

RESEARCH AGENDA

2026-2029

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Introduction

Research conducted at the Banco Central do Brasil (BCB) forms an essential part of the technical foundation supporting monetary policy, financial stability, and the efficiency of the banking system. It provides empirical evidence, models, and analytical tools that inform economic policy decisions, deepen the understanding of key issues in the Brazilian and international economy, and strengthen the Institution's credibility and reputation among peers and specialists. Research also reaffirms the BCB's commitment to transparency and accountability to society through broad dissemination of results in institutional reports, conferences, working papers, academic journals, and the BC Blog.

In 2021, the BC launched its first institutional Research Agenda for the 2021-2024 cycle. Structured into three major areas – *Macroeconomics, Finance, and Monetary Policy*, *National Financial System: Efficiency, Stability and Its Effects on the Real Economy*, and *Technological Innovation* – the Agenda represented a milestone in guiding research development, promoting greater transparency, and expanding dialogue with the academic community.

The results of that cycle demonstrated the relevance and impact of the BCB's research output: 217 publications, including 67 Working Papers, 79 scientific articles, 59 boxes in institutional reports, and 12 BC Blog posts. These outcomes reaffirm the strategic role of research in improving public policies under the BCB's responsibility.

The new Research Agenda 2026-2029 was developed considering the BCB's institutional mission, strategic objectives, and lessons learned from the previous cycle. While continuing to advance core topics, it incorporates methodological and technological improvements, as well as the challenges posed by an increasingly dynamic, complex, and interconnected economic environment. The Agenda is intended as guidance rather than a formal commitment to full execution, and seeks to stimulate both internal research production and collaboration with external researchers, universities, and partner institutions.

Organized into two major areas – *Macroeconomics and Finance*, and the *National Financial System* – the Agenda defines priority themes for the next four years, serving as a guide for producing applied knowledge to support public policy formulation and as an invitation for the academic community to collaborate with the BCB.

The following sections contextualize these major research areas and outline their associated themes.

1

Macroeconomics and Finance

Satisfying the institutional mission of the BCB requires the continuous development of analytical and operational tools to support effective and transparent economic policy decisions. Price stability, the strength of the financial system, and the economic well-being of society depend on a technical, evidence-based approach, particularly in an environment of increasing global complexity and volatility.

The main pillars of the research agenda in macroeconomics, finance, and monetary policy emphasize the role of the inflation-targeting regime in preserving the purchasing power of the currency, the evolution of monetary policy communication, the improvement of macroeconomic models, the complexity of forecasting techniques, and the integrated analysis of fiscal, exchange rate, and labor market policies. These efforts not only strengthen the institution's ability to respond to economic shocks but also promote greater predictability, credibility, and effectiveness of monetary policy and in regulation of the National Financial System (SFN). Beyond price stability, this research agenda reinforces the BCB's capacity to ensure financial stability, promote efficiency in the financial system, smooth fluctuations in economic activity, and support conditions for full employment.

The efforts detailed in this area of the agenda are organized around three fundamental dimensions that reflect recent developments in literature and are closely interconnected with other areas of the agenda:

- a) The need to develop, refine, and arrange increasingly granular databases to capture the behavior of economic agents, both over time—with the use of high-frequency information—and across agents, accounting for heterogeneity in the economy.
- b) The use of advanced technological tools for processing and analyzing existing and incipient datasets. Research using unstructured data in the context of economic policymaking requires efficient processing so that researchers can clearly identify the relevance of results. Open-source software fosters collaboration across fields, enriching analysis and accelerating the development of computational solutions.
- c) The rigorous formalization and precise solution of models linking individual agent behavior to the aggregate dynamics of the economy. Recent advancements have increased model complexity to better integrate data into forecasting and counterfactual exercises that support policy decisions.

Some examples from the recent literature that combine the three dimensions are:

- a) Models designed to evaluate the tone of policy decisions communicated in official documents using artificial intelligence (AI) and machine learning (ML) techniques to organize the information. The metrics extracted from these models are correlated with asset prices and allow for the assessment of monetary policy communication to society.
- b) Structural macroeconomic models that use algorithms capable of capturing nonlinearities present in the data, supported by increasingly advanced technologies.
- c) The use of large language models (LLMs) applied to administrative databases, processing large information sets in a short period of time to estimate, at the individual level, idiosyncratic income and wealth shocks. These shocks, in turn, are used to characterize wealth and income heterogeneity in heterogeneous-agent macroeconomic models.

To achieve these objectives, the BCB has pursued the continuous improvement of its policies and of the tools that support its decisions. Decision-making involves a set of processes that include, among others, the construction of macroeconomic models, forecasts and economic indicators, as well as the development of research and specific studies to support these decisions. Many challenges have affected different economies, and the purpose of this agenda is to open a window for researchers in the fields of macroeconomics, finance and monetary policy to understand the direction that research at the BCB intends to follow over the next four years.

1.1 Macroeconomic Conditions

1.1.1 Gross Domestic Product (GDP)

The analysis of Gross Domestic Product (GDP) is essential to the formulation of economic policies. Research at the BCB must include studies on potential GDP, the long-term determinants of economic growth, and the factors affecting aggregate productivity.

A country's potential growth is defined as the maximum rate at which its economy could grow without generating inflationary pressures. Measuring potential GDP allows for the identification of the output gap and the shocks that affect GDP trajectories. Accurately estimating these variables is crucial for conducting monetary policy, as it permits real-time

assessment of whether the economy is operating above or below capacity, enabling timely and precise policy responses. Research should explore structural and semi-structural methods, or other auxiliary approaches accounting for issues related to productivity, demographics, human capital, and innovation. A detailed understanding of potential growth is also relevant for the debate on the neutral interest rate, which guides monetary policy decisions over longer horizons.

The output gap reflects the transmission channels of monetary policy to economic activity and constitutes one of the relevant channels in the price formation process. It is important to understand the composition of the gap and its short-term dynamics by mapping household consumption, corporate investment, government spending, and external demand. Research on how the output gap responds to changes in financial conditions, credit, income, and expectations – including effects related to fiscal and parafiscal policy – is relevant for analyzing economic activity. Demand elasticities, behavioral heterogeneity, and market frictions are important topics for improving forecasting and analytical models.

On another research front, the analysis of economic growth helps to understand the evolution of the economy over time and the cyclical, structural, and external factors that contribute to wealth creation in the country. The relevance to monetary policy is immediate, as understanding the growth's drivers – consumption, investment, government spending, and the external sector – is essential for anticipating inflationary pressures and to anchor consistent inflation expectations consistent with sustainable demand and supply growth. One possible research avenue is the decomposition of growth by sectors, regions, and income groups, as well as the investigation of the effects of exogenous shocks such as financial crises, pandemics, or climate change. Models that integrate high-frequency and granular data can improve real-time monitoring of economic activity and provide additional valuable insights for monetary policy decision-making amid changes in the economic cycle.

Productivity is one of the main determinants of long-term economic growth and structural inflation. Understanding the factors that affect productivity – such as technological change, workforce qualification, allocative and productive efficiency, and innovation drivers – is essential for tracking and monitoring the economy's potential growth. Research in this area should try to incorporate microeconomic, sectoral, and regional data, as well as explore the impacts of digitalization, AI, the energy transition, and demographic changes on Brazilian economic activities. Models that capture heterogeneity among firms and workers can offer valuable inputs for policy formulation. The study of high-frequency productivity also enables better assessment of wage and price dynamics, which are relevant for analyzing the transmission of monetary policy.

1.1.2 Labor Market

Understanding the mechanisms governing the functioning and evolution of the labor market is essential for the BCB to achieve its fundamental objective of price stability and fostering the stability and efficiency of the financial system, smoothing fluctuations in the level of economic activity, and promoting full employment. Among the various pieces of information relevant to the conduct of monetary policy, labor market variables stand out, as they are related to fundamental monetary policy concepts such as the Phillips curve and the NAIRU (non-accelerating inflation rate of unemployment). Monetary policy influences the labor market, which in turn affects the transmission and the outcomes of monetary policy itself. These mutual effects, as well as the interactions between the BCB's policies and other sectoral and employment policies, are important research topics.

The analysis of stylized facts of the Brazilian labor market – such as the stratification of unemployment by occupational position or employment categories – can help assess this market's current conditions. The connection between the ongoing demographic changes in the country and the labor market is also significant for monetary policy, given that population aging and rising life expectancy may affect labor supply and aggregate savings, with possible effects on the economy's neutral interest rate. In addition, the study of labor market frictions – that is, the factors that hinder the matching between job seekers and employers – is also relevant for understanding this market at both the macroeconomic and microeconomic levels.

The Covid-19 pandemic brought important implications for the labor market, creating the challenge of distinguishing between temporary and permanent changes. The pandemic accelerated transformations that had been occurring gradually. Notably, the spread of remote work – now permanently incorporated into many work processes to varying degrees. The pandemic also appears to have introduced persistent changes in relevant indicators, such as the labor force participation rate, which has yet to return to pre-pandemic levels. All these changes have potentially important consequences for the economy's productivity.

On the other hand, fluctuations in the labor market over the business cycle are a relevant source of income variation for a large share of households, which seek to smooth consumption. This should occur more efficiently through the interaction between households and the financial sector. At the individual level, income shocks stemming from the labor market (such as unexpected layoffs) offer an opportunity to analyze this relationship at different stages of the economic cycle and to identify strengths and weaknesses in the provision of financial services to the population. In this respect, labor market frictions may amplify or

smooth the effects of such shocks, with the potential to influence the transmission channels of monetary policy. Structural policies – such as the access to credit histories, customer relationships with financial institutions, or the provision of collateral – may help smooth the effects of income shocks.

The growth of the informal labor market is a defining characteristic of developing economies, especially in contexts of instability or structural reforms, and it has relevant implications for monetary policy. Informality may reduce the effectiveness of traditional instruments by weakening transmission channels, making it harder to measure economic activity accurately, and affecting tax collection. In Brazil, where a significant share of businesses, GDP, and the labor force is tied to the informal sector, understanding this phenomenon becomes even more important. Studies evaluating the magnitude and effects of informality are therefore of great interest to the BCB. Additionally, the dynamics between formal and informal employment deserve attention, as evidence suggests that formal firms often hire part of their workforce informally, which directly influences labor market dynamics and indirectly affects the overall performance of the economy.

1.1.3 Prices

Price dynamics are among the most relevant actions of the economy for monetary policy. In this context, nominal and real rigidities, exchange-rate pass-through mechanisms, and sectoral effects on inflation contain valuable information to improve how price formation is represented in models.

The mechanisms of price formation in the economy are complex and often exhibit nonlinearities, reflecting market frictions, contractual arrangements, firms' strategic behavior, and responses to external shocks. Investigating how prices are adjusted over time can provide significant contributions, particularly by exploring sectoral and regional heterogeneities and their supply-side determinants, such as competition, innovation, AI, input costs, expectations, and regulation. Traditional models describe these dynamics in simplified ways, leaving room to explore how price-setting mechanisms respond asymmetrically to shocks – for example, whether cost increases are passed through more quickly than cost reductions. Understanding these complexities in auxiliary empirical models is essential for improving monetary policy decision support and avoiding inefficient BCB responses to price changes.

The formation of inflation expectations is one of the most critical elements for monetary policy and for models that provide analysis and guidance for decision-making. Expectations about prices directly affect consumption, investment, and savings decisions. Research

should investigate how different economic agents form their expectations and how they use expectations regarding inflation and growth in their economic decisions. The BCB has access to the Focus and Firmus survey databases, which provide relevant information for tracking the dynamics of expectations of economic analysts and business leaders regarding inflation, including how these expectations react to the BCB's communication. Empirical studies using these datasets may explore heterogeneities, the effects of institutional credibility, and the role of monetary policy communication. Auxiliary models incorporating Bayesian learning, bounded rationality, attention, and expectation de-anchoring and re-anchoring are relevant for understanding changes in expectation formation and price-setting behavior. The use of high-frequency data and ML techniques can contribute to describing normal and expected movements and identifying specific events of expectation reassessment.

1.2 Monetary Policy

1.2.1 Inflation Targeting Regime and Institutional Scope

The success and maturation of the inflation-targeting regime, both in advanced and emerging economies, have resulted in the development of new institutional arrangements capable of ensuring stable and predictable inflation. Empirical evidence suggests that adopting the inflation-targeting regime has contributed to lowering inflation rates, especially in emerging countries, in addition to providing greater autonomy to central banks. The regime has proven capable of successfully responding to major economic challenges, such as the 2008 Global Financial Crisis and the recent Covid-19 pandemic crisis.

In Brazil's case, the design of the inflation-targeting regime continues to be enhanced, reflecting institutional maturity in the conduct of monetary policy, as different governments have introduced relevant changes without generating major disruptions in the economic policy framework. Notably, the change in 2017 that extended the horizon for setting the annual-calendar inflation target – from two to three years in advance – and the introduction in 2024 of a continuous-horizon inflation-targeting system¹ constitute important milestones in improving the regime. These changes allowed inflation expectations to be managed over longer time horizons and further separated the definition of the inflation target from the short-term conduct of monetary policy.

Despite the success of the inflation-targeting regime in Brazil, its improvement must be continuous. This line of research aims to investigate not only the consequences of adopting

¹ [DECREE 12,079 of June 26, 2024.](#)

the regime for the economy – within a long-term perspective associated with economic growth, productivity, and price and expectation behavior – but also potential enhancements to the current version of the inflation-targeting framework implemented in the country.

1.2.2 Communication

Just like the inflation targeting regime, monetary policy communication is also in constant evolution. Academia already has a history of using computational linguistics models and is rapidly moving toward using LLMs to evaluate central bank communication. The literature establishes a detailed link between the tone of monetary policy communication and fluctuations in financial variables.

In this context, central banks' monetary policy communication has evolved rapidly in recent years, with initiatives aimed at increasing transparency, clarity, and effectiveness, as well as improving accountability to society. The way a central bank conveys its assessments plays a fundamental role in coordinating expectations, by clarifying why decisions were made and what the institution's economic outlook is. Proper communication creates a virtuous cycle – when society and markets understand the central bank's actions, expectations generally respond accordingly, increasing the effectiveness of monetary policy. Moreover, adequate communication provides inputs that help markets become better informed and better able to form their own views about monetary policy and the economy.

Additionally, in line with its mission, vision, and strategic objectives, the BCB's institutional communication has gained increasing importance, especially with the expansion of channels providing direct access to the public. The Institution operates in areas that include financial education, innovation, transparency, and financial system sustainability, and the way these initiatives are communicated to society is relevant not only for their success but also for strengthening public's trust. The process of modernizing the BCB's institutional communication in recent years has opened new opportunities for research. Quantitative methodologies, including computational linguistics techniques and language models, make it possible to assess clarity, coherence, and effectiveness across different communication fronts. Studies on how different audiences perceive and use this information – and especially on how this influences the achievement of institutional objectives – can contribute to the continuous improvement of the Institution's communication practices. While the impact of central bank communication on specialized audiences is well established in the economic literature, the analysis of its effects on the general public is still relatively recent, with broad research opportunities.

1.2.3 Macroeconomic Modeling

Macroeconomic models are widely used at the BCB as an important analytical tool to support monetary policy decisions and to design stress testing scenarios for financial stability analysis. These models try to synthesize the basic relationships between different elements of the economic system, with an emphasis on the transmission mechanisms of monetary policy. Macroeconomic models make it possible, in a consistent and quantifiable way, to analyze the effects of shocks on the economy, to develop macroeconomic scenarios, and to measure the impacts of different trajectories for the monetary policy decision variable. Models are also used to estimate unobservable variables considered fundamental for monetary policymaking, such as the output gap and the neutral interest rate.

To adequately perform these roles, a macroeconomic model must be well specified and have a theoretical structure capable of providing plausible answers to relevant economic policy questions – both qualitatively and quantitatively. To this end, the BCB develops and maintains a macroeconomic modeling framework based on different approaches, with an emphasis on semi-structural models and general equilibrium models. As new theoretical and empirical contributions emerge, or as the need arises to better interpret recent developments in the economy, macroeconomic models are regularly reassessed, validated, and improved.

The BCB makes a continuous effort in this regard. Enhancing existing models or developing new analytical frameworks includes topics related to methodological aspects – such as new estimation methods, estimation of the output gap and the neutral interest rate, the degree of model disaggregation, identification of economic shocks, and incorporation of judgment into projections – as well as thematic topics. Among the thematic topics, notable issues include the temporal assessment of monetary policy strength, limits and advantages of coordinating monetary, fiscal, and macroprudential policies, the role of fiscal policy in determining economic activity and prices, the labor market and the level of activity, and exchange rate pass-through. In the specific context of the Brazilian economy, the development and improvement of models must also consider the structural changes observed in the economy, combined with the constant improvement and refinement of short-term surveys, such as labor market surveys, that reduce the available sample at the time series dimension.

In terms of modeling strategy, the BCB adopts both a modular approach – in which new contributions are developed within the theoretical framework of existing models – and the development of entirely new models, based only on references from the literature. The modular approach has the advantage of facilitating greater granularity or disaggregation of

analysis by imposing aggregate constraints on the individual behavior of economic agents. On the other hand, the development of completely new models allows for the incorporation of new technologies and knowledge within the Institution, expanding the range of questions that the technical staff of the BCB can address. It is also worth stressing the fundamental role of the models' ability to incorporate policymakers' judgment in building scenarios and projections.

Expanding macroeconomic models through a modular structure (blocks) allows new analytical dimensions to be incorporated without compromising the core theoretical coherence. Modularity facilitates the integration of blocks that describe, for example, fiscal channels, external sector channels, or relevant labor market channels. The more detailed description provided by specific blocks allows for more realistic scenarios, providing flexibility to compute relevant elasticities in the monetary policy transmission channels. This approach also supports the incorporation of quantitative and qualitative judgment into short- and medium-term projection processes.

The development of auxiliary models for fiscal policy can yield greater precision in assessing the effects of fiscal variables on the output gap and the neutral rate, and consequently on inflation. The trajectory of public debt, automatic stabilizers, income transfer programs, and discretionary fiscal stimuli directly influence aggregate demand and economic agents' expectations.

Incorporating fiscal variables makes it possible to construct counterfactual scenarios and conditional analyses of fiscal policy effects, given that the interaction between fiscal and monetary policy is a key vector of macroeconomic stability. By improving fiscal modeling, inflation projections can better anticipate risks stemming from fiscal policy, assess the impact of reforms, and support monetary policy planning.

Labor market modeling is another necessary element for better understanding the mechanisms of wage formation, unemployment dynamics, productivity, and supply shocks. Including a specific labor market block in the Copom's auxiliary models improves the description and measurement of economic slack or overheating. The relationship between the output gap and potential GDP, the unemployment rate consistent with price stability (NAIRU), and the effects of labor market tightening on price and wage inflation are relevant for monetary policy and the dynamics of adjustment in the real economy. Sectoral heterogeneity, informality, job search frictions, and labor force participation dynamics are additional elements that may influence monetary policy transmission in certain contexts. Central banks in other countries have advanced in modeling labor market frictions and their effects on inflation using approaches that integrate microdata with behavioral equations of macro models. A descriptive block of labor market variables would enable a clearer and more

direct assessment of trade-offs between inflation and employment. Another advantage is the ability to simulate the effects of adverse shocks or structural changes in the labor force, related, for example, to contemporary phenomena such as platform work (the “uberization” of labor), fragmentation, informality, and the adoption of AI by firms.

A better description of an external sector block can help explore the effects of the international economy on domestic inflation, the exchange rate, asset prices, and the balance of payments. More detailed modeling of variables such as terms of trade, the real exchange rate, international commodity prices, external interest rates, and capital flows would improve the assessment of how external vectors modify monetary policy transmission. Medium-term domestic scenarios can be built from external events such as changes in U.S. monetary policy, Chinese economic slowdowns, or geopolitical tensions affecting international asset prices. A more robust external block would expand the capacity to construct scenarios involving international shocks, integrating domestic inflation projections with the international outlook.

1.2.4 Macroeconomic Forecasting

In a globalized and constantly changing world, generating accurate forecasts of macroeconomic variables is a challenge for public policymakers and of great importance for economic agents and their investment decisions. In the case of central banks, the use of forecasting models is intrinsically related to their core objectives, particularly the proper functioning of their inflation-targeting systems. The lag between monetary policy decisions and their effects on economic activity and prices, combined with the mission of keeping inflation under control, makes it essential to have well-designed forecasts of inflation and other relevant macroeconomic variables, such as the exchange rate, GDP, and unemployment.

Building a forecasting model involves numerous choices, such as choosing between time-series or panel data, a parsimonious or high-dimensional database, linear or non-linear modeling, as well as decisions regarding data frequency, forecasting horizon, and what exactly will be forecasted – expected value, quantile, interval, or density. Economists generally use several forecasting methods, including statistical time-series models (ARMA, VAR), asset-pricing models (term structure of interest rates, implied inflation), semi-structural and structural micro-founded macroeconomic models (DSGEs), and surveys of expectations from consumers or market analysts. Improving forecasts generated from the combination (or ensemble forecasts) of all these available methods constitutes a relevant research agenda in the field.

It is particularly important for central banks to generate risk measures around the forecasts of macroeconomic variables produced by different models. The use of validation techniques (backtests) for the risk measures of forecasting models ensures proper management and appropriate weighting of different models in the monetary and macroprudential policy decision-making process.

While the “Macroeconomic Modeling” section of this Agenda focuses mainly on the use of models for analysis and projections, the present section emphasizes methodological issues, particularly the use of different approaches and recent techniques from the literature. Indeed, research in the field of economic forecasting is constantly evolving and rapidly expanding in several directions. The research agenda in this area includes, for example, short-term forecasting models (nowcasts) that combine data of different frequencies, the identification and modeling of structural breaks and instabilities among macro variables. In this area, forecasting macroeconomic variables using high-frequency financial indicators has gained prominence. New techniques avoid excessive filtering and smoothing financial data for this type of forecasting.

Another example of the recent research agenda in the field of forecasting is the use of microdata and highly granular information to explore the heterogeneity among economic agents, as well as the potential gains from using cross-section or panel information to predict the aggregate behavior over time. In Brazil, it is important to highlight the challenge of organizing the existing microdata in a systematic way to generate consistent and periodic forecasts, in addition to developing new databases and new survey questionnaires on the behavior and expectations of households and firms.

Finally, new technologies make it possible to explore nonlinearities in data and in economic models, potentially generating more accurate forecasts. The use of ML techniques, with big data as an alternative to traditional econometric models, is already present at the BCB, but the speed at which new technologies are created and adopted in this field suggests that it is still an area with vast potential for further development.

1.2.5 Transmission Channels

Monetary policy is one of the main instruments used by central banks to maintain price stability. Its effectiveness depends on how decisions regarding the benchmark interest rate propagate throughout the economy, affecting the behavior of consumers, firms, and supervised institutions (SIs). Monetary policy transmission tends to vary depending on the type of action adopted – whether a tightening or easing of monetary policy – and its impact may also differ across economic sectors and income distribution brackets, as well as on the state of the economy, such as fiscal policy conditions.

Market concentration or the characteristics of SIs (such as liquidity and capitalization) may potentially weaken or strengthen the transmission of monetary policy to bank interest rates. Bank interest rates, in turn, affect the real side of the economy through consumption, savings, and investment decisions. Therefore, the degree of transmission from policy rates to bank interest rates influences the overall effectiveness of monetary policy.

In the first stage of transmission, changes in the benchmark interest rate initially affect financial conditions, such as lending rates, asset prices, and the exchange rate. The benchmark rate serves as a reference for other market rates, influencing the cost of credit and the return on financial investments. For example, an increase in the benchmark interest rate tends to make credit more expensive, discouraging consumption and investment, while making savings more attractive. Additionally, higher rates may appreciate the domestic currency, making exports less competitive and reducing external demand.

In addition to the effects on the exchange rate, there is also the international transmission channel: changes in the domestic policy interest rate can affect the flow of international capital to the country's credit supply, depending also on the size, capitalization, and liability structure of banks in the local economy; conversely, the monetary policy of other countries influences the credit supply available to domestic firms and, consequently, the flow of international capital into a country.

In the second stage of transmission, these changes in financial conditions impact economic activity. Household consumption and corporate investment respond to the new credit conditions and to the value of their assets. Monetary policy also affects the volume of available credit, as banks may restrict the supply of loans in response to higher funding costs or increased default risk. Risk perception and the financial health of economic agents, in turn, influence the intensity of this response.

Another important channel is expectations. Price and wage-setting decisions are often based on future inflation projections. If the central bank is considered credible, its actions can anchor expectations and reduce the need for more drastic adjustments in interest rates. Thus, monetary policy may influence inflation even before directly affecting economic activity.

In macroeconomic models, monetary policy usually affects prices through the relationship between economic activity and inflation, as described by the Phillips curve. During periods of economic expansion, upward pressure on prices tends to increase; during downturns, inflation tends to ease. Therefore, by controlling aggregate demand, the central bank can influence the trajectory of prices over time. In this context, measuring the intensity and

speed at which each channel operates, which channel predominates in different economic environments, and which variables influence this transmission is highly relevant for monetary policy decision-making.

Another relevant issue concerns the existence of nonlinearities and state dependence in the economy. The effects of monetary policy may vary according to the economic cycle, being stronger or weaker during recessions or expansions. For example, the credit channel may be more powerful when liquidity constraints are tighter, while the wealth channel may be more relevant during periods of asset appreciation. Understanding these variations is essential for properly calibrating monetary policy.

As noted earlier, it is important to discuss the impact of monetary policy on different social groups. Monetary policy can affect households with different income levels, firms of varying sizes, and regions with unequal degrees of access to credit in distinct ways. This distributive dimension of monetary policy remains relatively underexplored, yet it has important implications for the design of public policies. The growing agenda of heterogeneous-agent models (HANK) aims precisely to examine how monetary policy affects different dimensions of economic inequality from a macroeconomic perspective.

Finally, technological advances and the digitalization of the financial system raise new questions. The emergence of fintechs, digital currencies, and alternative lending platforms may alter the way traditional transmission channels operate, requiring new approaches to understand monetary policy transmission in evolving financial environments.

These issues highlight that, although the main channels of monetary policy transmission are widely recognized, their functioning still involves complexities that challenge researchers and policymakers. Deepening the study of these topics is essential to ensure that monetary policy remains an effective tool for economic stabilization and the promotion of well-being.

1.2.6 Fiscal Policy and its Effects

Fiscal policy is a fundamental part of the background against which monetary policy decisions are made. It directly influences the economic environment in which central banks operate. In the short run, automatic fiscal stabilizers tend to mitigate the volatility of cyclical fluctuations, while discretionary spending and taxation play an important role in determining inflation and GDP through changes in aggregate demand. In the long run, inadequate fiscal management can jeopardize the sustainability of public debt, increasing inflation expectations, uncertainty, and risk premia along the yield curve.

In this context, central banks' research agendas should incorporate topics related to fiscal policy. A first relevant dimension of this agenda involves studies on the coordination between monetary and fiscal policy, focusing on the consequences of fiscal deterioration for the effectiveness of monetary policy. This line of research is particularly important for economies operating under an inflation-targeting regime.

In advanced economies, during the 2008 Global Financial Crisis, central banks – when adopting unconventional monetary policies – were required to coordinate efforts with fiscal authorities regarding debt management and the magnitude of economic stimulus to be provided. This coordination between monetary and fiscal policy, however, must not come at the expense of a loss of autonomy for the monetary authority. Accordingly, central banks also conduct studies on fiscal institutions and their relationship with the price-stability mandate.

A second dimension of the research agenda on topics related to fiscal policy concerns the development of detailed, high-frequency databases on fiscal information. The agenda for HANK models requires analyzing the impact of monetary and fiscal policies on agents with different levels of income and wealth and assessing the implications for inequality measures. Thus, not only inferences about average tax rates on consumption and income, but also the degree of tax progressivity, are essential for evaluating the impact of economic policy measures (fiscal multipliers). This issue, in particular, is fundamental for the Brazilian economy, given its high degree of heterogeneity and the informality of its labor market.

1.3 Finance

1.3.1 Exchange Rate Policy

Exchange rate policy defines the financial relationships between the country and the rest of the world, the approach to manage the foreign exchange market, the rules governing international movements of capital and currency, and the management of international reserves. Exchange rate policy directly affects citizens' lives, even if they do not engage in transactions with foreign markets. The exchange rate is reflected in the prices of goods the country imports and exports, thereby influencing other prices throughout the economy.

In accordance with the guidelines established by the National Monetary Council (CMN), the BCB is responsible for regulating the foreign exchange market. It must also monitor and ensure the regular functioning of this market and enforce compliance with regulations. The exchange rate is freely negotiated between institutions authorized to operate in the

foreign exchange market and their clients. Thus, the BCB does not intervene in the market to determine the exchange rate, but rather to preserve the proper functioning of the foreign exchange market. This functionality also depends on the effectiveness of the set of instruments used by the monetary authority when operating in the market.

On the other hand, the exchange rate is an extremely important factor for inflation – that is, a key price within the inflation-targeting regime. The literature also seeks to construct measures of the equilibrium exchange rate or to decompose the factors that influence this variable. Different approaches yield different estimates of the equilibrium exchange rate. In this context, studies on exchange rate behavior and its dynamics are highly relevant, considering not only the effects of external shocks but also the conduct of exchange rate policy.

The BCB has several instruments for intervening in the foreign exchange market, such as spot-market interventions, credit line auctions, and foreign exchange swaps. Identifying the appropriate instrument for intervention at a given moment is also an important aspect of the BCB's exchange rate policy framework.

Another relevant issue for exchange rate policy is the appropriate size of international reserves. Reserves operate as a form of insurance, enabling the country to meet its external obligations and withstand external shocks, such as currency crises and sudden stops in capital flows. However, the cost of holding these reserves can be burdensome for the country. Thus, studies on the optimal level and the optimal composition of reserves – in terms of currencies, maturities, and instruments – are also important.

It is also important to emphasize the legal authority granted to the BCB to regulate and monitor Brazilian capital abroad and foreign capital in the country, in terms of both flows and stocks. Understanding the interaction of these capital movements with exchange-rate and monetary policy – and their impacts on economic and financial stability – is essential, especially considering the dynamics of the financial account of the balance of payments, which characterizes the country's current stage of liberalization.

1.3.2 Financial markets, real economy and prices

The 2008 Global Financial Crisis made evident the interdependence between financial markets and the real sector of the economy. Since then, the economic literature has intensified its efforts to understand the transmission mechanisms linking the financial system to real economic activity. In addition, policymakers have become increasingly interested in how monetary, fiscal, and macroprudential policies can mitigate the effects of negative financial shocks.

Financial assets contain useful information for evaluating the current and prospective state of the economy. Such information enables the construction of leading indicators, scenario analysis, and the estimation of expected economic trajectories. On the other hand, external shocks – such as crises in advanced economies, shifts in the positioning of financial institutions (i.e., the volume of funds allocated to each market), or monetary policy actions (including the transmission of changes in the policy rate or central bank communication) and exchange rate policy measures (such as foreign exchange interventions) – can influence the behavior of domestic asset prices and volatilities. Therefore, studies evaluating these impacts and the propagation of their effects to the real sector are highly pertinent.

Assessing the impact of unexpected changes in interest rates or communication is also an important topic of study for central banks. Such unexpected changes, known as monetary policy surprises, occur when central bank decisions deviate from market expectations. With the widespread adoption of high-frequency financial data in the early 2000s, the literature shifted its focus to understanding the informational content of these monetary surprises derived from financial markets. The distinction between informational effects – when policy changes reveal the central bank’s private information about economic conditions – and “pure” monetary policy shocks now dominates the research agenda. Recent studies show that conventional measures of monetary surprises (e.g., changes in interest rate futures within narrow windows) significantly predict revisions in market participants’ expectations about future growth and inflation. These findings challenge the central premise of informational exogeneity, as they suggest that price movements capture not only pure policy shocks, but also important macroeconomic information revealed by the BCB. The magnitude of informational effects is even more relevant in emerging economies due to greater macroeconomic uncertainty and the more pronounced informational role of central bank decisions. Lower historical credibility amplifies the importance of information conveyed through policy actions.

2 National Financial System

This section addresses the importance of a robust and efficient financial system for achieving sustainable economic development and societal well-being. Financial system efficiency refers to the ability to allocate resources while minimizing costs and maximizing benefits, whereas financial stability refers to the system's ability to operate continuously and safely, even in the face of economic or financial shocks.

To achieve the objectives of efficiency and stability, it is essential that the financial system is properly regulated and supervised, taking into account interconnectedness and systemic risks. Technological advances and innovations – such as fintechs, Pix, and Open Finance – have transformed the financial system, increasing efficiency and creating new channels for the distribution of financial products. However, these innovations also present challenges, including the need to balance financial stability with banking competition.

Climate change also poses challenges to the stability of the financial system. The transition to a low-carbon economy and the management of environmental risks are crucial topics for ensuring the resilience of the financial system. Moreover, the adoption of sustainable finance practices that incorporate environmental, social, and governance (ESG) criteria are becoming increasingly common, promoting environmental responsibility and improving long-term financial efficiency.

This pillar also highlights the importance of financial inclusion, financial education, and consumer protection. These three dimensions are essential for improving population well-being and promoting economic stability. Financial inclusion refers particularly to access to financial products and services. Financial education empowers individuals to make more informed financial decisions. Consumer protection aims to ensure that citizens can exercise their rights and duties in managing their financial resources effectively.

2.1 Financial Stability

Financial stability is defined as the system's ability to operate continuously and securely, even in the face of economic or financial shocks. A stable financial system is one that maintains the regular functioning of financial intermediation among households, firms, and the government, ensuring that depositors feel protected and that borrowers can access the resources necessary for their activities.

Achieving stability requires that the financial system be properly regulated and supervised. The 2008 global financial crisis and the Covid-19 pandemic are examples of events that have underscored the importance of a resilient financial system. The crisis revealed the need for

significant changes in the regulatory framework, in financial system monitoring, and in its interaction with other jurisdictions – especially with other financial markets – and with the real economy. Since the financial crisis, monitoring guidelines and banking regulation have evolved, shifting from a predominantly microprudential framework to a macroprudential one. This shift has required the development of new tools for monitoring and assessing financial institutions. New research and models were developed to evaluate the transmission of risks across institutions and markets, as well as possible effects on the real economy.

In this regard, one of the most relevant analytical tools is complex network analysis, which makes it possible to identify the institutions that are most vulnerable to shocks of different origins. In an interconnected financial system, it enables regulators to identify institutions whose failure would cause significant disruptions to the functioning of the banking system, with consequent repercussions for economic activity. Complex networks can also be used to identify potential shock-propagation paths. Mapping these paths enables regulators to act proactively and estimate potential losses for the financial system as a whole arising from adverse events. For example, during the global financial crisis, the banking system was one of the main channels through which shocks spread across various jurisdictions. Interconnectedness is even more relevant in Brazil, where most firms are unable to raise funds in capital markets (equity or debt) and depend on the banking system to finance investment and working capital. Therefore, any credit rationing has the potential to amplify negative effects on the economy.

Another highly relevant topic in this area is the incorporation of environmental, geopolitical, and socio-environmental risks into the financial stability framework. This requires the development of systematic models capable of identifying vulnerabilities, measuring exposures, and anticipating transmission channels through which shocks could affect the solvency of institutions, firms' repayment capacity, credit allocation, overall market functioning, and the resilience of the financial system. These risks – associated with extreme climate events, energy-market volatility, and pressures for transparency – are analyzed using micro- and macroprudential approaches and panel-data models, covering four axes: credit risk in sensitive sectors, geopolitical and energy-related risks, socio-environmental transparency and greenwashing, and the relationship between financial efficiency and sustainable capital allocation.

Each axis addresses specific mechanisms of risk transmission, ranging from the effects on default rates, spreads, and provisioning, to reputational impacts and asset repricing. This integrated approach provides essential inputs for the development of public policies aimed at strengthening financial stability and enhancing the resilience of the financial system.

2.2 Financial Efficiency

2.2.1 Systematic Measurement Model

The traditional definition of efficiency in the SFN refers to the ability of the financial system to allocate resources effectively, thereby minimizing costs and maximizing benefits for all participants. This includes the provision of accessible financial products and services, the sustainable reduction of spreads and interest rates, and the promotion of financial citizenship. This enables a greater proportion of individuals and firms to access credit and other financial services. Building on this traditional concept, the BCB defines financial efficiency as the “ability of the SFN and the Brazilian Payment System (SPB) to broadly, safely, and affordably provide sustainable financial products and services that are adequate to society’s needs and at the lowest possible cost.”

Given the fundamental role of the SFN in channeling resources among economic agents in society, the BCB has established four main pillars to measure financial efficiency: *Financial Agents*, *Consumers*, *Society*, and *Business Environment*. The *Financial Agents* pillar focuses on the ability of financial institutions to minimize costs and design financial products more efficiently. The *Consumer* pillar seeks to identify the accessibility, usage, and quality of financial products, as well as their suitability for users’ profiles and needs. The *Society* pillar aims to assess whether the resources intermediated by the SFN are directed toward sectors and agents that meet societal aspirations – such as credit allocation enabling firms to adapt to the transition to a low-carbon economy, lending to companies with high job-creation potential, and the development of products and services that enhance population well-being. The *Business Environment* pillar evaluates the structural and functional characteristics that may influence the other pillars, including market concentration, competition levels, institutional security, and openness to innovation.

To measure these pillars and inform public policy formulation, it is crucial to develop indicators that enable a thorough and precise evaluation of the various aspects of financial efficiency within the SFN. Particular attention should be given to achieving a sustainable reduction in spreads and increasing access to financial products and services that align with societal needs.

2.2.2 Products

The financial system plays a central role in channeling funds between savers and borrowers. Successfully fulfilling this role involves offering instruments for saving, managing risk, obtaining liquidity, making payments, and allocating capital to the most productive uses.

However, these tasks are hindered by transaction costs and information asymmetries, which affect the availability of credit and other financial products and services for firms and individuals. The prevalence of these frictions and market imperfections, in turn, is influenced by the structure and organization of the SFN.

This agenda includes studies that investigate how frictions and market imperfections impair the ability of the financial system to fulfill its primary function.

Due to information asymmetries, financial institutions may demand higher interest rates or collateral to extend credit. High interest rates can discourage potential good borrowers. Collateral requirements – whether in the form of tangible assets, guarantees, or future income/revenue – often make credit inaccessible to many micro and small firms and for individuals with more volatile incomes, such as self-employed workers and informal laborers. However, even when potential borrowers can meet collateral requirements, they may not obtain favorable terms, as financial institutions may struggle to enforce these guarantees due to legal uncertainties and execution costs.

One strategy used by financial institutions to mitigate information asymmetry is the systematic collection of customer data. Although costly, this practice places them at an advantage over other institutions with which a customer has not yet established a strong relationship. This imbalance in available information increases switching costs for customers – that is, it reduces the likelihood that individuals will change financial institutions to access credit, products, or services under more favorable conditions. On the other hand, new technologies and the evolution of the SFN are reducing these barriers and costs. Thus, this topic includes not only the measurement of switching costs and their evolution over time but also the factors that influence them. Moreover, understanding how the duration and depth of banking relationships affect credit behavior across borrower types – especially delinquency – is relevant for assessing determinants of credit spreads, which is another issue encompassed within this topic.

Therefore, a sustainable reduction in spreads is one of the central objectives for improving the financial efficiency of the Brazilian banking system. To achieve this, it is essential to promote the supply of financial products and services that meet the needs of different user profiles, considering characteristics such as income, firm size, and revenue volatility. The development of tailored solutions, incentives for innovation, and the expanded availability of inclusive financial products help mitigate risks, reduce operational costs, and improve credit conditions, especially for segments that have historically been excluded or that display greater vulnerability.

Furthermore, increased competition and improvements in the business environment play a strategic role in reducing spreads. The entry of new participants – such as fintechs and digital platforms – stimulates competition, enhances transparency, and pressures traditional institutions to adapt their practices and cost structures. Research supporting the development of regulatory measures that promote competition, process simplification, and institutional security is essential for creating a more dynamic, efficient, and accessible environment. This results in direct benefits for consumers and firms, while fostering a more balanced and sustainable financial system.

Beyond investigating the effects of sustainable spread reduction on the behavior of individuals and firms, it is also important to assess how the use of financial services affects individuals' well-being. For instance, excessive indebtedness may force households to make substantial cuts in consumption, or push firms into bankruptcy.

Financial products other than credit also play a critical role in the economy. Bank accounts – including checking, payment, and savings accounts – are essential for money management and everyday transactions. Investment products such as government and corporate securities, equities, and investment funds allow capital to be invested in pursuit of financial returns. Insurance products – such as life, health, and auto insurance – provide protection against various risks. Payment services, including bank transfers and electronic payments, facilitate the movement of funds across the economy. It is important to investigate whether the dynamics of some of these products have undergone significant recent changes. Examples include the investment market, where the entry of digital investment platforms has significantly altered traditional institutions' funding cost structure and has increased competition by expanding investor access to a broader range of products and providers.

It is also relevant to study the effective costs associated with each financial product – how to assign appropriate portions of costs in a multi-product context, the determinants of costs for major financial products, and how to deal with the possibility of cross-subsidization between products with high and low-price elasticity. Additionally, analyzing the interrelationships among these products, how new technologies are reshaping their cost structures, and how to design and implement regulation that supports their sustainable growth is essential. These topics are highly relevant to public policy aimed at improving population welfare.

In addition, the growing digitalization of financial services has accelerated the development of tokenized products, which represent assets in digital form through technologies such as blockchain and distributed ledgers. These services are increasingly different from conventional financial instruments by offering new forms of access, liquidity, and asset segmentation. In this context, it is essential to conduct studies that explore the economic

mechanisms associated with tokenization, particularly in Brazil, where the use of virtual assets has expanded significantly among the population. This trend may produce important effects on economic agents' behavior, the structure of financial markets, and public policy design. Research on the effects of tokenization should consider aspects such as allocative efficiency, legal security, platform interoperability, and the risks and opportunities involved in integrating these services into the traditional financial system.

Moreover, regulating virtual assets and virtual asset service providers (VASPs) is becoming increasingly important, especially regarding legal certainty, regulatory proportionality, and the integration of these assets into the foreign exchange market. Adopting technologies such as Distributed Ledger Technology (DLT) and the analysis of international experiences contribute to the development of regulatory frameworks that balance innovation with financial stability.

The topics covered in this section all aim to analyze how financial institutions can maximize benefits and minimize costs, thereby promoting a more stable and prosperous economy.

Technological innovation is also closely linked to financial efficiency and stability and has played a crucial role in the transformation of the financial system. The development of fintech and the implementation of Pix and Open Finance in Brazil exemplify innovations that have streamlined financial processes and created new distribution channels for financial products. However, increased competition could reduce the profit margins of some financial institutions to unsustainable levels during periods of economic stress, forcing them to reassess their business lines and product offerings. Public authorities responsible for financial system regulation must therefore be alert to the potential trade-off between financial stability and banking competition to prevent or mitigate any systemic risks that could arise from heightened competition in the financial market.

Conversely, lower profit margins also incentivize institutions to increase efficiency to remain sustainable in the long term. Such efficiency improvements can enhance the competitive environment and reduce the cost of financial services, making access more inclusive. During this process, latent variations or inertia in the regional or product-specific market power of traditional institutions may also become apparent. The interaction between technological innovation and its direct and indirect effects on competition and efficiency in the SFN is an important topic of study.

Additionally, this process of technological innovation promotes the sharing of customer information, reducing informational entry barriers and enabling greater competition between established and new financial market participants. In this regard, regulatory

initiatives – such as Open Finance, Positive Credit Registry, and centralized collateral registries – have the potential to foster not only greater efficiency in financial services but also lower prices for end-consumers. Reducing information asymmetry between borrowers and lenders brought about by these innovations is an important research topic with ample room for further exploration.

2.2.3 Financial Market Infrastructure Institutions (FMIIs)

When evaluating the stability and efficiency of the SFN, a group of agents that must also be considered is the set of Financial Market Infrastructure Institutions (FMIIs), which require studies related to structural, regulatory, and operational aspects. The market structure of FMIIs, both in Brazil and in other countries, is analyzed from the perspective of how different configurations can affect systemic efficiency. Markets with a larger number of competitors tend to reduce economies of scale and scope while increasing interoperability costs between systems. Conversely, markets with fewer participants may limit competition and increase the risk of institutional concentration, including the emergence of entities considered too big to fail. Intensified interoperability among FMIIs also raises concerns about greater exposure to operational risk, requiring special focus on system resilience.

Another relevant area of investigation is FMIIs operated by public entities, especially central banks. Establishing governance structures that ensure clear separation between regulatory and operational functions is essential to mitigate potential conflicts of interest and preserve institutional credibility. In this context, the central bank's role as a system operator requires frameworks that guarantee transparency, accountability, and operational efficiency.

The expansion of instant payment systems, such as Pix, has had significant impact on the liquidity management of financial institutions, and has prompted discussions about the feasibility of full-time emergency liquidity assistance mechanisms (24/7 ELA). The rapid growth of these arrangements demands the development of robust regulatory structures to ensure the operational resilience of systems, even in stressful scenarios.

The regulation of payment arrangements also constitutes an important research front, focusing on the role of sub-acquirers, payment institutions, and emerging models such as Banking as a Service (BaaS). Defining prudential requirements – such as capital requirements and volume thresholds – is essential for ensuring the safety and stability of the system while promoting innovation and financial inclusion.

Another aspect to be evaluated is central counterparty (CCP) risk. A CCP interposes itself between buyers and sellers in the markets it clears, fulfilling obligations in the event of

default. To manage the credit risk that it assumes, a CCP maintains a safeguarding structure, calibrated – among other factors – based on risk models. However, under volatile conditions, a CCP may need to replenish these resources, imposing liquidity pressures on its participants precisely during periods of stress (procyclicality). In this context, studies evaluating whether CCP risk models adequately capture the multiple dimensions of counterparty risk – and thus avoid the need for additional participant contributions during stress periods – are highly relevant. The composition and sizing of a CCP’s safeguarding structure is also an important research subject. This structure may include participant-funded resources and the CCP’s own capital. In the former case, contributions are generally proportional to participants’ risk exposures and may be allocated to cover individual or mutual risks. Given the specific order in which resources are used, the CCP’s own capital contributes to incentive alignment, as lenient risk systems can result in losses for the CCP itself. However, excessive CCP capital may generate undesirable participant behavior, particularly regarding risk-taking.

2.2.4 Risks

In recent years, cyber risks have become increasingly relevant in terms of the stability and efficiency of the SFN. The digitalization of financial services, while bringing significant gains in productivity and inclusion, also exposes institutions and users to new vulnerabilities. Sophisticated cyberattacks can compromise the integrity of banking systems, cause operational disruptions, and generate substantial financial loss. In addition, financial scams affecting both individuals and firms, including financial institutions, have intensified. These scams range from payment-system fraud and social engineering to complex schemes enabling unauthorized access to sensitive data. The spread of such criminal activities undermines trust in the system, increases operational security costs, and may have systemic effects, especially when occurring on a large scale. High-profile cases such as the attack on C&M Software, which compromised systems of six financial institutions, and the attack on Sinqia, a company responsible for connecting banks to the Pix system, illustrate critical vulnerabilities that must be addressed. Thus, it is essential for the SFN to develop robust mechanisms for preventing, detecting, and responding to cyber incidents and fraud, as well as to promote financial and digital education among the population. Research on these risks is fundamental in supporting the development of public policies that strengthen the resilience of the financial system in the face of emerging technological and behavioral threats.

Environmental risks have also shown increasing impacts on financial efficiency and stability, making the integration of sustainable practices that incorporate ESG criteria essential. In addition to promoting socio-environmental responsibility, such practices can mitigate legal and reputational risks and strengthen financial resilience. The materialization of physical

risks – such as extreme weather events or chronic shifts in climate patterns – and transition risks related to the shift toward a low-carbon economy affects assets, liabilities, and overall trust in the financial system. These risks require measurement through capital models and stress testing, as well as policies that encourage sustainable agricultural practices, clean energy, and effective regulation. Proper pricing of environmental risks and the evaluation of the economic value of natural resources are critical for mitigating impacts and guiding financial decision-making. By accounting for these factors, it becomes possible to build a more resilient, inclusive, and sustainable financial system capable of facing climate-related challenges and ensuring long-term stability.

2.3 Financial Citizenship

Improving well-being through adequate access to and use of financial products is a global goal. Six of the seventeen goals of the United Nations (UN) 2030 Agenda for Sustainable Development explicitly include financial services among their targets. In recent years, Brazil has undergone a strong process of financial inclusion. The number of individuals with checking or savings accounts, debit and/or credit cards has grown substantially over this period. The occurrence of shocks – such as the Covid-19 pandemic – together with technological advances and new regulatory frameworks (such as the law governing payment Institutions) has generated changes in the daily lives and behavioral patterns of citizens and firms. It is therefore important to evaluate their effects on the financial system.

Greater access to the financial system has highlighted the importance of ensuring that financial products and services are suitable for consumers' profiles, particularly those of low-income individuals. Access without proper suitability can create situations that, instead of improving quality of life and financial well-being, generate the opposite outcome – as in the case of over-indebtedness. Over-indebted individuals tend to become marginalized from society, facing reduced consumption and potential productivity losses. When such situations become widespread, their effects spill over into the economy, potentially undermining factor productivity and, ultimately, affecting inflation and economic growth.

At the same time, technological and regulatory innovation has brought about a profound transformation of the financial landscape. The payments industry and fintechs exemplify this transformation, along with the regulation of new types of BCB supervised institutions such as electronic-money issuers, direct credit companies, and peer-to-peer lending companies. These developments not only expand the range of clients served but also reshape how citizens interact with the financial system.

Because the inclusion of more vulnerable individuals in the SFN has occurred primarily through digital channels – such as payment apps and digital banks – it is important to assess whether this form of inclusion has benefited this population by providing greater access to financial services suitable to their needs, at affordable prices, and in ways that facilitate transactions. It is also crucial to understand whether the channel of inclusion affects the final impact on the user's financial well-being, and if so, which channels are more effective. Such analysis is essential for designing public policies aimed at improving population well-being, for both individuals and businesses. For firms, the BCB has sought to promote inclusion particularly through capital-market access and microcredit initiatives. Studies that support policies promoting inclusion, minority representation, and diversity within the SFN are also included under this topic.

In this context, it is important to establish whether the SFN has been able to offer products and services that are suitable to the profiles of its consumers (suitability), and whether payment companies and fintechs – by expanding access – are effectively offering products that better match consumers' needs. Evaluating the impacts of these new industries on population well-being and on the efficiency of the SFN is essential.

In recent years, the BCB has provided citizens with a range of information, services, and tools – such as Registrato, the Sistema de Valores a Receber (SVR), the Complaints Ranking, the Citizen Calculator, the Meu BC portal, and BC PROTEGE+ – to promote transparency, autonomy, financial citizenship, and the prevention of scams and fraud. It is important to assess how these services affect citizens' financial lives and their ability to interact with SFN institutions.

As a relevant and complementary dimension, financial education plays a central role in interacting with financial inclusion. It enables individuals to make better choices about consumption, saving, credit, and productive activities, improving their ability to cope with short-term shocks (emergencies) and to plan for the long term (such as retirement). Thus, it is necessary to understand how financial education affects individuals' interaction with the financial system, and how it can shape children's relationship with money, influencing their families and school communities in both the short and long term. This is closely related to studies of technological and regulatory changes, analyses of vulnerable populations, and assessments of the school ecosystem at the stage at which students' interaction with the financial system will develop. A second key question is identifying the most effective tools and strategies for promoting financial education, so that it can serve as a public policy instrument.

Building on the points made in subsection 2.2.4 – Risks, it is also important to promote public policies directed toward citizens, providing tools to enhance their financial resilience, well-being, and agency in the face of climate change. Vulnerable populations tend to contribute least to climate events yet suffer the most from their consequences. As noted earlier, Financial Citizenship initiatives aim to prioritize these groups. Investigating effective mitigation and prevention tools – within the realm of sustainable finance and considering social and community aspects – is essential to equip these populations, who are more exposed and less financially prepared for unforeseen events.

At the macroeconomic level, there is interest in examining the link between financial inclusion/education and economic policies, such as monetary and macroprudential policies. It is also relevant to investigate whether and how financial inclusion and financial education affect the stability of the SFN.

Thus, it is important to develop and monitor indicators that capture the evolution of financial citizenship² more broadly. It is essential to determine how to measure – using available data, without relying on primary data collection – the degree of financial inclusion and its dimensions (access, use, and quality), as well as financial education and financial health (financial well-being) of the population. Moreover, understanding the effects of financial inclusion and education on household financial behavior (saving, consumption, use of financial products, etc.) and on macroeconomic outcomes (unemployment, informality, income, inflation, financial stability, etc.) is crucial. It is also important to assess how inclusion and education affect labor-market decisions, including formal-sector labor supply and youth labor-market participation, as well as the effectiveness of monetary, credit, and prudential policies.

Despite the growing digitalization and increased access through digital channels, many central banks have emphasized the importance of preserving physical money – banknotes and coins – as an essential means of payment for segments of the population. This relevance is especially clear in contexts of social vulnerability, technological constraints, low digital inclusion, or crises affecting electronic payment infrastructure. Therefore, this topic includes studies that evaluate the contingent role of cash, its use as an instrument of financial citizenship, and the impacts of its potential decline on access to financial services, the resilience of the payments system, and population well-being. Such studies may explore the geographic and demographic distribution of cash use, the costs and benefits of maintaining physical money, and inclusion strategies to reconcile technological innovation with universal accessibility.

2 Financial citizenship refers to the exercise of rights and duties that enable individuals to manage their financial resources responsibly. This concept encompasses not only financial inclusion and financial education, but also consumer protection in financial services and participation in the dialogue regarding the financial system.

2.4 New Technologies in the Financial System and Digital Currency

The financial system is undergoing a rapid transformation driven by technological innovations. Since the beginning of the century, the exponential increase in computational capacity, data storage, and connectivity has reduced costs and enabled new business models and technologies – such as DLT, digital currencies, instant payments, fintechs, as well as the extensive use of big data and AI – with potentially profound impacts on the economy and society. Many of these impacts fall on issues of crucial interest to central banks, requiring careful and multidisciplinary analysis.

Additionally, alongside technological advances and the resulting expansion in the use of digital assets, the relevance of operational risk has increased – especially given the need to ensure cyber resilience in the face of digital attacks and incidents, as well as to prevent and mitigate increasingly sophisticated financial fraud. The regulatory and supervisory environment is facing additional challenges due to third parties and big tech companies entering the financial system, requiring constant adaptation to address limitations of traditional regulation and the supervision of new business models. Research on operational risk, included in subsection 2.2.4, must also address protection mechanisms, incident-response strategies, data governance, interoperability across systems, and approaches to strengthen user security and trust, thereby contributing to the stability and integrity of the financial system amid rapid digital transformation.

2.4.1 Big Data, IA and New Analytical Tools

Financial digitalization generates massive volumes of data and creates opportunities to apply AI to analyze these data. The availability of granular, real-time information enables the development of more powerful analytical tools, thereby increasing productivity and the accuracy of predictive models. For example, machine learning techniques can identify complex patterns and nonlinear relationships in the data, thereby improving credit assessment, fraud detection, and economic forecasting. Likewise, agent-based models have gained prominence by incorporating the heterogeneous behaviors of different actors – something which is difficult to capture in traditional macroeconomic models.

For central banks, these advances mean that new analytical tools – beyond classical econometric techniques – can be employed to better fulfill their mandates in an environment of rapid technological evolution. A key question is how to integrate new big data and AI techniques into monetary policy and supervisory decision-making while maintaining transparency and interpretability. In this context, the BCB and other central banks worldwide have invested in data infrastructure, innovation labs, and staff training,

aiming to reconcile traditional methods with innovative approaches. Thus, innovations in big data and AI not only support fintech companies and private banks in their operations, but also become valuable allies for policymakers in interpreting economic trends and making informed decisions.

2.4.2 DLT and Decentralized Payment Systems

DLT introduces the possibility of decentralized value-exchange systems, eliminating the need for a central intermediary to verify transactions. Through computer networks that jointly validate and record operations (as occurs with Bitcoin's blockchain), DLT paves the way for the emergence of private currencies and distributed clearing and payment systems operating alongside traditional arrangements. This disintermediation can make transactions faster and cheaper, as well as providing resilience to localized failures, since there is no single point of failure.

However, crucial questions arise regarding the desirability and impact of adopting such decentralized infrastructures on a large scale. Would it be worthwhile to implement these new systems widely? If so, how should an appropriate regulatory and supervisory framework be developed to ensure safety and prevent abuse? In addition, it is necessary to assess the impact of DLTs on existing structures – for example, what becomes of centralized payment systems and the traditional roles of commercial banks and the central bank as trusted intermediaries? The introduction of distributed networks may also require legal adjustments (such as the recognition of smart contracts and distributed ledgers), as well as international coordination, given the potentially cross-border nature of these networks.

2.4.3 Cryptocurrencies, Cryptoassets and Central Bank Digital Currencies (CBDC)

Alongside the innovations described above, the growing popularity of private cryptocurrencies – such as Bitcoin, Ethereum, and various stablecoins – and other cryptoassets has brought important debates to the forefront regarding payment instruments, the nature of money, and the transformation of financial assets in the modern economy. The increasing adoption of cryptoassets by the public has underscored the need to study their effects on the economy: for example, whether widespread use of a cryptoasset could reduce reliance on sovereign currency, alter the way domestic and international transactions are conducted, or change the structure and functioning of financial markets. These developments have also prompted central banks to consider the potential development of their own digital currencies, known as Central Bank Digital Currencies (CBDCs). A CBDC is a digital form of central bank-issued money, potentially available to the general public, combining the safety of official currency with the technological innovation of cryptocurrencies and cryptoassets.

All these innovations – private cryptocurrencies, cryptoassets, instant payments, and potentially CBDCs – have the potential to reshape financial intermediation, money and credit creation, and asset-market dynamics. They could directly affect financial stability and the transmission mechanisms of monetary policy, which could have potential implications for the conduct of both monetary and exchange rate policy.

From the perspective of the real economy, new financial technologies can also influence the dynamics of goods and labor markets, as well as aggregate productivity. The introduction of more efficient payment methods, more accessible financial services, and digital assets tends to increase productivity by reducing transaction costs and allocating resources more efficiently. However, measuring these gains can be challenging. At a fundamental level, it is necessary to discuss whether current productivity-measurement methodologies adequately capture the new forms of production, service provision, and investment that emerge from financial digitalization and the advancement of cryptoassets.

Central banks around the world – including the BCB – are seeking to understand the potential impact of a sovereign digital currency on the economy, financial stability, and the transmission of monetary policy. Different countries are studying various designs and architectures for implementing CBDCs, ranging from models in which the CBDC is distributed directly to the public by the central bank to models intermediated by commercial banks.

In addition, research is investigating the effects of introducing new payment methods and digital assets on the financial system and the economy. This includes exploring the potential benefits of a CBDC in an environment of growing popularity of private cryptocurrencies and cryptoassets.

In Brazil, in particular, discussions focus on what to expect from the interaction between Pix – the instant payment system successfully implemented by the BCB in 2020 – and Drex. Pix has revolutionized retail payments by enabling instant electronic transfers 24/7 and it has become the most widely used payment method in the country.

Final Remarks

The Research Agenda 2026–2029 reaffirms the BCB’s commitment to technical excellence, transparency, and innovation. By defining strategic themes for the next four-year period, it guides scientific production and encourages collaboration with the academic community, strengthening the analytical foundation for public policy formulation.

Organized into two major areas – Macroeconomics and Finance, and the National Financial System – the Agenda combines continuity in essential topics with the incorporation of new methodologies and technologies, reflecting the challenges of an increasingly dynamic and interconnected economic environment.

In Macroeconomics and Finance, the focus is on improving models and tools aimed at monetary and financial stability, with emphasis on studies of potential GDP, the labor market, inflation, the inflation-targeting regime, and the transmission channels of monetary policy – topics that are all essential to the population’s financial well-being.

In the National Financial System area, research aims to strengthen the system’s robustness and efficiency, addressing systemic and environmental risks, technological innovations such as Pix, Open Finance, and DLT, as well as financial citizenship topics such as inclusion, education, and consumer protection.

More than a work plan, the Agenda serves as a guide for the production of applied knowledge and for dialogue with researchers and partner institutions. Its implementation will reinforce the BCB’s ability to respond to economic shocks and will contribute to price stability, financial efficiency, and the well-being of Brazilian society.



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