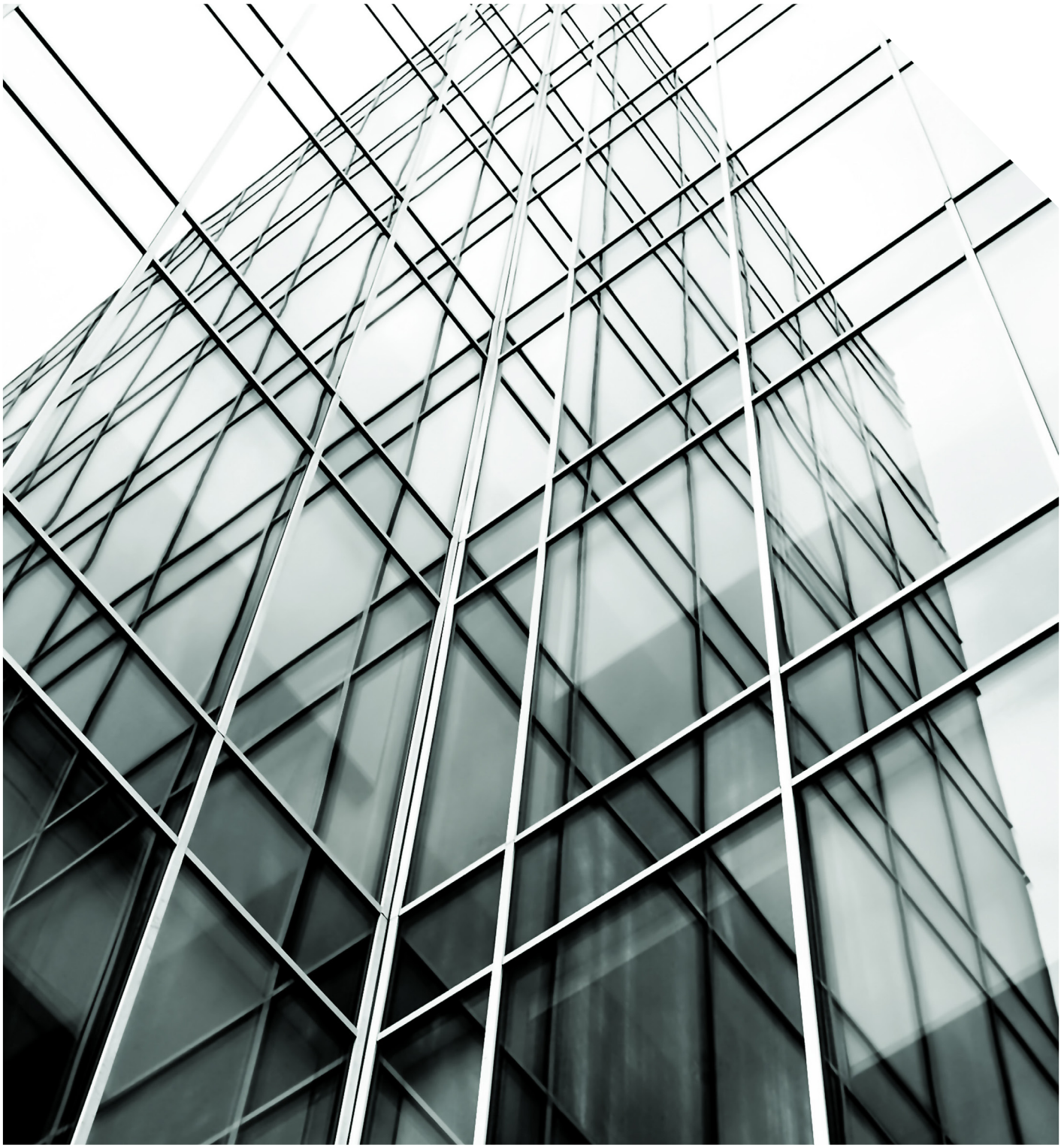

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Inflation Report

Volume 20 | Number 2 | 2018 June

BANCO CENTRAL DO BRASIL

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Inflation Report

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Statistical conventions

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

Hiphen 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) has as mission to ensure the stability of the currency's purchasing power and a solid and efficient financial system. The compliance with the task of ensuring price stability is achieved by means of the inflation targeting framework, with inflation targets set by the National Monetary Council.

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 families, businesses 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 has also 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 creation 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 genuine 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 Quarterly Inflation Report are key vehicles in communicating these assessments.

Inflation Report

The inflation projections are presented in scenarios, and are conditional on assumptions for some economic variables. Traditionally, the assumptions refer to the paths for the exchange and Selic rates throughout the projection horizon. These values are usually extracted from the Focus survey, conducted by the BCB with independent analysts, or are assumed constant. The reported scenarios are based on a combination of those assumptions. Alternative scenarios may also be presented. It is important to stress that these scenarios 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 degree of uncertainty associated with them. 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 exogenous variables. The 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.

Errata

In August 6, 2018, amendments were performed at box “New core inflation measures”, as follows:
a) in the first paragraph of page 40, item “New”, the expression “home appliances (4,1%)” was replaced by “electro-electronics (6.6%)”;
b) in the last paragraph of page 40, the figures on the sentence “...comprising 58.4% of market prices and 43.5% of the Extended National Consumer Price Index (IPCA) basket” were replaced by “..comprising 57.6% of market prices and 42.9% of the Extended National Consumer Price Index (IPCA) basket” and the figures on the sentence “...comprising 52.1% of market prices and 38.0% of the IPCA basket” were replaced by “”... comprising 51.3% of market prices and 38.2% of the IPCA basket”; and,
c) in footnote 6, page 40, the figures on the sentence “Excluded items represent 28.7% and 69.8%...” were replaced by “Excluded items represent 31.3% and 69.8%”.

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Executive summary

The Brazilian economy continues to recover, at a more gradual pace than that considered in the previous edition of the Inflation Report.

Gross Domestic Product (GDP) grew in the first quarter of the year, compared to the previous quarter, for the fifth consecutive period. On the supply side, the highlight was the increase in agricultural and livestock production in an environment of slowdown in industrial activity. Domestic demand continues on a recovery path with consistent growth in household consumption and investment. GDP growth projection for this year is 1.6 percent, below that presented in the March Inflation Report, reflecting recovery at a slower pace than previously expected.

The temporary halt in the transportation sector in May makes it more difficult to assess the recent evolution of economic activity. April data suggest more consistent activity relative to previous months. Indicators for May – and possibly June –, however, are likely to reflect the effects of the aforementioned halt, thus affecting activity in the second quarter and the revision of the annual growth projection.

The economy continues to operate with a high level of economic slack, as reflected in the low industrial capacity utilization indexes and, mainly, in the unemployment rate. Nevertheless, the recovery of the economy has gradually reduced the amount of slack. In the labor market, notably, the unemployment rate has presented a downward trend at a moderate pace.

The global outlook remained more challenging and showed volatility. The evolution of risks associated, to a large extent, with normalization of interest rates in some advanced economies led to adjustments in international financial markets. As a result, risk appetite towards emerging economies has diminished.

The Brazilian economy has capacity to withstand a setback in the international scenario, given its robust balance of payments, low inflation environment,

anchored expectations and prospects of economic recovery. Nevertheless, risks stemming from a possible additional deterioration in the outlook for emerging economies remain, in a context of frustration of expectations regarding the necessary reforms and adjustments in the Brazilian economy.

Expectations of the inflation rate measured by the Extended National Consumer Price Index (IPCA), collected by the Focus survey, are around 3.9 percent for 2018 and 4.1 percent for 2019. For 2020, expectations are around 4.0 percent.

In the short run, the Committee considers that inflation should reflect significant temporary upward pressures stemming from the halt in the transportation sector and from other relative price changes. Measures of underlying inflation are still running at low levels. This includes the components that are most sensitive to the business cycle and monetary policy.

Regarding conditional inflation projections, in the scenario with a constant interest rate at 6.50 percent p.a., and a constant exchange rate at R$3.70/US$, inflation projections stand around 4.2 percent for 2018 and 4.1 percent for 2019. Inflation projections for 2020 in the same scenario stand around 4.1 percent. In the scenario with interest rate and exchange rate paths extracted from the Focus survey, inflation projections stand around 4.2 percent for 2018 and 3.7 percent for 2019. Inflation projections for 2020 stand around 3.7 percent.

In the most recent Copom meeting (215th Meeting), its members discussed possible enduring effects of the shocks faced by the Brazilian economy. All members agreed that in the short term it will be more difficult to evaluate if the economic developments are in line with its baseline scenario for the medium and long terms. This context reinforces the importance of monitoring over time the evolution of the baseline scenario and its risks, and of evaluating the duration of the effects of shocks on inflation (i.e., its second-round effects) in order to ensure that the achievement of low inflation persists, even in the face of adverse shocks.

At that meeting, the Copom unanimously decided to maintain the Selic rate at 6.50 percent p.a. The Committee judges that this decision reflects its baseline scenario for prospective inflation and the associated balance of risks and is consistent with

convergence of inflation to target over the relevant horizon for the conduct of monetary policy, which includes 2018 and, mainly, 2019.

On the occasion, the Copom communicated that its baseline scenario for inflation encompasses risks factors in both directions. On the one hand, (i) the possible propagation, through inertial mechanisms, of low inflation levels in the past may lead to a lower-than-expected prospective inflation trajectory. On the other hand, (ii) frustration of expectations regarding the continuation of reforms and necessary adjustments in the Brazilian economy may affect risk *premia* and increase the path for inflation over the relevant horizon for the conduct of monetary policy. This risk intensifies in the case of (iii) further changes in the global outlook for emerging economies. The latter risk has intensified since the May Copom meeting (214th Meeting), whereas the risk that inflation would remain significantly below target over the relevant horizon has diminished.

The Copom judges that economic conditions prescribe accommodative monetary policy, i.e., interest rates below the structural interest level. The Committee emphasizes that the evolution of reforms and necessary adjustments in the Brazilian economy is essential to maintain low inflation in the medium and long run, for the reduction of its structural interest rate, and for sustainable recovery of the economy.

The Copom judges that it should base its decisions on the evolution of inflation projections and expectations, of the balance of risks, and of economic activity. Shocks that produce relative price changes should only lead to a monetary policy response to their possible second-round effects (i.e., to the propagation to prices in the economy that are not directly affected by the shock). It is through such second-round effects that these shocks may affect inflation projections and expectations, and change the balance of risks. These effects may be mitigated by the level of economic slack and by inflation expectations anchored around the targets. Therefore, there is no mechanical relationship between recent shocks and the conduct of monetary policy. In their deliberations, Committee members emphasized that this prescription requires an environment with anchored expectations.

In the Copom's assessment, the evolution of the baseline scenario and of the balance of risks

prescribes keeping the Special System for Clearance and Custody (Selic) rate at its current level. The Copom emphasized that the next steps in the conduct of monetary policy will continue to depend on the evolution of economic activity, the balance of risks, and on inflation projections and expectations.

1 Economic outlook

This chapter of the Inflation Report analyzes the recent evolution of the economic outlook, considering the international and domestic scenarios, as well as the prospects for the evolution of the country's economy in the coming quarters. The assessment of the international scenario addresses the most advanced and emerging economies, emphasising aspects that tend to influence the Brazilian economy, mainly inflation and activity indicators.

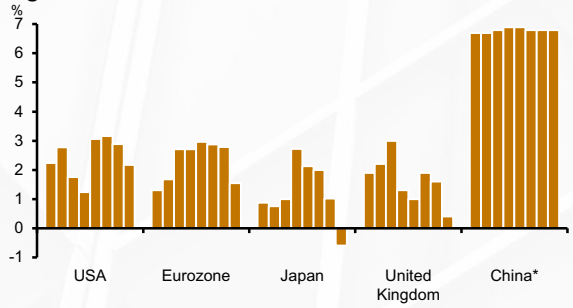
The analysis of the domestic outlook comprises the major drivers of economic activity, seen from the point of view of the trajectories of both national accounts and the most frequent and timely sectorial indicators. Central aspects are assessed, especially those associated with the movements in the labor market, the evolution of credit markets, and the performance of the country's public accounts and external accounts. The final section of this chapter analyzes the behavior of inflation and market expectations, taking into account the trajectories of key price indicators.

1.1 External scenario

The recent developments in the activity of the major economies point to the continuation of the cycle of disseminated global expansion, despite the prospects of slowdown of the growth pace in some advanced countries.

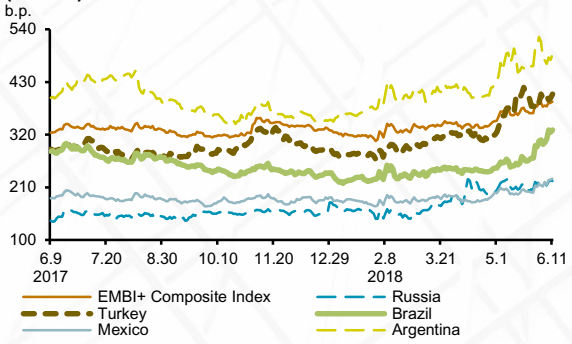
Indicators for the Euro Area, Japan, and the United Kingdom suggest moderate economic growth and accomodation of inflationary pressures in 2018Q1. In the United States of America (USA), the prospects for a gradual normalization of the monetary conditions remain, in an environment of continuous tightening of labor markets and growing inflation up to a level close to 2.0 percent.

Figure 1.1 – GDP[1/]



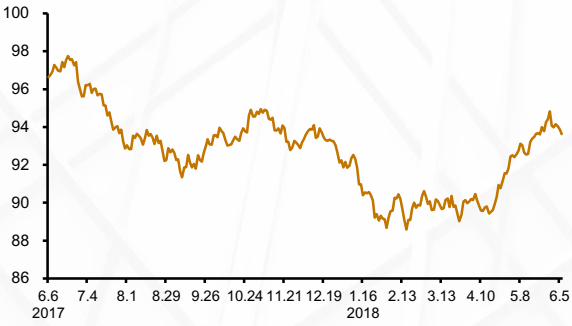
1/ QoQ saar. Last: Q1 2018.
* China: %Q/Q-4, not sa.
Source: Thomson Datastream

Figure 1.2 – Emerging Markets Bond Index Plus (Embi+)



Source: Thomson Reuters

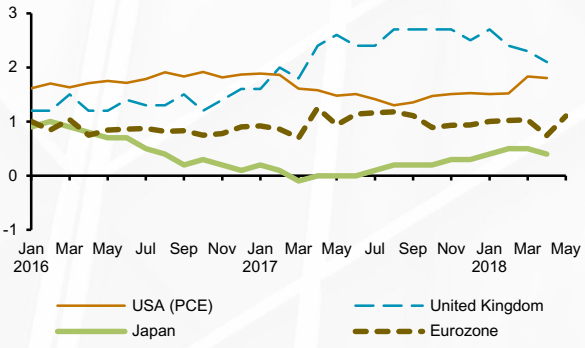
Figure 1.3 – Dollar Index



Source: Thomson Datastream

Figure 1.4 – Core inflation in advanced economies

% change YoY



Source: Thonsom Datastream

The current scenario is more complex, with less synchronization in the monetary standardization process of the main economies, which translates into greater volatility in the markets and stricter global financial conditions, with impacts mainly in the emerging economies. In this sense, it is worth noting the upward trajectory of country risk indicators throughout the year.

Recent international market oscillations reflect the evolution of risks related to the normalization of interest rates in some advanced economies and, to a lesser extent, concerns about the outlook for international trade. The magnitudes of the adjustments in the emerging economies assets pricing derive, moreover, from idiosyncratic components of each economy.

In the USA, economic activity remains robust, despite a slower-than-expected growth in 2018Q1. Domestic demand continued to expand consistently, even in an environment of global uncertainties. Labor market indicators point to risks of possible future wage pressures, which corroborates the prospect of continued normalization of US monetary policy and thus contributes to the strengthening of the dollar globally.

In the Euro Area, activity deceleration in the first quarter (expansion of 1.5 percent, annualized and seasonally adjusted quarterly rate) may be associated with temporary factors, such as severe weather conditions and localized workers' stoppages, especially in France and Germany. The expansion cycle in the region is expected to continue, although at more moderate growth rates than in 2017.

In Japan, GDP contracted in 2018Q1 (0.6 percent, annualized and seasonally adjusted quarterly rate), interrupting a long sequence of economic growth. This result reflected the fall in household consumption and the lower contribution from the external sector.

The interannual inflation rates in the main economies showed changes in their composition. The underlying inflation measures have been more restrained than expected, with downward revisions in the projections for the Euro Area and Japan. Conversely, increases in the energy and food components have exerted counter pressure, reducing the prospects of further decreases in inflation indices. In the USA, consistent with the recovery in economic activity and the

tightening of the labor market, annual inflation measures have approached the 2.0 percent target set by the Federal Reserve in the long run.

Moderate price and wage pressures in advanced countries have reinforced the scenario of gradual adjustment of monetary conditions. The adjustments are driven by the prospective assessment of prices and activity, in order to resolve volatility risks in the normalization process.

In summary, inflation rates remain low in the major advanced economies, and global growth remains robust. The current scenario is more challenging, with the revaluation of global assets and greater volatility in emerging markets in response to the normalization of monetary policies in central economies.

1.2 Domestic outlook

Economic activity and the labor market

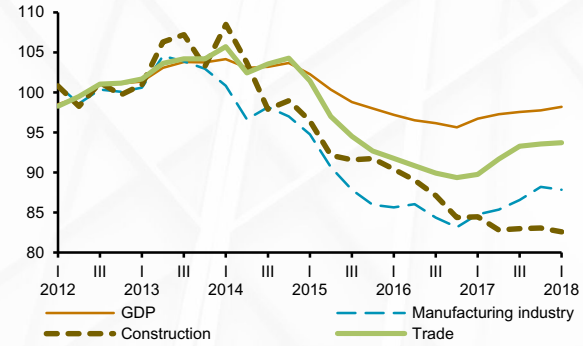
The set of activity indicators released since the last Inflation Report signals continuity of the recovery process of the Brazilian economy. In this sense, it is worth noting the GDP growth in 2018Q1 compared to the immediately preceding quarter, the fifth consecutive quarterly expansion in this comparison basis.

Despite the GDP growth, the observed performances for sectors more correlated to the economic cycle showed a slowdown in activity at the beginning of the year. In the second quarter, the temporary halt in the transportation sector in May brought negative impacts, not yet fully delineated, that compromised the reaction of the activity that had been outlined by the results observed in April.

The labor market continues to recover, despite the recent reduction in the growth rate of occupied population, as well as of the average income received by employees.

In this context, the central projection for GDP growth in 2018, released in the March Inflation Report, was revised from 2.6 percent to 1.6 percent[1], compared to the expansion of 1.0 percent of GDP in 2017.

Figure 1.5 – GDP and components[1/]
Average 2012 = 100



Source: IBGE
1/ Seasonally adjusted data.

Table 1.1 – Gross Domestic Product
QoQ previous quarter
Seasonally adjusted

% growth

	2017				2018
	I Q	II Q	III Q	IV Q	I Q
GDP at market prices	1.1	0.6	0.3	0.2	0.4
Agric. and livestock	11.6	-2.6	-1.8	-0.1	1.4
Industry	1.3	-0.4	1.0	0.7	0.1
Services	0.4	0.7	0.5	0.1	0.1
Households consumption	0.2	1.1	1.1	0.1	0.5
Government consumption	0.0	-0.2	-0.3	0.1	-0.4
GFCF	-0.8	0.4	2.0	2.1	0.6
Exports	4.8	1.2	3.6	-0.8	1.3
Imports	2.3	-2.8	6.5	1.6	2.5

Source: IBGE

1/ See box "Revision of the GDP projection for 2018" of this Report.

GDP growth in 2018Q1 – a seasonally adjusted increase of 0.4 percent compared to the previous quarter – reflected the expansion of the agricultural and livestock product (1.4 percent), which offset the slowdown in manufacturing. Among the components of aggregate demand, household consumption and Gross Fixed Capital Formation (GFCF) stood out, with sequences of consecutive quarterly growth not observed since 2013.[2]

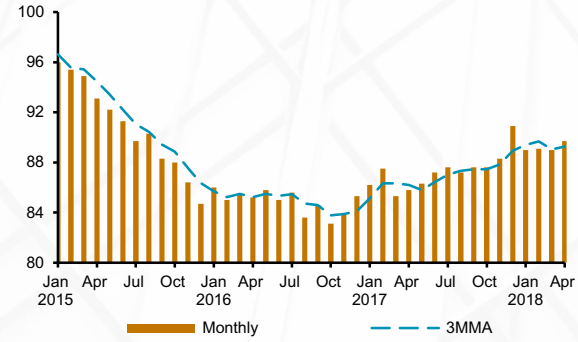
Data from several production segments showed a significant monthly growth in activity in April. Despite this QoQ evolution, the analysis on a quarterly basis corroborates the prospect of moderation in the pace of activity, in line with the accommodation of qualitative indicators that seek to measure the level of confidence of companies and consumers.

Industrial production fell 0.1 percent in the quarter ended in April, after growing 2.2 percent the quarter ended in January, according to seasonally adjusted data from Monthly Industrial Survey – Physical Production (PIM-PF), Brazilian Institute of Geography and Statistics (IBGE). Reinforcing the reading of slowdown in the sector's activity, only seven of the twenty-six branches of the industry registered production growth, in that base of comparison, compared to eighteen branches with expansion in the quarter ended in January. Of note, the positive performance of the automotive industry at 3.8 percent, in contrast to the industry average.

The volume of services fell by 0.6 percent in the quarter ended in April 2018 compared to the quarter ended in January, when it showed an increase of 1.1 percent, according to seasonally adjusted data from Monthly Survey of Services (PMS), IBGE. Two of the five large segments surveyed retreated, with emphasis on "transportation, auxiliary transportation services and postal services", -0.9 percent, a segment whose dynamics correlates with industrial activity.

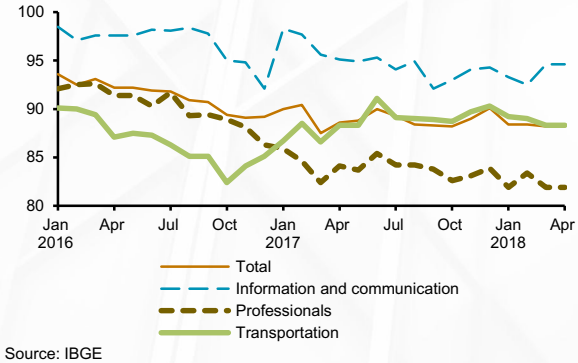
On the demand side, trade activity, the main indicator of consumption, showed a QoQ acceleration. Sales of the expanded trade advanced 2.2 percent in the quarter ended in April, compared to the that ended in January, when they grew 1.7 percent in the same comparison, according to seasonally adjusted data from Monthly Retail Trade Survey (PMC), IBGE. The performance of the sector is partly influenced by a greater dynamism of the automotive segment,

Figure 1.6 – Industrial production[1/]
2012 = 100



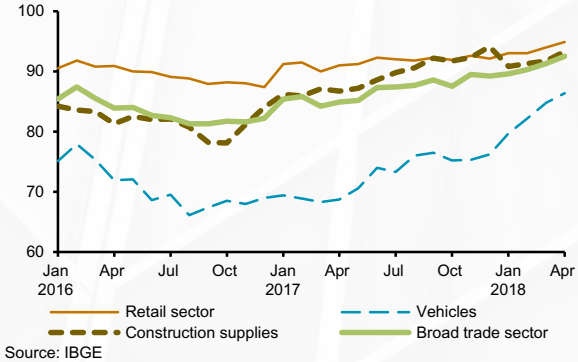
Source: IBGE
1/ Seasonally ajusted data.

Figure 1.7 – Volume of Services Index[1/]
Average 2014 = 100



Source: IBGE
1/ Seasonally ajusted data.

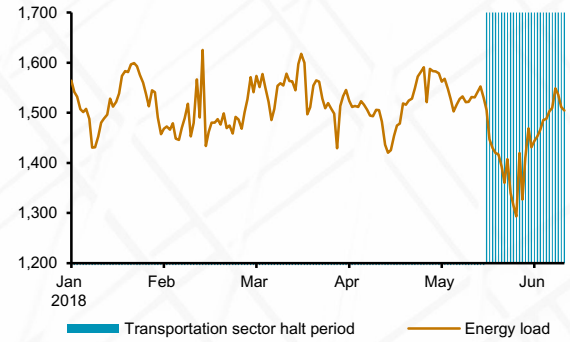
Figure 1.8 – Retail sales index[1/]
Average 2014 = 100



Source: IBGE
1/ Seasonally ajusted data.

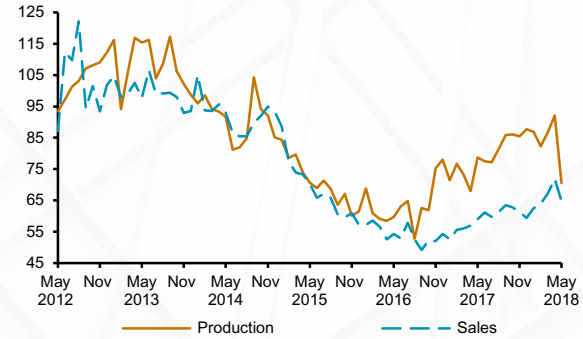
2/ Comparative analysis of the dynamics of these components in the various economic recovery periods can be found in the box entitled "Private components of aggregate demand in cycles of economic recovery" in this Report.

Figure 1.9 – Daily load of the interconnected system[1/]
GWh



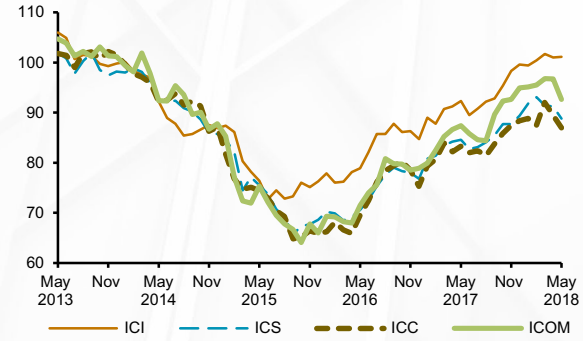
Source: ONS
1/ Seasonally adjusted data.

Figure 1.10 – Vehicle production and sales[1/]
Average 2012 = 100



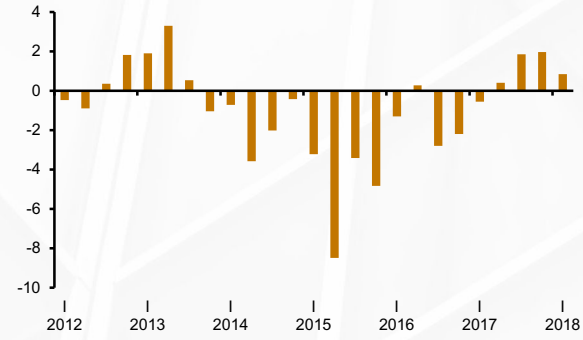
Source: Anfavea
1/ Seasonally adjusted data.

Figure 1.11 – Confidence indexes[1/]
Points



Source: FGV
1/ Seasonally ajusted data.

Figure 1.12 – Gross fixed capital formation[1/]
Quarterly change (%)



Source: IBGE
1/ Seasonally ajusted data.

whose sales grew by 9.6 percent in the period, driven mainly by expansion of credit – loans to households for vehicle acquisition increased by 26.5 percent in the first four months of the year in relation to the same period of 2017.

As long as the broader sectorial indicator trajectories referring to May and subsequent months are not released, it will not be possible to accurately measure the impact of the temporary halt of cargo transportation sector on economic activity. More timely statistics, however, indicate a significant influence of the event on production and retail. Daily data from the National Power System Operator (ONS) show a sharp decrease in the energy load in the system during the halt days – a variation of -16 percent in the most critical period – in relation to the average in the days of May prior to the halt. The Cielo Broad Retail Index (ICVA)[3], based on retail sales revenues, suggests a 15 percent decrease in trade during the worst period of the event, after a slight initial rise explained mainly by increases in sales in gas stations and supermarkets due to the possible defensive behavior of consumers in the midst of shortages.

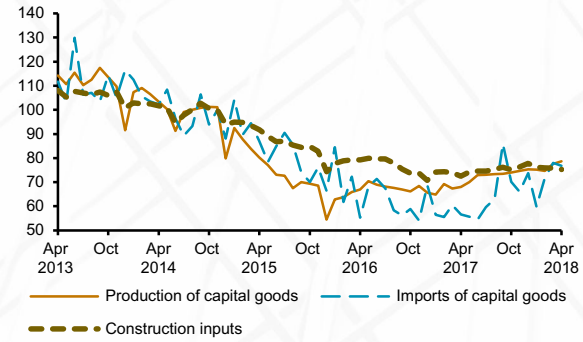
Monthly indicators – such as automobile production, released by National Association of Automotive Vehicle Manufacturers (Anfavea); new vehicles sales, by National Federation of Automotive Vehicle Distribution (Fenabrave); heavy vehicles traffic on toll roads, by Brazilian Association of Highway Concessionaires (ABCR); and corrugated cardboard shipment, by Brazilian Corrugated Board Association (ABPO) – recorded significant decreases in May, partly reflecting plant halts and significantly lower movement in concessionaires in the last week of the month.

The temporary halt in the transportation sector also tends to affect the evolution of confidence indexes of the various business segments and consumers. These indicators were already indicating a slowdown, at the margin, in the pace of economic recovery[4], reflecting both the behavior of the components associated with the perception of the current situation and those related to expectations for the coming months.

Regarding the evolution of investments, the recovery trajectory observed in the second half of 2017 remained at the beginning of 2018. The expansion

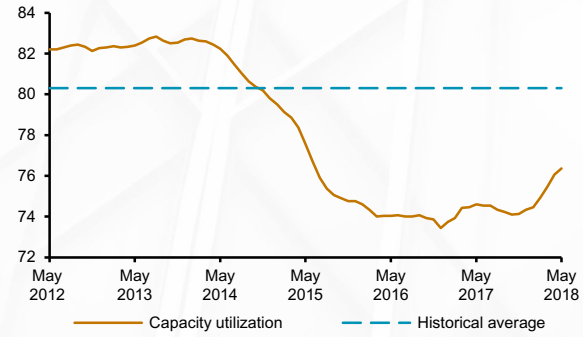
3/ Index developed by Cielo based on sales made at the active sales points accredited to the company.
4/ The results of the confidence indexes for June had not been released until the information cutoff date (June 15) for this edition of the Inflation Report.

Figure 1.13 – GFCF indicators[1/]
Average 2014 = 100



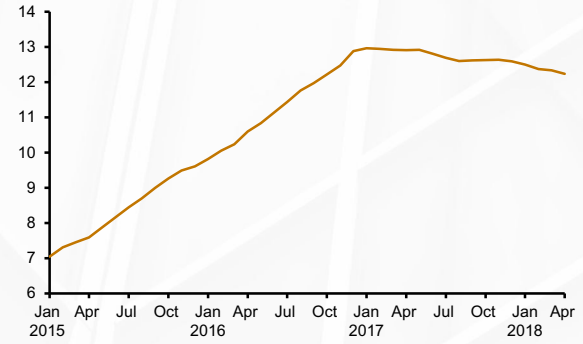
Source: IBGE
1/ Seasonally ajusted data.

Figure 1.14 – Capacity utilization[1/]
3MMA (%)



Source: IBGE
1/ Seasonally ajusted data.

Figure 1.15 – Unemployment rate[1/]
%



Source: IBGE
1/ Seasonally adjusted series.

of GFCF in 2018Q1 – up 0.6 percent according to the National Accounts IBGE – was the fourth consecutive period of growth QoQ, a fact not observed since 2013Q3. Compared to the same period of the previous year, GFCF grew 3.5 percent in 2018Q1, reflecting an upward movement in the production of capital goods.

Different dynamics of GFCF components in the year are observed, evidenced by the significant growth in absorption, reflecting increases in the production and imports of capital goods[5], in contrast to the relative stability in the evolution of construction performance indicators (production of inputs for the sector).

The still incipient recovery of the real estate market, given the high level of residential and commercial real estate stock, and of the public sector investment, at a historically low level, inhibit the sector's more consistent contribution. The expansion of uncertainty, demonstrated by the recent volatility of financial indicators, and the slowdown of business confidence are additional factors that jeopardize a more vigorous investment reaction in the year.

In addition, the economy continues to operate with a high level of slack in production factors, reflected in the low indexes of industry capacity utilization and the unemployment rate.

The Level of Capacity Utilization (Nuci of Getulio Vargas Foundation – FGV) of manufacturing increased 1.4 p.p. in the quarter ended in May, reaching 76.4 percent, considering seasonally adjusted data, sustaining the recovery path that begun by the end of 2017. Nevertheless, the indicator remains below its historical average (80.3 percent).

The labor market continues to recover moderately, in line with the pace of economic activity recovery. The recent trajectory of the employed population emphasizes the gradual adjustment trend in the labor market, a movement consistent with the procyclical characteristic of labor productivity, as mentioned in previous editions of the Inflation Report.[6]

The unemployment rate, as released by the Continuous National Household Sample Survey (PNAD Contínua) from IBGE, reached 12.9 percent in the quarter ended in April – 0.7 p.p. lower than in the

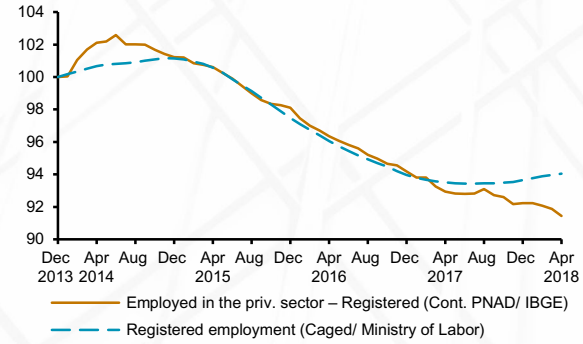
5/ The series of imports of capital goods was smoothed by removing extraordinary events occurred in June 2016 and in February 2018.
6/ Please see boxes "Reflections on the evolution of labor productivity and of the occupation level in Brazil", Inflation Report of March 2017, and "Recent evolution of labor productivity", Inflation Report of September 2017.

same period of the previous year – as a result of the expansion of the occupied population by 1.7 percent, while the labor force varied by 0.8 percent. In the seasonally adjusted series[7], the unemployment rate fell from 12.5 percent to 12.2 percent between the quarters ended in January and April, with decreases of 0.2 percent and 0.5 percent of the occupied population and the workforce, in that order. The evolution of the occupied QoQ reflects, in part, the slowdown in the generation of job positions in categories associated with informality, which had increased significantly in 2017.

Data from the General Registry of Employed and Unemployed Persons (Caged), from the Ministry of Labor, denote stronger evolution of formal jobs, contrasting to the trend observed in this category of occupation in PNAD Contínua.[8] Caged data recorded a generation of 233.2 thousand formal jobs in the quarter ended in April[9] (31.8 thousand in the same period of the previous year), especially in the services sector and in manufacturing. Formal jobs index grew 0.2 percent in the quarter, in the seasonally adjusted series[10], the third consecutive quarterly variation.

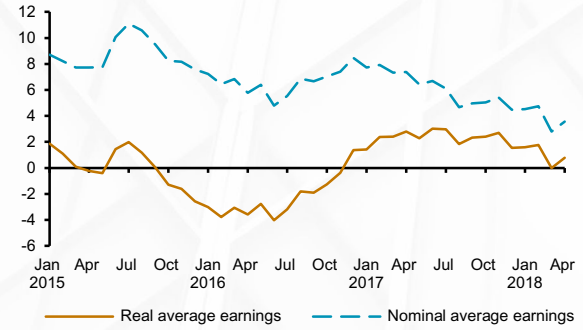
The usual average real labor income, reported by PNAD Contínua decreased by 0.1 percent in the quarter ended in April, compared to January, a behavior influenced by an atypical fact in the sample[11]. After correcting this atypical event, it is estimated that the average real income increased by 0.4 percent in the period, still benefited by the favorable inflationary scenario. The real salary mass fell by 0.2 percent in the same reference (0.2 percent increase after outlier withdrawal from the sample), reflecting changes in income and the occupied population.

Figure 1.16 – Occupied population[1/]
Dec 2013 = 100



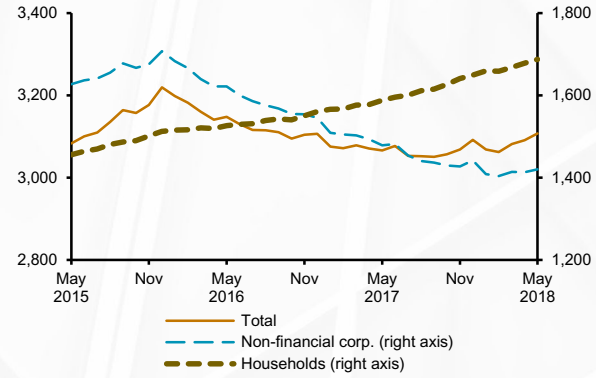
Sources: IBGE and Ministry of Labor
1/ Seasonally adjusted data.

Figure 1.17 – Real and nominal earnings
QoQ of previous year
% change



Source: IBGE

Figure 1.18 – Credit operations balance
R$ billion

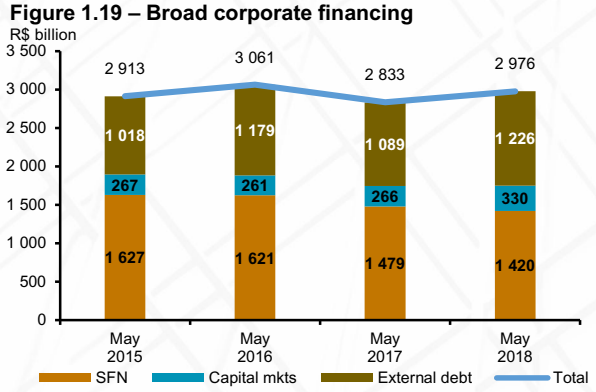


Credit

Credit markets evolve in line with the recovery of economic activity and with the stimuli coming from the current cycle of monetary policy easing. The balance of credit operations increased by 1.5

7/ Data seasonally adjusted by the BCB.
8/ Temporary differences in the indicators trajectories reflect different methodologies inherent to the data sources. The PNAD Contínua is a questionnaire survey, with a household sample, while Caged refers to a register of information reported by the companies to the Ministry of Labor.
9/ Unadjusted data to account for late registrations.
10/ Data seasonally adjusted by the BCB.
11/ Individuals living in low-income neighborhoods and with reported monthly income of R$ 1 million entered the PNAD Contínua sample in December 2016 and remained until December 2017, affecting the evolution of the average income series.

Figure 1.19 – Broad corporate financing



Sources: BCB and Cetip

Figure 1.20 – New transactions seasonally adjusted

3 months average – R$ billions

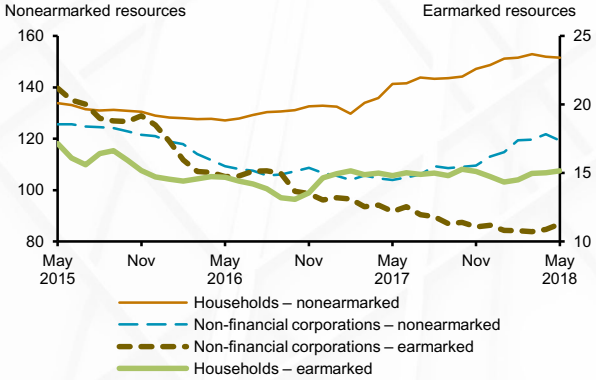
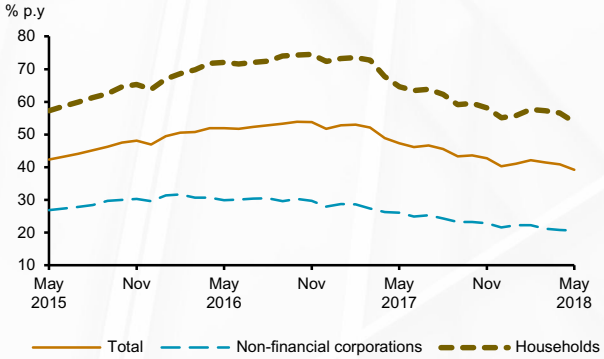


Figure 1.21 – Interest rates

Nonearmarked resources



percent in the quarter ended in May compared to the previous quarter, reflecting variations of 1.7 percent in the household credit segment and 1.2 percent in the corporate credit segment. For households, the highlights were the increases in vehicle financing and personal credit portfolios, in line with the trend of increase in household consumption. As to loans to corporations, funding from the capital and external markets continues to compensate, in part, for the weaker dynamism of financing in the National Financial System (SFN), especially regarding working capital and financing for investments with Brazilian Development Bank (BNDES) funds.[12]

The evolution of seasonally adjusted credit concessions makes it possible to evaluate significant QoQ movements, indicating the future behavior of balances. In this context, there was a growth of 0.1 percent of new loans in the quarter ended in May compared to the previous quarter, reflecting increases of 0.9 percent in the corporate segment and 0.1 percent in loans granted to households.[13]

In the scope of credit to corporations, it is worth noting the sharp increase in concessions in the modalities of advances in foreign-exchange contracts (ACC) and working capital.

The average interest rate on new credit operations (25.0 percent p.a. in May) declined 1.9 p.p. in the quarter, following a downward trend since the end of 2016.[14] In operations with nonearmarked resources, there were variations of -3.9 p.p. and -1.6 p.p. respectively in the household and corporate segments. The average interest rate on operations with earmarked resources declined by 1.2 p.p. in the quarter, influenced by the decrease of 3.0 p.p. in the corporate segment. The Average Cost of Outstanding Loans (ICC) continued to decrease gradually in the quarter ended in May (21.2 percent p.a.), with variations of -0.5 p.p. and -0.6 p.p. in the household and corporate segments, respectively. In operations with non-earmarked resources, more sensitive to the monetary policy cycle, the ICC fell by 1.6 p.p. to 33.7 percent p.a. In the segment of earmarked resources, the indicator remained stable at 8.9 percent p.a.

Delinquency rates have declined since mid-2017. Regarding operations with delays exceeding 90 days,

12/ See Box "Financing from the capital market and the external sector and corporate debt stock" from the March 2018 and box "Broad Enterprise Financing," in this Report.

13/ After deseasonalization, the additivity of the series that make up the totalization is not preserved.

14/ See box "Evolution of the credit market in the monetary policy easing cycles", of the March 2018 Inflation Report.

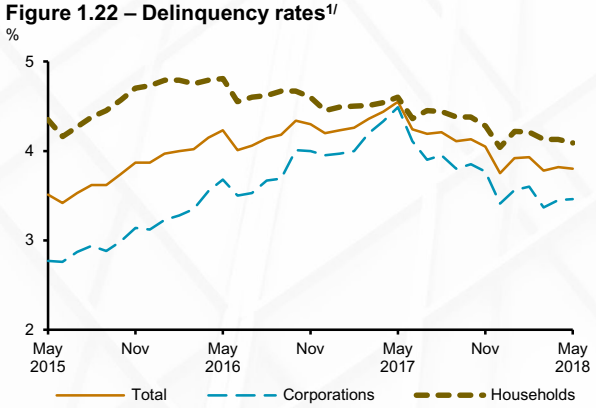
Table 1.2 – Cost of Credit Indicator (ICC)

% p.a.

Itemnization	2017	2018		Quarterly change	12-month variation
	Dec	Apr	May	p.p.	p.p.
Total	21.3	21.5	21.2	-0.6	-1.1
Nonearmarked	34.3	34.4	33.7	-1.6	-3.8
Earmarked	8.9	8.9	8.9	0.0	0.0
Household	26.6	27.2	26.8	-0.5	-1.5
Nonearmarked	45.8	46.8	45.8	-1.5	-3.9
Earmarked	8.8	8.7	8.7	0.0	-0.1
Corporations	15.5	15.1	14.9	-0.6	-1.3
Nonearmarked	22.1	20.9	20.5	-1.5	-4.1
Earmarked	9.0	9.1	9.1	0.0	0.2

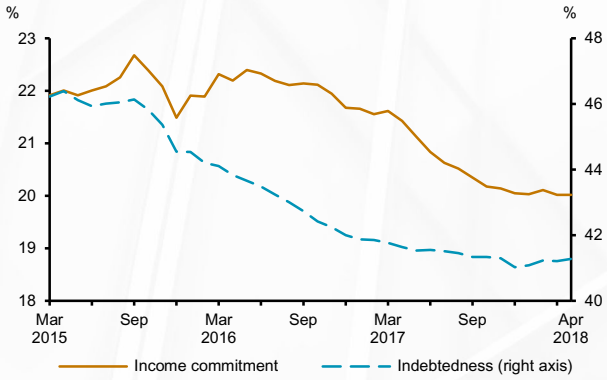
Source: BCB

Figure 1.22 – Delinquency rates[1/]



1/ Credit operations overdue for more than 90 days.

Figure 1.23 – Indebtedness and income commitment with household debt service



the default rate decreased to 3.3 percent in May (-0.1 p.p. compared to February), reflecting percentages of 3.6 percent and 3.0 percent in loans to households and corporations, respectively.

An expansion of 3.0 percent in the SFN credit balance is estimated for 2018. The balance of credit operations for households should advance 7.5 percent, favored by the fall in credit costs, economic recovery and reduction in household debt to a level similar to the 2011 levels.

Conversely, it is projected a decrease of 2.0 percent in the corporate credit portfolio, in a context of corporate deleveraging and greater dynamism in the capital and external markets. Regarding the balance of credit operations with non-earmarked resources, it is estimated growth of 7.0 percent, while the projection for the credit portfolio with earmarked resources indicates a decrease of 1.0 percent.

In line with the year's projections, data from the last Quarterly Survey on Credit Conditions (PTC)[15] – held with financial institutions between the first and fifteen of June 2018 – show continuity of positive expectations. Regarding 2018Q3, the indicators show better conditions for credit approvals in the household segment, mainly in the housing modality. However, the expectations of credit approvals for the corporate segment are negative, which, if verified, would interrupt the improvement observed in the first half of 2018.

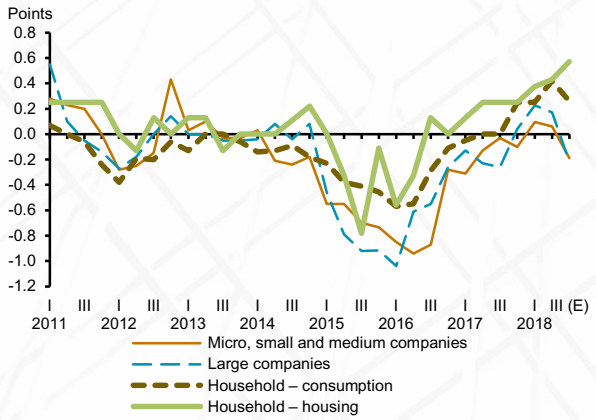
Fiscal

The consolidated public sector registered a primary surplus of R$7.3 billion in the first four months of 2018, compared to R$15.1 billion in the same period of 2017. The reduction reflected the anticipation of the payment of judgment debts owned by the government (*precatórios*), in March and April, totaling R$ 20.2 billion. In 2017, this occurred in May and June.

In the same period, the central government recorded a primary deficit of R$ 2.6 billion, reflecting the

15/ The data presented in this Report refer to the evaluation of the institutions on the percentage of approval of new loans, considering four segments (large companies, micro, small and medium enterprises, residential loans and consumer credit), regarding the last three months, and also the next three months. The indicators presented correspond to an average of the responses of each interviewee, ranging from -2 (considerably lower approval) to +2 (considerably higher approval). For more details on the methodology of the PTC, see Annibal, Clodoaldo and Koyama, Sérgio (2011), "*Pesquisa Trimestral de Condições de Crédito no Brasil*", BCB, Working Paper 245.

Figure 1.24 – New credit lines approvals indicators



Obs.:(E) – Values of III 2018 refers to the respondents expectations. The others refer to the observed perceptions.

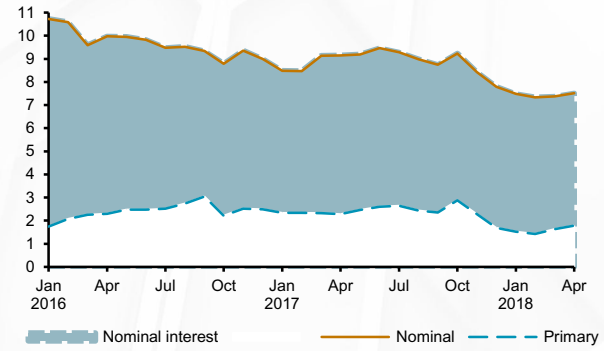
Table 1.3 – Public sector borrowing requirements – Primary result

Accumulated in the year up to April

R$ billion

Itemization	2016	2017	2018
Central Government	5.8	2.7	2.6
o/w Federal Government	-32.0	-49.5	-58.8
o/w INSS	37.5	52.0	61.2
Sub-national governments	-11,4	-17.9	-10.6
State companies	1.2	0.0	0.7
Total	-4.4	-15.1	-7.3

Figure 1.25 – Public Sector Borrowing Requirements
12-month accumulated – % GDP



increase in the deficit of the General Social Security System (R$ 9.2 billion), partially neutralizing the increase of the federal government surplus over the first four months of 2017 (R$ 9.3 billion). The improved performance of the primary result reflected changes of 10.5 percent in net revenue, partly reflecting the expansion of economic activity and the collection of non-recurring revenues; and 9.8 percent in expenses, mainly due to lower expenses with subsidies. The primary result of subnational entities was a surplus of R$ 10.6 billion, while state-owned companies had a primary deficit of R$ 695 million.

In the twelve-month period up to April, the consolidated public sector registered a primary deficit of R$ 118.4 billion (1.8 percent of GDP), compared to a deficit of R$ 145.1 billion in the twelve months ended in April 2017 (2.3 percent of GDP). The Budget Guidelines Law[16] established a deficit of R$ 161.3 billion as an indicative target for the consolidated public sector's primary result in 2018, which is estimated to correspond to 2.3 percent of GDP at the end of the fiscal period.

The result of accrued nominal interests relative to the public sector debt reached R$ 118.9 billion in the year to April 2018, with a significant decrease in relation to the same period in 2017 (R$ 138.8 billion), despite the unfavorable result for the BCB (R$ 2.5 billion, compared to a gain of R$ 5.4 billion in the first four months of 2017). This movement mainly reflects the current cycle of monetary policy, with consequent reduction of the implicit interest rate of the Public Sector Net Debt (PSND).

Regarding debt indicators, the PSND totaled R$ 3,448.1 billion (51.9 percent of GDP) in April 2018, rising 4.3 p.p. of GDP in relation to the same month of the last year. The Gross General Government Debt, which includes the Federal Government, National Social Security Institute (INSS), state and municipal governments, reached R$ 5,045.7 billion (75.9 percent of GDP), the highest value of the historical series started in December 2006.

The continuation of the reforms and necessary adjustments in the Brazilian fiscal policy is essential to revert the upward path of the public debt.

16/ Law 13,408, of December 26th, 2016, modified into Law 13,480, of September 13th, 2017.

Table 1.4 – Balance of Payments

US$ billion

Itemization	2017			2018	
	May	Jan-May	Year	May	Jan-May
Current account	2.8	-0.7	-9.8	0.7	-4.0
Balance on goods	7.4	28.0	64.0	5.6	22.0
Exports	19.7	87.7	217.2	19.2	93.2
Imports	12.3	59.7	153.2	13.6	71.3
Services	-2.5	-12.4	-33.9	-2.7	-13.6
of which: Travel	-1.1	-4.6	-13.2	-1.2	-5.2
of which: Transportation	-0.3	-1.6	-5.0	-0.4	-2.6
Primary income	-2.4	-17.2	-42.6	-2.3	-13.4
of which: Interest	-1.0	-9.8	-21.8	-0.8	-7.9
of which: Dividends	-1.4	-7.5	-21.0	-1.6	-5.6
Secondary income	0.2	0.9	2.6	0.2	1.1
Capital account	0.0	0.1	0.4	0.0	0.2
Financial account	2.8	0.5	-6.1	1.2	-1.6
Investments – assets[1/]	4.5	19.8	63.5	-1.0	32.5
DI assets	0.1	0.8	6.3	-1.9	0.3
Portfolio invest.	0.1	3.3	12.4	-1.1	4.6
Other invest.	4.3	15.7	44.8	2.0	27.6
of which: Banks' assets	0.4	-4.9	-8.6	-0.5	-4.9
Investments – liabilities	1.9	27.2	75.4	0.3	46.1
DI liabilities	2.9	32.2	70.7	3.0	23.3
Equity	2.9	25.1	59.1	1.9	16.0
Intercompany loans	-0.1	7.2	11.5	1.1	7.3
Total shares[2/]	0.8	-0.2	5.7	-4.4	-2.0
Debt sec. in Brazil	-3.1	0.1	-5.1	-2.0	3.9
Loans and debt sec. abroad long term[3/]	0.9	-4.1	-5.2	0.1	-3.6
Trade credit and other[4/]	0.4	-0.8	9.3	3.7	24.5
Financial derivatives	-0.4	-0.5	0.7	0.0	1.4
Reserve assets	0.6	8.4	5.1	2.5	10.5
Errors and omissions	0.1	1.1	3.3	0.4	2.2
Memo:					
Current account/GDP (%)			-0.5		
DIL/GDP[5/] (%)			3.4		
Rollover rate (%)	148.9	95.5	98.3	115.4	89.6

1/ Includes direct investment, portfolio investment and other investments.
2/ Includes equities traded in stock exchanges in Brazil and abroad.
3/ Includes banks', buyers', bilateral and multilateral loans.
4/ Includes loans and debt sec. abroad short term.
5/ DIL: Direct Investment Liabilities.

External demand and Balance of Payments

In 2018, from January to May, current transactions recorded a deficit of US$4.0 billion, compared to US$0.7 billion in the same period of 2017. The result reflects, to some extent, the reduction of the trade balance, insofar as the increase in domestic consumption has translated into an increase in imports at a faster rate than the growth in exports, in line with the prospects from previous reports. In the twelve months up to May, the current account deficit stood at 0.6 percent of GDP, compared to 1.1 percent of GDP in May 2017.

The Central Bank projection, presented in this Report, estimates that the current account deficit should reach 0.6 percent of GDP in December 2018. The revision made on the projection presented in the previous Report (1.1 percent of GDP) indicates a smaller deficit, considering that imports should grow at a more moderate pace, given the gradual recovery of the Brazilian economy, and the impacts of the exchange rate depreciation.[17]

The trade balance account totaled US$22.0 billion in the first five months of this year, decreasing US$6.0 billion over the same period of 2017. The trade balance change reflected, mainly, the increase of 19.3 percent in imports, with emphasis on purchases of intermediate and capital goods, a movement consistent with the dynamics of GFCF. Exports totaled US$ 93.2 billion, 6.3 percent higher than in the same period in 2017. The increase in sales of manufactured products – notably oil platform and passenger cars – is worth noting.

On the services side, net travel expenses expanded 13.2 percent – accumulated in the year up to May – compared to the same period of 2017, influenced by the recovery in domestic income. Moreover, the strengthening of trade flows has been determinant for the increase of net expenses with transportation services.

The significant increase in revenue and dividends and the decline in gross interest expenses resulted in a reduction of the deficit in primary income accumulated from the year to May – from US$ 17.2 billion in 2017 to US$ 13.4 billion this year.

17/ Please see box "Revision of the Projection for the Balance of Payments in 2018", in this Report, for a breakdown of the projection of the balance of payments.

The inflow of direct investment in the country fell from US$32.2 billion, in the first five months of 2017, to US$23.3 billion in the same period of this year. This is partially explained by specific operations that took place at the beginning of the previous year without correspondence in 2018 and to changes in corporate indebtedness management strategies.

Foreign investments in stocks, funds, and securities traded in the country registered a surplus of US$ 1.8 billion in the year to May, compared to a deficit of US$ 93 million in the same period of 2017. These flows have been characterized by considerable volatility, due to changes in the economic and financial conditions of the domestic and foreign markets.

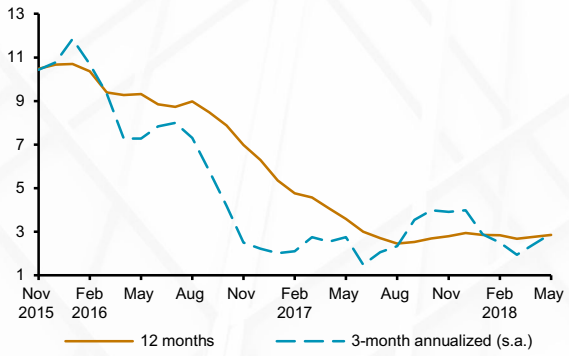
Long-term foreign credit – considering long-term operations for bonds and direct loans in the international market – provided disbursements of US$14.9 billion, resulting in a rollover rate of 88 percent from the year to May, below the level of 93 percent verified in the same period of 2017.

The estimated foreign debt stock in May – US$322.1 billion – increased on edge, when compared to US$317.3 billion at the end of 2017. The relation between the stock of international reserves and foreign debt maturities in a 12-month period reached 351 percent in May (365 percent in December 2017). The stock of international reserves corresponded to 19.0 percent of GDP in May, equivalent to twenty-eight months of imports of goods.

1.3 Inflation and market expectations

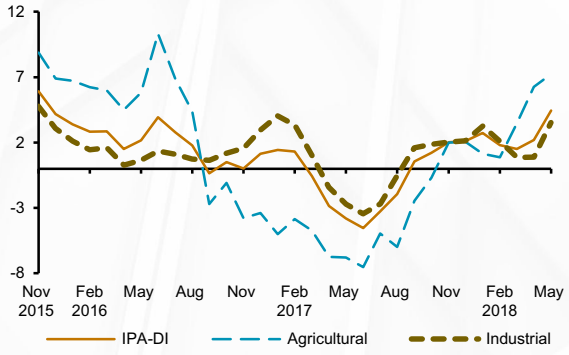
Inflation behavior remained favorable, with various measures of underlying inflation running at low levels. This includes the components that are most sensitive to the business cycle and monetary policy. The impact of the temporary halt of transportation sector on consumer price index in May was concentrated on fuel and food prices. The event is also expected to affect June inflation – as has already been signaled by partial results of price indicators – and in July, to a lesser extent. Such upward effects should be temporary, constituting price adjustments related to said shocks.

Figure 1.26 – IPCA trajectory
% change



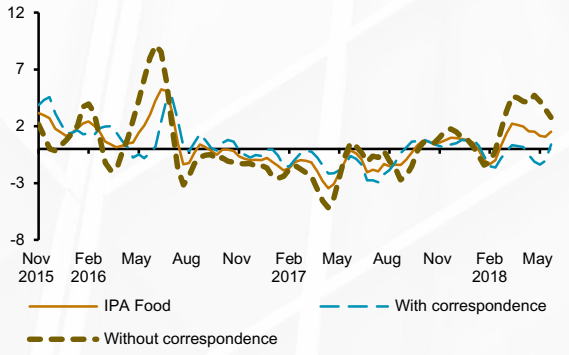
Source: IBGE

Figure 1.27 – IPA-DI
% change in 3 months



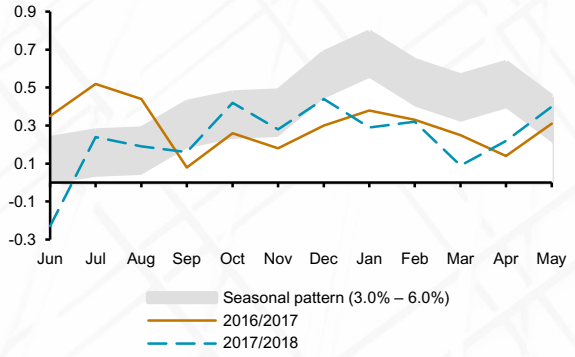
Source: FGV

Figure 1.28 – IPA-DI – Food
% change in 3 months



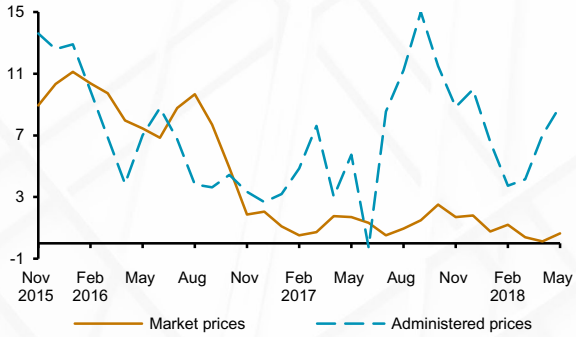
Source: FGV

Figure 1.29 – IPCA – Seasonal pattern
Monthly % change



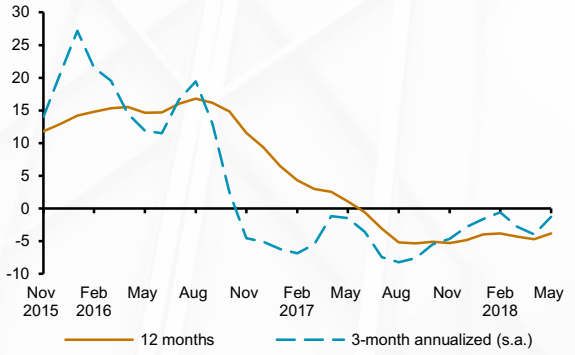
Sources: IBGE and BCB

Figure 1.30 – IPCA components
% change in 3 months, seasonally adjusted and annualized



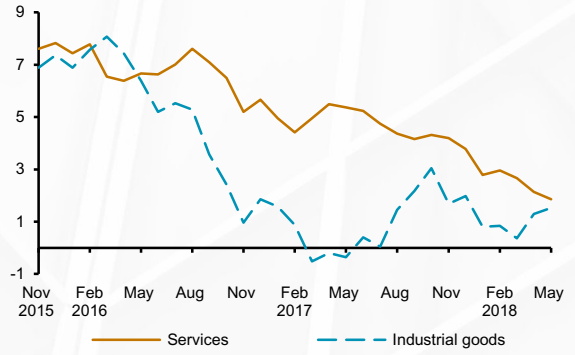
Sources: IBGE and BCB

Figure 1.31 – IPCA – Food-at-home
% change



Sources: IBGE and BCB

Figure 1.32 – IPCA – Services and industrial goods
% change in 3 months, seasonally adjusted and annualized



Sources: IBGE and BCB

Prices indexes

The Broad Producer Price Index – Domestic Supply (IPA-DI) recorded a variation of 4.44 percent in the quarter ended in May, compared to 1.81 percent in the previous quarter, reflecting the acceleration of industrial and agricultural prices. The increase in the agricultural and livestock index was mainly due to advances in soybean and corn prices – more volatile and exchange sensitive items, but without a direct impact on the IPCA. Agricultural and livestock prices relevant to the dynamics of consumer inflation, such as meat and *in natura* products, continued to grow favorably in the quarter under review. The acceleration of the industrial price index in the period mainly reflected the significant effects of exchange rate depreciation and the rise in international oil prices over gasoline prices (25.50 percent vs. -3.54 percent) and diesel (22.91 percent, versus -3.91 percent).

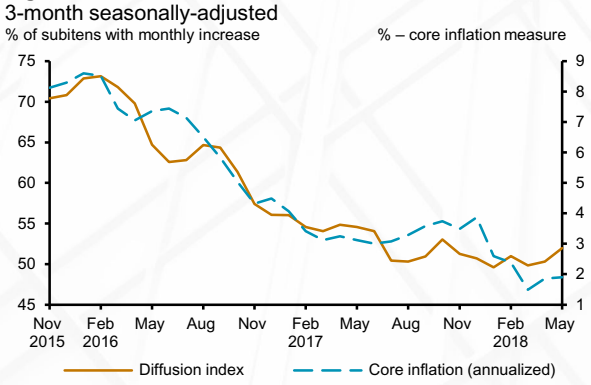
The IPCA varied 0.71 percent in the three months ended in May, below the quarter's historical median compatible with the inflation target (1.22 percent) for the seventh consecutive quarter.[18] The 12-month IPCA remained below the established inflation target for the current year, varying from 2.84 percent in February to 2.86 percent in May.

The positive trend of the IPCA up to May continued to reflect, mainly, the benign evolution of non-earmarked prices, whose 12-month variation increased from 1.41 percent in February to 1.13 percent, reaching the lowest value in the historical series, started in 1989. It is worth noting that although the historically low levels of non-earmarked prices inflation are a downward factor for the prospective inflation path, the effects of the recent exchange rate depreciation reduce the risk of too slow convergence of inflation to targets.

The impact of the economic cycle and the favorable supply conditions continued to influence the food price path. Food-at-home subgroup prices rose by 0.45 percent in the quarter ended in May, remaining below the historical average for the period. The 12-month accumulated variation of food prices stood at -3.80 percent, compared to -3.82 percent in February, amid the intensification of the deflation of industrialized and semi-processed foods, which

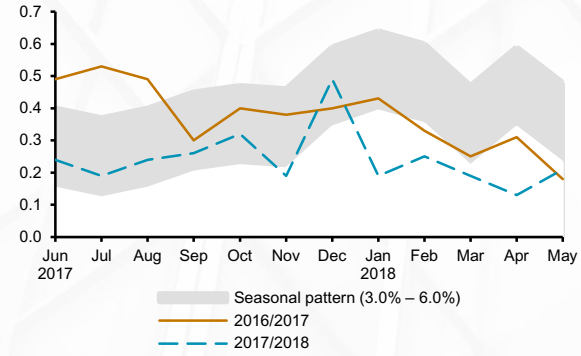
18/ Seasonal pattern obtained from the monthly trimmed means of the period between 2012 and 2017, with a 20 percent exclusion from each tail, adjusted so that the total accumulated in the year stands at 4.5 percent. The seasonal ranges of figures 1.29, 1.34 and 1.35 were also calculated considering the seasonal pattern of the period, adjusted so the year total remains within the interval between 3.0 percent and 6.0 percent per year.

Figure 1.33 – Diffusion index and core inflation
3-month seasonally-adjusted



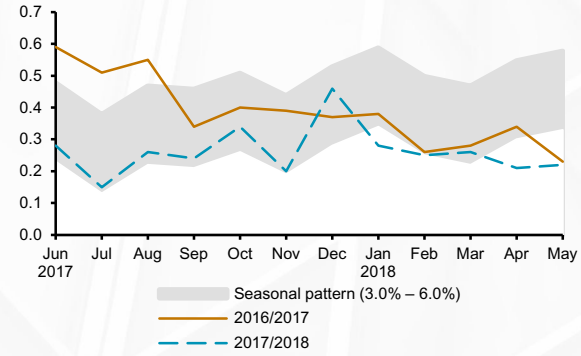
Sources: IBGE and BCB

Figure 1.34 – Core double weighting
Monthly % change



Sources: IBGE and BCB

Figure 1.35 – Core trimmed smoothed averages
Monthly % change



Sources: IBGE and BCB

mitigated the acceleration of prices of *in natura* products. The halt in the transportation sector may temporarily change this dynamics.

The slack in production factors and the spread of the reduced level of current inflation continue to favor a decline in services inflation, which, measured at twelve-month intervals, reached 3.33 percent in May, compared to 4.22 percent in February. The benign evolution of services inflation reflected the behavior of the underlying services index (3.03 percent, compared to 3.40 percent), with emphasis on food-away-from-home and residential rent, as well as the *ex-subjacente* (3.84 percent, compared to 5.61 percent), with emphasis on airfares, domestic servants and labor force.[19] In the quarter ended in May, services prices recorded the lowest quarterly change (0.02 percent) since November 1999 (0.00 percent).

Industrial goods inflation increased slightly in the period (0.32 percent), despite significant exchange rate depreciation in the quarter ended in May (15.2 percent), with highlights to the seasonal decrease in ethanol prices. The 12-month inflation up to May (1.37 percent) stood at a low level, although higher than in February (0.91 percent).

Administered prices rose 2.21 percent in the quarter ended in May, mainly reflecting the increase in electric power tariffs due to changes in the tariff's surcharge flag[20], and the pass-through of the exchange rate depreciation and the international oil price increase in domestic gas price. The 12-month inflation of administered prices went from 7.32 percent in February, to 8.14 percent in May.

Diffusion index and core inflation measures

The diffusion index, which measures the proportion of IPCA components with positive price variations, stood at a historically low level, recording an average of 53.21 percent, in the quarter ended in May, compared to 54.43 percent in the quarter ended in

19/ Monthly variations of the sub-items domestic servant and labor force, which had been obtained by the imputation of the twelfth root of the annual adjustment of the minimum wage, had their calculation methodology changed from May 2018, with the incorporation of the PNAD Contínua income information. That way, monthly results, which were fixed at 0.15 percent in the first four months of 2018 (0.52 percent in 2017), registered increases of 0.43 percent and 0.03 percent in May for domestic servant and labor force and respectively.

20/ Change from green flag to yellow flag in May.

Figure 1.36 – Market expectations – IPCA
Median (%)

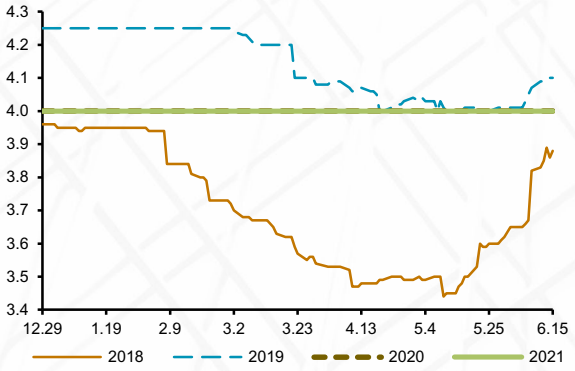


Table 1.5 – Summary of market expectations

	29.12.2017		29.3.2018		15.6.2018	
	2018	2019	2018	2019	2018	2019
In percentage						
IPCA	3.96	4.25	3.54	4.08	3.88	4.10
IGP-M	4.39	4.30	4.51	4.30	7.04	4.47
IPA-DI	4.42	4.50	4.51	4.20	8.30	4.50
Administered Prices	5.00	4.25	4.80	4.50	6.16	4.50
Selic (end-of-period)	6.75	8.25	6.25	8.00	6.50	8.00
Selic (average)	6.75	8.00	6.34	7.27	6.53	7.25
GDP growth	2.70	2.80	2.84	3.00	1.76	2.70
In BRL/US$						
Exchange rate (end-of-period)	3.34	3.40	3.30	3.40	3.63	3.60
Exchange rate (average)	3.31	3.33	3.29	3.35	3.57	3.50

(continues)

Table 1.5 – Summary of market expectations
(concluded)

	29.12.2017		29.3.2018		15.6.2018	
	2020	2021	2020	2021	2020	2021
In percentage						
IPCA	4.00	4.00	4.00	4.00	4.00	4.00
IGP-M	4.00	4.00	4.00	4.00	4.00	4.00
IPA-DI	4.00	4.00	4.00	4.00	4.50	4.50
Administered Prices	4.00	4.00	4.00	4.00	4.00	4.00
Selic (end-of-period)	8.00	8.00	8.00	8.00	8.00	8.00
Selic (average)	8.00	8.00	8.00	8.00	8.00	8.00
GDP growth	2.50	2.50	2.50	2.50	2.50	2.50
In BRL/US$						
Exchange rate (end-of-period)	3.45	3.50	3.47	3.50	3.60	3.70
Exchange rate (average)	3.41	3.45	3.44	3.48	3.60	3.68

February and 56.03 percent in the same period of the previous year.

As pointed out in a box in this Report[21], core inflation measures once more indicated a deceleration in underlying inflation at the beginning of 2018 and stood at levels close to or below the lower limit of the inflation target. In fact, there was a reduction in the respective quarterly moving averages, seasonally adjusted and annualized, of the core Trimmed Smoothed Averages (from 3.41 percent in February to 2.43 percent in May), Double Weighting (from 2.79 percent to 2.10 percent), and EX2 (from 1.45 percent to 1.13 percent). In twelve months, the average of the three cores decelerated from 2.92 percent in February to 2.68 percent in May.

Market expectations

According to Focus survey, the medians of projections for the yearly variation of IPCA in 2018 increased from 3.54 percent on March 29, to 3.88 percent on June 15th. The median of projections moved from 4.08 percent to 4.10 percent in 2019, and stood at 4.00 percent in 2020 and 2021. The median of 12 months ahead inflation expectations (smoothed), increased from 3.95 percent to 4.39 percent in the same period.

The median expectations for the increase in the prices administered or monitored by contracts in 2018 and 2019 stood on June 15th at 6.16 percent and 4.50 percent, respectively (4.80 percent and 4.50 percent on March 29th). The projections median for 2020 and 2021 remained at 4.0 percent.

The exchange rate medians projected by the market for the end of 2018 reached R$3.63/US$ on June 15th, compared to R$3.30/US$ on March 29th. The median relative to 2019, 2020 and 2021 increased from R$3.40/US$, R$3.47/US$ and R$3.50/US$ to R$3.60/US$, R$3.60/US$ and R$3.70/US$.

21/ Box "New measures of core inflation", in this Report, evaluates the recent evolution of core inflation traditionally monitored by the BCB, in addition to two new exclusion measures: EX-2 and EX-3.

Revision of the GDP projection for 2018

This box updates the Central Bank's projections for GDP growth in 2018. Projections have been revised in light of the latest data released for the first quarter, coincident indicators already known for the second quarter of the year and the set of information available until the cut-off date of this Report.

The central projection for GDP growth in 2018 is 1.6%, lower than the forecast presented in the March Inflation Report (2.6%). The review is associated with the slowdown in activity at the beginning of the year, the accommodation of business and consumer confidence indicators and prospects of direct and indirect impacts of the halt in the cargo transportation sector at the end of May.

In terms of supply, the forecast for the annual variation of value added by agriculture and livestock increased compared to the projection presented in the previous Inflation Report, contrasting with reductions in growth forecasts for the other sectors.

Table 1 – Gross Domestic Product
Accumulated in 4 quarters

	% growth	
	2017	2018
	IV Q	IV Q[1/]
Crop and livestock	13.0	1.9
Industry	0.0	1.6
Mining	4.3	1.7
Manufacturing	1.7	2.4
Construction	-5.0	-0.7
Public utilities	0.9	2.6
Services	0.3	1.3
Commerce	1.8	2.7
Transportation and storage	0.9	2.6
Communications	-1.1	-0.9
Financial and related services	-1.3	0.2
Other services	0.4	1.5
Real estate services	1.1	1.6
Public administration, health and education	-0.6	0.7
Value added at basic prices	0.9	1.4
Taxes on products	1.3	2.5
GDP at market prices	**1.0**	**1.6**
Households consumption	1.0	2.1
Government consumption	-0.6	-0.2
Gross fixed capital formation	-1.8	4.0
Exports	5.2	5.2
Imports	5.0	6.4

Source: IBGE
1/ Estimated.

The agricultural and livestock sector is expected to grow 1.9% in the year, compared to a 0.3% decline in March, after annual growth of 13.0% in 2017 – the best result of the entire historical series. The improvement in projection is due to this result above expectations in the first quarter and the sequence of increases in the prognoses for the annual agricultural production (Systematic Survey of Agricultural Production – LSPA/ Brazilian Institute of Geography and Statistics – IBGE). In this context, we highlight the revisions that occurred in IBGE projections for the production of soybeans, coffee and sugar cane, products with high participation in the value added of agriculture. Estimates for the annual variations of these items rose from -1.6%, 14.6% and -2.2% in the February survey, respectively to 0.7%, 23.3% and 2.2% in the May survey.

The projection for industry performance was revised from 3.1% to 1.9%, with revisions in projections for the manufacturing industry from 4.0% to 2.4%, and for civil construction, from 1.5% to -0.7%. On the other hand, the projection for distribution of electricity, gas, and water was revised from 2.0% to 2.6%, led by the strong growth in the first quarter.

Expansion of 1.3% for the tertiary sector product in 2018 is estimated, compared to 2.4% in the March projection, with reductions in projections for most activities. Estimates for the annual growth of trade and transport, warehousing and mail, which are highly correlated with industrial activity, were

revised from 4.2% to 2.7% and from 3.8% to 2.6%, respectively. In addition, results below expectations in the first quarter of this year led to reductions in estimates for information services (from 2.4% to -0.9%), financial intermediation and related services (from 2.7% to 0.2%) and other services (from 2.9% to 1.5%).

In the household components of aggregate demand, the estimate for household consumption growth was revised from 3.0% in the March projection to 2.1%, compatible with a slower recovery in wages, a result of the reduction in the growth rate of incomes and the employed population. The growth projection for Gross Fixed Capital Formation (GFCF) remained stable (4.0% vs. 4.1% in the March projection). The positive result of this component in the first quarter of 2018 should be noted, considering seasonally adjusted data, as it is the fourth consecutive advance. Government consumption is expected to decline 0.2%, compared to a 0.5% growth projection in March, consistent with the expectation of worsening government revenues in a scenario of lower economic growth than forecast in the March Inflation Report.

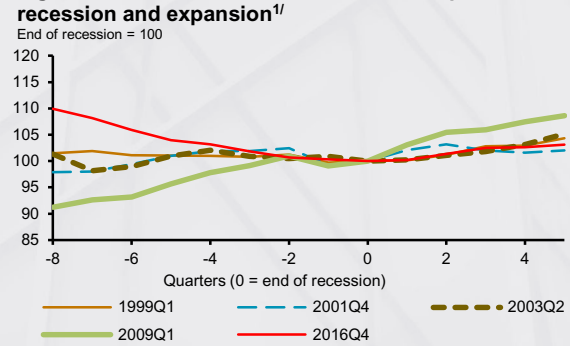
Exports and imports of goods and services should vary by 5.2% and 6.4% in 2018, compared to respective projections of 4.9% and 6.8% in the March Inflation Report. The slight rise in export projections reflects better-than-expected first-quarter performance and revisions in prognoses for crops of important export-led products. In spite of the performance in the first quarter above the forecast and the incorporation of a fictitious importation of petroleum platform in the data of the semester, the projection for the volume of imports was reduced in a context of foreign exchange adjustment and more modest growths of manufacturing and household consumption. In this scenario, the contributions of domestic demand and the external sector to the evolution of GDP in 2018 are estimated at 1.9 p.p. and -0.1 p.p., respectively.

Private components of aggregate demand in cycles of economic recovery

Which is the behavior pattern of the private components of aggregate demand in cycles of economic recovery? This box analyses this question with basis on the five most recent cycles of economic recovery, including the current.

Figure 1 shows the performance of household consumption after five quarters since the most recent recession valley (4th quarter of 2016) to the last Gross Domestic Product (GDP) release, as well as in the equivalent periods of the recovery cycles after 1996[1] (1999, 2001, 2003 and 2009). Except for the 2009 cycle, which included a very short recession, their trajectories are similar. After five quarters of recovery, consumption expanded 3.1%, remaining within the interval of variations observed in other episodes (between 2.0% and 5.2%).

Figure 1 – Evolution of household consumption in recession and expansion[1/]



Source: IBGE
1/ Seasonally adjusted index.

In 2017, household consumption was favored by disinflation, job generation – both contributing significantly to the expansion of overall wages –, credit expansion (albeit moderate) and, also, the extraordinary release of Employment Compensation Fund (FGTS) funds. It should be emphasized that, five quarters after the end of the recession, the recovery of labor market remains relatively slow in this cycle, with a 1.9% expansion in the number of occupied people against 4.9%, 7.7%, 3.9% and 4.1% in the 1999, 2001, 2003 and 2009 cycles, respectively[2] (Figure 2).

As to household credit operations, the decline of interest rates observed in the current cycle shows a magnitude similar to that observed in some of the previous recessions[3], except for 1999. With regard to the nonearmarked household credit segment (the most relevant for household consumption), interest rates dropped 40.9 p.p., 22.4 p.p. and 19.4 p.p. in the 1999, 2003 and 2009 cycles, respectively, and increased 21.5 p.p. in the 2001 cycle. In the current recovery, there was a variation of -20.9 p.p. The growth of credit balances shows less dynamism in this cycle, with a real variation of 2.9%[4], compared to the 1999, 2003

1/ This is the farthest year for which available GDP figures on the demand side are consistent with the current version of the National Accounts and its periodization. The periods of recovery following recession that were considered began after the first quarter of 1999, the fourth quarter of 2001, the second quarter of 2003, the first quarter of 2009 and the fourth quarter of 2016 (current cycle).

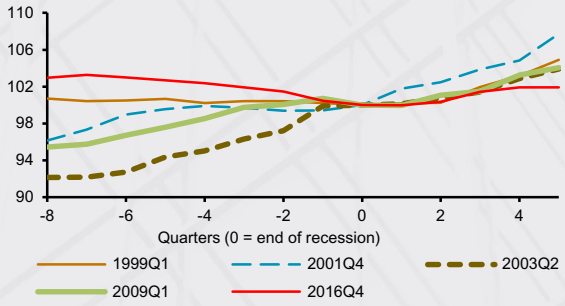
2/ Since the Monthly Employment Survey (PME) was interrupted in 2016, the analysis of the current cycle relies upon data from the Continuous National Household Sample Survey (PNAD Contínua).

3/ A similar result may be observed in the Box "Evolution of the credit market in monetary policy easing cycles" included in the March 2018 Inflation Report, which took into account the trajectory of interest rates and nonearmarked lending operations for the monetary policy cycles.

4/ The statistical series 2050 of SGS, which includes older statistics, was used. The series was deflated in view of the sharp influence of inflation on the credit balances of previous years.

Figure 2 – Evolution of occupied population in recession and expansion[1/]

End of recession = 100

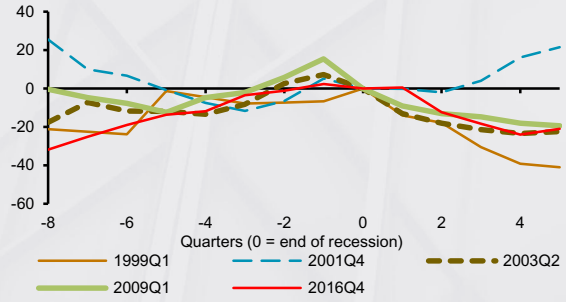


Source: IBGE
1/ Seasonally adjusted index.

and 2009 cycles, which registered increases of 32.4%, 24.0%, and 16.4% respectively. In the cycle of 2001, the balance has decreased by 7.7%. This difference may be partially attributed to innovations that fueled operations in the previous recessions, such as the payroll-deducted loans in 2003, or the lengthening of credit terms for the financing of vehicles in 2009. Above all, the distinct credit trajectory in the current cycle is associated with the need for household deleveraging, after a period of credit stimuli and excessive indebtedness levels that led the household credit portfolio to reach 13.6% of GDP in the fourth quarter of 2014, the eighth quarter before the beginning of the current recovery cycle. Considering the same period of reference, this percentage is at a level sharply higher than those of the 1999, 2001, 2003 and 2009 cycles (3.0%, 3.8%, 5.9% and 9.9%, respectively).

Figure 3 – Evolution of non-earmarked interest rate for individuals in recession and expansion

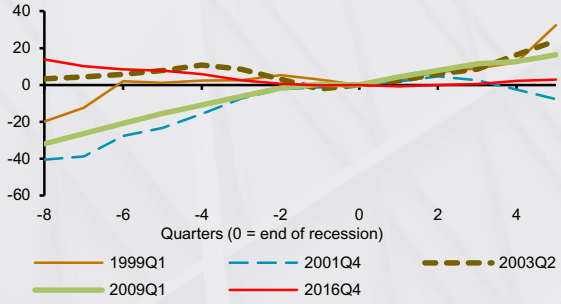
Diferença em p.p. at the end of recession



Source: BCB

Figure 4 – Absolut change of non-earmarked credit to individuals in recession and expansion

% em relação ao momento 0 (end of recession)

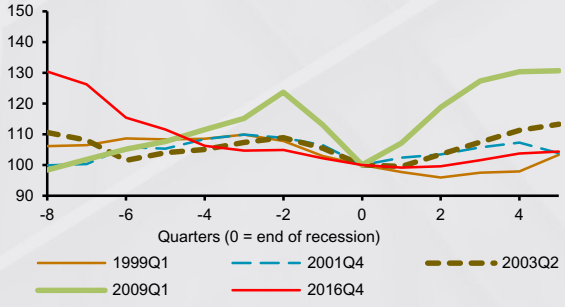


Source: BCB

The growth of Gross Fixed Capital Formation (GFCF) until the fifth quarter of this cycle (4.4%) is relatively aligned with the 1999 and 2001 cycles (3.3% and 3.9%, respectively) and below the cycles of 2003 (13.3%) and 2009 (30.7%), as shown in Figure 5.

Figure 5 – Evolution of GFCF in recession and expansion[1/]

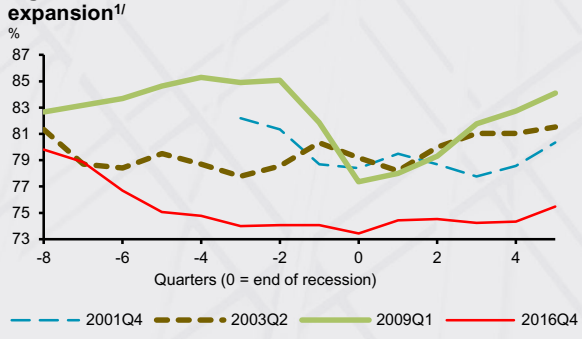
End of recession = 100



Source: IBGE
1/ Seasonally adjusted index.

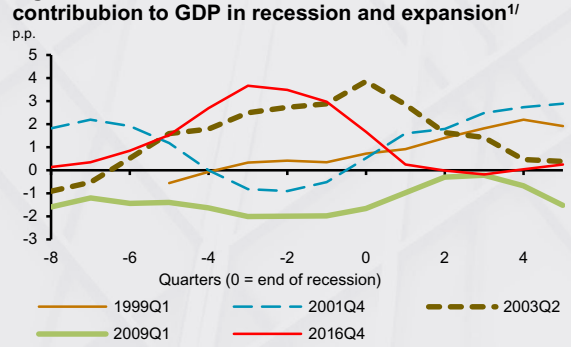
The financial situation of firms and the prospects for economic growth appear as possible influence factors on investments in the current recovery cycle, which occurs amidst a deleveraging process in the sector.

Figure 6 – Evolution of Nuci in recession and expansion[1/]



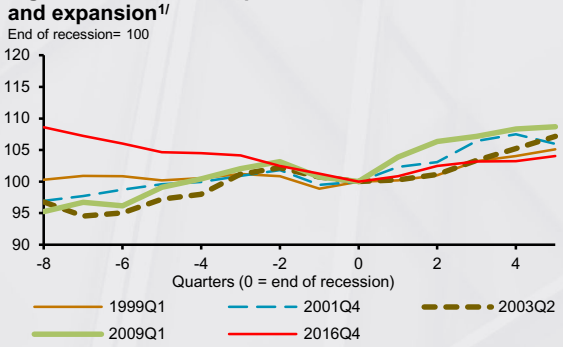
Source: FGV
1/ Seasonally adjusted index.

Figure 7 – Evolution of external sector contribubion to GDP in recession and expansion[1/]



Source: IBGE
1/ Accumulated contribution in four quarters.

Figure 8 – Evolution of private GDP in recession and expansion[1/]



Source: IBGE (elaborated by BCB)
1/ Seasonally adjusted index.

Additionally, there are other factors limiting investments in this cycle, such as the level of utilization of installed capacity, presently at a historic low level (Figure 6), and the industry confidence index.

For concluding the evaluation of GDP components in the side of private demand, it should be mentioned the external sector contribution during economic activity recovery periods. The current cycle reveals that this contribution is not significant *vis-à-vis* the 1999 and 2001 cycles and is quite similar to that of 2003 trajectory, especially given the significant external sector contribution to the GDP growth observed in the previous period (Figure 7). It is worth noting that, in the 2009 cycle, there was no positive contribution from the external sector neither before nor after the start of the recovery, which could be partially explained by the deep world recession observed in that period.

The analysis carried out so far may be summed up by consolidating the components of the so-called "Private GDP",[5] Figure 8 shows this measure for the five recovery cycles under analysis and reveals that the pace of recovery of Private GDP in the current cycle is similar to those of the 1999 and 2001 cycles, but lower than those of the 2003 and 2009 cycles.

5/ The "Private GDP" was built by aggregating household consumption, net exports and private GFCF. The latter was obtained by subtracting the Public GFCF from the Total GFCF. For the calculation of public GFCF, the ratio between public GFCF and total GFCF was assumed as the participation of institutional General Government expenditures on total expenditures on the gross capital formation, available every year in the Integrated Economic Accounts (CEI) in the period from 2000 to 2015. It was assumed a constant proportion between all quarters of each year, equivalent to the nearest year availble in the years where there is no CEI available. It is worth noting that the General Government comprises only dependent state-owned enterprises – those whose products are mostly offered at not economically significant prices and whose resources mainly arise from Government transfers. As for non-dependent state-owned enterprises – those whose products are offered at economically significant prices and whose balance sheets are not consolidated in the accounting statements of their respective government spheres – they are not included in the institutional sector General Government (for further information, please see the methodology of the National Accounts System, reference 2010 (IBGE, 2016).

Broad corporate financing

This Box analyzes the credit evolution for a group of corporate borrowers, taking into account not only the credit in the National Financing System (SFN) but also funds raised in the capital and external markets. For the sake of this presentation, the set of operations originated from these three sources is herein referred to as broad corporate financing[1]. The analysis was based on microdata containing individual information on corporate entities (by National Register of Legal Entities – CNPJ).

The box "Recent evolution in corporate credit", published in the December 2017 Inflation Report, evidenced that the contraction in the balance of corporate credit has been related mostly to operations performed with a small group of borrowers of great financial capacity. About 36 borrowers were responsible for 80% of the reduction in the corporate debt balance before the National Financial System (SFN), notably in operations with resources from the Banco Nacional de Desenvolvimento Econômico e Social (BNDES).[2]

The corporate credit portfolio with nonearmarked resources and with BNDES resources have shown different behaviors since 2017. After a steep decline in both segments in 2016, the contraction in the corporate credit segment with nonearmarked resources smoothed during 2017 and started to show a marginal expansion, while the corporate credit with BNDES resources remained at remarkable low levels until the first months of the current year (Figure 1). Accomplished credit operations registered similar trajectories, notably the resumption of credit operations with nonearmarked resources from June 2017 on (Figure 2). Additionally, queries and credit approval procedures in BNDES continue to show negative variations (Figure 3), denoting a lack of resumption in lending with resources from that institution.

Figure 1 – Corporate credit evolution

12-month balance change (%)

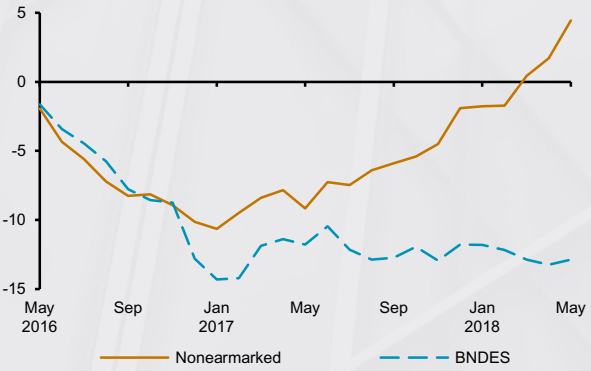
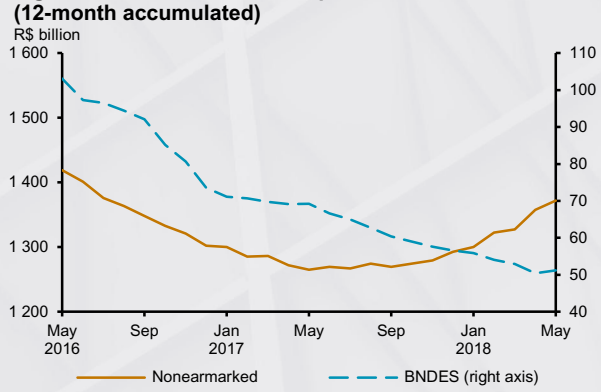


Figure 2 – Concessions to corporations (12-month accumulated)

R$ billion

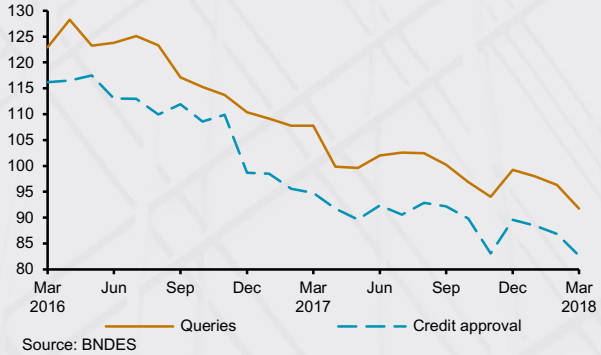


1/ In capital markets, only debentures and promissory notes were considered.

2/ It was also pointed out, additionally, that the low performance in the corporate credit segment has been, to some extent, offset by the greater dynamism in capital markets. This aspect was further assessed in the box "Financing from the capital market and the external sector and corporate debt stock" published in the March 2018 Inflation Report.

Figure 3 – Queries and credit approval procedures

R$ billion – 12-month accumulated



Source: BNDES

The BNDES portfolio's performance is associated with the economic cycle and lower costs from other funding sources. Almost the totality of BNDES resources is aimed at financing investments (around 95% in December 2017) configuring, therefore, long-term operations (Figure 4) whose evolution has specific determinants. Additionally, alterations in BNDES lending costs compared to other funding sources (Figure 5) is a relevant factor to explain the bank's portfolio recent performance.[3]

Figure 4 – Average portfolio duration

Months

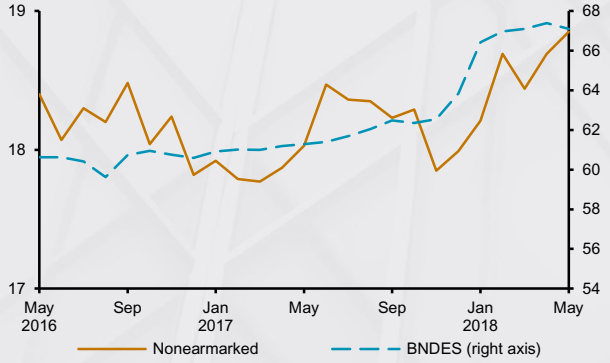
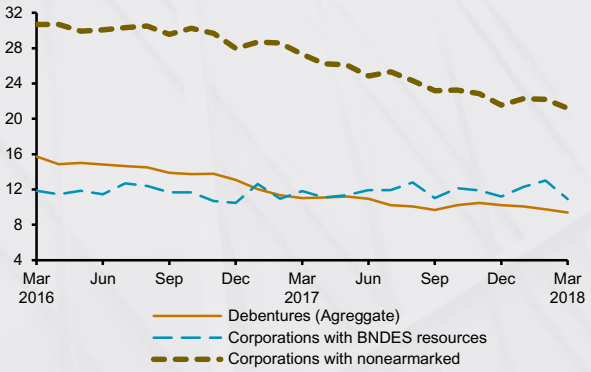


Figure 5 – Financing cost (% p.a.)



Sources: BCB and Cemec/Fipe

With the objective of verifying the dynamics of the broad financing of companies that had operations with resources from BNDES, a group of companies with significant operations with that development bank between December 2013 and May 2018 was selected.[4] The broad financing of this group indicates a volume of operations more robust than the one suggested by the isolated evaluation of the credit originated within the SFN between December 2016 and May 2018.

Considering just the SFN, the selected group's debt with the BNDES registered a significant reduction (R$86.3 billion, corresponding to a change of -19.1%), while it increased both in the segment of operations with nonearmarked resources (R$4.5 billion, 1.8%) and in the segment of operations with other earmarked resources (R$ 6.9 billion, 10.1%), excluded operations with BNDES funds (Figure 6).

On the other hand, the reduction in the indebtedness of these companies before the SFN was compensated by an increase in their debts in the capital markets (R$ 21.2 billion, 18.5%) and external markets (R$ 101.7 billion, 15,6%),[5] so that the broad financing in the period evaluated (Figure 7) grew 3.1%. Please note that this

3/ This aspect was highlighted in previous editions of the Inflation Report. Please see boxes "Recent evolution in corporate credit" and "Financing from the capital market and the external sector and corporate debt stock", respectively from the December 2017 and March 2018 editions of the Inflation Report.

4/ Companies with debt equal to or greater than R$50 million (considering only operations with BNDES resources), totaling about 1400 companies that held 80% of the total credit balance of the BNDES in December 2017.

5/ It is worth noting that the external debt was impacted by the currency devaluation that occurred in the period. In USD dollars, the debt changed around 1%.

behavior was even more positive than that observed for the other companies (outside the sample mentioned above), whose balance of broad financing increased 2.3%,[6] despite the reductions in operations with nonearmarked resources (-2.6%), with BNDES resources (-3.8%) and other earmarked resources (-19.3%).[7]

Figure 6 – Credit at SFN (selec. group) – balance

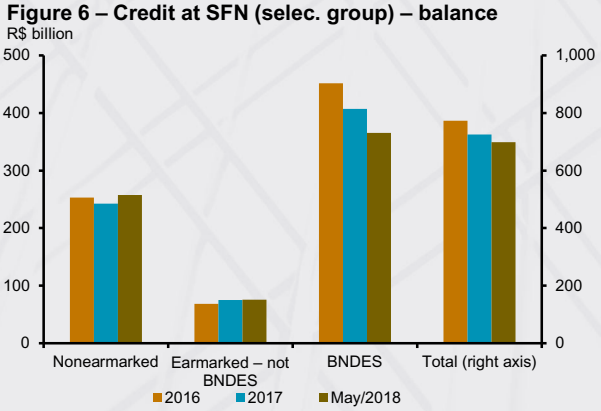
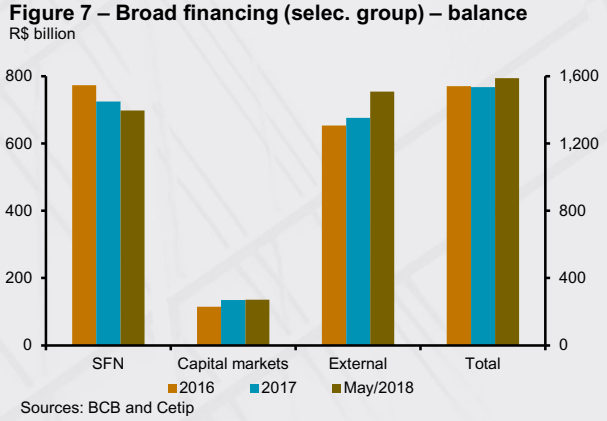


Figure 7 – Broad financing (selec. group) – balance



Sources: BCB and Cetip

Table 1 – Broad financing
Balance variaton betweeen Dec/2016 and May/2018

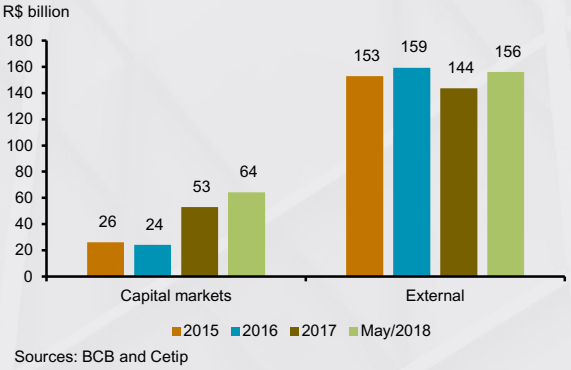
%

	Operations with BNDES resources	Earmarked not BNDES	Non-earmarked resources	Capital markets	External debt	Broad financing
Selected group	-19.1	10.1	1.8	18.5	15.6	3.1
Other corporations	-3.8	-19.3	-2.6	27.8	9.3	2.3

Sources: BCB and Cetip

At the same time, there is a growth of roughly 7% of funds raised outside of the SFN by the selected group in 2017 over 2016, a trend that continues in 2018 with an increase of 18.3% in the accumulated in the twelve months up to May 2018, over the same period of the previous year.

Figure 8 – Other financing sources
Selected group – 12-month acum.



Sources: BCB and Cetip

The increase in the borrowing of funds from other financing sources by the selected companies shows that their demand for credit remained relatively stable in 2017. Also, it denotes a replacement in the funding with resources from the SFN and other markets, as occurred in other samples of companies.[8] In this regard,

6/ Data obtained by considering the difference between overall debts (within the SFN and internal and external capital markets) and debts of the group selected.

7/ It is worth noting that in the second half of 2017 there was a significant reduction in the stock of rural credit operations within the SFN, which may have been offset by the issuance of different private securities, such as the Agribusiness Credit Rights Certificate (CDCA), the Rural Product Note (CPR) and the Agribusiness Receivables Certificate (CRA).

8/ Please see box "Financing from the capital market and the external sector and corporate debt stock", published in the March 2018 Inflation Report.

there are indications that the reduction in the selected group debts with the BNDES has a more relevant association with the relative convergence of financing costs in the capital and external markets, compared to borrowing from the BNDES after the recent reduction in subsidies, than with insufficient demand for resources.

Considering that the nature of BNDES operations in the corporate credit segment is predominantly associated with investments, the greater dynamism suggested by the broad financing, and the process of credit sources replacement indicate a more favorable framework for financing conditions than which could be inferred exclusively from the SFN information. This movement, in turn, is more consistent with the already detected trend of gradual improvement of gross fixed capital formation in national accounts in 2017.[9]

Corporate indebtedness presented different dynamics among the different economic sectors of the sample analyzed. The extractive, construction, domestic trade, and information and communication industries

Tabela 2 – Debt change of corporations at the selected group between Dec/2016 and May/2018

R$ million

Main economic sectors	Credit at SFN	Capital markets	External debt	Broad financing
Total	-74 790	21 223	101 682	48 115
Extractive	-9 741	147	2 323	-7 272
Construction	-173	-716	218	-670
Information and comunication	-7 590	5 206	-9 021	-11 405
Manufacturing	-34 596	2 863	83 958	52 226
Agriculture, livestock and forestry production	-332	0	533	202
Real state activities	-631	-299	-19	-950
Electric power and gas	-12 124	10 577	9 921	8 373
Trade	941	8 128	6 563	15 633
Government, defense & social security	9 341	0	0	9 341
Other	-19 885	-4 684	7 205	-17 364

Sources: BCB and Cetip

recorded decreases in their respective broad financing balances between December 2016 and May 2018, influenced by policies of deleveraging and less dynamism the sectors. In contrast, there was an increase in the debts of companies in the segments of manufacturing, electricity and gas, retail sales, and public administration, driven by long-term investments plans, the recovery of retail sales, and the need to finance public entities. (Table 2).

Companies with smaller debt balances, however, showed a contraction in debt with earmarked and nonearmarked resources and, due to their size, less access to capital and external markets. The sample of firms with credit operations with the BNDES of less than R$ 1 million[10] showed a significant reduction in the credit balance with resources from the BNDES (-40.7%) between December 2016 and May 2018, in addition to decreases in operations with earmarked (24.2 %) and nonearmarked (17.6%) resources other

9/ It should be stressed, however, that financial resources obtained at the capital and external markets are not necessarily conveyed only to investments.

10/ This sample comprehends more than 400 mil firms, representing around 6% of the total operations with BNDES resources performed by corporations.

11/ Only 0.3% of the group (around 1,100 firms) had debts in the external and/or capital markets in the period under analysis.

12/ As an example, credit cooperatives significantly increased their participation in the financing concessions for smaller companies in 2017, as highlighted by box "Participation of cooperatives in the credit market" of the Banking Economy Report published in June 2018. Other alternative sources to the companies are the direct credit societies and lending partnerships between people (known as fintechs), regulated by Resolution 4,656, of April 26, 2018, which may encourage cheaper and more widespread credit, according to box "Fintechs" disclosed in the same Banking Economy Report.

than BNDES'. However, most of the companies belonging to this group does not have access to the capital and/or external markets,[11] so that 72% of this sample has a reduction in the broad financing, signaling a marked deleveraging process. It should be pointed out in this scenario that the restricted access of these companies to foreign and capital markets highlights the challenge of encouraging the development of alternative sources of financing for bank credit.[12]

In short, despite SFN credit indicators show significantly negative performances for credit operations with BNDES resources, the analysis of the broad financing of the group of companies with greater financial capacity indicates a more benign picture from 2017 on. In the case of companies with less significant operations with the BNDES, information on broad financing signal a significant process of financial deleveraging, while stressing the importance of expanding the access to other funding sources outside the SFN.

Projection for the Balance of Payments in 2018

This box presents the revision of projections for the 2018 Balance of Payments, considering statistics published since the March Inflation Report, the evolution of domestic and international economies, and the recent data about the country's external debt stock and service.

Table 1 – Balance of payments forecasts

US$ billion

Itemization	2017			2018		
	May	Jan-May	Year	May	Jan-May	Year[1/]
Current account	2.8	-0.7	-9.8	0.7	-4.0	-11.5
Balance on goods	7.4	28.0	64.0	5.6	22.0	61.0
Exports	19.7	87.7	217.2	19.2	93.2	228.0
Imports	12.3	59.7	153.2	13.6	71.3	167.0
Services	-2.5	-12.4	-33.9	-2.7	-13.6	-35.6
of which: Travel	-1.1	-4.6	-13.2	-1.2	-5.2	-15.0
of which: Transportation	-0.3	-1.6	-5.0	-0.4	-2.6	-5.8
Primary income	-2.4	-17.2	-42.6	-2.3	-13.4	-39.4
of which: Interest	-1.0	-9.8	-21.8	-0.8	-7.9	-19.1
of which: Dividends	-1.4	-7.5	-21.0	-1.6	-5.6	-20.6
Secondary income	0.2	0.9	2.6	0.2	1.1	2.6
Capital account	0.0	0.1	0.4	0.0	0.2	0.4
Financial account	2.8	0.5	-6.1	1.2	-1.6	-11.1
Investments – assets[2/]	4.5	19.8	63.5	-1.0	32.5	63.0
DI assets	0.1	0.8	6.3	-1.9	0.3	6.0
Portfolio invest.	0.1	3.3	12.4	-1.1	4.6	10.0
Other invest.	4.3	15.7	44.8	2.0	27.6	47.0
of which: Banks' assets	0.4	-4.9	-8.6	-0.5	-4.9	-7.0
Investments – liabilities	1.9	27.2	75.4	0.3	46.1	87.6
DI liabilities	2.9	32.2	70.7	3.0	23.3	70.0
Total shares[3/]	0.8	-0.2	5.7	-4.4	-2.0	3.0
Debt sec. in Brazil	-3.1	0.1	-5.1	-2.0	3.9	-
Loans and debt sec. abroad long term[4/]	0.9	-4.1	-5.2	0.1	-3.6	-5.5
Loans and debt sec. abroad short term	-1.8	-8.9	-5.3	0.6	13.2	-
Trade credit and other	2.1	8.1	14.6	3.1	11.3	20.1
Financial derivatives	-0.4	-0.5	0.7	0.0	1.4	-
Reserve assets	0.6	8.4	5.1	2.5	10.5	13.5
Errors and omissions	0.1	1.1	3.3	0.4	2.2	-
Memo:						
Current account/GDP (%)			-0.5			-0.6
DIL/GDP[5/] (%)			3.4			3.6
Rollover rate (%)	148.9	95.5	98.3	115.4	89.6	90.0

1/ Forecast.
2/ Includes direct investment, portfolio investment and other investments.
3/ Includes equities traded in stock exchanges in Brazil and abroad.
4/ Includes banks', buyers', bilateral and multilateral loans.
5/ Direct Investment Liabilities.

A more challenging external scenario and the recent cooling of economic activity at the beginning of the year conditioned the revision of the projection for the current account deficit, from US$23.3 billion (1.1% of GDP) to US$11.5 billion (0.6% of GDP) in 2018. Changes refer mainly to the current account composition, with expectations of an increase in the trade balance surplus and lower deficits in the services and primary income accounts.

For the year, the trade surplus is expected to reach US$61 billion, with expansions of 5.0% in exports and 9.0% in imports to US$228 billion and US$167 billion respectively. Of note, an increase of US$3 billion in the projection for exports and a reduction of US$2 billion in the projection for imports over the previous projections. This revision in the projection for the trade balance reflects the scenario of global strengthening of the US dollar and the recent cooling of domestic activity, with effects over the demand for external goods and services, among other factors.

The services account deficit is estimated at US$35.6 billion for the year, a value US$2.5 billion below the previous report. The revision reflects adjustments in travel and transportation accounts, in accordance with updated economic activity indicators and the recent devaluation of the domestic currency. Projected net expenses decreased US$2.3 billion to US$15.0 billion for travel and US$0.2 billion to US$5.8 billion for transportation. The projection for equipment leasing net expenses remained at US$17 billion.

Net payments of interests were projected at US$19.1 billion, slightly below the previous projection (US$19.4 billion). The projection for net remittance of profits was reduced by US$3.9 billion to US$20.6 billion, taking into account the recent evolution

of the exchange rate and revenues accrued during the first five months of the year. The estimate for net inflows of secondary revenues increased by US$0.1 billion to US$2.6 billion, taking into account the recent evolution of this flow.

The projection for net inflows of foreign direct investments (FDI) was reduced by US$10 billion over the previous projection to US$70 billion (3.6% of GDP), a value significantly higher than the deficit expected for the current account. FDI inflows during the first five months of the year and the month of June suggest a reduction in the inflow over the year, especially for intercompany operations, influenced by the financial strategies adopted by large corporations seeking to deleverage. Also, the decrease in FDI relative to equity reflects large one-off operations – related to public sector concessions or sale of large companies' assets – occurred in 2017 with no correspondence in the present year. Brazilian net direct investments abroad (BDIA) were kept at US$6 billion.

There was no revision of projections for portfolio investments from the side of assets. Regarding portfolio investments from the side of liabilities, net inflow in stocks and investment funds decreased by US$2 billion to US$3 billion, partially reflecting the volatility of these flows up to May. Despite a similar behavior in domestic securities, the projection for net inflows under this heading was kept at zero.

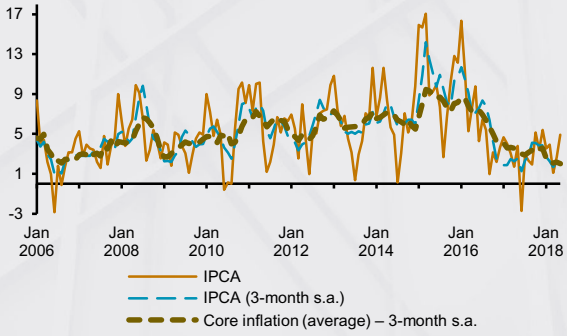
Rollover rates on long-term loans and securities traded in the international market were reduced to 90%, against 100% in the previous Inflation Report, in line with the recent evolution of the international outlook.

New core inflation measures

This box assesses the recent evolution of core inflation traditionally monitored by the Banco Central do Brasil (BCB) and introduces two new measures, describing the methodology used in their elaboration.

Among cores regularly monitored by the BCB, the IPCA-EX0, IPCA-MS, and IPCA-MA were introduced between 2000 and 2003, while the publication of cores IPCA-EX1 and IPCA-DP began in 2009[1, 2]. These measures seek to minimize the influence of higher volatility items on the aggregated indicator, with the aim of assessing the inflation trend without the effects of temporary shocks on prices behavior (Figure 1).

Figure 1 – CPI e core inflation measures
Annualized change %



Sources: IBGE and BCB

There is no consensual pattern in the literature about the ideal composition of an inflation core. Thus, a whole set of criteria has been used to assess the different cores[3]. As no individual core prevails over the others on all criteria, analysts usually monitor more than one core measure.

In this regard, the continuous evaluation of new core-building methodologies is part of the process of monitoring and analyzing current inflation. Both metrics presented hereafter expand the concept of the underlying inflation indicator for services[4], by adding components of two other segments of inflation expressed in market prices: food-at-home and industrial goods.

1/ In this box, the IPCA historical series have been used, after being recalculated with the POF 2009 weighting framework and ranking, implemented in January, 2012.

2/ A more detailed history on the inclusion of cores in the BCB's documents may be found in the Work for Discussion 356 "Revisiting the Core Inflation Measures of the Banco Central do Brasil" from 2014, available at BCB's site (http://www.bcb.gov.br/pec/wps/port/default.asp).O IPCA-EX0 core is obtained by the exclusion of the Food-at-home and Administered Prices groups. The IPCA-EX1 excludes 10 of 16 items from the Food-at-home group, besides items domestic fuels and vehicle fuels. The trimmed averages core (IPCA-MA) excludes items whose monthly changes stand, in the distribution, above the 80 percentile or below the 20 percentile. The remaining 60% are used to calculate the core monthly change. The smoothed trimmed averages indicator (IPCA-MS) follows the same procedure of the previous measure, with a difference: before eliminating tails, the components with infrequent changes are smoothed out. The double-weighting core (IPCA-DP) adjusts the original weights of each item in accordance with its relative volatility, a procedure that reduces the significance of more volatile components.

3/ Please see discussion in Da Silva Filho & Figueiredo (2011).

4/ For additional information, see box "The services sector inflation", published in the September 2016 edition of the Inflation Report.

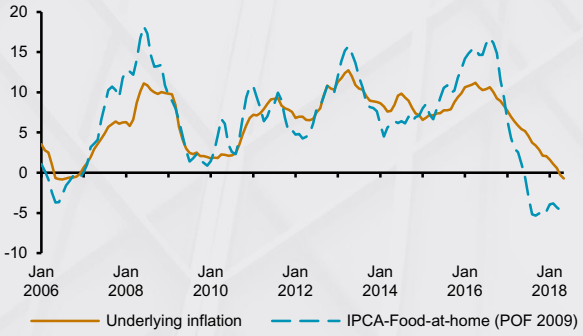
At first, an underlying indicator for industrial goods was obtained, by excluding the following items:

- Ethanol (representing 4.3% of the industrial goods weight[5]): a subitem that shows high price volatility and is significantly influenced by the supply conditions of inputs and substitute fuels;
- Cigarettes (4.7%): a subitem with few changes over the year, but whose prices are frequently affected by tax changes (taxes comprise about 80% of the product's final price); and
- New (11.6%) and used (4.0%) vehicles; electro-electronics (6.6%): subitems under heavy influence of tax administration policies, for example, the IPI tax relief policy in effect as of 2008 and the recomposition of rates since 2015.

Regarding the "food-at-home" group, only the less volatile items were kept: Baked goods (12,2%); Beverage and infusions (12,2%); Processed meat and fish (4,8%) and Canned and preserved goods (1,0%).

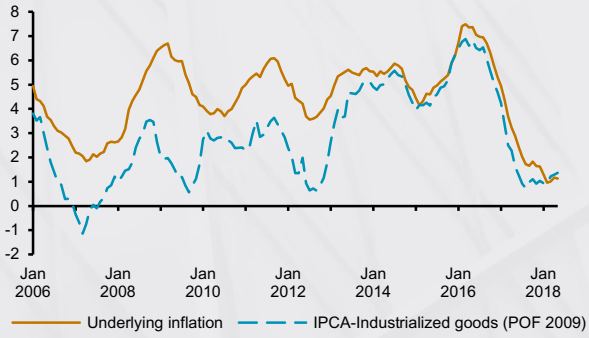
For the food-at-home group (Figure 2), underlying inflation shows lower volatility than the respective headline indicator, as expected. For industrial goods (Figure 3), inflation for the selected items is systematically higher than in the segment as a whole, reflecting the exclusion of vehicles and home appliances – which recorded relatively low inflation in the period. The underlying inflation indicator for services, however, shows an average closer to the sector's inflation as a whole and lower volatility in the monthly measures (Figure 4).

Figure 2 – Food-at-home inflation
% change in 12 months



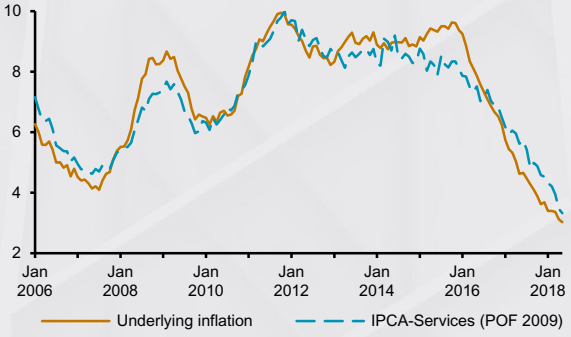
Sources: IBGE and BCB

Figure 3 – Industrialized goods inflation
% change in 12 months



Sources: IBGE and BCB

Figure 4 – Services inflation
% change in 12 months



Sources: IBGE and BCB

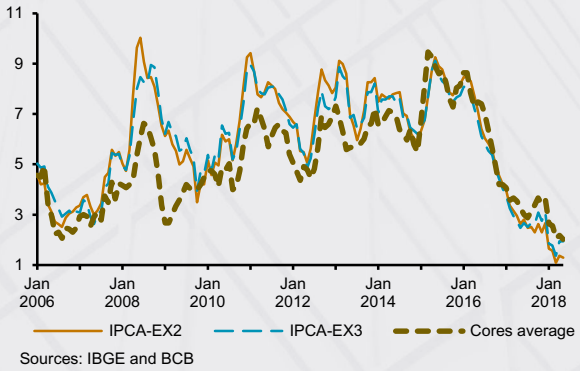
The selected items of services, industrial goods, and food-at-home are aggregated in the IPCA-EX2 core, comprising 57.6% of market prices and 42.9% of the Extended National Consumer Price Index (IPCA)[6] basket. A second core, the IPCA-EX3, aggregates only selected items from services and industrial goods, comprising 51.3% of market prices and 38.2% of the IPCA basket. While significantly different from the average of cores

5/ The weights shown in this box are those from the May 2018 IPCA.

6/ Excluded items represent 31.3% and 69.8% of the total weight of industrial goods and food-at-home in the IPCA, respectively. Regarding services inflation, the weight of the four groups eliminated corresponds to 37.6% of the sectorial IPCA inflation.

currently monitored by the BCB, the trajectories of IPCA-EX2 and IPCA-EX3 differ little between them, which may be attributed to the reduced weight of the remaining items of food-at-home.

Figure 5 – Core inflation measures
% change 3-month-annualized (s.a.)



Sources: IBGE and BCB

Table 1 shows basic statistics for the seven inflation cores, using as the basis for comparison seasonally adjusted data and three-month moving averages[7].

Table 1 – Selected statistics of core inflation[1/]

	Average			Standard deviation	MAE vs 12m centered MA[2/]		
	2006-2011	2012-2017	2006-2017	2006-2017	2006-2011	2012-2017	2006-2017
IPCA	4.6	6.4	5.5	3.6	-	-	-
IPCA-EX0	4.4	6.0	5.2	1.9	1.0	1.2	1.1
IPCA-EX1	4.3	6.3	5.3	2.0	0.7	1.0	0.8
IPCA-DP	4.7	6.4	5.5	1.9	0.7	0.8	0.8
IPCA-MS	4.5	6.2	5.4	1.7	0.8	0.8	0.8
IPCA-MA	4.0	5.6	4.9	1.7	0.7	0.9	0.8
IPCA-EX2	5.7	6.5	6.1	2.1	1.4	1.1	1.2
IPCA-EX3	5.7	6.3	6.0	1.9	1.4	1.0	1.2

Source: IBGE and BCB

1/ Standard deviation of the CPI calculated on its annualized monthly variation. For cores, the statistics are calculated on quarterly moving averages seasonally adjusted and annualized.

2/ Mean absolute error in relation to the 12-month centered moving average of CPI.

In the 2006-2017 period, the IPCA-DP, IPCA-MS, and IPCA-EX1 recorded averages closer to the IPCA average. In line with results from previous studies, the IPCA-MA tends to underestimate the average change of headline inflation. From 2012 to 2017, the IPCA-EX3 and the IPCA-EX2 showed reduced deviation in relation to the IPCA average, but from 2006 to 2011 they showed a high bias, mostly due to the selection of components from the industrial goods group (Figure 3). More recently, the discrepancy of IPCA-EX2 and IPCA-EX3 in relation to the IPCA, however smaller, is due to the realignment of administered prices, especially domestic electricity rates. Thus, these cores minimized the effects of big temporary shocks.

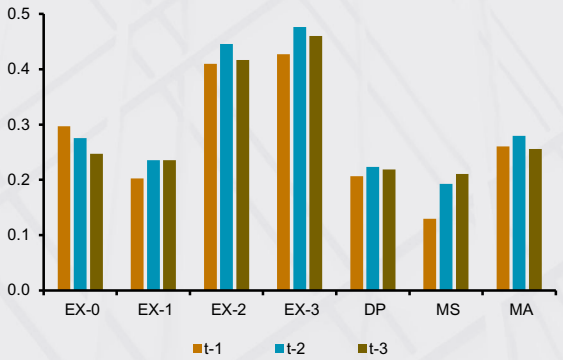
Regarding volatility, the IPCA-MS and IPCA-MA were the cores showing lower standard-deviation in the 2006-2017 period, but all cores show significantly lower volatility when compared to the headline IPCA indicator.

In order to evaluate the adherence to the inflation trend, were calculated the mean absolute deviations in relation to a centered moving average of IPCA. According to this *criterium*, and considering the whole interval, the IPCA-DP, IPCA-MA and the IPCA-MS show the best statistics, followed by the IPCA-EX1.

7/ Results do not change qualitatively when the seasonal adjustment is performed in real time.

Additionally, the cores were tested for their sensitivity to economic activity. Both in correlation tests (Figure 6)[8] and in econometric exercises including other variables as control, cores IPCA-EX2 and IPCA-EX3 showed greater adherence than the remaining cores to measures of the product gap. In this regard, the IPCA-EX2 and the IPCA-EX3 seem to include components more sensitive to the economic cycle, despite not highlighted in any of the previous criteria.

Figure 6 – Correlations between lags of gap and core



Regardless of methodological differences, all cores assessed in the current box indicate a process of significant fall in underlying inflation during 2016 and 2017. After stabilization in the second half of 2017, measures resumed indications of deceleration in the underlying inflation at the beginning of 2018. They now are in levels similar to or below to the inferior limit of the tolerance interval for the inflation target.

It is worth noting that the cores herein analyzed are part of a wide set of indicators that help conducting the monetary policy, without highlights for any specific measure.

8/ Figure 6 compares the simple correlations between each core and a measure of the product gap, considering 1 to 3 lags quarterly.

Inflation outlook

2

This chapter of the Inflation Report presents an analysis of the inflation outlook up to 2020, thus covering all years for which the National Monetary Council (CMN) sets inflation targets, up to the Report's cutoff date.

The projections presented here use the information set available at the last meeting of the Copom held on June 19th and 20th, 2018. For the conditioning paths used in the projections, especially those arising from the Focus survey carried out by the Banco Central do Brasil, the cutoff date is June 15th, 2018, unless otherwise indicated.

Conditional projections for inflation are presented in four scenarios, depending on the conditioning path used for the exchange and Selic rates over the projection horizon. The conditioning paths may be derived from the expectations extracted from the Focus survey or paths in which the values of these variables remain constant throughout the projection horizon.

The first scenario presented uses constant Selic and interest rates during the projection horizon, while the second scenario supposes paths extracted from the Focus survey for these two variables.

Two other scenarios – namely "hybrid" scenarios – are presented, which alternatively assume a constant Selic rate, are also presented. In the first, it is assumed that the exchange rate remains constant, while in the second, its trajectory comes from the Focus survey.

It is worth noting that the conditional inflation projections disclosed in this Report contemplate probability intervals that embody the degree of uncertainty present at the aforementioned cutoff date. The projections depend not only on the assumptions about interest rates and exchange rates but also on a set of assumptions about the behavior of exogenous variables.

In its decision-making process, the Copom analyzes a broad set of variables and models, in which it exercises judgments based on the available information set. In presenting some scenarios that inform its deliberations, the Copom seeks to increase transparency to monetary policy decisions, contributing to its effectiveness in controlling inflation, which is its primary objective.

2.1 Short-term revisions and projections

In the quarter ending in May, consumer inflation as measured by the IPCA was 0.08 p.p. below the baseline scenario presented in the previous Inflation Report (Table 2.1), reflecting the benign evolution of market prices, especially food and services. Conversely, the effects of the exchange rate depreciation and the rise in the international oil prices on fuel prices, as well as the change in the surcharge flag on the electric power tariff[22], led to a higher-than-expected inflation of administered prices.

Table 2.1 – IPCA – Inflationary surprise

% change

	2018				
	Mar	Apr	May	In the quarter	12-month up to May
Copom's scenario[1/]	0.20	0.33	0.26	0.79	2.94
IPCA observed	0.09	0.22	0.40	0.71	2.86
Surprise	-0.11	-0.11	0.14	-0.08	-0.08

Sources: IBGE and BCB

1/ Scenario at March 2018 Inflation Report cutoff date.

IPCA inflation in March and April maintained the benign trajectory of the last quarters, standing 0.22 p.p. below projections, with surprises spread among the market prices. In May, however, the effect of the shortage caused by a temporary halt in the transportation sector at the end of the month was added to the already mentioned pressures on administered prices, causing a rise of 0.40 percent in the IPCA, 0.14 p.p. above what was projected in the previous Inflation Report.

Table 2.2 – IPCA – Short-term projections

% change

	2018				
	Jun	Jul	Aug	In the quarter	12-month up to Aug
Copom's scenario[1/]	1.06	0.27	0.20	1.54	4.23

Sources: IBGE and BCB

1/ Scenario at cutoff date.

Short-term IPCA projections in the Copom baseline scenario for the months of June to August 2018, respectively, are 1.06 percent, 0.27 percent and 0.20 percent. If this projections materialize, the 1.54 percent increase in IPCA in the quarter will be significantly above the 0.20 percent observed in the same period of 2017[23], implying an increase in the 12-month inflation to 4.23 percent in August (Table 2.2), compared to 2.86 percent in May.

The significant acceleration projected for June's monthly inflation reflects the intensification of the effects of the halt of the transportation sector on food and fuel prices and the change on the electric

22/ Change from green flag to yellow flag in May.

23/ The result of the period was particularly influenced by the 0.23 percent deflation in June 2017.

power tariff surcharge flag[24]. In the following months, despite the lagged effects of the exchange rate depreciation observed since the end of April and the projected raise in flight tickets in July, it is expected that the reversal of the effects of the shortage, the favorable seasonality of food prices and the high slack in production factors benefit the weakening of monthly rates.

It is worth noting that despite the acceleration projected for the coming months, the resumption of activity at a more-than-expected gradual pace and the inertial propagation of the low inflationary level are factors that contribute to the maintenance of inflation at a reduced level, especially in the segment of services and in underlying inflation measures.

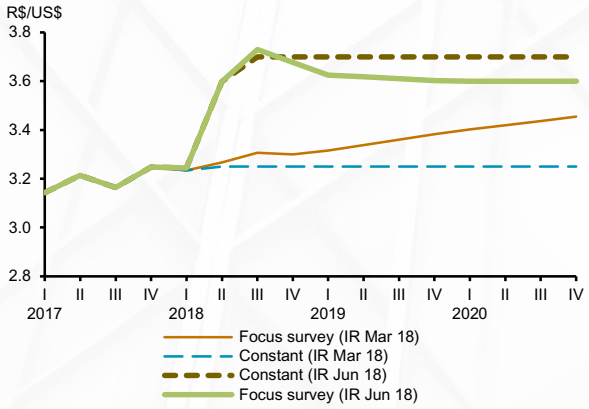
2.2 Conditional projections

The exchange rate used in scenarios that assume a constant value for this variable changed from R$3.25/US$, in the March 2018 Inflation Report, to R$3.70/US$[25] (Figure 2.1). The median expectations for the year-end exchange rate, extracted from the Focus survey of June 15th, 2018, when compared to the March 16th, 2018 values used in the March 2018 Inflation Report, increased for all horizons, from R$3.30/US$ to R$3.63/US$ for 2018, from R$3.39/US$ to R$3.60/US$ for 2019 and from R$3.46/US$ to R$ 3,60/US$ for 2020 (Figure 2.1).

As for the Selic rate, the value assumed in the scenarios using a constant rate decreased from 6.75 percent p.a., used in the March 2018 Report, to 6.50 percent p.a. (Figure 2.2). Consistent with this Selic rate path and the increase in risk premia – after reaching a minimum value in 2018Q2 –, the projected 360-day Pre-DI swap rate rises in the next two quarters, stabilizing thereafter.

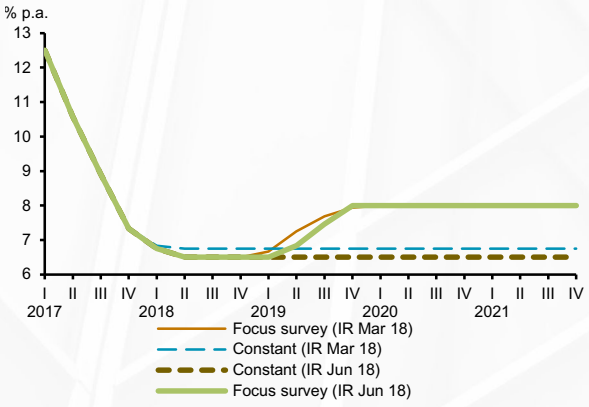
The median expectations for the Selic rate extracted from the Focus survey – under the same comparison basis – between March 16th, 2018, and June 15th, 2018, remained at 6.50 percent p.a. for the end of 2018 and 8.00 percent p.a. for the end of 2019, 2020 and 2021 (Figure 2.2). In this conditioning path, the Selic rate begins to rise in 2019Q2, reaching 8.00 percent p.a.

Figure 2.1 – Exchange rate assumptions for projections



Obs.: values refer to quarterly averages.

Figure 2.2 – Selic rate target assumptions for projections



Obs.: values refer to quarterly averages.

24/ Change from yellow flag to red flag – level 2, in June. The projection considers the maintenance of this latter flag in July and August.

25/ Value obtained by the usual procedure of rounding the average quotation of the R$/US$ exchange rate observed during the five business days ended the Friday before the Copom meeting.

in the last quarter of the same year,[26] remaining at this level until the end of 2021.[27] Consistent with this path for the Selic rate and the increase in risk premia, the projected rate of the 360-day Pre-DI swap starts an upward trend in 2018Q3, stabilizing from the end of 2019 onward.

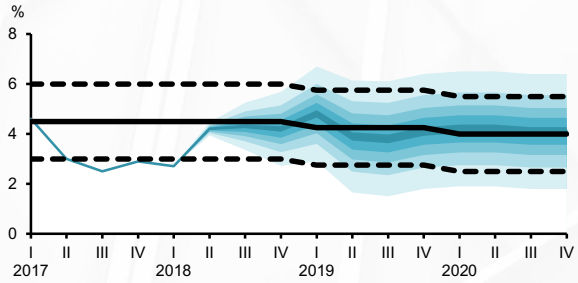
The projections presented herein also depend on considerations about the evolution of the necessary reforms and adjustments in the economy. Its effects on projections are captured through asset prices, the degree of uncertainty, the expectations from the Focus survey, and their effect on the structural interest rate of the economy. In addition to these channels, fiscal policy influences the conditional projections for inflation through impulse effects on the aggregate demand.

These projections also embed the understanding that the process of structural reforms – such as fiscal and lending reforms – contributes to the gradual reduction of the structural interest rate.

The projections for year-on-year IPCA inflation were based on the combination of the short-term projections and conditioning paths. These projections are based on the use of a set of models and information available, combined with the exercise of judgment.

Figure 2.3 – Projected inflation with constant interest and exchange rates

Inflation fan chart



Note: Year-on-year IPCA inflation (%)

The central projection associated with the scenario that combines constant interest and exchange rates over the entire projection horizon indicates that year-on-year the inflation, after reaching 2.68 percent in 2018Q1, increases to around 4.2 percent in the following quarter and ends the year around 4.2 percent (Figure 2.3 and Table 2.3). The projected inflation reaches a peak of about 4.8 percent in 2019Q1, also influenced by the discarding of the unusually low quarterly inflation rate in 2018Q1. In 2019Q2, year-on-year inflation falls to around 3.9 percent, ending 2019 at around 4.1 percent, the same value projected for 2020. In this scenario, the projections for administered price inflation are around 7.4 percent for 2018, 4.8 percent for 2019 and 4.1 percent for 2020.

In this scenario, the estimated probabilities of inflation exceeding the upper and lower limits of the target tolerance range in 2018 are close to 2 and 9

26/ Until December 2019, the Focus survey presents monthly values of the Selic rate and thereafter only end-of-year values.

27/ As described in the box "Small-scale aggregate model – 2017" (June 2017 Inflation Report), the path of the 360-day Pre-DI swap rate depends on the conditioning Selic rate path for the same period and the premium path (difference between the swap rate and the expected rate for the Selic). Therefore, the swap rate throughout 2020 also depends on the Selic trajectory over 2021.

Table 2.3 – Projected inflation with constant interest and exchange rates
Central projection and probability intervals

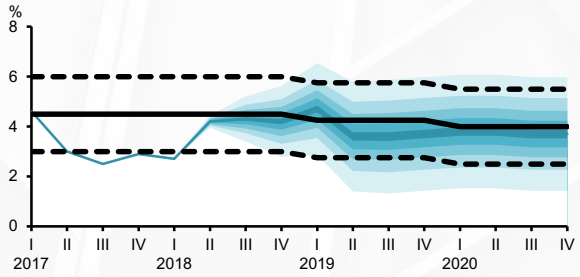
Year	Q			50%				
			30%					
				10%				
					Central			
2018	2	4.1	4.1	4.2	4.2	4.2	4.3	4.3
2018	3	3.9	4.1	4.2	4.3	4.4	4.5	4.7
2018	4	3.6	3.9	4.1	4.2	4.3	4.5	4.8
2019	1	4.0	4.4	4.7	4.8	4.9	5.2	5.6
2019	2	3.0	3.4	3.7	3.9	4.1	4.4	4.8
2019	3	2.9	3.3	3.6	3.8	4.0	4.3	4.7
2019	4	3.2	3.6	3.9	4.1	4.3	4.6	5.0
2020	1	3.3	3.7	4.0	4.2	4.4	4.7	5.1
2020	2	3.3	3.7	4.0	4.2	4.4	4.7	5.1
2020	3	3.2	3.6	3.9	4.1	4.3	4.6	5.0
2020	4	3.2	3.6	3.9	4.1	4.3	4.6	5.0

Note: Year-on-year IPCA inflation (%).

Table 2.4 – Projections in the previous and current Inflation Report – scenario with interest and exchange rates from Focus survev
Inflation accumulated in four quarters (%)

Period	March Inflation Report	June Inflation Report
2018 2	3.3	4.2
2018 3	3.4	4.3
2018 4	3.6	4.2
2019 1	4.1	4.8
2019 2	4.1	3.9
2019 3	4.1	3.8
2019 4	4.0	4.1
2020 1	4.1	4.2
2020 2	4.1	4.2
2020 3	4.1	4.1
2020 4	4.1	4.1

Figure 2.4 – Projected inflation with interest and exchange rates from Focus survey
Inflation fan chart



Note: Year-on-year IPCA inflation (%).

percent, respectively. By 2019, the probabilities are around 12 and 17 percent for the upper and lower limits, respectively. By 2020, the probabilities are around 16 and 13 percent for the upper and lower limits, respectively.

In comparison with the March 2018 Inflation Report (Table 2.4), projections for 2018 and 2019 in the scenario with constant interest and exchange rates increased by around 0.6 p.p. and 0.1 p.p., respectively, and remained constant for 2020.

The exchange rate depreciation in 2018Q2 was the main factor driving the increase in the projections. The exchange rate went from an average of R$ 3.24/US$ in the first quarter to around R$3.70/US$ in the week prior to the June Copom meeting (215th meeting). The 0.25 p.p. lower Selic rate and the higher oil price levels observed in 2018Q2 also contributed to the increase in projections.

Conversely, the lower-than-expected inflation rate for the March-May quarter (-0.08 p.p.) and the more moderate growth rate of economic activity contributed to reduce projections.

It is worth noting that the effects of exchange rate variations on inflation operate faster and are more intensely than changes in economic activity.[28] In fact, the recent exchange depreciation has a more concentrated impact on the projections for inflation in 2018, while changes in the economic activity path have greater effects on projections for 2019.

Several factors contribute to ensuring that inflation projections for 2018, 2019 and 2020 are consistent with inflation targets. As for 2018, the projections presented in the Inflation Report of March 2018 were lower than the target, hence, their increase results in values consistent with the target. For 2019 and 2020, it is worth noting the inflation expectations anchored in the target, the decrease in the effects of exchange rate depreciation over time and the recovery path of economic activity. As such, the accommodative monetary policy fosters the narrowing of the level of economic slack in the production factors, thus favoring the convergence of inflation to the target. It is also assumed that shocks on inflation and activity will lose momentum over time.

28/ See box "Internally consistent conditioning paths for exchange rate, economic uncertainty and country risk premium" in the March 2018 Inflation Report.

Table 2.5 – Projected inflation with interest and exchange rates from Focus survey

Central projection and probability intervals

Year	Q			50%				
			30%					
		10%						
				Central				
2018	2	4.1	4.1	4.2	4.2	4.2	4.3	4.3
2018	3	3.9	4.1	4.2	4.3	4.4	4.5	4.7
2018	4	3.6	3.9	4.1	4.2	4.3	4.5	4.8
2019	1	3.9	4.3	4.6	4.7	4.8	5.1	5.5
2019	2	2.7	3.1	3.4	3.6	3.8	4.1	4.5
2019	3	2.7	3.1	3.4	3.6	3.8	4.1	4.5
2019	4	2.8	3.2	3.5	3.7	3.9	4.2	4.6
2020	1	2.9	3.3	3.6	3.8	4.0	4.3	4.7
2020	2	2.9	3.3	3.6	3.8	4.0	4.3	4.7
2020	3	2.8	3.2	3.5	3.7	3.9	4.2	4.6
2020	4	2.8	3.2	3.5	3.7	3.9	4.2	4.6

Note: Year-on-year IPCA inflation (%).

Table 2.6 – Projections in the previous and current Inflation Report – scenario with interest and exchange rates from Focus survey

Inflation accumulated in four quarters (%)

Period	March Inflation Report	June Inflation Report
2018 2	3.3	4.2
2018 3	3.5	4.3
2018 4	3.8	4.2
2019 1	4.3	4.7
2019 2	4.3	3.6
2019 3	4.3	3.6
2019 4	4.1	3.7
2020 1	4.2	3.8
2020 2	4.1	3.8
2020 3	4.0	3.7
2020 4	4.0	3.7

Table 2.7 – Central projections in different scenarios

Period	Constant interest and FX rate	Interest and FX rate from Focus survey	Interest rate from Focus survey and constant FX rate	Constant interest rate and FX rate from Focus survey
2018 2	4.2	4.2	4.2	4.2
2018 3	4.3	4.3	4.3	4.3
2018 4	4.2	4.2	4.2	4.2
2019 1	4.8	4.7	4.8	4.7
2019 2	3.9	3.6	3.8	3.7
2019 3	3.8	3.6	3.8	3.6
2019 4	4.1	3.7	3.9	3.8
2020 1	4.2	3.8	4.0	4.0
2020 2	4.2	3.8	3.9	4.1
2020 3	4.1	3.7	3.8	4.0
2020 4	4.1	3.7	3.7	4.1

Note: Year-on-year IPCA inflation (%).

In comparison with the inflation projections of the May Copom meeting (214th Meeting), there was an increase of approximately 0.2 p.p. for 2018 and 0.1 p.p. for 2019 (see Minutes of the 214th Meeting), mainly due to the depreciation of the exchange rate.

In the scenario with interest and exchange rates from the Focus survey, the central projection indicates that year-on-year inflation ends 2018 at approximately 4.2 percent. After reaching a maximum of 4.7 percent in 2019Q1, the year-on-year inflation ends 2019 and 2020 at around 3.7 percent (Figure 2.4 and Table 2.5). In this scenario, the projections for administered prices inflation are 7.2 percent for 2018, 4.6 percent for 2019 and 3.8 percent for 2020.

Compared to the March 2018 Inflation Report, inflation projections were higher for the horizon up to 2019Q1, but lower for longer horizons (Table 2.6). The main reason was the change in the exchange rate trajectory of the Focus survey, which predicts an exchange rate appreciation until the end of 2019, while the trajectory used in the March Report foresaw depreciation (Figure 2.1).

In comparison with the scenario that uses constant Selic and exchange rates (Table 2.7), projected inflation is always lower as of 2019Q1. The exchange rate trajectory of the Focus survey foresees exchange rate appreciation until the end of 2019 (3.4 percent between 2018Q3 and 2019Q4), contributing to lower inflation projections when compared to those coming from a scenario with a constant exchange rate. In the same direction, the increase in the Selic rate predicted in the Focus survey, which also increases the Pre-DI swap rate, acts to reduce inflation projections, since it implies a moderation of economic activity.

In this scenario, the estimated probabilities of inflation exceeding the upper and lower limits of the target tolerance range in 2018 are close to 2 and 8 percent, respectively. By 2019, the probabilities are around 7 and 25 percent for the upper and lower limits, respectively. By 2020, the probabilities are around 10 and 19 percent for the upper and lower limits, respectively.

In the hybrid scenario with constant exchange rate and Selic rate from the Focus survey, inflation projections are around 4.2 percent, 3.9 percent and 3.7 percent for 2018, 2019 and 2020, respectively (Table 2.8). In comparison with the scenario that, alternatively, uses a constant Selic rate, the projections are lower

Table 2.8 – Projected inflation with interest rate from Focus survey and constant exchange rate

Central projection and probability intervals

Year	Q	50%	30%	10%	Central	10%	30%	50%
2018	2	4.1	4.1	4.2	4.2	4.2	4.3	4.3
2018	3	3.9	4.1	4.2	4.3	4.4	4.5	4.7
2018	4	3.6	3.9	4.1	4.2	4.3	4.5	4.8
2019	1	4.0	4.4	4.7	4.8	4.9	5.2	5.6
2019	2	2.9	3.3	3.6	3.8	4.0	4.3	4.7
2019	3	2.9	3.3	3.6	3.8	4.0	4.3	4.7
2019	4	3.0	3.4	3.7	3.9	4.1	4.4	4.8
2020	1	3.1	3.5	3.8	4.0	4.2	4.5	4.9
2020	2	3.0	3.4	3.7	3.9	4.1	4.4	4.8
2020	3	2.9	3.3	3.6	3.8	4.0	4.3	4.7
2020	4	2.8	3.2	3.5	3.7	3.9	4.2	4.6

Note: Year-on-year IPCA inflation (%).

Table 2.9 – Projected inflation with exchange rate from Focus survey and constant interest rate

Central projection and probability intervals

Year	Q	50%	30%	10%	Central	10%	30%	50%
2018	2	4.1	4.1	4.2	4.2	4.2	4.3	4.3
2018	3	3.9	4.1	4.2	4.3	4.4	4.5	4.7
2018	4	3.6	3.9	4.1	4.2	4.3	4.5	4.8
2019	1	3.9	4.3	4.6	4.7	4.8	5.1	5.5
2019	2	2.8	3.2	3.5	3.7	3.9	4.2	4.6
2019	3	2.7	3.1	3.4	3.6	3.8	4.1	4.5
2019	4	2.9	3.3	3.6	3.8	4.0	4.3	4.7
2020	1	3.1	3.5	3.8	4.0	4.2	4.5	4.9
2020	2	3.2	3.6	3.9	4.1	4.3	4.6	5.0
2020	3	3.1	3.5	3.8	4.0	4.2	4.5	4.9
2020	4	3.2	3.6	3.9	4.1	4.3	4.6	5.0

Note: Year-on-year IPCA inflation (%).

from 2019Q2 on, reflecting the higher Selic rate (and Pre-DI swap rate).

Finally, in the hybrid scenario with exchange rates from the Focus survey and constant Selic rate, inflation projections are approximately 4.2 percent, 3.8 percent and 4.1 percent for 2018, 2019 and 2020, respectively (Table 2.9). In comparison with the scenario that alternatively uses constant exchange rates, the projections are lower between 2019Q1 and 2020Q3, as a result of the exchange appreciation path extracted from the Focus survey.

2.3 Monetary policy conduct and balance of risks

The temporary halt in the transportation sector in May makes it more difficult to assess the recent evolution of economic activity. April data suggest more consistent activity relative to previous months. Indicators for May – and possibly June –, however, are likely to reflect the effects of the aforementioned halt. The baseline scenario entertains continuation of recovery of economic activity in the Brazilian economy at a more gradual pace.

The global outlook remained more challenging and showed volatility. The evolution of risks associated, to a large extent, with normalization of interest rates in some advanced economies led to adjustments in international financial markets. As a result, risk appetite towards emerging economies has diminished.

Inflation expectations for 2018 and 2019 collected by the Focus survey are around 3.9 percent and 4.1 percent, respectively. Expectations for 2020 are around 4.0 percent.

In the short run, the Committee considers that inflation should reflect significant temporary upward pressures stemming from the halt in the transportation sector and other relative price changes. Measures of underlying inflation are still running at low levels. This includes the components that are most sensitive to the business cycle and monetary policy.

In the most recent Copom meeting (215th Meeting), its members discussed possible enduring effects

of the shocks faced by the Brazilian economy. All members agreed that in the short term it will be more difficult to evaluate if the economic developments are in line with its baseline scenario for the medium and long terms. This context reinforces the importance of monitoring over time the evolution of the baseline scenario and its risks, and of evaluating the duration of the effects of shocks on inflation (i.e., its second-round effects) in order to ensure that the achievement of low inflation persists, even in the face of adverse shocks.

At that meeting, the Copom unanimously decided to maintain the Selic rate at 6.50 percent p.a. The Committee judges that this decision reflects its baseline scenario for prospective inflation and the associated balance of risks and is consistent with the convergence of inflation to target over the relevant horizon for the conduct of monetary policy, which includes 2018 and, mainly, 2019.

On the occasion, the Copom communicated that its baseline scenario for inflation encompasses risks factors in both directions. On the one hand, (i) the possible propagation, through inertial mechanisms, of low inflation levels in the past may lead to a lower-than-expected prospective inflation trajectory. On the other hand, (ii) frustration of expectations regarding the continuation of reforms and necessary adjustments in the Brazilian economy may affect risk premia and increase the path for inflation over the relevant horizon for the conduct of monetary policy. This risk intensifies in the case of (iii) further changes in the global outlook for emerging economies. The latter risk has intensified since the May Copom meeting (214th Meeting), whereas the risk that inflation would remain significantly below target over the relevant horizon has diminished.

The Copom judges that economic conditions prescribe accommodative monetary policy, i.e., interest rates below the structural interest level. The Committee emphasizes that the evolution of reforms and necessary adjustments in the Brazilian economy is essential to maintain low inflation in the medium and long run, for the reduction of its structural interest rate, and for sustainable recovery of the economy.

The Copom judges that it should base its decisions on the evolution of inflation projections and expectations, of the balance of risks, and of economic activity. Shocks that produce relative price changes

should only lead to a monetary policy response to their possible second-round effects (i.e., to the propagation to prices in the economy that are not directly affected by the shock). It is through such second-round effects that these shocks may affect inflation projections and expectations, and change the balance of risks. These effects may be mitigated by the level of economic slack and by inflation expectations anchored around the targets. Therefore, there is no mechanical relationship between recent shocks and the conduct of monetary policy. In their deliberations, Committee members emphasized that this prescription requires an environment with anchored expectations.

In the Copom's assessment, the evolution of the baseline scenario and the balance of risks prescribes keeping the Selic rate at its current level. The Copom emphasized that the next steps in the conduct of monetary policy will continue to depend on the evolution of economic activity, the balance of risks, and on inflation projections and expectations.

Small-scale model of disaggregate prices – 2018

This box presents a revision in one of the semi-structural small-scale model for the category of "disaggregate model", since it allows to model market prices inflation through the disaggregation of the sectors of services, industrial goods and food-at-home. Disaggregate models help evaluating the primary and secondary effects of shocks on the inflation of each sector. They also allow identifying the specific dynamics of each sector and evaluate the behavior of inflation core measures by exclusion, especially those excluding the food-at-home and administered prices, called EX0.

The revision of the models presented in this box incorporates the same improvements introduced in the aggregate semi-structural model[1]. This revision also allows capturing the impacts of supply shocks from climatic conditions, with direct effects on the food-at-home sector.

Always seeking to improve its specifications and adapt them to changes in the economy, the models used by the Banco Central do Brasil (BCB) are in constant revision, which are not restricted to the annual frequency.

Specification of the revised small-scale semi-structural model of disaggregate prices

The structure of the small-scale model of disaggregate prices is defined by three sectoral Phillips curves: (i) services, (ii) food-at-home, and (iii) industrial goods; in addition to a Phillips curve of market prices that aggregates the sectoral Phillips curves. There is also an IS curve that describes the dynamics of the output gap and one curve for the premium of the 360 day Pre-DI swap. The projections for the Extended National Consumer Price Index (IPCA) are obtained from the combination of projections for market prices and administered prices. The latter depends on specialists' assessments for shorter-terms and in the model of administered prices[2] for longer periods. Since one of the determinants of the projection of administered prices is the past inflation, changes in projections for market prices also affect automatically the projection for administered prices.

The sectoral Phillips curves are generally represented by:

$$(1)\ \pi_t^g = \sum_{i>0} \beta_{1i}^g \pi_{t-i}^x + \sum_{j>0} \beta_{2j}^g E_t \pi_{t+j}^x + \sum_{k\geq 0} \beta_{1k}^g \pi_{t-k}^* + \sum_{l\geq 0} \beta_{3l}^g h_{t-l} + \sum_{n\geq 0} \sum_{q} \beta_{5n}^{g,q} Z_{t-n}^{g,q} + \varepsilon_t^g,$$

$$(2)\ \pi_t^L = \sum_{g} \omega^g \pi_t^g,$$

where π_t^g represents the food inflation for each sector (services, food-at-home or industrial goods); π_t^x may refer to the inflation of each sector or to the IPCA inflation; $E_t \pi_{t+j}^x$ refers to expectation in t for inflation j quarters ahead; π_t^* is a measure of external inflation; h_t is the measure of the output gap; and Z_t are variables that capture, among other factors, the specific seasonality of each sector and supply shocks, such as climatic shocks. The term ε_t^g corresponds to the residual estimation of each sectoral curve, and ω^g is the

1/ See box "Small-scale aggregate model – 2017" in the June 2017 Inflation Report.

2/ See box "Revision of the medium-term projection models for administered prices" to be published in the September 2018 Inflation Report.

weight of the respective sectoral inflation on market prices, so as $\sum_g \omega^g = 1$. In each sectoral Phillips curve, the parameters are estimated subject to the long-run verticality constraint.

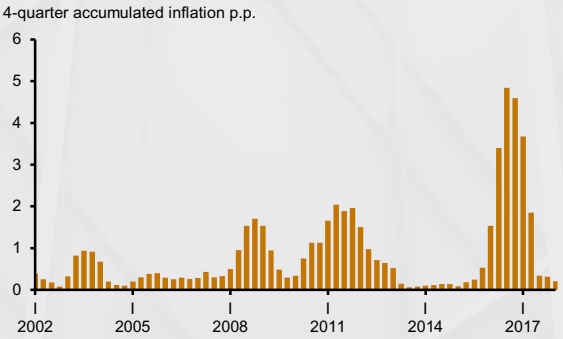
Specific relations of each sector depend on the estimation made. In addition to channels explicitly modelled, the model allows capturing other propagation channels by means of expectations.

Because of the effect of changes in commodity prices on domestic inflation dynamics, the model uses an indicator of commodity prices as an indicator of external inflation, expressed in U.S. dollars and converted to local currency by the corresponding exchange rate. The small-scale disaggregate model under discussion employ the Commodities Index – Brazil (IC-Br), calculated and published by the BCB.[3] The IC-Br was designed to take into account the magnitude of the impact of price changes of different commodities on domestic inflation.

Within the set of control variables, this revision introduced a variable that captures supply shocks arising from climate factors. In fact, climate anomalies have been indicated as one of the possible explanatory factors of food price fluctuations[4]. Due to the role that *El Niño* and *La Niña* events play on the Brazilian agricultural harvest, the Phillips curve of the food-at-home sector includes a control variable that reflects Pacific Ocean temperatures.[5]

Figure 1 shows the direct contribution of climate events to food-at-home[6]. It should be observed that the phenomenon occurred throughout 2016 was responsible for the greatest impact on the sector's inflation, reflecting the intense *El Niño* episode during this period.

Figure 1 – Direct contribution from weather events to food-at-home inflation



The IS curve describes the dynamics of the output gap as a function of its lags, the *ex-ante* real interest rate, fiscal and external-sector variables and control variables:

$$(3)\ h_t = \sum_{i>0} \alpha_{1i}\, h_{t-i} + \sum_{j\geq 0} \alpha_{2j}\left(r_{t-j} - \bar{r}\right) + \sum_{k\geq 0} \alpha_{3k}\left(h^*_{t-k} + \Delta^{-*}_{y_{t-k}} - \Delta^{-}_{y_{t-k}}\right) + \sum_{l\geq 0} \alpha_{4l}\, \Delta sup_{t-l} + \sum_{n\geq 0}\sum_{p} \alpha^p_{5n} Z^{h,p}_{t-n} + u_t\ ,$$

where r_t is the real interest rate calculated from the 360-day Pre-DI swap nominal interest, deflated by the expected inflation for the period of the contract; $\bar{r}$ is the equilibrium interest rate; Δsup_t is the change in the structural primary balance; h^*_t is the worldwide output gap relevant for the Brazilian economy; $\Delta^{-*}_{y_t}$ is the growth of the worldwide potential output; $\Delta^{-}_{y_t}$ is the growth of the domestic potential output; Z_t is the control variable; and u_t is an error term.

3/ The IC-Br was initially presented in the box "Transfer of Commodity Prices to the IPCA and Commodities Index – Brazil" (Inflation Report, December/2010) and the methodological revision was published in the box "Methodological Revision of the Commodities Index – Brazil (IC-Br)" (December 2017 Inflation Report).

4/ See boxes "Effects of food prices shocks on the IPCA" (March 2017 Inflation Report) and "*El Niño, chuvas e principais impactos inflacionários*" (December 2015 Inflation Report).

5/ One of the series is utilized is the Oceanic Niño Index (ONI), obtained from the Climate Prediction Center, associated with the National Oceanic and Atmospheric Administration (NOAA) – United States of America (USA).

6/ The impacts showed in Figure 1 do not incorporate direct effects on inflation arising from inertia or inflation expectations.

The presence of the primary surplus in the IS curve seeks to capture eventual fiscal impulses on current economic conditions. The set of external variables, in turn, reflects exogenous pressures on the domestic economic activity from the global economy. The set of control variables of the IS curve seeks to capture eventual shocks on aggregate demand. It should be highlighted, in this group, the variable used as conditioning in the model aimed to capturing the degree of economic uncertainty, which affects investment and consumption decisions.

The disaggregate model presented in this box employs the modelling strategy of the 360-day Pre-DI swap adopted in the aggregate model. Under this specification, one takes into account the elements underlying the composition of the swap rate in its usual decomposition: the Selic rate expected for the term of the contract (more precisely, the DI rated plus the difference between the Selic and DI) and a premium.

The premium is modelled as a function of its own lags and the country-risk premium:

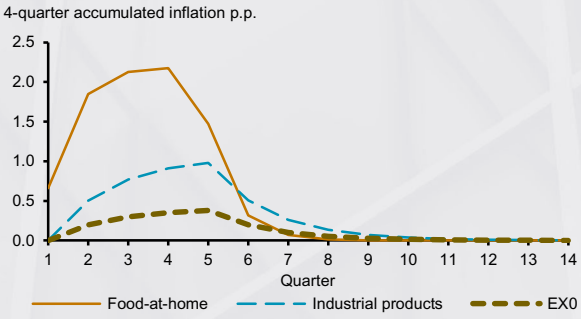
$$(4)\ premio_t = \gamma_0 + \sum_{i>0} \gamma_{1i}\, premio_{t-i} + \gamma_2 rispa_t + \nu_t,$$

where $premio_t$ is the difference between the 360-day pre-DI swap and the Selic rate expectation for the period of the swap contract; $rispa_t$ is a the country-risk premium, such as, for example, Emerging Market Bond Index (Embi) or Credit Default Swap (CDS) Brazil; and ν_t is an residue term.[7]

One of the relevant characteristics of this class of disaggregate price models refers to its capacity of mapping out specific shocks more directly on each sector.[8]

The disaggregate model also allows improving the mapping out of the pass-through of exchange rate variations on the inflation of each market price segment. Figure 2 shows the response of sectoral inflation to a permanent devaluation of 10% in the nominal exchange rate, concentrated in one quarter (t=1).[9] In this exercise, direct or indirect effects on administered prices are also considered.[10]

Figure 2 – Inflation response to exchange rate, disaggregated model segment[1/]



1/ Exchange rate 10% depreciation in t=1.

Inflation in the food-at-home sector is the most sensitive to exchange devaluation, with effects preponderantly concentrated in the first quarters. Cumulative inflation in four quarters reaches a peak in the fourth quarter, increasing nearly 2.2 p.p. in four quarters. Inflation in the sector of industrial goods shows lower pass-through, increasing around 0.9 p.p. in four quarters. Pass-through in the core inflation EX0 is even lower, in view of the weaker direct relation between services prices and exchange rate. The cumulative variation in four quarters of the EX0 reached 0.4 p.p. in the fourth quarter.

7/ The joint estimate of these equations also includes a Taylor rule specification that relates Selic rate to deviations of expected inflation from its target, the output gap, the Selic equilibrium level and to autoregressive Selic terms.

8/ For example, in the box "Effects of food prices shocks on the IPCA" (Inflation Report, March 2017), the disaggregate model was utilized for identifying the food prices shocks.

9/ In this exercise, the reaction of inflation expectations or interest rates to an exchange shock is not modelled.

10/ For further details, see box "Revision of the medium-term projection models for administered prices" (Inflation Report, September 2017).

BCB has monitored the evolution of different core inflation measures in order to evaluate the inflation trend, as highlighted in monetary policy documents. The particularity of the EX0 core is that it is easily mapped out through the disaggregate model under discussion. Among the excluded items are those segments that are commonly excluded in core measures monitored by central banks in other countries, such as food and electric power. Prices of these segments tend to show high volatility, thus making it difficult to be used as indicators of more persistent inflation trends. The price dynamics in these segments is influenced, to a great extent, by external factors to the domestic economic cycle, such as climatic conditions and international oil prices. Their dependence on international prices also make prices in these segments more sensitive to exchange rate variations, as shown in this box.

However, it should be highlighted that the BCB observes different inflation core measures, as shown in the box "New core inflation measures" released in this Inflation Report, in which no particular measure is emphasized.

In sum, aiming to maintain the degree of transparency of the conduct of monetary policy, this box updates information about one of the small-scale semi-structural disaggregate models of the BCB. This and other models used in the forecasting and policy analysis system (FPAS) of the BCB – such as other semi-structural aggregate models, DSGE Samba model and vector autoregressive models (VAR) – are constantly under revision and improvement.

Vector autoregression model with long-term anchoring

Long-term projections from vector autoregression models (VARs) have as one of their characteristics their convergence to the unconditional mean of their variables, directly related to the constant – or intercept – present in each equation. However, certain changes in economy that affect the variables longer-term perspective are not easily incorporated into traditional VARs, especially in the case of recent changes.

As for Brazil, credibility gains and the convergence process of expectations to target in the most recent period are important changes to the dynamics of inflation. Moreover, after 14 years with a 4.50% annual inflation target, the National Monetary Council (CMN), in June 2017, set lower targets, of 4.25% for 2019 and of 4.00% for 2020. These changes were reflected by the behavior of the expectations of market analysts captured by the Focus survey conducted by the Central Bank of Brazil (BCB).

This box presents a VAR model that allows the anchoring of its long-term projection in the expectations of Focus survey, thus incorporating important recent changes in the Brazilian economy.[1]

In traditional VARs, changes that affect long-run inflation behavior do not have an immediate impact on model projections. In these cases, it is necessary to wait for a significant increase in the sample so that these changes affect the unconditional inflation average and, consequently, the long-term forecasts. In addition, in an environment with more than one regime, the coefficients of VAR models reflect a mean behavior of the dynamics between the regimes of each variable.

In contrast to the inertial behavior of VARs, changes in the conduct of monetary policy or the setting of targets at values other than those usually defined can be quickly captured by the agents' expectations for long-term inflation, since those expectations tend to reflect structural changes in the level of inflation, as they are free of influence of economic cycles. Incorporating these expectations into VARs would be an effective way to improve projections in situations where there are changes in the level of endogenous variables. This guideline is present in Faust and Wright (2013), where the authors, after analyzing various approaches to inflation forecasting, report better predictive capacity in models that consider the intercept of time-varying equations and that include judgments of experts in their projections.

Regarding Brazil, the longer-term projections of the VAR models have distanced themselves from those derived from other models and analysts' expectations. Basically, projections converge in the long-run to the average of the sample period, which includes periods in which the target value was higher than the one set for 2019 and 2020 and also periods when inflation was consistently above target, although within the tolerance interval, defined in the target system in Brazil in terms of calendar-year inflation.

In order to correct this distortion, this box applies to the VAR model the shifting endpoints methodology, proposed in Kozicki and Tinsley (2012), in which the intercept of the equation describing the dynamics of inflation is time variant, given by an unobservable random walk. The estimation of the coefficients of the model and of the random walk is anchored by the restriction that, in the long run, the projections for inflation are equal to the expectations of the analysts. With this approach, two benefits are obtained: (i) the model becomes less inertial due to the introduction of analysts' long-term expectations; and (ii) the level of projections becomes adjustable over the long term.

1/ Results from the ongoing study "Anchoring long-term VAR forecasts based on survey data and state-space models", conducted by Marta Baltar Moreira Areosa and Wagner Piazza Gaglianone.

The VAR model, adjusted by the shifting endpoints, herein called VAR-SE, can be written in state-space format as:

$$X_t = AX_{t-1} + B\varepsilon_t$$

$$Y_t = CX_t + D\epsilon_t$$

where X_t is the state vector, Y_t is the observable variables vector, while ε_t and ϵ_t represent error vectors. In their turn, *A*, *B*, *C* and *D* are coefficient matrices. We have $Y_t = \left[y_t^T;\ \mathbf{1}_t;\ f_{t+H|t}\right]^T$, where $\mathbf{1}_t$ is a variable that assumes the value 1 for all t, $f_{t+H|t} = \sum_{h=H-11}^{H} E[\pi_{t+h}|\mathcal{F}_t]$ is the agents' expectation for annualized inflation H periods ahead and $y_t = \left[\pi_t;\ y_{2,t};\ \ldots;\ y_{k,t}\right]^T$ is a vector with all k endogenous variables, the first being equal to inflation. We have $X_t = \left[\tilde{x}_t^T;\ \bar{x}_t;\ \mu_t\right]^T$ being $\tilde{x}_t^T = \left[x_t^T;\ x_{t-1}^T;\ x_{t-2}^T;\ \ldots;\ x_{t-p+2}^T;\ x_{t-p+1}^T\right]$. The first k states of $\tilde{x}_t$ are equal to the endogenous variables ($x_t = y_t$) and the following, to their $p-1$ lags. The variable $\bar{x}_t$ represents a constant state and is associated to the intercept of the equations describing the dynamics of endogenous variables, except for the inflation equation, a variable for which the random walk $\mu_t = \mu_{t-1} + \varepsilon_{\mu,t}$ replaces the intercept. In addition, the constraint $f_{t+H|t} = \beta X_t = J_1 \sum_{h=H-11}^{H} A^h X_t$ completes the model description by imposing that the forecast for annualized inflation H periods ahead is equal to analysts' expectations for the same period. The vector J_1 is part of a family of selection vectors such that for all $i = 1, \ldots, k$, J_i corresponds to the i-th line of an identity matrix of dimension $kp+2$. These relationships are obtained by imposing appropriate constraints on the coefficient matrices *A*, *B*, *C* and *D*.

In order to illustrate this methodology, it is estimated, using a Kalman filter, a VAR-SE model with monthly frequency for the Brazilian economy, starting from one of the traditional VAR model specifications presented in the box "*Revisão dos Modelos de Vetores Autorregressivos com Fundamentação Econômica* – 2012" (September 2012 Inflation Report).[2] The sample covers the period from November 2001 to April 2018 (198 observations). For comparison purposes, it is also estimated an unrestricted VAR model, with the same variables and lags, as well as an autoregressive model and moving averages (ARMA)[3] for market prices inflation.

Figure 1 presents market prices inflation observed up to April 2018, as well as the projection of the three models considered, with projection horizons ranging from 1 to 48 months. The long-term 12-month inflation projections of the ARMA (6.05%) and VAR (6.32%) models are close to the annualized monthly average of 6.20%.[4] Conversely, the long-term projection of the VAR-SE model was 3.91%, that is, equal to the average projection of the Focus survey for a horizon of $H = 48$ months.[5]

Figures 2 and 3 show the Extended National Consumer Price Index (IPCA) market prices inflation and the projections of the VAR and VAR-SE models, respectively, estimated with the sample ending in five different periods, corresponding to the months of December in 2013, 2014, 2015, 2016 and 2017, with projection horizons ranging from 1 to 48 months. It is worth noting in Figure 2 that, in all cases, the long-term 12-month inflation projections for the VAR model are at a level above 6.20%, illustrating the difficulty of the traditional VAR modeling in generating long-term projections that capture recent structural changes in the dynamics of inflation. In contrast, in the case of the VAR-SE model, Figure 3 shows that the long-term projections fall as the sample incorporates a more recent period, characterized by the drop in the long-term inflation expectations of the Focus survey.

2/ VAR I model, which has, as endogenous variables, IPCA inflation – market prices, IPCA inflation – administered prices, exchange rate variation (R$/US$) and real interest rate.

3/ VAR models with two lags and ARMA(4,3) were used, according to the Akaike information criteria.

4/ ARMA and VAR models projections reach their long-term values in approximately 30 periods.

5/ The average inflation expectations (IPCA) of the Focus survey, on April 30, 2018, for 2021 and 2022 were, respectively, 3.93% and 3.86%. A linear interpolation of these values results in an inflation expectation of 3.91% for a projection horizon of 48 months.

Figure 1 – IPCA nonearmarked inflation and projections
12-month accumulated

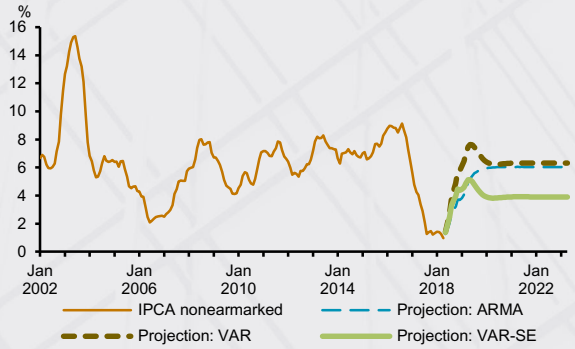


Figure 2 – IPCA nonearmarked inflation and projections using VAR model
12-month accumulated

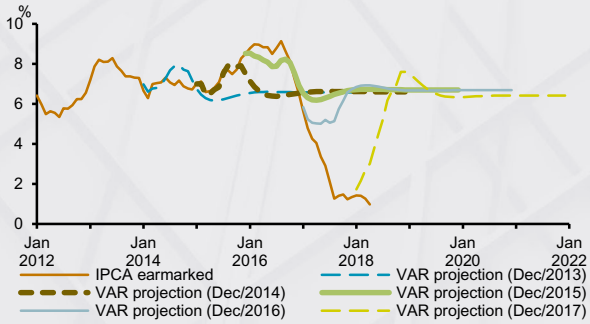
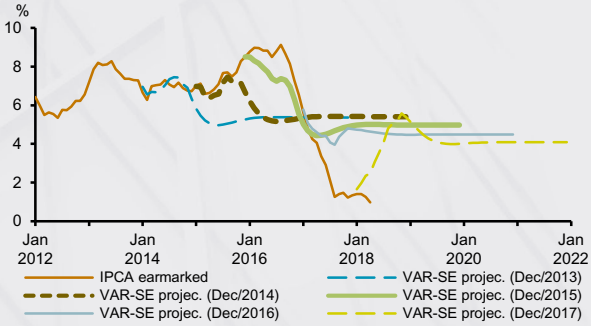


Figure 3 – IPCA nonearmarked inflation and projections using VAR-SE model
12-month accumulated



Finally, Table 1 presents the results of a projection exercise with data outside the sample[6] with recursive estimation of the three models considered. Note that, for all the projection horizons considered, the VAR-SE model presents the smallest Mean Square Error (MSE). In particular, in the comparison between the two VARs models, the unrestricted VAR model presents a MSE 23% higher than the VAR-SE model for a one year horizon (and 48% higher over a three year horizon). Finally, the predictive capacity comparison tests

Table 1 – Mean Square Error (MSE)[1/]

Projection horizon (months)	Models						Observations
	ARMA		VAR		VAR-SE		
1	0.064	**	0.056	*	0.051		59
	(0,026)		[0,086]				
3	0.104	**	0.087		0.071		57
	(0,010)		[0,397]				
6	0.134		0.121		0.104		54
	(0,295)		[0,955]				
12	0.138		0.141		0.115		48
	(0,547)		[0,728]				
24	0.146		0.149		0.117		36
	(0,288)		[0,380]				
36	0.156	***	0.162	***	0.110		24
	(0,000)		[0,001]				

1/ The MSE values are multiplied by 10,000. The p-value of the test of Diebold and Mariano (1995) is presented in parentheses and the one of the test of Clark and West (2007) in brackets. Rejection of the null hypothesis of equality of the projections of the model considered in relation to the VAR-SE at 1%, 5% and 10% of significance are represented by ***, ** and *, respectively.

6/ For on horizon projection fixed at 12 months, were assessed model projections made for the perido from May 2014 to April 2018 (48 observations).

of Diebold and Mariano (1995) and Clark and West (2007) statistically confirm the superiority of the VAR-SE model for some considered horizons.

In conclusion, this box proposes a methodology that allows to incorporate additional information in the projections of a VAR model, related to recent changes in the Brazilian economy, besides presenting better predictive capacity in comparison with the traditional VAR and an ARMA model.

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Appendix

Banco Central do Brasil Management

Monetary Policy Committee (Copom)

Banco Central do Brasil Management

Board of Governors

Ilan Goldfajn
Governor

Carlos Viana de Carvalho
Deputy Governor for Economic Policy

Carolina de Assis Barros
Deputy Governor for Administration

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

Reinaldo Le Grazie
Deputy Governor for Monetary Policy

Sidnei Corrêa Marques
Deputy Governor for Licensing and Resolution

Tiago Couto Berriel
Deputy Governor for International Affairs and Corporate Risk Management

Members of the Monetary Policy Committee (Copom)

Members

Governor
Ilan Goldfajn

Deputy Governor
Carlos Viana de Carvalho

Deputy Governor
Carolina de Assis Barros

Deputy Governor
Maurício Costa de Moura

Deputy Governor
Otávio Ribeiro Damaso

Deputy Governor
Paulo Sérgio Neves de Souza

Deputy Governor
Reinaldo Le Grazie

Deputy Governor
Sidnei Corrêa Marques

Deputy Governor
Tiago Couto Berriel

Heads of Department Participating in the Copom Meetings (Circular nr. 3,868/2017)

Department of Banking Operations and Payments System – Deban
Flávio Túlio Vilela

Department of Economics – Depec
Tulio José Lenti Maciel

Department of Foreign Reserves – Depin
Alan da Silva Andrade Mendes

International Affairs Department – Derin
João Barata Ribeiro Blanco Barroso

Open Market Operations Department – Demab
João Henrique de Paula Freitas Simão

Research Department – Depep
André Minella

Acronyms

ABCR	Brazilian Association of Highway Concessionaires
ABPO	Brazilian Corrugated Board Association
ACC	Advance on Exchange Contracts
Anfavea	National Association of Automotive Vehicle Manufacturers
ARMA	Autoregressive Moving Average
BCB	Central Bank of Brazil
BNDES	Brazilian Development Bank
Caged	General Registry of Employed and Unemployed Persons
CDCA	Agribusiness Credit Rights Certificate
CDS	Credit Default Swap
CEI	Integrated Economic Accounts
CMN	National Monetary Council
CNPJ	National Register of Legal Entities
Copom	Monetary Policy Committee
CPR	Rural Product Note
Depec	Department of Economics
Depep	Research Department
Derin	International Affairs Department
DIA	Direct Investment Abroad
DSGE	Dynamic Stochastic General Equilibrium
Dstat	Department of Statistics
Embi	Emerging Market Bond Index
FDI	Foreign Direct Investment
Fenabrave	National Federation of Automotive Vehicle Distribution
FGTS	Employment Compensation Fund
FGV	Getulio Vargas Foundation
GDP	Gross Domestic Product
GFCF	Gross Fixed Capital Formation
IBGE	Brazilian Institute of Geography and Statistics
IC-Br	Commodities Index – Brazil
ICC	Average Cost of Outstanding Loans
ICVA	Cielo Broad Retail Index
INSS	National Social Security Institute
IPA-DI	Broad Producer Price Index – Domestic Supply
IPCA	Extended National Consumer Price Index
MSE	Mean Square Error
NOAA	National Oceanic and Atmospheric Administration
Nuci	Level of Capacity Utilization
ONI	Oceanic Niño Index
ONS	National Power System Operator
p.a.	per annum

p.p.	percentage points
PIM-PF	Monthly Industrial Survey – Physical Production
PMC	Monthly Retail Trade Survey
PMS	Monthly Survey of Services
PNAD Contínua	Continuous National Household Sample Survey
PSND	Public Sector Net Debt
PTC	Credit Conditions Quarterly Survey
Selic	Special System for Clearance and Custody
SFN	National Financial System
UP	Agribusiness Receivables Certificate
USA	United States of America
VAR	Autoregressive Vector