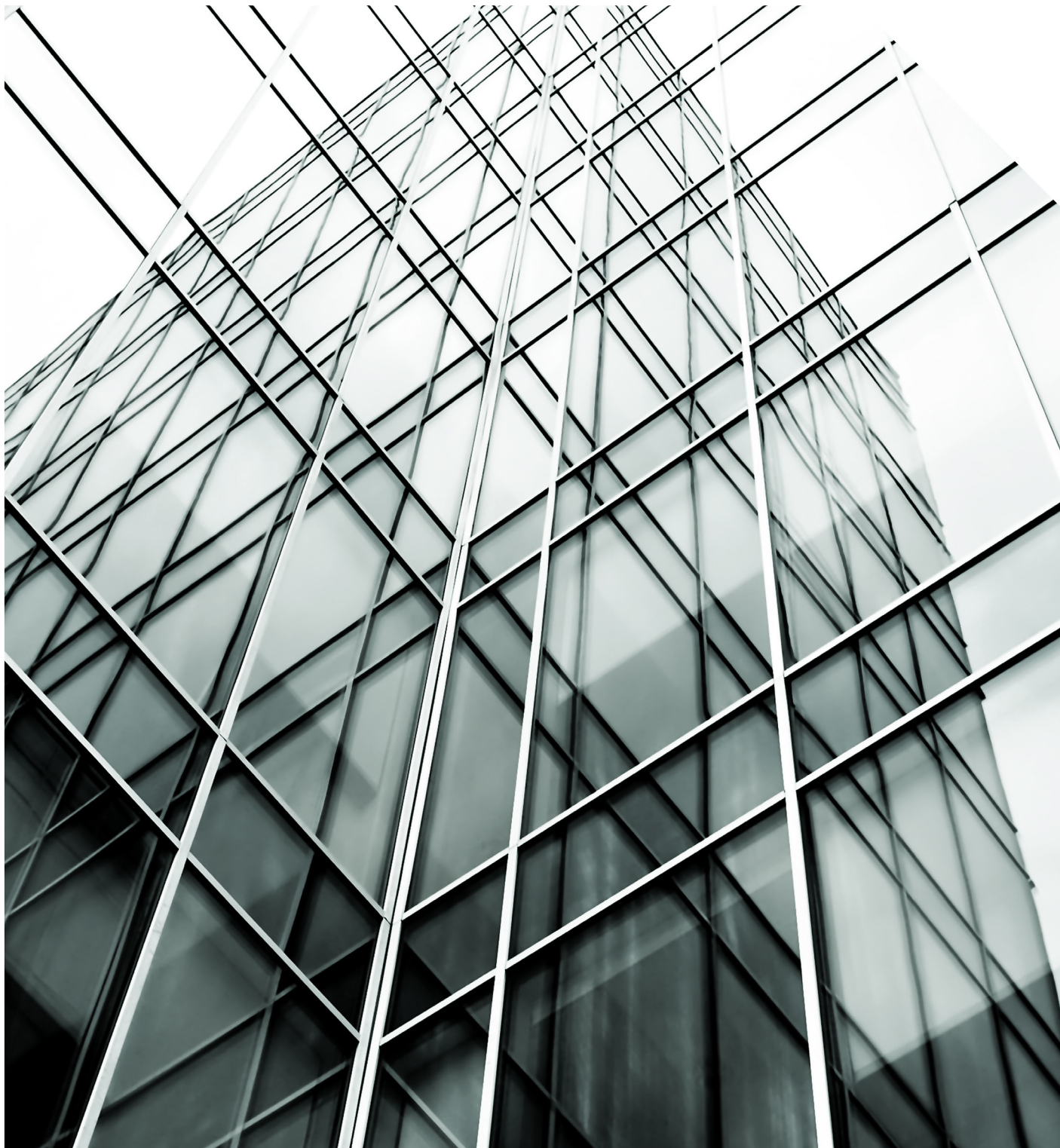




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Inflation Report

Volume 24 | Number 4 | December 2022

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Inflation Report

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Statistical conventions

- ... data not available.
- nil or non-existence of the event considered.
- 0 or 0.0 less than half the final digit shown on the right.
- * preliminary data.

Hipphen between years indicates the years covered, including the first and the last year.

A bar (/) between years (1970/1975) indicates the average of the years covered, including the first and the last year or even crop or agreement year, when mentioned in the text.

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

There are no references to sources in tables and figures originated in the Banco Central do Brasil.

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Principles for the Conduct of Monetary Policy in Brazil

Mission and objectives

The Banco Central do Brasil (BCB) primary goal is to ensure price stability. Without compromising this goal, the BCB also aims to ensure the stability and efficiency of the financial system, smooth out economic activity fluctuations, and foster full employment. The compliance with the price stability goal is achieved by means of the inflation targeting framework, with inflation targets set by the National Monetary Council (CMN).

The experience, both domestic and international, shows that the best contribution of monetary policy to sustainable economic growth, low unemployment and improvement in people's living conditions is to keep inflation low, stable and predictable.

The economic literature indicates that high and volatile inflation rates generate distortions that lead to increased risks and negatively affect investment. These distortions shorten the planning horizons of households, companies and governments and erode business confidence. High inflation rates subtract the purchasing power of wages and transfers, with negative repercussions on household's confidence and consumption. Moreover, they produce inefficient price dispersion and reduce the informational value from prices that contributes to the efficient allocation of resources in the economy.

High and volatile inflation also has regressive distributive effects. The less favored groups of the population, which generally have more restricted access to instruments to protect them from the loss of the currency's purchasing power, benefit the most from price stability.

In short, high inflation rates reduce potential economic growth, affect job openings and income, and worsen income distribution.

Implementation

Monetary policy impacts the economy with long, variable, and uncertain lags, usually estimated to extend up to two years. As a result, there is substantial uncertainty associated with inflation projections in the relevant horizon for the conduct of monetary policy, which arises naturally from the incidence of favorable and unfavorable shocks to the economy over time. It is thus expected that,

even under appropriate policy, realized inflation will fluctuate around target. The Monetary Policy Committee (Copom) should seek to conduct monetary policy so that inflation projections point to inflation converging to the target. Therefore, it is natural that monetary policy is carried out in a forward-looking way.

The inflation targeting framework in Brazil is flexible. The horizon that the BCB sees as appropriate for the return of inflation to the target depends on both the nature of the shocks that affect the economy and their persistence.

The BCB believes that a clear and transparent communication is essential for monetary policy to achieve its objectives efficiently. Thus, the BCB regularly publishes evaluations of the economic factors that determine the inflation trajectory, as well as the potential risks to this trajectory. The Copom Statements and Minutes, and the Inflation Report are key vehicles in communicating these assessments.

Inflation Report

The inflation projections are presented in scenarios that are conditional on assumptions about some economic variables. Traditionally, the assumptions refer to the paths for the exchange and Selic rates throughout the projection horizon. In addition to the baseline scenario, alternative scenarios may also be presented. It is important to stress that the scenarios presented in the Inflation Report are part of the quantitative tools used to guide Copom's monetary policy decisions and that their assumptions do not constitute and should not be seen as the Committee's forecasts for the future behavior of those variables.

The conditional inflation projections incorporate probability intervals that highlight the associated degree of uncertainty. Inflation projections depend not only on assumptions about the interest rate and the exchange rate, but also on a set of assumptions about the behavior of other variables.

Copom uses a wide range of models and scenarios, with conditioning assumptions associated with them, to guide its monetary policy decisions. By reporting some of these scenarios, the Committee seeks to enhance the transparency of monetary policy decisions, contributing to its effectiveness in controlling inflation, which is its primary objective.

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Executive summary

The global environment remains adverse and volatile, marked by prospects of below-potential 2023 global growth. The tightening of financial conditions in major economies, difficulties in energy supply to Europe, and a challenging scenario for growth in China, partly due to the Covid-19 policy in the country, reinforce a slowing global growth outlook in the coming quarters.

The inflationary environment remains challenging. There is a normalization in supply chains and an accommodation in the prices of major commodities in the recent period, which should lead to a moderation in global goods-related inflationary pressures. In turn, the low level of labor market slack in some economies, coupled with high current inflation and a high degree of diffusion, suggests that inflationary pressures on the services sector should last longer.

The process of normalization of monetary policy in advanced economies continues towards contractionary rates synchronized across countries, tightening financial conditions, impacting economic growth expectations, and raising the risk of abrupt repricing movements in the markets. In addition, a stronger market sensitivity of financial assets to fiscal fundamentals, including in advanced economies, and lower liquidity in several markets stand out. This environment calls for greater caution in the conduct of economic policies also by emerging economies.

Turning to the Brazilian economy, the release of the third quarter GDP figures suggested a more moderate growth rate. The recent set of indicators is in line with the scenario of deceleration expected by the Monetary Policy Committee (Copom).

The projection for GDP growth in 2022 went from 2.7%, in the previous Report, to 2.9% in this Report. This change was greatly influenced by the revision of the GDP time series, which led to an increase in the year-over-year results in the first half of the year. The growth projection of 1% for 2023 remains, reflecting the prospective scenario of a slowdown in economic

activity. Domestic and external uncertainties remain high and, thus, growth projections for Brazil, especially for 2023, are more uncertain than usual.

The 12-month inflation, measured by the Extended National Consumer Price Index (IPCA), has continued to decrease since the previous Report, in the wake of the effects of tax measures and the recent decline in commodity prices. Underlying inflation remains high and at a level incompatible with meeting the inflation target, but, recently, there are incipient signs of slowdown, including in the services segment.

In the quarter ended in November, the IPCA increased 0.17 p.p. above the reference scenario presented in the previous IR. Two factors greatly influenced this surprise. Part of the expected reduction in residential electricity fares, resulting from changes in the State Value-Added Tax on Sales and Services (ICMS), did not materialize, and fresh food prices increased sharply, associated with the rains in the period.

Inflation expectations for 2022, 2023, and 2024 collected by the Focus survey remained relatively stable, around 5.9%, 5.1%, and 3.5%, respectively.

The projections presented use the information available up to the 251st Copom Meeting, held on December 6-7, 2022. As for the conditioning factors used in the projections, especially those from the Focus survey, the cut-off date is December 2, 2022, unless otherwise stated.

Regarding the conditional inflation projections, in the reference scenario, the interest rate path is extracted from the Focus survey, and the exchange rate starts at USD/BRL 5.25 and evolves according to the purchasing power parity (PPP). Oil prices follow approximately the futures market curve for the following six months and then start increasing 2% per year onwards. In this scenario, Copom's inflation projections stand at 6.0% for 2022, 5.0% for 2023, and 3.0% for 2024. The Committee decided again to emphasize the six-quarter-ahead horizon, which reflects the relevant horizon, mitigates the primary effects from the tax changes but incorporates their second-round effects. On this horizon, which refers to 2024Q2, the 12-month inflation projection stands at 3.3%. Copom judges that the uncertainty in its assumptions and projections is higher than usual.

In its most recent meeting (251st), considering the assessed scenarios, the balance of risks, and

the broad array of available information, Copom decided to maintain the Selic rate at 13.75% p.a. The Committee judges that this decision reflects the uncertainty around its scenarios for prospective inflation, an even higher-than-usual variance in the balance of risks, and is consistent with the strategy for inflation convergence to a level around its target throughout the relevant horizon for monetary policy, which includes 2023 and 2024. Without compromising its fundamental objective of ensuring price stability, this decision also implies smoothing economic activity fluctuations and fostering full employment.

The Committee will remain vigilant, assessing if the strategy of maintaining the Selic rate for a sufficiently long period will be enough to ensure the convergence of inflation. The Committee emphasizes that it will persist until the disinflation process consolidates and inflation expectations anchor around its targets. The Committee reinforces that future monetary policy steps can be adjusted and will not hesitate to resume the tightening cycle if the disinflationary process does not proceed as expected.

Economic outlook

This chapter of the Inflation Report (IR) analyzes the recent evolution of the economic outlook, considering the international and domestic scenarios, as well as the prospects for the Brazilian economy in the coming quarters. The assessment of the international scenario addresses the main advanced and emerging economies, emphasizing aspects that tend to influence the Brazilian economy, especially inflation and activity indicators.

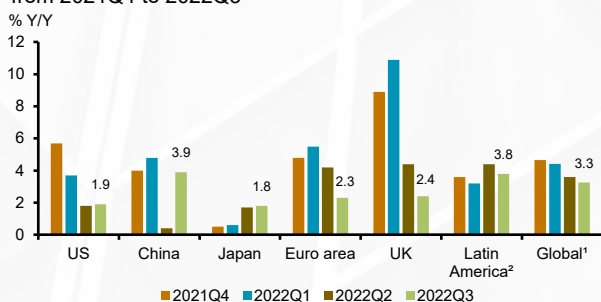
The analysis of the domestic outlook comprises the major drivers of economic activity, considering both the evolution of national accounts and the most frequent and timely sectoral indicators. Central aspects related to the movements in the labor market, the evolution of credit markets, and the performance of the country's public and external accounts are also assessed. The final section of this chapter analyzes the behavior of inflation and market expectations, considering the trajectories of key price indicators.

1.1 External scenario

The global economy continues to face an adverse scenario. The zero-Covid policy in China, the economic and geopolitical consequences of the war in Ukraine, the widespread monetary tightening in an environment of still pressured inflation, and the persistence, although at a lower extent, of disruptions in global supply chains have led to relevant revisions in global activity and inflation projections and should remain relevant uncertainty and risk factors in the prospective international scenario.

Added to these factors is an increased sensitiveness of financial markets to fiscal fundamentals and prospects, including in advanced economies. This concern may be illustrated by the events that took place in the UK in October, when a proposed plan of tax cuts and spending increases resulted in strong volatility in sovereign assets, with impacts even

Figure 1.1.1 – GDP growth
from 2021Q4 to 2022Q3

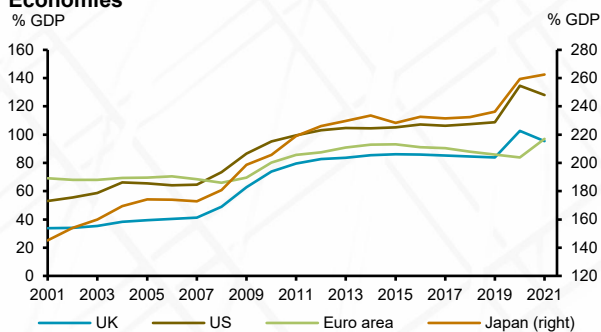


Source: Bloomberg

1/ Calculated as described in the box "Projections and macroeconomic analysis model of the global economy" of the September 2022 IR.

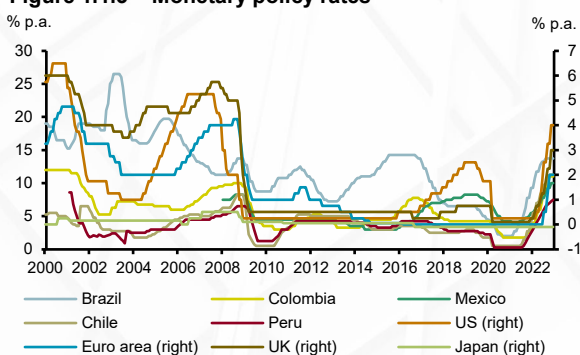
2/ Argentina, Brazil, Chile, Colombia, Mexico and Peru

Figure 1.1.2 – Government gross debt - Advanced Economies¹



Source: IMF WEO October 1/ Until 2021.

Figure 1.1.3 – Monetary policy rates¹



Source: Bloomberg 1/ Until December 6th

on pension fund balance sheets. The sovereign indebtedness environment at historically high levels, reflecting fiscal efforts during the pandemic, takes place in a period of interest rates substantially higher than that observed in last decades. In the face of pressured and widespread inflation rates, there is a risk of greater persistence of the global inflationary scenario, which should require a more lasting effort of contractionary monetary policies. That sensitiveness calls for greater caution from emerging economies.

The US economy grew 2.9% in the 2022Q3, on an annualized quarterly basis, after two consecutive quarterly declines. Aggregate consumption expenditure rose in line with the pre-pandemic trend, despite the persistence of a mismatch between goods and services. Investment expenditures, in turn, followed a sluggish pace, reflecting the deceleration in the residential construction sector in view of increased costs and interest rates, and worse economic growth prospects. High frequency data have been signaling a persistent deceleration in the US pace of economic growth. The expected continuity in the monetary tightening cycle, together with the signaling of higher and lasting terminal rates, have contributed to sustain longer-term interest rates at high levels, tightening financial conditions. Nevertheless, the labor market remains strong, with the unemployment rate reaching 3.7% in November, a historical low that is close to pre-pandemic levels. One key factor driving this performance is the labor participation rate, which remains below the pre-pandemic level, mainly due to the accelerated pace of retirements during the Covid-19 crisis and greater unwillingness of the population to return to the labor market. Amid a scenario in which consumption remains sustained and workforce continues below its expansion trend, difficulties to fill job vacancies persist, thus pressuring wages. The strong and sequential reduction in labor productivity has implied increased unit labor costs, possibly generating a persistent pressure on consumer inflation. Doubts about how much of the reduced productivity expansion is structural or cyclical represent an additional uncertainty factor for the coming quarters in the US economy.

The US inflation persists at historically high levels unseen since the start of the eighties, reflecting the strength of demand, the increase of energy and agricultural prices since early 2022 and a still strong labor market, in addition to the inertial inflation component, which is even more noticeable in high

inflation contexts. In October, the inflation rate reached 6.0%¹, a value well above the 2% target. Prospects indicate deceleration over the next two years, due to the cumulative effect of monetary policy measures, coupled with the deceleration of economic activity and the normalization of global supply chains.

The Federal Reserve (Fed) continues to increase interest rates in response to the high inflation scenario. So far in 2022 until November, the Fed had raised the Fed Funds by 375 bps, to the 3.75%-4.0% p.a. range, and further interest rate increases are expected in the next meetings, although at a more moderate pace. Moreover, the Fed continues to reduce the stock of government securities and mortgage-backed securities (MBS) in its balance sheet, scheduled by up to USD 95 billion a month from September onwards.

In Europe, the region more directly affected by the conflict in Ukraine, business, households, and market participants' confidence are still declining, leading to continuous downward revisions in growth prospects for 2023. The energy crisis in the region, mainly resulting from the Ukraine-Russia conflict, has led some industries to limit their production levels, despite governments' efforts to stimulate investments in renewables and promote greater energy efficiency. To curb energy prices pressures, mitigate the loss in households' purchasing power, and reduce the pressure on corporate costs, governments have announced fiscal measures, such as subsidies and transfers, and discussed the possibility of establishing caps for natural gas prices. Despite these initiatives, the Harmonized Consumer Price Index (HICPI) reached 10% in November 2022, still reflecting, to a large extent, the pressure of energy and food prices. The scenario of potentially negative growth in an environment of pressured inflation presents several policy challenges to the region.

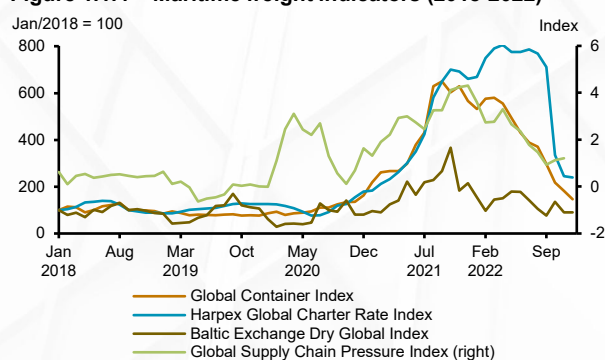
In response to the strong deterioration in the short-term inflationary scenario in the euro area, the European Central Bank (ECB) implemented in October the third interest rate increase in this cycle, accumulating an adjustment of 200 bps, leading the deposit rate to 1.5% p.a. The ECB is expected to continue tightening monetary policy in December.

1/ Value relative to the Personal Consumption Expenditures Price Index (PCE-deflator), the inflation indicator used by the Fed to evaluate the fulfillment of the inflation target.

In China, the zero-Covid policy continued to negatively pressure consumption and private investment in the second half of 2022. October activity data revealed a sharp deceleration in both supply and demand indicators, and growth projections for the Chinese economy have been revised downward mainly for 2022, but also, to a lesser extent, to 2023.

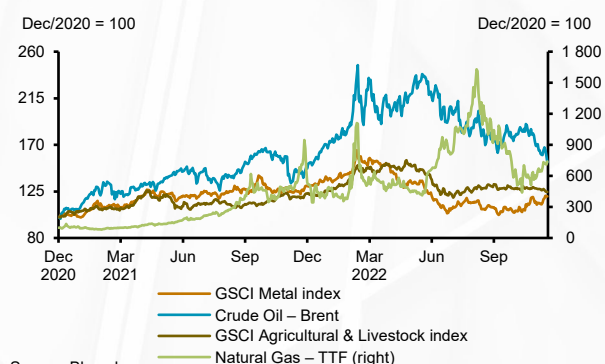
Chinese authorities have intensified the response to the real estate crisis. In November, the China Banking and Insurance Regulatory Commission (CBIRC) and the People's Bank of China (PBoC) presented a set of sixteen guidelines aimed at containing the liquidity crisis faced by real estate developers, including a temporary flexibilization of restrictions to new loans in the sector. The PBoC, in view of a relatively benign inflation scenario and depressed demand due to measures to fight Covid, announced the second cut of 0.25 p.p., in banks' compulsory reserve requirements in 2022, effective as of December 5, maintaining the 1-year Loan Prime Rate (LPR) at 3.65% p.a. and the 5-year rate at 4.3% p.a. The latest change in the LPR had taken place in August, when the PBoC reduced the 1-year rate by 5 bps and the 5-year rate by 15 bps. The Chinese government has recently announced several measures to ease the zero-Covid policy, which should add to the country's effort to support economic activity.

Figure 1.1.4 – Maritime freight indicators (2018-2022)¹



Sources: Refinitiv, the Fed
1/ Until December 2022.

Figure 1.1.5 – Commodities prices¹



Source: Bloomberg
1/ Until December 6th.

Global supply chains have improved, although not yet fully recovering in relation to the pre-pandemic period, reflecting both lockdowns in large Chinese cities, which affect the production and transportation of goods, and the unfolding of the Russia-Ukraine war on the supply of raw materials.

Commodity prices continue to be heavily influenced by the dynamics of global growth, and particularly of the Chinese economy, in addition to the consequences of the Russia-Ukraine war. Among energy commodities, oil prices have oscillated strongly since the September 2022 IR. At first, prices increased in response to the Organization of Petroleum Exporting Countries (OPEC)'s production cuts announced in early October, which were lately counterbalanced by expectations of lower demand as a result of lower global growth forecasts, continuity of sales of US strategical reserves, and a lower-than-expected decline, so far, in Russian production. Oil stocks continue to recover slowly, although still at levels below the five years before the pandemic due to the slower pace of growth in the US production and the erratic resumption of OPEC's production. More

Figure 1.1.6 – CPI – Advanced economies¹

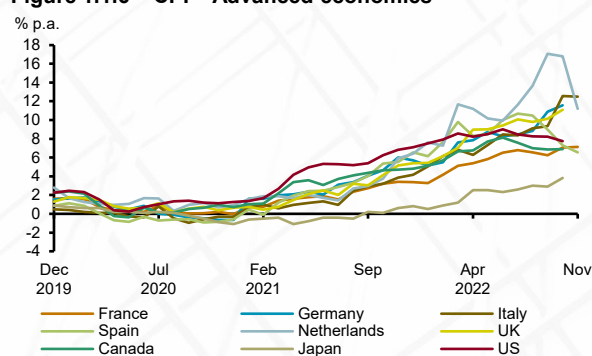


Figure 1.1.7 – CPI headline, emerging markets¹

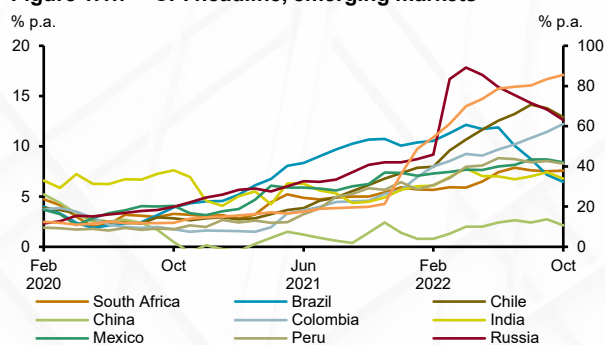


Figure 1.1.8 – Policy interest rates¹

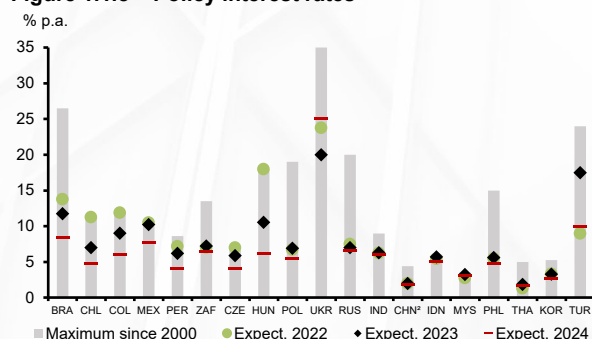
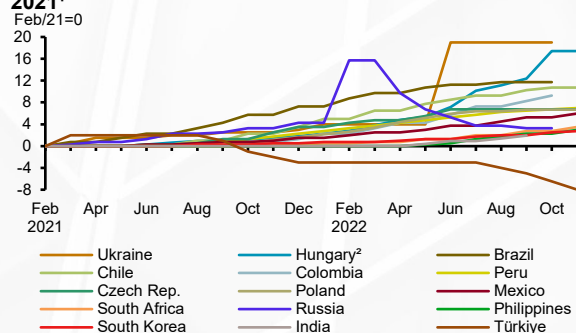


Figure 1.1.9 – Change in interest rates since March of 2021¹

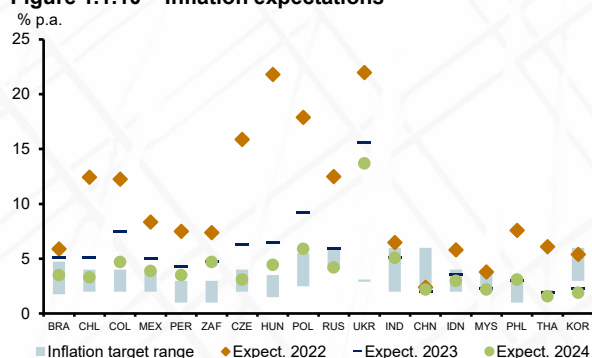


recently, oil prices registered a sharp decline in view of the imposition of new mobility restrictions related with the new Covid outbreak in China. The natural gas market, in turn, continued to see a decline in European prices, reflecting the higher-than-expected level of stocks due to a warmer winter, energy saving measures imposed by several countries and the consequent consumption reduction in the region. The increased supply of liquefied gas in the region, which counterbalanced much of the reduction in the supply of Russian gas, also contributed to prices decline. Further, the reduction in Chinese natural gas imports, in line with the country's economic slowdown, also played an important role in reducing the prices of this commodity. Prospects of a resumption of Chinese economic growth and the consequent tightening in natural gas global market sustain the pressure on futures prices, especially in Europe.

The announcement, in November, of stimulus measures in China to curb the deceleration in the real estate sector outweighed the concerns about the global economic growth and led to the increase of metal commodity prices. Agricultural commodity prices, in turn, have been relieved as the Black Sea grain export corridor continued. However, supply restrictive measures, low stocks, climatic issues, and the possibility of new restrictions originating from Ukraine's war prevented an even stronger decline in prices.

The moderation of commodity prices may suggest a reduced global inflationary pressure over the next quarters. Nevertheless, the persistence of bottlenecks in production chains and the spreading of inflationary pressures to more inertial items should contribute to maintain global inflation high in the short- and medium-terms. Such persistence of inflationary pressures remains a risk to the prospective scenario of monetary policy in advanced and emerging economies.

Among emerging economies, several central banks proceeded with increases in basic interest rates, although, in some cases, at a slower pace. Interest rate rises reflect persistently high inflation and inflation expectations for 2023 above the range consistent with inflation targets in several countries. Still, consumer inflation rates show modest signs of reduction in some countries, as a result of a certain moderation in commodity prices, deceleration in domestic demand, and the reduction of fiscal stimuli adopted in response to the pandemic.

Figure 1.1.10 – Inflation expectations¹

Sources: Bloomberg and central banks' surveys
1/ Until December 6th.

Exchange rates in several emerging economies have appreciated in the period, even though following an uneven trajectory across countries, in line with the recent USD depreciation in view of signs that the Fed might reduce the pace of interest rate rises in its next meetings. Notwithstanding this, tight global financial conditions have contributed to high volatility in global financial markets and pressured exchange rates. Central banks in Southeast Asia, which, until mid-2022 had been registering inflation rates close to their targets and are at initial stages of the monetary tightening cycle, continued to increase their interest rates.

In summary, since the September 2022 IR, global growth prospects have continued to deteriorate. Regarding inflation, over the recent months, there are early signs of a slowdown in consumer inflation rates in some countries. Nevertheless, still high commodity prices, bottlenecks in supply chains, the realignment of relative prices, the impact of tightening global financial conditions on exchange rates, coupled with the normalization in the services sector, tight labor markets, and a still robust demand for goods suggest that inflation rates should persist under pressure for some time. In that scenario, which encompasses deteriorating inflation expectations in some countries, central banks continue to be vigilant and active, leading interest rates to restrictive levels and adjusting unconventional accommodative policies.

Table 1.2.1 – Gross Domestic Product

Quarter/previous quarter

Seasonally adjusted

Itemization	% change							
	2021				2022			
	I	II	III	IV	I	II	III	III ¹
GDP at market prices	1,1	-0,3	0,4	0,9	1,3	1,0	0,4	4,5
Agric. and livestock	6,1	-4,8	-5,6	4,7	0,2	0,1	-0,9	1,2
Industry	1,3	-1,5	-0,1	-0,3	0,8	1,7	0,8	4,1
Services	0,9	0,7	1,4	0,9	1,0	1,3	1,1	6,0
Household consumption	0,4	-0,9	2,0	0,5	0,9	2,1	1,0	3,5
Government consumption	0,3	1,8	1,4	0,8	-0,3	-0,9	1,3	1,8
Investment	7,5	-4,3	-0,8	1,1	-2,4	3,8	2,8	20,2
Exports	3,8	10,3	-9,3	0,2	7,5	-2,8	3,6	8,0
Imports	10,4	-1,4	-6,2	0,5	-3,7	8,7	5,8	9,6
GDP at mkt. prices (previous release)	1,1	-0,3	0,1	0,8	1,1	1,2	-	-

Source: IBGE

1/ Change from 2019Q4.

1.2 Domestic outlook

Economic activity

GDP grew 0.4% in 2022Q3 compared with 2022Q2, decelerating from the average growth of 1.1% observed on the previous three quarters. With this result, GDP reached a level 4.5% above 2019Q4 – exceeding for the second consecutive quarter the peak reached in 2014² – but still 0.6% below the pre-pandemic trend.³

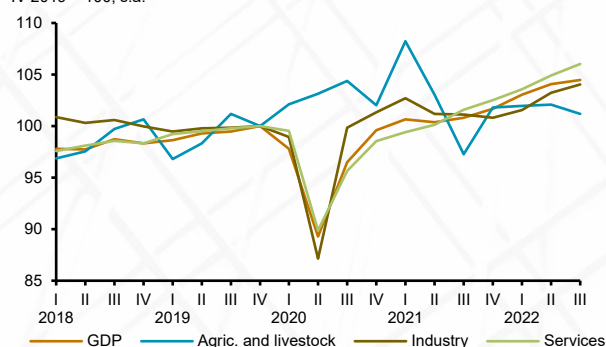
The release of the CNT for 2022Q3 led to revisions in past data, as is the case every year on this occasion. The series revision incorporates, in particular, the latest annual estimate of the National Accounts

2/ With the revision of the Quarterly National Accounts (CNT) data occurred in the release of the 2022Q3 results, GDP started to surpass the historical peak of 2014Q1 in 2022Q2, which was not observed in the previous release.

3/ The pre-pandemic trend is herein defined as the indicator projection from 2020Q1 onwards based on the average growth from 2017 to 2019.

Figure 1.2.1 – Gross Domestic Product – Supply

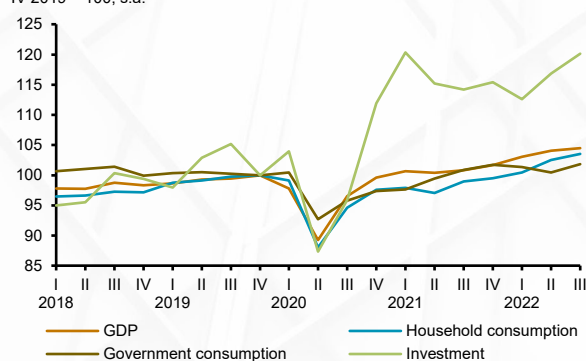
IV 2019 = 100, s.a.



Source: IBGE

Figure 1.2.2 – Gross Domestic Product – Demand

IV 2019 = 100, s.a.



Source: IBGE

(relative to 2020 and released in early November) and the most updated versions of monthly economic indicators and agricultural production surveys. With the revision in past data and the inclusion of the 2022Q3 result, quarterly changes in the seasonally adjusted GDP series rose from 1.1% to 1.3% in 2022Q1 and dropped from 1.2% to 1.0% in 2022Q2. In addition, the annual change was revised from -3.9% to -3.3% in 2020 and from 4.6% to 5.0% in 2021.

On the supply side, the GDP growth in 2022Q3 reflected a drop in agriculture and livestock and increases in industry and services. The drop in agriculture and livestock, a result different from what was expected, might have been influenced by the revision in the time series, which raised the sector's value added in the first half of the year, and by declines in the production of sugar cane and manioc.

In the secondary sector, the highlights were the growth rates in electricity, gas, and water distribution and in civil construction. With the 2022Q3 result, construction is 16.4% above the pre-pandemic level. The manufacturing value added remained stable (variation of 0.1%), after expanding above 1.0% in 2022Q1 and 2022Q2. This performance in 2022Q3 reflected expansions in the production of capital goods and durable consumer goods and declines in intermediate goods and semi and nondurable consumer goods, according to data from the Monthly Industry Survey (PIM). The only segment of the secondary sector to decline was the extractive industry, which has been oscillating around stability over the past three years.

The services sector continued to grow at a robust pace. The growths within the sector were widespread and high, equal to or greater than 1.0%, except for commerce, affected by the slowing down of retail and industrial output. After growing for nine consecutive quarters, the lowest growth in this period being 0.7% in 2021Q2, the services sector remained 6.0% above the 2019Q4 level and 0.8% above the pre-pandemic trend. Among services components, deviations from trend are positive in transportation, information and communication services, and in the "other services" group, and are negative or close to zero in the other components.

Regarding the final demand, household consumption continued to increase sharply, despite tighter credit conditions and greater household indebtedness. The rise in consumption was benefited by an increased

Figure 1.2.3 – Capital goods – production and imports

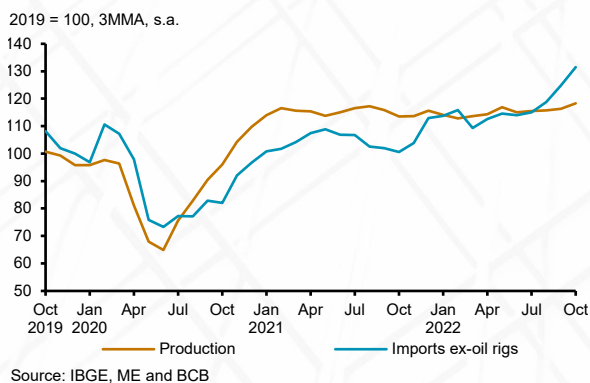


Figure 1.2.4 – Industrial production

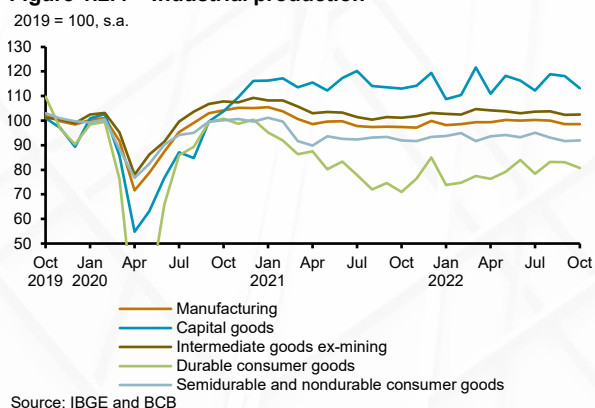
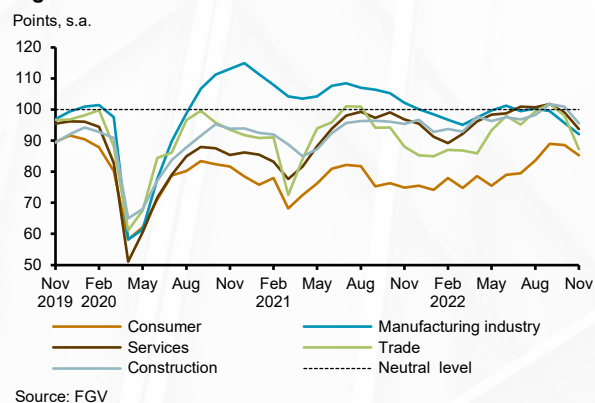


Figure 1.2.5 – Confidence index



Household Gross Disposable National Income (HGDNI) in 2022Q3. According to the BCB's estimates, the HGDNI grew 0.6% in the broad concept and 0.2% in the restricted concept, influenced by the continued expansion in the overall labor income and by the increase in the *Auxílio Brasil*.⁴

The Gross Fixed Capital Formation (GFCF) continued to grow strongly in 2022Q3, accumulating an expansion of 6.7% over the last two quarters and reaching a level 20.2% higher than in the pre-pandemic period. The growth in 2022Q3 reflected increases in production and imports of capital goods and civil construction.⁵

Among the other demand components, government spending increased, recovering from the 2022Q2 decline. Exports and imports also grew in 2022Q3, with widespread expansions in both goods and services.

Data for October and November reinforce the perception of an economic activity slowdown, an expected movement in view of the tight financial conditions. Manufacturing output remained stable in October – with decreases in capital goods and durable consumer goods and increases in intermediate goods and semi and nondurable consumer goods –, resulting in a negative statistical carry-over for industrial production in 2022Q4. The production of vehicles (National Association of Motor Vehicle Manufacturers – Anfavea) resumed expansion in November, following three consecutive declines. Nevertheless, the sector closed the quarter ended in November with a decline of 4.8% and a statistical carry-over of -4.1% for 2022Q4. Indicators based on credit and debit card sales continued to point predominantly to a slowdown in the recent period, despite some oscillation in monthly variations.⁶ It is worth emphasizing that the November results might have been affected by the World Cup and by the protests that occurred after the second round of the election,⁷ which demands greater caution in interpreting this month's results. Finally, surveys

4/ Further details on the BCB's HGDNI estimate are available in box [Monthly estimate of the Household Gross Disposable National Income](#), of the December 2021 IR.

5/ It is worth noting that variations in construction investment differ from changes in the sector's gross value added (GVA). The GFCF in construction products in each period is related to the value produced in this sector, while the construction activity GVA is equal to the difference between the value produced by the activity, considering all goods, and its intermediate consumption. Historically, however, the construction sector GVA has proven to be a good proxy for construction investment. This is to a large extent explained by the fact that most of the final goods classified as construction are produced by the civil construction activity.

6/ Assessed indicators include IDAT (Banco Itaú), IGet (Santander/Getnet), and the ICVA (Cielo).

7/ Some of the October results might also have been affected, but to a lesser extent, as the protests started on the last day of that month.

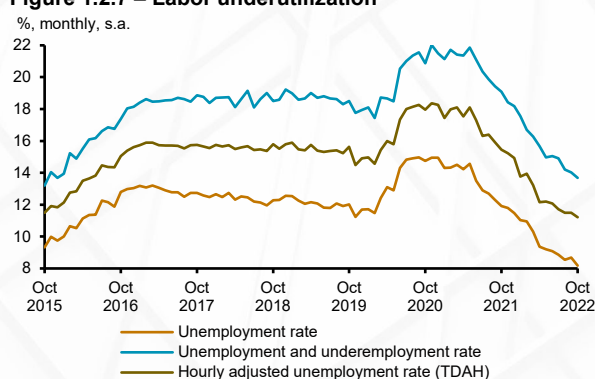
Figure 1.2.6 – Unemployment rate



Historical unemployment rate estimates following Alves, S. A. L. and Fasolo, A. M., Not Just Another Mixed Frequency Paper, Banco Central do Brasil (2015), Working Paper 400.

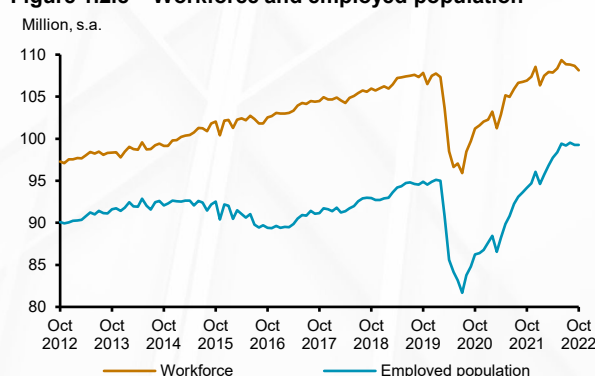
Source: IBGE and BCB

Figure 1.2.7 – Labor underutilization



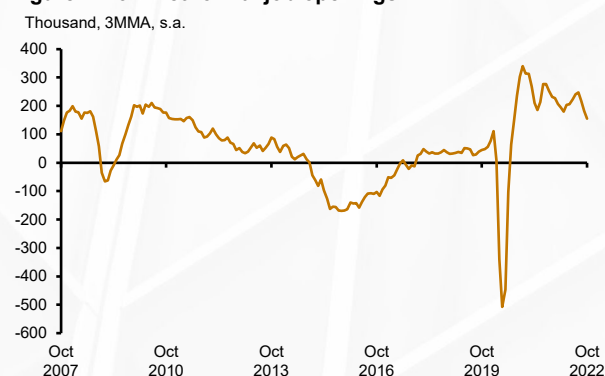
Source: IBGE and BCB

Figure 1.2.8 – Workforce and employed population



Source: IBGE and BCB (estimation of monthly series)

Figure 1.2.9 – Net formal job openings



Source: Brazilian Ministry of Labor and Social Security

showed strong deterioration in business and consumer confidence in these two months.

As detailed in a box of this IR, the projected GDP growth in 2022 was raised to 2.9%, compared with 2.7% in the previous IR. This change was heavily influenced by the revision in the time series, which led to an increase in YoY changes in the first half of the year. The growth projection of 1.0% in 2023 remains, reflecting the prospective scenario of economic activity slowdown. As domestic and external uncertainties remain high, growth projections for the Brazilian economy, especially for 2023, are more uncertain than usual. In the domestic scenario, there is high uncertainty concerning the future fiscal framework. Uncertainties also persist about the magnitude of fiscal stimuli in 2023 and their transmission to the economic activity. In the external scenario, challenges to the global economic activity performance remain, stemming from the tightening of monetary policy in several major economies, the evolution of the war in Ukraine, coupled with the crisis in the real estate sector and uncertainties regarding the zero-Covid policy in China.

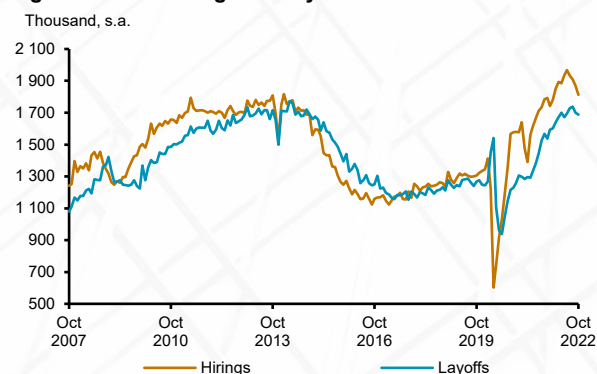
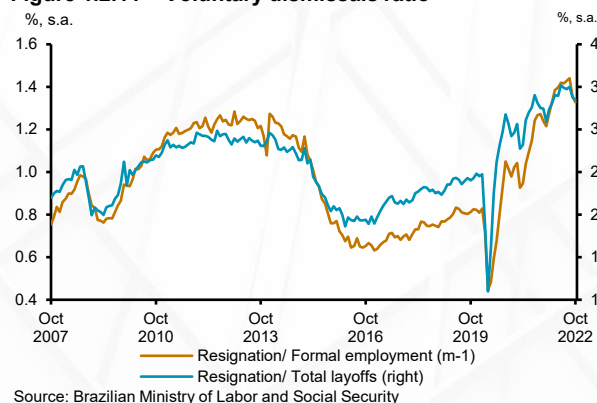
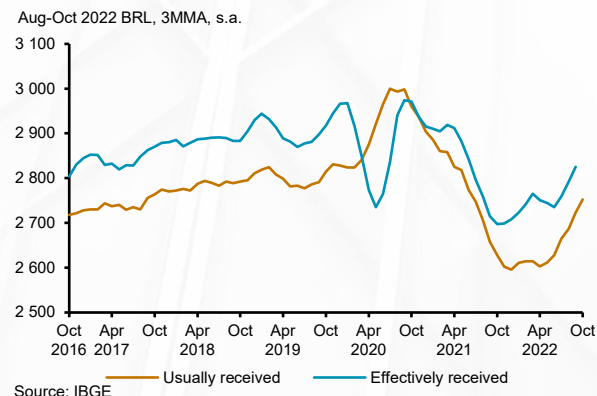
Labor market

The net job openings remained positive in the quarter ended in October, but at a slower pace than in the first half of the year and with some other signs of reduced dynamism. Although this deceleration is clearer in the Continuous National Household Sample Survey (PNAD Continuous) data, it is also observed in the New General Registry of Employed and Unemployed Persons (New Caged) indicators. The real labor income continued to recover, mainly favored by the lower inflation in the period.

Seasonally adjusted data from PNAD Continuous show that the unemployment rate dropped in the quarter ended in October according to both the traditional measure and broader measures that consider the under-utilization of the workforce.⁸ Unlike the trend observed since mid-2021, the unemployment rate decline resulted from a drop in the workforce and a more moderate growth in the employed population. The monthly evolution of PNAD Continuous indicators also signals a slowdown in the labor market.⁹ Although the monthlised

8/ About the TDAH, see box [Workforce under-utilization indicators adjusted by hours worked](#), of the December 2019 IR.

9/ Further details on the estimation of the monthlised series available in box [Estimate for monthlised PNAD Continuous data](#), of the June 2020 IR.

Figure 1.2.10 – Hirings and layoffs**Figure 1.2.11 – Voluntary dismissals ratio****Figure 1.2.12 – Real average labor income**

unemployment rate resumed its decline in October, the employed population remained stable and the workforce followed a downward trend in recent months.

New Caged data continue to show a robust pace of job openings, although slower than in the first half of the year. This deceleration is widespread across economic activities. Despite a positive balance of net job openings, the number of hirings and layoffs decreased, indicating a reduced dynamism in the labor market. Likewise, the share of voluntary dismissals also declined, although remaining close to its historical highs.

The real average labor income, measured by PNAD Continuous, continued on a recovery path in the quarter ended in October, as a result of both the growth in nominal earnings and the lower inflation in the period. Despite this expansion, real income remains below the pre-pandemic level in both the effective and usual concepts. In the formal private labor market, data from collective bargaining agreements (CCT)¹⁰ continued indicating high nominal adjustments that, however, are not sufficient to recompose the inflationary losses accumulated since 2021.

The overall labor income grew in both effective and usual metrics, mainly influenced by increased average labor income. With this result, the overall labor income exceeded the pre-pandemic level. The HGDNI, an indicator that incorporates income sources in addition to labor, also increased in the quarter ended in October.^{11,12} The HGDNI expansion was influenced by the growth of the overall labor income and by the extra allowance of the *Auxílio Brasil*, which began to be paid in August.¹³ In the opposite direction, it should be mentioned the effects of the extraordinary withdrawal from the Employment Compensation

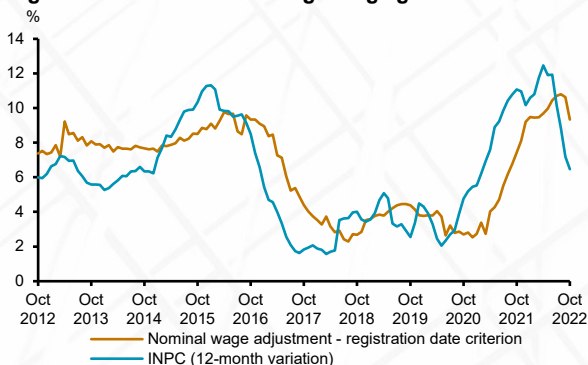
10/ This refers to the arithmetic average of nominal adjustments of the collective bargaining agreements in São Paulo and Rio de Janeiro by registration date criterion in the Collective Labor Negotiations System (*Mediador*) of the Ministry of Labor and Social Security. These agreements are those for which the percentage of adjustment agreed upon was possible to be captured. Usually, there is a delay between the dates of negotiation and registration in the system. Exercises suggest that, based on the date of registration, the agreed wage adjustments are highly correlated with the 12-month National Consumer Price Index (INPC) measured five months earlier, which is the deflator used in this analysis. If the effective date is considered, the highest correlation is registered with the previous month's INPC. The disadvantage of the effective date criterion is the low representativeness in recent months. Both metrics show similar results for the 2021 and 2022 averages (up to August).

11/ Further details on the BCB's HGDNI estimate are available in box [Monthly estimate of the Household Gross Disposable National Income](#) of the December 2021 IR.

12/ In November, with the release of the System of National Accounts (SNA) 2020 by the Brazilian Institute of Geography and Statistics (IBGE), the BCB's monthly HGDNI estimates were updated. This procedure, already foreseen by the BCB's monthly indicator methodology, re-estimates the series so that their annual totals correspond to the values disclosed in the SNA up to 2020.

13/ As indicated in the previous IR, there is relevant uncertainty associated with the HGDNI seasonal adjustment process. Using the indirect adjustment method, based on the aggregation of the seasonally adjusted HGDNI components, income variation in 2022Q3 is negative. Even in this case, however, the HGDNI reveals a sharp upward trajectory since early 2022.

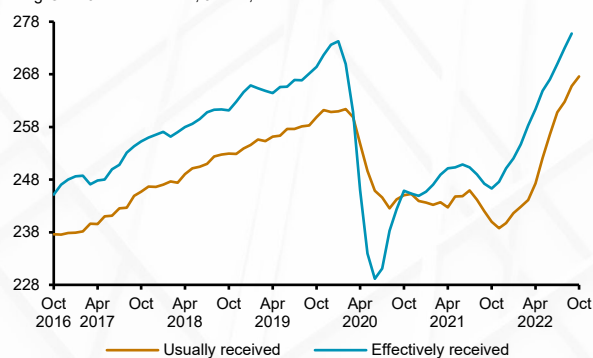
Figure 1.2.13 – Collective bargaining agreements



Source: IBGE and Brazilian Ministry of Labor and Social Security, elaborated by BCB

Figure 1.2.14 – Overall real labor income

Aug-Oct 2022 BRL billion, 3MMA, s.a.



Source: IBGE

Figure 1.2.15 – Household real gross disposable national income

Aug-Oct 2022 BRL billion, 3MMA, s.a.

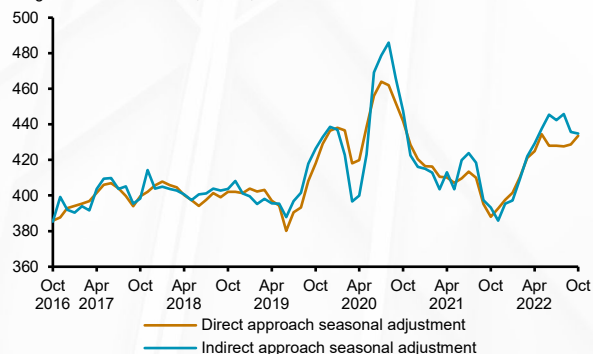
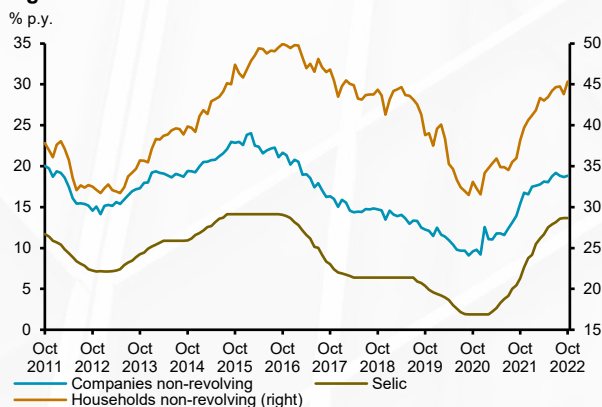


Figure 1.2.16 – Non-earmarked interest rates



14/ See box [Selic rate pass-through to the bank credit market](#), of the September 2022 IR.

15/ The definition of financial flow was presented in box [Financial flow and credit stimulus](#), of the September 2021 IR.

Fund (FGTS) in 2022Q2 and, mainly, the anticipation of the Christmas bonuses for retirees and pensioners of the National Social Security Institute (INSS), which inflate the comparison period.

Credit

Overall, the evolution of the credit market over the last months followed the pattern described in the September 2022 IR. Grants in the non-earmarked segment maintained the upward trend in high-cost modalities for household and in short-term modalities for non-financial corporations. New transactions in the earmarked segment rose in both household and corporate segments, and issuances of corporate debt in the capital market continued at a level above the pre-pandemic period. Interest rates continued to rise, although at a slower pace, while the worsening of the delinquency rate is still stronger in the household segment.

The increase in the Selic rate implemented by Copom until August has been passed on quickly to interest rates on credit operations, as expected.¹⁴ Interest rates on non-earmarked credit excluding revolving modalities reached levels similar to those observed during the monetary adjustment cycle of 2015 (Figure 1.2.16).

Non-earmarked household new credit operations continued at a high level. The expansion in this segment over the last two years was mainly due to increased expenses on credit card operations. Excluding these operations, figures reveal a real decline in comparison with 2021 (Figure 1.2.17). The composition of credit operations continued to deteriorate, in a process that started in late 2020. High-cost operations continued to grow (Figure 1.2.18), especially credit card expenses financing – both the revolving and installment modalities. Low-cost operations posted a one-off sharp increase in October, driven by payroll-deducted operations to *Auxílio Brasil* beneficiaries. In this scenario, the financial flow between the SFN and households in the non-earmarked segment has declined over the last months, fueled by non-revolving modalities (Figure 1.2.19).¹⁵

Earmarked household credit operations increased sharply, boosted by the strong, higher-than-expected

Figure 1.2.17 – Households non-earmarked new operations

Oct 2022 BRL billion, s.a.

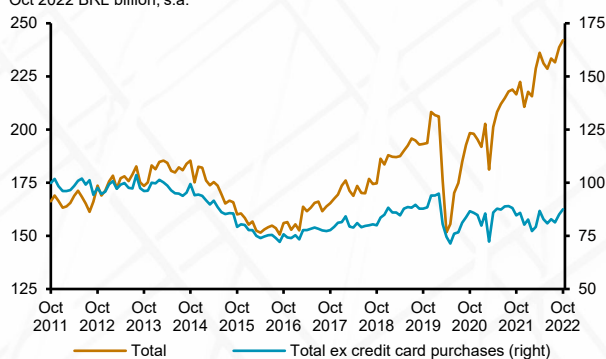


Figure 1.2.18 – Households non-earmarked grants

Oct 2022 BRL billion, s.a.

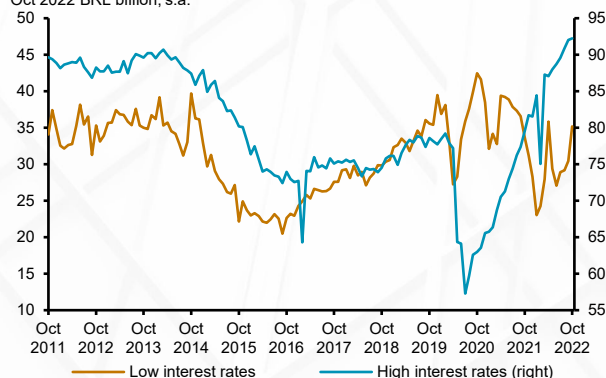


Figure 1.2.19 – Households non-earmarked financial flow

Oct 2022 BRL billion, 3MMA, s.a.

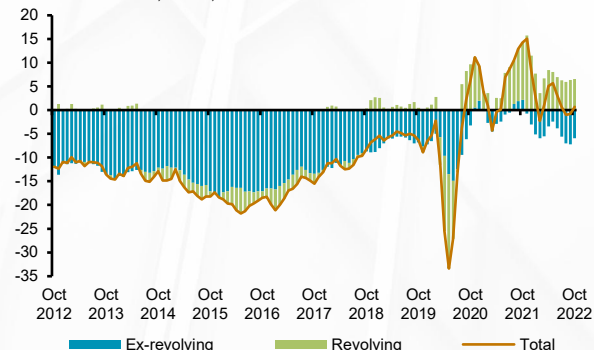
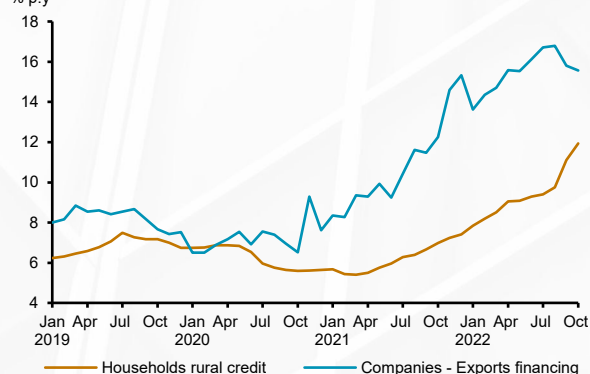


Figure 1.2.20 – Interest rates

% p.y



expansion in rural credit (Figure 1.2.21). New operations in this segment grew 43% in real terms in the July-October period, when compared with the same period in 2021. This result may be explained by the increased budget of the 22/23 *Plano Safra* (36% above 21/22), by more expensive agricultural inputs, and by higher interest rates in alternative credit lines, such as export financing (Figure 1.2.20). Real estate financing, in turn, despite registering higher interest rates over the last months, has remained stable – although at a level below the peak observed in 2021Q3, when it reached levels close to that of 2012 and 2013.

Earmarked corporate credit increased over the last months, with the resumption of the National Program for the Support of Micro and Small Businesses (Pronampe) and the Emergency Credit Access Program (PEAC), targeted to micro, small, and medium-sized companies (Figure 1.2.22). Pronampe operations resumed as of the last week of July and registered strong demand, totaling BRL 33 billion until November 9. New PEAC operations started at late August and totaled BRL 9 billion until November 3rd. Following the strong initial demand, the volume of operations dropped gradually in both programs, converging to values around BRL 3.5 billion (Pronampe) and BRL 1.5 billion (PEAC) in October.

In the non-earmarked corporate credit, new transactions overall have shown some stabilization over the last months, growing in real terms in short-term modalities and declining in longer-term ones. The stabilization in the non-earmarked segment might partially reflect the increased supply of earmarked credit in the period, as highlighted in the previous paragraph. Capital market funding, more concentrated in the segment of large companies, have oscillated since late 2021 at a level higher than in the pre-pandemic period, mainly due to issuance of debentures (Figure 1.2.23).

The delinquency in the non-earmarked household segment has been growing since 2021Q4, in line with rising interest rates and high debt-to-income ratio. Among credit modalities, the largest contributions for the delinquency increase came from revolving credit card, non-payroll-deducted personal credit, and vehicle financing (Figure 1.2.24). In the corporate segment, delinquency has grown at a moderate pace, with worse results in operations with micro, small, and medium-sized companies (Figure 1.2.25).¹⁶

16/ Further analyses about the credit risk by company size are available in section 1.2.2 of the [Financial Stability Report of November 2022](#).

Figure 1.2.21 – Households earmarked new transactions

Oct 2022 BRL billion, s.a.

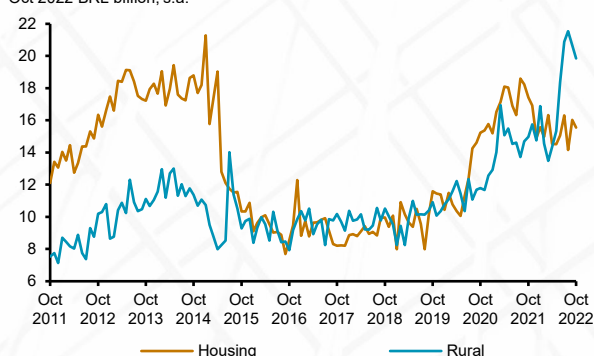
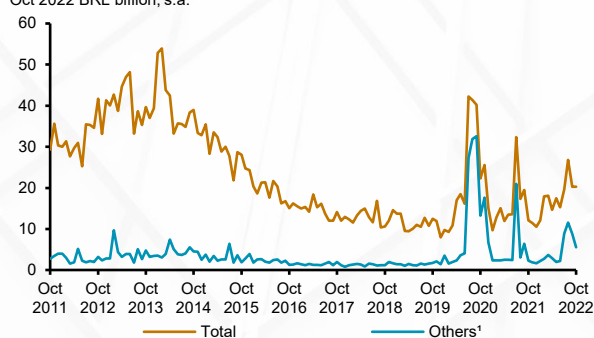


Figure 1.2.22 – Companies earmarked new transactions

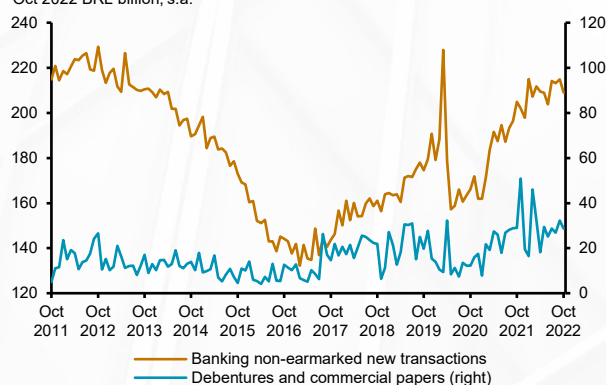
Oct 2022 BRL billion, s.a.



1/ Includes Pronampe, PEAC, PESE, among others.

Figure 1.2.23 – Corporate financing

Oct 2022 BRL billion, s.a.



The nominal balance of the earmarked credit portfolio has grown more than expected since the September 2022 IR. This surprise explains most of the revision in the growth projection for the overall credit balance in 2022, from 14.2% to 15.1%, as described in a box of this IR. Although revised from 8.2% to 8.3%, the 2023 projection continues to embody a credit slowdown in real terms compared with 2022.

Fiscal

Since the September 2022 IR, the disclosed fiscal results have continued to surprise positively, albeit by a smaller magnitude.¹⁷ The consolidated public sector registered a primary surplus of BRL 158 billion in the year up to October – BRL 65 billion in the central government, BRL 87 billion in the regional governments, and BRL 5 billion for state-owned companies. In line with these results, fiscal projections for 2022 continued to improve. The median projected public sector primary surplus, according to the Focus Report, rose from 0.75% to 1.29% of GDP.

Despite the year's accumulated positive result and improved primary result expectations for 2022,¹⁸ some aspects require attention. Regarding the central government, notwithstanding the growth in tax collection related to corporate profits in general (Corporate Income Tax – IRPJ and Social Contribution on Net Income – CSLL), revenues continue to be heavily influenced by the transfer of dividends from state-owned companies and by the highly favorable performance of the mineral extractive sector, both of which are more volatile and dependent on commodity prices in BRL.

In the subnational governments, results begin to more strongly reflect the effects of the Complementary Law 194/2022 that reduced the ICMS rates on fuels, energy, and telecommunications.¹⁹ In the quarter ended in October, state governments recorded a deficit of BRL 4 billion, interrupting the year's

17/ In October, central government net revenues disclosed by the National Treasury exceeded the Prisma Fiscal median for the fifth consecutive month. However, in the quarter ended in October, the average surprise was BRL 4.4 billion, compared with BRL 22.7 billion in the previous quarter.

18/ In the Pre-Copom Questionnaire (PCQ) relative to the February 2022 meeting, the respondents' median projected a central government primary deficit of BRL 93 billion in the year. In the PCQ relative to the June meeting, the forecast was a deficit of BRL 12 billion. The PCQ estimation for the December meeting was a surplus of BRL 60 billion in the year.

19/ Complementary Law 194/2022 was approved on June 23, 2022. Given the legal challenges to the Complementary Law and the lag between the tax event and the tax collection, August was possibly the first month with a full effective impact of this measure on fiscal statistics.

Figure 1.2.24 – Households non-earmarked 90 days past due loans

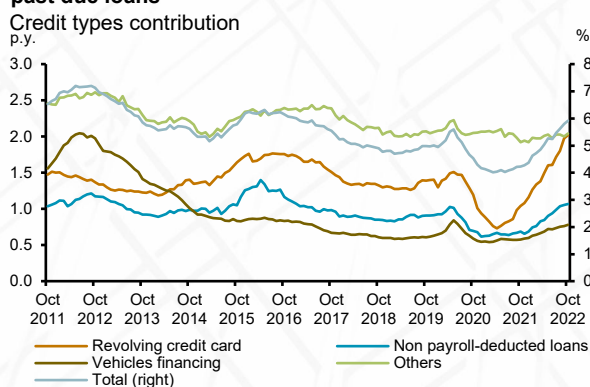


Figure 1.2.25 – Companies 90 days past due loans

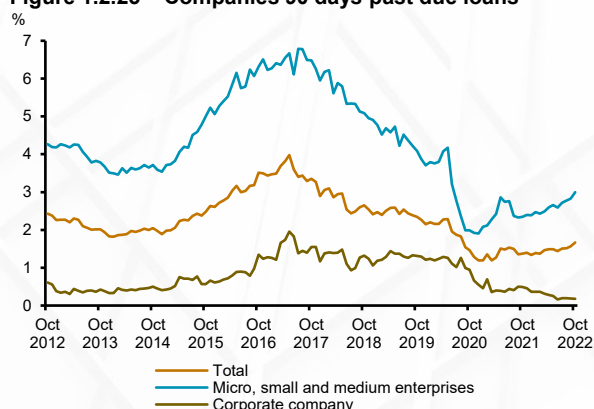


Table 1.2.2 – Public Sector Borrowing Requirements - Primary balance

Accumulated in the year until October

Itemization	BRL billion		
	2020	2021	2022
Central Government	680	53	-65
o/w Federal Government	427	-188	-314
o/w INSS	252	241	249
Regional governments	-42	-99	-87
State-owned companies	-5	-4	-5
Total	633	-50	-158

Positive values represent deficit and negative values represent superavit.

positive trend, which had accumulated a surplus of BRL 57 billion until July.²⁰

According to both the Focus Report and the PCQ, public debt projections for the end of 2022 are around 77% of GDP for the General Government Gross Debt (GGGD) and 58% for the Public Sector Net Debt (PSND), similar to those observed in the cut-off date of the September 2022 IR. Considering ten months of effective data in the year, the variability of projections for 2022 tends to be smaller. However, the median projection of the Focus and the PCQ possibly do not completely reflect the positive revision in nominal GDP disclosed in early December, which, all else constant, should imply a decrease in the government debt-to-GDP ratio.²¹

As the end of the year approaches and given the conclusion of the election process, the analysis of the fiscal scenario has focused on 2023 and the subsequent years. In particular, some measures under discussion represent relevant uncertainties on both fiscal expenses and revenues for 2023, with potentially long-lasting or permanent impacts.²² On the expenditures side, several alternatives are being discussed, in particular the removal of the *Auxílio Brasil* from the limit determined by the spending cap, which opens a significant fiscal space for an expansion of around 1% of GDP of expenses under the cap. On the revenues side, bills revising the Income Tax table and the limits of *Simples*, under discussion in the National Congress, represent a risk of substantial revenue loss. Moreover, a relevant share of the recent revenue growth was linked to the volatile performance of commodity prices in BRL.

These uncertainties are already reflected, at least partially, in market projections for fiscal variables. According to the latest PCQ, the analysts' median projection indicate that central government expenses will exceed the spending cap by BRL 130 billion in 2023 and by BRL 109 billion in 2024.²³

20/ The August's fiscal result was heavily impacted by the agreement between the federal government and the city of São Paulo about the Campo de Marte airport. Although the fiscal effect of this operation is null for the consolidated public sector, it atypically benefited the municipalities' results in the month by BRL 24 billion.

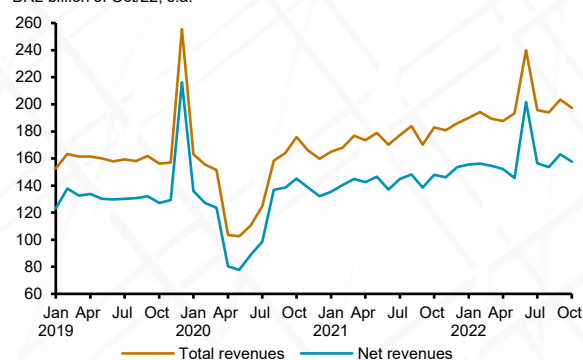
21/ Nominal GDP figures for 2020, 2021, and the first half of 2022 were revised by 1.9%, 2.5%, and 2.9%, respectively, relative to the figures effective on the September 2022 IR publication date. See the "Economic Activity" section in this chapter for a discussion about the real GDP growth revision.

22/ It is worth mentioning that the fiscal scenario and the associated uncertainties were the topic most frequently mentioned by analysts present at the 89th cycle of meetings of the BCB's Deputy Governor for Economic Policy with economists who participate in the Market Expectations System, which took place by video call on November 10-11, 2022.

23/ The precise wording of the question in the December Copom PCQ may be translated to English as "Beyond the constitutional exceptions already specified by the current law, does your projection of central government expenses incorporate any amount above that defined by the current spending cap for 2023 and 2024? If so, what is that amount for 2023 and 2024?" PCQ forms and aggregated quantitative results (Portuguese only) can be found at www.bcb.gov.br/controleinflacao/precopom.

Figure 1.2.26 – Central Government revenues

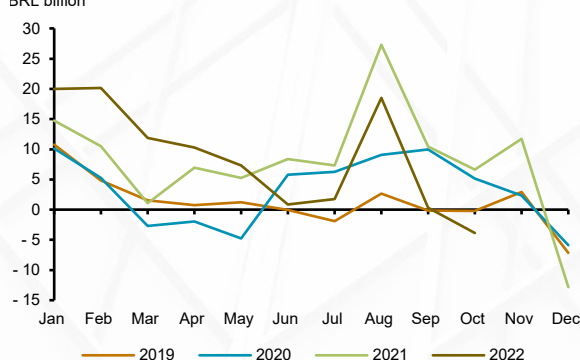
BRL billion of Oct/22, s.a.



Source: Minister of Finance, BCB (s.a.)

Figure 1.2.27 – Primary result - regional governments

BRL billion

**Table 1.2.3 – PCQ: Estimated Central Government expenses that surpass the current expendind ceiling**

	2023	2024
p75	150	150
median	130	109
p25	100	44

Table 1.2.4 – PCQ: Forecast Copom 251

	Central Gov. primary result (BRL billion)	Regional Gov. primary result (BRL billion)	PSND (% GDP)	GGGD (%GDP)
2022	60	65	58	77
2023	-116	10	62	81
2024	-89	5	66	84

Likewise, the median forecast for the central government's primary deficit for 2023 grew from BRL 55 billion in the September PCQ to BRL 116 billion in the December one. The projected central government's deficit and the reduced regional governments' surplus underpin the expectation of sharp public debt increase from 2022 to 2023: from 77% to 81% in the GGGD and from 58% to 62% in the PSND (Table 1.2.4).

Considering not only the central projections, but also the risks present in the scenario, the analysts' perception about the fiscal situation worsened according to the PCQ. In the October PCQ, most respondents considered that the fiscal situation had not changed significantly since the previous Copom meeting. However, this outlook changed substantially in the December's survey, when 91% said to notice a worsening in the fiscal situation.

External accounts

Balance of payments data from June to October indicate a slightly larger current account deficit when compared to the quarter ended in May, as available in the September 2022 IR. This worsening reflects in part the methodological revision in the transportation services account. The lower trade balance also had a negative contribution to the period's average, when measured using the criterion of the International Monetary Fund (IMF)'s Balance of Payments and International Investment Position Manual 6th edition (BPM6). However, the monthly evolution of the trade balance shows a gradual recovery in recent months. In the financial account, net inflows of direct investment liabilities continued at a high level, above the current account deficit.

The value of exports has continued an upward trend in recent months. This favorable performance reflects the growth in the volume of external sales, especially of basic and semi-manufactured goods. Implicit prices continue to fall, in line with the corresponding international prices, but at a lower magnitude. Thus, considering customs data from the Foreign Trade Secretariat of the Ministry of Economy (Secex/ME), the accumulated exports in the year up to October reached USD 281 billion, a record value in the time series, with relevant contributions from oil and soybeans.

Table 1.2.5 – PCQ: Assessment of fiscal situation

	%		
	Worsened	No relevant changes	Improved
Copom 242	80	17	2
Copom 243	70	23	8
Copom 244	69	22	10
Copom 245	50	28	22
Copom 246	24	57	19
Copom 247	69	23	8
Copom 248	93	4	3
Copom 249	46	44	9
Copom 250	21	72	7
Copom 251	91	9	0

Results above refer to the PCQ question: "How do you evaluate fiscal developments since the last Copom, considering both your baseline scenario and related risks?"

Considering quarterly averages, imports' value also increased when compared to May. The monthly value of imports, however, has been falling since August, signaling a recovery in the trade balance. This recent fall in imports was mainly due to widespread price declines, as a result of both reduced supply chain pressures and lower international commodity prices. It should be particularly highlighted the sharp drop in the volume and prices of imports of fertilizers, reversing the precautionary movement that led to an intense rise in purchases due to initial uncertainties generated by the Russian invasion of Ukraine.

The deficit in the services account has remained stable in recent months. In particular, the small decrease in net travel expenses, still limited by the restricted supply of international routes and the higher exchange rate than in the pre-pandemic period, was offset by other components of the account.

Also in the services account, the series released in November incorporated a methodological revision to revenues and expenses on transportation services, which started considering freight data from the Secex/ME.²⁴ The revision resulted in a higher deficit in the entire time series of this account, although with stronger effect in 2021 and 2022 – in line with increased international freight prices in the period.²⁵ Although expenses on transportation services remained at a high level in recent months, they are expected to decline as freight prices normalize.

The primary income deficit remained at a high level, above that of the pre-pandemic period, but stable compared to May. This result is largely determined by the level of profits and dividends outflows. Recent interest expenses also show a marginal increase, possibly reflecting the tightening of financial conditions worldwide.

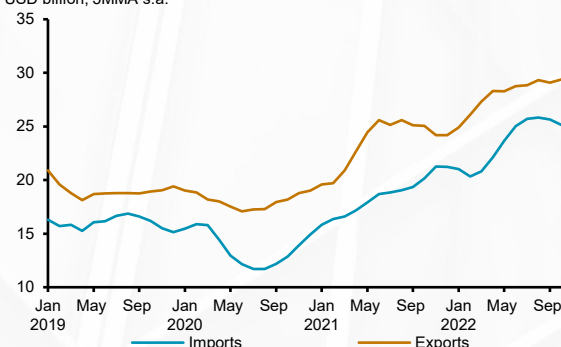
In the financial account, direct investment liabilities accumulated until October have already exceeded the annual figures reached from 2019 to 2021. As already highlighted in the previous IR, several factors might be benefiting this better-than-anticipated inflow: improved domestic economic activity and corporate profitability; resumption of projects postponed due to the pandemic; and the investment demand in sectors such as electricity, technology, and oil and gas.

Figure 1.2.28 – Current account

USD billion, 3MMA s.a.

**Figure 1.2.29 – Trade balance**

USD billion, 3MMA s.a.



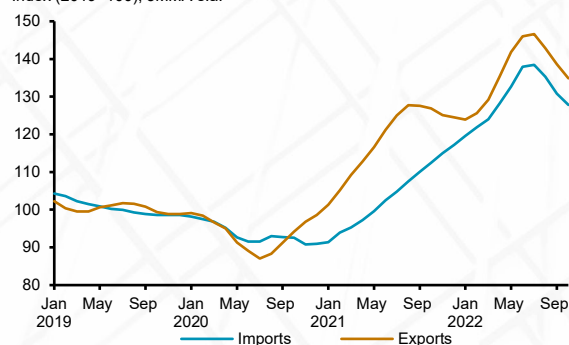
Source: SECEX/ME, BCB (s.a.)

24/ Further information about this revision can be found in the November [Economic-Financial External Sector Statistics Press Release](#).

25/ On this subject, see box [Brazilian supply chains pressure index](#), of the September 2022 IR.

Figure 1.2.30 – Price Index

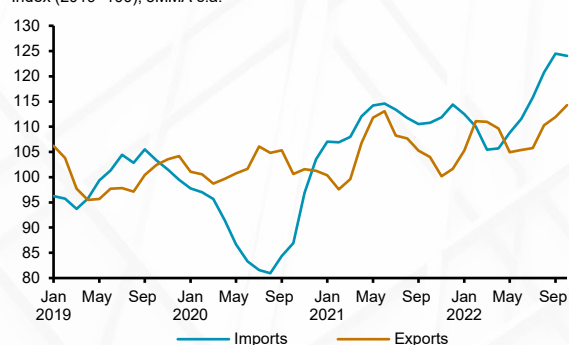
Index (2019=100), 3MMA s.a.



Source: Secex/ME, BCB (s.a.)

Figure 1.2.31 – Quantum Index

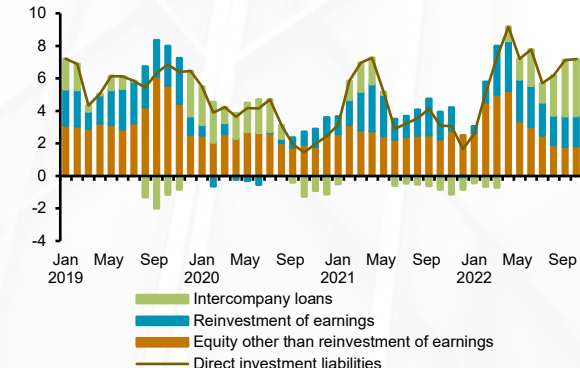
Index (2019=100), 3MMA s.a.



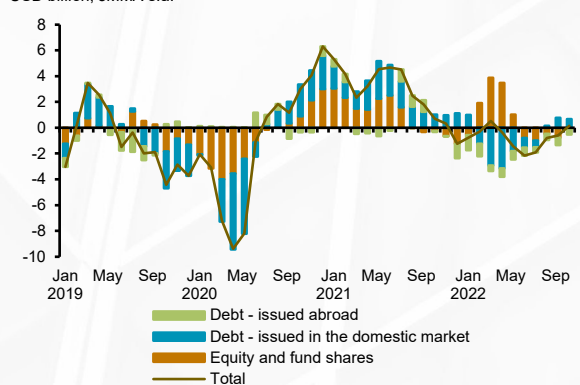
Source: Secex/ME

Figure 1.2.32 – Direct investment liabilities

USD billion, 3MMA s.a.

**Figure 1.2.33 – Portfolio investment - liabilities**

USD billion, 3MMA s.a.



Following net outflows in 2022Q2, portfolio investment flows have approached equilibrium in recent months. The main contribution to this movement came from net positive flows towards debt securities traded in the domestic market, even with the continuing monetary adjustment abroad, especially in advanced economies.

Prices

The 12-month inflation continued to decrease since the September 2022 IR, in the wake of the effects of tax measures and the recent decline in commodity prices. Underlying inflation remains high and at a level incompatible with meeting the inflation target, but, recently, there have been incipient signs of slowdown, including in the services segment, which might be in part associated with the gradual materialization of the effects of the already undertaken monetary policy cycle. Finally, analysts' inflation expectations remained relatively stable over the relevant monetary policy horizon.

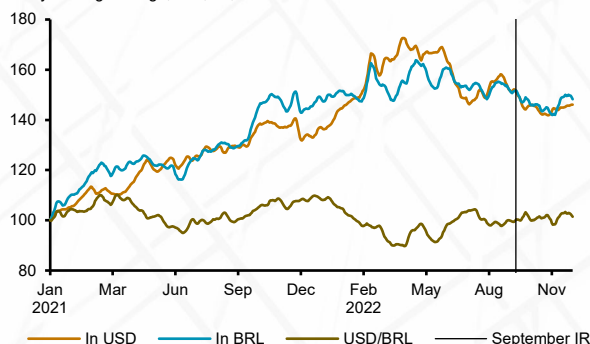
Commodity prices continued to decline, resulting in disinflationary influences. The Commodities Index – Brazil (IC-Br) dropped 3.7% in the quarter, when measured in USD, following a 10.2% decline in the previous quarter.²⁶ The commodity prices decline was followed by the BRL depreciation (1.5%) and was, therefore, lower when measured in BRL (-2.3%).

Among the macroeconomic factors driving this recent commodity prices decline, it is worth mentioning the tightening of financial conditions, with relevant effects on global economic growth prospects, and the economic impact of measures to fight the Covid-19 in China. There is substantial uncertainty about the evolution of these measures and commodity prices have been volatile, but recent signs of easing of these measures have supported prices, especially of metal commodities. Despite the decline in the aggregate index, most of the IC-Br commodities had price increases, when measured in USD (14 out of 23). By segments, a decline was observed in the energy commodities index, widespread within its components, and there was also a decline in the agricultural commodities index – concentrated in cotton, coffee, wheat, and corn. In turn, most of the commodities in the metal index increased (except iron ore and zinc).

26/ The IC-Br and exchange rate variations discussed in this section are always relative to the five-day moving average between the respective IR cut-off dates.

Figure 1.2.34 – IC-Br and exchange rate

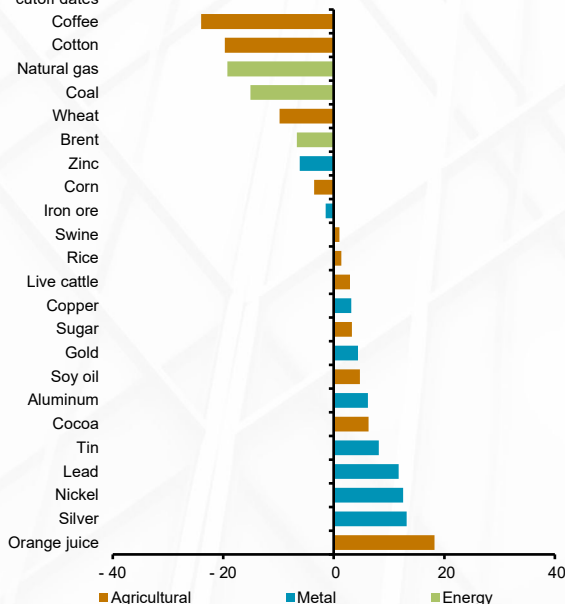
5-day moving average; Dec, 31, 2020 = 100



Sources: Bloomberg and BCB

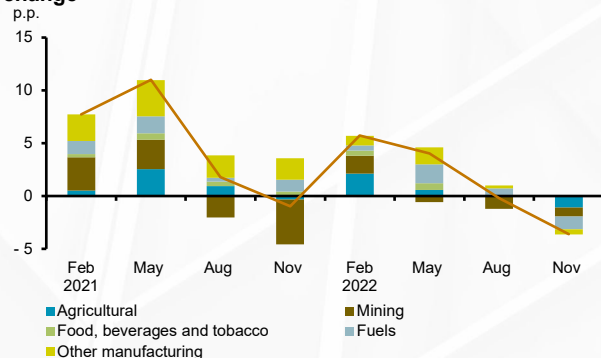
Figure 1.2.35 – Change in commodity prices (USD)

% change of the 5-day moving-average between previous and current IR cutoff dates



Source: Bloomberg

Figure 1.2.36 – Contributions to quarterly IPA-M change



Source: FGV

The persistent decline in commodity prices intensified the decrease in producer prices. The Broad Producer Price Index – Market (IPA-M) dropped 3.61% in the quarter ended in November, following a decline of 0.20% in the previous quarter. Prices of several goods declined, and some prices increased less than in the previous quarter. Therefore, the drop of the index does not reflect just the influence of a few products with significant weight. Among agricultural and livestock products the sharp decline in the price of milk (-3.86%) is especially noteworthy, following two quarterly strong increases. Relevant price declines were also observed in cattle, poultry, coffee, cotton, sugar cane, and wheat. The largest declines among industrial prices (-3.52%) came from iron ore and fuels. In addition to a moderate fall in manufacturing prices ex-food and fuels, particularly metallurgy, industrialized food prices also declined slightly, reflecting the decrease in some agricultural and livestock products. Overall, the quarterly trajectory of producer prices seems consistent with the recent slowdown of goods inflation and suggests the persistence of this process over the coming months.

Consumer prices rose 0.32% in the quarter ended in November, according to the IPCA-15, after a variation close to zero in the previous quarter (0.08%).²⁷ The smaller increase compared with the same quarter in 2021 implied a significant decline in the 12-month inflation, from 9.60% in August to 6.17% in November. The IPCA-15 resumed positive variations in October and November (0.16% and 0.53%, respectively), after most of the effects of the tax exemption measures on fuel, electricity, and telecommunications – which led to deflation in August and September (-0.73% and -0.37%, respectively) – came to an end. Nonetheless, the increases in IPCA-15 in the last two months were still below the level observed until mid-year.

When disregarding the index components that were directly affected by the tax measures, the IPCA-15 quarterly variation fell from 2.54% in August to 1.53% in November. Likewise, the average inflation cores declined from 2.17% to 1.46%, suggesting moderation in the inflationary process. Nevertheless, despite this substantial relief, underlying inflation measures remain above the level compatible with meeting the inflation target.

Services inflation also declined (from 2.10% to 1.21%), reflecting the influence of tax measures

^{27/} The analysis relied on the IPCA-15 because the November IPCA was released only on December 9th, after the cut-off date of this IR and the December Copom meeting.

Figure 1.2.37 – IPCA-15, cores average and IPCA-15 ex-sub-items affected by tax measures

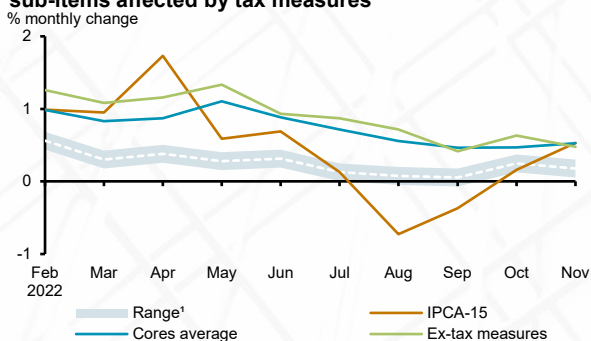
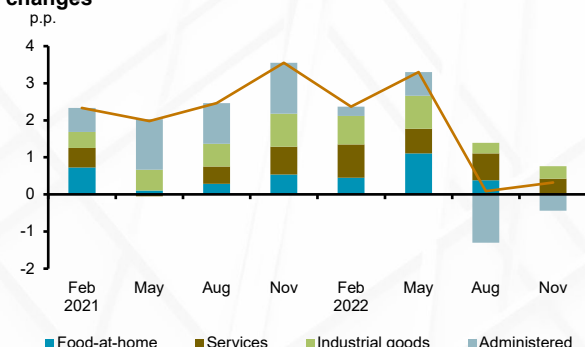
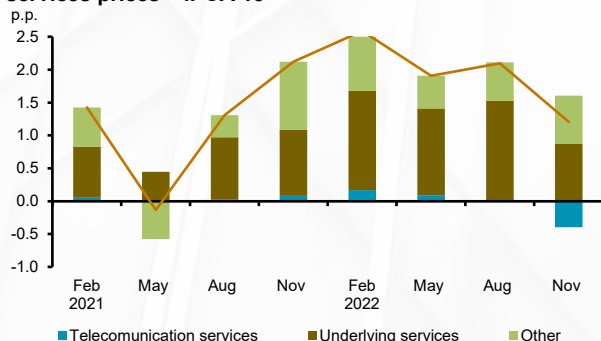


Figure 1.2.38 – Contributions to IPCA-15 quarterly changes



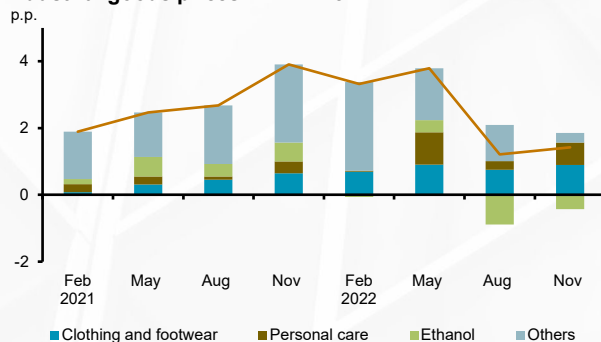
Sources: IBGE and BCB

Figure 1.2.39 – Contributions to quarterly changes in services prices – IPCA-15



Sources: IBGE and BCB

Figure 1.2.40 – Contributions to quarterly changes in industrial goods prices – IPCA-15



Sources: IBGE and BCB

on the telecommunications sector and the relevant contribution of the underlying component (from 2.58% to 1.46%). It is noteworthy in the quarter the slowdown of increases in the prices of food-away-from-home, rent, condominium fees, voluntary vehicle insurance, and car repair – the latter two possibly associated with lower increases in the costs of vehicles and parts. The slowdown in the rise of labor-intensive services, especially domestic employees, was also relevant. A box of this IR shows a slowdown both in services more sensitive to the inflationary inertia and in those more sensitive to the degree of economic slack.²⁸

Meanwhile, the increase of industrial goods prices in this quarter was higher than in the previous one (1.42% against 1.21%). However, the disaggregated analysis reveals a relatively widespread disinflationary evolution across components. This becomes clearer when ethanol and personal hygiene – two volatile components, with significant contribution to the acceleration of industrial prices – are excluded from the calculation (1.46% against 2.30%). It is noteworthy, however, that the slowdown of industrial goods prices is not observed in the prices of clothing. The persistence of inflation in clothing articles might reflect a delayed pass-through of the substantial cost increase observed in this sector since 2020. This delay, larger than the historical pattern, is possibly associated with the drop in demand in 2020 and early 2021, due to social distancing measures. The recent decline in the prices of cotton and synthetic fibers, in turn, suggests a relative slowdown in the cost pressures in this sector.

Food prices remained relatively stable, dropping 0.13%, after an increase of 2.46% in the previous quarter. This trajectory reflected the decline in milk prices, after sharp quarterly increases, which offset a strong rise in fresh food prices, as a result of heavy and early rainfalls – considering the seasonal pattern.

Administered prices continued to decrease due to lower fuel prices, although at a much slower pace than in the previous quarter (-1.67% against -4.90%), given the dissipation of the tax measures effects on fuels and electricity prices.

The median inflation expectation for 2022 declined slightly, from 6.00% to 5.92%. Inflation expectations declined to 5.60% in early November, but the negative surprise with the release of the October

28/ See box “Analysis of services inflation considering slack and inertia”, of this IR.

Figure 1.2.41 – Contributions to quarterly changes in food-at-home prices – IPCA-15

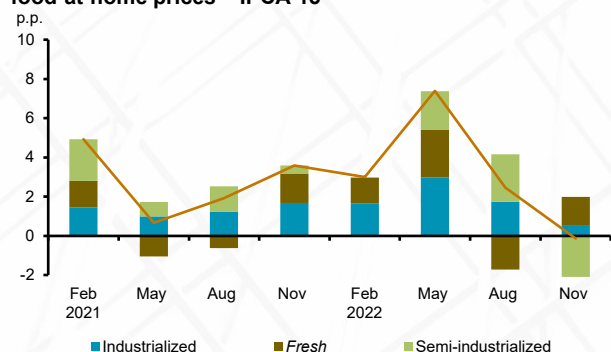


Figure 1.2.42 – Contributions to quarterly changes in administered prices – IPCA-15

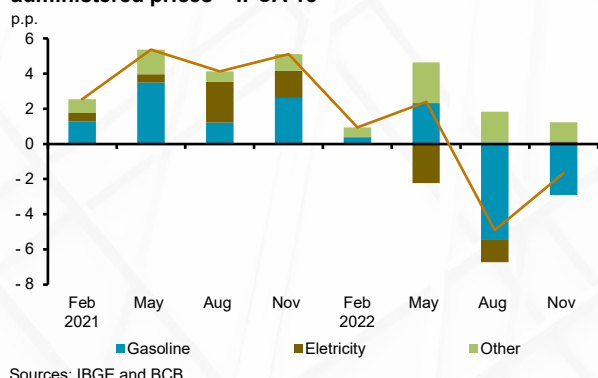


Figure 1.2.43 – Median market expectations (Focus) – 2022 IPCA

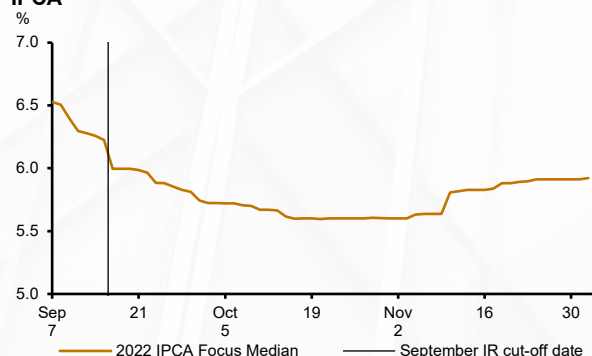
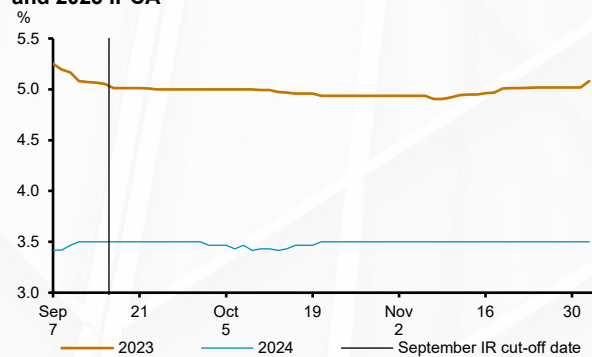


Figure 1.2.44 – Median market expectations (Focus) – 2022 and 2023 IPCA



IPCA and the economic outlook in general – including the BRL depreciation and the recent marginal increase in commodity prices – led to subsequent upward revisions. The downward revision was due to the more favorable evolution of the services inflation, offset by an upward revision in food and administered prices, when compared with the expectations observed in the September 2022 IR cut-off date, and considering the disaggregated analysis by segments.

Expectations for 2023 and 2024 – which currently characterize the relevant monetary policy horizon – remained relatively stable. The median expectations for 2023 rose from 5.01% to 5.08%, remaining above the upper limit of the tolerance interval (4.75%). Most analysts do not incorporate relevant impacts on the 2023 inflation stemming from a potential reversion of tax exemption measures implemented in 2022.²⁹ For 2024, although the median projection remained at 3.50%, the average grew from 3.48% to 3.66%. The Pre-Copom Questionnaire (PCQ) also signals a relative stability in central projections for 2023 and 2024 – with respective medians of 5.00% and 3.50%. Most PCQ respondents, however, started to indicate preponderantly upside risks associated with projections in both 2023 and 2024.

29/ A specific question about the potential reversion of tax exemption measures was included in the PCQ relative to the December Copom meeting: “What is the impact on the IPCA 2023 of a potential reversion of tax exemption measures implemented in 2022? How much of this estimated impact is already incorporated into your projections?”. The median response about the incorporated impact was 0.1 p.p. Out of the 85 respondents to this question, 42 indicated that no impact was incorporated into their projections. The full PCQ and a quantitative summary of responses is available (Portuguese only) at the [BCB homepage](#).

GDP projections for 2022 and 2023

This box updates the central projections for the growth of GDP and its supply and demand components in 2022 and 2023. Changes from the September 2022 IR forecasts were greatly influenced by the 2022Q3 result and the revision in the National Accounts time series, which increased the 2022Q3 statistical carry-over for the 2022 GDP and decreased the carry-over for the 2023 GDP. Current projections reflect the perspective that the economic activity slowdown will consolidate in 2022Q4 and throughout 2023, reflecting the expected activity deceleration worldwide and the cumulative impacts of domestic monetary policy.

As already emphasized in previous IR issues, the uncertainty surrounding Brazilian growth projections, especially for 2023, is higher than usual, due to both external and domestic factors. In the external scenario, challenges to the global economic activity performance remain, stemming from the tightening of monetary policy in several countries, the evolution of the war in Ukraine, coupled with the crisis in the real estate sector and uncertainties regarding the zero-Covid policy in China. Domestically, there is high uncertainty about the future fiscal framework. Uncertainties also persist about the magnitude of fiscal stimuli in 2023 and their transmission to the economic activity.

Table 1 – Gross Domestic Product

Accumulated in the year

Itemization	2021	% growth	
		2022 ¹	
		Previous	Current
Agriculture and livestock	0.3	0.0	-2.0
Industry	4.8	2.4	1.9
Mining	2.9	0.5	-1.0
Manufacturing	4.5	0.5	-0.2
Construction	10.0	6.4	7.0
Public utilities	1.0	10.5	10.1
Services	5.2	3.4	4.1
Trade	5.0	1.8	0.9
Transportation and storage	12.9	8.5	8.4
Communications	12.6	2.6	4.9
Financial and related services	0.0	-0.7	0.0
Other services	9.1	10.2	10.6
Real estate services	2.1	0.6	2.4
Public admin., health and education	2.3	0.7	1.8
Value added at basic prices	4.8	2.9	3.0
Taxes on products	6.2	1.1	2.1
GDP at market prices	5.0	2.7	2.9
Household consumption	3.7	3.9	4.2
Government consumption	3.5	0.7	1.6
Gross fixed capital formation	16.5	-0.4	0.7
Exports	5.9	1.5	4.0
Imports	12.0	-2.5	0.0

Source: IBGE

1/ Estimated.

Revision of the 2022 GDP projection

The projection for GDP growth in 2022 was raised from 2.7% in the September 2022 IR to 2.9%. The change in the forecast was greatly influenced by the GDP time series revision, which resulted in higher YoY variations in the first half of the year.

On the supply side, the higher GDP projection reflected an increase in the forecast for the services sector, partially offset by lower estimates for agriculture and livestock and industry.

The projection for agriculture and livestock was changed from stability to a decline of 2.0%, mainly reflecting the 2022Q3 result. The decrease in 2022Q3 relative to the previous quarter surprised the BCB, which was expecting a positive result, influenced by the relatively weak comparison base in 2022Q2 – still affected by the partial loss in the crop of soybeans, which is concentrated in the first two quarters of the year – and by increased production of orange and cotton, crops with relevant shares in the third quarter. However, these upward factors were outweighed by declines in the production of sugarcane and manioc, leading to a quarterly activity decline and worsening the year's estimate.

The industrial output projection was revised from 2.4% to 1.9%, with reductions in forecasts for all sectors but construction. Among the negative revisions, it is worth mentioning the revision in manufacturing, reflecting the stronger-than-anticipated slowdown in 2022Q3 and indicators already released for 2022Q4. The manufacturing output (Monthly Survey of Industry – PIM), in particular, remained stable in October, leaving a negative carry-over to 2022Q4. Conversely, the result of the construction sector in 2022Q3 exceeded expectations, increasing the year's projection. Despite this positive surprise, the projected slowdown in this sector is maintained for the next quarters, in part reflecting the implemented monetary adjustment. Monthly indicators, such as the production of construction inputs, retail sales of construction materials, and job openings in the sector, suggest the slowdown process is underway.

In the services sector, the growth projection for 2022 rose from 3.4% to 4.1%, influenced by the 2022Q3 result and by the revision in the time series. The tertiary sector has shown resilience, continuing to grow at a robust pace in 2022Q3. The growth rates within the sector were widespread and high, equal to or greater than 1.0%, except for commerce, affected by the slowdown of retail sales and industrial output. Nevertheless, a more widespread slowdown is expected for the next quarters, reflecting the prospect of a deceleration in household consumption, in an environment of higher interest rates and a cooling labor market¹.

As for the domestic components of the aggregate demand, the estimated expansions rose from 3.9% to 4.2% for household consumption, from 0.7% to 1.6% for government consumption, and from -0.4% to 0.7% for the Gross Fixed Capital Formation (GFCF). In general, these changes reflect revisions in the time series, which increased the YoY variation in the first half of the year. As for household consumption, the lower-than-expected deceleration in 2022Q3 also contributed for the revision.

Exports and imports are expected to vary 4.0% and 0.0%, respectively, in 2022, against previous projections of 1.5% and -2.5%, respectively, due to higher-than-projected expansions in the volume of exports and imports of goods and services. Considering new estimates for the components of aggregate demand, the contributions of the domestic demand and of the external sector to the evolution of the GDP in 2022 are estimated at 2.1 p.p. and 0.8 p.p., respectively.

1/ As discussed in the Labor Market section of the Chapter 1 of this IR.

Revision of the 2023 GDP projection

For 2023, the growth projection remained at 1.0%, maintaining the prospect of a slowdown in domestic demand and in more cyclical supply components.

As already mentioned, the lower statistical carry-over for 2023 negatively influenced the GDP growth projection for the year. However, this statistical effect was uneven: among supply components, there was a reduction for agriculture and livestock and for industry and an increase for the services sector. The IBGE's release of the first forecast for agricultural production for 2023, with perspectives of slightly lower increases than those considered in the forecast released in the previous IR, was an additional downward factor.

Discussions concerning the 2023 government budget indicate greater expansion of primary expenditures than that foreseen in the current legislation, especially those associated with transfers to households.² The effect of the fiscal expansion on the economic activity operates through different channels. On the one hand, greater fiscal stimulus, through their direct effects, may help sustain the aggregate demand, especially in the short-term. On the other hand, additional fiscal stimulus, especially when impacting the perception of the public debt sustainability, may hamper financial conditions and the economic expansion. Therefore, the final outcome depends on the combination of the magnitude of the fiscal expansion in the short-term and the exact formulation of the new fiscal framework.

On the supply side, the maintenance of the central projection for the GDP variation in 2023 reflected declines in the forecasts for agriculture and livestock and for industry, from respectively 7.5% and 0.4% to 7.0% and 0.0%, and an increase for services, from 0.6% to 0.9%.

Regarding the domestic demand, projections for household consumption, government consumption, and GFCF rose, respectively, from 0.7%, 1.0%, and -0.5% to 1.2%, 1.1%, and 0.3%, greatly influenced by the expansions in 2022Q3, which suggested a domestic demand marginally more resilient than the expected.

Estimated variations for exports and imports remained practically unchanged, going from 3.0% to 2.8% and from 0.5% to 0.7%, respectively. The contributions of domestic and external demand are estimated at 0.6% and 0.4%, respectively.

Table 2 – Gross Domestic Product

Accumulated in the year

Itemization	2021	2022 ¹	% growth	
			2023 ¹	
			Previous	Current
Agriculture and livestock	0.3	-2.0	7.5	7.0
Industry	4.8	1.9	0.4	0.0
Services	5.2	4.1	0.6	0.9
Value added at basic prices	4.8	3.0	1.1	1.1
Taxes on products	6.2	2.1	0.2	0.4
GDP at market prices	5.0	2.9	1.0	1.0
Household consumption	3.7	4.2	0.7	1.2
Government consumption	3.5	1.6	1.0	1.1
Gross Fixed Capital Formation	16.5	0.7	-0.5	0.3
Exports	5.9	4.0	3.0	2.8
Imports	12.0	0.0	0.5	0.7

Source: IBGE

1/ Estimated.

2/ Although the value of this public spending expansion is uncertain, analysts incorporate BRL 130 billion in expenses above the current spending cap in their projections for the 2023 fiscal result, according to the median responses in the Pre-Copom Questionnaire (PCQ) relative to the December Copom meeting. The precise wording of the question in the December Copom PCQ may be translated to English as "Beyond the constitutional exceptions already specified by the current law, does your projection of central government expenses incorporate any amount above that defined by the current spending cap for 2023 and 2024? If so, what is that amount for 2023 and 2024?" The PCQ forms and aggregated quantitative results (Portuguese only) can be found at www.bcb.gov.br/controleinflacao/precopom.

Projection for credit growth in 2022 and 2023

This box presents the revised projections for the nominal balance growth of the SFN credit portfolio in 2022 and 2023 (Table 1). Since the September 2022 IR, the volume of new operations in the scope of Pronampe and PEAC was higher than expected, there was a strong expansion in rural credit and real estate financing remained resilient. The perspective of a more robust expansion in the earmarked segment is, therefore, the main reason underlying the revision of credit balance projections for 2022 and 2023, from 14.2% and 8.2% to 15.1% and 8.3%, respectively.

In the non-earmarked segment, the recent results for the household credit balance remained in line with expectations and the 2022 projection was maintained. In the corporate segment, the projection for 2022 was revised downward, incorporating negative surprises from recent results, influenced by a high volume of amortizations.

For 2023, the projection for non-earmarked credit was marginally revised downward, in line with the recent movement of domestic financial conditions and the expectation of a more contractionary real interest rate in this horizon, according to the Focus survey.

In the earmarked segment, the robust budget for the 22/23 *Plano Safra*, associated with the increased price of agricultural inputs and the greater attractiveness of subsidized credit, given the higher Selic rate, contributed to positive surprises in this segment in 2022Q3, impacting especially the credit to households. Similarly, real estate financing, influenced by the *Casa Verde Amarela* program, registered a lower-than-expected deceleration, despite the scenario of higher interest rates. These positive surprises led to the revision in the projected growth in the earmarked household segment in 2022, from 13% to 17%, and in 2023, from 7% to 9%.

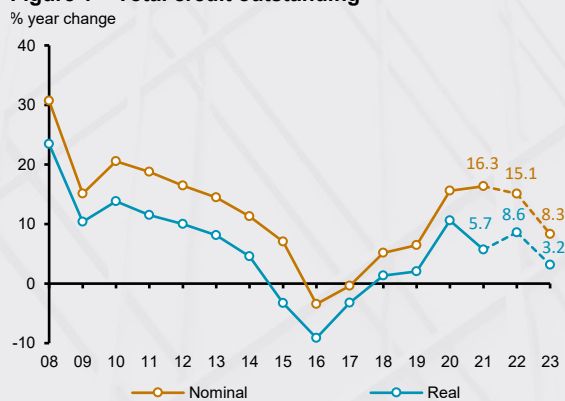
Table 1 – Credit balance

	12-month variation					
	Occurred		Proj. 2022		Proj. 2023	
	2021	Oct 2022	Previous	Current	Previous	Current
Total	16.3	15.8	14.2	15.1	8.2	8.3
Non-earmarked	20.4	17.6	17.2	16.3	9.6	8.6
Households	23.0	20.9	19.0	19.0	10.0	9.0
Corporations	17.4	13.5	15.0	13.0	9.0	8.0
Earmarked	10.9	13.2	9.7	13.4	6.0	8.0
Households	18.5	18.2	13.0	17.0	7.0	9.0
Corporations	-0.3	4.9	4.0	7.0	4.0	6.0
Total Households	21.0	19.7	16.4	18.1	8.7	9.0
Total Corporations	10.5	10.4	11.2	10.9	7.4	7.3

The balance of the corporate earmarked segment was impacted by higher disbursements in the scope of Pronampe and PEAC, which led to a revision in the growth projection, from 4% to 7% in 2022, and from 4% to 6% in 2023. It is still assumed that new operations in the scope of these programs will be financed by resources gradually released by the amortization of current operations.

In short, new projections for the nominal credit balance are marginally higher for 2022 and maintain the expected pace for 2023 when compared with those of the September 2022 IR. In terms of composition, the revision incorporates expectations of greater expansion in the earmarked segment, especially in 2022, and lower nominal credit variation in the non-earmarked segment, in line with the expected impacts of the monetary tightening. For 2023, projections for both the non-earmarked and earmarked segments indicate deceleration in the credit balance when compared with 2022.

Figure 1 – Total credit outstanding



Projections for the external accounts in 2022 and 2023

There have been marginal changes in the external accounts prospective scenario since the September 2022 IR, embodying a larger deficit in the current account and higher net inflows of direct investment liabilities in 2022. The higher deficit projection in 2022, USD 60 billion (3.2% of GDP), is mainly due to an increased projection for expenses on services, given the incorporation of the methodological revision in the transportation account.¹ For direct investment liabilities, the main reason underlying the revision was the strong inflow of intercompany loans over the last months. In 2023, the current account deficit is expected to be lower than in 2022, USD 49 billion (2.5% of GDP), due to the expected improvement in the trade balance. Despite these revisions, projections continue to indicate a favorable scenario for the external accounts, with current account deficit remaining lower than net inflows of direct investment liabilities.

Table 1 – Projections for the external accounts

Itemization	USD billion					
	2021	2022	2022 Forecast		2023 Forecast	
	Year	Jan-Oct	Previous	Current	Previous	Current
Current account	-46	-44	-47	-60	-36	-49
Balance on goods	36	37	42	41	54	46
Exports	284	285	331	334	338	328
Imports	248	248	289	293	284	282
Services	-27	-33	-29	-39	-33	-36
of which: Travel	-2	-6	-8	-7	-11	-11
of which: Operating leasing services	-7	-6	-8	-8	-8	-8
Primary income	-59	-52	-63	-66	-60	-62
of which: Interests	-21	-16	-27	-23	-29	-27
of which: Profits and dividends	-38	-36	-36	-43	-31	-35
Investment - liabilities	106	106	66	96	70	70
Direct investment liabilities	46	74	70	80	75	75
Portfolio investments	23	-7	-9	-5	-5	-5
Other investments ¹	36	40	5	21	0	0

^{1/} includes loans, commercial credits, deposits and other investments

The projection for exports in 2022, which already signaled a historical record this year in the September 2022 IR, increased marginally. This projection incorporates a stronger result for foreign sales' volume, with positive surprises in the exports of corn and sugar, and, in the opposite direction, lower prices for most commodities. The year should end with a record in the exports' value of important goods, such as soybeans, oil, meat, corn, soybeans meal, and fuel oils.

The projection for imports in 2022 also increased slightly, which maintains the expected trade balance essentially unchanged. Similarly to exports, the revision incorporates a greater projection for the volume of imports, partially counterbalanced by lower prices, in line with the decline in commodity prices and reduced bottlenecks in supply chains.

^{1/} Further information about the review of external sector statistics is available in the [November Economic-Financial External Sector Statistics Press Release](#).

In the services account, the key factor for the expected increase in the 2022 deficit was the methodological revision in the transportation services account, which started to capture the strong increases in transportation costs due the Covid-19 pandemic. Despite the recent slowdown in the prices of international freights of goods, net expenses on transportation services from January to September were revised up by USD 8.9 billion. In the primary income account, the surprise with the released data resulted in a higher projection for net expenses on profits and dividends. Despite the growth in recent seasonally adjusted results, which might reflect the tightening of world financial conditions, the deficit in the interest account is still below expectations and, thus, its projection was reduced for 2022.

In the financial account, the projection for direct investment liabilities was revised to USD 80 billion in 2022 (4.3% of GDP) in response to strong flows of intercompany reverse transactions over the last months, which added to relevant equity inflows. Therefore, the ratio of direct investment liabilities to GDP over the last 12 months returned to a level higher than in the pre-pandemic period. As highlighted in the September 2022 IR, several factors might be benefiting these inflows: improved domestic economic activity and corporate profitability; the resumption of projects postponed due to the pandemic; and the demand for investments in sectors such as electricity, technology, and oil and gas. Portfolio investments were also revised upward for 2022, especially incorporating the improved flows towards equities and fund shares, according to the October data and partial results for November.

Figure 1 – Current account

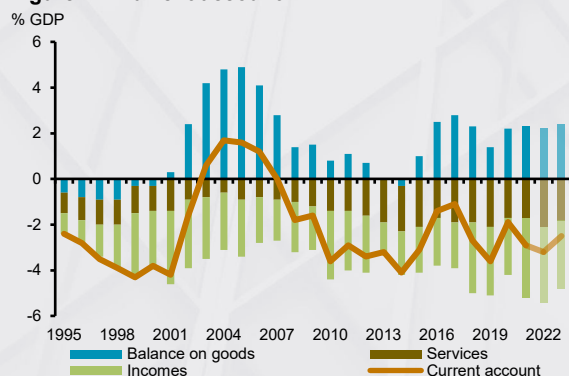
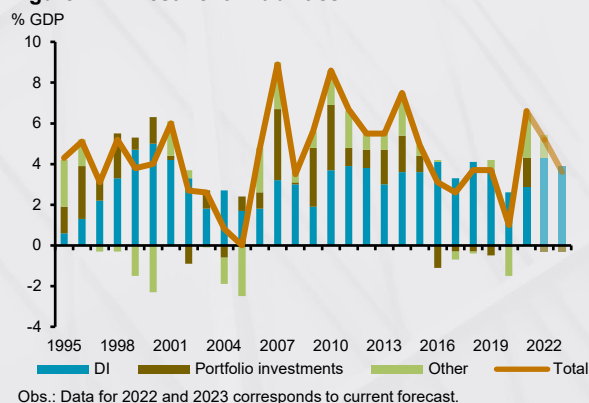


Figure 2 – Investment - liabilities



In general, projections for the external accounts in 2023 changed slightly, still conditioned by a scenario of activity deceleration, both in Brazil and in advanced economies, due to the monetary tightening cycle. Regarding exports, its projected value was revised down, due to lower prices in comparison to the outlook in the previous IR, following the trend of international commodity prices. Projections for imports were reduced due to the same reason. Therefore, the expectation of an increase in the trade balance from 2022 to 2023 was maintained, although at a slower pace than expected in the September 2022 IR, contributing to a lower current account deficit in 2023.

A lower deficit is also expected in the services account in 2023, comparing to 2022, mainly due to the normalization of transportation costs, partially offset by the expansion of international travel expenses. For the primary income account, interest expenses should increase, reflecting larger basic interest rate levels in advanced economies. The projected reduction in net expenses on profits and dividends reflects the lower economic growth and the assumption of a stabilization of commodity prices, impacting corporate profitability.

Direct investment liabilities should reach USD 75 billion. Despite the scenario of activity deceleration, the other factors underlying positive flows observed in 2022 remain. Further net outflows are expected for portfolio investments, with similar magnitude to those of 2022. Despite the attractive level of the interest rates differential, the effects of the monetary tightening cycle in advanced economies should prevail on the demand for debt securities traded in the domestic market.

Analysis of the services inflation considering slack and inertia

Services inflation has been particularly monitored in the recent economic outlook analysis. This is the inflation component typically most associated with the degree of economic slack and inflationary inertia for reasons that include the relevance of wages in the sector's costs and the degree of rigidity in price setting. This box analyses the recent evolution of the services inflation considering the influence of both factors. For this purpose, a method for the classification of services inflation components was defined based on the sensitiveness of each component to the measures of slack and inertia.¹

The strategy adopted for this classification involved, for each component of services inflation, the estimation of regressions with the following structure:

$$\pi_{i,t} = \alpha + \beta_i \pi_{t-1} + \gamma_i y_t + \varepsilon_{i,t},$$

where $\pi_{i,t}$ represents the inflation of component i , π_{t-1} past inflation and y_t a measure of slack. Regressions were also estimated with an adjusted version of the aggregated services inflation,² resulting in the coefficients β_{serv} and γ_{serv} . If $\beta_i > \beta_{serv}$, the component i of services inflation is classified as sensitive to past inflation. If $\gamma_i > \gamma_{serv}$, the component i is classified as sensitive to the degree of economic slack. In both cases, the comparison uses point estimates. In this framework, each component may be classified as sensitive to both, to neither, or to only one of these factors.

To increase the robustness of this exercise, four alternative regression specifications were considered, varying the metrics for slack (unemployment or the output gap from the BCB's aggregate model) and inflation (12-month or 3-month). Further details on specifications, sample, and data may be found in the annex.

Table 1 shows the classifications obtained with each model and, in the last column, the final classification chosen for the analysis. The classifications in each model were very similar to each another, and the final classification considers the most common among those individually obtained.^{3,4} Of the evaluated components, 60% were classified as sensitive to past inflation and 62% to economic slack. Some components were classified as sensitive to both (29%) and other components as not sensitive to either (7%).

In general, the obtained classifications are in line with what is expected, given the characteristics of each economic activity. Among the unexpected results, which are common in this type of exercise, residential

1/ More specifically, the object of interest is the past inflation. Although the expression "inertia" is occasionally used in the text for the sake of simplicity, it should not be taken as other possible inertial effects, such as autocorrelation of the series itself.

2/ This exercise did not use the total services inflation. Only the services components in the current IPCA structure, based on the 2017/2018 Household Budget Survey (POF), were included. As some components were not present in the structures associated with previous POF, data were imputed from similar components available in those structures. Some components were discarded, due to their high volatility (airfare), the lack of a close correspondent in previous POF (car rental and app transportation), or because they have been recently affected by exogenous shocks (telecommunication services). Further details are presented in the Annex. The adjusted version of the aggregated services inflation is obtained by aggregating the components used in the analysis, which comprise 87% of services inflation components, considering the weighting structure of October 2022.

3/ The degree of similarity of the final classification with those chosen in the four models is 77%, 97%, 94%, and 95%. This calculation involves summing the weights of the components whose classification in the model was equal to the final classification, considering the four possible sensitiveness combinations.

4/ Four components had no preponderant classification among the models. In these four cases, it was decided to choose the final classification that indicated greater sensitiveness to the evaluated factor.

Table 1 – Classification obtained with each model* and final

	M1	M2	M3	M4	Final classification
Food-away-from-home	s	i, s	i, s	i, s	i, s
Residential rental	s	s	s	s	s
Condominium fee	i	i	i	i	i
Moving house	s	s	i, s	s	s
Labor (repairs)	i, s	i, s	i, s	i, s	i, s
Repairs and maintenance	i	i	i	i	i
School transport services	i	i	i	i	i
Vehicle voluntary insurance	i	i	i	i	i
Vehicle maintenance	i, s	i, s	i, s	i, s	i, s
Parking	s	s	s	s	s
Vehicle painting	-	-	-	-	-
Medical and dental service	-	s	-	s	s
Hospital and laboratory services	-	-	-	-	-
Seamstress	-	s	i	s	s
Manicure	s	s	s	s	s
Domestic services	s	s	s	s	s
Hairdressing salon and barber	s	s	s	s	s
Depilation	s	s	s	s	s
Forwarding agent	i	i	i	i	i
Banking service	-	-	-	-	-
Eyebrow	s	s	s	s	s
Club	i	i	i	i	i
Animal care (clinic)	i, s	s	i, s	s	i, s
Nightclub	s	i	s	-	s
Accommodation	s	s	s	s	s
Tour package	i, s	i	i, s	i	i, s
Pet grooming service	s	s	s	s	s
Cinema, theater and concerts	i	i	i	i	i
Regular courses	i	i	i	i	i
Various courses	i	i	-	-	i

Note: "i": inertia-sensitive, "s": slack-sensitive, "i,s": both inertia and slack-sensitive.

* The models (M1, M2, M3 and M4) are defined in the appendix.

rent, which was not classified as sensitive to inertia, stands out. As thoroughly discussed in the annex, from 1999 to 2005, rent inflation was much lower and not correlated to past inflation, which explains the obtained classification.⁵

Table 2 shows how the classification proposed in this box compares to other services inflation segmentations when the Jaccard similarity index is used.⁶ Underlying services inflation components have greater similarity with slack-sensitive services ($J=0.57$) than with non-sensitive services ($J=0.25$). They also have greater similarity with inertia-sensitive services ($J=0.44$) than with non-sensitive services ($J=0.37$), although the difference is smaller in this case. These comparisons suggest that underlying services inflation is relatively more influenced by slack than by inflationary inertia, which supports its appeal for scenario analysis.

Labor-intensive services also have greater similarity with slack-sensitive services ($J=0.26$ against $J=0$ for the complementary set) and, surprisingly, little similarity with inertia-sensitive services ($J=0.03$ against $J=0.34$

5/ Considering a sample starting in July 2006 (when the POF was changed), rent is then classified as sensitive to both slack and past inflation.

6/ Defined as the ratio of the size of the intersection to the size of the union of both compared sets (i.e., $J = |A \cap B| / |A \cup B|$). The size measurement considers the weighting structure of October 2022.

Table 2 – Jaccard similarity index between proposed and usual classifications

	Slack	Non-slack	Inertia	Non-inertia
Labor intensive services	0.26	0	0.03	0.34
Services - underlying	0.57	0.25	0.44	0.37
Services - ex-underlying	0.19	0.32	0.29	0.18
Covid services	0.22	0.48	0.3	0.34
Non-Covid services	0.59	0.13	0.45	0.24
Non-labor intensive services	0.46	0.45	0.68	0.26

in the complementary set). Finally, “Covid services”⁷ have lower similarity with slack-sensitive services than the complementary set ($J=0.22$ against $J=0.48$).

One way to evaluate the influence of inertia and slack on the inflation evolution is by comparing the series of services sensitive to a factor with the complementary series of services less sensitive to this factor. Intuitively, if inflationary inertia is relevant in a given period, services more sensitive to this factor should present a higher increase than the others in the same time frame. Similarly, if there is pressure coming from aggregate demand in a given period, services more sensitive to slack should increase more than the others.

Figures 1 to 4 compare inertia-sensitive services with the complementary set. The most significant difference was observed at the beginning of the sample and is strongly associated with the behavior of residential rent, as already mentioned. From that point on, the series show a relatively similar behavior, although the post-2015 disinflation was somewhat slower for inertia-sensitive services. Both seem to have been similarly affected by the pandemic shock and the reopening impact. Considering more recent data, inertia-sensitive services accumulated a stronger 12-month increase (9.3% against 8.0% for the complementary set), suggesting that the inertia factor was relevant for the increased inflation in the period. Looking at more recent readings, however, inertia-sensitive services have slowed down and no significant difference was observed between them and services less sensitive to this factor – which might be an incipient signal that the inertial momentum has already lost some strength.

Figure 1 – Services inflation, segmented by sensitivity to inertia

YoY % change

**Figure 2 – Services inflation, segmented by sensitivity to inertia**

QoQ % change, s.a.a.r.



Figures 5 to 8 compare slack-sensitive services with the complementary set. This time the most significant difference occurred between 2006 and 2015, a period marked by a positive output gap and declining unemployment. In the 2015-2016 recession and in the subsequent period, characterized by a modest activity recovery, the variation in services more sensitive to slack was lower than the others, indicating the relevance of the high degree of slack for the reduction of inflation in this period. During the pandemic, slack-sensitive services were less affected than others. Considering more recent data, slack-sensitive services present a 12-month variation lower than the complementary set (8.3% against 9.6%), suggesting that the degree of

7/ See box [Recent evolution of services inflation](#), of the December 2021 IR.

Figure 3 – Services inflation, segmented by sensitivity to inertia

MoM % change

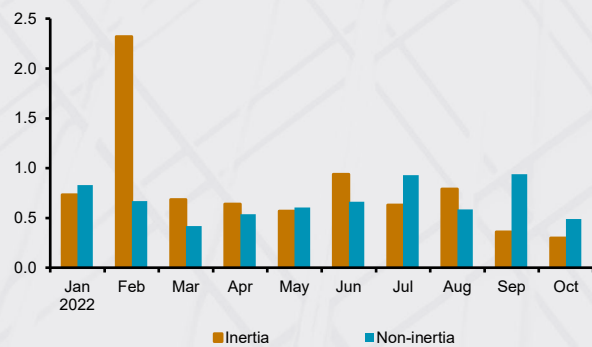


Figure 4 – Services inflation, segmented by sensitivity to inertia

Seasonally adjusted MoM % change

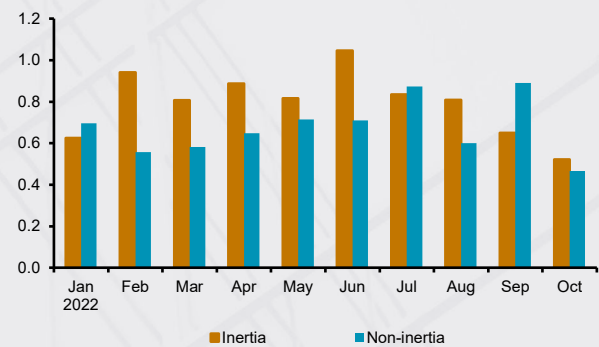


Figure 5 – Services inflation, segmented by sensitivity to slack

YoY % change

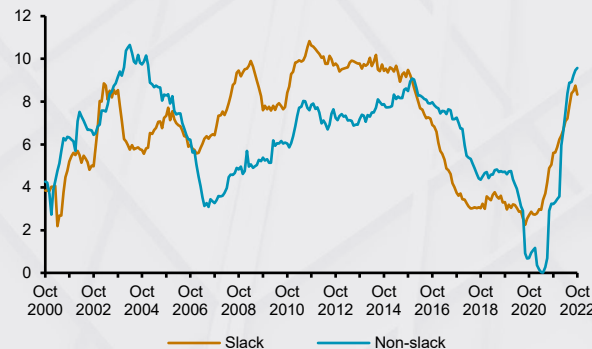


Figure 6 – Services inflation, segmented by sensitivity to slack

QoQ % change, s.a.a.r.

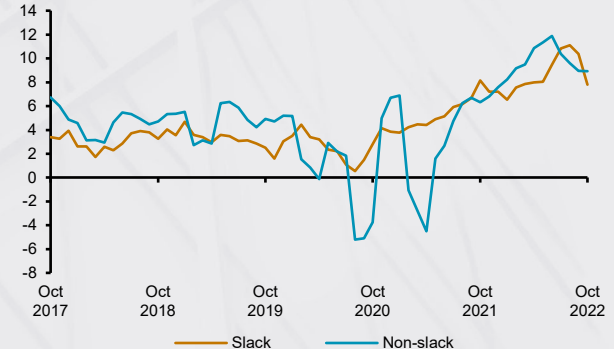


Figure 7 – Services inflation, segmented by sensitivity to slack

MoM % change

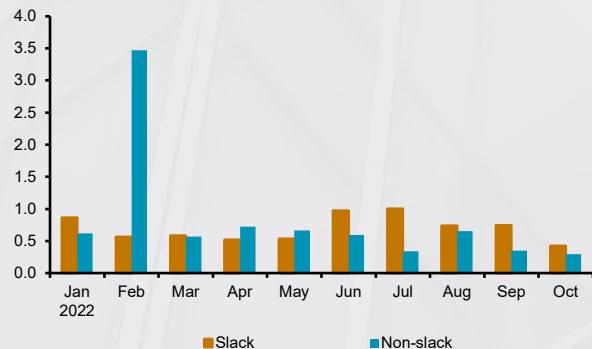
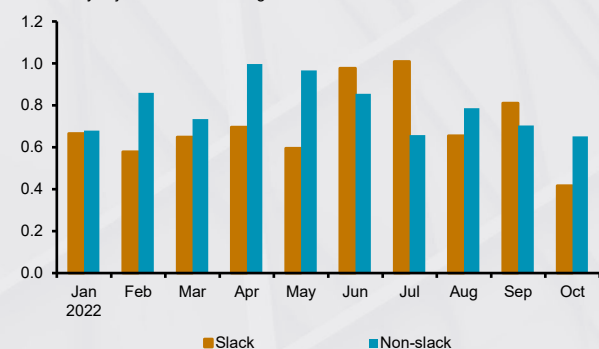


Figure 8 – Services inflation, segmented by sensitivity to slack

Seasonally adjusted MoM % change



slack in the economy would have collaborated to mitigate the inflation increase. This result is in line with the output gap estimate according to the BCB's small-scale aggregate model⁸, which points to a negative gap (although closer to zero than in the period from 2015 to 2019). Therefore, the result may be interpreted as indirect evidence that, at least until recently, the economy was operating with some degree of slack.

8/ See box [Revision of the small-scale aggregate model](#), of the December 2021 IR.

ANNEX

Parsimonious models have been chosen for the classification, including only past inflation and slack as explanatory variables. Two slack measures (BCB's small-scale aggregate model output gap and the unemployment rate) and two inflation measures (12-month or 3-month) were considered. The combination of these possibilities results in four models, which are:

$$(M1) \quad \pi_{i,t}^{(12)} = \alpha_i + \beta_i \text{IPCA12M}_{t-4} + \gamma_i \text{MA}(\text{hiato}_t, 4) + \varepsilon_{i,t}$$

$$(M2) \quad \pi_{i,t}^{(12)} = \alpha_i + \beta_i \text{IPCA12M}_{t-4} + \gamma_i \text{MA}(-\text{desocupa\c{c}\~{a}o}_t, 4) + \varepsilon_{i,t}$$

$$(M3) \quad \pi_{i,t}^{(3)} = \alpha_i + \beta_i \text{IPCA12M}_{t-1} + \gamma_i \text{MA}(\text{hiato}_t, 2) + S_t + \varepsilon_{i,t}$$

$$(M4) \quad \pi_{i,t}^{(3)} = \alpha_i + \beta_i \text{IPCA12M}_{t-1} + \gamma_i \text{MA}(-\text{desocupa\c{c}\~{a}o}_t, 2) + S_t + \varepsilon_{i,t}$$

In these equations, $\pi_{i,t}^{(12)}$ and $\pi_{i,t}^{(3)}$ represent, respectively, the 12-month inflation and the 3-month inflation of the component i of the services inflation, in the quarter t . IPCA12M_t represents the 12-month headline inflation, hiato_t represents the output gap obtained by the BCB small-scale aggregate model, and $\text{desocupa\c{c}\~{a}o}_t$ is the unemployment rate (which is inserted into the model with inverted signal to standardize the coefficients' signal γ). $\text{MA}(\cdot, x)$ represents the moving average operator, within which x is the number of periods considered in the average. S_t represents quarterly dummies to control for seasonality and $\varepsilon_{i,t}$ denotes the error term.

Estimation was based on quarterly data in all cases. In models with output gap, the sample starts in 2003Q4. In models with unemployment rate, in 2000Q3.⁹ In both cases, the sample ends in 2019Q4. This choice is made because the period marked by the pandemic period involved significant peculiar shocks to services inflation, which could distort the classification. In addition, given the goal of evaluating the inflation trajectory in the recent period, the option was to make the classification itself not to be based on recent data at all (i.e., evaluation outside the estimation/classification sample).

The classification was built upon the current structure of the IPCA, based on the 2017/2018 POF. Some components that appear in this structure do not appear in previous structures, and so it was decided to impute data from similar components that appeared in the respective structures. Table A.1 shows which imputations were applied.

Table A.1 – Replacement for missing components

POF 2017/2018	POF 1995/1996	POF 2002/2003	POF 2008/2009
2103042.Labor (repairs)	7101010.Domestic servants	-	-
7101011.Hairdressing salon and barber	7101009.Hairdressing salon	7101009.Hairdressing salon	7101009.Hairdressing salon
7101144.Eyebrow	7101009.Hairdressing salon	7101009.Hairdressing salon	7101009.Hairdressing salon
7201015.Pet care (veterinary clinic)	7101009.Hairdressing salon	7201018.Pet purchases and care	7201018.Pet care
7201256.Pet grooming service	7101009.Hairdressing salon	7101009.Hairdressing salon	7101009.Hairdressing salon
7201266.Cinema, theater and concerts	7201001.Cinema	7201001.Cinema	7201001.Cinema
8104.Variou courses	8101014.Variou courses	-	-

Note: "-" means that no replacement was necessary.

9/ The mentioned period refers to the availability of gross data. Since the models use a moving average of the variables, the size of the sample is somewhat smaller. For the unemployment rate, a retropolated version is used. It follows the methodology of Alves, S. A. L. and Fasolo, A. M., Not Just Another Mixed Frequency Paper, Banco Central do Brasil (2015), Working Paper n. 400.

Figures A.1 to A.4 illustrate the classification of each model. On the axes are the estimated coefficients, and the horizontal and vertical lines represent the classification thresholds, which are based on the adjusted services inflation coefficients.

Figure A.1 – M1 coefficients

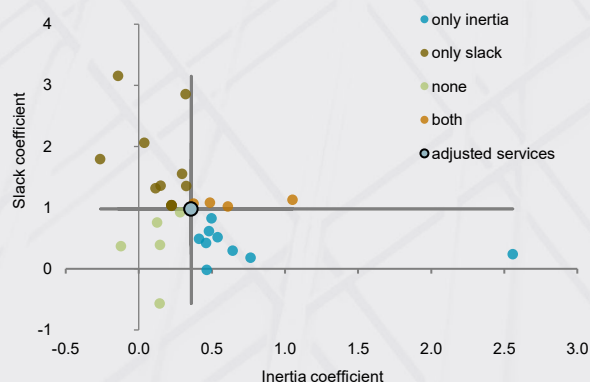


Figure A.2 – M2 coefficients

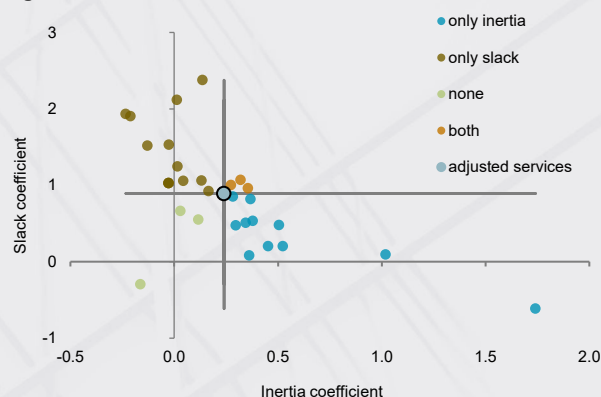


Figure A.3 – M3 coefficients

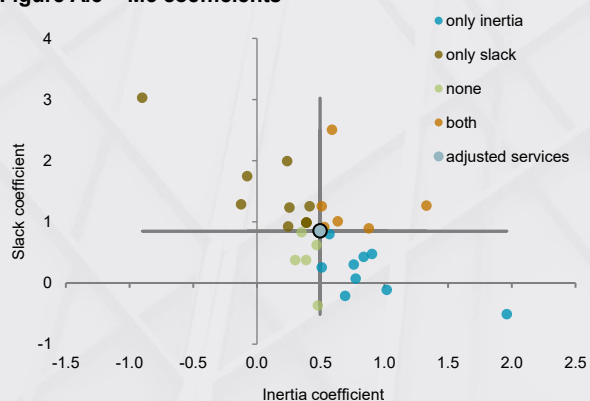


Figure A.4 – M4 coefficients



The same models used for the classification were then used to evaluate the resulting aggregations (Table A.2). As expected, slack-sensitive services have a larger coefficient regarding the output gap or unemployment, while services sensitive to past inflation have a larger coefficient regarding IPCA lags. The difference is significant when compared with the respective complementary sets.

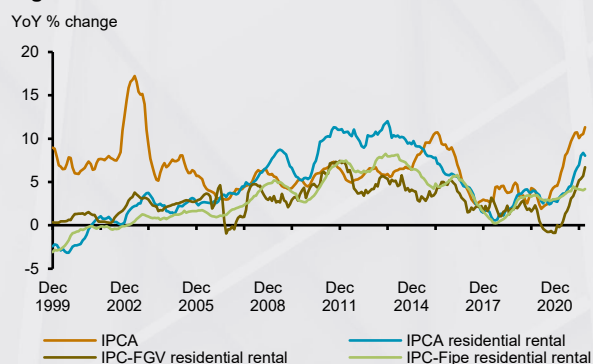
Residential rent was classified as sensitive to slack, but not to past inflation. Figure A.5 shows that this occurs because in the late 1990s and early 2000s, when inflation was high, residential rent showed modest increases or even decreases, according to different price indexes. The models interpret this episode as evidence that rent does not respond to past inflation, as opposed to what is usually considered by analysts *a priori*. However, if this period is removed from the sample, the classification of residential rent is considered as sensitive to past inflation. Since residential rent has a large weight in aggregate services inflation, its classification makes a difference in the analysis. Figures A.6 to A.9 show how Figures 1 to 4, in the box, would look like if the choice had been made to classify rent as sensitive to past inflation. Findings remain relatively unchanged for more recent data, but with a greater difference between inertia-sensitive services and other services in the 12-month period.

Table A.2 – Classification obtained with each model^a and final

	Past inflation		Slack		Adjusted R ²	Sample size
	Coefficient	Standard error	Coefficient	Standard error		
M1						
Slack	0,24***	(0,08)	1,21***	(0,11)	0.67	62
Non-slack	0,60***	(0,07)	0,31***	(0,09)	0.6	62
Inertia	0,49***	(0,06)	0,91***	(0,08)	0.72	62
Non-inertia	0,17*	(0,09)	1,06***	(0,12)	0.56	62
Adjusted services	0,36***	(0,06)	0,98***	(0,09)	0.7	62
M2						
Slack	0,13***	(0,04)	1,14***	(0,06)	0.84	74
Non-slack	0,49***	(0,05)	0,21***	(0,07)	0.6	74
Inertia	0,39***	(0,05)	0,73***	(0,07)	0.65	74
Non-inertia	0.02	(0,05)	1,12***	(0,07)	0.78	74
Adjusted services	0,24***	(0,04)	0,89***	(0,05)	0.8	74
M3						
Slack	0,39***	(0,11)	1,12***	(0,13)	0.65	64
Non-slack	0,72***	(0,13)	0.12	(0,15)	0.92	64
Inertia	0,63***	(0,09)	0,75***	(0,1)	0.9	64
Non-inertia	0,30**	(0,14)	0,98***	(0,16)	0.46	64
Adjusted services	0,50***	(0,09)	0,85***	(0,1)	0.84	64
M4						
Slack	0,16**	(0,08)	1,11***	(0,12)	0.59	77
Non-slack	0,43***	(0,08)	0.11	(0,13)	0.91	77
Inertia	0,40***	(0,07)	0,66***	(0,11)	0.81	77
Non-inertia	0.02	(0,08)	1,10***	(0,13)	0.52	77
Adjusted services	0,24***	(0,06)	0,84***	(0,1)	0.75	77

* p<0,1, ** p<0,05, *** p<0,01

Figure A.5 – Residential rental variation and inflation



Source: IBGE, FGV, Fipe

Figure A.6 – Services inflation, segmented by sensitivity to inertia with sensitive residential rental

YoY % change

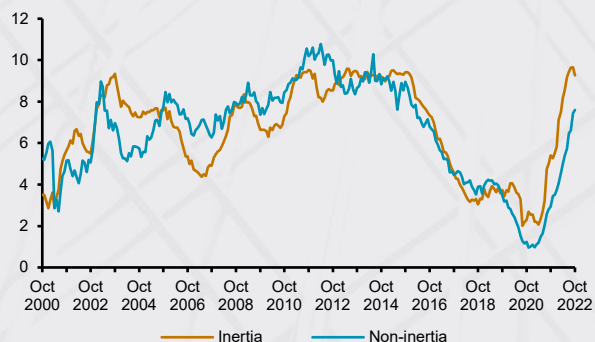


Figure A.7 – Services inflation, segmented by sensitivity to inertia with sensitive residential rental

QoQ % change, s.a.a.r.



Figure A.8 – Services inflation, segmented by sensitivity to inertia with sensitive residential rental

MoM % change

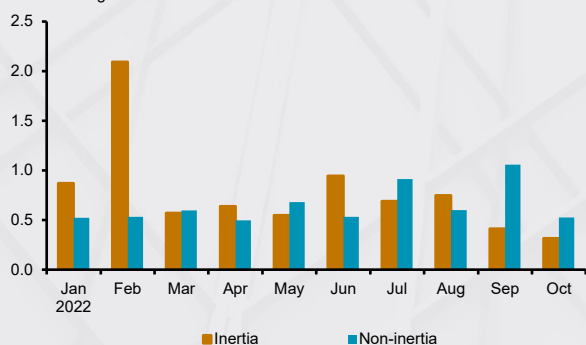
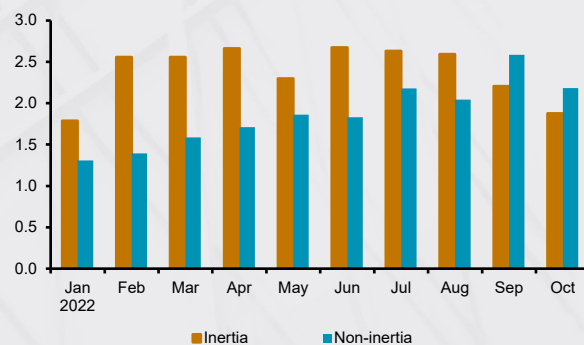


Figure A.9 – Services inflation, segmented by sensitivity to inertia with sensitive residential rental

S.a. MoM % change



This chapter analyzes the inflation outlook up to 2025, therefore covering all years for which the CMN sets inflation targets, considering the cut-off date of this document.

Inflation projections presented herein represent the Copom's view. Projections are generated using a set of models and available information, combined with judgment.

Inflation projections are conditional on a set of variables. In particular, the scenarios use as conditioning factors the Selic rate path from the BCB's Focus survey and the exchange rate path based on the purchasing power parity (PPP) theory.³⁰

The projections depend not only on hypotheses about interest and exchange rates, but also on a set of assumptions about the behavior of other exogenous variables. Projections are presented together with probability intervals that highlight the degree of uncertainty involved.

In this IR, projections use data available up to the 251st Copom Meeting, held on December 6-7, 2022. The cut-off date for the conditioning factors used in the projections, especially those from the Focus survey, is December 2, 2022, unless otherwise stated.

30/ Further details available in box "Exchange rate path in BCB projections and the purchasing power parity", of the September 2020 IR.

2.1 Revisions and short-term projections

Table 2.1.1 – Inflation surprise

	% change				
	2022				12-month up to Nov.
	Sep	Oct	Nov	Quarterly	
Copom scenario ^{1/}	-0.21	0.36	0.39	0.54	5.72
Actual IPCA	-0.29	0.59	0.41	0.71	5.90
Surprise	-0.08	0.23	0.02	0.17	0.18

Sources: IBGE and BCB

1/ Scenario in the cut-off date of the September 2022 IR.

Consumer inflation, measured by the IPCA, showed another upward surprise in the quarter ended in November. The IPCA variation was 0.17 p.p. higher than anticipated in the Copom's reference scenario of the September 2022 IR (Table 2.1.1).³¹ Comparing with the median market projections, inflation was slightly lower.³²

Two factors were the main drivers of the upward surprise. Firstly, part of the expected reduction in the residential electricity rates did not materialize, in view of the removal of items for the calculation basis of the ICMS.³³ This factor accounted for more than two thirds of the surprise. Secondly, the prices of fresh food rose sharply, reflecting stronger and sooner-than-expected rainfall. The variation of industrial goods prices was slightly above projections, with upward surprises in clothing, personal hygiene, and ethanol partially offset by widespread downward surprises in the other components. Services inflation, in turn, was significantly lower than expected, with emphasis on the more favorable dynamics of its underlying component. Therefore, the surprise composition suggests a less unfavorable scenario than indicated by its magnitude.

Table 2.1.2 – Short-term projection

	% change					
	2022		2023		Quarterly up to Feb.	12-month up to Feb.
	Nov	Dec	Jan	Feb		
Copom scenario ^{1/}	0.54	0.70	0.82	0.88	2.42	6.16

Sources: IBGE and BCB

1/ Scenario at cut-off date.

Short-term projections in the Copom reference scenario consider variations of 0.54% in November and 2.42% in the quarter ended in February (Table 2.1.2). In this scenario, 12-month inflation drops from 6.47% in October to 6.16% in February.

This scenario considers the reversal of the federal tax cuts on gasoline, diesel, and ethanol, which are effective until the end of 2022, in addition to no longer using the 60-month moving average of prices for calculating the base of the ICMS on fuels. In this scenario, tax cuts of permanent nature were maintained, according to the effective legislation in the cut-off date of this IR. This includes the

31/ For greater transparency, the November IPCA was incorporated in this section for calculating the quarter's inflationary surprise (first paragraph and Table 2.1.1), despite being released after the cut-off date of this IR and the Copom meeting. The remainder of this section – the analytical comment on the inflationary surprise and projections – and other sections of the Chapter uses only information available until the cut-off date. In that date, the Copom projection for the November IPCA was 0.54%, whereas the median Focus projection was 0.53%.

32/ The median inflation accumulated in September, October, and November projected by the Focus participants on September 16, 2022, was 0.79%. The percentiles 10 and 90 of the distribution were 0.47% and 1.35%, respectively.

33/ Complementary Law 192 stipulated the removal of the transmission and distributions tariffs and sectoral charges from the ICMS calculation on electricity. Some states presented legal claims against this measure and a final decision has not yet been made for this subject.

maintenance of reduced ICMS rates on fuels, electricity, and telecommunications and the removal of transmission and distribution tariffs and sectoral charges from the ICMS calculation on electricity. As the change of the calculation base for electricity has not fully materialized so far, the scenario considers that the remaining impact will occur only in early 2023. The reference scenario also considers the decline in gasoline prices to producers, because of the recent decrease in the international fuel price. The projected impact on consumers is concentrated in January, partially mitigating the reversal of federal taxes and the change in the ICMS calculation base on fuels.

In addition to the tax impact on fuels, higher inflation expected for the quarter ended in February also reflects the seasonal pattern, which typically implies sharper price increases of fresh food and adjustments in tuition fees and public transportation fares. The scenario for the prices of industrial goods and services considers a gradual slowdown. Nevertheless, in the quarter ended in February 2023, the average of core inflation indicators should still remain above the upper limit of the inflation target tolerance band.

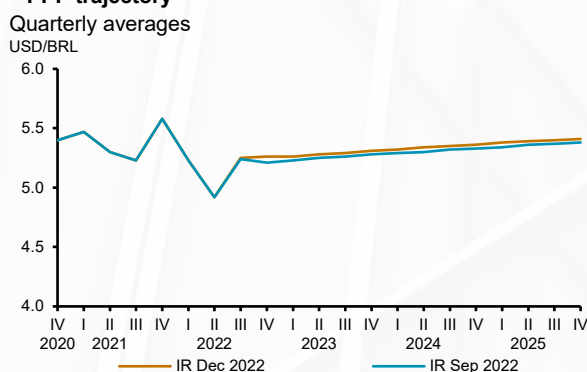
2.2 Conditional projections

Conditioning factors

The considered inflation scenarios are built using several conditioning factors. The exchange rate starts at USD/BRL 5.25³⁴, 1% over the value of USD/BRL 5.20 of the September 2022 IR, and follows a path according to the PPP³⁵ (Figure 2.2.1). Averages for the last quarters of 2022, 2023, 2024, and 2025 are USD/BRL 5.26, USD/BRL 5.31, USD/BRL 5.36, and USD/BRL 5.41, respectively.

As for the Selic, the median expectations extracted from the Focus survey of December 2, 2022 indicated stability at 13.75% p.a. until the August 2023 meeting, when it starts a downward path (Figure 2.2.2). In this trajectory, the Selic rate for the end of 2023, 2024, 2025, and 2026 is 11.75% p.a., 8.50% p.a., 8.00% p.a.,

Figure 2.2.1 – Exchange rate assumptions for projections – PPP trajectory

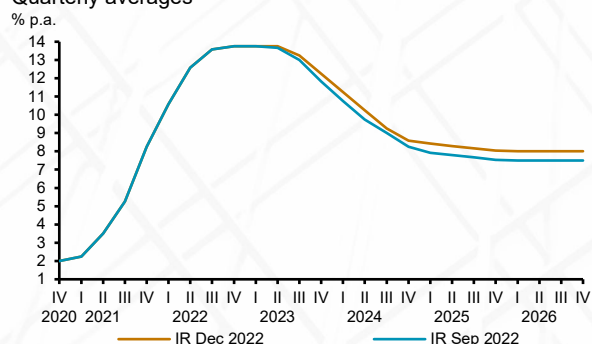


34/ Value obtained according to the usual procedure of rounding the average USD/BRL exchange rate observed on the five business days ending on the last day of the week before the Copom meeting.

35/ Considering the easiness in the formulation of projections and the simplicity in communication, the assumed inflation differential is the difference between the Brazilian inflation target for each year and the long-term external inflation, considered as 2% p.a., in line with the inflation target of most developed countries.

Figure 2.2.2 – Selic rate target assumptions for projections – Focus survey expectations

Quarterly averages

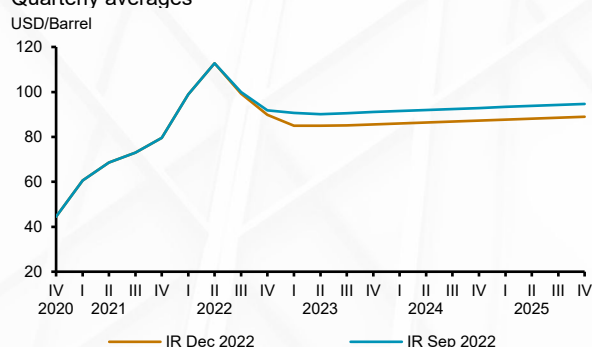


and 8.00% p.a., respectively.³⁶ When compared with the survey used in the previous IR, conducted on September 16, 2022, the assumed Selic rate curve is higher from June 2023 onwards.

The considered scenarios also have assumptions for several other conditioning factors. The current level of economic uncertainty is expected to decrease over time. From the fiscal point of view, it was assumed several trajectories for the central government primary result corrected by the economic cycle and by outliers, in the 12-month period, including a path in which this result declines over 2023 and remains relatively stable afterwards. The real neutral interest rate assumed in projections is 4.0% p.a. in the considered horizon.³⁷ The scenarios also incorporate the *La Niña* phenomenon in projections. In terms of electricity flag rates, it is assumed the green flag in December 2022 and the yellow flag in December 2023, 2024, and 2025.

Figure 2.2.3 – Brent oil price

Quarterly averages



Sources: Bloomberg and BCB

Regarding the oil price used in the projections, the assumed value is that around the average of prices effective during the week before the Copom's meeting. It is assumed that oil prices follow approximately the forward market curve in the following six months, reaching USD 85/barrel, and then start increasing 2% p.a. onwards (Figure 2.2.3). Although oscillating in the quarter, the oil price presented lower values in the cut-off date of this IR when compared with the previous IR. When compared with the September 2022 IR, the average oil price assumed for 2023Q1 is 6.3% lower, more than offsetting the exchange rate differential. In turn, it should be highlighted that the reference scenario considers the reversal of federal tax cuts on gasoline, diesel, and ethanol in 2023.³⁸

Projections evaluated by Copom depend on assumptions about the evolution of fiscal and parafiscal policies and their institutional arrangement, and on necessary reforms and adjustments in the economy. Their effects on projections are captured through asset prices, the degree of uncertainty, expectations from the Focus survey, and their effect on the economy's structural interest rate. Besides these channels, the fiscal policy influences

36/ As described in box "Revision of the small-scale aggregate model" of the December 2021 IR, the Selic rate used in the IS curve refers to the Selic rate path one year ahead. Therefore, the interest rate over 2025 also depends on the Selic trajectory over 2026. The construction of the Selic rate trajectory in this scenario includes interpolation for the months in which the survey does not collect the respective data, using as reference the value of each year's end.

37/ For an estimation of the neutral real interest rate, see box "Revision of the small-scale aggregate model", of the December 2021 IR.

38/ See Section 2.1 of this Chapter.

conditional inflation projections by affecting the aggregate demand.

Inflation determinants

Commodity prices, after reaching a peak from late 2022Q1 and 2022Q2, mainly driven by the war in Ukraine, declined in 2022Q3 and oscillated over 2022Q4 (until the cut-off date of this IR), mainly reflecting increased prices of metal commodities, lower prices of energy commodities, and stabilization of agricultural commodities. When comparing 2022Q4 and 2022Q3 averages, the IC-Br dropped 4.1% in USD. The monetary policy tightening in advanced economies and the perspective of global economic deceleration has been an important limiting factor for commodity prices.

Price indexes in 2022Q3 were strongly impacted by tax exemptions on the prices of fuels, energy, and communication. These measures resulted in deflation in July, August, and September, the latter also impacted by the reduction of food-at-home prices. This movement accelerated the 12-month inflation decline. Although inflation was higher than expected in October, 12-month inflation declined again.

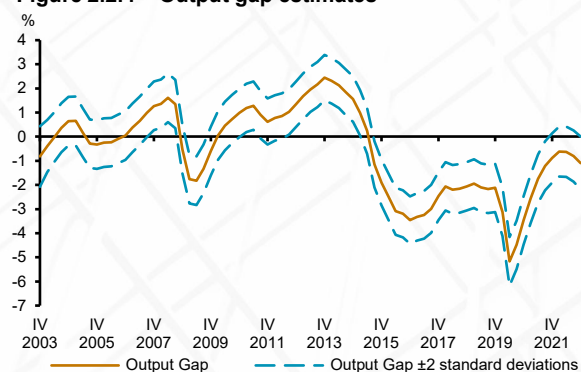
The output gap – an unobservable variable whose measurement is subject to high uncertainty – is measured by the BCB through different methodologies. This IR presents the estimated output gap according to a methodology based on a Bayesian model estimation.³⁹ In this estimation, the output gap is an unobservable variable whose path incorporates information from four economic activity variables relative to the output in the economy and the slack of production factors. Specifically, the estimation uses the GDP, the Nuci (calculated by the FGV), the unemployment rate (measured by the IBGE), and the stock of formal jobs (measured by New Caged of the Ministry of Labor and Employment).⁴⁰ It is noteworthy that the model embeds economic structure to the estimation of the output gap path by considering its relationship with market prices inflation, via both the Phillips curve, and the IS curve.

Using the methodology described above, the estimated output gap, which was following a narrowing trajectory, starts widening in 2022Q2 (Figure 2.2.4). The output gap is estimated at -0.8%

39/ See box "Revision of the small-scale aggregate model", of the December 2021 IR.

40/ Seasonally adjusted series are used.

Figure 2.2.4 – Output gap estimates



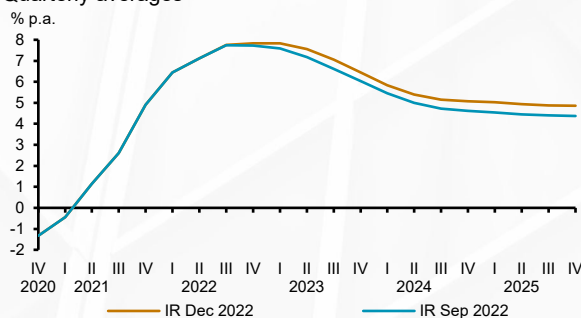
Note: Figure data: 2003Q4–2022Q4.

and -1.1% in 2022Q3 and 2022Q4, respectively⁴¹, against -1.2% and -1.6%, respectively, in the previous IR. The revision of previous data and a better-than-expected performance of some domestic activity variables contributed to a narrower output gap estimate. It should be mentioned that, due to uncertainty concerning output gap estimates, Copom evaluates projections with different estimates and scenarios for this variable.

Seasonally adjusted GDP rose 0.4% in 2022Q3, when compared with 2022Q2, lower than the 1.0% increase in 2022Q2. The GDP growth projection in 2022 increased from 2.7% to 2.9%.⁴² The labor market continues to recover, although at a slower pace than in previous months. The unemployment rate continued a downward trend that started in early 2021, reaching levels around 8%, lower than the pre-pandemic level, nearly 11.7%, and the historical average, around 9%. The most recent unemployment decline, in turn, has mainly reflected a lower participation rate rather than increases in the employed population. Similarly, net job openings measured by the New Caged remain positive, although at a slower pace than in the previous two years. After reaching, in 2022Q3, the largest value since 2014, Nuci dropped from an average of 82.0% in the quarter ended in August to 80.4% in the quarter ended in November, both seasonally adjusted.

The projected output gap for 2023Q4 is -1.8%, therefore wider than the 2022Q3 estimate, although slightly narrower than projected in the previous IR, -2.1%. The output gap starts a narrowing trajectory onwards. The main factor explaining this behavior is the Selic rate path (total increase of 11.75 p.p. between March 2021 and August 2022 meetings) and its future path according to the Focus survey.

Figure 2.2.5 – Four-quarter-ahead real Selic
Quarterly averages



Note: Real Selic calculated as the four-quarter-ahead Selic rate, discounted from inflation expectations for the same period, both variables extracted from the Focus survey.

The four-quarter-ahead Selic rate discounted from inflation expectations for the same period, both variables extracted from the Focus survey and measured in terms of quarterly averages, rose when compared with the September 2022 IR (Figure 2.2.5). These values reflect the upward nominal Selic rate trajectory (Figure 2.2.2), more than offsetting increased inflation expectations for 2023. According to this metric, after reaching the trough of -1.3% p.a. in 2020Q4, the real interest rate starts a swift upward trajectory, reaching the peak of 7.8% in 2022Q4 and 2023Q1, compared to a peak of 7.7%

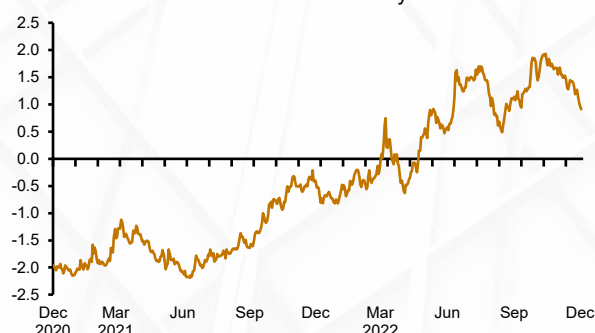
41/ For 2022Q4, projections of these activity variables were used when data were not available.

42/ See box "Projections for 2022 and 2023 GDP growth", of this IR.

in the September 2022 IR. Afterwards, it declines to 6.4% p.a. at the end of 2023, to 5.1% p.a. at the end of 2024, and to 4.9% p.a. at the end of 2025, still above the assumed neutral rate of 4.0% p.a. and nearly 0.4-0.5 p.p. above the rate considered in the September 2022 IR.

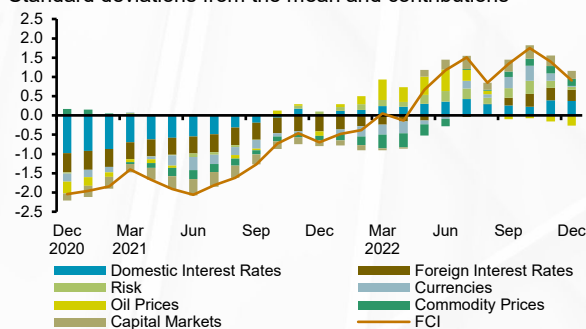
According to the FGV's Brazilian Economy Uncertainty Index – Brazil (IIE-Br), uncertainty fell in September and increased slightly in October and November. The degree of uncertainty depends on both external variables – such as the volatility on the international markets – and domestic ones – such as the path of fiscal variables, including public spending, the primary result, and the public debt.

Figure 2.2.6 – Financial Conditions Index
Standard deviations from the mean – daily series



Note: The higher the value of the index, the more restrictive the financial conditions. Figure data: 9.3.2020–12.02.2022.

Figure 2.2.7 – Financial Conditions Index
Standard deviations from the mean and contributions



Note: The higher the value of the index, the more restrictive the financial conditions. Values refer to monthly averages. Dec/2022 value refers to the average until the 2nd.

Financial conditions have oscillated since the September 2022 IR, as measured by the BCB's Financial Conditions Index (FCI) (Figures 2.2.6 and 2.2.7).⁴³ The FCI rose in October and fell in November and early December (average value until December 2nd), closing at a less restrictive level than in September. More restrictive financial conditions in October mainly reflected external factors, as the increase of forward interest rates in the US and in other advanced economies, coupled with the USD appreciation worldwide, in addition to the increase in the country risk.⁴⁴ Less restrictive financial conditions in November and early December were also affected by external factors, as the decline in the Chicago Board Options Exchange Volatility Index (VIX), the USD depreciation worldwide, the decline in the oil price, the increase of metal commodity prices, and the appreciation of stock exchanges in advanced and emerging countries, in addition to the decline in the country risk. More restrictive conditions, in turn, were represented by domestic variables, such as the increase of forward interest rates in Brazil and the depreciation of the domestic stock exchange. The FCI is still at historically high levels, the largest since early 2016, despite oscillating throughout the current quarter. It should be emphasized that the FCI reflects a series of factors and should not be interpreted as a monetary stimulus or tightening indicator. Moreover, the relationship of this indicator with inflation is ambiguous, because some of its components, such as those related to the risk premium and the exchange rate, are in general positively related to inflation and negatively related to activity. Therefore,

43/ By construction, the FCI is a dimensionless measure, with a zero mean and unit variance in the sample considered since January 2006. For a description of the methodology used in the calculation of the FCI, see box "Financial Conditions Indicator", of the March 2020 IR.

44/ For the FCI decomposition in external and domestic factors, see box "Decomposition of the Financial Conditions Index into domestic and external factors", of this IR.

more restrictive financial conditions indicate lower expected economic activity, but may imply either higher or lower inflation, depending on which factors are driving its dynamics.

The median inflation expectations collected by the Focus survey, when compared with the previous IR, fell from 6.00% to 5.92% in 2022, rose from 5.01% to 5.08% in 2023, and remained stable at 3.50% and 3.00% in 2023 and 2025, respectively.

Table 2.2.1 – Inflation projections – Scenario with Selic from Focus survey and PPP exchange rate
Year-on-year IPCA inflation

Year	Qtr	Target	September IR	December IR	Difference (p.p.)
2022	IV	3.50	5.8	6.0	0.2
2023	I		4.9	5.0	0.1
2023	II		3.7	3.9	0.2
2023	III		5.5	5.9	0.4
2023	IV	3.25	4.6	5.0	0.4
2024	I		3.5	3.6	0.1
2024	II		3.1	3.3	0.2
2024	III		3.0	3.1	0.1
2024	IV	3.00	2.8	3.0	0.2
2025	I		2.8	2.9	0.1
2025	II		2.8	2.9	0.1
2025	III		2.8	2.9	0.1
2025	IV	3.00	2.8	2.8	0.0

Table 2.2.2 – Inflation projection and probability intervals – Scenario with Selic from Focus survey and PPP
Year-on-year IPCA inflation

Year on year % Estimation									%
Year	Qtr								
		50%							
		30%							
		10%							
		Central							
2022	IV	5.8	5.9	6.0	6.0	6.0	6.1	6.2	
2023	I	4.6	4.8	4.9	5.0	5.1	5.3	5.5	
2023	II	3.3	3.5	3.8	3.9	4.0	4.3	4.5	
2023	III	5.1	5.4	5.8	5.9	6.1	6.4	6.7	
2023	IV	4.1	4.5	4.8	5.0	5.2	5.5	5.9	
2024	I	2.7	3.1	3.4	3.6	3.8	4.1	4.5	
2024	II	2.4	2.8	3.1	3.3	3.5	3.8	4.2	
2024	III	2.2	2.6	2.9	3.1	3.3	3.6	4.0	
2024	IV	2.1	2.5	2.8	3.0	3.2	3.5	3.9	
2025	I	2.0	2.4	2.7	2.9	3.1	3.4	3.8	
2025	II	2.0	2.4	2.7	2.9	3.1	3.4	3.8	
2025	III	2.0	2.4	2.7	2.9	3.1	3.4	3.8	
2025	IV	1.9	2.3	2.6	2.8	3.0	3.3	3.7	

Inflation projections

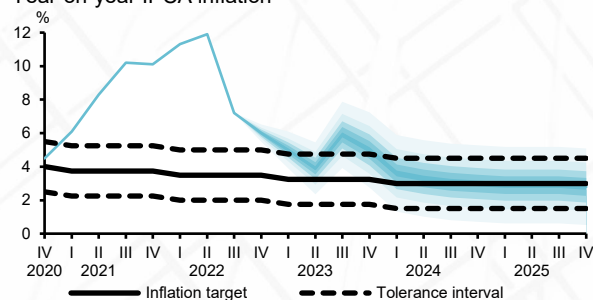
Projections in this IR represent the Copom's view and resulted from the combination of the following elements: i. experts' projections for market prices in shorter horizons and for administered prices up to a certain horizon; ii. use of macroeconomic models, satellite models, and specific models for administered price items; iii. use of certain trajectories for the conditioning variables; and iv. assessment on the state and prospects of the economy.

In the reference scenario projection, which assumes an oil price path that follows approximately the futures market curve over the next six months, the Selic rate path from the Focus survey, and an exchange rate path following the PPP, the four-quarter inflation peaks at 11.9% in 2022Q2, falls strongly in the following quarters reaching 6.0% at the end of the year, above the upper limit of the tolerance band (5.00%) of the inflation target (3.50%). Projected inflation falls to 5.0% in 2023, 3.0% in 2024, and 2.8% in 2025, relative to inflation targets of 3.25%, 3.00%, and 3.00%, respectively (Tables 2.2.1 and 2.2.2 and Figure 2.2.8).

In terms of estimated probabilities that inflation surpasses the limits of the tolerance interval (Table 2.2.3), it is noteworthy, in the reference scenario, an almost 100% probability of inflation surpassing the upper limit in 2022 and nearly 57% in 2023. Projected inflation falls to 5.0% in 2023, 3.0% in 2024, and 2.8% in 2025, relative to inflation targets of 3.25%, 3.00%, and 3.00%, respectively (Tables 2.2.1 and 2.2.2 and Figure 2.2.8).

Compared with the previous IR, inflation projections, in the reference scenario, increased for 2022, 2023, and 2024, and kept unchanged for 2025.

Figure 2.2.8 – Inflation projection and fan chart – Scenario with Selic from Focus survey and PPP
Year-on-year IPCA inflation



Note: The lines of the inflation target and the tolerance interval refer only to the calendar year, but, for better visualization, they are presented for all quarters.

Table 2.2.3 – Estimated probabilities of inflation surpassing the target's tolerance interval

Year	Lower limit	Probability of surpassing the lower limit	Upper limit	Probability of surpassing the upper limit
2022	2.00	0	5.00	100
2023	1.75	1	4.75	57
2024	1.50	14	4.50	14
2025	1.50	17	4.50	11

Note: Numbers rounded to the nearest integer value.

Table 2.2.4 – Inflation projections of market and administered prices – Scenario with Selic from Focus survey and PPP exchange rate

Year	IPCA	Market prices	Administered prices
2022	6.0	9.6	-3.6
2023	5.0	3.7	9.1
2024	3.0	2.6	4.2
2025	2.8	2.7	3.2

It should be mentioned that projections vary considerably in intra-annual basis by including or not 2022Q3 and 2023Q1 figures. These quarters accumulated most of direct effects on inflation, either decreases or increases, that stemmed from tax measures on fuels, electricity, and telecommunications.

The main factors of revision of inflation projections are listed below.

Main upside factors:

- short-term inflationary surprise and revision of short-term projections; and
- narrower output gap estimate.

Main downside factors:

- fall in commodity prices, especially oil;
- higher Selic rate trajectory of the Focus survey; and
- economic uncertainty trajectory, measured by the IIE-Br, at higher values than considered in the projections.

When the market and administered price groups are considered (Table 2.2.4), it stands out the increase in projections for market price inflation from 3.1% to 3.7% in 2023, and, in the case of administered prices, the reduction in the expected deflation from -4.0% to -3.6% in 2022, the decline in projections from 9.3% to 9.1% in 2023, and the increase in projections from 3.7% to 4.2% in 2024.

Compared with the 250th Copom Meeting held in October, inflation projections increased 0.2 p.p. for 2022 and 2023, and 0.1 p.p. for 2024 (see 250th Meeting Minutes). Main factors were similar to those indicated in the comparison with the previous IR.

2.3 Monetary policy conduct and balance of risks

The global environment remains adverse and volatile, marked by prospects of below-potential global growth for 2023, high volatility of financial assets and an inflationary environment that remains under pressure. The tightening process of monetary policy

in advanced economies and the stronger market sensitivity to fiscal fundamentals require more caution by developing economies.

Turning to the Brazilian economy, the release of the third quarter GDP figures suggested a more moderate growth rate. The recent set of indicators is in line with the scenario of deceleration expected by Copom.

Despite the recent inflation reduction, especially on items which are more volatile and affected by tax measures, consumer inflation remains high.

The various measures of underlying inflation are above the range compatible with meeting the inflation target.

Inflation expectations for 2022, 2023, and 2024 collected by the Focus survey are around 5.9%, 5.1%, and 3.5%, respectively.

In its more recent meeting (251st), the Committee communicated that its inflation scenarios encompass risk factors in both directions. Among the upside risks for the inflationary scenario and inflation expectations, it should be emphasized (i) a greater persistence of global inflationary pressures; (ii) the heightened uncertainty about the country's future fiscal framework and additional fiscal stimuli that support aggregate demand, partially incorporated in inflation expectations and asset prices; and (iii) an output gap tighter than the one currently adopted by the Committee in its reference scenario, especially in the labor market. Among the downside risks, it should be noted (i) an additional reduction in the prices of international commodities measured in local currency; (ii) a greater than projected deceleration of global economic activity; and (iii) the continuity of tax cuts assumed to be reversed in 2023. The current scenario, particularly uncertain on the fiscal side, requires serenity when evaluating risks. The Committee will closely monitor future developments in fiscal policy and, in particular, its effects on asset prices and inflation expectations, with potential impacts on the dynamics of future inflation.

Considering the assessed scenarios, the balance of risks, and the broad array of available information, the Copom decided to maintain the Selic rate at 13.75% p.a. The Committee judges that this decision reflects the uncertainty around its scenarios for prospective inflation, an even higher-than-usual variance in the balance of risks and is consistent

with the strategy for inflation convergence to a level around its target throughout the relevant horizon for monetary policy, which includes 2023 and 2024. Without compromising its fundamental objective of ensuring price stability, this decision also implies smoothing economic activity fluctuations and fostering full employment.

The Committee will remain vigilant, assessing if the strategy of maintaining the Selic rate for a sufficiently long period will be enough to ensure the convergence of inflation. The Committee emphasizes that it will persist until the disinflation process consolidates and the expectations anchor around its targets. The Committee reinforces that future monetary policy steps can be adjusted and will not hesitate to resume the tightening cycle if the disinflationary process does not proceed as expected.

Decomposition of the Financial Conditions Index into domestic and external factors

It is important for central banks to understand how financial conditions evolve and affect the economy, since these conditions impact upon business cycles and reflect not only current economic condition but also market expectations regarding future economic outlook. In particular, as is well known in literature, tighter financial conditions in the present may indicate lower economic growth in the future.¹

As disclosed in a previous IR, the BCB has developed a Financial Conditions Index (FCI) to timely monitor the evolution of general market conditions.² The FCI incorporates daily information from 26 domestic and external variables, split into seven groups: interest rates in Brazil, interest rates abroad, risk, currencies, oil, commodities, and capital markets. The variables are aggregated into a single indicator via principal components extracted from these groups.³ Some of them contain both domestic and external variables, such as the risk, currency, and capital market groups. However, it can also be useful to have a measure of how much of the FCI variation comes from domestic factors and how much from external ones.

This box presents the FCI decomposition into domestic and external factors, separating the contribution of external variables on financial conditions from the impact produced exclusively by domestic series. This does not mean, however, that there can be no causal relationship between external and domestic variables.

The employed methodology involves the following steps:

- (i) exclusion of domestic variables⁴ from the FCI groups of variables⁵;
- (ii) removal of trend and standardization from the remaining series, according to the FCI construction method;
- (iii) calculation of first principal component of each group;
- (iv) estimation of weights of each group⁶;
- (v) calculation and normalization of the weighted average of the principal components, using the weights from the previous step;
- (vi) estimation of a FCI regression on an intercept and on the weighted average from the previous step; and
- (vii) definition of the external FCI as the part explained by the regression⁷ of the previous step and the domestic FCI as the residue of that same regression.

1/ For example, Adrian et al. (2019) present empirical evidence that the left tail of the conditional distribution of the US GDP growth rate varies with financial conditions.

2/ See box “Financial Conditions Index” of the March 2020 IR.

3/ Further details about the methodology are available in the box mentioned above.

4/ Interest rates of 1-year and 5-year (Pre-DI swap), 5-year Credit Default Swap (CDS) Brazil, exchange rate (USD/BRL), and Ibovespa.

5/ Since the group “interest rates in Brazil” contains only domestic series, it is excluded from this step.

6/ The weights are obtained from regressions of the seasonally adjusted six-month change rate of the BCB’s Economic Activity Index – Brazil (IBC-Br) on the first difference of the first principal component of each group, on an intercept and on a dummy variable for the 2008 global crisis. The final weights, normalized to ensure a unit sum, are the following: interest rate abroad (0.85); risk (0.34); currencies (0.12); oil (0.23); commodities (-0.28); and capital markets (-0.26).

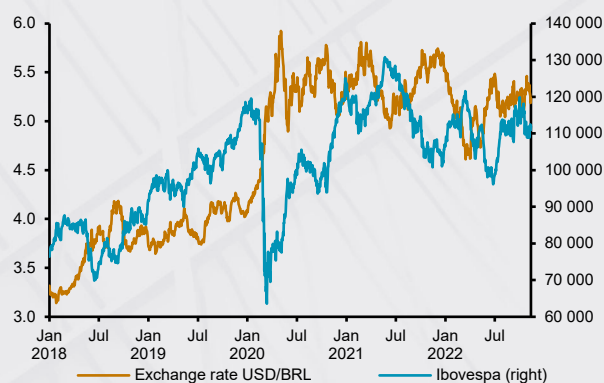
7/ In other words, the external FCI is defined as the weighted average of the principal components, multiplied by the respective coefficient estimated in the regression (assuming that, according to the FCI construction, the estimated intercept is statistically equal to zero).

Figures 1 and 2 present the daily frequency of the domestic variables that make up the FCI since 2018. It is worth noting that the outbreak of the Covid-19 pandemic in Brazil, in late 2020Q1, strongly impacted the dynamics of domestic variables that make up the FCI, producing a sudden increase in the domestic risk premium measured by the CDS, a sharp BRL depreciation against the USD, and a significant drop in Ibovespa. Next, mainly due to the adopted anti-cyclical policies, there was a decline in interest rates and a rise in the stock market. As of early 2021, forward interest rates increased, reflecting the start of the monetary tightening.

Figure 1 – Domestic interest rates and CDS



Figure 2 – Exchange rate and Ibovespa



From an external perspective, as of early 2022, events such as the war in Ukraine, with subsequent increases in oil and agricultural commodity prices, the USD appreciation worldwide, and the rise in forward interest rates in advanced economies,⁸ among other factors, have brought strong stress into financial conditions, with prospects of lower global economic growth ahead.⁹

Figures 3 and 4 present some external variables that make up the FCI with a daily frequency. Figure 3 shows nominal interest rates, with a 2-year maturity, in the US, the UK, and Germany. It is noteworthy the sharp interest rates increase in these three countries throughout 2022, following, therefore, the rise in domestic interest rates. Figure 4, in turn, shows the USD appreciation trend observed in recent years.

Figure 3 – Foreign interest rates - 2 years

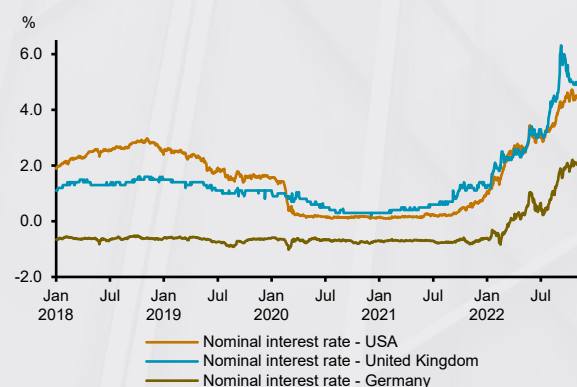


Figure 4 – USD



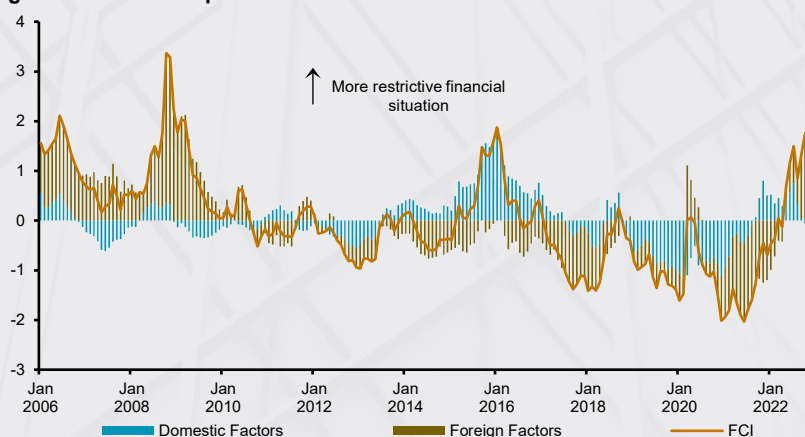
Figure 5 shows the FCI with a monthly frequency and its decomposition into domestic and external factors since 2006. In general, the decomposition is related to the analysis of the main events occurred in the period. According to this decomposition, the tightening of financial conditions in 2008 and 2009 mainly reflects external factors, stemming from the outbreak of the global financial crisis. The tightening of conditions

8/ Ending a period of more than a decade of accommodative monetary policy in these economies, with interest rates at or near zero or their historical lows.

9/ Including expectations of stagflation in the euro area and prospects of recession or low economic growth in the US. Further details are available at the International Monetary Fund's October 2022 Global Financial Stability Report (GFSR).

in 2015 and early 2016, in turn, reflects domestic factors, which are related to the political scenario in the period. A further significant tightening takes place in early 2020, with the outbreak of the Covid-19 pandemic, where the restrictive role of both external and domestic conditions becomes clear, followed by less restrictive conditions resulting from the extraordinary stimuli implemented domestically and worldwide. Considering the most recent period, it becomes evident the difference in the timing of the monetary tightening cycles, which occurred earlier in Brazil compared with advanced economies. Over the last 12 months, nearly 83% of the observed FCI variation was due to external factors and only 17% to domestic ones, whereas, in the previous 12 months,¹⁰ external factors accounted for 15% of the FCI variation, while domestic factors caused 85% of the tightening in financial conditions.

Figure 5 – FCI decomposition



From the domestic perspective, the extraordinarily stimulative monetary policy observed in 2020 was replaced by a new upward cycle of basic interest rate (Selic), as of March 2021. This trajectory contributed to the tightening of financial conditions throughout that period, shifting FCI from historical lows seen in late 2020 to values regarded as the most restrictive since early 2016. Therefore, financial conditions have deteriorated substantially over the last two years, initially due to domestic factors and, more recently, to external ones. In particular, the domestic monetary tightening cycle started in 2021Q1 by the BCB preceded by nearly one year the start of the contractionary monetary policy seen in advanced economies, such as that observed in the US from March 2022, with the Federal Reserve increasing the interest rate.

In summary, this box presents a methodology for the FCI decomposition into domestic and external factors. This decomposition can be used to timely monitor the several factors that impact financial conditions. This initiative is part of the continuous effort to improve the tools used by the BCB, as well as to provide transparency to its actions.

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¹⁰/ From December 2020 to December 2021.

Risk premium in Brazilian nominal interest rates

Risk aversion is the individuals' reluctance to invest in assets that may lead to changes in their future income or consumption. Therefore, individuals require compensation for exposing themselves to uncertain events when compared with a more stable scenario. This is demonstrated in different empirical behaviors as well as employed in theoretical models. For example, investors are willing to invest their savings in equities only if the expected return on these speculative assets is higher than the return on a risk-free asset.¹¹ Thus, there should always be a positive risk premium in equity returns to induce risk-averse investors to buy these financial instruments instead of investing their money in safer assets. In this case, one may interpret this premium as an excess of expected returns to compensate the investor for the uncertainty of the variable-income market.

As with stocks, risk premium is also present in fixed-income securities, including government bonds. For example, imagine a National Treasury bond maturing in ten years, with no intermediate payments, with face value of BRL 1,000 and a nominal rate of return of 10% p.a. The price of this security is BRL 385.54. If the rate suddenly changes to 11% p.a., its price drops to BRL 352.18 (-8.65%). Thus, since the risk of this security is related to the interest rate variation over time, the investor charges a premium to invest. In addition, the longer the security's maturity, the greater the price sensitiveness to interest rate fluctuations and, therefore, the higher the risk premium, i.e., an investor will require greater compensation for holding such a security.

It is possible to decompose the nominal interest rate on a security as described above example into three components: i. a rate to compensate for expected inflation; ii. a risk-free real rate of return; and iii. a risk premium, which encompasses specific characteristics of this security, such as delinquency and liquidity risks, and broad factors such as market and inflation risks. However, one can also look at the nominal interest rate from another perspective, which is quite relevant in terms of monetary policy: a decomposition into two components, the cumulative expectation of short-term interest rates and the term premium. The first is the long-term interest rate that would prevail if investors were risk neutral. The second is a compensation to the investor for investing in a long-term security instead of consecutively investing in short-term securities. The following formula expresses this relationship mathematically:

$$(1 + ny_t^{(n)}) = E \left[(1 + y_t^{(1)}) \times (1 + y_{t+1}^{(1)}) \times \dots \times (1 + y_{t+n-1}^{(1)}) \right] \times (1 + n \times TP_t^{(n)})$$

The term on the left refers to the long-term spot interest rate (n); the term of the expectation operator refers to the expectation of the cumulative short-term rates (unit size period rates); finally, the last term is the term premium for period n . Therefore, the term premium could be obtained from the forward interest rate structure and the estimated expectation of the cumulative short-term forward rates. Intuitively, the term premium represents the difference between the expected return by a long-term investor and the expected return by an investor who rolls over funds overnight.

For investors, knowing the risk premium and, as a result, nominal interest rate expectations is crucial because they are allowed to compare their own expectations with market expectations to determine their rate positions. In addition, risk premium influences interest rates to which companies, households, and governments are exposed. Therefore, central banks should monitor and understand long-term interest rates movements that embed risk premium when assessing financial conditions.

11/ This is true for speculative assets. Assets negatively correlated with consumption (hedge assets) have expected returns lower than the risk-free rate, which means a negative risk premium.

Interest rate expectations are to a greater extent related to the monetary policy. Since central banks usually determine the short-term interest rate, an increase in interest rate expectation indicates a prospect of increased basic rate in the economy, usually linked to a rise in inflation (which may reflect activity growth). Therefore, the expectation curve also serves to observe the market's response function to new information that potentially affects monetary policy. The term premium, in turn, is related to several types of uncertainty, both external and internal, such as the global economic outlook, the domestic economic policy, and the perception about the country's fiscal situation.

Estimation of risk premia embedded in yield curves has more commonly been based on affine models (see Duffie and Kan, 1996). The idea is to specify the dynamics of yield curves as linear combinations of stochastic factors (latent or observable). The connection between the physical and risk-neutral distribution of rates takes place by using a risk-premium process so as to exclude arbitrage opportunities.

Although affine models are widely used in modern fixed-income literature, estimation of parameters that govern the evolution of factors is not straightforward.¹² There are some alternative solutions to circumvent this difficulty. This box adopts the methodology described in Adrian, Crump, and Moench (2013), hereafter ACM. ACM imposed conditions on the affine model so the estimation may be carried out by sequentially applying ordinary least squares in three regressions. In principle, additional conditions imposed by ACM could entail greater errors, but empirically this is not observed. Several papers, such as Ramos-Francia, García-Verdú, and Sánchez-Martínez (2020) and Cohen, Hoerdahl and Xia (2018), have shown that curves estimated by the ACM model are in line with more general affine models, such as the one by Kim and Wright (2005).

The ACM model considers the first five principal components of interest rates as observable factors. These factors evolve as a Vector Autoregression (VAR) process with shocks following the normal distribution.¹³

The first step of the ACM model merely consists in estimating a VAR process obeyed by the factors. Next, the excess returns on securities (the difference between the return on a security and the short-term rate) is regressed on lagged factors and their innovations (errors from the first regression). In the third step, the risk premium parameters arise from a cross-section regression of the exposures of lagged factor returns on the exposures to contemporaneous factors innovations.

Figure 1 presents the daily series of the 2, 5, and 10-year risk premia from 2007 to 2022 estimated by the ACM model. The model's input data are the nominal rates constructed by the Svensson (1995) interpolation method for maturities from one to ten years and the effective Selic rate.¹⁴ Estimated premia generally agree with the theory: i) the 10-year is the highest in almost the entire sample, while the 2-year is the lowest; ii) the risk premium is almost always positive; and iii) the risk premium increases around turmoils, such as the 2008 Global Financial Crisis, the 2013 street manifestations, the 2016 presidential impeachment, and the 2022 elections. The sample's median 10-year premium is 2.08%, much higher than that of US securities for the same term, of 0.32%.¹⁵

12/ As well reported by Hamilton and Wu (2012), flat regions around the likelihood function prevent proper convergence, especially of the risk premium.

13/ The no-arbitrage assumption implies the existence of a pricing kernel. In the affine class of forward structure models, pricing kernel is exponentially affine. According to the Duffee's (2002) proposal, the risk premium is essentially affine. Pricing kernel is also known as the stochastic discount factor.

14/ In this exercise, the construction of the interest rate forward structure by Svensson (1995) used fixed-rate government securities (both without coupons, as the National Treasury Bills – LTNs –, and with coupons, as the National Treasury Notes – NTN-Fs).

15/ The term premium by the ACM model for US securities is available at the Federal Reserve Bank of New York's website https://www.newyorkfed.org/research/data_indicators/term-premia-tabs.

Estimated risk premia seemed to have followed an unusual trajectory during the Covid-19 pandemic, especially in 2020: risk premia are negative and short-term premia are larger than long-term ones. However, these unusual behaviors were also observed in other markets, such as in the US and Chilean markets.¹⁶

Figure 2 shows the daily series of the nominal spot rate and the estimated expectation component, both for the 10-year term. One may observe that the expectation is much less volatile than the spot rate. Therefore, the large variation in the 10-year rate is mainly due to significant changes in the magnitude of the risk premium. For example, the large increase in the 10-year spot rate during the 2008 Global Financial Crisis was almost entirely due to the increase in the risk premium rather than to the increase in interest rate expectations.

The decomposition of the yield curve movements via expectations or premium as presented in this box based on the ACM model helps to understand and separate movements that arise from uncertainty from those linked to the perception about future monetary policy.

Figure 1 – Nominal risk premium

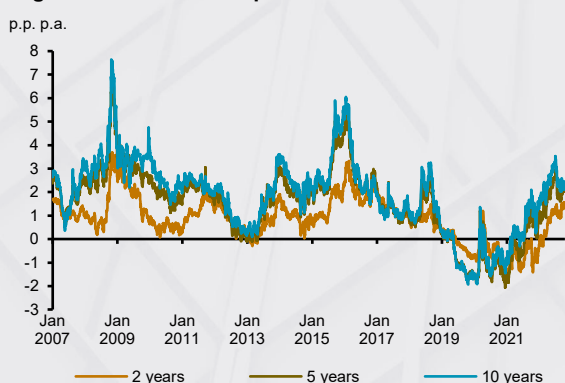
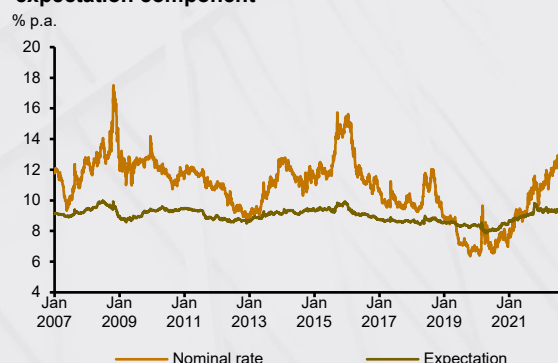


Figure 2 – 10-year nominal spot rate and estimated expectation component



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Appendix

Banco Central do Brasil Management Monetary Policy Committee (Copom)

Banco Central do Brasil Management

Board of Governors

Roberto de Oliveira Campos Neto
Governor

Bruno Serra Fernandes
Deputy Governor for Monetary Policy

Carolina de Assis Barros
Deputy Governor for Administration

Fernanda Magalhães Rumenos Guardado
Deputy Governor for International Affairs and
Corporate Risk Management

Diogo Abry Guillen
Deputy Governor for Economic Policy

Maurício Costa de Moura
Deputy Governor for Institutional Relations and
Citizenship

Otávio Ribeiro Damaso
Deputy Governor for Regulation

Paulo Sérgio Neves de Souza
Deputy Governor for Supervision

Renato Dias de Brito Gomes
Deputy Governor for Licensing and Resolution

Members of the Monetary Policy Committee (Copom)

Members

Governor

Roberto de Oliveira Campos Neto

Deputy Governor

Bruno Serra Fernandes

Deputy Governor

Carolina de Assis Barros

Deputy Governor

Diogo Abry Guillen

Deputy Governor

Fernanda Magalhães Rumenos Guardado

Deputy Governor

Maurício Costa de Moura

Deputy Governor

Otávio Ribeiro Damaso

Deputy Governor

Paulo Sérgio Neves de Souza

Deputy Governor

Renato Dias de Brito Gomes

Heads of Department Participating in the Copom Meetings (Resolution nr. 61/2021)

Department of Banking Operations and Payments System – Deban

Rogério Antônio Lucca

Department of Economics – Depec

Ricardo Sabbadini

Department of Foreign Reserves – Depin

Alan da Silva Andrade Mendes

International Affairs Department – Derin

Fabia Aparecida de Carvalho

Open Market Operations Department – Demab

André de Oliveira Amante

Research Department – Depep

André Minella

Acronyms

12MMA	12-months moving average
3MMA	3-month moving average
5DMA	5-day moving average
Anfavea	National Association of Automotive Vehicle Manufacturers
BCB	Banco Central do Brasil
BPM6	IMF Balance of Payments 6th Issue
CBIRC	China Banking and Insurance Regulatory Commission
CCT	Collective Bargaining
CDS	Credit Default Swap
CMN	National Monetary Council
Continuous PNAD	Continuous National Household Sample Survey
Copom	Monetary Policy Committee
CPI	Consumer Price Index
CSLL	Social Contribution on Net Income
Depec	Department of Economics
Depep	Research Department
Derin	International Affairs Department
DSTAT	Department of Statistics
ECB	European Central Bank
FCI	Financial Conditions Indicator
Fed	Federal Reserve
FGTS	Employment Compensation Fund
FGV	Getulio Vargas Foundation
Fipe	Institute of Economic Research Foundation
GAV	Gross Added Value
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
GFSR	Global Financial Stability Report
GGGD	Gross General Government Debt
HGDNI	Household Gross Disposable National Income
HICP	Harmonized Consumer Price Index
IBC-Br	Central Bank Economic Activity Index – Brazil
IBGE	Brazilian Institute of Geography and Statistics
Ibovespa	Bovespa Index
IC-Br	Commodities Index – Brazil
ICMS	State Value-Added Tax on Sales and Services
ICVA	Cielo Broad Retail Index
IIE-Br	Economic Uncertainty Index
IMF	International Monetary Fund
INPC	National Consumer Price Index
INSS	National Social Security Institute

IPA-M	Producer Price Index – Market
IPCA	Extended National Consumer Price Index
IPCA-15	Extended National Consumer Price Index – 15
IR	Inflation Report
IRPJ	Corporate Income Tax
LC	Complementary Law
LPR	Loan Prime Rate
LTN	National Treasury Bills
MBS	Mortgage-backed securities
ME	Ministry of Economy
Mediator	Labor Collective Bargaining System
MTP	Ministry of Labor and Social Security
New Caged	New General Registry of Employed and Unemployed Persons
NTN	National Treasury Note
Nuci	Industry Installed Capacity Usage Level
OPEC	Organization of the Petroleum Exporting Countries
p.a.	Per annum
p.p.	Percentage points
PBoC	People's Bank of China
PCQ	Pre-Copom Questionnaire
PEAC	Emergency Employment Support Program
PF	Natural person, individuals
PIM	Monthly Industrial Survey
PJ	Legal entity, companies
POF	Consumer Expenditure Survey
PPP	Purchasing Power Parity
Pronampe	National Program for the Support of Micro and Small Businesses
PSND	Public Sector Net Debt
QNA	Quarterly National Accounts
s.a.	Seasonally adjusted data
SCN	System of National Accounts
Secex	Foreign Trade Secretariat
Selic	Special System for Clearance and Custody
SFN	National Financial System
US	United States of America
VAR	Autoregressive Vector
VIX	Chicago Board Options Exchange Volatility Index