

Financial Stability Report

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Preface

The Financial Stability Report (FSR) is a biannual publication of the Banco Central do Brasil (the Brazilian central bank, hereafter BCB) aiming to present, with a focus on systemic risk, the main results of analysis performed on the Brazilian National Financial System (hereafter, SFN), especially with respect to its recent dynamics, the prospects and the degree of resistance to shocks of the Brazilian economy or of the SFN itself. This edition focuses on the events occurred in the first half of 2016.

This English version of the report consists of three chapters. Chapter 1 – Macroeconomic and financial environment – presents an analysis of the major international markets and the effects in the domestic financial market. Chapter 2 – Financial system – provides an overview of risk exposure, profitability and solvency of institutions and conglomerates that comprise the Brazilian financial system. The chapter includes stress testing of market and credit risks and their impact on the state of solvency of the institutions. Chapter 3 – National Financial System regulation – presents the major standards approved by the National Monetary Council (hereafter, CMN) and the BCB to regulate the functioning of the SFN.

This edition includes boxes exploring the Liquidity Coverage Ratio, the Economic and financial panorama of listed companies and the Working papers that deal with financial stability.

The original version, in Portuguese, includes two other chapters, that were not translated to this English version, evaluating the functioning of the Brazilian Payment System and examining the major changes in the organization of the Brazilian Financial System. A box describing the involvement of the BCB in issues related to financial innovations is also available in the original version.

This Financial Stability Report is issued in ‘pdf’ format and is available at the electronic address <www.bcb.gov.br>. Database of the graphics and tables of Chapter 2 and other related data, including the main Financial Soundness Indicators, are available at the same electronic address.

Furthermore, aggregated time series of financial stability related metrics for the Brazilian financial institutions are available at the electronic address <<https://www3.bcb.gov.br/sgspub/localizarseries/localizarSeries.do?method=prepararTelaLocalizarSeries>>. Other individualized data related to these time series of the Brazilian financial institutions are available at the electronic address <<https://www3.bcb.gov.br/informes/relatorios?lingua=pt>>.

Executive summary

In the first half of 2016, global economic recovery remained fragile and growth forecasts were repeatedly revised downwards. Risks to financial stability in international markets are still significant. Shrinking bond yields in major advanced economies impose risks to the financial system, in special to institutions exposed to these sovereign bonds, hindering efficient asset allocation and encouraging excessive risk-taking.

Contraction in domestic economic activity persisted, reflecting the macroeconomic adjustments underway and the low confidence of economic agents, which had impacts on consumption and investment decisions and on labor and credit markets. Nevertheless, at the end of the period, the economy began to show signs that contraction cycle is nearing its end and of a gradual recovery of activity levels. Given that inflation expectations persisted at a high level, the Monetary Policy Committee (Copom) maintained the target for the Selic rate unchanged throughout the semester. Since March, due to the improvement in the international scenario and the Brazilian Real's lower volatility, Central Bank of Brazil (BCB) has reduced significantly its stock of currency swaps. In the futures market, interest rates have declined sharply, especially in longer term contracts.

The domestic financial system held sufficient liquid assets to maintain its operations during the first semester of 2016. Banks have raised their capacity to absorb short term liquidity shocks while structural liquidity risks remained unchanged, with long-term assets fully supported by sources of stable funding.

The real economy adverse scenario continues to sharply affect credit risk indicators, resulting in the maintenance of cautious credit granting policy as well as low borrower demand, both contributing to a slowdown in credit portfolio growth. Renegotiation and restructuring of loans stood high in an attempt to adjust debt service to

households and corporations' payment capacity. Non-performing loans increased along the semester, except in June, when it decreased due to relevant effects of debt restructuring, which does not allow, for now, inferences regarding trend reversion of overdue loans.

Banking system profitability has declined, reflecting the deterioration of credit portfolio quality and the following rise in loan loss provision expenses. On the other hand, banking institutions have made efforts to reduce administrative expenses and to increase the share of net incomes from fees and commissions, insurance and credit card services, among others.

Banking system solvency remained stable and sound in the first half of 2016. The system continues to surpass the required regulatory minimums even considering the Basel III stricter conditions and the economic scenario. Additionally, a leverage ratio comfortable level, well above the requirements in discussion in international forums, reinforces the financial system solvency robustness.

Stress tests outputs indicate that the banking system is able to absorb shocks from adverse macro-economic scenarios, as well as from abrupt changes in interest and exchange rates, from increase in defaults and from widespread decline in house prices, despite the increase in impacts due to materialization of risks from macroeconomic environment.

Brazilian authorities have implemented measures to improve financial system's regulatory framework, such as minimum requirements to be observed by systemically important financial institutions when developing and implementing recovery plans, as well as rules to enhance the safety and efficiency of financial institutions' transactions.

1.1 Introduction

In the first half of 2016, the global economy recovery remained fragile, with the presence of deflationary risks in important major economies. In this context, the European Central Bank (BCE) and the Bank of Japan (BoJ) strengthened the expansionary stance of their monetary policies, while the Federal Reserve (Fed), of the United States, kept the Fed Funds rate unchanged. In the financial markets there was strong increase in the volatility up to the middle of February, due to uncertainties regarding the transition in the Chinese economy, successive reductions in the expectations of global growth, fast retreat in oil prices and concerns relative to the European banking system. In the end of the semester, the risk aversion intensified after the UK decision to exit the European Union (Brexit), which negatively affected the expectations of economic growth in Europe and, specially, in that country, increasing the prospect for the maintenance of the monetary policy accommodative stance in the main developed economies. In this environment, the long-term interest rate in these economies reached the lowest values of the historical series, with the ten-year German and Japanese bonds presenting negative yields at the end of the semester.

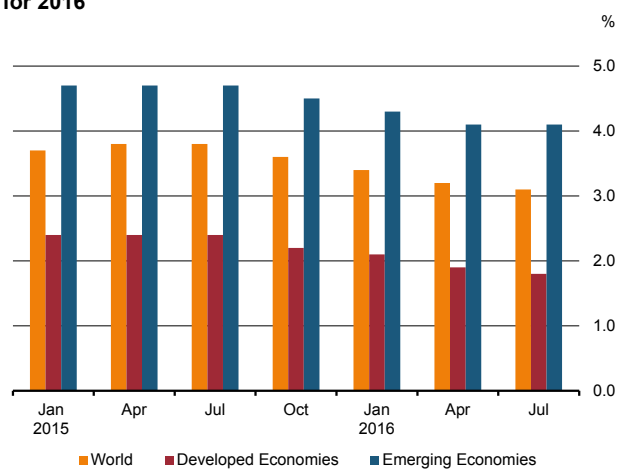
In the emerging markets, measures of incentives to investment in infrastructure and of monetary easing announced by the Chinese government, the partial recovery in the commodity prices, started in the middle of February, and the maintenance of the global monetary policy expansionary bias allowed the reduction of the sovereign risk premium in important economies, as well as the appreciation of their currencies against the US dollar.

In Brazil, the retreat in the activity level continues to reflect the ongoing macroeconomic adjustment and the consumers' and businessmen confidence at

still low levels. The external scenario contributed positively, with elevation in exports and contraction in imports. Prospectively, signs of accommodation in the contractionary trajectory and of the activity level gradual recovery emerge. Together with the prospects of progressive retreat of inflation, more favorable trajectories for the employment and income levels tend to contribute for the domestic demand recovery.

In the domestic front, in environment of high slack in the production factors and of credit contraction, the uncertainties regarding the process of implementation of the necessary adjustments in the economy prevailed. From March on, with the improvement in the external scenario and the BRL appreciation, the Banco Central do Brasil (BCB) significantly reduced the FX swap outstanding. In the conduction of the monetary policy, in light of the still elevated inflation expectations, the Monetary Policy Committee (Copom) maintained the Selic target unchanged, and, in the future market, the interest rates presented a downward trend, particularly in the longer terms.

Chart 1.2.1 – Global Economic Growth Expectations for 2016



Source: World Economic Outlook, International Monetary Fund

1.2 International macroeconomic environment

The global economic recovery remained fragile, with successive revision downwards in the 2016 growth expectations. According to the International Monetary Fund (IMF)¹, the global economy should grow by 3.1% in 2016, identical change to the one registered in 2015², with expected expansions of 1.8% for advanced economies and 4.1% for the emerging ones³. The changes in the consumer price indices remained at very low levels in the main advanced economies, with risk of deflation in the Euro Area and Japan, associated to the low figures for commodities prices, mainly oil.

The Gross Domestic Product (GDP) in the United States grew 2.6% in 2015, with expectation of 2.2% for 2016⁴. In the first two quarters of the year, the economy grew at respective annualized rates of 0.8% and 1.2%, a pace lower than the expected by the market⁵. The labor market

1/ World Economic Outlook (WEO) Update. July 2016.

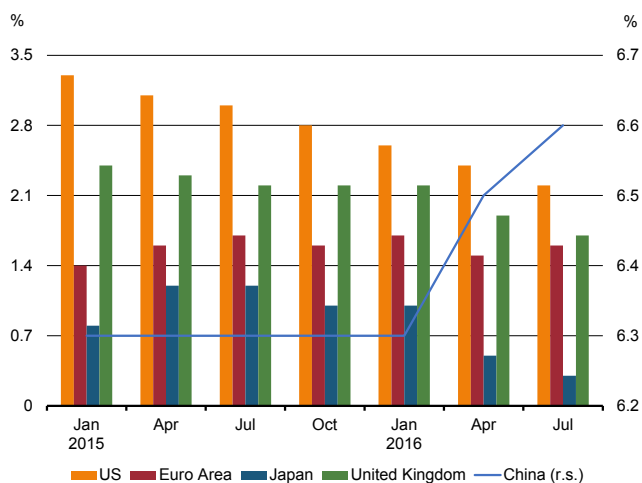
2/ The WEO reports contemplated successive revisions downwards in its estimates for the 2016 global growth, from 3.8%, at the October 2015 report, to 3.1%, in the last update (July).

3/ The last WEO update already contemplates the Brexit.

4/ WEO Update, July 2016.

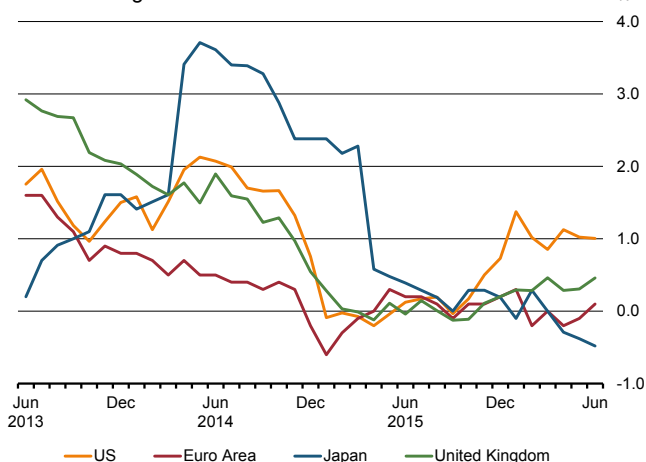
5/ The median of GDP estimates in the 2nd quarter of 2016 stood at 2.5%, according to Bloomberg.

Chart 1.2.2 – Economic Growth Expectations for 2016



Source: World Economic Outlook, International Monetary Fund

Chart 1.2.3 – Consumer Price Index Annual change



Source: Bloomberg

evolved favorably, with the unemployment retreating to 4.9% in June, despite the volatility in the job generation. In a scenario of still low inflation, the Federal Open Market Committee (FOMC) signaled that it remains waiting for more consistent signs of recovery before starting the monetary policy normalization.

In the Euro Area, GDP grew 1.7% in 2015, with expectation of 1.6% for 2016. The deflation risk remains, after retreats of the consumer price index in February, April and May, and increase of 0.1% in June. The risks for the economic growth in the region were reinforced by the uncertainties generated after the Brexit. In this scenario, the BCE deepened the accommodative stance of the monetary policy, by reducing the deposit rate to -0.40% p.y. and broadening the assets purchases program⁶. The effects of the monetary policy contributed for retreats in the long-term interest rates and for the devaluation of the euro.

Among the major developed economies, the United Kingdom was the one that grew the most in the first half of 2016, with GDP annualized quarterly expansions of 1.8% and 2.4%, in the first and second quarters⁷. The decision to exit from the European Union affected the confidence indicators and the growth expectations, which retreated from 1.9% to 1.7% for 2016 and from 2.2% to 1.3% for 2017, according to the IMF⁸. In this context, the Bank of England signaled new measures of monetary easing and the pound reached the lowest value in the last thirty years, against the US dollar.

The Japanese economy grew 0.5% in 2015 and should decelerate to 0.3% in 2016⁹, in a deflationary environment. In this context, the Bank of Japan initiated, in January, the Quantitative and Qualitative Monetary Easing Program (QQE), with negative interest rate. It bears still highlighting that, despite the accommodative monetary policy, the yen recorded significant valuation, imposing challenges to the exporter sector and to the conduction of the economic policy.

6/ Broadening of €20 billion, to €80 billion/month up to March 2017 or longer, if necessary. Additionally, in June, there was the start of purchases of private bonds of companies in the region, the Corporate Sector Purchase Program (CSPP).

7/ In 2015, the United Kingdom GDP increased 2.2%, decelerating from 3.1% in 2014.

8/ Difference between the WEO expectations released in April and July 2016.

9/ WEO Update, July 2016.

China continued the transition from an investment-intensive and exports-oriented growth model, to another pattern, based on the domestic demand and on consumption. As the reduction in investments and the deceleration of industrial activity is not totally compensated by the increase in the domestic demand, the economy continues to fade, recording expansions of 6.9% in 2015, the lowest rate since 1990, and of 6.7%, year-over-year, in each of the first two quarters of 2016. For the year, the estimate is of 6.5%¹⁰ increase. The government has sought to stimulate the economy, with investments in infrastructure, credit expansion and maintenance of the accommodative monetary stance. However, the fast credit growth and the excess of industrial capacity present risks in the medium term, adding uncertainties to the global growth, and, in particular, to the commodities prices.

Among the other emerging economies, additional retreats in the commodities prices and the normalization of the monetary policy in the US remain as main source of risks. In Latin America, GDP in the region should contract 0.4% in 2016, after null growth in 2015, reflecting, mainly, the evolution of the activity level in Brazil. In Russia, despite the recovery in the oil prices since February, the economy should retreat 1.2% in 2016, after contraction of 3.7% in 2015. India maintains the highest growth rate among the main global economies, with expectation for expansion of 7.4% in the year¹¹.

1.3 Domestic macroeconomic environment

In the first half of 2016, the Brazilian economy maintained the trajectory of contraction, still mirroring the impacts of the ongoing macroeconomic adjustment in the Country, with repercussions over the labor and credit markets, and of the unfavorable scenario of economic agents' confidence, with effects over the consumption and investment decisions.

In this context, in the first quarter of 2016, GDP retreated 0.3% relatively to the fourth quarter of 2015, when it retreated 1.3%, according to the same comparison basis. The first quarter result was the fifth consecutive quarter-over-quarter decrease, which was due, according to the supply side, to the contraction of the industrial and services output, and according to the demand side, to

10/ The same.

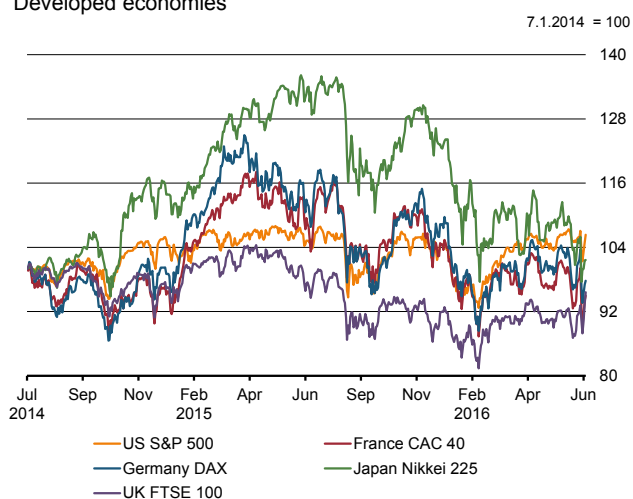
11/ The same.

the retreat in investments and household consumption. The external component continues to contribute positively, reflecting the recent performance of the domestic consumption and the lagged effects of the BRL depreciation in 2015, which implied significant imports contraction.

The GDP contraction in the first quarter of 2016 in a less intense pace than the recorded in the four previous quarters and the relatively favorable evolution of several indicators in the second quarter, including the industrial production, suggest accommodation of the decline trajectory. In the medium term, positive signs for the evolution of the economic activity emerge, among which, the gradual reversion of the negative trend of the consumers' and businessmen confidence indicators, which, among other factors, reflect the improvement in the perception associated to the implementation of adjustments in the macroeconomic policy. The inventories' adjustment, still in course in the industrial sector, and the low level of installed capacity utilization evidence the absence of restrictions, from the supply side, for the industrial activity pick-up.

However, the more consistent recovery of the economic activity remains conditioned to the improvement of the labor market conditions. According to the Continuous National Household Sample Survey (Continuous PNAD), the unemployment rate stood at 11.2% in the second quarter of 2016, the highest level of the historical series started in 2012, and the payroll contracted 0.3% in the twelve-month period ended in June. Despite the gradual pick-up of economic activity, the labor market reaction should happen with lags, with the unemployment rate remaining at a high level. The extended payroll, however, should maintain stable trajectory in the upcoming year, influenced by the expected increase for the minimum wage and by its effects over social benefits. In this context, the gradual pick-up in activity and the continuity of the ongoing disinflationary process should contribute to the moderate recovery of household consumption, favoring the domestic demand, paramount factor underpinning the activity recovery.

Chart 1.4.1 – Stocks exchanges
Developed economies

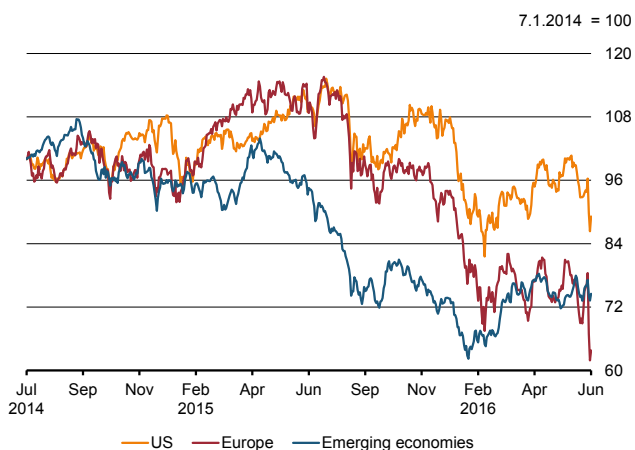


Source: Bloomberg

1.4 International financial environment

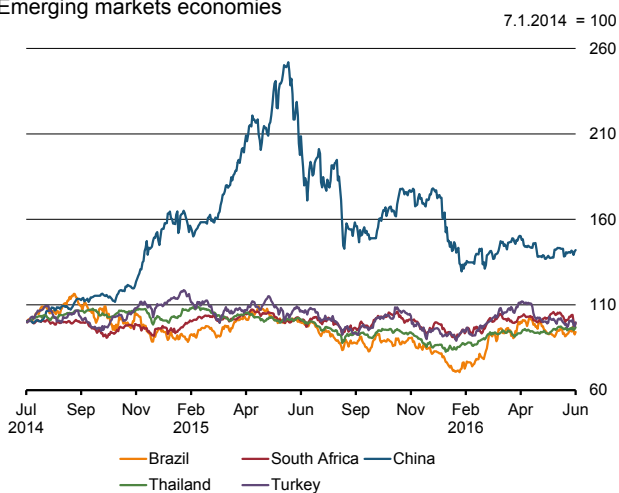
The financial markets recorded volatility episodes in the first half of 2016. Uncertainties related to the growth in China and the retreat in oil prices provoked swings

Chart 1.4.2 – MSCI Stock Index – Banks



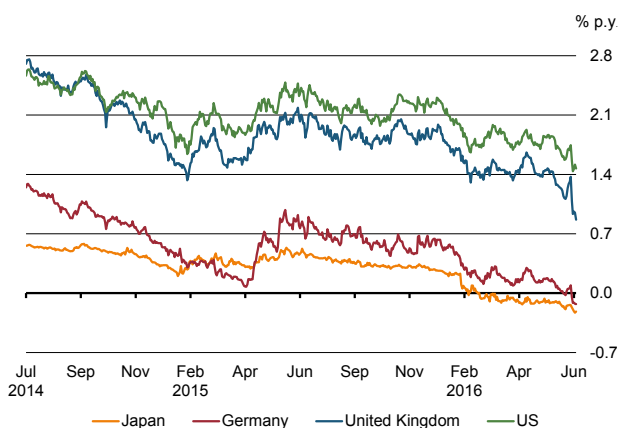
Source: Bloomberg

Chart 1.4.3 – Stocks exchanges
Emerging markets economies



Source: Bloomberg

Chart 1.4.4 – 10-Year Sovereign Yields



Source: Bloomberg

in the financial markets and strong retreat in the stocks markets at the start of the year. The uncertainty relative to the European banking system and to its capacity to honor the payments associated to the so-called Contingent Convertible Bonds (CoCo bonds) triggered sales of bonds issued by the banking sector. Bonds of the energy sector retreated significantly, in line with oil prices. Since mid-February, the energy sector presented recovery, but the bonds of the banking sector, mainly in Europe, showed lower dynamism, reflecting the moderate economic activity and the negative interest rates. The Brexit was followed by a new risk aversion movement, with higher intensity in Europe, but the signaling of additional monetary stimuli in some jurisdictions brought accommodation to the financial markets.

In the first half, the Dollar Index (Major)¹² declined 2.5%, after three consecutive semesters of positive growth, recording retreats in relation to the main currencies, with highlights for the depreciations relative to the BRL, to the yen, to the Russian ruble and to the euro¹³. In opposed sense, the US dollar strengthened in relation to the Argentine peso, to the pound sterling and to the renminbi¹⁴.

In expansionary environment, with intensification of the risk aversion, ten-year-bond annual yields of the advanced economies strongly compressed in the period, reaching the lowest values in the respective historical series. At the end of the semester, the annual yields of the US and United Kingdom bonds stood at 1.47% and 0.87%, respectively, while the bonds yields in German and Japan remained at negative levels.

However, the emerging economies, mainly the commodity exporters, were benefited by the partial recovery of those prices from mid-February on, which contributed for the reduction of the sovereign risk premium and for the strengthening of the domestic currencies.

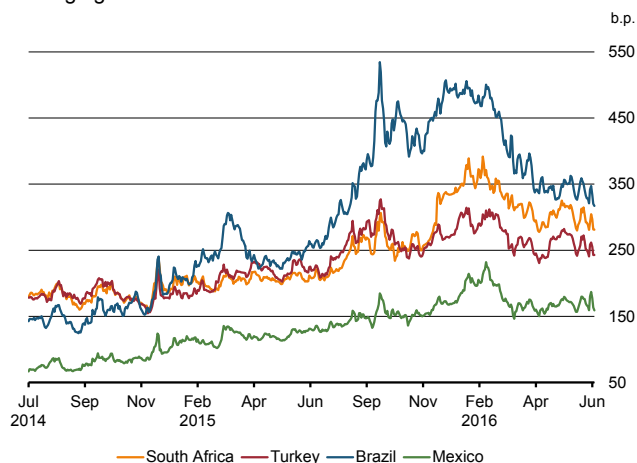
In this scenario, the risks to the financial stability remained relevant. The excessive compression of the advanced economies' bonds yields produces systemic consequences with potential difficulties for the financial system and for the insurance companies, banks and pension funds with portfolios more exposed to these

12/ The Dollar Index Major, released by the Fed, reflects the price of the US dollar weighted in relation to seven currencies traded in high liquidity markets: euro, Canadian dollar, yen, pound sterling, Swiss franc, Australian dollar and Swedish krona.

13/ In the order, 17.8%, 14.2%, 11.9% and 2.2%.

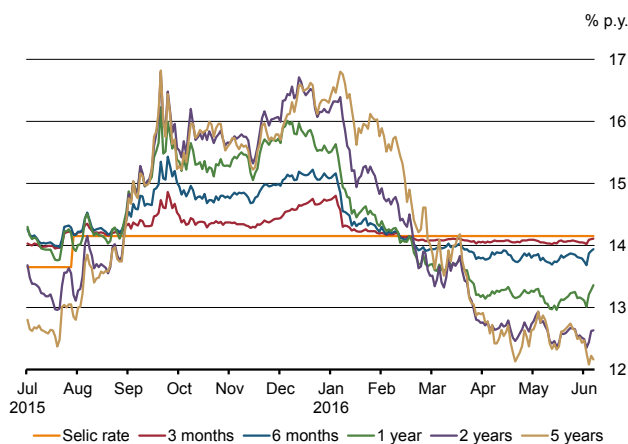
14/ Respectively, 16.3%, 10.7% and 2.4%.

Chart 1.4.5 – 5-year Sovereign CDS
Emerging markets economies



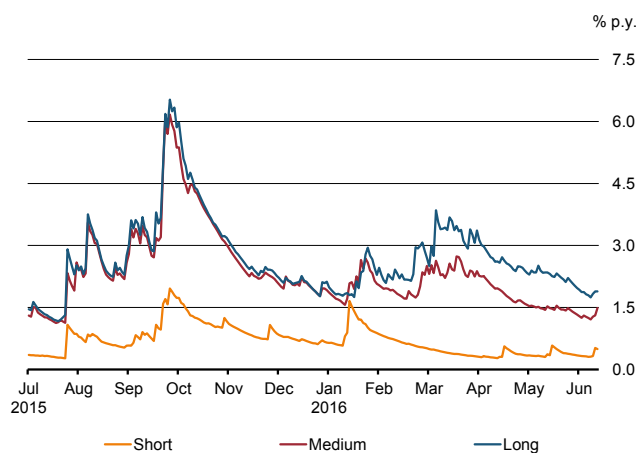
Source: Bloomberg

Chart 1.5.1 – Interest rate evolution
Selic rate and 3- and 6-month, 1-, 2- and 5-year swaps



Sources: BM&FBovespa and BCB

Chart 1.5.2 – Interest rates volatility



Sources: BM&FBovespa and BCB

bonds, in addition to producing distortions in the allocation of assets and incentive to excessive leveraging.

In the United States, despite the recent signaling, high degree of uncertainty related to the normalization of the monetary policy remains, which can cause new volatility episodes in the financial markets. In Europe, the uncertainties related to the profitability of the banking sector have increased, against the backdrop of negative interest rates and low economic growth environment. The intensification of the political risks associated to the Brexit composes the scenario, with concerns regarding the permanence of other countries in the European Union.

In the emerging markets, the foreign currency indebtedness of the corporate sector can bring difficulties under a scenario of higher volatility in the FX markets. Moreover, the commodities prices remain conditioned to the uncertainties that restrict the global demand.

1.5 National financial market

In the first half of 2016, Copom has maintained the target for the interest rate at 14.25%, the same since July 2015¹⁵. Despite the disinflation process, in June¹⁶, both the accumulated inflation in 12 months and the expectation for inflation were still above the 4.5% target set by the National Monetary Council (CMN)¹⁷. Throughout the semester, the Committee reassured it would seek to maintain inflation into the limits set by the CMN in 2016 and would take the necessary measures to ensure the convergence of inflation to the target of 4.5% in 2017.

Reversing the previous semester movement in the interest rates future market, rates, particularly longer-term ones, showed a mostly downward trend. The yield curve initially presented positive slope but since March it became negatively sloped (Chart 1.5.1). This loss in the yield curve steepness was due to external and internal factors. In the international arena, the adoption

15/ From April 2013 to July 2015, Copom implemented a monetary tightening cycle, which raised the target for Selic rate to 14.25% from 7.25%.

16/ The median of inflation expectations (IPCA) for the next twelve months (smoothed) decreased monotonically throughout the semester (to 5.89% at the end of June 2016 from 6.94% at the end of December 2015). The IPCA accumulated in 12 months fell to 8.84% in June from 10.67% in December

17/ Resolution No. 4,345 of June 25th, 2014, set the target for inflation in 2016 at 4.5% (Broad Consumer Price Index - IPCA), and the tolerance interval on 2.0 percentage points (p.p.) below and above the goal. Resolutions No. 4.419, of June 25th, 2015, and No. 4.499, of June 30th, 2016, fixed the inflation target for 2017 and 2018, respectively, at 4.5%, with a tolerance interval of 1.5 p.p. below and above the target.

Chart 1.5.3 – Exchange Rate

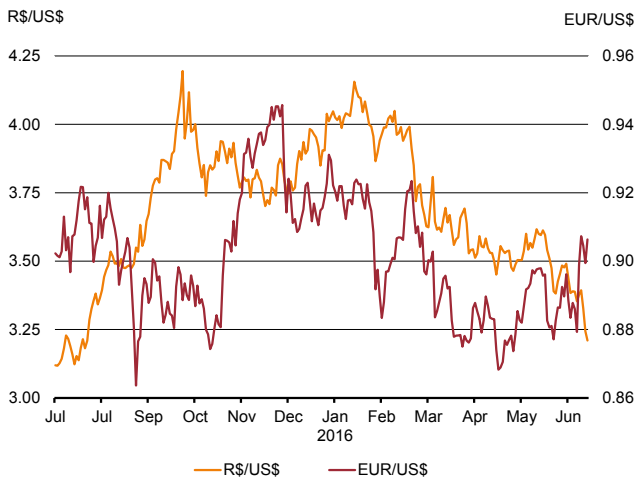
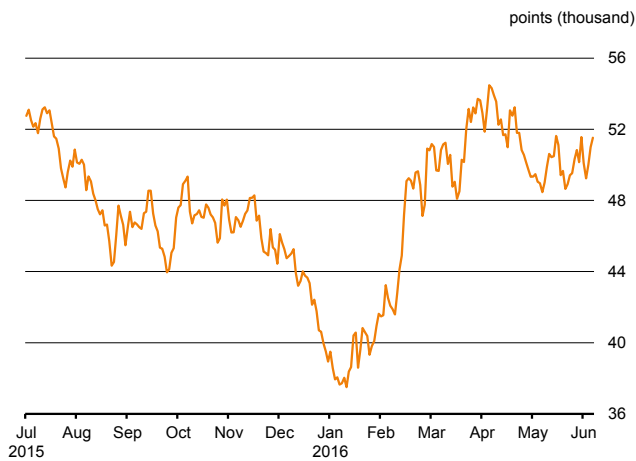


Chart 1.5.4 – Bovespa Index



Source: BM&FBovespa

of expansionary monetary policy measures by central banks of major economies prevailed; domestically, the expectations of economic agents were higher, regarding the overcoming of obstacles to the adoption of measures that would allow the recovery of the economy.

Earlier this year, the uncertainties brought about by the turbulence in FX and stock markets in China triggered a risk aversion movement around the world and a more cautious attitude on monetary policy by central banks of major economies. In this scenario, the Federal Reserve (Fed), after long preparation to unlock the monetary policy normalization process and effectively implement the first rise of interest rate in December 2015, began to indicate greater gradualism and kept its base rate unchanged throughout the first half of 2016.

Until the Copom meeting in January, interest rates in future markets pointed to the possibility of resumption of a contractionary cycle of monetary policy that eventually did not happen. The minutes of that meeting highlighted potentially external deflationary factors and an increase in idle capacity in the domestic labor market, which, together with the change in the monetary policy of the BoJ, led to a sudden revision of expectations on domestic interest rates path.

From mid-February, internal factors, economic and political, became more relevant. *Pari passu* to the deepening of the recession, the decrease in revenues worsened fiscal performance¹⁸. This fact, enhanced by non-economic uncertainties, has led to further downgrades of Brazilian sovereign rating¹⁹ and occasionally led to the rise of interest rates in longer-maturity contracts. Nevertheless, the effects of lower risk aversion on the international scene and of an appreciation of the real against the dollar prevailed and were particularly pronounced in March, which contributed to the decline of interest rates in the future markets. Shorter-term rates presented greater stability, as the monetary authority

18/ The announcements, in February, that the temporary cuts in 2016 Government Budget was postponed to the following month and that the government would send a bill to Congress easing the fiscal target of the year, ended up, in March, with the revision of the primary deficit to R\$ 96 billion in 2016. In May, the forecast for the deficit was raised, once again, to R\$ 170.5 billion.

19/ In February, S & P downgraded Brazil's sovereign credit rating to BB with negative outlook from BB+, and Moody's, which until then maintained the classification as investment grade, downgraded it two levels, to Ba2 with negative outlook from Baa3. In May, Fitch downgraded it to BB with negative outlook from BB+.

indicated that the monetary policy course²⁰ would be kept, which also influenced a reduction in rates in the medium and long terms.

By the end of April, the effects on the interest rates of the methodological review of IPCA, which raised inflation expectations for the year, were partially offset by an increase in labor market slack²¹. Market participants also mentioned developments in the political arena as factors that have influenced the behavior of rates in the interest rates future market. During the semester, the rates showed a downward trend, only interrupted on May 18 with the release of FOMC minutes. These minutes brought a positive assessment of the US economy and resulted in an increase in the Treasuries yields and in the probability that Fed would increase interest rates in June. By the end of May, the speech of Fed Chairman's reinforced that expectation.

In June, the rates resumed their downward trend due to the lower risk associated with the processing of measures for fiscal rebalancing²² and with the reversal of expectations that, in the short term, Fed would raise its basic rate. This reversal was due to the weak developments in the US labor market (May payroll) and to the proximity of the June 23 Great Britain's popular consultation on the permanence in the European Union (EU). The Treasuries rates fell, reflecting the increasingly lower probability of the Fed promoting an interest increase further in 2016. The surprise with the victory of the output of the UK from EU (Brexit) led to risk repricing in global financial markets. The possibility of central banks of major economies adopting more accommodative policies led to the perception that Brazil could attract greater capital

20/ On March 22, speaking to the Senate, the Governor of the BCB reassured he would not work with the hypothesis of an easing on monetary conditions. April's Copom minutes corroborated his speech, mentioning that there would be no room for a drop in interest rate before a significant reduction of inflation in 12 months and in future expectations. The second quarter Inflation Report further corroborated it, as it indicated that the central scenario would not work well with the hypothesis of an easing on monetary policy.

21/ The National Household Sample Survey (PNAD) Continuous, conducted by the Brazilian Institute of Geography and Statistics (IBGE), showed an increase in unemployment rate throughout the semester until April. By the end of 2015, the quarter rate ended in December was in 9.0% and gradually rose to 11.3% in June (quarter rate ended in June).

22/ The Special Committee of the House of Representatives approved the Constitutional Amendment Project (PEC) extending the untying of Union Revenues (DRU) until 2023. In mid-June, the new Minister of Finance presented tax measures, including one proposal to limit public spending growth for twenty years, which might be revised only after 9 years. In 2017, the total expenditure amount would already be equal to the 2016 total expenditure adjusted by inflation (IPCA). The Ministry of Finance and governors signed a renegotiation agreement of States debt with the federal government.

inflows, limiting any negative reaction in the domestic interest rate market soon after the vote and subsequently reducing long-term future rates.

Interest rates volatility was lower than in the previous semester. Nevertheless, for medium and long term there was a surge in volatility, especially in March and April, declining afterwards to the level of last December. The short-term volatility, except for a spike in January, continued on a downward trajectory, gradually returning to the beginning of July 2015 level (Chart 1.5.2).

For the longer term, the significant decrease in interest rates, the changes in Fed's signaling regarding the pace of the normalization of its monetary policy and the prevalence of domestic political factors have led to an increase in volatility. The expectations of the financial market and consequently the prices of financial assets reacted to the possibility of change in economic policy direction with the reformulation of government support in Congress in March and April. When the President of Brazil was temporarily absent and the Vice President assumed the position on an interim basis on 12 May²³, the market responded analogously.

The real depreciated 6.0% until January 21, when it reached R\$ 4.16/US\$. Since then it presented an appreciation trend. In the semester, the exchange rate fell 17.8% in dollars and 16.7% in euros, ending at R\$ 3.21/US\$²⁴ and R\$ 3.54/Euro (Chart 1.5.3).

The depreciation of the real at the beginning of the year was due to an unfavorable external environment that led to increased risk aversion and, internally, to a worsening of the fiscal situation and higher political uncertainties. Since then, the real showed significant appreciation as it was expected that the Fed would not change interest rates²⁵, which favored a higher propensity to risk in global markets. Internally, financial market participants

23/ On April 19th, the House of Representatives approved the admissibility of the process of impeachment of the President of the Republic and sent it to the Senate, which approved initiation of impeachment proceedings on May 12th, determining the removal of the President from office by up to 180 days for the trial. Interim President formed, then, a new ministry with a new configuration of supporting parties.

24/ Exchange rate R\$/US\$ published by the BCB (PTAX), calculated according to the methodology disclosed by Circular BCB No. 3,506, of September 23rd, 2010, and updated by Circular BCB No. 3,537, of May 25th, 2011.

25/ In May, there was a stronger dollar appreciation mainly due to FOMC minutes, which brought a positive assessment of the US economy. As a result, the likelihood of a rising in interest rates by the Fed in June increased. However, as this scenario did not happen, the real was brought back to its downward trend.

were more optimistic about the implementation of the necessary adjustments in the economy and believed that uncertainties in the domestic scene would gradually fade away. By the end of June, the expectation for the approval of measures favorable to the fiscal adjustment by Congress and the perception that the effect of the output of the UK from EU in keeping interest rates in developed economies at low levels would be long lasting boosted an appreciation of the real.

In the first two months of the year, the BCB maintained the strategy of full rollover of FX swap redemptions. Over March, however, due to more favorable market conditions²⁶, the BCB began to reduce the volume offered to rollover the FX swaps maturing on April until, in the last ten days, returned to make reverse FX swap auctions²⁷, which had not been offered since March 2013. These auctions were held until mid-May, and reduced FX swap stock at \$ 43.7 billion. In the first half of the year, the BCB carried out traditional FX swap auctions²⁸ in the notional amount equivalent to US\$ 29.3 billion (referring only to the rollover of redemptions), and reverse FX swap auctions in the notional amount equivalent to US\$ 42.8 billion. By the end of the semester BCB short net position (swap) in foreign exchange has been reduced to US\$ 62.1 billion, from US\$ 108.1 billion in December.

The balance of the FX transactions showed an outflow of US\$ 10.4 billion in the first half of 2016 and resulted from inflows of US\$ 25.4 billion in trade and outflows of US \$ 35.8 billion in financial. The net volume of direct investment in the country (IDP) was US \$ 33.8 billion from January to June. At the end of June, International reserves were at US\$ 364.2 billion, a 2.2% increase since the end of 2015.

In the stock market, the Bovespa Index of BM&FBovespa (Ibovespa) rose 18.9% in the semester (Chart 1.5.4). For most of January, however, its trajectory was downward, accumulating 13.5% losses by January 26. This was mainly due to falling oil prices and the slowdown of Chinese economy. Since then, the partial recovery of oil prices, the increasing appetite for global risk and, domestically, political developments, led to the reversal of Ibovespa²⁹ trajectory. In the first half of the year, the

26/ In March, for example, the real appreciated 11.8% against the dollar.

27/ FX swap operation in which the BCB assumes a long position on FX plus interest and short position in the domestic interest rate (Selic).

28/ FX swap operation in which the BCB assumes a short position on FX plus interest and long position in the domestic interest rate (Selic).

29/ In this context, Petrobras returned to the international market and issued in May US\$ 6.8 billion in bonds maturing in five and ten years.

net inflow of foreign investment was R\$ 12.6 billion, concentrated in March, when there was an inflow of R\$ 8.4 billion.

Throughout the semester, externally, the process of monetary policy normalization by the Fed was limited to the uncertainties in the international arena. Domestically, despite the confidence level downward trend reversal and the disinflation process in progress, inflation expectations remained high. In response to the challenges for inflation convergence, Copom maintained the target for the Selic rate unchanged throughout the semester. Interest rates in future market reacted positively to the improvement of domestic and international scenarios, especially in the intermediate and long terms, showing downward trend over the period. Due to lower uncertainties in the domestic and international fronts, the real appreciated, and the Ibovespa rose by the end of the semester.

2.1 Introduction

The domestic financial system held sufficient liquid assets to maintain its operations during the first semester of 2016. Banks have raised their capacity to absorb short-term liquidity shocks while structural liquidity risks remained unchanged, with long-term assets fully supported by stable funding.

The real economy adverse scenario continues to sharply affect credit risk indicators, resulting in a slowdown in credit portfolio growth due to both the maintenance of cautious credit granting policy and low borrower demand. Renegotiation and restructuring of loans stood high in an attempt to adjust households and corporations' debt service to their payment capacity. Non-performing loans (NPL) increased along the semester, except in June, when it decreased due to relevant effects of debt restructuring, which does not allow, for now, inferences regarding trend reversion in NPL.

Banking system profitability has declined, reflecting the deterioration of credit portfolio quality and the following rise in loan loss provision expenses. On the other hand, banking institutions have made efforts to reduce administrative expenses and to increase the share of other net income sources, such as fees and commissions, insurance and credit card services.

Banking system solvency remained stable and sound in the first half of 2016. The system continues to surpass the required regulatory minimums even considering stricter regulatory requirements as per Basel III and the adverse economic scenario. Additionally, a leverage ratio comfortable level, well above the requirements in discussion in international forums, reinforces the financial system solvency robustness.

Stress tests outputs indicate that the banking system is able to absorb shocks from adverse macroeconomic scenarios, as well as from abrupt changes in interest and exchange rates, from increase in defaults and from widespread decline in house prices, despite the increase in impacts due to materialization of risks from macroeconomic environment.

Analyses in sections 2.2 Liquidity, 2.4 Profitability, 2.5 Solvency and 2.6 Stress tests include the banking system. Development banks are not included, except in the analyses of section 2.3 Credit.

2.2 Liquidity

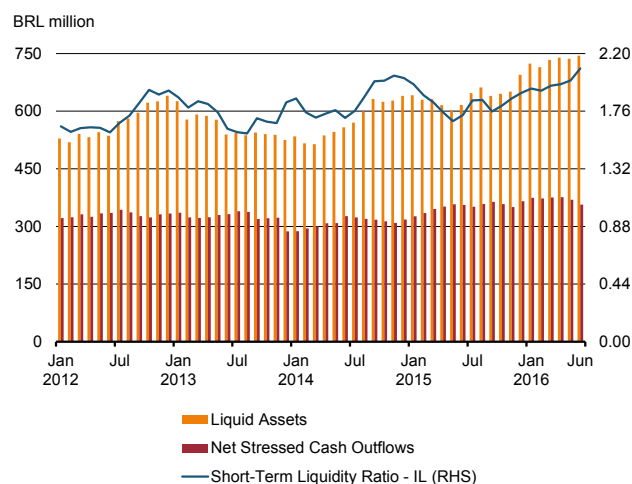
In a context of an economic slowdown and a contraction of credit to the real economy, banking system's high quality liquid assets kept growing in the first half of 2016. This additional liquidity, combined with the relative stability in banks' cash-flow needs in stress scenarios, puts the system's ability to withstand short-term liquidity shocks in historically high levels. The structural liquidity risk remained in a comfortable level, with long-term assets backed in full by stable funding.

The portfolio of Brazilian sovereign bonds (TPF) held by market participants, including those securities backing repurchase agreements, reached BRL 3.8 trillion,³⁰ a growth of BRL 242 billion almost fully owing to interest accrual. Economic agents have rebalanced their TPF portfolios as a result of both currency swaps cleared by market participants, non-residents' withdrawal from sovereign debt positions and positive inflows to investment funds, especially pension funds.

The banking system's liquid assets in domestic currency, mainly comprised of TPF, expanded by BRL 50 billion from December 2015 to June 2016, when comparing monthly averages, a 7.1% increase, slightly above the Selic rate in the period (6.7%). TPF portfolio grew mainly due to accrued interest income and to a rise in these bonds' market values resulting from a fall in long-term and medium-term interest rates.

At the same time, a reduction of BRL 9 billion, -2.4%, in the banks' estimated cash-flow needs in stressed scenarios lowered average short-term liquidity risk. The main

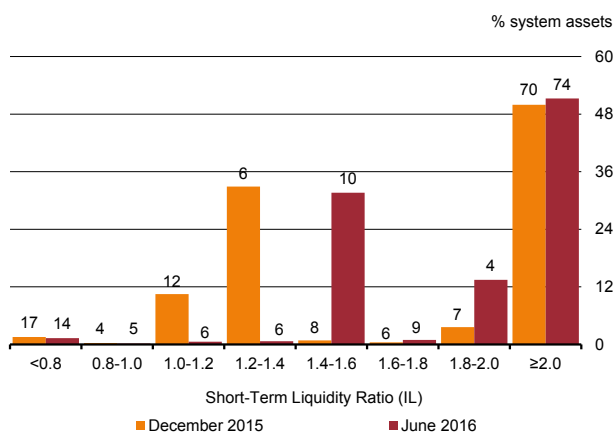
Chart 2.2.1 – Short-Term Liquidity Ratio



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^{30/} Refer to tables 3 and 15 of the monthly press release on open market conditions available at <<http://www.bcb.gov.br/htms/infecon/demab/ma201606/index.asp>>

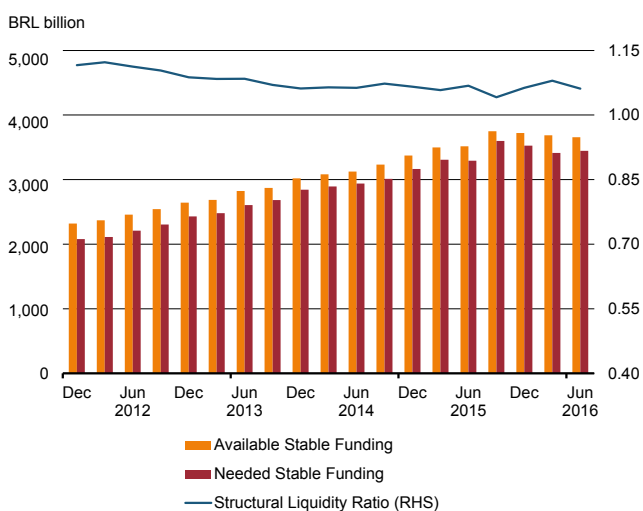
Chart 2.2.2 – IL Frequency Distribution^{1/}



1/ The numbers above the bars are the number of financial institutions with IL within the corresponding interval.

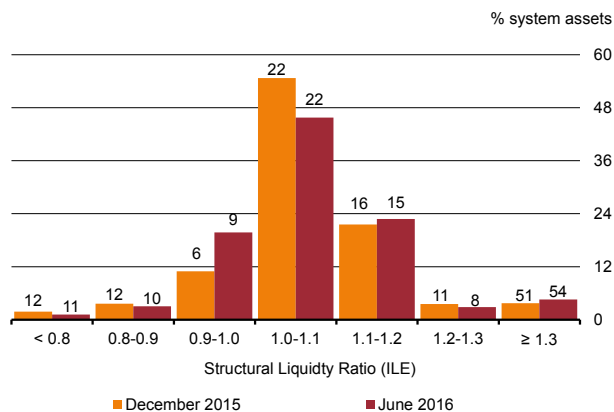
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Chart 2.2.3 – Structural Liquidity Ratio (ILE)



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Chart 2.2.4 – ILE Frequency Distribution^{1/}



1/ The numbers above the bars are the number of financial institutions with ILE within the corresponding interval.

[Database](#)

contributing factors to this drop were a reduction in the outstanding FX swaps with the BCB and the liquidation of interest rate futures, which reduced the estimated losses in positions subject to market swings in a crisis scenario. On the other hand, estimated deposit losses from a hypothetical bank run remained virtually stable when compared to those estimated at the end of 2015.

Hence, the banking system’s aggregate short-term liquidity ratio (IL)³¹ went up from 1.90, in December 2015, to 2.10, in June 2016, when it reached its maximum in the current methodology, which began in 2012 (Chart 2.2.1).

Assessing the distribution of individual institutions’ liquidity risks, there were an improvement in the ratios of larger-sized institutions and a small reduction in the number of banks with IL below 1.00 (Chart 2.2.2). In the first half of 2016, there was a positive move of institutions towards the 1.4-1.6 and 1.8-2.0 intervals. The number of banks most exposed to short-term liquidity risk (IL below 1.00) fell to 19, accounting for a negligible portion of banking system’s total assets.

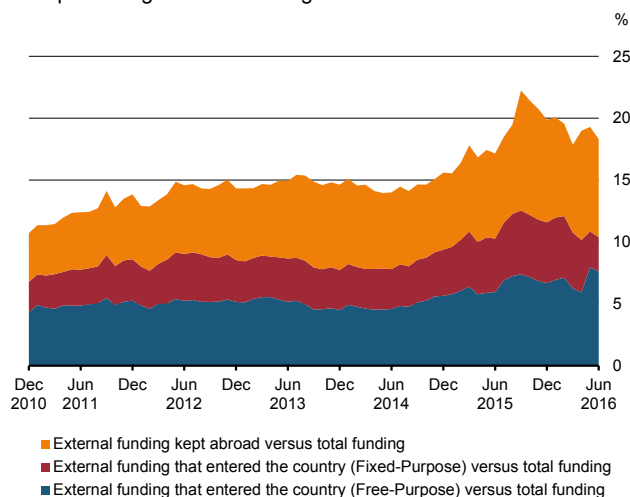
Brazil’s banking system has enough stable funding to finance its long-term operations. The system’s aggregate structural liquidity remained stable, as measured by the Structural Liquidity Ratio (ILE)³², which rose slightly along the first half of 2016 and closed the semester in 1.06, the same level as December 2015 (Chart 2.2.3). In the first half of 2016, the stock of stable funding showed a slight drop of 1.7%, BRL 67 billion, as a result of a fall in liabilities maturing over one year, especially offshore. On the other hand, there was a reduction of 2.2%, BRL 82 billion, in long-term assets, as a result of an increase in the share of loans with short-term maturities (below one year) in the credit portfolio.

An analysis of the dispersion of individual institutions’ ILEs shows that most large institutions have ILEs slightly above 1.00, while less representative institutions have more dispersed ratios (Chart 2.2.4). Some of the changes from the previous semester are due to institutions very close to the bounds of each interval in the chart. The changes observed in intervals 0.9-1.0 and 1.0-1.1, for

31/ IL measures whether banks have enough liquid assets to cover their short-term cash-flow needs in a simulated stress scenario. Institutions with IL above 1 have enough liquid assets for such scenarios. For further calculation details, please refer to annex Concepts and methodologies, item *a*.

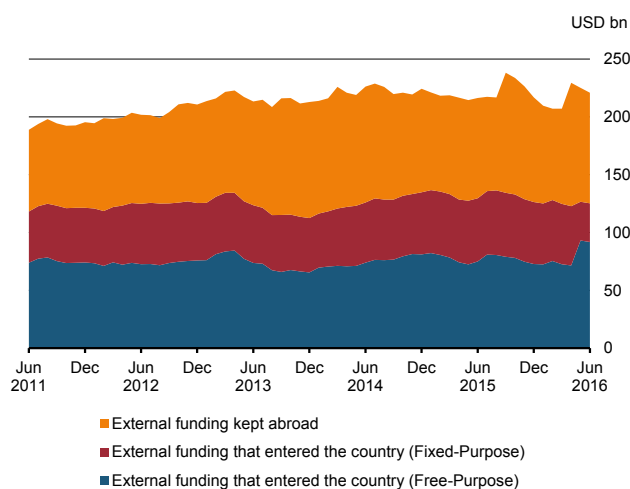
32/ The ILE measures whether banks have properly stable funding sources to finance their long-term operations. Institutions with ILE above 1 are less vulnerable to liquidity problems. For further calculation details, please refer to the annex Concepts and methodologies, item *b*.

Chart 2.2.5 – Profile of external funding
As a percentage of total funding



[Database](#)

Chart 2.2.6 – Profile of external funding



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example, are due to a small 5 bps drop in the ratio of a single large institution. Financial institutions with ILE equal or higher than 1.00 held 76% of the system's assets in June compared to 84% at end the end of 2015.

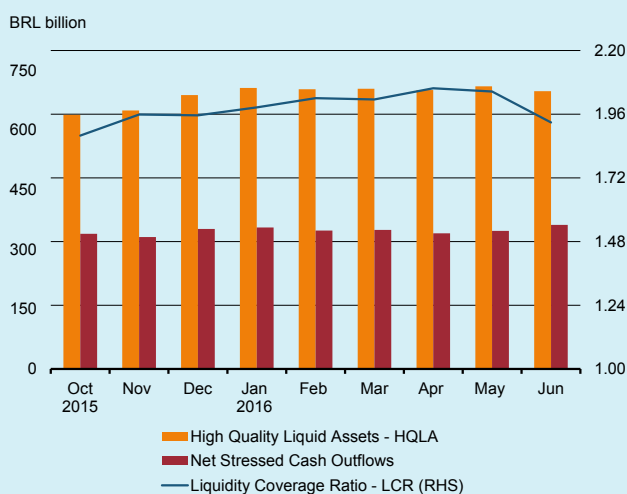
Dependence on external funding remains low. In the first half of 2016, the outstanding positions, expressed in Reais (BRL), show a reduction in the share of external funding due to the appreciation of the Real, partially reversing the nominal growth observed in 2014 and 2015, due to the devaluation of 47% of the currency against the US dollar (USD) in these two years (Chart 2.2.5).

Nevertheless, when this foreign dependence is analyzed in the original currencies, there is a relative stability in the stock of foreign funding that entered the country (funding for domestic utilization). There was an increase in the foreign funding kept abroad due to the acquisition of a Chilean bank by Itaú Unibanco. A similar situation occurred in the second half of 2015, with the acquisition of a Swiss bank by BTG Pactual.

In May 2016, the reclassification, by one bank, of its fixed-purpose lines of credit (trade finance lines and lines for same-condition on-lending) to free-purpose lines of credit had an impact in the composition of the stock of funding that entered the country, not altering, however, its total amount (Chart 2.2.6).

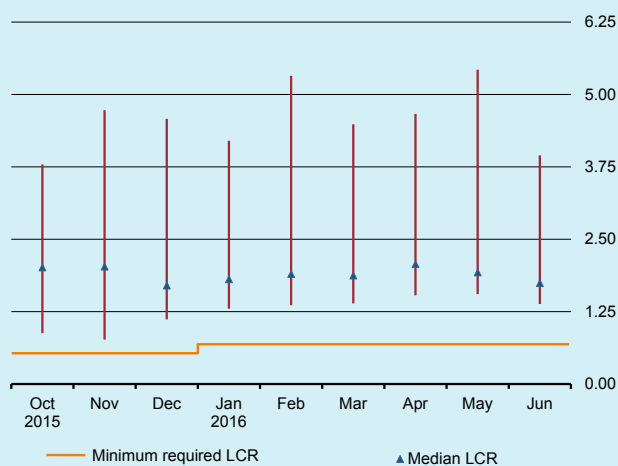
Liquidity Coverage Ratio¹

Chart 1 – Liquidity Coverage Ratio (LCR)



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Chart 2 – LCR: Median, Low and High



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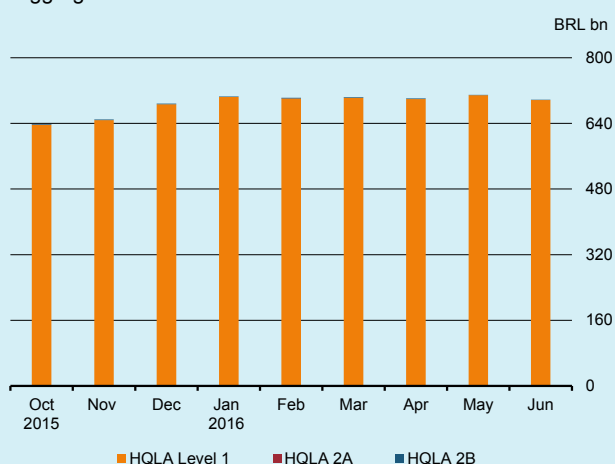
In the process of aligning domestic regulation to the new Basel recommendations, starting in October 2015, banks with total assets above BRL 100 billion are required to report their liquidity coverage ratio (LCR) to the BCB on a monthly basis. In order to comply with LCR regulation, financial institutions must maintain enough high-quality liquid assets to withstand cash outflows for 30 days, in a stress scenario defined by the local banking supervisor.

In accordance with the schedule put forth by the Resolution 4,401, from February 27, 2015, the minimum required LCR went into effect as 60% and rose to 70% in January 2016. Every January until 2019, there will be 10 p.p. yearly hikes, plateauing on a 100% required level. Ever since these minimums came into effect, none of the nine institutions subject to the regulation has presented ratios below the established minimum.

The aggregate LCR for this group of banks was 1.93 in June 2016, with no individual bank below 1.3, which shows that these institutions have a considerable slack in liquid assets to withstand the Basel III standardized stress scenario (Chart 2). Hence, this conclusion corroborates previous assessments of short-term liquidity adequacy conducted by the BCB using the locally-developed Short-term Liquidity Ratio (IL)².

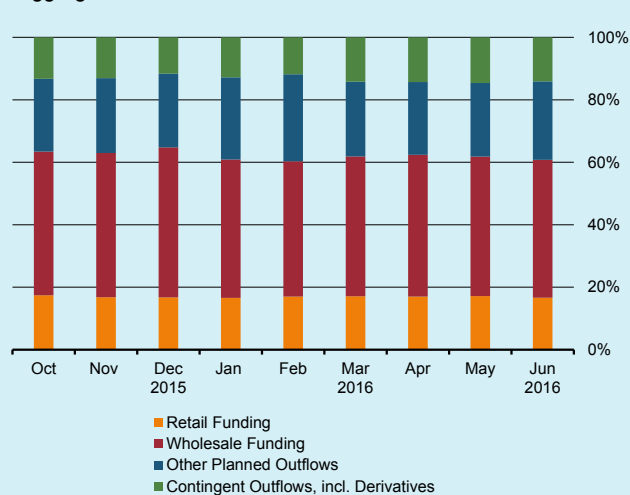
1/ The LCR is the ratio between the stock of high-quality liquid assets (HQLA) and the net cash outflows (outflows minus inflows) forecasted for a 30-day period, adjusted for a stress scenario. The specifications about the LCR minimum requirement can be found in Resolution 4,401, from 2015, with calculation methodology defined by Circular BCB 3,749, from March 5, 2015.
 2/ The LCR calculations take into account exposures both in Brazil and in the offshore subsidiaries, in the various currencies in which those may be denominated, unlike the IL, which monitors only exposures in Brazil and in local currency. Furthermore, the IL is calculated for all banks and banking conglomerates operating in Brazil.

Chart 3 – HQLA by quality level
Aggregate of banks with assets > BRL 100 bn



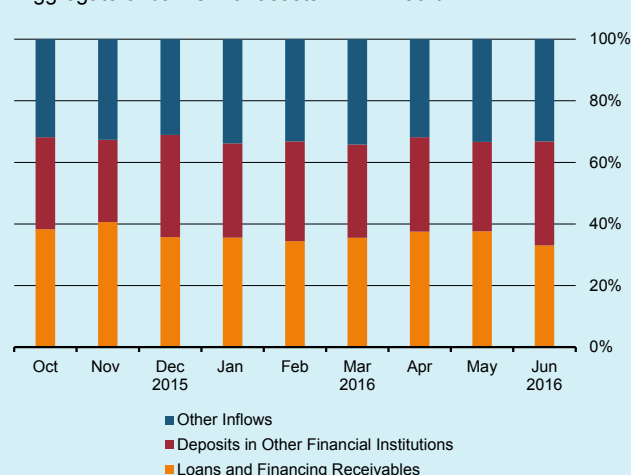
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Chart 4 – Composition of net stressed outflows
Aggregate of banks with assets > BRL 100 bn



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Chart 5 – Composition of cash inflows
Aggregate of banks with assets > BRL 100 bn



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Despite the recent process of internationalization of some domestic banks, the ratio breakdown shows that, generally, the exposure to liquidity risk by foreign subsidiaries is very low when compared to the risk taken by their domestic activities. In June 2016, 5% of the total stock of high quality liquid assets (HQLA) was held by subsidiaries, and these accounted for 6% of net cash outflows.

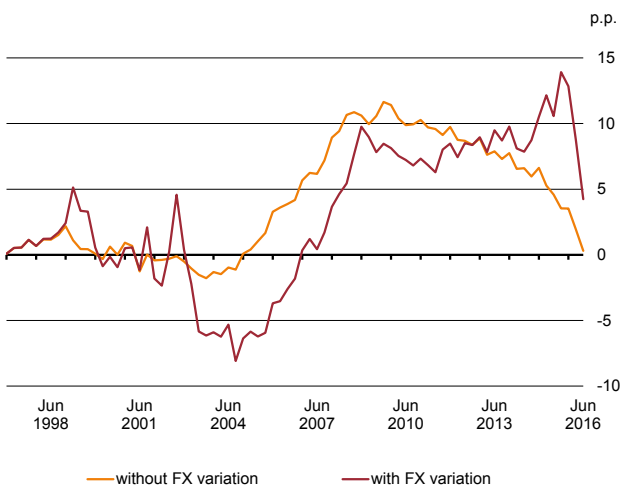
In terms of the quality of the liquidity buffer, 99.9% of the HQLA is comprised of instruments defined as “Level 1” in the LCR regulation, i.e., those which can be most quickly converted into cash during a stress event.

The LCR methodology considers wholesale funding (medium and large companies, institutional investors, other financial institutions), callable or maturing in up to 30 days as the main source of banks’ liquidity risk, because these liabilities are deemed to have a high probability of withdrawal in crisis situations. These liabilities accounted for 44% of total cash outflows in the LCR calculation in 1H2016.

An important source of cash inflows assumed by the LCR calculations is the partial retention of receivables from a bank’s credit portfolio. There is an assumption of a 50% retention rate of the projected inflow from fully-performing loans to be due in the considered time horizon. Deposits in other institutions which are callable within 30 days also represent relevant reserves in order to meet possible cash-flow needs, of which deposits in US dollars in offshore banks are the foremost example.

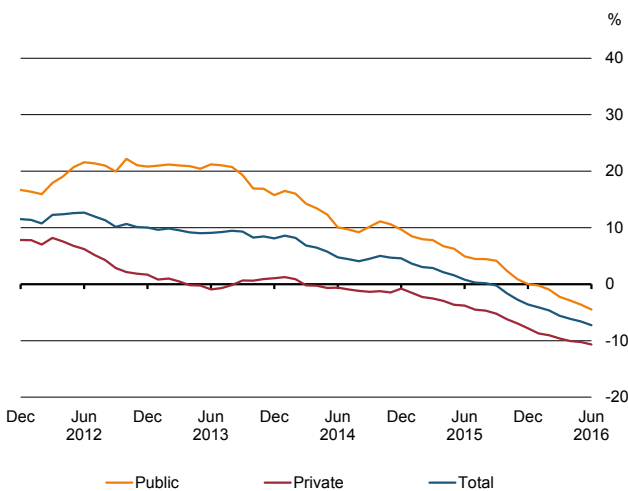
2.3 Credit

Chart 2.3.1 – Credit/GDP GAP



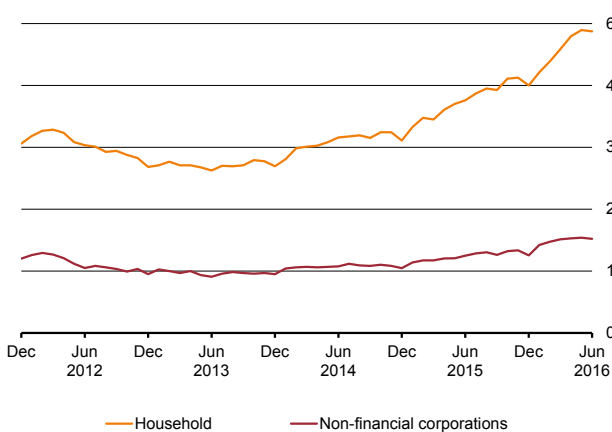
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Chart 2.3.2 – YoY real credit growth – by ownership



[Database](#)

Chart 2.3.3 – Spread evolution
Household and Non-financial corporations
non-earmarked loans



[Database](#)

The adverse domestic economic scenario continued to sharply affect credit indicators in the last semester, resulting in continued caution in credit granting policy as well as in low borrowers' demand, both leading to a slowdown of credit portfolio growth.

Outstanding credit metrics showed downward trends on short and long run trends. On the one hand, in a long run perspective, the steep slowdown occurred in the Credit-to-GDP Gap³³ – which relates a broader credit measure, rather than only bank loans, with the real economic growth – throughout the semester materializes the dimension of the contraction (Chart 2.3.1).

On the other hand, in a shorter and narrower perspective than the Credit-to-GDP Gap, credit outstanding³⁴ continued its downward trend, with a 1.0% YoY nominal growth and a 7.2% decrease in real terms (Chart 2.3.2). Loans shrank 2.8% in nominal terms in the first half of 2016.

Loan portfolios held by private-controlled banks have been growing less than those held by public banks³⁵ in the last three years. In this semester, once again, private banks' deceleration was more pronounced than state-owned ones regarding credit growth, thus resulting in an increase of state-owned banks' share in total loans from 55.8% in December 2015 to 56.6% in June 2016.

33/ Credit-to-GDP Gap is defined as the difference between the broad Credit-to-GDP ratio and its long-term trend. Broad credit includes not only domestic loans granted by the financial system but also households and corporate debt borrowed abroad and in the capital markets. This measure seeks to assess, in a long-term perspective, if the broad credit growth rate is compatible with the real economy growth rate. Long periods of excessive credit growth, continuously over GDP growth may indicate the formation of credit bubbles. In Brazil, the BCB monitors two measures of Credit-to-GDP Gap, one which considers currency appreciation/depreciation in foreign-currency-denominated loans, and another one which eliminates the impact of exchange rate fluctuations in these loans when reported in Brazilian Reals. The first measure is heavily influenced by the inertial increase of foreign-currency-denominated debt in exchange devaluation times and therefore is not actually representing new loans to corporates and households. The second measure shows more precisely the portfolio growth due to loans effectively granted to the economy. For further analysis about the Credit-to-GDP Gap, please read the Box "Countercyclical Additional Principal Capital" in the Financial Stability Report issued in April 2016.

34/ Loans granted by financial institutions in Brazil (not including branches and subsidiaries of Brazilian banks abroad), mostly to local borrowers. Some specific loans are made to borrowers located abroad. Financial institutions are savings and loans associations, commercial banks, exchange banks, development banks, investment banks, universal banks, savings banks, mortgage companies, leasing companies, credit, consumer finance companies and real estate credit companies. For more details, see Concepts and methodology, item c.

35/ "Public banks" and "state-owned banks" are used in this report as synonyms.

Chart 2.3.4 – NPL by ownership

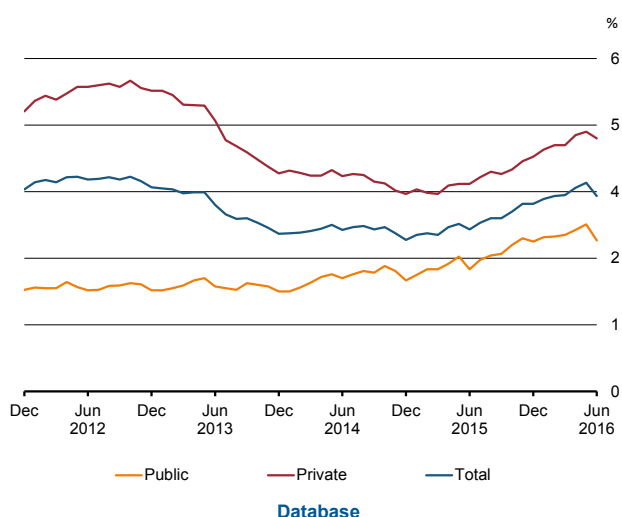


Chart 2.3.5 – Renegotiated and restructured debt

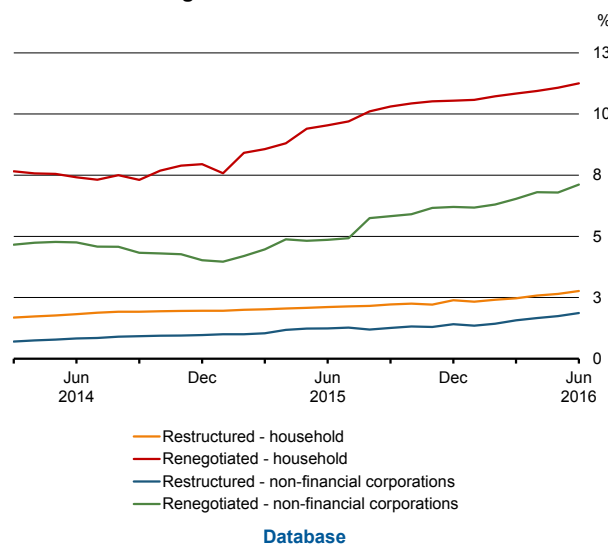
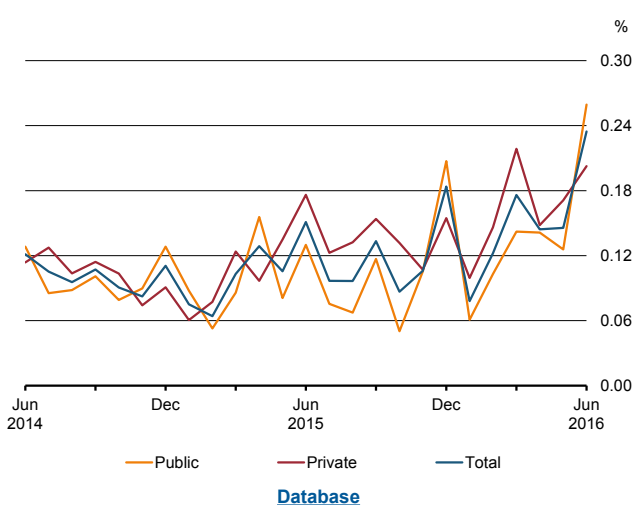


Chart 2.3.6 – Monthly flow of restructured loans in relation to total loans



In response to a riskier environment, banks have been hiking spreads³⁶ charged on new non-earmarked loans (Chart 2.3.3). This increase is mainly due to the new unsecured (i.e. not backed up by any collateral) loans granted to households (overdraft, personal credit and revolving credit card), indicating a deterioration in lenders' risk assessment due to both the rise in unemployment rates and the decrease in income.

Non-performing loans (NPL)³⁷ increased in the last semester to 3.5%, despite a short fall in June (Chart 2.3.4). In addition, NPL evolution does not necessarily mean an improvement in credit portfolio risk profile, once the preventive renegotiation³⁸ and the restructuring³⁹ of past due loans remained high in the semester (Chart 2.3.5). Despite their effects on NPL ratio, debt renegotiation and restructuring are measures taken so as to adjust households and corporations' debt service to their payment capacity.

Additionally, in most cases, NPL decrease at the end of semesters is not maintained in subsequent months. Last June, this decrease was even greater than in previous semesters. Chart 2.3.6 shows that debt restructuring monthly flow was more intense in the first half of 2016 than in previous periods, in both state-owned and private-owned banks. Moreover, in June 2016 there was a debt restructuring peak in both segments,

36/ Time Series Management System (SGS); series # 20,787 and 20,809.

37/ All references to NPL in this report follow the concept of credits of 90 days past due.

38/ According to the concept presented in the previous Financial Stability Report, for the purpose of monitoring the credit market, the broad definition of renegotiation includes both commercial renegotiation and restructuring. On the one hand, commercial renegotiation occurs when new loan conditions (interest rates, terms) are similar to other loans granted by the financial market. For instance, a new payroll-deducted personal loan granted with an extended term or a deducted interest rate as long as these special conditions are similar to normal market conditions is considered as a commercial renegotiation. On the other hand, restructuring occurs when the financial institution accepts special conditions due to the borrower's incapacity to pay. Financial institutions shall report data on both renegotiations and restructuring to the SCR (Credit Risk Bureau) in compliance with the concept issued by Resolution 2,682 of December, 21, 1999 (art. 8, paragraph 3). This concept implies that renegotiations reported in SCR should follow the broad concept, including both strictly commercial renegotiation and restructuring.

39/ Debt restructuring is a subset of *lato sensu* renegotiation, but not the same as the commercial renegotiation. Debt restructuring is any form of renegotiation in which the borrower faces difficulty to pay and the financial institution eases payment conditions of a loan in order to reduce its loss. Restructuring transactions are estimated by an algorithm, which identifies those non-performing loans converted back to performing status without past due debt being fully paid. Renegotiation and restructuring in this report are different from those released by the "Monetary Policy and Financial System Credit Operations" Press Release (<http://www.bcb.gov.br/en/#/n/PRESS>) and on the Time Series Management System (SGS): series # 20,575 – "Nonearmarked credit operations outstanding – Households – Personal credit – renegotiation".

Chart 2.3.7 – 15-90 days past due loans by ownership

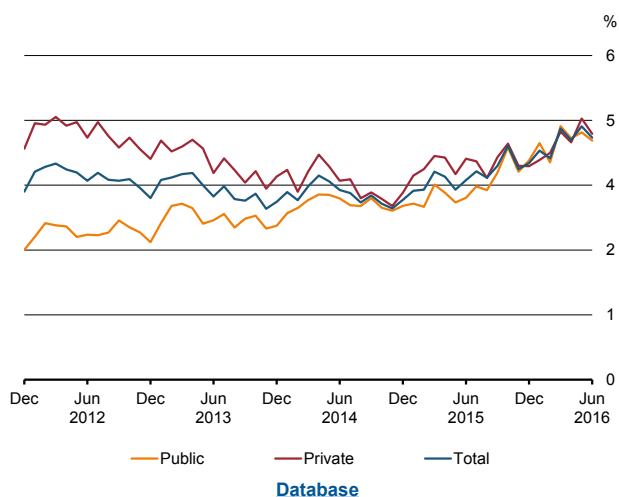


Chart 2.3.8 – NPL Coverage Index – by ownership

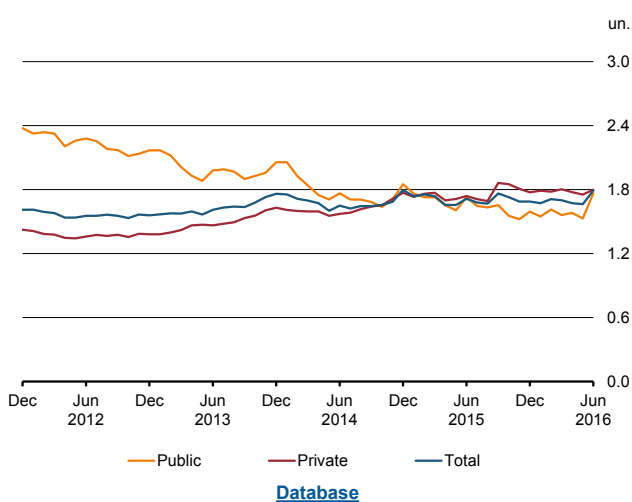
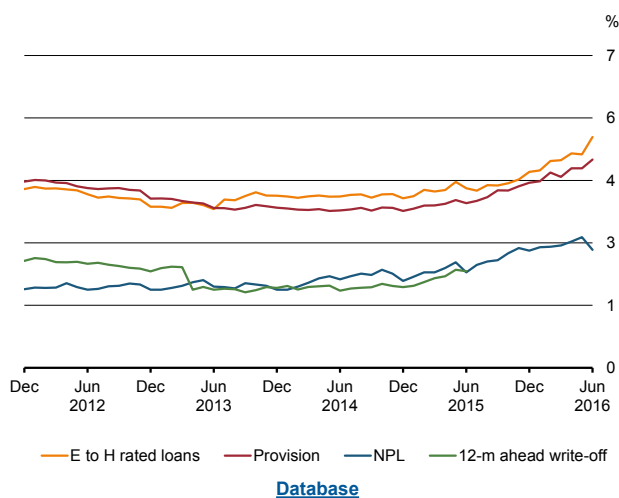


Chart 2.3.9 – NPL, provision and 12-m ahead write-off Public



contributing to the NPL reduction in the end of semester. If restructured debt were to be considered in the NPL ratio, there would be an increase of 0.9 p.p. in the semester, representing 4.4% of total loans⁴⁰.

Loans past due from 15 to 90 days (Chart 2.3.7), which is a NPL leading indicator, registered an upward trend in the first half of 2016, with 0.5 p.p. increase over the previous six months. Traditionally, this indicator increases more in the first quarter due to seasonal expenditures (taxes, school supplies, etc.), with subsequent reduction. However, in 2016, there was an even greater increase and no subsequent reduction as compared to 2015.

The NPL Coverage Index (NCI) showed an increase in the loan loss provision (LLP) as a share of NPL, to 1.79⁴¹, to face the increased credit risk in the first half of 2016. There were no significant differences between public and private banks at the end of the period (Chart 2.3.8). Even after adjusting the NPL, by adding restructured debt, provisions continue to exceed NPL figures, resulting in a 1.44 NCI.

The NCI remains adequate, both in the public and private banks. The relation between NPL ratios and 12-month-ahead write-offs endorse this assessment; so does the stability of the ratio between provisions and riskier loans portfolio, composed by loans rated from E to H⁴². Loans rated from E to H risk levels are not only overdue loans (90 days past due), but also those assessed at higher risks, which demonstrates that provisioning increases according to the financial institution's credit risk perception (Charts 2.3.9 and 2.3.10).

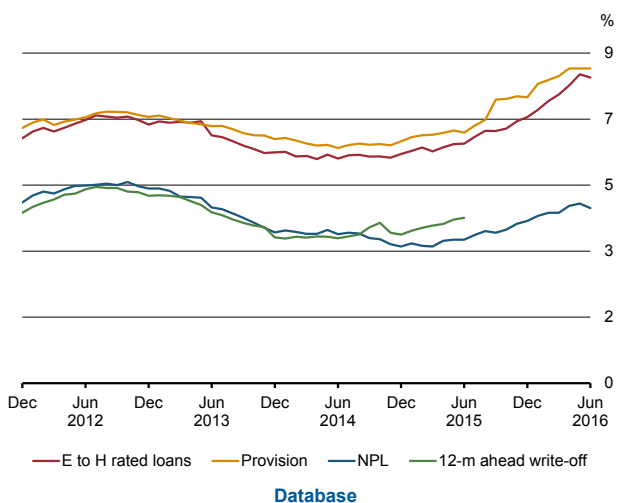
The dispersion of NCI shows that most banks have provisions at least 30% higher than the NPL. These banks hold more than 90% of financial system credit outstanding in June 2016. In addition, financial institutions with NCI below 1.0 represent only 5% of financial system total loans (Chart 2.3.11).

40/ To implement such an adjustment to NPL ratio, all restructured loans in the last 12 months are added to the indicator. Having a good performance for 12 months (without other restructuring), these loans are considered cured and, therefore, finally deducted from the NPL.

41/ An NCI of 1.79 means that loan-loss provisions are 79% higher than the amount of NPL.

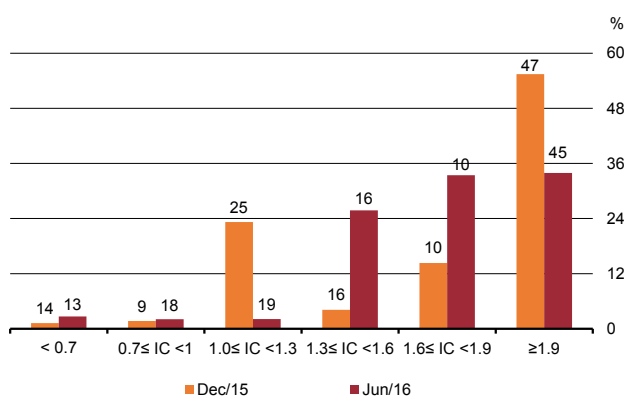
42/ Brazilian credit risk rating system, established by Resolution 2,682 in 1999, has a nine-level rating scale based on expected credit losses associated with minimum provisions for each rating. For instance, an expected loss of 30% on the loan outstanding amount implies a rating level E and 30% of LLP. Ratings E to H refers to credit operations which expected losses and correspondent provisions are on a range between 30% and 100% of outstanding amount.

Chart 2.3.10 – NPL, provision and 12-m ahead write-off Private



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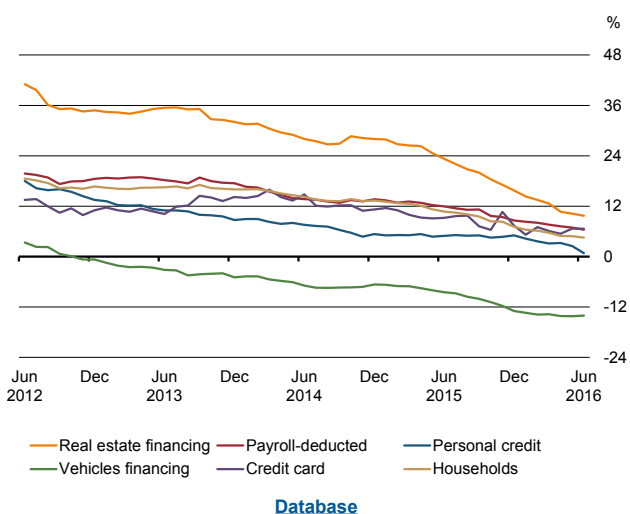
Chart 2.3.11 – Frequency distribution for the NPL Coverage Index^{1/}



1/ The bars indicate the representativeness in the portfolio, and the values on the bars refer to the number of financial institutions with NPL Coverage Index in that range.

[Database](#)

Chart 2.3.12 – YoY credit growth Main household modalities



[Database](#)

Regarding household credit, the rise in unemployment and the decline in income contributed to the deterioration in households' debt payment capacity. This scenario affected banks' credit portfolio quality and credit risk management policies, leading them to actions such as preventive loan renegotiations and also restructuring past due loans.

Household debt service ratio (HDSR)⁴³ rose by 1.57 p.p. in the semester, reaching 22.71%, mainly due to the increase in the debt service interest and the drop in the average real income of workers – 3.9% in June 2016. This was the sharpest fall since this rate started to be measured in March 2012 (data from Continuous PNAD of IBGE). Since 2015, increasing interest rates have been raising the weight of interest payment in HSDR composition, while reducing principal amortization.

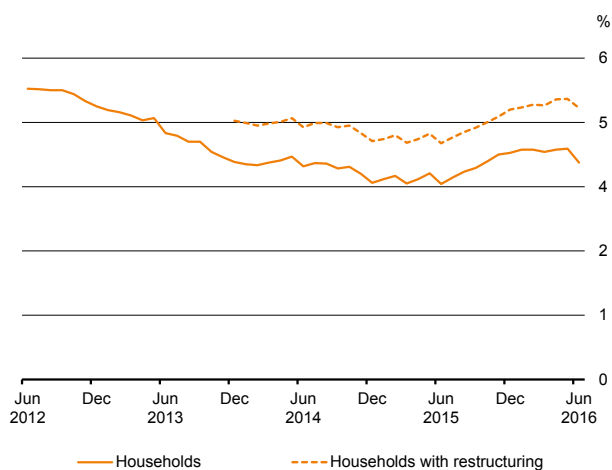
The harsh scenario, characterized by decreasing household income and rising unemployment and interest rates, contributed to the slowdown of household credit portfolio growth (Chart 2.3.12). Such deceleration in the semester was stronger in real estate financing, which was also driven by the reduction in the savings deposits balance – the major source of funding for this modality of credit – and by the more conservative lending standards applied by the financial institutions since 2015. This latter change affected, among other aspects, the loan-to-value (LTV) ratio. As a result, the average LTV of new earmarked loans granted to real estate financing (Housing Financial System – SFH) fell from 71.6% in January 2015 to 64.7% in June 2016.

As for the household credit portfolio, NPL ratio rose steadily in the first five months of 2016, but fell down sharply in June, reaching 4.1%. The NPL adjustment brought by the restructured loans rose from 0.8 p.p. in December 2015 to 1.0 p.p. in June 2016, highlighting the rising amount of loans owed by borrowers in poor financial conditions (Chart 2.3.13).

The monthly flow of restructured debt has been growing since the last quarter of 2015 and reached its peak in June 2016. Debt restructuring is a practice that has been adopted in all credit modalities, but more often in real estate financing (Chart 2.3.14). The credit modalities that showed the highest growth both in non-performing and restructured loans in the semester are vehicles financing, credit card and real estate financing, reflecting the harsh

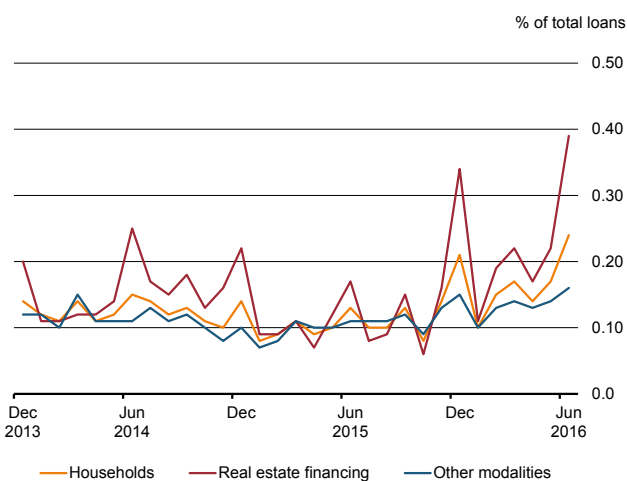
43/ Time Series Management System; series 19879, 19880 and 19881.

Chart 2.3.13 – 90-days past due
Households



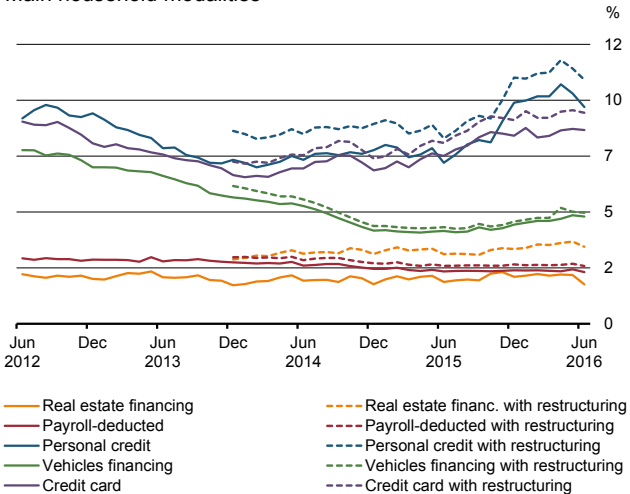
[Database](#)

Chart 2.3.14 – Monthly flow of restructured loans
Households



[Database](#)

Chart 2.3.15 – 90-days past due
Main household modalities



[Database](#)

economic environment and the adverse conditions in the labor market (Chart 2.3.15).

On the other hand, there was an improvement in the payroll-deducted personal loans portfolio, whose NPL ratio decreased slightly in the semester. This credit modality is less affected by the economic conditions, especially concerning the employment level, as it is mainly granted (93.6%) to retirees and civil servants, despite the recent difficulties faced by some Brazilian states and municipalities in paying their employees and transferring to the financial institutions the payroll-deducted resources.

Regarding loans to non-financial corporations, their financial situation and the low levels of economic activity, as well as the adoption of stricter lending standards by financial institutions, resulted in slower YoY growth of outstanding credit to this sector. As for Small and Medium Enterprises (SMEs)⁴⁴, the credit contraction highlighted on the previous Financial Stability Report intensified in the semester (Chart 2.3.16), both in private and public banks. In the former, portfolio has been shrinking since May 2014; in the latter, since October 2015.

Loans to corporations increased only in public institutions, since in private banks they decreased on a YoY basis. Despite credit portfolio's loss of dynamism becoming evident on nominal growth data only recently, this situation was already materializing during 2015, as evidenced by purging the exchange rate variation from the foreign-currency-denominated credit portfolio⁴⁵ (Chart 2.3.17).

Corporations' NPL rose considerably in the semester, closing at 3.0%. Considering the debt restructuring adjustment, this indicator would increase further 0.7 pp, reaching 3.7%. Besides NPL ratio, the record amount of judicial recovery requests must be highlighted (Chart 2.3.18). In spite of such credits not being considered past due by rule of law, and thus not being formally computed as NPL, financial system provisioning for this portfolio is significant, being approximately 60%.

44/ The separation by size uses as proxy the companies' outstanding debt on the financial system. Companies whose outstanding debt is lower than BRL100 million are considered SMEs. Companies whose outstanding debt is equal to or greater than BRL100 million are classified as Corporates.

45/ SMEs' credit portfolio growth rates controlling for exchange rate variation were not presented because the difference between them and nominal rates are negligible.

Chart 2.3.16 – YoY credit growth
Small and medium enterprises (SME)

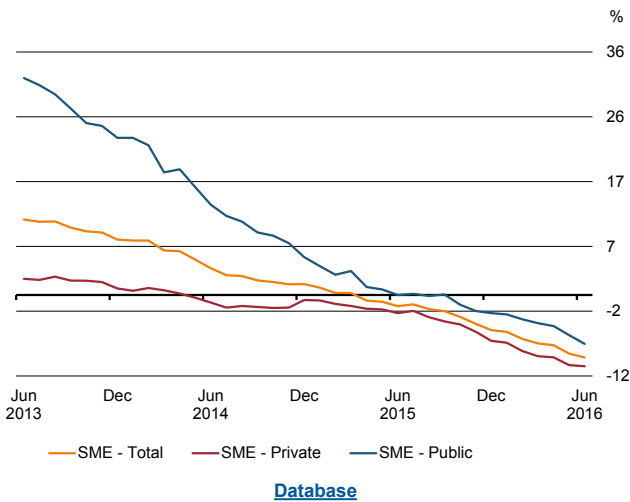


Chart 2.3.17 – YoY credit growth
Corporates

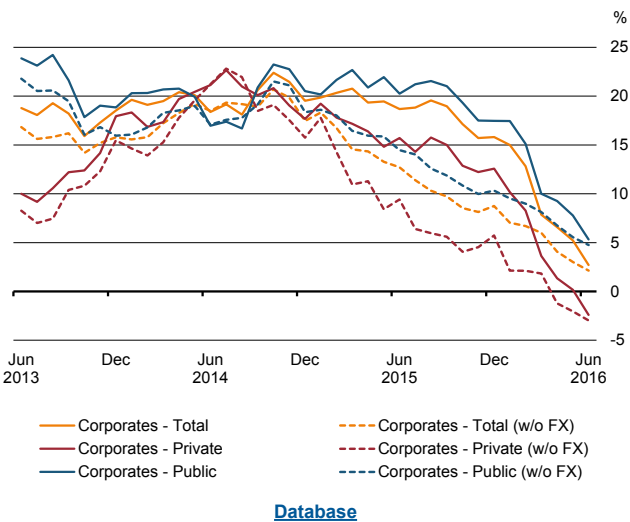
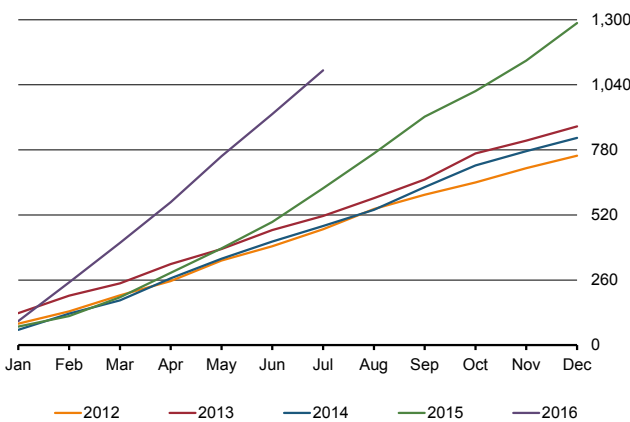


Chart 2.3.18 – Corporations in judicial recovery
Cumulative requests by year



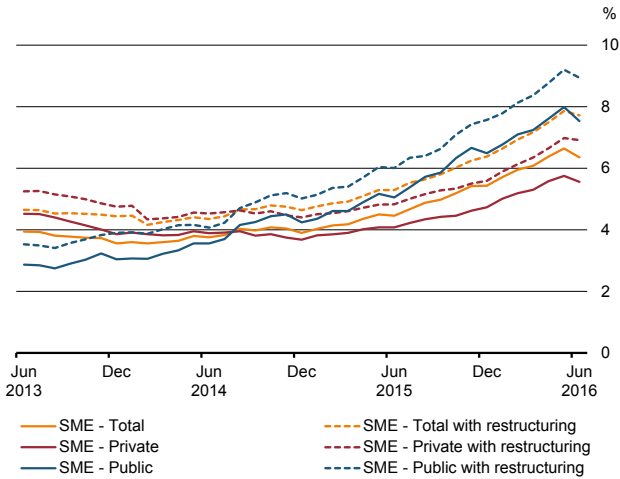
Source: Serasa Experian

As for loans to SMEs, NPL continued its upward trend, reaching 6.4%. The debt restructuring adjustment would add 1.4 p.p. to this indicator. In public banks, SMEs' NPL reached 8.0% in May, decreasing in June, while in private banks a relevant increase was also observed. In both cases, even though the rates have decreased in the last month of the series, the restructuring-adjusted NPL (Chart 2.3.19) decreases less, given the upward trend of monthly debt restructuring flows as well as the peak observed in June (Chart 2.3.20).

As for loans to large corporations, NPL has also increased, with a little reversion in June, ending the semester at 0.8%. Debt restructuring adjustment would add 0.3 p.p. to the indicator, rising throughout the semester in public banks. In private banks, there was a downward trend as such adjustments were more relevant than those seen in public entities (Chart 2.3.21). Moreover, another event monitored regarding large corporations is the practice of preventive debt restructuring, either before any credit is past due or by means of securities issuance such as debentures, which are not computed in the financial system's credit portfolio.

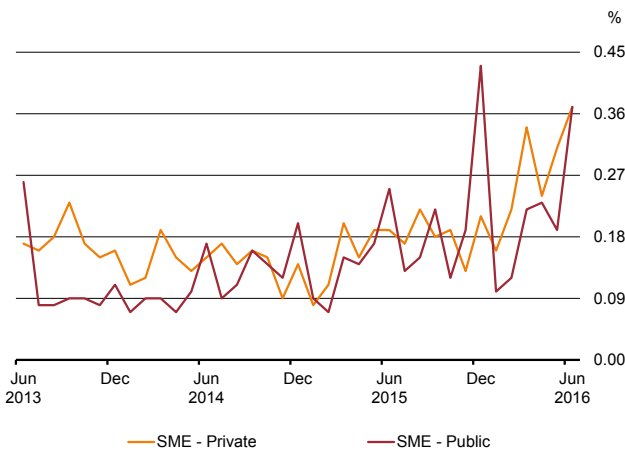
Thus, adverse conditions in real economy are resulting in relevant impacts on households and corporations' solvency, as shown on listed companies' financial indicators, as well as on employment and income indicators for households. The impact of this scenario in financial institutions' credit portfolio is reflected in the continuous increase in NPL and debt restructuring indicators, in addition to the growth on riskier portfolios (rated E to H). On the other hand, it's worth noting that spreads and provisioning has increased, as well as provisioning coverage for NPL and riskier portfolios.

Chart 2.3.19 – Non-performing loans
Small and medium enterprises (SME)



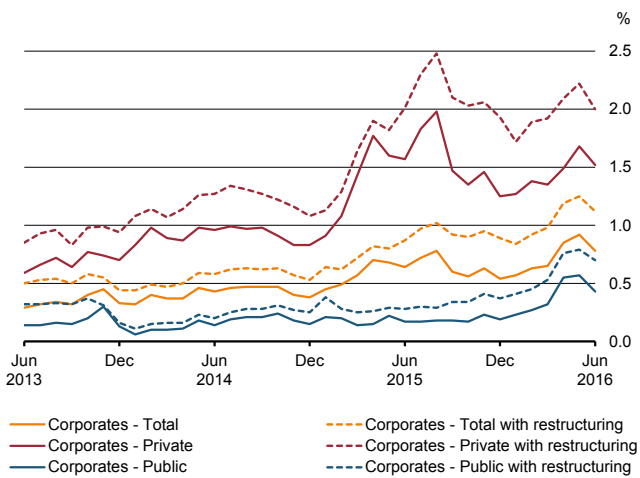
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Chart 2.3.20 – Monthly flow of restructured loans
Small and medium enterprises (SME)



[Database](#)

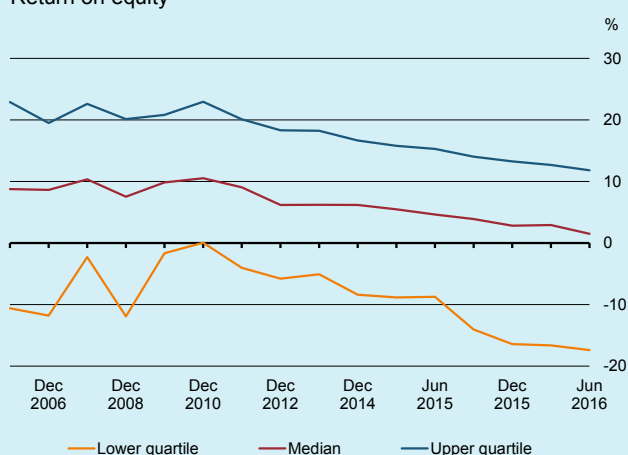
Chart 2.3.21 – Non-performing loans
Corporates



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Economic and financial panorama of listed companies

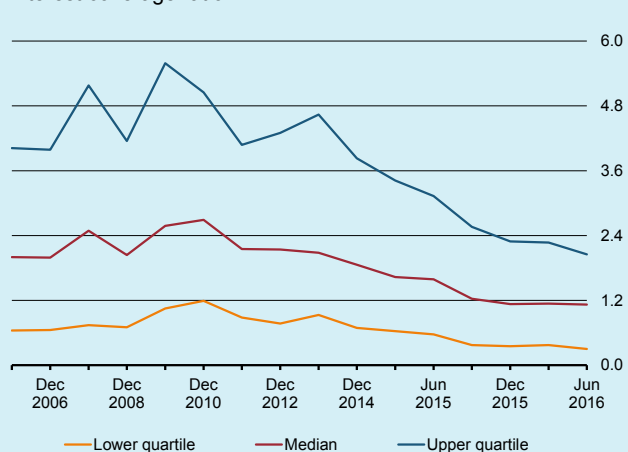
Chart 1 – Nonfinancial listed corporations
Return on equity



Source: Economatica

[Database](#)

Chart 2 – Nonfinancial listed corporations
Interest coverage ratio



Source: Economatica

[Database](#)

This box presents a brief analysis of economic and financial indicators of nonfinancial listed corporations. In summary, it has the purpose of demonstrating the economic environment's main effects on the financial situation of such corporations. This analysis was conducted only for listed companies, as their financial statements are available¹. Regardless such restriction, this is a representative sample of corporations in general.

Median values and first and third quartiles were analyzed yearly from 2005 to 2014, and quarterly since March 2015. Regarding quarterly data, the prior twelve months were consolidated. The indicators are not weighted by company size or balances analyzed².

The adverse scenario is indeed reflected negatively on listed companies' situation, as seen on their economic and financial indicators. Return on equity (Chart 1)³, interest coverage ratio (Chart 2)⁴, and net debt to EBITDA ratio (Chart 3) have deteriorated during 2015. In 2016, return on equity and interest coverage ratio continued to worsen or presented relative stability, but in lower levels. Net debt to EBITDA, however, improved in 2016 for more leveraged corporations (third quartile) due to exchange rate appreciation in the period, reducing the amount due in BRL of foreign currency denominated debt.

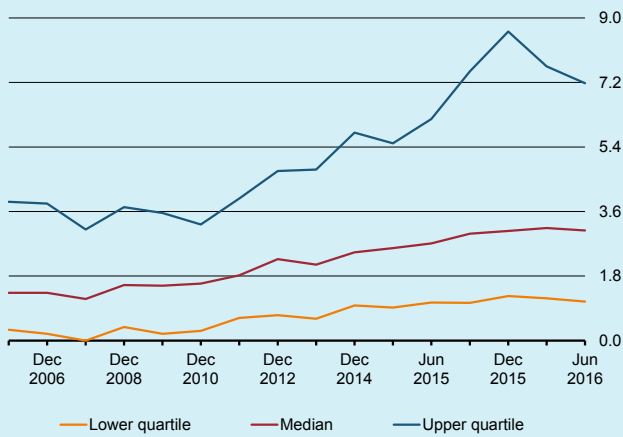
1/ Brazilian listed companies' financial statements were obtained from Economatica database.

2/ Only nonfinancial corporations with positive operating income were considered in each period. The purging of a corporation in a period does not imply its automatic purging from other periods. This approach seeks to purge from the sample inactive corporations as well as holding companies.

3/ Return on Equity (ROE) was defined as the net profit to average equity ratio.

4/ Interest coverage ratio was defined as EBITDA (earnings before interest, taxes, depreciation and amortization) to financial expenses ratio.

Chart 3 – Nonfinancial listed corporations
Net debt/EBITDA



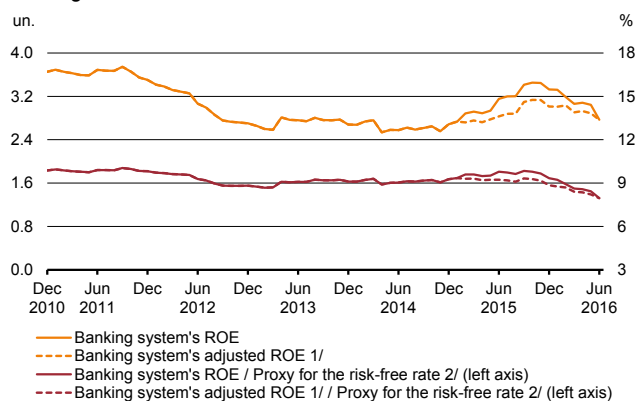
Source: Economatica

[Database](#)

Generally speaking, the deterioration in 2015 was caused primarily by increases in net debt and financial expenses as well as decreases in operating cash flow as estimated by EBITDA. In 2016, corporations' operating cash flow presented relative stability, contributing to soften the worsening or even to stabilize interest coverage and net debt to EBITDA ratios in the period.

Chart 2.4.1 – Return on equity^{1/ 2/}

Trailing twelve months



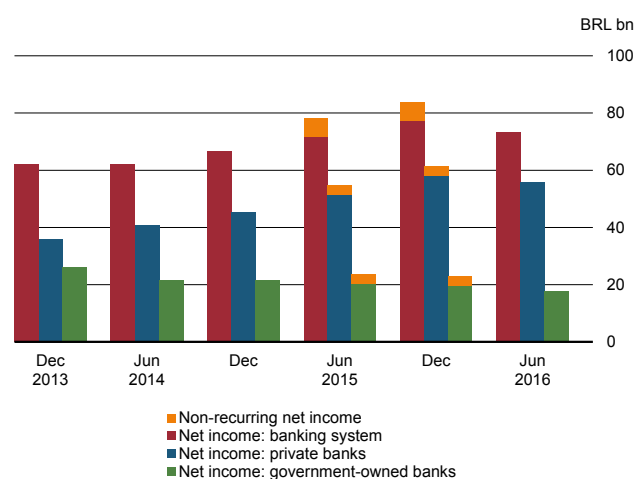
1/ Excludes non-recurring income.

2/ For comparison with ROE, the average Selic annual rate over the last 36 months was used as a proxy for the risk-free rate, multiplied by 0.85 to compensate the tax effect. The 36-month period was defined based on the credit portfolio average term, the main banking revenue source.

[Database](#)

Chart 2.4.2 – Net income by ownership

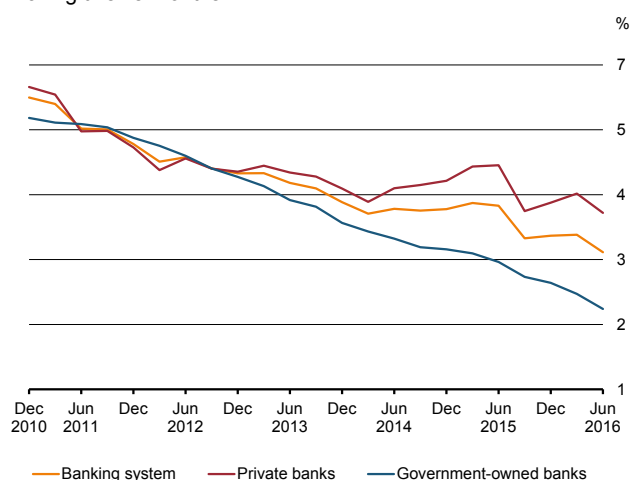
Trailing twelve months



[Database](#)

Chart 2.4.3 – Net interest income

Trailing twelve months



[Database](#)

2.4 Profitability

Brazilian banking system profitability decreased in the first half of 2016, after two semesters of recovery. Return on equity (ROE) reached 13.4% in June, a 2.1 p.p. drop compared to December, 2015. Increasing loan loss provisions (LLP) contributed to the net income downturn during the first half of 2016, once extraordinary results related to the recognition of deferred tax credits did not counterbalance it this semester. Although banking services fees have risen above inflation, they were not enough to offset the LLP's effect. The net income decline reflected the challenging internal macroeconomic environment, which impacted both private and government-owned banks (Charts 2.4.1 and 2.4.2).

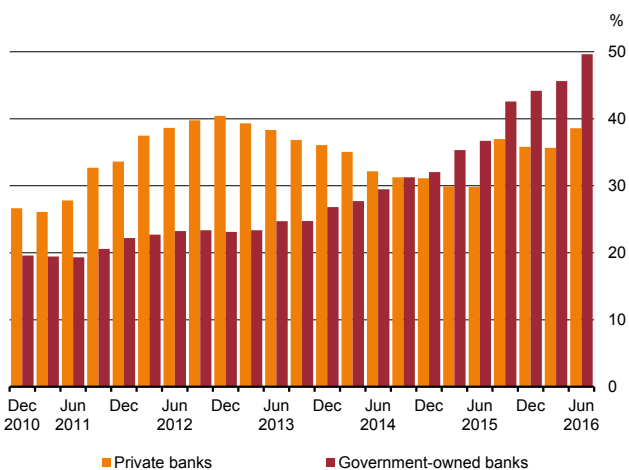
The net income downturn is explained by the net interest income (NII) after provisions reduction⁴⁶. The level of loan loss provisions kept growing throughout the first half of 2016, as a response to increasing credit defaults and stronger losses perspective, both derived from the credit quality deterioration. As a consequence, provision expenses reached around 40% of net interest income before provisions in June, 2016. In contrast, bonds and securities income positively impacted NII after provisions (Charts 2.4.3 and 2.4.4).

In spite of increasing spreads on more recent loans – a reflection of the riskier scenario – the weak credit demand inhibited the renewal of credit portfolio at the same pace as adjustments in funding costs. Moreover, net credit margins remained pressured by increasing provision expenses (Chart 2.4.5).

Although economic activity remained weak, banking services income accelerated their growth. While facing a tight credit market and rising provision expenses, Brazilian financial institutions concentrated their efforts in strengthening services income. Services related to the payment system, as well as those derived from credit/debit cards and insurance activities, increased their importance as income sources. Banks also directed significant efforts towards cutting costs, generating higher cost-to-income ratios (Chart 2.4.6).

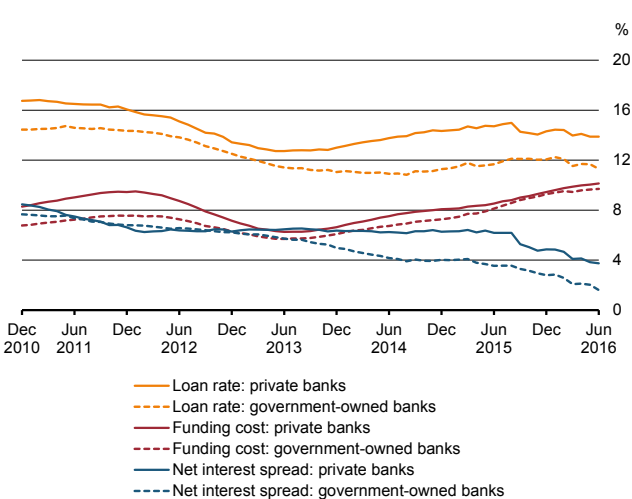
46/ Incomes from: credit operations (net of LLP), securities, foreign exchange and derivatives minus funding expenses.

Chart 2.4.4 – Provisions on net interest income before provisions expenses
Trailing twelve months



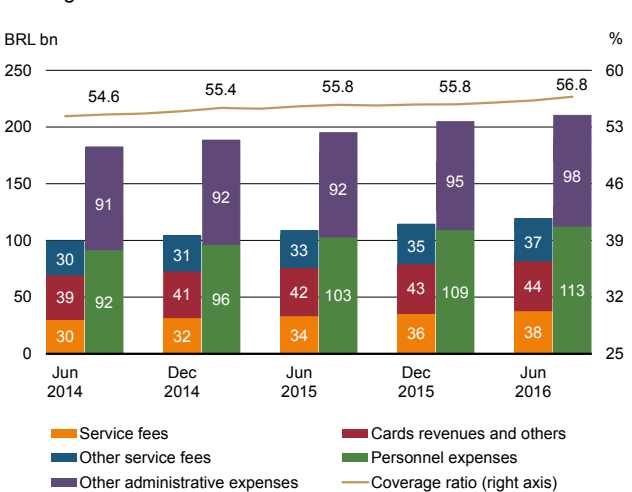
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Chart 2.4.5 – Breakdown of net interest rate by ownership
Trailing twelve months



[Database](#)

Chart 2.4.6 – Coverage ratio of administrative expenses
Trailing twelve months



[Database](#)

Nevertheless, in a broader sense, the efficiency ratio⁴⁷ deteriorated both in private and government-owned banks. The main reason is the loan loss provisions negative effect on net interest income (Chart 2.4.7).

Considering financial institutions individually, the number of banks with annual loss remained stable, but the number of banks with profitability below the risk-free rate proxy increased from 35 to 50. In spite of the fact that these banks represent a small share of total assets, the profitability deterioration also reflects the lower income diversification of small and medium-sized banks, as well as increasing difficulty in absorbing additional expenses (Chart 2.4.8).

The absence of a more optimistic outlook for credit growth⁴⁸ in the short term, alongside the continuous pressure on margins caused by increasing provision levels, creates a challenging environment for banks profitability in the next semester. Hence, expectations are that service fees, insurances and credit/debit cards incomes will probably increase their share on final results, as well as controlling operational expenses will be crucial in this context, especially for banks facing continuous loan portfolio reduction.

2.5 Solvency

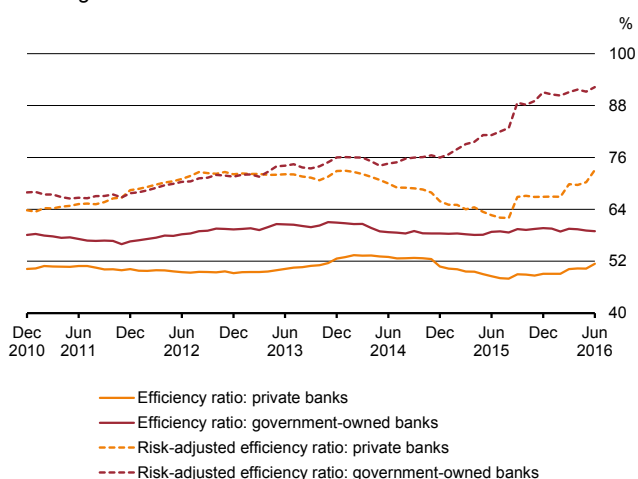
The banking system solvency remained stable, presenting high level of capitalization in the first half of 2016. The slow-growth pace of the risk-weighted assets was crucial to the capital and leverage ratios stability, balancing the challenging economic scenario and the progressive Basel III implementation schedule. Even considering the Basel III full implementation, the majority of the institutions would still be over-capitalized, reinforcing the financial system soundness and resilience.

The banking system solvency stability can be confirmed by the 0.2 p.p. increase in the Total Capital Ratio in the first half of 2016, leading it to 16.5% (Chart 2.5.1), almost equal to the one year before baseline. Tier 1 and Common Equity Tier 1 ratios exhibited similar behavior, increasing 0.5 p.p. and 0.4 p.p., respectively. Retained earnings and

47/ Efficiency ratio is defined as general and administrative expenses as a percentage of the sum of: net interest income before provisions (for the efficiency ratio) or the net interest income after provisions (for the risk-adjusted efficiency ratio); service fees; operating lease income; equity in profit (loss) of unconsolidated companies and other operational income and expenses. An increase in the ratio indicates decreasing efficiency.

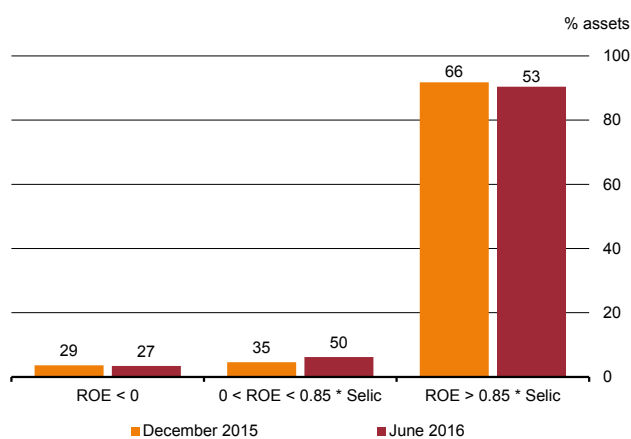
48/ See section 2.3 – Credit.

Chart 2.4.7 – Efficiency ratio
Trailing twelve months



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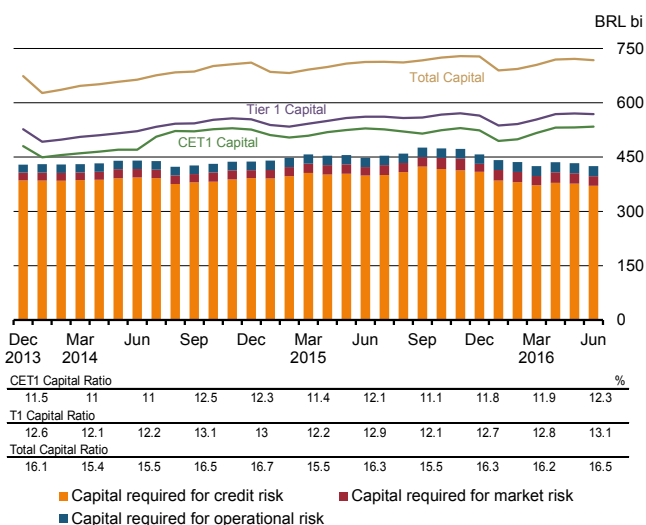
Chart 2.4.8 – ROE frequency distribution^{1/}



1/ Values inside the bars represent the number of financial institutions in the correspondent ROE range. Average Selic rate over a 36-month period is used as a proxy for the risk-free rate.

[Database](#)

Chart 2.5.1 – Capital levels and requirements



[Database](#)

risk-weighted assets (RWA) reduction – especially credit risk – neutralized the expected Basel III implementation⁴⁹ negative impact over the capital indices.

Although not so comfortable as the private banks, which hold CET1 above the three capital requirements, included the conservation buffer, public institutions hold capital surplus in all current regulatory requirements (Chart 2.5.2).

Decreasing 1.4% during the period, the system total regulatory capital (TC) reached BRL 669.6 billion in June 2016, due to, mostly, the progressive Basel III implementation process⁵⁰. The retained earnings and the deferred tax assets and unrealized losses reduction balanced the above-mentioned TC movement.

The system RWA finished June amounting BRL 4,048 billion (-2.7%), with distinct performances among the credit, market and operational risk components. On one hand, the credit RWA fell 5.1%, influenced by the total assets contraction – the exchange rate appreciation which reduced the foreign exposition. On the other hand, operational and market risk RWA have grown 11.3% and 25.9% in 2016 first half, respectively, with significant contribution of interest rate and commodities risk components, influenced by the RWA multiplier (F factor) reduction⁵¹.

The Common Equity Tier 1 (CET1) ratio analysis through different central tendency measures (Chart 2.5.3) confirms the stability and soundness of the capitalization over the time for larger and, especially, smaller banks. Only three small institutions (accounting for 0.3% of the total assets) exhibited CET1 ratio below 7% of the RWA in June 2016⁵².

Simulation of the full-fledged Basel III framework revealed enhancement in the banking system capacity to bear incurred risks under the new rules. Compared to the December 2015 information, the June data presented 1.2 p.p. rise in the capital ratio to 13.7%. Aligned to this trend, the capital shortfall considering the minimum

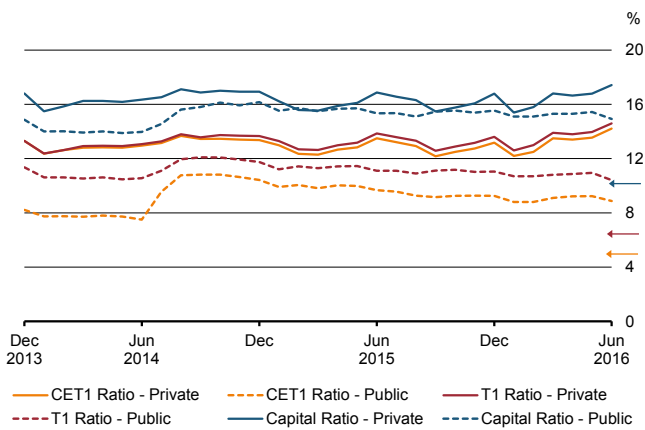
49/ Considers the progressive Basel III effects over the regulatory capital and the RWA, according to the Resolution 4,192, of March 1, 2013, Resolution 4,193, of 2013, and the Circular BCB 3,644, of March 4, 2013.

50/ According to the Resolution 4,192, of March 1 of 2013, the prudential adjustments phase-in evolved from 40% to 60%, starting on January 1 of 2016. Furthermore, the capital instruments phase-out reduced from 70% to 60%, according to the art. 28.

51/ According to the Resolution 4,193, article 4, of 2013, the “F” multiplier converts operational and market risk capital charges into RWA. From January 1 of 2016, it turned from 1/11% to 1/9.875%.

52/ Refers to the 2019 capital requirement, considering the conservation buffer.

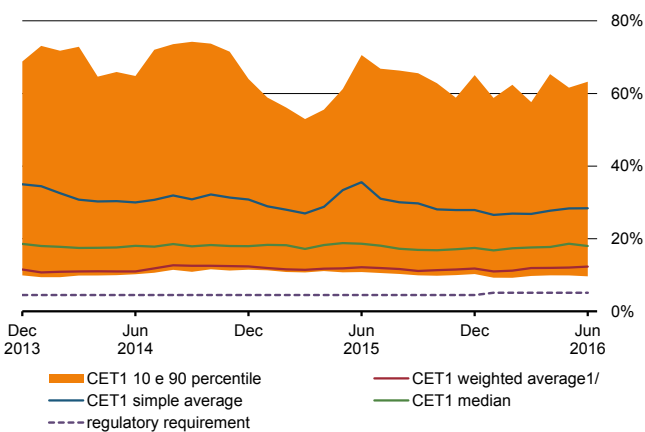
Chart 2.5.2 – Capital Ratios and Regulatory Requirements^{1/}



1/ The arrows represent the regulatory requirements for different capital levels, including Conservation Buffer (5.125% for CET1 Capital, 6.625% for T1 Capital and 10.5% for Total Capital)

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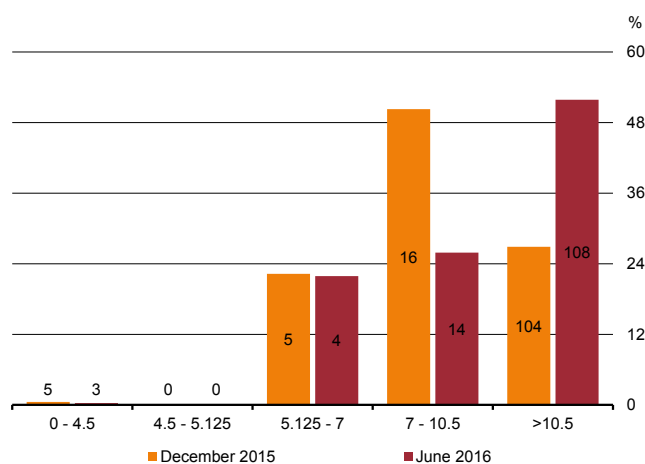
Chart 2.5.3 – CET1 Ratio evolution
Banking System: 128 Financial Institutions



1/ Aggregate value. Calculated as the aggregate CET1 divided by the aggregate RWA

[Database](#)

Chart 2.5.4 – 2019 CET1 Ratio Frequency Distribution^{1/}



1/ Inside the bars the # of financial institutions in the correspondent CET1 ratio range

[Database](#)

requirements reduced 1.9 p.p. to 4.3% of the system total capital⁵³. This behavior comes from the same reasons that led to the capital ratios stability across the 2016 first half, even considering the Basel III progressive implementation effect between 2015 and 2016, already incorporated in the model.

In this simulation, the capital shortfall majority is due to capital buffer requirements and it tends to materialize only from 2018 on. Government-owned banks are responsible for an important share of the capital shortfall, reflecting their smaller capital levels and the influence of the systemic buffer requirement. The frequency distribution for the CET1 ratio, considering Basel III full implementation, presents stability except for some representative institutions improvements (Chart 2.5.4).

Regarding the Basel III Leverage Ratio (LR) the institutions demonstrate comfortable relationship between the Tier 1 and the total exposure (Chart 2.5.5). The LR considering the reporting date and the 2019 projection remained stable across the first half of 2016, 7.5% and 6.6%, respectively, exceeding the proposed international requirement under discussion (minimum of 3%).

Summarizing, the Basel III schedule advance effect and the system profitability fall were counterbalanced by the RWA decrease, which led to the capital ratios stability. Overall, the banking system shows good excess capital levels to face the Basel III implementation, although with a smaller margin for public institutions. Risk sensitive and non-sensitive metrics, evaluated individually or in aggregate, alongside the above-mentioned evidences, reiterate the banking system soundness.

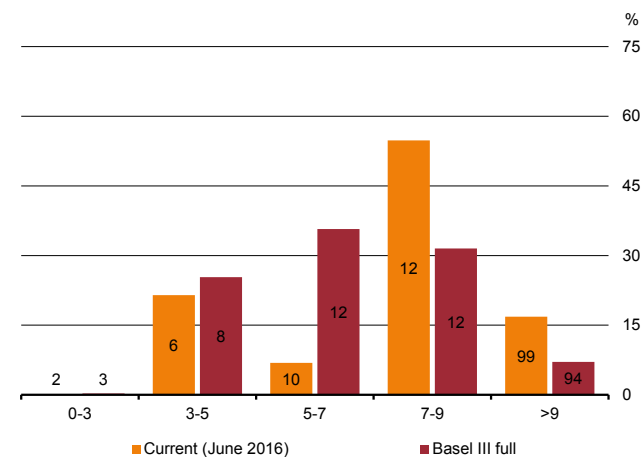
2.6 Capital stress tests⁵⁴

Capital stress tests are conducted in order to evaluate the shock absorbing capacity of the financial system. Extreme adverse scenarios on relevant economic factors are applied and the effect on capital is measured.

53/ From June 2016 on, the Basel III full implementation simulation encompasses eventual countercyclical capital requirement, according the Resolution 4,193, article 8, §6°, of 2013 and Circular BCB 3,769, of October 29, of 2015. In June 2016, 51 institutions chose the simple approach to calculate the countercyclical buffer, which means a CET1 capital requirement of 0.625% of the RWA. The countercyclical capital buffer requirement increased 0.1 p.p the system capital shortfall compared to the total capital.

54/ The stress tests and scenario methodologies are presented in the annex Concepts and methodologies – Capital stress.

Chart 2.5.5 – Leverage Ratio frequency distribution^{1/}



1/ Inside the bars the # of financial institutions in the correspondent Leverage Ratio range

[Database](#)

2.6.1 Scenario analysis – Stress tests on macroeconomic factors

Table 2.6.1 presents all macroeconomic factors used in the stress scenarios: Base, Stressed Vector Autoregressive (VAR), Structural Brake and Worst Historical. Chart 2.6.1 presents the projected NPL⁵⁵ in each scenario.

Results based on the VAR Scenario reveal that projected NPL would reach, in December 2017, a 7.6% maximum. This represents a 1.4 p.p. in excess of the present level of registered provisions. For the Structural Break Scenario, NPL would reach 7.8%. After 6 quarters of macroeconomic deterioration, the estimated capital needed to avoid reaching the hurdle rate would be 8.8% of the total regulatory capital of the financial system (Chart 2.6.2).

Table 2.6.1 – Macroeconomic Stressed Scenarios (december/2017)

Scenarios	Jan 2016	Base Scenario ^{1/}	Adverse Scenarios ^{3/}		
			Stressed VAR ($\alpha = 5\%$)	Structural Break	Worst Historical
Output (IBC-Br)	-5.6%	0.9%	-8.9%	-8.9%	-5.8%
Domestic Interest Rates (Selic)	14.2%	11.0%	23.3%	30.9%	17.9%
Exchange Rate (BRL/USD)	3.51	3.49	4.50	6.32	3.91
Inflation (annual IPCA)	8.5%	5.2%	8.5%	18.5%	8.7%
Unemployment (PNAD-C IBGE)	11.2%	11.2%	20.2%	20.2%	11.2%
Country Risk (Brazil EMBI+)	379	379	379	379	591
Foreign Int. Rates (US G. Bonds Yield 10yr)	1.8%	4.3%	5.8%	5.8%	1.6%

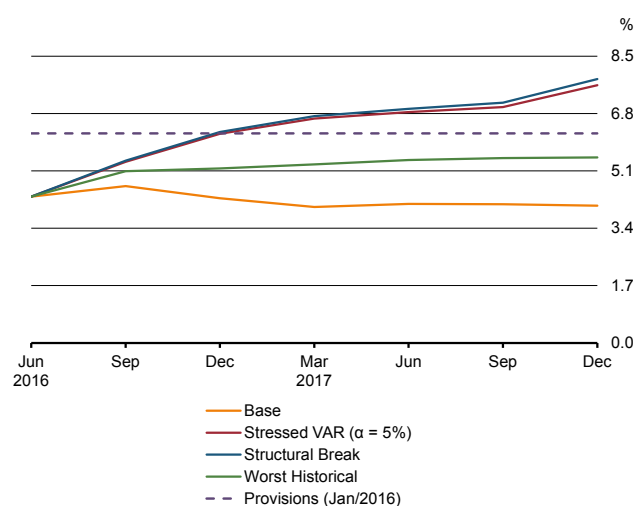
1/ GDP preview, SELIC Rate, FX and inflation are the risk factors were collected from the August, 5 Focus survey. US interest rates behavior are the Dodd-Frank Act Stress Testing (DFAST) FED ones for the baseline scenario. Remaining risk factors are kept steady for the stress test time horizon.

2/ For the Stressed VAR and Structural Break scenarios the EMBI+Brazil peak of 758 is reached in September, 2016 gradually returning to its present value in December, 2017.

3/ The construction criteria for each scenario can be found in the annex Concepts and methodologies – Capital stress.

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Chart 2.6.1 – Macroeconomic stress test NPL



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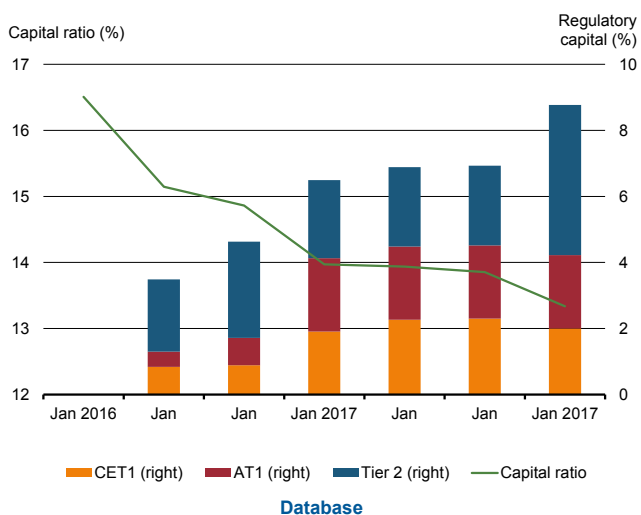
Capital needs are measured as the amount of 90 days past due credit (NPL) and credit restructuring⁵⁶ that exceeds registered provisions. This represents an extra amount of provisions that is a significant loss absorbing cushion.

The financial system capital needs as of June, 2016 showed an increase in amount if compared to December, 2015 figures (Chart 2.6.3), but most of it is concentrated in a few institutions. Although the results demonstrate an adequate loss absorbing capacity, it is worth noting that the situation is less comfortable than before.

55/ All references to NPL on this report follow the concept of credits of 90 days past due.

56/ Credit restructuring methodology is described in Section 2.3 – Credit.

Chart 2.6.2 – Capital requirement gap and Capital ratio Stressed VAR

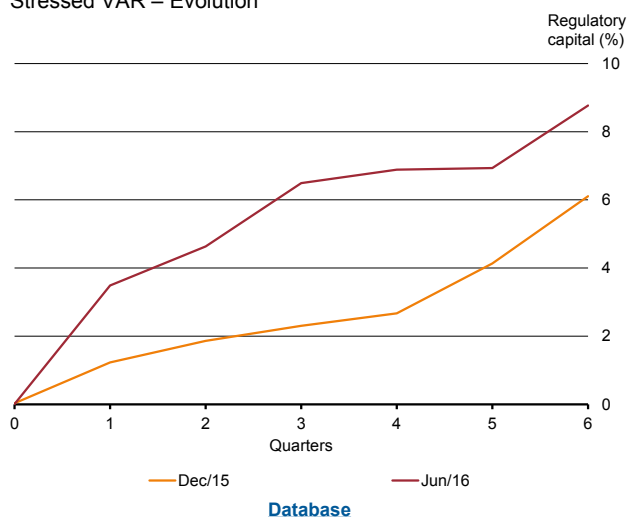


Frequency distribution of the Basel Capital Ratio makes clear that most institutions would still be placed above the regulatory minimum (10.5%). Together, they represent 72% of the financial system total assets (Chart 2.6.4).

2.6.2 Sensitivity analysis

FX rate sensitivity evaluation keeps pointing towards insignificant impacts on the financial system. This conclusion is confirmed by the irrelevant effects of FX rate volatility on the financial system capital ratios. Interest rate sensitivity analysis reveals that impact would be small as well, and it is also corroborated by low exposure to this risk factor and by the hedging strategies adopted by financial institutions.

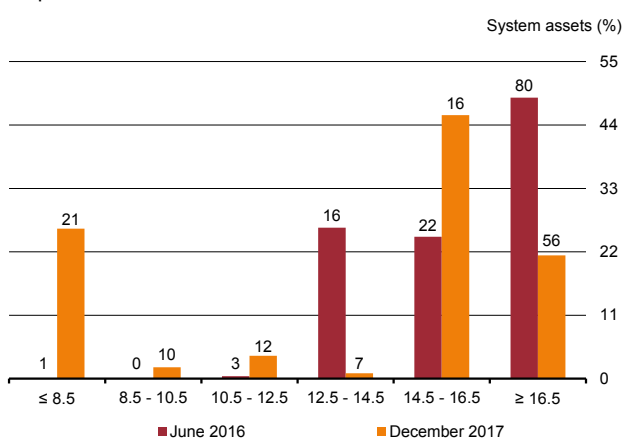
Chart 2.6.3 – Capital requirement Stressed VAR – Evolution



Credit risk sensitivity test (Chart 2.6.5) indicates that banking institutions with capital ratio below the regulatory minimum would represent 0.5% of Brazilian Financial System total assets, should the worst Brazilian NPL⁵⁷ (7%, as of December, 2000) occurs. Moreover, if an extreme NPL of 17.9% occurs, capital needs would amount up to 10% of present financial system total regulatory capital.

Financial institutions capital ratios remain above the hurdle rate even if real estate prices fall 25%. Only a 35% drop in prices would result in insolvency situations, that is, financial institutions with negative net worth. Results are presented in Chart 2.6.6.

Chart 2.6.4 – Macroeconomic Stress Test Stressed VAR – Frequency distribution of system assets by Capital ratio band^{1/}



^{1/} The value above each bar represents the number of institutions per band.

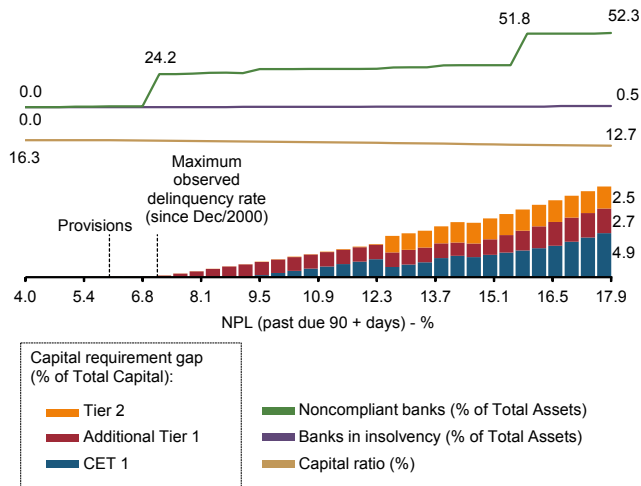
In June, 2016 the outstanding mortgage portfolio loan-to-value (LTV) averaged 65.4%, considering the updated collateral values according to the IVG-R index. Regarding extreme price shocks, more rigorous credit granting criteria and faster initial amortization improve both the credit LTV and the system loss absorbing capacity.

Hence, sensitivity analysis reinforce the soundness of the Brazilian financial system as meaningful capital needs would only materialize under extreme conditions.

^{57/} All references to NPL on this report follow the concept of credits of 90 days past due.

Chart 2.6.5 – Sensitivity analysis

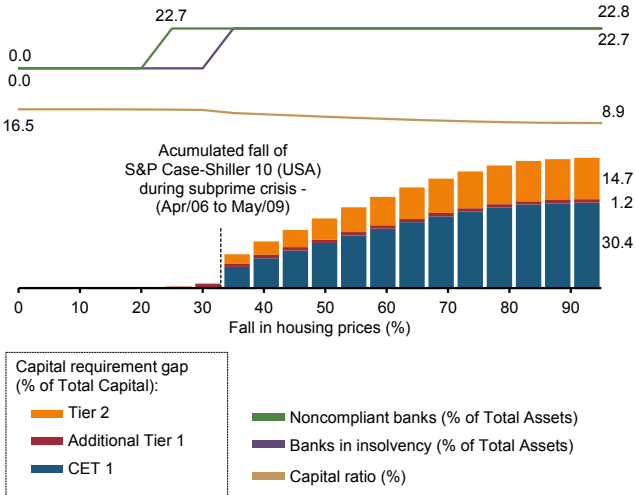
Credit risk



[Database](#)

Chart 2.6.6 – Sensitivity analysis

Housing prices risk



[Database](#)

3.1 Minimum requirements for the formulation and implementation of recovery plans

Resolution no. 4,502, issued by the National Monetary Council (CMN) on June 30th, 2016, incorporates the Financial Stability Board's Key Attributes of Effective Resolution Regimes for Financial Institutions (Key Attributes⁵⁸, or "KAs") into the Brazilian regulatory framework. This measure is an important step in aligning our regulatory framework to the international best practices.

The existence of a recovery plan is essential for an effective resolution framework. By designing the recovery plan, the management of the financial institution develops a deeper understanding of its business' vulnerabilities, which allows for timely corrective actions and for a better grasp of the risks taken. Those effects are value enhancing, as they foster confidence in the soundness of the financial institution.

Aiming to reestablish adequate levels of capital and liquidity and to secure the continuity of financial institutions deemed systemically important, the regulation issued establishes the minimum requirements for the formulation and implementation of recovery plans by universal banks, commercial banks, investment banks and savings banks whose Exposure/GDP, defined by Circular no. 3,768, of October 29th, 2015, is above 10% (ten percent) on December 31th of the penultimate year.

The requirements include the mapping of critical functions for the bank and the core services the bank

58/ FSB's Key Attributes of Effective Resolution Regimes for Financial Institutions – Published in October 2011, updated in October 2014. <http://www.fsb.org/wp-content/uploads/r_141015.pdf>.

provides to the financial system, the craft of stress scenarios and suitable indicators, the establishment of clear governance arrangements for the implementation of the recovery plan, the assessment of potential barriers to effective recovery and the development of a proper communication strategy with the institution's main stakeholders. According to the Resolution, banks should formulate recovery plans every year and subject their plans to an internal review at a three-year interval. Senior management should be involved in the entire process of the formulation of the recovery plan and take charge of its implementation whenever deemed necessary.

Financial institutions have already been exposed to recovery planning activities when they devise capital and liquidity contingency plans and when they take part in stress tests related to their capital management and to the assessment of various risks. The objective of the issuance of the Resolution is to reinforce the recovery planning of systemically important banks, thus, contributing to the soundness of the financial system.

According to the schedule of Resolution no. 4,502, of 2016, the institutions will have until December of 2017 to adjust themselves to the new rules, in a gradual transition. The transition includes step-by-step deliveries that will allow the BCB to closely accompany the implementation of the recovery plans.

3.2 Special Regime of Exchange and Tax Regularization – Foreign Exchange provisions and regularization of CBE declaration

Law 13,254, of January 13, 2016, established the Special Regime of Foreign Exchange and Tax Regularization (RERCT), through which individuals and companies can voluntarily declare their assets, property or rights of legitimate origin that have been remitted, repatriated or kept abroad and that have not yet been correctly reported. The Law establishes that the regulation of RERCT is in charge of the Federal Revenue of Brazil (RFB), leaving the BCB to address specific topics of its competence.

In this sense, the BCB issued Circular 3,787, of March 17, 2016, to regulate operating procedures regarding topics of its competence, related to RERCT. The Circular addressed the form and procedures for the regularization

of the declaration of Brazilian Capital Abroad (CBE), the dollar rate and the par values of other currencies against the dollar, to be used for the conversion to foreign currency. In addition, the Circular has created specific code for classification of foreign exchange transactions related to repatriated funds.

3.3 Electronic opening and closing of deposit accounts

In recent years, the development of new technologies, improvements in the transmission of data and the growing use of portable electronic devices have changed the way financial institutions deliver their services.

In this context, CMN issued Resolution no. 4,480, on April 25th, 2016, which allows customers to open and close deposit accounts using electronic channels, as long as financial institutions have in place sound controls and adequate safeguards. This measure applies to check accounts as well as time and savings deposit accounts.

Currently available technologies allow financial institutions to put in place processes and internal controls which make opening an account both an easy and safe process. Safety mechanisms can be deployed to verify the identity of clients, such as electronic device validation, geolocation of clients, transmission of digitized documents and pictures, image recording and detection of the physical presence of the client, digital signature etc., all of these data been available for monitoring and auditing activities.

This regulation is part of BCB's efforts to stimulate innovation in the banking sector, especially as it comes to increasing the supply of financial services through electronic channels.

3.4 Acquisition of securities issued by subsidiaries

CMN approved an amendment to Resolution no. 1,775, of December 6th, 1990, in order to allow financial institutions to buy subordinate mortgage backed securities (“certificados de recebíveis imobiliários” – CRI) and rural credit backed securities (“certificados de recebíveis do agronegócio” – CRA), or to buy CRIs and CRAs as a consequence of a firm offer by the financial institution in the context of an issuance of such securities

by a securitization company controlled by the financial institution, as long as the underlying loans are under a fiduciary regime.

The maintenance of safety in the financial system and the increase in economic predictability is what allows the development of financial instruments such as asset backed securities.

The main reasons for this amendment are:

I – to allow the acquisition of asset backed securities issued by companies of the same group, but only if the underlying assets are under fiduciary regime, taking into account that, in this case, there is no exposure to the issuer credit risk and no financing within the same group;

II – to provide a less-costly funding alternative for financial institutions, particularly in segments where funding is highly dependent on directed credit schemes such as housing and agricultural finance. In addition, this allows financial institutions to better manage temporary funding shortages;

III – to induce good practices for loan origination. By retaining subordinated tranches of a securitized bond, the financial institutions have an added incentive to ensure a good performance of the underlying loans and thus, a good performance of the asset backed securities.

Therefore, Resolution no. 4,478, of 2016, is consistent with BCB's efforts to improve funding conditions and funding diversity for financial institutions with due regard for the stability of the National Financial System.

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Appendix

Banco Central do Brasil Management

Acronyms

Banco Central do Brasil Management

Board of Governors

Ilan Goldfajn
Governor

Anthero de Moraes Meirelles
Deputy Governor

Carlos Viana de Carvalho
Deputy Governor

Isaac Sidney Menezes Ferreira
Deputy Governor

Luiz Edson Feltrim
Deputy Governor

Otávio Ribeiro Damaso
Deputy Governor

Reinaldo Le Grazie
Deputy Governor

Sidnei Corrêa Marques
Deputy Governor

Tiago Couto Berriel
Deputy Governor

Acronyms

AT1	Additional Tier 1
CET1	Common Equity Tier I
DTA	Deferred Tax Asset
EMBI+Br	Emerging Markets Bond Index Plus Brazil
Fed	Federal Reserve
Focus	Central Bank of Brazil's market expectations survey
IBC-Br	Brazilian Economic Activity Index
IBGE	Brazilian Institute of Geography and Statistics
IL	Short-Term Liquidity Ratio
ILE	Structural Liquidity Ratio
IPCA	Extended National Consumer Price Index
IVG-R	Financed Residential Properties index
LLP	Loan loss provisions
LR	Leverage Ratio
LTV	Loan-to-value
LCR	Liquidity Coverage Ratio
NII	Net interest income
NPL	Non-performing loans
PNAD-C	Continuous National Household Sample Survey
RC	Regulatory Capital
ROE	Return on equity
RWA	Risk-Weighted assets
RWA _{CAM}	Exposures in gold, foreign currency and assets subject to changes in foreign exchange.
RWA _{JUR1}	Exposures subject to changes in fixed interest rates.
RWA _{JUR2}	Exposures subject to changes in foreign currency coupon rate.
RWA _{JUR3}	Exposures subject to changes in price index coupons rate.
RWA _{JUR4}	Exposures subject to changes in interest coupon rates.
SCR	Credit Information System
Selic rate	Brazilian benchmark interest rate
TPF	Brazilian Sovereign Bonds and Notes
VAR	Vector Autoregressive

Concepts and methodologies

- a) Short-term Liquidity Ratio (IL) – the ratio of the institution’s available liquid assets to its stressed cash flows (total disbursements in the 21 business days following a stress event). The estimated stressed cash flows simulate outflows far above the expected, using past crises as parameters. Institutions with IL above one (100%) have enough liquid assets to withstand this stress scenario. Since the methodology simulates a thirty-day period in which the liquid assets would have to be monetized, these are marked to market and/or weighted so as to reflect reductions in prices in the event of forced sales. The liquidity coverage ratio (LCR), introduced by Basel III, is defined as the same ratio of liquid assets to net cash outflows under a thirty-day stressed scenario. Therefore, the IL and the LCR are analogous concepts. By the way, the first public release of LCR numbers will refer to 2T2016.
- i. Liquid assets – liquid resources available for each conglomerate/institution to meet its stressed cash flows for the next thirty days. The liquid assets are the sum of highly liquid assets, disbursed reserve requirements and supplemental resources.
- a. Highly liquid assets – encompass local sovereigns (TPFs), excess margin requirements at exchanges, Ibovespa stocks, mutual funds quotas, excess cash, and excess reserve requirements
- i) TPFs held by the institution encompass those in unencumbered positions or received as collateral in reverse repo agreements (buying/lending position), as well as the excess margin deposits at exchanges (only TPF).
- ii) Total marked-to-market stocks that compound the Ibovespa index.
- iii) Marked-to-market value of quotas of mutual funds covered by the *Instrução Normativa CVM* no. 555, from 17 December 2014.
- iv) Excess cash equals the difference between the balance on the cash account and the minimum required vault cash.
- b. Disbursed reserve requirements – the part of the reserve requirement which returns to the institution as a result of the loss of deposits estimated in the stressed cash flows calculation.
- c. Supplemental resources – other options for monetization in the scenario’s time horizon.

- i) Private securities – Certificate of Deposit (CDB), Receipt of Bank Deposit (RDB), Interbank Deposit (DI), long positions in box strategies, lending positions in repo agreements backed by private securities, special guarantee term-deposit (DPGE) backed by the Federal Deposit Insurance Fund (FGC) – after the grace period for early redemption – with maturity date beyond the thirty-day time horizon.
 - ii) Less liquid quotas in funds – senior quotas in debt mutual funds or in funds of funds, regulated by the *Instrução* CVM no. 356, from 17 December 2001.
- ii. Stressed cash flows – an estimate of the amount of funds which institutions would need to disburse in a thirty-day horizon in a stress scenario. The analyses take into account the deposits profile, the perspectives on early redemptions, the market stress composition and the planned outflows.
 - a. Deposits profile – an estimate of the necessary amount to cover for a run on the bank’s deposits, savings accounts, box strategies, securities issued by the bank, and repo agreements backed by private securities.
 - b. Early redemption – an estimate of the amount necessary to cover for early redemptions of short positions with the three largest market counterparties on the portfolio.
 - c. Market stress – Crisis scenario – an estimate of the amount necessary to cover losses arising from market moves (all risk factors considered for capital calculations) affecting the liquid assets or illiquid positions that may cause a cash outflow from the institution. The losses encompass:
 - i) Margin call to replenish collateral in exchanges;
 - ii) Disbursements to derivatives exchanges due to adjustments or the closing of positions maturing the stress scenario’s time horizon;
 - iii) Capital losses on liquid assets.
 - d. Planned outflows – Payments due and adjustments in long and short positions in derivatives with market agents, maturing within the scenario’s time horizon.
- b) Structural Liquidity Ratio (ILE) – It is a ratio of available stable funding – part of the equity and liabilities on which the institution can rely in a one-year horizon – to the required stable funding – part of the assets, including off-the-balance-sheet assets which must be financed by stable funding because they have long maturities and/or low liquidity. Institutions with ILE equal or above one (100%) are less susceptible to future liquidity issues. The calculation methodology is based off the final version of the regulations on the Net Stable Funding Ratio (NSFR), published in October 2014 by the *Bank for International Settlements* (BIS) (<www.bis.org/bcbs/publ/d295.htm>), within Basel III. The NSFR will be enacted with mandatory levels and reporting starting in 2018, and it represents an evolution from the traditional loan-to-deposit ratios, in that it encompasses exposures both on and off the balance sheet. The ILE calculation is detailed below.
 - i. Available stable funding – funding that shall remain in the institution for at least a year. It is calculated with the application of different weights to the accounting balances of the various liabilities and the equity. The higher the weighting factor, the higher is the stability of the funding, according to the following classification:
 - a. Factor 100% – Equity and liabilities with residual maturities above one year, without the option of early redemption, regardless of the counterparty.

- b. Factor between 90% and 95% – deposits, redeemable liabilities or liabilities maturing with residual maturity of less than one year, held by retail customers.
 - c. Factor 50% – Deposits and funds from non-financial corporate customers, government and public-sector entities; trade-finance related lines; and other liabilities maturing between six months and one year, including funds from other financial institutions, institutional investors and mutual funds.
 - d. Factor 0% – Other liabilities with no maturity or maturing in under six months, including funding provided by other financial institutions, institutional investors and mutual funds; clean offshore credit lines; net payable balance in derivatives; provisions; tax and social security payables; others.
- ii. Required stable funding – amount of necessary stable funding, estimated considering the liquidity characteristics and the maturity of the assets held by financial institutions. It is calculated with the application of different weights to the accounting or marked-to-market (when applicable) balances of the various assets. The higher the weighting factor, the less liquid an asset is.
- a. Factor between 0% and 15% – Cash; reserves at the BCB; TPFs (including unencumbered positions, excess margin at exchanges, and backing repo agreements with residual maturities of up to six months); long positions in repo agreements backed by TPF; mutual fund quotas regulated by *Instrução Normativa CVM* no. 409, from 2004; loans to other financial institutions maturing in up to six months.
 - b. Factor 50% – Cash flows from performing loans (no payments overdue for more than ninety days) with maturities under one year, except those that are necessary to roll-over to comply with legal requirements and pass-through loans; stocks listed at exchanges; loans to other financial institutions maturing between six months and one year; and other assets maturing in less than one year, including private bonds not listed in item *a*.
 - c. Factor 65% or 85% – Cash flows from performing loans with maturities longer than one year, except those that are necessary to roll-over to comply with legal requirements and pass-through loans; unencumbered private bonds and stocks not listed in items *a* or *b*; commodities (gold); and required margins at exchanges.
 - d. Factor 100% – Cash flows from performing loans that are necessary to roll-over to comply with legal requirements and pass-through loans (any maturity); stocks and bonds financed by repo agreements with maturities above six months, encumbered securities above one year, not including margins at exchanges; net derivative receivables; 20% of derivative payables; and other assets with maturity above one year or with no maturity, including non-performing loans, fixed assets, items deducted from regulatory capital, among others.
 - e. There is also a 5% factor for the following off-balance-sheet accounts: co-obligations, granted guarantees and non-irrevocable liquidity and credit lines.
- c) Financial system credit operations – Total obtained by time series No. 20539, as the sum of the series No. 2007, No. 12106 and No. 12150, Time Series Management System (SGS). Available at <<https://www3.bcb.gov.br/sgspub/localizarseries/localizarSeries.do?method=prepararTelaLocalizarSeries>>. Data refer to loans granted by financial institutions in Brazil (not including branches and subsidiaries of Brazilian banks abroad), to predominantly local borrowers. Some specific operations are made to borrowers located abroad. Financial institutions covered: savings and loans associations, commercial banks, exchange banks, development banks, investment banks, universal banks, savings banks, mortgage companies, leasing companies, credit, consumer finance companies and real estate credit companies.

The data of the institutions that have missed the due date to file the document are estimated based on the latest available document from these institutions. The information from the last three reference dates are revised periodically, and revision may possibly occur in other reference dates.

- d) Total Capital Ratio – Basel Committee on Banking Supervision international concept, consisting of the system regulatory capital (RC) divided by the system RWA. In Brazil, until September 2013, the minimum required ratio was the factor “F”, according to Resolution 3,490, of 29 August 2007, and Circular BCB 3,360, of September 12, 2007. Until October 2013, financial institutions and other institutions authorized to operate should observe the 11% limit established by the BCB, except for individual credit unions not affiliated to central units. From October 2013 on, the minimum required ratio has been disciplined by the Resolution 4,193, of March 1, 2013, which defines a convergent calendar, requiring 11% of RWA from October 2013 to December 2015; 9.875% in 2016; 9.25% in 2017; 8.625% in 2018; and 8% from 2019 on. On top of this requirement must be added a capital buffer, as mentioned in the Common Equity Tier 1 (CET1) Ratio topic.
- e) Tier 1 Capital Ratio – According the Resolution 4,193, of 2013, a Tier 1 Capital requirement became effective from October 2013 on, corresponding to 5.5% of RWA, from October 2013 to December 2014, and 6% from January 2015 on. On top of this requirement must be added a capital buffer, as mentioned in the Common Equity Tier 1 (CET1) Ratio topic.
- f) Common Equity Tier I Ratio (CET1) – According the Resolution 4,193, 2013, a CET1 capital requirement became effective from October 2013 on, corresponding to 4.5% of RWA. In addition to this requirement, the Resolution established a capital buffer, composed by the following items: conservation, countercyclical and systemic. The conservation buffer requirement corresponds to the following RWA percentages: zero, until December 31, 2015; 0.625%, from January to December 2016; 1.25%, from January to December 2017; 1.875%, from January to December 2018; and 2.5% from January 2019 on. The countercyclical buffer requirement is limited to the following maximum RWA percentage: zero, until December 31, 2015; 0.625%, from January to December 2016; 1.25%, from January to December 2017; 1.875%, from January to December 2018; and 2.5% from January 2019 on. The systemic buffer requirement is limited to the maximum RWA percentage: zero until December 31, 2016; 0.5%, from January to December 2017; 1.0%, from January to December 2018; and 2.0% from January 2019 on.
- g) Leverage ratio – Basel Committee on Banking Supervision international concept, consisting of Tier I Capital to Total Exposure ratio. In Brazil, the BCB Circular 3.748, of February 27, 2015, established the leverage ratio (LR) methodology. This index intends to complement the current prudential requirements, through a simple, transparent and non-sensitive risk metric. By now, there is no regulatory requirement for LR. A minimum requirement is expected to be established in 2018, after data analysis and studies.

Concepts and methodologies – Capital stress

Capital stress tests are an estimation of potential losses and eventual capital needs motivated by huge movements on interest rates and FX rates (market risk), credit volume and delinquency (credit risk). Shocks may be applied individually on each risk factor or simultaneously on all of them and negative results impact directly the capital of each institution.

For each stress scenario, the Basle Ratio, the CET1 and Level 1 capital are estimated. A bank is considered uncompliant whenever it falls below the hurdle rate in any requirement, and insolvent or bankrupt if CET1 gets negative. Positive effects of regulatory expected triggers are considered as well. Results display the aggregated capital needs in order to all banks but taken individually to comply with capital requirements, in relative terms against the financial system total assets.

1 Sensitivity analysis

1.1 Market risk factors shifts

We subject to stress all exposures that are subject to interest rate risk and are listed on the trading book (e.g., fixed rates, currency coupons). The stress consists of repricing exposures at all vertices (from 21 to 2520 days) and evaluating its impacts on banks' capital positions. Beyond its impact on capital, stressed exposures also affect RWAs (RWA_{JUR1} , RWA_{JUR2} , RWA_{JUR3} , RWA_{JUR4}).

Moreover, exposures in foreign currency, gold and other instruments subject to changes in the exchange rates are also stressed and their impacts on capital and RWA_{CAM} . Here we assume that all exposures are repriced following the percentage points forecasted for the stressed Dollar-Real exchange rate.

We apply shocks individually for each factor, the interest rate and the exchange rate, starting at their current values, in steps of 10% for both directions, until it reaches 200% and 10% of its current value, on the upside and on the downside, respectively. After recalculating capital ratios, we evaluate both the regulatory capital adequacy and the solvency of banks.

1.2 Increase in delinquency rates

We analyze the effects in NPL¹ increases on banks' capital positions and required capital. We increase the NPL up to 350% of its current level and compute the additional provision required to meet the NPL. These additional provisions impact both banks' capital positions and the RWA_{CPAD} component of the required capital. After recalculating capital ratios, we evaluate both the regulatory capital adequacy and the solvency of banks.

1.3 Fall in housing prices

We estimate the impacts of the fall in house prices on the capital of banks with outstanding mortgages. We proxy house prices with the value of the updated² collateral provided for the loan.

1/ All references to NPL on this report follow the concept of credits of 90 days past due.

2/ We use the IVG-R to update house prices.

The analysis consists of reducing house prices, in steps of 5p.p. and recalculating LTVs. Collaterals that become lower than 90% of the remaining loan are considered delinquent. For these loans, the losses account for the loan value, the recoverable amount, taxes and other costs associated with the foreclosure process. Finally, these losses are computed as additional provisions and impacts on capital ratios are evaluated just like in the NPL sensitivity analysis above.

2 Scenario analysis – Macro stress tests

2.1 Scenario design

We design four different scenarios: baseline, stressed VAR, structural break and historical. They are used to project macroeconomic variables for each quarter in the six-quarter forecast horizon. The macroeconomic variables forecasted for the stress test exercises are the Economic Activity Index measured by the BCB (IBC-Br), the Brazilian Real—US Dollar exchange rate, short term interest rate (SELIC rate), inflation (IPCA), country risk (EMBI+Br), long run foreign interest rate (10-yr US Treasuries Yield), and Unemployment. All variables are measured as a 3-month average.

The baseline scenario represents the market median expectations (FOCUS) for the economic activity, interest rate, exchange rate and inflation. The following adjustments as premises are considered in the design of the scenario: economic activity measure from the FOCUS and IBC-BR are perfectly correlated ($\rho = 1$); Brazil's risk premium is constant over the forecast horizon; foreign interest rates follow the baseline scenario designed by the FED on the report “2016 Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Act Stress Testing Rules and the Capital Plan Rule”³.

The stressed VAR and structural break scenarios are both designed using estimated VAR coefficients. The estimation considers the IBC-Br, exchange rate, SELIC and IPCA as endogenous variables, and the EMBI+Br and the 10-yr Treasury yield as exogenous variables. Moreover, “model selection” results in the stressed forecasted trajectories (5% one-sided), that when translated into credit risk on banks' portfolios, produce maximal NPL⁴. In the stressed VAR case, the relationships among macro variables are preserved as given by the interrelated impulse response functions. On the other hand, the structural break scenario breaks the interdependence among the stressed forecasted trajectories. Each variable stressed forecast is just the 5%, one-sided, that produces adverse effects – disregarding economic inconsistencies.

Finally, the historical scenario we simulate the behavior of the macroeconomic variables looking at their history. For each six-month window, starting in July, 1998, we study their impact on NPL (as we do for the VAR forecasts above) and keep the one that produces the higher level of non-performing loans. That is the historical scenario.

2.2 Forecasts of credit growth and delinquency rates

The macroeconomic scenarios are translated into credit risk on bank's portfolios through the estimation of satellite panel models for credit growth and NPL. The models are estimated for three loan portfolios: consumer loans, corporate loans and household mortgages, adding up to six different models that allow us to assess each bank's reaction when facing stressed macroeconomic conditions.

For credit growth we consider dynamic models, where the dependent variable is the gap between credit growth and its long run tendency, extracted from an HP filter ($\lambda = 1,600$). As for the delinquency model, we

3/ See <<http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20141023a1.pdf>>.

4/ While the Treasury yields forecasts comes from adverse scenario designed by the FED (in the same document mentioned in footnote 1), EMBI+Br and Unemployment are updated using each series largest historical variation.

estimate dynamic panels for the logistic transformation of NPL, considering credit growth (and its lags) as predetermined variables. In both models, we also include macro variables (current and lagged) as exogenous variables and control variables at the bank's level (e.g., ownership).

In the process of projecting credit growth and NPL over the forecast horizon, we limit the former to the availability of capital. That is, each bank's loan growth cannot result in credit positions that breach capital adequacy ratios (total, additional and tier 1).

All credit transactions that have to be informed individually to the SCR have its contribution to credit risk evaluated, including those sold but whose risk remains within the bank (seller).

2.3 Market risk factors forecast

Unlike the impacts of credit risk, market risks affect bank's positions (only) immediately. They result from gains and losses associated with the repricing of the financial instruments that banks hold, at the date when the exercise starts, and last until the end of the forecasting horizon—once and for all shock.

The mark-to-market process relies on forecasted interest rates term structures. These projections are linked to the scenarios through the relation between the forecasted SELIC rate and implicit, 1-yr, fixed rates. Moreover, they are derived from Principle Components Analysis. Additionally, we compute coupon curves for currencies, price index, and other interest rates, assuming non-arbitrage with the fixed rate curve.

All financial instruments registered in the trading book and the derivatives registered in the banking book are marked-to-market.

2.4 Evaluating the impacts on bank's capital

Once we have computed the losses (or gains) from both credit and market risk on bank's balance sheet, we are able to evaluate their impact on their capital adequacy ratios. The effects from credit risk come from the additional provisions required whenever the projected non-performing loans are greater than the level of provisions in place. The additional provisions are due to stressed credit growth and NPL that impact both capital levels and the credit risk component of the RWA. On the same avenue, stressed interest rates and coupon curves used to (re)price financial instruments produce gains or losses in asset values with effects on both capital and the market components of the RWA (except for stocks and commodities). Hence, for each bank and date in the forecasting horizon, we inspect effects on both capital levels and risk weighted assets (RWA).

Furthermore, both the additional provisions and the losses resulting from repricing the financial instruments also impact DTAs. However, the constitution of new DTAs is conditioned by the banks capacity to generate earnings in the following years, so it is able to use them. This is important because DTAs also affect the levels of available and required capital. Another important aspect is that Basel III rules are incorporated in our framework. Hence, for example, effects from the schedule (phase-in, phase-out) and deductions are taken into account. Finally, we remark that the impacts we evaluate do not consider actions that potentially mitigate risks throughout the forecasting horizon.