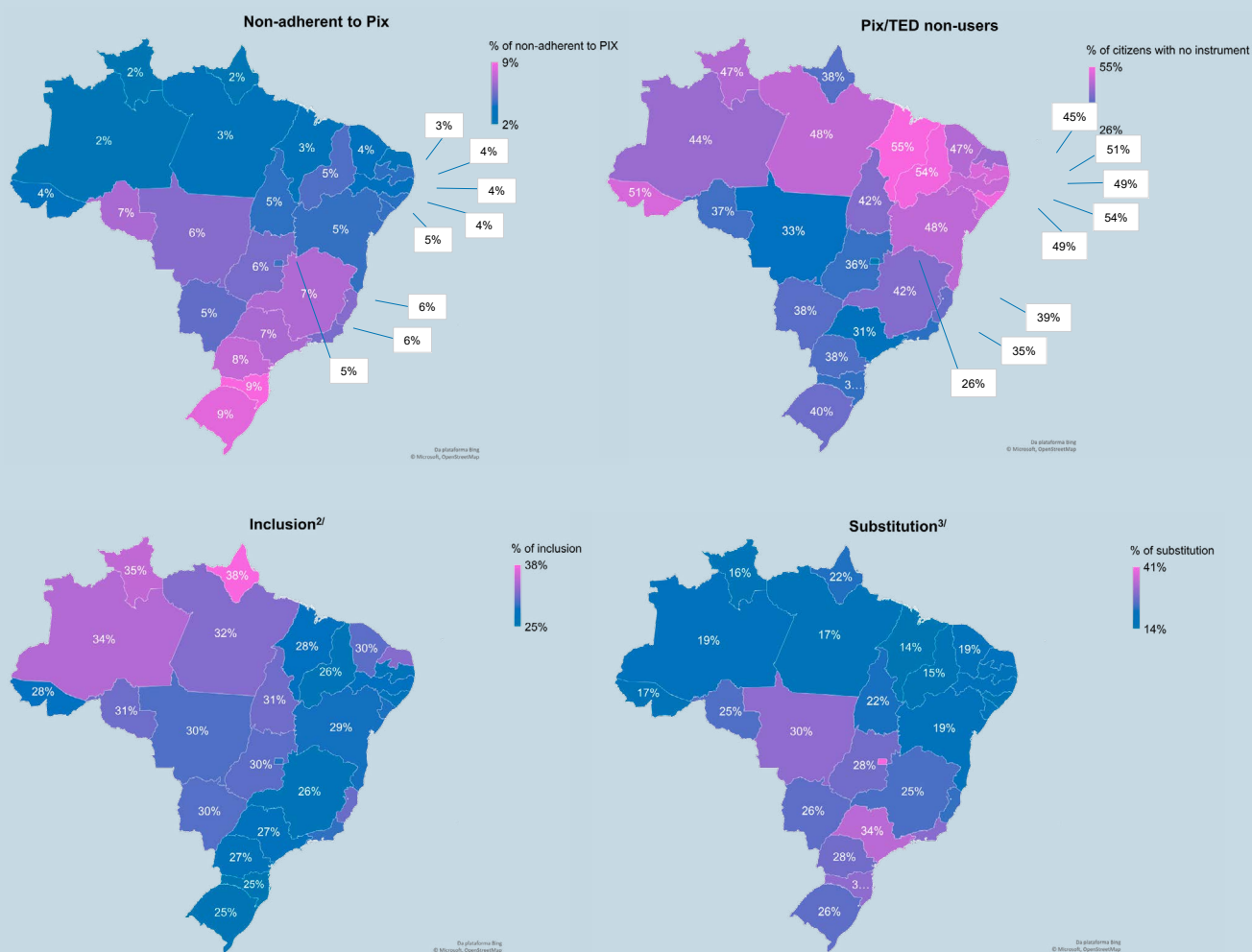
	Pix inclusion	Pix/TED inclusion	Partial subst.	Total subst.	Non-adherent to Pix
Number of individuals (million)	36	14	39	7	11
Average ticket (BRL)					
TED before	-	-	2,265	1,987	6,226
TED after	-	2,047	3,601	-	6,506
Pix	171	231	411	246	-
Average number of transactions per capita per month					
TED before	-	-	1.8	0.3	0.4
TED after	-	0.3	1.2	-	0.5
Pix	2.5	5.0	8.3	4.5	-

Sources: BCB, SRF

Regional differences in the Pix use

The North region presents the highest percentages among those who have not used TED and started using Pix (“Pix Inclusion” and “Pix/TED Inclusion” groups). Amapá stands out (38% of the population), followed by Roraima (35%) and Amazonas (34%) (Picture 1). Regarding inclusion, the Central-West and Northeast regions follow the North.

Picture 1 – Regional impact of Pix adherence^{1/}



Sources: BCB, SRF.

1/ Complete data are described in Table A.1.

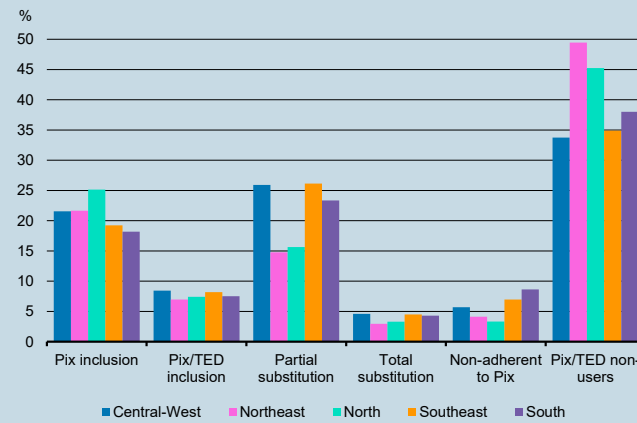
2/ The map of Inclusion does not incorporate the groups “Pix Inclusion” and “Pix/TED Inclusion”.

3/ The map of Substitution incorporates the groups “Partial Substitution” and “Total Substitution”.

The South region shows the highest percentage in the “Non-Adherent to Pix” group (9%), while the Central-West and Southeast stand out in the “Partial Substitution” group, both with 26% (Figure 2). The Federal District stands out in the “Partial Substitution” and “Total Substitution” groups, which together corresponds to 41% of adult population.

In turn, in Acre, Alagoas, Maranhão, Paraíba, and Piauí, more than half of the adult populations do not use transfer instruments (“Non Pix/TED Users” group).

Figure 2 – Regional distribution according to the use of instruments

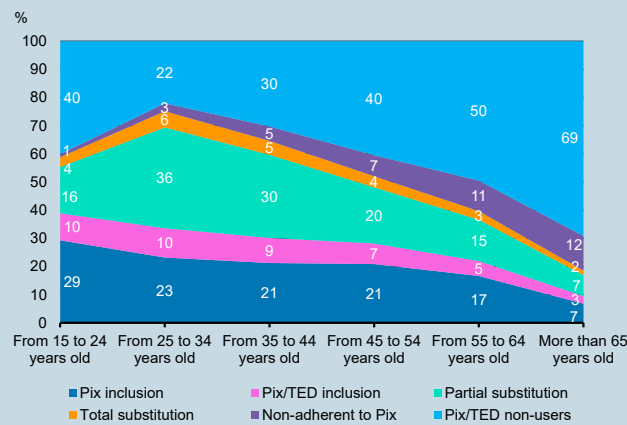


Source: BCB, SRF

The inclusion of the youngest and the low adherence among the oldest

Regarding the age aspect of the Brazilian population, except for the group between 15 and 24 years old, as the age increases, the use of TED and Pix decreases (“Non Pix/TED Users” group). And the higher the age, the lower the adoption of Pix among those who were already using TED (“Non-Adherent to Pix” group). Among the youngest, greater use of Pix is noticeable, especially by those who were not using TED before Pix was launched, as shown in the “Pix Inclusion” and “TED/Pix Inclusion” groups, with 39% of the population between 15 and 24 years old and 33% between 25 and 34 years old, respectively (Figure 3).

Figure 3 – Age range distribution according to the use of instruments

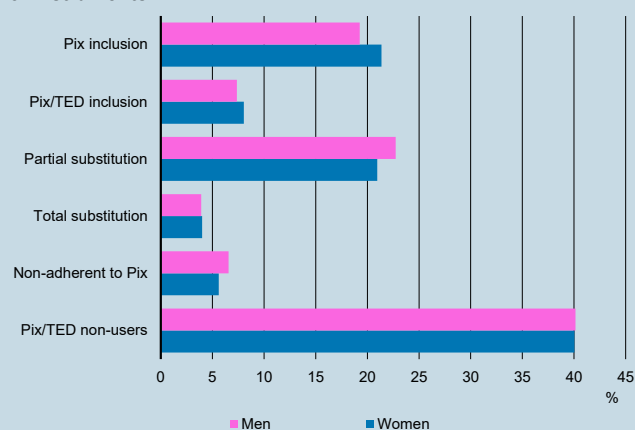


Source: BCB, SRF

Transfers made by men have higher average values

Looking at the groups from a gender perspective, the representation of men and women is marked by a small difference, although indicating greater inclusion among women (Figure 4). On average, the male ticket is higher than the female ticket in all groups, although with important differences between the groups (Table 3).

Figure 4 – Gender distribution according to the use of instruments



Source: BCB, SRF

Table 3 – Average ticket, in BRL, by gender

Group	Instrument	Gender		Variation (men/women) (%)
		Men	Women	
Pix inclusion	Pix	161	180	12
Pix/TED inclusion	Pix	205	258	26
	TED	1,804	2,306	28
Partial substitution	Pix	324	488	51
	TED	2,369	4,611	95
Total substitution	Pix	225	267	19
Non-adherent to Pix	TED	5,251	7,512	43

Sources: BCB, SRF

Socioeconomic characterization

Participation in the formal labor market⁵ (Table 4) is highly heterogeneous across Pix and TED use classifications, with a higher proportion of formally employed individuals in the “Partial Substitution” (40.3%) and “Total Substitution” (33.3%) groups. Conversely, in the group that does not use those transfer instruments, participation in the formal labor market is only 10.9%.

Regarding the compensation dimensions included in Table 4, the “Pix Inclusion” and “Pix/TED Non-Users” groups are similar and tend to have lower incomes than the other groups.

⁵ For this analysis, data from the 2019 Annual Report of Social Information (RAIS), updated by the General Registry of Employed and Unemployed Persons (Caged), were used.

Table 4 – Formal labor market^{1/}

Group	Share (%)	Average wage (m.w.)	Median wage (m.w.)	Share of formal workers (%)		
				up to 2 m.w.	from 2 up to 4 m.w.	more than 4 m.w.
Pix inclusion	19.6	2.4	1.6	63.6	24.7	11.7
Pix/TED inclusion	27.1	2.8	1.8	55.4	27.6	16.9
Partial substitution	40.3	6.0	3.1	32.4	27.0	40.6
Total substitution	33.3	3.5	2.1	46.8	29.3	23.9
Non-adherent to Pix	27.0	4.6	2.5	40.1	29.5	30.4
Pix/TED non-users	10.9	2.2	1.6	66.1	24.1	9.8

Sources: BCB, SRF, RAIS/CAGED

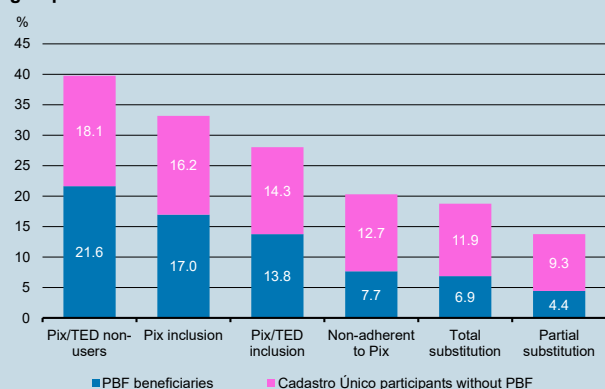
1/ Based on RAIS 2019 information updated by CAGED.

Low-income presence

Another aspect that helps in the socioeconomic characterization of the groups according to the use of Pix and TED is their participation in the Unified Registry for Social Programs of the Federal Government (*Cadastro Único*) coordinated by the Ministry of Citizenship (MC).⁶

Population registered in *Cadastro Único* has a higher participation in the group that does not use transfer instruments (“Non Pix/TED Users” group), both among the beneficiaries of *Bolsa Família* Program (BFP) and among the non-participants of this program who are registered in *Cadastro Único* (Figure 5a). Conversely, 29.9% of the participants in *Cadastro Único* did not use electronic fund transfers before the Pix launch and started to do so, and 22.6% did it only via Pix (Figure 5b).

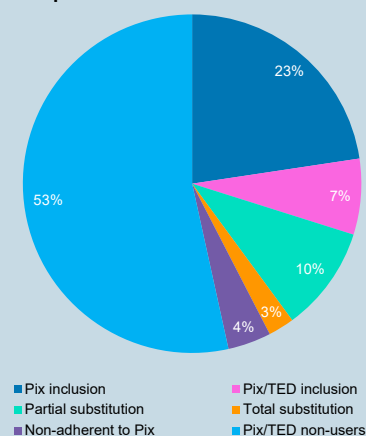
Figure 5a – Participation of the *Cadastro Único* in the groups^{1/}



Source: BCB, SRF, MC

1/ Data from *Cadastro Único* at December 2020

Figure 5b – Participation in the *Cadastro Único*^{1/}



Source: BCB, SRF, MC

1/ Data from *Cadastro Único* at December 2020

6 Families with monthly incomes of up to half a minimum wage per capita or up to three minimum wages in total are eligible for *Cadastro Único*. In addition, families that are beneficiaries of any program that requires registration in *Cadastro Único*, or are requesting it, can also be registered. A subset of this population were the beneficiary families of *Bolsa Família* Program (BFP), which existed until 2021. All families with per capita income of up to BRL 89.00 per month (extreme poverty) and those with per capita income between BRL 89.01 and BRL 178.00 per month (poverty) could participate in the program, provided they had children from 0 to 17 years old. Sources: <https://www.gov.br/pt-br/servicos/inscrever-se-no-cadastro-unico-para-programas-sociais-do-governo-federal> and <https://www.gov.br/cidania/pt-br/acoes-e-programas/bolsa-familia>. Access on: Jan 3, 2022.

Increased use of credit by included people

In the month Pix was launched, the groups that least used credit were “Non Pix/TED Users” (30.5%), “Pix Inclusion” (37.7%) and “Pix/TED Inclusion” (50.8%) – Table 5. However, the groups with new users of electronic transactions were those in which there was the greatest growth in the percentage of borrowers in the following months, reaching 13.3 p.p. in the “Pix Inclusion” group and 18.4 p.p. in the “Pix/TED Inclusion” group. The percentage of borrowers in the latter group surpassed that of the “Non-Adherent to Pix” group in September 2021 (Figure 6).

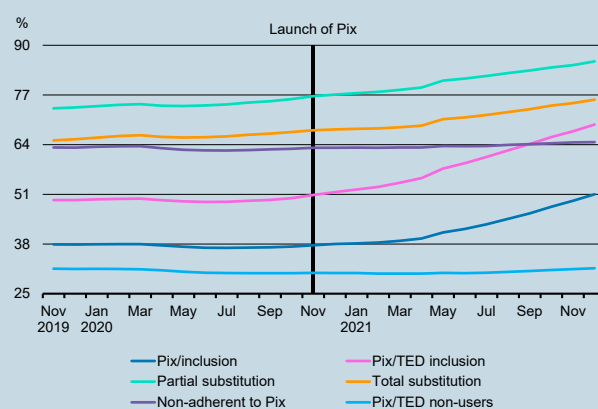
Table 5 – Participation in the credit market^{1/}

Group	Borrowers (%)			Difference (p.p.)	
	Nov 2019	Nov 2020	Dec 2021	Nov 2020 x Nov 2019	Dec 2021 x Nov 2020
Pix inclusion	37.9	37.7	51.0	-0.2	13.3
Pix/TED inclusion	49.5	50.8	69.3	1.3	18.4
Partial substitution	73.5	76.7	85.8	3.2	9.1
Total substitution	65.1	67.8	75.8	2.7	8.0
Non-adherent to Pix	63.3	63.2	64.7	-0.1	1.5
Pix/TED non-users	31.6	30.5	31.7	-1.1	1.2
Population	46.6	47.0	54.1	0.4	7.0

Sources: BCB, SRF

1/ Individuals with outstanding balance.

Figure 6 – Percentage of individuals with outstanding balance



Source: BCB, SRF

The available data do not allow establishing a causal relationship, that is, it is not possible to say that Pix has increased access to credit, nor that the need for credit has encouraged the Pix use. There is, however, a greater increase in the access to credit among the groups that were included (fully or partially) via Pix. This suggests complementarity between payment services and access to credit.

Approximately one third of the individuals classified as “Non Pix/TED Users” have outstanding credit operations with at least one financial institution. It is important to remember that part of these transactions is credit cards purchases (either spot or non-interest-bearing installments), having characteristics of both payment and credit instruments.

After the Pix launch, when credit categories are analyzed, the growth in participation of the two inclusion groups and of the partial substitution group (Figures 7 to 10) is perceptible.

Figure 7 – Percentage of individuals with credit card purchases either spot or non-interest-bearing installments

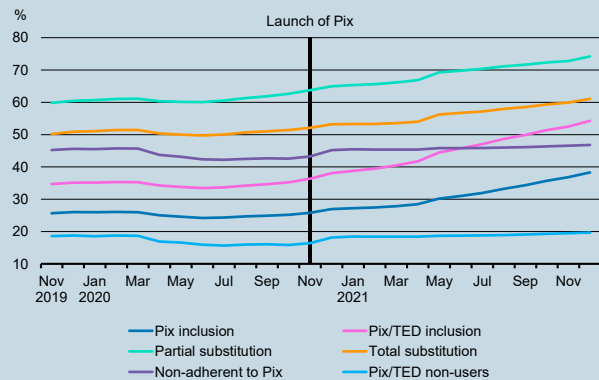


Figure 8 – Percentage of individuals with credit card purchases either with revolving or interest-bearing installments

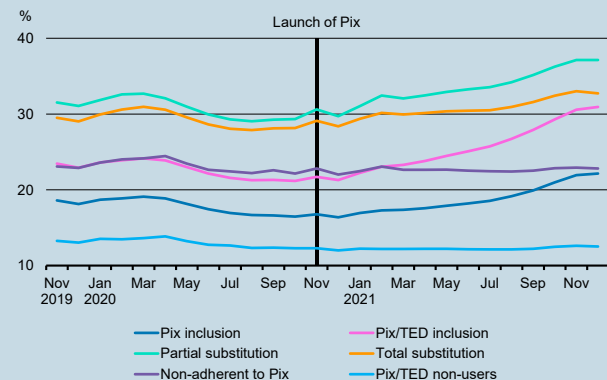


Figure 9 – Percentage of individuals with overdraft facility

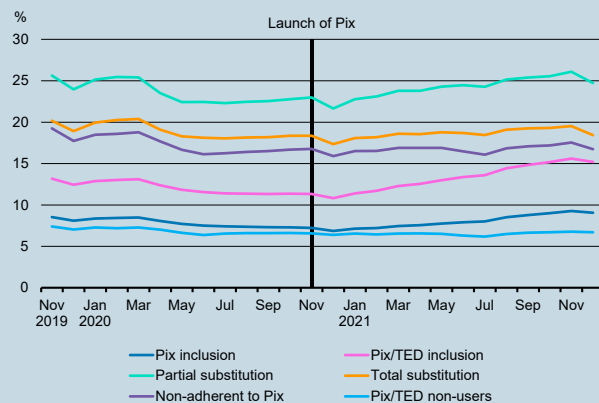
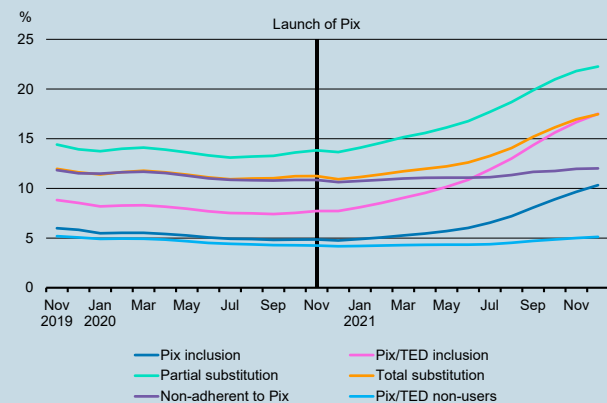


Figure 10 – Percentage of individuals with non-payroll-deducted personal credit



Conclusion

In this box, it was found that Pix played a prominent role in the inclusion of a large part of the Brazilian population regarding the use of digital transfer instruments. In regional terms, the North was the region that presented the greatest inclusion, besides being the region that still has the highest rates of people without access to transfer instruments.

Regarding the age aspect, it was found that younger people showed greater Pix adoption. Adherence decreases as age increases. Although evenly distributed among the groups using the transfers instruments, women had a stronger inclusion process.

A strong replacement of TED by Pix was observed, as well as a clear difference in the average values transacted using the instruments, with Pix being used for lower values.

On average, the portion of the population that started using Pix and was not using TED had lower income than the groups that were already using TED. The group that started using Pix and was not using TED also had lower participation in formal labor market, lower wages among those formally employed, as well as higher

participation in the groups included in *Cadastro Único*, both as beneficiaries of *Bolsa Família* or not. The size of these groups of new users of electronic transfers is similar to the size of the groups that were already using TED and began to use Pix. This may indicate that the SPB has taken an important step when offering this new service, considering that adhesion is an indication that this service is more appropriate for these groups than the services previously offered. In turn, the population that does not access electronic transfer instruments tends to have a lower income than the population included by Pix.

Additionally to the expansion of the public using electronic transfer instruments with the inclusion of lower income population, credit use by the groups included by Pix expanded substantially. Although it is not possible to state that there is a causal relationship at this point, the analysis suggests that Pix incentivized the relationship with the SFN, thus functioning as a gateway to the use of other financial services. Such a causality evaluation, in experimental or quasi-experimental contexts, would be of great use for a better understanding of this phenomenon.

Annex

Table A.1 – Distribution of groups by state^{1/}

Region	State	Pix inclusion	Pix/TED inclusion	Partial substitution	Total substitution	Non-adherent to Pix	Pix/TED non-users	%
North	Amapá	29.6	8.0	18.1	4.2	2.1	37.9	
North	Roraima	27.4	7.4	13.3	3.2	2.0	46.7	
North	Amazonas	26.7	7.5	15.8	3.7	2.2	44.1	
North	Pará	25.1	7.0	14.1	2.8	2.9	48.2	
Northeast	Rio Grande do Norte	24.5	7.6	16.5	3.6	3.2	44.6	
Northeast	Ceará	23.5	7.0	15.7	3.2	3.7	46.9	
North	Tocantins	23.1	8.1	18.3	3.8	4.5	42.1	
North	Rondônia	22.5	8.7	20.9	4.2	7.2	36.5	
Central-West	Goiás	22.1	8.4	23.3	4.3	6.0	35.9	
Central-West	Mato Grosso do Sul	22.0	8.2	21.8	4.2	5.4	38.3	
Northeast	Maranhão	21.9	6.4	11.3	2.6	3.2	54.7	
Northeast	Sergipe	21.7	7.0	14.4	3.0	4.6	49.3	
North	Acre	21.7	6.8	13.9	3.3	3.7	50.8	
Northeast	Pernambuco	21.5	6.8	15.8	2.9	4.1	49.0	
Northeast	Bahia	21.3	7.3	15.8	3.1	4.6	47.9	
Southeast	Espírito Santo	21.1	9.9	19.8	3.6	6.3	39.4	
Central-West	Distrito Federal	21.1	7.7	35.1	5.9	4.7	25.5	
Southeast	Rio de Janeiro	20.9	8.2	25.5	4.2	6.0	35.2	
Central-West	Mato Grosso	20.7	9.3	26.0	4.2	6.3	33.5	
Northeast	Paraíba	20.1	6.7	15.1	2.7	4.5	51.0	
Northeast	Alagoas	19.8	6.8	12.8	2.5	4.4	53.7	
Northeast	Piauí	19.3	6.7	12.4	2.8	5.1	53.7	
South	Paraná	19.0	7.7	23.4	4.3	7.9	37.6	
Southeast	São Paulo	18.9	8.4	29.3	5.1	7.2	31.2	
Southeast	Minas Gerais	18.4	7.5	21.0	3.7	7.4	42.1	
South	Rio Grande do Sul	18.1	7.2	21.9	4.1	8.8	39.8	
South	Santa Catarina	16.9	7.8	25.7	4.5	9.5	35.6	

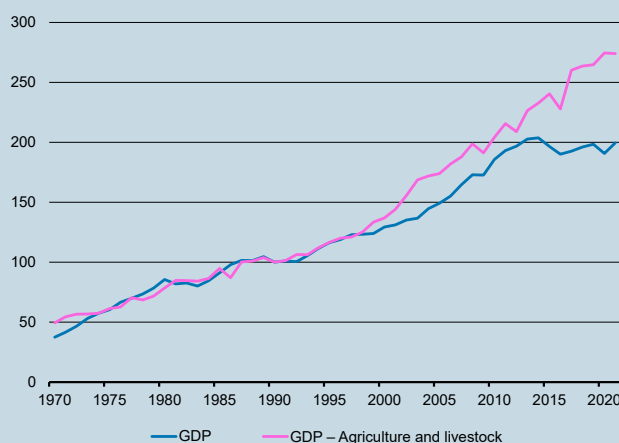
1/ Decreasing order according to the Pix inclusion column

Recent changes in the Brazilian rural credit

In the last 40 years, Brazil has gone from being a food importer to an exporter of agricultural products, with significant increases in agricultural production and productivity. Besides playing a prominent role in the export of agricultural commodities, the production of animal and plant products in rural areas exceeds four hundred products from agriculture in its different scales and sizes of productive units.

Since 1999, the growth of the agriculture and livestock sector has been higher than the evolution of GDP (Figure 1). The growth of national agricultural and livestock production is driven by the domestic market, by international demand and by gains in productivity.¹ The dynamism of Brazilian agriculture is accompanied by profound changes – economic, cultural, social, technological, environmental, and market – that occur at high speed and in different directions, which substantially impact the rural world. Accompanying these transformations, the financing of activities in the agricultural sector is modernizing in terms of its sources, instruments, and effectiveness.

Figure 1 – Evolution of the GDP and the agriculture and livestock sector
1990 = 100



Rural credit is a type of credit aiming to finance the regular expenses of the production cycles of agricultural, livestock, forestry, extractive, fishing and aquacultural activities, as well as investment in goods and services, and the expenses in the commercialization and industrialization of the production carried out by the rural producer, whether a household or a company, and the operations with these purposes carried out with agricultural cooperatives.

Rural credit operations are financing operations, classified according to the purpose of use of their resources in funding, investment, commercialization and industrialization. Funding operations cover regular expenses linked to

¹ BRAZIL. Ministry of Agriculture, Livestock and Supply. *Projeções do Agronegócio: Brasil 2020/21 a 2030/31: projeções de longo prazo*. Brasília, DF, 2021. Available at: <https://www.gov.br/agricultura/pt-br/assuntos/politica-agricola/todas-publicacoes-de-politica-agricola/projecoes-do-agronegocio>. (Portuguese only).

one or more production cycles. Investment operations are destined to the acquisition of goods and services whose returns will take place over the course of several production cycles. Commercialization operations, separately or as an extension of the funding, cover the expenses of the phase that follows the production harvesting, its storage, transport, or those related to the monetization of securities resulting from the sale of products by the producers. Finally, industrialization operations cover the expenses with the transformation of the primary product obtained by the rural producer's or the agricultural cooperatives' production.

This box aims to present a brief overview of the evolution of rural credit, as well as the new compliance model adopted as of 2021, which is supported by new georeferencing technologies and by regulatory simplifications. The new System of Consultation and Authorization of Access to Rural Credit Operations (CACR), which allows rural producers greater transparency and ease of access to resources to finance their production, both inside and outside the financial system, is also highlighted.

Funding for rural credit

Funding for rural credit is divided into controlled resources and non-controlled resources.

Controlled resources are those in which the National Monetary Council (CMN) sets the maximum term, the amount of resources to be accessed and the interest rate of the rural credit operation.

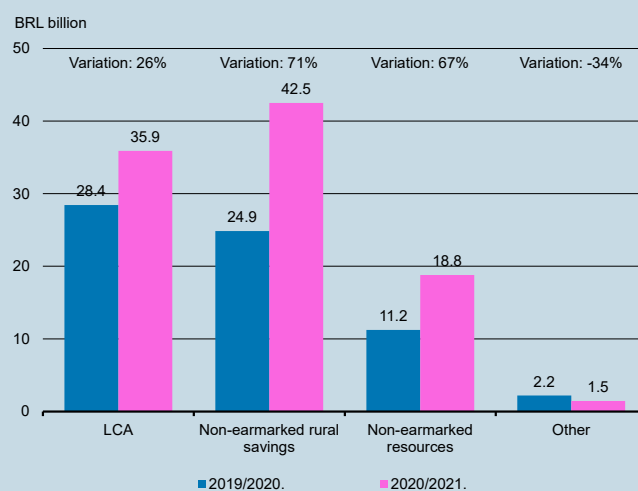
Non-controlled resources are those in which the conditions of the rural credit operation are freely agreed upon between the financial institution and the rural credit beneficiary.

A dynamic market

Rural credit granting grew by 29% in the 2020/2021 agricultural year compared to 2019/2020, reaching the amount of BRL 245 billion. Operations with non-controlled resources increased significantly (48%) comparing the two agricultural years.

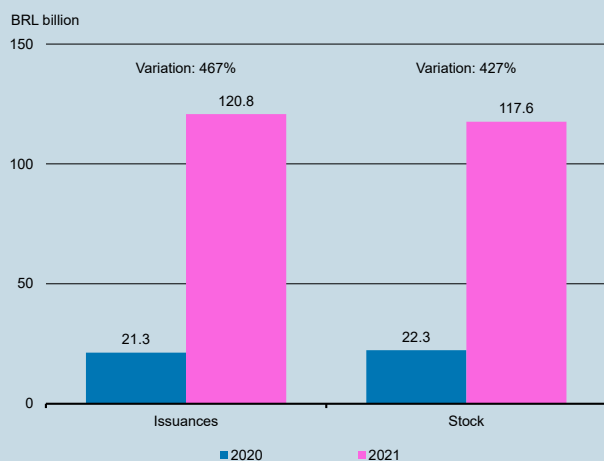
Among the funding of non-controlled resources, the growth of 71% of the Free Rural Savings Account and 67% of the operations with non-earmarked resources (Figure 2) stand out.

Figure 2 – Uncontrolled sources of resources



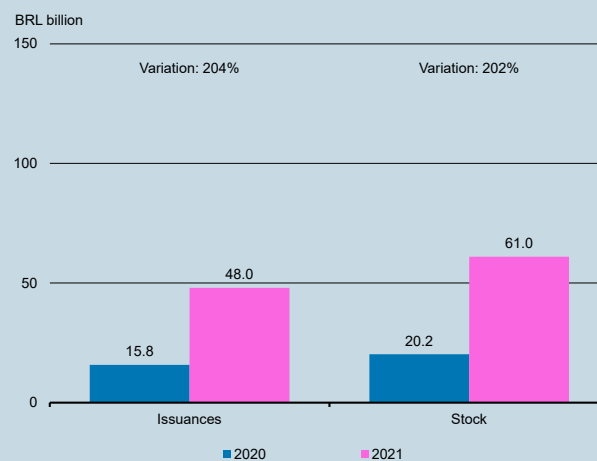
Despite the growth of rural credit operations with funding of non-controlled resources, the growth in the use of capital market instruments was even more significant. The expansion in the issuance and stock of Rural Product Notes (CPR) was over 400%, and that of Agribusiness Receivables Certificates (CRA) exceeded 200% in the comparison between 2020 and 2021 (Figures 3a and 3b).

Figure 3a – CPR by issuance year^{1/}



^{1/} Stock values relative to December 31 of the respective year.

Figure 3b – CRA by issuance year^{1/}



^{1/} Stock values relative to December 31 of the respective year.

It is expected that the development of capital market instruments as funding for agribusiness will continue in the coming years. Moreover, there are expectations of greater dynamics in the market with the entry of new players and arrangements to finance agribusiness, such as agrofintechs and sustainable project finance funds.

The new model of rural credit portfolio compliance by the financial institutions

As determined by item III of article 10 of Law 4.829, of 1965, the rural credit operations are subject, among others, to the requirements of inspection carried by the financial institution. Historically, regulation regarding the topic was prescriptive as to the form of supervision, determining, for example, the requirements of direct supervision in all high-value operations and sampling inspections, in a percentage established by the CMN, for low-value operations.

As of 2018,² regulation regarding the supervision of use of rural credit resources has incorporated principle-based characteristics, allowing greater autonomy in the choice of supervision methods by the institution granting the credit, including sampling criteria. CMN has also granted greater autonomy to the BCB to undertake corrective measures in its supervisory actions.

Rules regarding the sampling and the definition of groups of operations that should be inspected were revoked by CMN in 2021. On the other hand, lenders were required to manage compliance risks of their rural credit portfolios based on consistent, verifiable, and assessable methods.³ Thus, rural credit portfolios with distinct risk profiles can be evaluated through monitoring and supervision techniques more appropriate to the lending profile of the financial institution.

² Resolution CMN 4,641 of February 22, 2018.

³ Resolution CMN 4,895 of February 26, 2021.

In line with new technologies available to control rural credit operations, which allow a higher efficiency, CMN has regulated monitoring activities – which differ from inspection. While inspection activities are conceptually linked to the act of verifying, after contracting, the adherence of predetermined operations to the several requirements applicable to rural credit granting, monitoring is associated to practices related to the previous evaluation and follow-up of operations, such as mapping the rural credit portfolio composition, crossing-checking of data and information, the use of indicators, irregularity risk alert generation, among others.

Regulatory innovation, by making mandatory the monitoring of rural credit portfolios by financial institutions, guides the market to the adoption of a set of actions and strategic activities related to the identification, management and prevention of factors that may increase the risk of rural credit operations, based on proactive risk management systems.

New technologies: geodesic coordinates and remote sensing

The new model of compliance of the rural credit portfolio by financial institutions and the BCB has new technologies – especially the use of georeferencing and remote sensing technologies, which are developing very quickly – as an important support in. New remote sensing technologies, present in the aerospace and military areas, are gaining more and more relevance in the agricultural sector, allowing the advancement of precision agriculture and the increase of productivity in rural areas.

Aiming to adapt the regulatory framework to technological developments, CMN started in 2012 an explicit introduction of such technologies in the regulation of rural credit, allowing the optional inclusion of geodesic coordinates (GCs) data in agricultural crop funding ventures.⁴

With the expansion of the use of these technologies in Brazilian rural areas, as of 2016, a phased requirement that financed areas GCs must be included in the budget, plan or project related to agricultural funding operations and some types of investment – such as afforestation, reforestation, permanent crops and pasture formation or recovery was established.⁵ Furthermore, the use of remote sensing as a way to monitor the application of rural credit resources was authorized.

Therefore, financing agents and the BCB supervision teams were able to use geoprocessing tools and satellite images for monitoring and inspection. These tools enhanced the efficiency of risk mitigation regarding financing duplication and misuse more efficiently, through a series of controls and checks in the System of Rural Credit and Proagro Operations (Sicor).

Since then, rural areas have continuously advanced in the use of georeferencing technologies. Since CMN Resolution 4,829, of June 18, 2020, presentation of GCs for all rural credit operations of funding and investment in agricultural or livestock activities⁶ linked to the delimited area of the rural property, regardless of the value, size of the area of the enterprise or source of resources is mandatory.

4 Resolution CMN 4,174 of December 27, 2012.

5 Resolution CMN 4,427 of June 25, 2015.

6 Excluding Rural Microcredit.

Based on the know-how acquired over the years by BC and financial institutions teams, several partnerships with public and private entities⁷ are being established to integrate Sicor with other georeferenced databases of great social, environmental and climatic relevance. In the future, this will allow even greater advances in risk control, monitoring and inspection of rural credit operations.

Regulatory simplification – consolidation of applicable rural credit rules

The CMN is responsible for the infra-legal regulation of rural credit and, subsidiarily, the BCB. Infra-legal regulations codified in the Rural Credit Manual (MCR) grew significantly in complexity over decades, and by the end of April 2021, the MCR contained 15 chapters and 13 documents, totaling 483 pages of regulations.

Recognizing the importance of reducing costs and legal uncertainty arising from the complexity of regulation, the BCB has started in 2016 to simplify rural credit rules with the support of the Secretariat of Economic Policy of the Ministry of Economy (SPE/ME). This initiative was further strengthened with the edition of Decree 10,139, of November 28, 2019, which established the obligation of agencies and entities of the direct, indirect and foundational federal public administration to review and consolidate the normative acts issued within the scope of their respective jurisdiction.

The revision, concluded in 2021, resulted in a lighter structure for the MCR, which contains today twelve chapters and eight documents distributed in 293 pages of normative commands, reducing the complexity of compliance for financial institutions.

Transparency – Open Finance in rural credit

To reduce information asymmetry and costs to borrowers of credit for agricultural and livestock activities, a consultation and authorization system is under development – the Consultation and Authorization System for Access to Rural Credit Operations (CACR).

In October 2021, within the scope of this project, financial institutions were able to directly consult Sicor for information regarding rural credit operations carried out by other institutions, if previously authorized by the borrower.

The second phase of the system's implementation will allow, as of May 2022, holders of rural credit operations to share data on their operations with any market agent registered on the platform.

CACR will allow the construction of a more competitive environment among financing agents and, for the rural credit beneficiary, easier access to financial resources needed for rural ventures.

7 Brazilian Forest Service (SFB – <https://www.gov.br/mma/pt-br/noticias/brazilian-forest-service-enters-the-iberoamerican-model-forest-network>), National Institute of Colonization and Agrarian Reform (Incra - <https://agris.fao.org/agris-search/search.do?recordID=US201300367638>), Ministry of Science, Technology and Innovations (MCTI), Ministry of Justice and Public Safety (MJSP), Arapyaú Institute, National Indian Foundation (Funai – <https://www.hrw.org/news/2021/04/06/brazil-open-letter-human-rights-watch-national-indian-foundation-funai>), Brazilian Institute of Environment and Renewable Natural Resources (Ibama – http://www.abc.gov.br/training/informacoes/InstituicaoIBAMA_en.aspx), Chico Mendes Institute for Biodiversity Conservation (ICMBio – <https://cites.org/eng/node/110851>) and others.

BC# Sustainability – legal and infralegal compliance in rural credit

Resolution BC 140, of September 15, 2021, consolidated in the MCR impediments to grant rural credit in force, already existing in laws or infralegal norms dealing with social and environmental requirements, bringing even more transparency to financial institutions and rural credit beneficiaries.

Resolution BC 140 establishes that the Environmental Rural Registry (CAR) is compulsory for rural credit contracting, presents the rules that forbid overlapping of the contracted areas with conservation units, indigenous or *quilombola* lands, and embargoed areas, as well as those prohibiting credit contracting by households or companies registered in the registry of employers that have kept workers under conditions analogous to slavery.

Conclusion

The growth of agriculture and livestock activities, driven by technological innovations, has brought an important highlight to this economic sector. Accompanying this growth, the environment to finance the agricultural sector has been modernized, especially rural credit.

Recent innovation promoted by the BCB have contributed to simplify access of rural producers to the resources needed for their activities, reducing compliance costs to financial institutions, and allowing a greater efficiency in the allocation of resources in the Brazilian agribusiness chain.

Evaluation of the protective varnish on Brazilian real banknotes

Introduction

Weather conditions and handling habits result in banknotes absorbing dirt, which increases the speed of wear and tear. This leads to the need for banknotes replacement in a short period of time, a costly procedure.

To protect banknotes from dirt and to extend their lifespan, many issuers have applied a protective varnish. According to studies by other issuers,¹ the increase in banknote lifespan provided by this protective varnish varies according to climate conditions and handling habits in each country, as well as the characteristics of the varnish. In general, these studies indicate a 20% to 70% increase in banknotes lifespan. BRL 2.00 and BRL 5.00 bills of the second family of the Brazilian real (BRL) are coated with this protective varnish.

The purpose of this box is to evaluate whether the application of a layer of protective varnish on banknotes increases the lifespan of the banknotes due to increased protection against dirt. This evaluation is an important input to the analyses of reducing the costs of replacing old banknotes. Previous studies by other banknote issuers have been based on controlled experiments, with samples of varnished and unvarnished banknote in different demographic regions. As no similar experiment was conducted in Brazil, a representative sample of banknotes in circulation across the country was evaluated. All the BRL 2.00 or BRL 5.00 the banknotes are varnished, making it impossible to compare varnished or unvarnished banknotes of BRL 2.00 or BRL 5.00. Therefore, the study compares the lifespan of varnished BRL 5.00 banknotes against unvarnished BRL 10.00 banknotes due to the similarity of lifespan and usage. This setup allows an assessment of the minimal effect of coating with varnish.²

Data collection

To measure and compare the lifespan of banknotes, a sampling plan was developed to ensure that the sample was representative of the money in circulation in the country. The sample was comprised of 4,500 banknotes, but the number was later reduced to 4,467 due to losses in the collection process. Of these, 2,232 were BRL 5.00 bills and 2,235 were BRL 10.00 bills. To ensure a nationally representative sample, the 4,225 branches of the custodian bank active in September 2018 were grouped according to the level of average cash movement, geographic region, and location (capital or countryside) and drawn proportionally to their participation in the cash movement of their group. Overall, 751 branches were randomly selected from which three banknotes of each type were collected (totaling twelve banknotes per branch).³

1 For instance, see Candela *et al.* (2009), Candela *et al.* (2014) and *National Bank of Poland* (2016).

2 The level of wear and tear between banknotes of different denominations is distinct. The choice of the denominations of BRL 5.00 and BRL 10.00 aimed to allow an evaluation of the effect of the use of varnish in banknotes with the most similar lifespan possible. According to a survey of the banknotes of the first family of the BRL, in which there was no varnish, the time for a BRL 5.00 banknote to reach wear and tear level 4 was 12.4 months, while for a BRL 10.00 banknote this time was 13.9 months.

3 Further details can be found in Koyama, Oliveira, Silveira, Monteiro, Quintella and Vieira (2021) at <https://www.bcb.gov.br/pec/wps/ingl/wps560.pdf>.

The sample banknotes were visually classified according to their wear and tear level, following a 6-level rank being level 4 the cut-off level, *i.e.*, in which the banknote should ideally be withdrawn from circulation.

Figure 1 - Classification of banknotes according to the wear and tear level



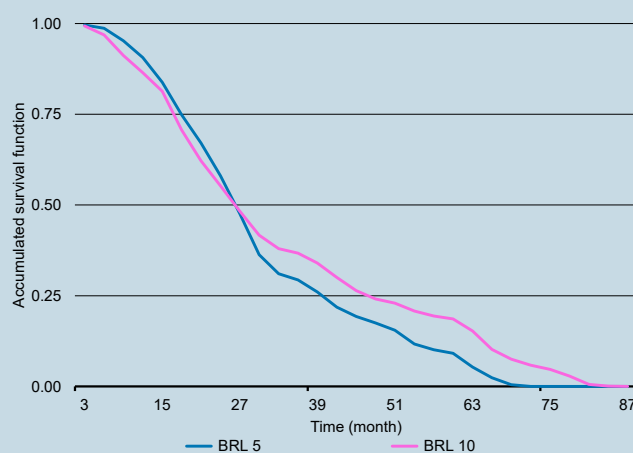
The banknote series number allowed the identification of its issue date using BCB's datasets. The issue date refers to the date in which the custodian delivered the banknote to another financial institution or to its own branches.

Results

The accumulated survival function shows the probability, at each moment, of a banknote showing a wear and tear level below 4 (survival)⁴. Thus, a function with a slower decay indicates longer “duration” of the banknote.

The nationwide comparison of the accumulated survival functions of the varnished BRL 5.00 bills and unvarnished BRL 10.00 bills, estimated by Kaplan-Meier (Figure 1), shows different curve behaviors ($p < 0.001$). Until approximately two years of circulation, the BRL 5.00 bills show less wear and tear – although quite similar – than the BRL 10.00 bills. Subsequently, there is a rapid drop in the survival function of varnished banknotes, inverting the previously observed pattern.

Figure 1 – Kaplan-Meier accumulated survival function



To evaluate the effect of varnish, controlled by geographic region, type of location (capital or countryside), and size of the bank branch (subdivided into quartiles), a Cox regression model was adjusted, considering as the outcome event the classification in wear and tear levels equal to or greater than 4:

$$\lambda_{irlp}(t) = \lambda_{0,rlp}(t) \cdot \exp\{\beta V + \gamma_1 R_r + \gamma_2 L_l + \gamma_3 P_p\},$$

where:

$\lambda_{irlp}(t)$ is the risk function of the i -th banknote obtained in the r -th region, l -th type of location and in the p branch size reaching wear and tear levels 4, 5, or 6.

V is an indicator variable for the application of the varnish in the i -th banknote obtained in the r -th region, l -th type of location and in the p branch size.

R_r is a variable indicative of the region of the i -th banknote.

L_l is a variable indicating the type of region of the i -th banknote.

⁴ That is, $P(T > t)$, where T is the time for a banknote to reach the wear and tear level 4. Thus, the survival function measures the probability that the time for circulation withdrawal is greater than a certain time t . For this calculation, both the grades with a rating greater than or equal to 4 (wear and tear level) and those with a lower rating (censorship) were considered.

P_p is an indicator variable for the size of the branch of the i -th banknote.

In the Cox model, the survival function is expressed in terms of the hazard function, and it is interpreted in terms of a ratio of the hazard functions (HR – hazard ratio). In this study, this ratio is the chance that a banknote will reach wear and tear levels 4, 5 or 6. The Cox model assumes the existence of proportional hazards, which was violated for the variables' geographic region and use of varnish. The solution to this problem is to include interactions of these variables with time, according to the model below:⁵

$$\lambda_{irlp}(t) = \lambda_{0,rlp}(t) \cdot \exp\{\beta V + \gamma_1 R_r + \gamma_2 L_l + \gamma_3 P_p + \delta V \cdot I_t + \delta R_r \cdot I_t\},$$

where

I_t is a variable indicative of the t -th time.

The varnish has proven to be a protective factor when the banknotes go into circulation, making the hazard of wear and tear 38% lower (Table 1). However, as the varnish effect decreases over time (interaction between varnish and time), varnished and unvarnished banknotes show no difference after 24 months.

At the beginning of the circulation, the Northern and Northeastern regions presented the highest hazards of wear and tear compared with the Southeastern region (approximately five times higher). However, this difference reduces at a rate of 3% per month (p.m.). The Central-West presented a higher hazard than the Southeast (2.09 times), with an approximation rate of only 1% p.m. By contrast, the Southern region presented a wear and tear risk 57% lower than that of the Southeastern region and a 2% p.m. reduction of this advantage. The location type and the branch size, used as control variables, had no significant effect on the final model.

5 Further details at Koyama, Oliveira, Silveira, Monteiro, Quintella, Vieira (2021).

Table 1 – Cox model – Varnish effect

	Adjusted HR (IC 95%)	P
Varnish (ref.= R\$10)	0.62 (0.54 - 0.72)	<0.001
Region (ref.= Southeast)		<0.001
North	4.99 (3.88 - 6.41)	<0.001
Northeast	5.17 (4.20 - 6.37)	<0.001
South	0.43 (0.33 - 0.55)	<0.001
Central-West	2.09 (1.63 - 2.69)	<0.001
Capital (ref.=Inland)	-	-
Size (ref.= 1st quartile)		0.137
2nd quartile	1.06 (0.86 - 1.31)	0.588
3rd quartile	1.16 (0.95 - 1.42)	0.150
4th quartile	1.18 (0.97 - 1.44)	0.094
GDP	-	-
Interaction region x time		
North	0.97 (0.96 - 0.98)	<0.001
Northeast	0.97 (0.97 - 0.98)	<0.001
South	1.02 (1.01 - 1.02)	<0.001
Central-West	0.99 (0.98 - 1.00)	0.017
Interaction varnish x time	1.02 (1.02 - 1.03)	<0.001

Conclusions

This study aimed to evaluate the efficacy of the protective varnish coat in the BRL 5.00 bills of the second family of the BRL, identifying possible differences regarding wear and tear and lifespan between varnished and unvarnished banknotes.

Varnished BRL 5.00 bills and unvarnished BRL 10.00 bills were compared. Survival analysis has shown that the varnish is a protective factor for the banknotes, reducing the hazard of wear and tear. However, the varnish protection loses efficiency over time and, after 24 months, there is no longer protective difference between varnished and unvarnished banknotes. This result is consistent with other studies conducted by other issuers, such as the study of the Bank of Mexico, which identified a protective varnish effect, although with a lower magnitude than the one observed (8.2% and 16.2% depending on the type of paper used) (Candela *et al.*, 2014).

The study of the National Bank of Poland identified an increase in the lifespan of varnished banknotes around 26.8% to 33.14% (National Bank of Poland, 2016).

In regional terms, compared to the Southeastern region, the Northern, Northeastern, and Central-western regions have hazard of banknote wear and tear up to five times higher, while the Southern region has a lower hazard of wear and tear. These results suggest that the Brazilian territory has very different circulation conditions, probably related to differences in climate, handling habits, and access to electronic means of payment. However, the study reveals that regional differences related to the wear and tear risk tend to reduce throughout the period of circulation of banknotes.

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Annex A – Definitions – Chapter 1

The definitions below were used in Chapter 1 and are based on data of the Credit Information System (SCR) from the BCB, considering the period between December 2020 to December 2022.

Credit

Original lender: institution with which the client already has the contracted operation.

Delinquency: result of the ratio of the sum of operations with installments overdue for more than 90 days to the sum of all credit operations granted. The sum of credit –including overdue and not yet due installments– is deemed to be delinquent if there are installments overdue for more than 90 days. This process, called hauling (*arrasto*), assumes that the debtor in such a situation will not pay the not yet due installments while there are installments overdue for more than 90 days.

Credit type: subtypes of credit within the SCR, whose description may be found in the document “*Instruções de Preenchimento do Documento 3040*” (Document 3040 filling instructions), available at: http://www.bcb.gov.br/fis/crc/ftp/SCR_InstrucoesDePreenchimento_Doc3040.pdf. Related subtypes were grouped, for the sake of simplicity.

Identified operations: when the same client operations sum up an amount over R\$200.00¹ in a single FI, the operation is identified at the SCR, meaning that both client and operation are individualized, and their information is detailed. When the sum does not surpass R\$200.00, the information is aggregated without identification of client or operation. The indicators herewith presented were built based on identified operations, which comprise most of the credit operations within the SFN.

Credit portability: The client may request the transfer of credit operations (loans and financing) and leasing from one financial institution to another, upon early settlement of the operation at the original institution by the new financial institution. The terms of the new transaction must be negotiated between the customer himself and the institution that will grant the new credit.

Proposer: Institution offering new credit to which the operation will be ported.

Number of loans granted: a number of credit operations contracted and effectively realized, which have outstanding installments at the reference date, overdue or not yet due. The number of operations encompasses not only grants performed on the reference date, but also the outstanding credit stock on that date, regardless of the date the loan was granted.

1 Value in force since June 2016, as per Circular 3,567 of December 12, 2011, modified by Circular 3,786 of March 10, 2016.

Number of borrowers: number of clients with outstanding credit operations (outstanding portfolio, as aforementioned). Individuals or companies that: i) reside abroad; or ii) do not have a Corporate Taxpayer Register Number (CNPJ) or an Individual Taxpayer Register Number (CPF) – whose values, in any case, are not very expressive – were disregarded.

Reimbursement of Loan Origination Fees (RCO) is a compensation paid by the proposer to the original creditor when portability is granted. The value is defined by the Portability Management Committee (self-regulation), in accordance with the credit type and value ported. The cost for payroll-deducted loans is relatively higher than the other credit types in all the delimited bands of outstanding debt balance, taking the band's average value as reference.

Credit portfolio balance: is equivalent to the total of the outstanding portfolio, that includes both overdue and not yet due installments, and excludes operations accrued as losses. The active portfolio encompasses not only grants performed on the reference date, but also the outstanding credit stock on that date, regardless of the date the loan was granted.

Granting segment: a segment of financial institutions that grant credit operations.

Banking segment: independent banks (excluding credit unions) and financial institutions that grant credit and are part of a conglomerate bank.

Non-banking segment: credit unions, cooperative banks, and financial institutions that are not part of a bank conglomerate (the so called “independent FI”): economic development agencies, saving and loans associations, mortgage companies, leasing companies, credit companies to micro-entrepreneurs and small business, credit, financing, and investment companies, and on-lending real estate financing companies.

Origin of resources

Non-earmarked resources: refer to loans granted with interest rates agreed between financial institutions and borrowers (market interest rates). In non-earmarked operations, the financial institutions decide how to apply the funds raised in the market.

Earmarked resources: operations regulated by the National Monetary Council (CMN) or linked to budgetary resources to foster the long-term and mid-term production of goods and investment in the real estate, housing, rural and infrastructure segments. Resources come from a part of the on-demand deposits and savings accounts, and from public funds and programs. The Production-Oriented Microcredit National Program (PNMPO) is an example.

Annex B – Chapter 1

Table A – Balance of household credit operations by state

BRL million

	Dec 2019	Dec 2020	Dec 2021	Variation (%)			
				2019	2020	2021	Average
Brazil Total	2,017,046	2,241,084	2,711,123	11.9	11.1	21.0	14.7
North	102,195	116,425	151,776	15.8	13.9	30.4	20.0
Acre	5,164	5,920	7,633	16.5	14.6	28.9	20.0
Amapá	4,942	5,541	7,130	14.6	12.1	28.7	18.5
Amazonas	17,953	20,032	25,155	16.9	11.6	25.6	18.0
Pará	38,637	43,892	57,761	16.9	13.6	31.6	20.7
Rondônia	18,740	22,049	29,126	16.8	17.7	32.1	22.2
Roraima	4,006	4,478	5,738	10.4	11.8	28.1	16.8
Tocantins	12,752	14,512	19,232	11.6	13.8	32.5	19.3
Northeast	325,622	356,727	434,451	12.6	9.6	21.8	14.6
Alagoas	19,146	20,859	25,200	11.7	8.9	20.8	13.8
Bahia	84,873	92,556	112,604	11.9	9.1	21.7	14.2
Ceará	47,096	52,486	64,034	14.2	11.4	22.0	15.9
Maranhão	34,512	38,563	48,571	12.8	11.7	26.0	16.8
Paraíba	28,301	31,004	36,981	12.1	9.6	19.3	13.6
Pernambuco	53,673	58,780	71,640	14.6	9.5	21.9	15.3
Piauí	17,291	18,949	23,331	14.4	9.6	23.1	15.7
Rio Grande do Norte	24,624	26,504	31,741	9.0	7.6	19.8	12.1
Sergipe	16,107	17,025	20,349	10.7	5.7	19.5	12.0
Central-West	265,355	302,180	372,665	12.9	13.9	23.3	16.7
Distrito Federal	55,056	60,786	71,468	8.8	10.4	17.6	12.3
Goiás	96,371	109,279	137,666	13.1	13.4	26.0	17.5
Mato Grosso	69,891	82,039	101,629	15.4	17.4	23.9	18.9
Mato Grosso do Sul	44,037	50,077	61,902	14.0	13.7	23.6	17.1
Southeast	916,851	1,013,102	1,212,306	11.4	10.5	19.7	13.9
Espírito Santo	32,244	34,490	40,554	7.8	7.0	17.6	10.8
Minas Gerais	190,884	211,703	254,413	10.6	10.9	20.2	13.9
Rio de Janeiro	150,533	163,556	198,341	12.7	8.7	21.3	14.2
São Paulo	543,190	603,353	718,999	11.5	11.1	19.2	13.9
South	405,324	451,187	538,306	10.9	11.3	19.3	13.8
Paraná	154,586	172,280	207,729	11.2	11.4	20.6	14.4
Rio Grande do Sul	154,877	171,118	201,926	10.3	10.5	18.0	12.9
Santa Catarina	95,861	107,788	128,651	11.3	12.4	19.4	14.4
Unidentified	1,700	1,464	1,619	-10.2	-13.9	10.6	-4.5

Table B – Household credit density by state (per capita credit volume)

BRL

	Credit density 2019	Credit density 2020	Credit density 2021	Variation (%)			Average
				2019	2020	2021	
Brazil Total	9,569	10,552	12,673	11.0	10.3	20.1	13.8
North	5,517	6,206	7,992	14.3	12.5	28.8	18.5
Acre	5,820	6,580	8,369	14.8	13.1	27.2	18.4
Amapá	5,799	6,381	8,065	12.5	10.0	26.4	16.3
Amazonas	4,304	4,732	5,856	15.1	9.9	23.8	16.3
Pará	4,472	5,029	6,554	15.7	12.5	30.3	19.5
Rondônia	10,498	12,222	15,979	15.5	16.4	30.7	20.9
Roraima	6,588	7,120	8,837	6.6	8.1	24.1	12.9
Tocantins	8,069	9,084	11,914	10.4	12.6	31.1	18.0
Northeast	5,693	6,205	7,519	12.0	9.0	21.2	14.1
Alagoas	5,726	6,213	7,476	11.3	8.5	20.3	13.4
Bahia	5,697	6,190	7,504	11.5	8.6	21.2	13.8
Ceará	5,144	5,699	6,914	13.5	10.8	21.3	15.2
Maranhão	4,866	5,408	6,775	12.2	11.1	25.3	16.2
Paraíba	7,030	7,661	9,092	11.5	9.0	18.7	13.1
Pernambuco	5,601	6,096	7,387	13.8	8.9	21.2	14.6
Piauí	5,278	5,770	7,089	14.1	9.3	22.8	15.4
Rio Grande do Norte	6,998	7,475	8,886	8.2	6.8	18.9	11.3
Sergipe	6,981	7,316	8,672	9.8	4.8	18.5	11.0
Central-West	16,199	18,219	22,198	11.5	12.5	21.8	15.3
Distrito Federal	18,176	19,809	22,999	7.4	9.0	16.1	10.8
Goiás	13,651	15,275	18,998	11.6	11.9	24.4	15.9
Mato Grosso	19,964	23,159	28,362	14.0	16.0	22.5	17.5
Mato Grosso do Sul	15,777	17,749	21,713	12.8	12.5	22.3	15.9
Southeast	10,345	11,350	13,489	10.6	9.7	18.8	13.0
Espírito Santo	7,987	8,449	9,829	6.6	5.8	16.3	9.6
Minas Gerais	8,995	9,920	11,856	10.0	10.3	19.5	13.3
Rio de Janeiro	8,699	9,398	11,334	12.0	8.0	20.6	13.5
São Paulo	11,791	12,993	15,366	10.6	10.2	18.3	13.0
South	13,483	14,902	17,658	10.1	10.5	18.5	13.0
Paraná	13,481	14,917	17,863	10.4	10.7	19.7	13.6
Rio Grande do Sul	13,592	14,958	17,584	9.8	10.0	17.6	12.5
Santa Catarina	13,314	14,792	17,450	9.9	11.1	18.0	13.0

Table C – Delinquency on household credit operations by state

%

	Dec 2019	Dec 2020	Dec 2021
Brazil Total	3.5	2.9	3.0
North	3.9	3.1	3.1
Acre	3.6	2.6	2.9
Amapá	4.8	4.1	3.7
Amazonas	4.4	3.7	4.2
Pará	4.4	3.3	3.5
Rondônia	2.6	2.0	1.9
Roraima	4.2	3.5	3.2
Tocantins	3.7	2.7	2.4
Northeast	4.5	3.8	4.0
Alagoas	4.6	3.9	4.3
Bahia	4.4	3.7	4.0
Ceará	4.2	3.7	4.1
Maranhão	4.3	3.8	3.5
Paraíba	4.6	3.6	4.0
Pernambuco	4.8	4.3	4.8
Piauí	4.4	3.4	3.8
Rio Grande do Norte	4.7	4.0	4.1
Sergipe	3.9	3.1	3.4
Central-West	2.8	2.2	2.3
Distrito Federal	3.2	2.6	2.9
Goiás	3.1	2.5	2.4
Mato Grosso	2.3	1.8	1.7
Mato Grosso do Sul	2.6	2.0	2.1
Southeast	3.7	3.0	3.2
Espírito Santo	4.2	3.1	3.0
Minas Gerais	3.2	2.4	2.6
Rio de Janeiro	4.8	4.6	4.9
São Paulo	3.4	2.7	2.9
South	2.8	2.1	2.3
Paraná	2.8	2.2	2.4
Rio Grande do Sul	2.7	2.1	2.2
Santa Catarina	2.7	2.1	2.3
Unidentified	14.4	13.2	2.5

Table D – Balance of corporate credit operations by state

BRL million

	Dec 2019	Dec 2020	Dec 2021	Variation (%)			
				2019	2020	2021	Average
Brazil Total	1,457,952	1,775,851	1,961,530	-0.3	21.8	10.5	10.7
North	46,238	57,755	70,526	9.7	24.9	22.1	18.9
Acre	2,542	2,877	3,069	0.8	13.2	6.7	6.9
Amapá	3,291	3,653	3,863	3.1	11.0	5.8	6.6
Amazonas	12,740	16,746	19,279	16.6	31.4	15.1	21.1
Pará	16,152	20,445	26,066	8.3	26.6	27.5	20.8
Rondônia	4,779	5,738	7,750	16.0	20.1	35.1	23.7
Roraima	1,576	1,814	2,052	-1.3	15.1	13.1	9.0
Tocantins	5,158	6,482	8,447	6.1	25.7	30.3	20.7
Northeast	143,772	166,366	189,811	3.8	15.7	14.1	11.2
Alagoas	5,284	6,765	8,101	4.1	28.0	19.8	17.3
Bahia	42,907	50,166	56,068	13.3	16.9	11.8	14.0
Ceará	32,069	36,470	39,070	1.2	13.7	7.1	7.4
Maranhão	10,935	12,308	15,235	9.6	12.6	23.8	15.3
Paraíba	5,673	7,053	8,020	-3.6	24.3	13.7	11.5
Pernambuco	25,801	28,573	31,819	-4.8	10.7	11.4	5.8
Piauí	7,726	9,186	12,454	15.8	18.9	35.6	23.4
Rio Grande do Norte	9,345	11,034	12,703	-6.7	18.1	15.1	8.8
Sergipe	4,033	4,811	6,341	-3.4	19.3	31.8	15.9
Central-West	147,119	179,133	192,942	4.5	21.8	7.7	11.3
Distrito Federal	52,321	57,777	59,544	-0.1	10.4	3.1	4.5
Goiás	41,282	52,002	59,545	3.4	26.0	14.5	14.6
Mato Grosso	39,696	51,450	51,768	15.2	29.6	0.6	15.1
Mato Grosso do Sul	13,819	17,905	22,085	-1.7	29.6	23.3	17.1
Southeast	850,083	1,033,252	1,112,263	-2.9	21.5	7.6	8.8
Espírito Santo	21,999	26,390	31,964	10.8	20.0	21.1	17.3
Minas Gerais	118,662	149,639	175,643	-2.6	26.1	17.4	13.6
Rio de Janeiro	225,841	262,576	249,921	-8.9	16.3	-4.8	0.9
São Paulo	483,581	594,647	654,735	-0.4	23.0	10.1	10.9
South	261,541	330,096	388,217	7.6	26.2	17.6	17.1
Paraná	96,144	125,200	145,516	5.5	30.2	16.2	17.3
Rio Grande do Sul	82,443	102,476	118,811	8.2	24.3	15.9	16.2
Santa Catarina	82,954	102,420	123,890	9.5	23.5	21.0	18.0
Unidentified	9,198	9,250	7,771	-58.7	0.6	-16.0	-24.7

Table E – Delinquency on corporate credit operations by state

%

	Dec 2019	Dec 2020	Dec 2021
Brazil Total	2.2	1.2	1.3
North	3.9	1.3	1.9
Acre	3.2	2.1	1.5
Amapá	3.8	2.3	1.7
Amazonas	2.7	1.1	1.5
Pará	6.7	1.6	2.2
Rondônia	3.4	1.5	2.5
Roraima	1.2	0.7	1.1
Tocantins	1.7	1.0	1.4
Northeast	3.2	1.3	1.9
Alagoas	3.8	2.3	1.7
Bahia	4.0	1.2	1.9
Ceará	1.8	0.6	1.6
Maranhão	1.7	1.6	1.7
Paraíba	4.5	3.4	2.4
Pernambuco	4.9	1.4	2.2
Piauí	1.2	1.0	1.5
Rio Grande do Norte	1.9	1.5	2.3
Sergipe	2.3	1.5	1.4
Central-West	2.1	1.1	1.2
Distrito Federal	0.9	0.7	0.9
Goiás	2.2	1.3	1.4
Mato Grosso	1.7	1.6	1.7
Mato Grosso do Sul	6.9	2.1	1.2
Southeast	1.9	1.2	1.3
Espírito Santo	4.3	0.9	1.2
Minas Gerais	2.0	1.1	1.2
Rio de Janeiro	1.2	0.8	1.3
São Paulo	2.3	1.5	1.4
South	2.0	1.2	1.1
Paraná	4.5	3.4	2.4
Rio Grande do Sul	1.9	1.5	2.3
Santa Catarina	1.1	0.7	0.9
Unidentified	1.5	1.5	2.1

Table F – Balance of corporate credit operations by activity sector

BRL million

Discrimination	Dec 2019	Dec 2020	Dec 2021	Variation (%)		
				2019	2020	2021
Total	1,457,952	1,775,851	1,961,530	-0.3	21.8	10.5
Agriculture, livestock, forestry, fishing, and aquaculture	27,217	33,441	40,093	-2.1	22.9	19.9
Extractive industries	15,474	16,890	15,071	-13.7	9.2	-10.8
Manufacturing	357,841	435,996	454,754	-8.5	21.8	4.3
Food	95,327	111,593	126,984	-6.5	17.1	13.8
Beverage	7,637	7,641	8,483	10.4	0.0	11.0
Tobacco products	1,396	1,797	2,376	-23.9	28.7	32.2
Textile products	7,109	8,539	9,003	-0.7	20.1	5.4
Clothing	8,190	10,814	11,442	5.9	32.0	5.8
Leather goods, travel goods, and footwear	4,605	5,636	6,479	-9.1	22.4	15.0
Wood products	5,758	7,298	9,009	13.2	26.7	23.5
Pulp, paper, and paper products	19,931	21,291	23,459	-18.7	6.8	10.2
Printing and engraving	2,040	3,185	3,485	2.9	56.1	9.4
Coke, oil-derived products, and biofuels	32,250	42,415	23,169	-40.5	31.5	-45.4
Chemical products	18,447	26,079	26,434	20.6	41.4	1.4
Pharmaceutical and pharmaceutical products	3,927	6,439	6,442	1.9	64.0	0.1
Rubber and plastic products	12,709	18,209	18,678	7.3	43.3	2.6
Products of non-metallic minerals	10,489	12,227	13,966	-2.1	16.6	14.2
Metallurgy	32,295	35,656	39,233	-18.2	10.4	10.0
Metal products, except machinery and equipment	12,992	17,146	22,093	18.1	32.0	28.9
IT equipment, electronic and optical products	3,599	5,864	7,588	7.8	62.9	29.4
Electrical machines, appliances, and materials	10,227	13,190	14,371	3.5	29.0	9.0
Machinery and equipment	12,822	15,372	18,755	6.2	19.9	22.0
Motor vehicles, trailers, and bodies	39,233	45,895	41,443	1.9	17.0	-9.7
Other transport equipment, except motor vehicles	6,368	5,368	5,030	-31.7	-15.7	-6.3
Furniture	4,494	6,099	7,204	9.1	35.7	18.1
Miscellaneous products	3,030	4,252	4,694	9.1	40.3	10.4
Maintenance, repair, and installation of machinery and equipment	2,965	3,992	4,935	14.8	34.6	23.6
Construction	66,932	77,570	84,821	-11.2	15.9	9.3
SIUP – Public utility industrial services	182,362	208,729	217,637	-5.5	14.5	4.3
Electricity and gas	161,408	185,770	195,281	-6.1	15.1	5.1
Water, sewage, waste management and decontamination activities	20,954	22,959	22,356	-1.1	9.6	-2.6
Trade and repair of motor vehicles and motorcycles	319,455	410,408	497,317	11.0	28.5	21.2
Trade and repair of motor vehicles and motorcycles	46,927	43,032	54,130	14.1	-8.3	25.8
Wholesale trade, except of motor vehicles and motorcycles	133,118	178,735	214,467	9.5	34.3	20.0
Retailing	139,409	188,641	228,720	11.5	35.3	21.2
Transport, warehousing, and mail	139,203	169,927	183,396	9.2	22.1	7.9
Ground transport	80,126	99,937	115,507	14.7	24.7	15.6
Waterborne transport	18,338	22,909	21,895	4.1	24.9	-4.4
Air transport	2,484	3,396	1,491	31.9	36.7	-56.1
Warehousing and transport-support activities, mail, and other delivery activities	38,255	43,685	44,502	0.5	14.2	1.9
Public administration, defense, and social security	141,010	163,041	165,434	1.8	15.6	1.5
Other services	198,058	262,709	302,577	9.2	32.6	15.2
Lodging and food	13,804	22,485	25,391	21.8	62.9	12.9
Information and communication, except telecommunications	9,385	11,870	13,348	14.6	26.5	12.4
Telecommunications	13,561	10,228	12,086	4.1	-24.6	18.2
Financial, insurance, and related services activities	44,991	65,221	80,237	9.3	45.0	23.0
Real estate, professional, scientific, technical, administrative activities and complementary services	84,585	110,113	123,550	4.9	30.2	12.2
Education	9,580	12,740	13,408	16.5	33.0	5.3
Human health and social services	18,378	25,445	29,315	18.0	38.5	15.2
Arts, culture, sports, and recreation	3,774	4,607	5,241	18.5	22.1	13.8
Foreign-based or non-classified companies	10,400	460	430	-51.5	-95.6	-6.5

Table G – Delinquency on corporate credit operations by activity sector

%

Discrimination	Dec 2019	Dec 2020	Dec 2021	Variation (p.p.)		
				2019	2020	2021
Total	2.2	1.2	1.3	-0.3	-1.0	0.1
Agriculture, livestock, forestry, fishing, and aquaculture	3.7	1.3	0.8	1.1	-2.4	-0.5
Extractive industries	0.7	0.2	10.2	-0.4	-0.5	10.0
Manufacturing	2.4	0.8	0.7	0.3	-1.6	-0.1
Food	1.0	0.5	0.6	-0.3	-0.5	0.1
Beverage	0.3	0.2	0.6	-1.1	-0.1	0.4
Tobacco products	0.1	0.0	0.0	0.1	0.0	0.0
Textile products	1.1	1.7	0.7	-1.0	0.7	-1.1
Clothing	3.8	3.7	3.6	-0.2	-0.1	-0.1
Leather goods, travel goods, and footwear	8.0	4.3	4.2	5.3	-3.7	-0.1
Wood products	1.5	0.9	0.5	-0.1	-0.6	-0.4
Pulp, paper, and paper products	0.2	0.3	0.4	0.0	0.0	0.1
Printing and engraving	3.9	1.5	3.3	-1.4	-2.4	1.8
Coke, oil-derived products, and biofuels	8.9	0.3	0.1	4.6	-8.6	-0.2
Chemical products	3.3	0.3	0.4	2.0	-3.0	0.0
Pharmaceutical and pharmaceutical products	0.2	0.7	0.3	-0.1	0.6	-0.5
Rubber and plastic products	1.5	0.7	0.8	-1.3	-0.8	0.1
Products of non-metallic minerals	1.4	0.8	0.6	-1.4	-0.6	-0.2
Metallurgy	0.3	0.3	0.0	-0.3	-0.1	-0.2
Metal products, except machinery and equipment	3.0	1.2	0.9	-1.1	-1.8	-0.2
IT equipment, electronic and optical products	1.0	0.4	0.2	-0.3	-0.6	-0.2
Electrical machines, appliances, and materials	1.1	2.1	0.4	-2.9	0.9	-1.7
Machinery and equipment	1.6	2.6	0.8	-3.1	1.1	-1.8
Motor vehicles, trailers, and bodies	0.3	0.3	0.1	-0.7	0.1	-0.2
Other transport equipment, except motor vehicles	24.5	1.6	0.2	21.3	-22.8	-1.4
Furniture	3.0	1.6	1.7	-1.3	-1.3	0.0
Miscellaneous products	2.3	1.1	1.6	-3.0	-1.2	0.5
Maintenance, repair, and installation of machinery and equipment	3.1	2.1	2.8	-1.6	-1.0	0.7
Construction	6.6	3.7	2.9	-0.4	-2.9	-0.8
SIUP – Public utility industrial services	0.1	0.5	0.1	-0.2	0.4	-0.4
Electricity and gas	0.0	0.0	0.0	-0.1	0.0	0.0
Water, sewage, waste management and decontamination activities	0.5	4.1	0.5	-1.1	3.6	-3.6
Trade and repair of motor vehicles and motorcycles	2.5	1.6	1.8	-0.5	-0.9	0.2
Trade and repair of motor vehicles and motorcycles	1.6	1.5	1.8	-0.5	-0.1	0.3
Wholesale trade, except of motor vehicles and motorcycles	2.1	1.4	1.0	-0.3	-0.7	-0.4
Retailing	3.1	1.8	2.6	-0.8	-1.3	0.7
Transport, warehousing, and mail	1.5	0.9	1.4	0.0	-0.6	0.5
Ground transport	1.0	0.8	1.8	-0.5	-0.2	0.9
Waterborne transport	0.4	0.1	0.0	0.3	-0.3	0.0
Air transport	0.2	4.8	7.9	0.1	4.5	3.2
Warehousing and transport-support activities, mail, and other delivery activities	3.3	1.3	0.9	1.0	-2.0	-0.4
Public administration, defense, and social security	0.3	0.0	0.0	0.2	-0.3	0.0
Other services	2.5	1.7	2.0	-1.3	-0.8	0.3
Lodging and food	6.6	3.8	7.0	0.0	-2.8	3.1
Information and communication, except telecommunications	2.1	2.0	1.6	-0.3	-0.1	-0.5
Telecommunications	0.2	0.3	0.7	0.1	0.1	0.4
Financial, insurance, and related services activities	3.0	1.9	0.5	-2.8	-1.1	-1.4
Real estate, professional, scientific, technical, administrative activities and complementary services	1.9	1.1	1.9	-1.7	-0.8	0.8
Education	2.7	1.8	2.7	0.2	-0.9	0.9
Human health and social services	1.1	0.8	1.0	0.2	-0.3	0.2
Arts, culture, sports, and recreation	1.9	1.8	2.3	-0.4	-0.1	0.5
Foreign-based or non-classified companies	3.8	1.0	1.6	2.4	-2.8	0.7

Annex C – Chapter 6

Table A – Summary of the SFN concentration indexes

Indexes	Banking and non-banking sector				Banking sector				Commercial banking sector			
	Dec 2018	Dec 2019	Dec 2020	Dec 2021	Dec 2018	Dec 2019	Dec 2020	Dec 2021	Dec 2018	Dec 2019	Dec 2020	Dec 2021
Total assets												
HHIn	0.1090	0.1071	0.0983	0.0931	0.1334	0.1308	0.1207	0.1180	0.1390	0.1367	0.1259	0.1232
RC5 (%)	69.3	69.8	67.0	65.2	79.5	79.2	76.0	74.9	81.2	81.0	77.6	76.6
HHIn equivalent	9.2	9.3	10.2	10.7	7.5	7.6	8.3	8.5	7.2	7.3	7.9	8.1
Total deposit												
HHIn	0.1297	0.1263	0.1103	0.1034	0.1447	0.1419	0.1261	0.1213	0.1479	0.1456	0.1306	0.1262
RC5 (%)	78.4	77.6	72.7	70.0	82.8	82.3	77.7	75.9	83.8	83.4	79.1	77.4
HHIn equivalent	7.7	7.9	9.1	9.7	6.9	7.0	7.9	8.2	6.8	6.9	7.7	7.9
Credit operations												
HHIn	0.1205	0.1124	0.1069	0.1034	0.1530	0.1427	0.1367	0.1345	0.1630	0.1532	0.1456	0.1434
RC5 (%)	70.9	69.8	68.5	67.9	82.2	80.7	79.2	78.7	84.8	83.7	81.8	81.4
HHIn equivalent	8.3	8.9	9.4	9.7	6.5	7.0	7.3	7.4	6.1	6.5	6.9	7.0

Table B – Concentration indexes in the stock of credit
Rural and agribusiness financing – Households and companies

	2019	2020	2021
Share (%)			
By segment type			
b1+ b2	84.8	83.3	81.9
b3	11.4	13.4	15.6
b4	3.4	2.9	2.2
n1+ n2	0.4	0.4	0.3
n4	0.0	0.0	0.0
By control type			
State-owned	61.6	61.0	61.4
Private-owned	38.4	39.0	38.6
By origin of resources			
Earmarked	89.0	86.9	87.5
Non-earmarked	11.0	13.1	12.5
Concentration indexes			
HHI	0.3127	0.2999	0.2860
EN	3.2	3.3	3.5
RC4 (%)	68.6	66.7	64.2

Table C – Concentration indexes in the stock of credit
Real estate financing – Households and companies

	2019	2020	2021
Share (%)			
By segment type			
b1+ b2	99.8	99.8	99.7
b3	0.0	0.1	0.1
b4	0.0	0.0	0.0
n1+ n2	0.2	0.2	0.1
n4	0.0	0.0	0.0
By control type			
State-owned	79.3	77.2	72.9
Private-owned	20.7	22.8	27.1
By origin of resources			
Earmarked	98.9	99.1	99.2
Non-earmarked	1.1	0.9	0.8
Concentration indexes			
HHI	0.5188	0.5061	0.4654
EN	1.9	2.0	2.1
RC4 (%)	92.7	92.2	92.3

Table D – Concentration indexes in the stock of credit

Infrastructure and development financing – Companies

	2019	2020	2021
Share (%)			
By segment type			
b1+ b2	34.7	34.3	34.6
b3	0.0	0.0	0.0
b4	64.6	65.0	64.7
n1+ n2	0.7	0.7	0.7
n4	0.0	0.0	0.0
By control type			
State-owned	96.1	95.6	95.6
Private-owned	3.9	4.4	4.4
By origin of resources			
Earmarked	98.4	98.0	98.0
Non-earmarked	1.6	2.0	2.0
Concentration indexes			
HHI	0.4463	0.4475	0.4457
EN	2.2	2.2	2.2
RC4 (%)	94.7	94.3	93.9

Table E – Concentration indexes in the stock of credit

Working capital – Companies

	2019	2020	2021
Share (%)			
By segment type			
b1+ b2	88.1	89.3	87.0
b3	11.2	10.2	12.3
b4	0.2	0.2	0.4
n1+ n2	0.4	0.4	0.4
n4	0.0	0.0	0.0
By control type			
State-owned	25.4	23.8	27.2
Private-owned	74.6	76.2	72.8
By origin of resources			
Earmarked	-	-	-
Non-earmarked	100.0	100.0	100.0
Concentration indexes			
HHI	0.0916	0.0963	0.0928
EN	10.9	10.4	10.8
RC4 (%)	55.3	55.8	56.9

Table F – Concentration indexes in the stock of credit

Payroll-deducted personal loans – Households

	2019	2020	2021
Share (%)			
By segment type			
b1+ b2	96.8	96.6	96.3
b3	2.9	3.0	3.2
b4	0.0	0.0	0.0
n1+ n2	0.3	0.4	0.5
n4	0.0	0.0	0.0
By control type			
State-owned	44.6	45.6	44.6
Private-owned	55.4	54.4	55.4
By origin of resources			
Earmarked	-	-	-
Non-earmarked	100.0	100.0	100.0
Concentration indexes			
HHI	0.1293	0.1272	0.1234
EN	7.7	7.9	8.1
RC4 (%)	65.9	66.5	65.2

Table G – Concentration indexes in the stock of credit

Credit card – Overall analysis – Households and companies

	2019	2020	2021
Share (%)			
By segment type			
b1+ b2	89.0	87.1	85.3
b3	1.1	1.4	1.7
b4	0.0	0.0	0.0
n1+ n2	6.1	6.3	6.3
n4	3.9	5.3	6.8
By control type			
State-owned	16.6	16.2	16.5
Private-owned	83.4	83.8	83.5
By origin of resources			
Earmarked	-	-	-
Non-earmarked	100.0	100.0	100.0
Concentration indexes			
HHI	0.1594	0.1444	0.1331
EN	6.3	6.9	7.5
RC4 (%)	71.2	68.4	66.0

Table H – Concentration indexes in the stock of credit

Receivables acquisitions – Companies

	2019	2020	2021
Share (%)			
By segment type			
b1+ b2	100.0	100.0	99.8
b3	0.0	0.0	0.0
b4	0.0	0.0	0.0
n1+ n2	0.0	0.0	0.2
n4	0.0	0.0	0.0
By control type			
State-owned	0.0	1.4	1.1
Private-owned	100.0	98.6	98.9
By origin of resources			
Earmarked	-	-	-
Non-earmarked	100.0	100.0	100.0
Concentration indexes			
HHI	0.1652	0.1457	0.1286
EN	6.1	6.9	7.8
RC4 (%)	73.1	69.3	65.9

Figure C.1 – Leading institutions share in rural and agribusiness financing in 2021 – Households and companies

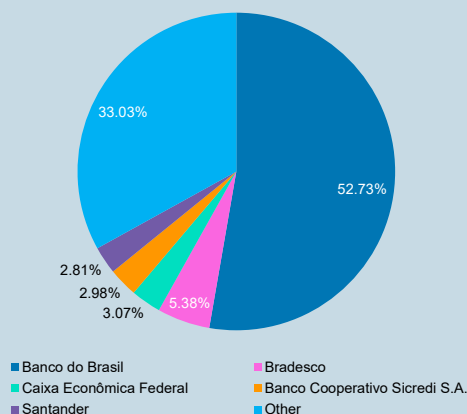


Figure C.2 – Leading institutions share in real state financing in 2021 – Households and companies

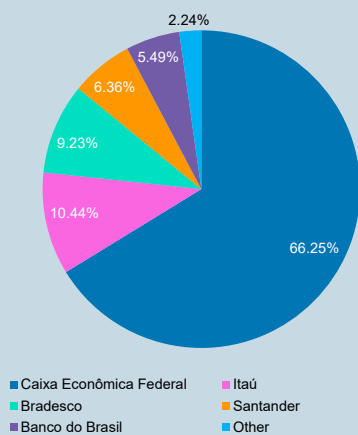


Figure C.3 – Leading institutions share in corporate infrastructure and development financing in 2021 – Companies

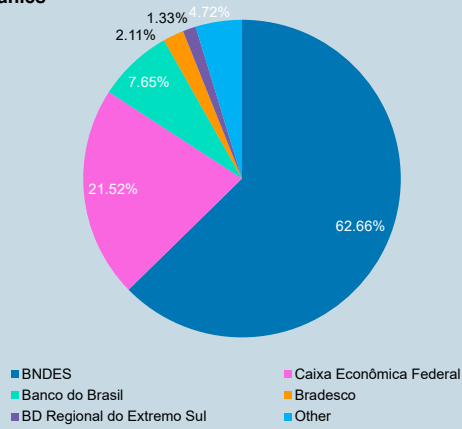


Figure C.4 – Leading institutions share in working capital in 2021 – Companies

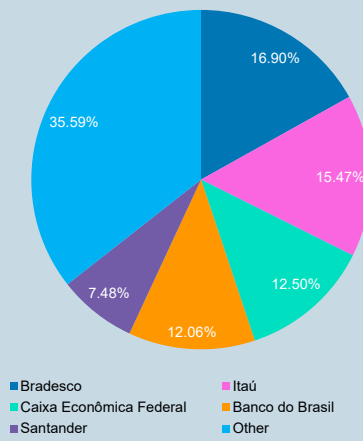


Figure C.5 – Leading institutions share in payroll-deducted personal loans in 2021 – Households

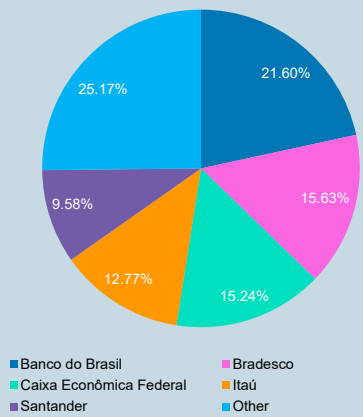


Figure C.6 – Leading institutions share in credit card – overall analysis in 2021 – Households and companies

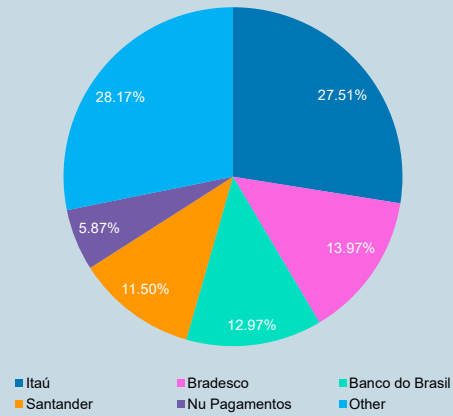


Figure C.7 – Leading institutions share in receivables acquisition in 2021 – Companies

