FINANCIAL STABILITY REPORT

Second Half 2018

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CONTENTS*/

*/ The cutoff date for this *Report* was 5 November 2018.

PREFACE

As established in its Basic Constitutional Act, the Central Bank of Chile must "safeguard the stability of the currency and the normal operation of internal and external payments." To carry out these tasks, the Central Bank of Chile is vested with diverse legal powers, such as extending emergency credit and determining regulations in matters affecting the financial system and international foreign exchange operations.

The Central Bank's focus in the area of financial stability is centered mainly on the well-functioning of the system and the Chilean economy's access to international financial markets. In this context, financial stability is said to exist when the financial system is able to operate normally or without significant disruptions, even in the face of adverse situations. The Central Bank's tracking of financial stability is complementary to that undertaken by the specialized supervisory entities; it serves as an independent element of analysis with respect to the supervisors' powers and functions in relation to the entities subject to their oversight.

The objective of the *Financial Stability Report* (FSR) is to provide information, on a half-yearly basis, on recent macroeconomic and financial events that could affect the financial stability of the Chilean economy, such as the evolution of the indebtedness of the main credit users, the performance of the capital market, and the ability of the financial system and the international financial position to adapt sufficiently to adverse economic situations. In addition, the *Report* presents the policies and measures that support the normal operation of the internal and external payment system, with the objective of promoting general knowledge and public debate with regard to the Bank's performance in fulfilling this function.

The Board

SUMMARY

Since the previous Financial Stability Report*, the Chilean financial system, including its internal and external payment systems, has not recorded significant disruption events. In terms of risk, external financing conditions that are less favorable than those observed in recent years stand out. Local vulnerabilities and mitigators remain unchanged, being the flexible exchange rate regime one of the most relevant elements permitting to adequately absorb external shocks. In line with the previous* Reports*, the information available to date indicates that both debtors and lenders would be able to accommodate the impact of different aggregate stress scenarios, among other factors due to a low exposure to currency risk. All in all, some developments require further monitoring, among which stand out a potential abrupt change in external financing conditions, the smaller capital margin of local banks and the growth of non-bank credit in the absence of consolidated information about indebtedness.*

Among the threats to financial stability, those linked to a sudden adjustment of external financing conditions continue standing out. Since the previous *Report*, the gradual process of monetary normalization in advanced economies has continued. The United States, Canada and the United Kingdom, among others, have gradually withdrawn their monetary stimuli; However, still remains the risk of a faster monetary policy adjustment in the U.S. with respect to what is implicit in different market prices. Meanwhile, the European Central Bank has reduced bond purchases, intending to begin a gradual increase of its policy rate towards the end of 2019. In this context, long rates in Canada and the United Kingdom have remained stable since last May, while in the United States long rates showed an increase. There is also a risk of adjustment in appetite for risk of investors, which according to various indicators currently would be at high levels. This would lead to decompressions in risk premia and therefore abrupt changes in financial prices. In turn, in the emerging world, capital flows showed significant decreases during the year and in some economies financial conditions adjusted somewhat faster. For the time being, the main countries affected are those that had previous imbalances, such as Argentina, Brazil and Turkey.

In contrast, financing conditions at the local level in addition to risk premia for private issuers, continued to be favorable. Going forward, the deepening of adverse external events could have wider effects in emerging countries where the prolonged previous period of low rates incubated larger vulnerabilities. In the case of Chile, there are several mitigators, among others: a flexible exchange rate regime, and a deep local fixed income market, which translate into a low impact of changes in external financial conditions on local financial conditions. All in all, the higher equity reached by fixed-income mutual funds —made up of instruments that are more sensitive to changes in medium- and long-term interest rates— has increased the potential effect a massive liquidation of their portfolios could have, when faced with a sudden increase in long-term interest rates.

In general, no significant financial vulnerabilities are observed among local companies. However, certain developments require a more detailed follow-up. Firms' indebtedness would have reached 113% of GDP in the third quarter, with movements in recent quarters mostly explained by changes in the peso-dollar parity. This level of indebtedness does not necessarily represent a vulnerability due to important financial and currency risk mitigators. First, within the external debt (42% of GDP), loans related to foreign direct investment have a significant participation (17% of GDP) which has remained, these loans do not pose a level of financial risk equivalent to that of other sources of financing since they are financial obligations between related entities. Second, the firms that report to the Financial Market Commission exhibit low levels of currency risk exposure, due either to the composition of their balance sheets or the use of hedging instruments. Similarly, bond issuance in recent years has increased the duration of liabilities, therefore decreasing the risk of short-term refinancing. In particular, short-term residual external debt from loans (non-FDI) and bonds represents 3% of GDP. All these elements combined account for the low financial risk reported in stress test exercises carried out for the corporate sector. However, a potential vulnerability is configured for the group of local companies with investments in emerging economies—such as Argentina and Brazil—which could be affected by economic activity changes in these countries; nevertheless, their indebtedness with local banks is low. Finally, even though default levels have remained low among companies with local funding, firms from sectors related to the residential real estate market have shown some deterioration. A slowdown in the economic activity of this sector could exacerbate this situation, also affecting the portfolio of their creditor banks.

Household financial indicators have not shown major changes since the previous FSR. Debt continued to expand by over 7% in real annual terms. Since then, the deceleration of the mortgage component, which had been showing less dynamism since 2016 after a long period of higher growth, stood out. Meanwhile, non-mortgage debt continued to grow mainly through non-bank credit suppliers (NBCS), which represented close to 12% of total household debt by the second quarter of 2018. With respect to default, several indicators remained stable at low levels for historical patterns. In turn, between 2014 and 2017, the Household Financial Survey (HFS) reported a decrease in the number of households with debt, as well as an increase in those with

savings. However, among indebted households, the total median indebtedness increased from 1.6 to 3.5 times their monthly income, this was mainly explained by the fact that the representative household now has mortgage debt. This, together with higher obligations linked to revolving debt, resulted in an increased financial debt service ratio for the median household, which went from 20 to 25% of their monthly income in the same period. Moving forward, the evolution of the labor market will be relevant for the performance of the sector.

The main vulnerability of the banking sector is its lower capital margin with respect to the levels reached at the beginning of this decade. As discussed in previous FSR, stress tests have pointed out that banks have a sufficient level of capital to face a severe stress scenario, however over the last few years their financial slack has reduced. These capital margins will have to be improved under the implementation of the new banking legislation. Other elements that merit monitoring are the intensive use of collateral to hedge credit risk in the individual assessment commercial portfolio, as well as the indirect exposure to households that some banks have through the financing they provide to NBCSs.

This *Report* includes a thematic chapter on the residential real estate sector, which describes the main developments of the sector and their implications for financial stability. In the residential real estate market, multiple economic actors interact, among others: real estate and construction firms, households and banks. Therefore, its adequate development contributes to the financial health of the agents that participate in it. The chapter documents the recent evolution of the market and its main variables, establishing that it has grown without presenting major imbalances over time. In particular, bank funding of mortgages has become more important in the last 15 years. In this period, the mortgage portfolio went from representing 19% of bank assets to 28% by the second quarter of the current year. In addition, housing prices grew at an average real annual rate of around 5%, in line with higher income levels, relatively lower land availability, and the expansion of the rental market. Among the issues that merit more follow-up, the increase of retail investors in real estate stands out. While this element contributes to the development of the rental market, such investors are exposed to new risks arising, for example, from changes in both vacancy rates and house prices.

During the second half of the year, regulatory advances were consolidated, mainly in the convergence of banking regulation towards Basel III and towards strengthening the standards applicable to financial market infrastructures. During the second half of the year, the convergence of the Chilean legal and regulatory framework towards Basel III was consolidated, through the approval of a new General Banking Law and the incorporation into banking regulation of compliance requirements for short-term liquidity levels. In the area of financial infrastructures, the promulgation by the Central Bank of new regulation during last January, which increased and updated regulatory standards, has had a positive impact on the evaluations of international organizations. In August, the Bank enacted a contingency protocol for high-value payment systems in order to strengthen their operational continuity through the complementary functioning of the subsystems that compose them

in the event of critical operational events. In October, the Bank published for consultation the regulatory framework needed to establish an integrated derivatives information system that will be a repository of transactions and will be administered directly by the Central Bank, this will contribute to deepening this market. Other important normative advances correspond to regulations issued by the SBIF, on provisions for credit risk and cybersecurity matters.

Transactions through high-value payment systems increased, maintaining high standards of management and operational security, even during contingency situations. In particular, the real-time gross settlement system, which is administered directly by the Central Bank, has provided 100% availability while operating appropriately, even during contingency situations experienced by a local bank that required an extension of its normal hours of operation.

I. FINANCIAL MARKET TRENDS AND EXTERNAL RISKS

Given that risk appetite remains high and monetary policy is normalizing in several advanced economies, the main risk for financial market stability remains that of a sharp correction in various asset prices that could increase the cost of external financing. A greater deterioration of the Latin American economies and a worse performance from China due to a deepening of the trade conflict with the United States could raise challenges for global and local growth in the medium term. Finally, cyber security breaches are increasingly an issue in monitoring financial stability at the global level.

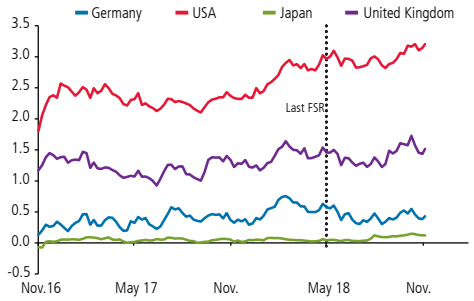
INTERNATIONAL FINANCIAL SITUATION

The medium-term growth forecast has been revised downward for several advanced economies, in a scenario where inflation has started to recover and long-term interest rates have been mixed.

The economic growth outlook for the next two years, while still positive, has recently begun to incorporate downward revisions. These adjustments could reflect, in part, the withdrawal of the monetary stimulus by some developed economies, motivated by higher inflation at the global level (WEO, October 2018). In the case of the U.S. Federal Reserve, the market expects an additional increase in the monetary policy rate at the December meeting and a total increase of 75 basis points (bp) in 2019. The Bank of Canada increased its policy rate by 25 bp for the third time this year at its October meeting, bringing it to the current level of 1.75%. In the United Kingdom, the Bank of England increased its reference rate by 25 bp at its August meeting, and a possible additional hike in the third or fourth quarter of next year it cannot be ruled out, depending, in part, on future developments around Brexit. The European Central Bank, in turn, reduced its monthly net asset purchases from 30 billion euros to 15 billion in October and announced the end of this program in January 2019, if the new data confirm the medium-term inflation forecast.

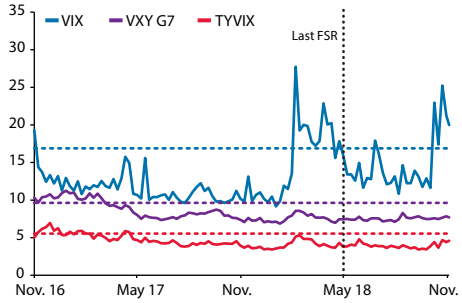
Long-term interest rates have had a mixed performance in the main developed economies since the cutoff date of the last *Report*, pointing to some degree of divergence among these economies (figure I.1). In this context, the sovereign bond rate fell to 0.43% in Germany and stayed around 1.5% in the United Kingdom. Long-term rates increased in the United States and Japan, by 24 and 8 bp, respectively.

FIGURE I.1
Interest rates on 10-year sovereign bonds
(percent)



Source: Central Bank of Chile, based on data from Bloomberg.

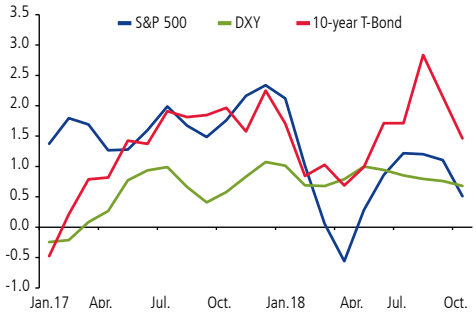
FIGURE I.2
Implied volatility (*)
(percent)



(*) VIX: implied volatility of 30-day options on the S&P 500 index. VXY G7: volatility index for G7 currencies. TYVIX: volatility index for 10-year U.S. Treasury bonds. Dotted lines mark the 2010–2016 average of the respective series.

Source: Central Bank of Chile, based on data from Bloomberg.

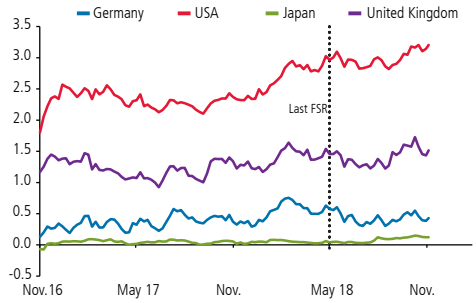
FIGURE I.3
Proxies for risk appetite (*)
(index)



(*) Positive (negative) values indicate higher (lower) risk appetite relative to the historical average.

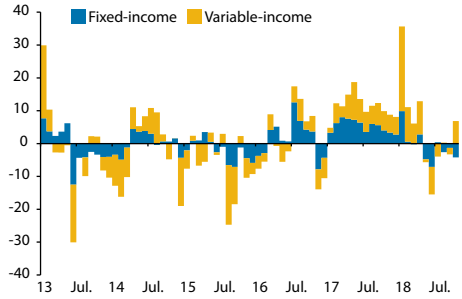
Source: Central Bank of Chile, based on Álvarez et al. (2018).

FIGURE I.4
International stock indices
(average index: January 2018=100)



Source: Central Bank of Chile, based on data from Bloomberg.

FIGURE I.5
Portfolio inflows to emerging economies
(US$ billion)



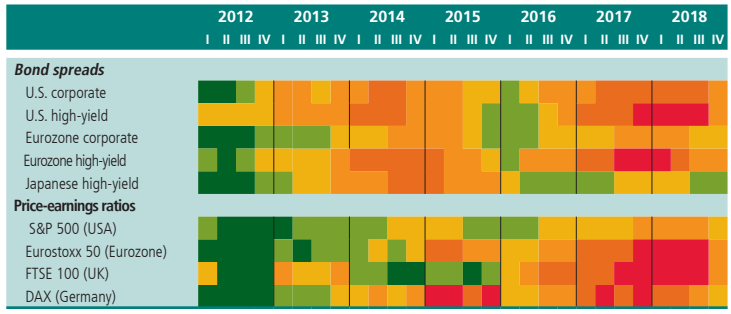
Source: Central Bank of Chile, based on EPFR.

Despite recent corrections, several indicators suggest that some asset prices are still high from a historical perspective.

Since the last *Financial Stability Report* (FSR), options prices in the foreign exchange and fixed-income markets have continued to record implicit volatility levels below historical averages, pointing to a low risk perception in these markets. In contrast, implicit volatility in the stock market has increased significantly since mid-October, mainly due to uncertainty surrounding specific geopolitical events and trade tensions (figure I.2). Nevertheless, these levels are relatively low compared with the actual variance of the different asset prices, known as realized volatility. By comparing these two measures of volatility, it is possible to infer the premium that investors require on different financial assets[1]/. In the most recent period, the difference between the two measures has narrowed, suggesting that investors still have a high appetite for relatively riskier financial instruments (figure I.3).

The above development is consistent with the recent evolution of a wide range of asset prices discussed in *Global Financial Stability Report* (GFSR) in October 2018. Thus, since the last FSR, stock indices have generally fallen, except in the United States, with emerging regions such as Latin America and Asia recording the largest accumulated reductions (figure I.4). Despite these adjustments, a number of stock indices are still high relative to their yields. Corporate bond spreads, in turn, remain low from a historical perspective, pointing to lower differentiation of private versus sovereign instruments (table I.1).

TABLE I.1
Heat map of vulnerability deriving from valuation (*)



(*) Green, yellow/orange, and red indicate low, medium, and high risk, respectively. Low spreads and high price-earnings ratios indicate high risk. Risk categories are based on sextiles of the distribution for each variable. Earnings per share was cyclically adjusted taking the ten-year moving average.

Source: Central Bank of Chile, based on data from Bloomberg.

[1]/ The smaller the difference between implicit and realized volatility, the smaller the premium demanded by investors and thus the greater their willingness to buy the asset.

The macrofinancial situation of some emerging economies has deteriorated.

Portfolio inflows to emerging economies shrank considerably over the course of the year in both the fixed- and variable-income components, a trend that eased in the recent period (figure I.5).

As of the cutoff date of this FSR, long-term interest rates have increased in emerging economies relative to the last *Report*, while their spreads were essentially stable, except for more vulnerable countries like Argentina, Brazil, and Turkey. In the case of Argentina, inflation soared to over 40% and the peso depreciated against the dollar by almost 95% in the year, leading the government to request an increase in its credit line from the International Monetary Fund. In Brazil, private investment remains sluggish, contracting 1.8% in the second quarter, while the financial markets recorded episodes of volatility around the presidential elections. In Turkey, the large current account deficit, inflation over 25%, and the sharp depreciation of the lira have resulted in an extensive currency mismatch in the corporate sector, equivalent to almost 25% of GDP. These factors have contributed to the significant destabilization of the Turkish economy.

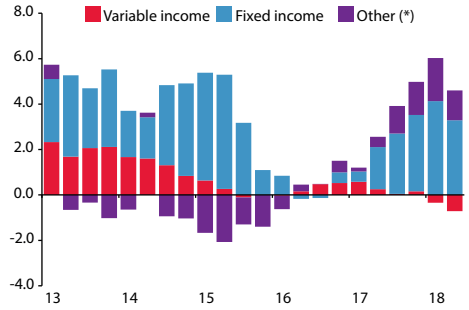
In Chile, some local firms that report to the Financial Market Commission (FMC) have investments in Argentina and Brazil, reaching 16% of their total assets or up to 27% of their total sales, and they could thus be affected by the economic cycle in these countries. If these firms adjust their business model, it could have an impact on their local suppliers, which in general have financial commitments with the banking sector.

In China, the debt level of the nonbank system continues to expand despite the measures taken by the monetary authority to contain it. Market estimates indicate that China's off-balance-sheet local government debt, mostly designated for investment in infrastructure, is significant and carries a high credit risk. According to these estimates, total government debt may have reached 60% of GDP in 2017, which could exacerbate the financial risks associated with the trade war with the United States.

The trade conflict between the United States and China has thus far been concentrated in these two economies, but uncertainty surrounding future developments remains high.

With regard to the trade war, the United States applied tariffs on imports totaling US$250 billion. China retaliated while also announcing a reduction in tariffs on other trading partners and fiscal measures to boost the real economy. These events had a negative impact on the stock markets of both countries, which contracted around 1.4% on average on the day of the announcements, and the renminbi depreciated about 0.5% against the dollar on average (BIS, 2018). Subsequent U.S. announcements on a new round of tariffs and uncertainty about how China would respond to them have perpetuated the tension surrounding the conflict.

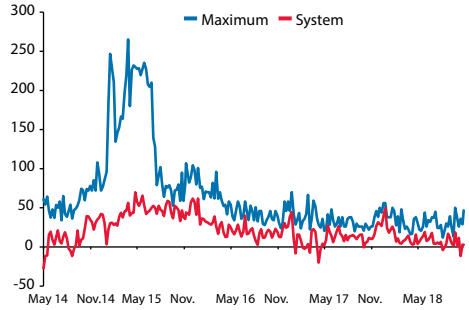
FIGURE I.6
Portfolio inflows to Chile
(percent of GDP)



(*) Includes bank loans, trade credit, currency and deposits, and other liabilities.

Sources: Central Bank of Chile.

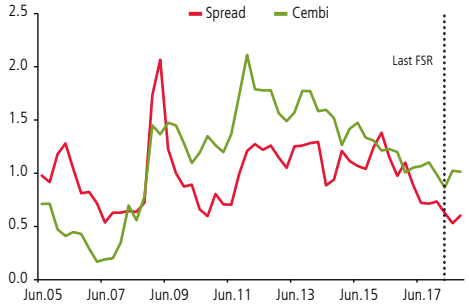
FIGURE I.7
30-day deposit rates (*)
(basis points, spread over MPR)



(*) Weekly statistics calculated based on daily data on time deposits traded in secondary markets, by issuer.

Source: Central Bank of Chile, based on data from the BCS.

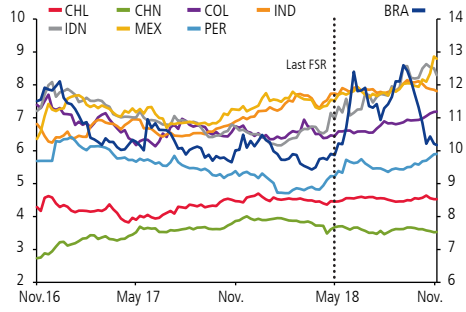
FIGURE I.8
Private bond rates (*)
(percent)



(*) Includes traded UF-denominated bonds issued by financial and nonfinancial firms, with an AA rating and a duration of 4 to 6 years.

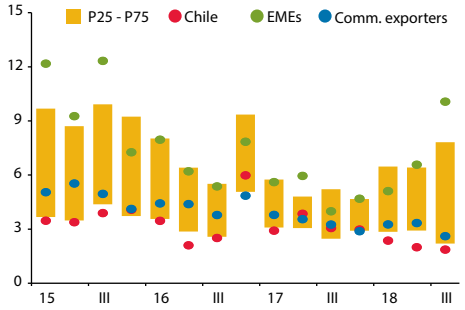
Source: Central Bank of Chile, based on data from the Santiago Stock Exchange and Bloomberg.

FIGURE I.9
Interest rates emerging market sovereign bonds
(percent)



Source: Central Bank of Chile, based on data from Bloomberg.

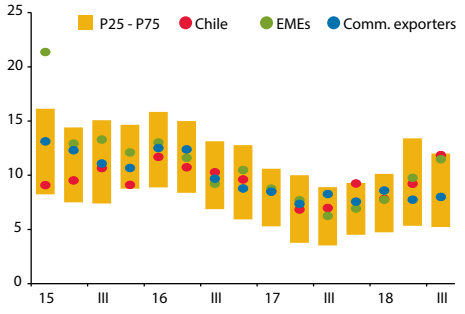
FIGURE I.10
Volatility of emerging 10-year sovereign rates (*)
(basis points)



(*) Calculated as the standard deviation of the daily change in rates. EMs include Chile, Brazil, China, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Poland, Russia, and Turkey. Commodity exporters include Australia, Canada, Norway, and New Zealand.

Sources: Central Bank of Chile and Bloomberg.

FIGURE I.11
Annualized exchange rate volatility (*)
(percent)



(*) EMs include Chile, Brazil, China, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Poland, Russia, and Turkey. Commodity exporters include Australia, Canada, Norway, and New Zealand.

Sources: Central Bank of Chile and Bloomberg.

LOCAL FINANCIAL SITUATION

Since the last FSR, short- and long-term financing conditions, as well as the spreads demanded by investors, remain favorable. The pension funds have helped keep long-term interest rates stable.

In the case of Chile's financial account, foreign fixed-income investors (portfolio liabilities) continued to grow, mainly in central government bonds. At the same time, nonresident variable-income investment decreased around 0.7% of GDP in the second quarter of this year (figure I.6).

Short-term financing conditions in pesos have evolved normally, which has translated into 30-day funding costs in line with the current monetary policy rate and little dispersion among the different banks in the market (figure I.7). On-shore dollar rates continue to undergo periods of volatility, especially the rates implicit in peso-dollar forward contracts at less than 30 days. However, complementary information shows that these episodes have not affected the banking sector's funding costs.

Since the last FSR, the spreads on medium- and long-term debt from private issuers have remained low from a historical perspective, near the historical minimum. In the same period, the financial profile of issuers has been stable (in terms of liquidity, debt, and profitability), so an adjustment in spreads would be based on variables such as investors' appetite, the relative supply and demand for these instruments, and so forth (figure I.8).

In Chile, long-term sovereign rates in pesos have been relatively stable at around 4.5%, in contrast with the trends in other emerging economies (figure I.9). The low relative volatility of local sovereign rates is not a recent development. A comparison with other emerging economies shows that Chile has systematically been positioned at the lower end of the distribution (figure I.10). In contrast, the exchange rate has recorded high relative volatility, consistent with a flexible exchange rate regime (figure I.11). An additional factor that could explain the lower rate volatility is the participation of the pension funds in the domestic sovereign debt market, especially in the longer segments of the curve, where these investors account for 80 to 90% of the market and generally pursue a buy-and-hold strategy (figure I.12). Internal estimates indicate that an increase of 10 pp in the share of domestic nonbank investors in the sovereign bond market would reduce the volatility of long-term sovereign bond rates by around 10%, on average.

Since the cutoff date of the last *Report*, the pension funds have increased the share of their portfolio invested in the local market, to the detriment of overseas investments. Thus, in October, flows of nearly US$3.5 billion have been allocated mainly to investment in sovereign bonds (figure I.13). As mentioned earlier, the greater investment in sovereign bonds by the pension funds increased their share by 2.3 pp, which more than offset the exit of nonresident investors in this market (figure I.14).

With regard to local variable-income assets, the IPSA fell just over 7% relative to the cutoff date of the last FSR. This could be explained, in part, by the poor performance of local firms with a high exposure to Argentina and Brazil. The yield volatility of the IPSA has recently increased, but it is still at the lower end of the distribution for a broad sample of emerging economies and is similar to other commodity exporters (figure I.15).

With regard to the mutual funds, the low and stable long-term interest rates continued to drive the growth of medium- and long-term debt funds (type 3 mutual funds, or MF3) since the last FSR. Thus, a sudden increase in local long rates could affect the size of MF3 funds, which, in turn, could amplify the upward shift in long-term interest rates (Álvarez et al., 2018).

EXTERNAL THREATS TO FINANCIAL STABILITY

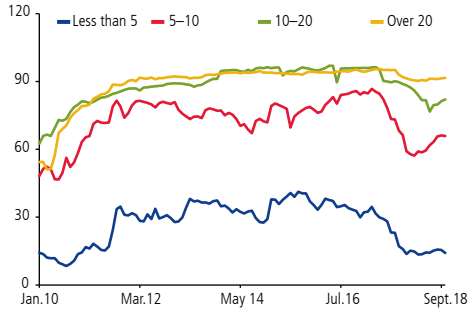
Faster monetary policy adjustments in the advanced economies, combined with changes in investors' risk appetite, could have a negative impact on different asset prices

As indicated above, the monetary stimulus withdrawal is ongoing in several developed economies, while a large set of assets continues to be overvalued, both in advanced economies and at the local level. This may be driven by the low levels of implicit volatility, relative to realized volatility, thus reflecting a strong appetite for global risk. A faster adjustment in external reference rates and changes in investor perceptions could result in sharp portfolios adjustments. This represents a risk scenario since it could lead to an increase in spreads, thereby triggering a significant reversal of the price of various international and local financial assets in the short term.

The escalation of adverse events in some emerging countries could have wide-ranging effects.

While many emerging economies have recorded capital outflows, the impact has been larger in countries with existing vulnerabilities in terms of the current account deficit or high inflation (BIS, 2018). A deepening of these trends could have broader adverse impacts, affecting other emerging economies, including Chile. On the one hand, an increase in the share of investors with a lower risk appetite could make it harder to predict their behavior in response to future stress episodes. On the other, the regional growth outlook affects the performance of local firms with investments in Argentina and Brazil (chapter II).

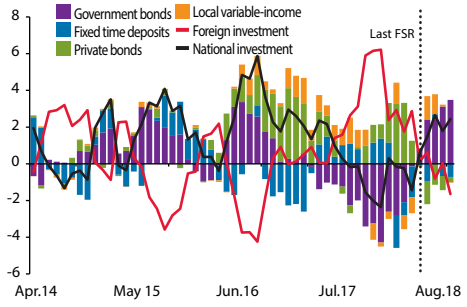
FIGURE I.12
Share of PFs in the yield curve (*)
(percent)



(*) Share based on residual maturity, measured in years, of domestic sovereign bonds.

Sources: Central Bank of Chile and CSD.

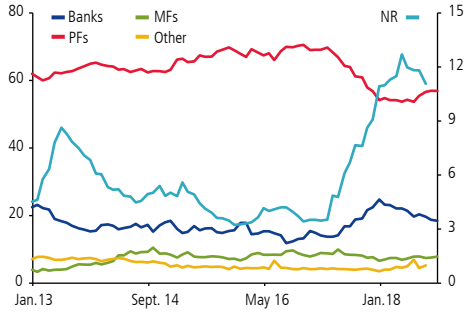
FIGURE I.13
Pension fund investment flows (*)
(US$ billion, three-month moving sum)



(*) Net change per instrument, including purchases, sales, redemptions, and drawings and excluding derivative maturities, rebates, dividends, and coupon cuts. Last datum updated through 12 October 2018.

Source: Central Bank of Chile, based on data from the Superintendence of Pensions.

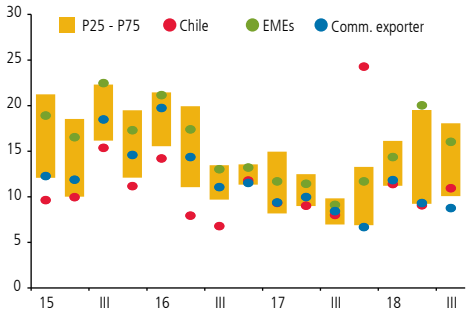
FIGURE I.14
Sovereign debt by type of investor (*)
(percent)



(*) Nonresident (NR) data are available through August 2018.

Source: Central Bank of Chile, based on data from the CSD.

FIGURE I.15
Annualized volatility of stock returns (*)
(percent)



(*) EMs include Chile, Brazil, China, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Poland, Russia, and Turkey. Commodity exporters include Australia, Canada, Norway, and New Zealand.

Source: Central Bank of Chile, based on data from Bloomberg.

The trade war between the United States and China continues to escalate, and it could have a significant and long-lasting impact on global growth and prices.

The recent developments in the U.S.-China trade conflict and fears of a worsening in the tension between the two countries have begun to have some adverse effects. In particular, the International Monetary Fund (IMF) revised the growth forecast of both economies downward in its October report (WEO), estimating that the tariffs that have already been implemented imply a 0.3% reduction in long-term growth relative to a scenario without tariffs. The *Report* also warns that if the conflict affects the investment plans or financing conditions of firms in other countries, the negative impact on world growth would be long-lasting. Furthermore, increased uncertainty surrounding the conflict could cause a significant increases in the VIX, as has recently been the case, revealing a lower risk appetite among investors that could increase credit and term spreads, ultimately affecting asset prices both globally and in Chile.

In Europe, negotiations on a Brexit deal continue.

The United Kingdom is scheduled to leave the European Union in March 2019. Although a deal could still be reached before the end of the year to minimize the real and financial stability impacts of the transition, a no-deal scenario is still a real possibility. *Oxford Economics* (2018) estimates that the economic effects of a no-deal Brexit would largely be confined to the United Kingdom and Ireland, with a reduction in growth in two years of 2.0 and 1.5%, respectively. In addition, the operational continuity of the derivatives market between counterparties in the United Kingdom and the European Union is still a source of uncertainty, especially in the United Kingdom. Specifically, the Bank of England's Financial Policy Committee estimates that derivative contracts between European and British firms currently total 69 trillion pounds, representing around 38% of this market. A sudden liquidation of these contracts would raise costs and increase stress in this market. Industry estimates suggest that for each basis point of increase in the liquidation cost of interest rate swap contracts, the European industry would incur annual costs of nearly 22 billion euros.

The occurrence of cyber attacks could affect the operational continuity of the financial system.

Cybernetic risks are increasing worldwide. While these threats have not compromised the financial system as a whole, they are becoming increasingly important for the agencies that do the work of monitoring financial stability. The Chilean financial system is not exempt from these risks, and ongoing mitigation efforts have involved the coordination of the different local financial agents (box I.1).

BOX I.1
CYBER SECURITY AND FINANCIAL STABILITY

Containing operational risks in the financial sector is a concern for both regulators and the industry. Typical risk containment strategies include the adoption of measures for mitigating the negative effects of events such as natural disasters, disruptions in physical and technological infrastructure, and cyber attacks.

Over the last few years, there has been an increase in the risks associated with cyber security. This is related to the increasing levels of sophistication, process technology, and interconnection of financial entities. Thus, while cyber risks are similar to other operational risks in terms of their potential to disrupt financial services, they can imply a more far-reaching risk for financial stability, for example, through the theft of financial assets or information that more directly compromises the victims of this type of attack.

Different jurisdictions are increasingly reporting cyber security breaches in financial institutions, with material consequences in a number of cases. For example, in 2013, a cyber attack on three banks in South Korea affected sensitive information, monetary operations, and automated teller machines; in 2016, the Central Bank of Bangladesh suffered the theft of US$81 million; also in 2016, a bank data breach in India compromised 3.2 million credit cards; and in April of this year, three banks were attacked in Mexico, resulting in the disruption of service and equity losses. Locally, the cyber attacks on *Banco de Chile* on 24 May 2018 and on *Banco Consorcio* on 6 November show that our financial system is not immune from these threats (chapter VI).

Financial stability

There are at least five channels through which the materialization of cyber security risks can threaten financial stability. First, cyber attacks can cause the disruption of financial services in the affected institutions, whether they are banks or financial infrastructures. Due to the interconnectedness of these entities, the disruption can potentially spread to the rest of the financial system. Second, cyber attacks can interrupt the normal flow of payments, affecting other institutions, including financial market infrastructures, through the large-value payment system (LVPS). At heart, these two channels are mainly related to the traditional understanding of cyber security as an operational risk. Third, a cyber attack can result in the theft of critical information from the financial system, including sensitive client information. Fourth, cyber attacks can weaken the equity position of a financial institution as a result of the theft of resources. Fifth, a cyber attack can undermine confidence in the security of the financial system. For example, a cyber attack on retail payment systems reduces the confidence of the people who use the system, inhibiting their transactions and ultimately affecting financial activity.

The impact on financial stability will depend on factors such as the magnitude of the attack, the size of the institutions affected, and their ability to respond to the attack and return to normal operations.

Role of the Central Bank of Chile

The Central Bank's role in the area of cyber security is determined by two key elements: (i) its legal mandate to safeguard the normal functioning of the payment systems; and (ii) its responsibility for the direct administration and management of critical financial system processes.

In accordance with the mandate established in its Basic Constitutional Act, the CBC must safeguard the normal functioning of internal and external payments, ensure the provision of liquidity in normal times, and also act as lender of last resort. These instructions translate into a constant concern for the stability of the financial system and are manifested in concrete actions. First, the CBC, through the *Financial Stability Report* and other channels, issues warnings on market risks and, through structures such as the Financial Stability Board (FSB), promotes the necessary safeguards. Second, the CBC participates in the regulation of the financial system, for example, through its influence on liquidity and market risk management standards and the conditions for participating in the bank sector, the derivatives market, and the taking of deposits. It also regulates financial market infrastructures and the LVPS. Finally, the CBC continuously provides liquidity to the interbank system.

In parallel, the CBC must ensure the operational continuity of the various critical financial system processes that it manages. Thus, the Bank manages overseas financial assets, such as its international reserves or the sovereign funds administered for the Ministry of Finance. Additionally, the Bank manages and generates essential and sensitive statistical and financial information for the system. Finally, it operates the real-time gross settlement (RTGS) system, which settles payments between financial institutions, and thus has direct responsibility in the event of operational disruptions.

Institutional coordination and future challenges

Other authorities besides the CBC play an important role in supervising and regulating the financial system, including the banking system (SBIF), securities and financial market infrastructures (FMC), and the pension funds (SP). Some of these authorities have recently published recommendations and incorporated regulatory changes in relation to safeguarding cyber security (chapter V).

Given the nature of cyber security risks, there are a number of authorities involved in containment in the country, including, for example, the special police unit for the prevention and control of financial crime, which has a broader jurisdiction than the authorities and entities that directly make up the financial system.

In the financial arena, international experience indicates that cyber attacks can have a systemic impact and thus require coordinated and consistent action by the authorities with power and responsibility in this area. Thus, the Financial Stability Board (FSB), in accordance with its role in coordinating and articulating policies in conjunction with the financial supervisors, reconvened the FSB Working Group on Operational Continuity (FSBWGOC), which resulted in the signing of a Memorandum of Understanding on the design and implementation of a contingency protocol for operational risk problems caused by cyber security disruptions. The FSB also requested technical assistance from the IMF in this area.

In this context, the Executive Office announced a financial cyber security bill, which in turn is part of the government's general strategy to strengthen cyber security. According to announcements by the Finance Ministry, the bill will include clear and uniform powers and mandates for all authorities; requirements proportional to a given financial entity's potential impact on the system; the obligation to continuously report to the authorities on risk management and specific incidents; and the development of risk assessment, contingency plans, cyber security training, testing, and so on.

Some of the future challenges for the regulators are to review the regulatory and supervisory framework on operational and cyber security risk management in search of areas for improvement. These might include the incorporation of more detailed rules and regulations, so as to reduce discretion in the implementation of measures; graduated requirements in line with international standards and best practices; and the consideration of systemwide risks and impacts on other institutions.

In addition, the tracking and monitoring of cyber security risks needs to be improved. This implies the analysis of new measures that allow the correct identification and weighting of these risks. There also needs to be an assessment of supervisory capacity in this area to determine whether it needs to be improved or even created.

Finally, it is essential for private sector financial entities to constantly review whether they are adequately managing the cyber security risks to which they are exposed. Not only are they responsible to their clients for the commitment they have undertaken, but they are also part of a highly interconnected system. Moreover, it is in their own best interest to adequately safeguard their data and resources, given that the materialization of these risks can entail very high reputational and equity costs.

[7] As part of the process of overhauling its management structure, the CBC recently created the position of Head of Cyber Security, who will be in charge of monitoring the IT security risks faced by the Bank.

II. CREDIT USERS

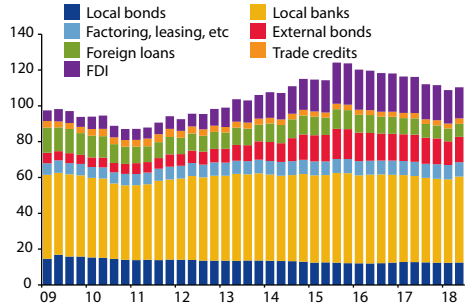
The financial situation of local firms has not changed substantially since the last Report. *However, credit risk indicators have increased in some sectors, with lengthening arrears. In the residential real estate sector, new home sales increased, and prices continued to rise. For households, both indebtedness and debt service increased, but there was no significant change in loan delinquency. The more favorable macroeconomic context puts credit users in a better position to face adverse events, provided they take advantage of the higher growth to strengthen their financial position.*

FIRMS

Corporate debt was 110% of GDP, which is around the level in the last FSR (figure II.1).

After several quarters in decline, the total debt of firms stabilized at around 110% in the second quarter of 2018. Internal estimates suggest that it will be around 113% in the third quarter. The recent trend is explained, in large part, by the valuation in pesos of the external component. Expressed in dollars, external corporate debt has not changed much over the last three years, hovering around US$115 billion (figure II.2). At the local level, the funding source comprising factoring, leasing, and others remained dynamic as of the cutoff date of this *Report*, and the growth rate of local bank debt was also high in the period (table II.1). Third-quarter data on commercial loans confirm this trend and continue to be dominated by firms whose only source of financing is the local banking sector, that is, firms whose funding sources do not include bonds (local or overseas) or FDI-related loans, although firms that report to the Financial Market Commission (FMC) also account for a large share of the growth (figure II.3).

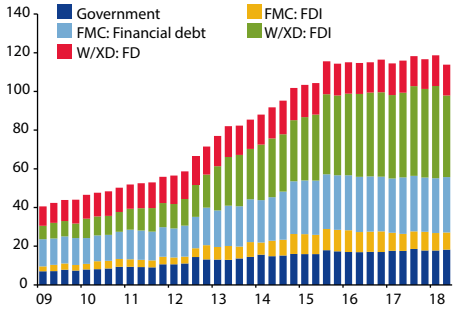
FIGURE II.1
Total debt of nonbank firms (*)
(percent of GDP)



(*) Based on firm-level data, except "Factoring, leasing, etc.," securitized bonds, and commercial papers. For more detail on the series and methodology, see the figure set.

Source: Central Bank of Chile, based on data from Achef, SBIF, and FMC.

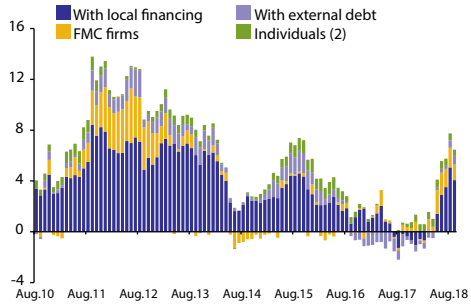
FIGURE II.2
External debt of nonbank firms (*)
(US$ billion)



(*) Based on GDP in the rolling year ending in each quarter. GDP converted using the average exchange rate in the last month of each quarter. For more detail on the series and methodology, see the figure set.

Source: Central Bank of Chile, based on data from the FMC.

FIGURE II.3
(real annual change, percent)

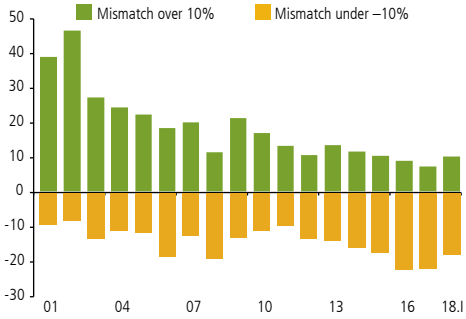


(1) Includes contingent loans and foreign trade loans. FMC-reporting firms include direct subsidiaries. Firms with external debt have had overseas loans, bonds, or FDI at least once between 2009 and 2018. For more details, see Fernández and Vásquez (2018).

(2) Estimates based on data through September 2018.

Source: Central Bank of Chile, based on data from the SBIF and FMC.

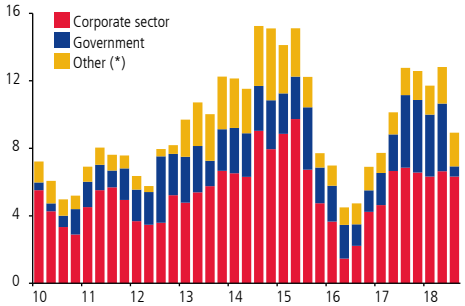
FIGURE II.4
Currency mismatch of firms in the corporate sector (*)
(percent of total assets)



(*) Based on a sample of firms that report their balance sheet in pesos. For more detail on the series and methodology, see the figure set.

Source: Central Bank of Chile, based on data from the FMC.

FIGURE II.5
Bonds issued by nonbank firms
(US$ billion, 12-month rolling sum)



(*) Other includes local and overseas bonds issued by FMC-reporting and nonreporting firms in the financial services and mining sectors.

Source: Central Bank of Chile, based on data from the FMC.

TABLE II.1
Sources of financing (1)
(real annual change, percent)

	2012	2013	2014	2015	2016	2017		2018			Share	Contribution to growth
	IV	IV	IV	IV	IV	III	IV	I	II	III		
Local debt	7.2	6.9	1.8	3.8	1.9	1.9	1.4	1.8	5.4		62.1	3.2
Bank and other loans	9.4	7.3	2.9	5.4	1.1	0.5	0.8	1.9	5.7		50.7	2.8
Commercial loans (2)	9.5	7.4	2.4	5.8	0.8	-0.4	-0.2	1.1	5.6	6.6	43.5	2.3
Factoring, leasing, etc.	8.5	6.9	6.1	3.0	3.1	6.8	7.4	6.9	6.7		7.2	0.5
Local publicly traded securities	-0.8	5.3	-2.8	-3.3	5.6	8.4	4.0	1.2	3.7	5.4	11.3	0.4
External debt	9.4	26.7	27.3	22.2	-6.0	-5.1	-5.2	-6.8	-6.6		37.9	-2.7
Loans	0.3	2.9	15.2	4.3	-8.1	-14.5	-19.7	-16.5	-16.4	3.6	6.6	-1.3
Trade credit	-19.1	-0.7	-3.7	-1.2	-4.1	-0.4	7.0	0.5	8.9		2.8	0.2
Bonds	13.6	42.3	40.8	21.8	-7.2	-0.1	-0.1	-6.9	-1.2	7.9	12.8	-0.2
FDI-related loans	36.0	48.4	33.1	37.8	-4.4	-5.1	-4.1	-3.4	-8.6		15.8	-1.5
Exchange rate	-7.7	11.0	15.8	14.9	-5.3	-6.4	-4.5	-8.7	-4.4	8.9		
Total	**7.9**	**12.9**	**10.5**	**11.0**	**-1.5**	**-1.0**	**-1.3**	**-1.7**	**0.5**		**100.0**	**0.5**

(1) For more detail on the series and methodology, see the figure set. Third quarter 2018 is estimated based on partial data.

(2) Includes commercial loans to firms and individuals, foreign trade loans, and contingent loans. Excludes student loans to individuals.

Source: Central Bank of Chile, based on data from Achef, SBIF, and FMC.

As reported in past FSRs, a large share of the increased debt of firms corresponds to the external component, which explains the total amount of growth in the last three years. While this dynamic could be a potential source of vulnerability, it is important to take into account the composition of external corporate debt, in particular the share of loans associated with foreign direct investment (FDI) (figure II.2). Because these liabilities are between related companies, the enforceability of the debt and possible changes in financing conditions are affected by different factors than, say, bank loans. Thus, the large share of this type of funding in total external corporate debt should be understood as a risk mitigator in the face of events that drive up financing costs (see *Monetary Policy Report*, September 2018, box II.1).

Firms that report to the FMC recorded increases in both profitability and debt (table II.2 and the statistical appendix).

In the second quarter of 2018, the profitability and interest coverage of firms that report to the FMC—that is, the corporate sector—increased relative to a year ago. Indebtedness also increased relative to past periods, concentrated in a small group of firms. The currency mismatch of firms that keep their accounts in pesos was low and stable, both on aggregate and for the segment of firms with a mismatch of over 10% of assets (figure II.4 and the statistical appendix). Finally, gross bond issues remained dynamic for the corporate sector (figure II.5). In terms of maturity, the bulk of these corporate bonds come due in the medium term, consistent with the policy of refinancing liabilities reported in past FSRs. This factor, together with the use of currency derivatives to reduce the debt's exposure to fluctuations in the peso, has bolstered the stress test results discussed in the last *Report*. According to the tests, a 200 bp increase in interest rates and a 20% peso depreciation in one year would not significantly increase firms' financial expense to where it would represent a threat to the normal functioning of the sector.

TABLE II.2
Corporate sector financial indicators: FMC-reporting firms (*)
(percent, times)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	Jun.18
Profitability										
Average	7.58	8.17	6.88	6.23	5.80	6.08	5.91	6.65	6.59	7.08
Median	6.57	7.52	7.50	6.13	6.17	5.67	5.40	5.64	5.34	7.16
Indebtedness										
Average	0.64	0.63	0.68	0.73	0.71	0.73	0.73	0.73	0.71	0.76
Median	0.57	0.52	0.50	0.62	0.66	0.63	0.57	0.59	0.61	0.65
Coverage										
Average	3.89	4.40	3.49	3.11	2.91	3.06	3.06	3.25	3.27	3.65
Median	4.02	4.30	3.86	2.81	3.12	2.75	3.10	3.04	2.89	3.24

(*) Data through December of each year, except 2018, which uses the rolling year ending in June. Excludes firms in the financial services and mining sectors, as well as state-owned companies. Profitability (percent): earnings before interest and taxes over total assets. Indebtedness (times): financial debt over equity. coverage (times): earnings before interest and taxes over interest.

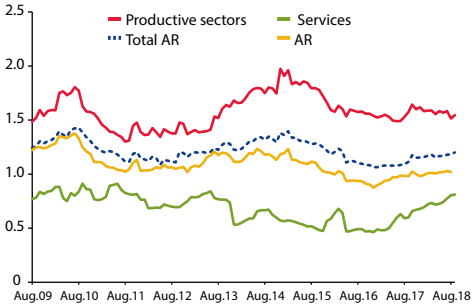
Source: Central Bank of Chile, based on data from the FMC.

Regional developments could affect a group of FMC-reporting firms that have overseas investments, particularly in Argentina and Brazil. In June 2018, the exposure of these companies to these two countries represented 31% of their assets and 33% of their total sales. The debt held in Chile by these firms is equivalent to 9% of GDP, of which 68% corresponds to external debt, 20% to local bond issues, and the rest to local bank financing. For firms with exposure to Argentina and Brazil, the potential total effect has two dimensions. On the one hand, the depreciation of local currencies could affect their equity through the conversion effect on investments in subsidiaries. On the other, if the depreciation is persistent and flows in local currency do not increase—due to an adverse macroeconomic scenario—the lower return on these investments could affect the firms' profitability and cash flow. These scenarios are more likely among companies oriented toward the domestic sector of these markets.

In terms of bank repayment rates, the default ratio on commercial loans maintained a slight upward trend, driven by the services sector (figure II.6).

The arrears rate (AR)—while low from a historical perspective—has continued to rise since the last FSR, primarily in service-related sectors (statistical appendix). In particular, the repayment behavior of real estate companies has been worsening for several quarters, and arrears has increased somewhat in the construction sector (figure II.7). Additionally, the construction and real estate sectors have both recorded an increase in arrears of over one year. As mentioned in past *Reports*, this lengthening of arrears significantly reduces the probability of future repayment (see FSR, second half 2015, box III.1).

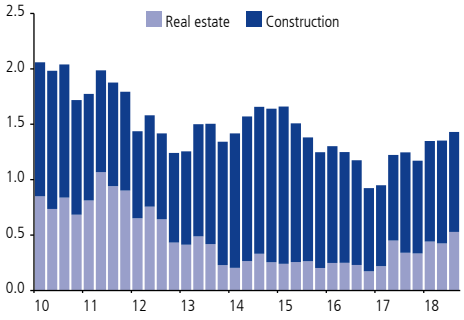
FIGURE II.6
Arrears rate (*)
(percent of loans)



(*) Excluding contingent loans. The classification of economic activity is from a 2016 directory. The results are subject to change as information is updated. Includes loans without a sectoral classification.

Source: Central Bank of Chile, based on data from INE, IRS, and SBIF.

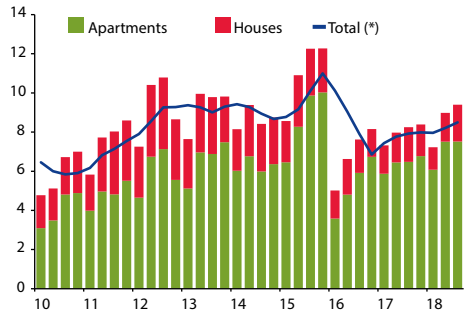
FIGURE II.7
Arrears rate: Real estate and construction (*)
(percent of total loans in each sector)



(*) Excluding contingent loans. The classification of economic activity is from a 2016 directory. The results are subject to change as information is updated. Includes loans without a sectoral classification.

Source: Central Bank of Chile, based on data from INE, IRS, and SBIF.

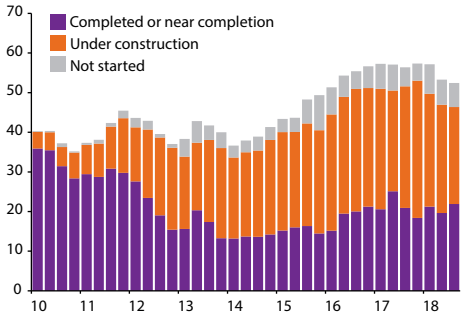
FIGURE II.8
New house sales in Santiago
(thousands of units)



(*) 12-month moving average.

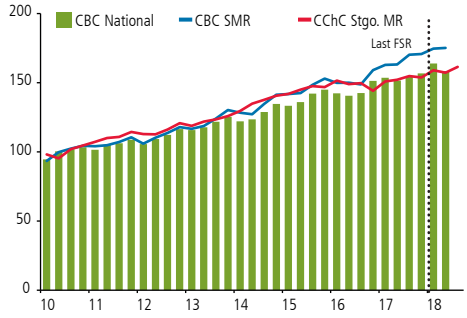
Source: Central Bank of Chile, based on data from the Chilean Chamber of Construction.

FIGURE II.9
Supply of available new houses in Santiago
(thousands of units)



Sources: Central Bank of Chile and Chilean Chamber of Construction.

FIGURE II.10
Real house prices
(fixed-base index: 2010=100)



Sources: Central Bank of Chile and Chilean Chamber of Construction (CChC).

In sum, as of the third quarter of 2018, aggregate corporate debt was stable as a percent of GDP, with minor changes since the last FSR. This debt level does not necessarily represent a vulnerability, since it is mitigated by various mechanisms. A large share of external debt corresponds to loans between related companies (that is, FDI-related loans), which mitigates the risk level associated with the indebtedness of the sector. Among firms that report to the FMC, profitability and interest coverage ratios improved, while debt ratios increased for a small group of firms. With regard to currency mismatches, firms that keep their accounts in pesos have appropriate coverage for their debt levels, and less than 10% are strongly exposed to a depreciation of the peso against the dollar. Firms that report to the FMC and that have investments in emerging economies—such as Argentina and Brazil—could be affected by a possible adverse economic scenario in those countries, but their local bank debt is limited. Among firms that mainly use local bank financing, there was an increase in the level and length of arrears in some sectors relative to the last FSR, in particular among construction and real estate companies. A slowdown in these sectors could exacerbate the situation, with an impact on the lending banks.

REAL ESTATE SECTOR

The real estate market has been dynamic since the last FSR, and both new house sales and new and used prices recorded positive growth rates.

New house sales were stable relative to the last FSR, maintaining a slight recovery since late 2016 and a concentration in the apartment segment (figure II.8). Around 50% of the units sold were completed or near completion and 40% under construction (statistical appendix). New houses available for sale (supply) declined slightly in the third quarter of 2018, although they remain high from a historical perspective. The fact that the supply includes a large share of projects in the construction phase should facilitate the sector's inventory management and mitigate the risk of a potential overstock (figure II.9). However, there is evidence of heterogeneity among geographical areas within the Santiago Metropolitan Region (SMR).

As of the cutoff of this *Report*, preliminary data suggest that housing prices remain dynamic. The house price index (HPI) calculated by the Central Bank—based on sales deeds for new and used properties—shows that in the 2010–2018 period, house prices accumulated a real increase of 60% at the national level and 75% in the SMR. The real house price index calculated by the Chilean Chamber of Construction (CChC), which considers new house sales as opposed to deeds, indicates that this dynamic trend continued in the third quarter of 2018. The growth of house prices in the last decade is explained by both land values and demand factors (higher income and better financing conditions). Both factors are consistent with the natural development of the housing market (chapter IV).

The percent of households living in a rented dwelling was 22% in 2017, versus 17% in 2003 (CASEN).

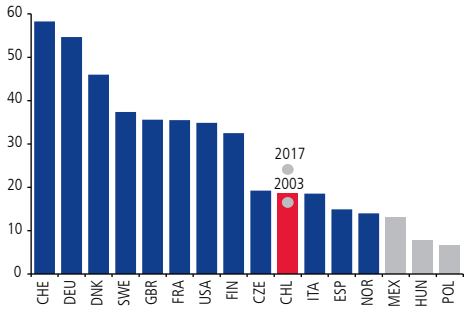
The increase in renting was sharpest in the Santiago Metropolitan Region (SMR), where the rental rate rose from 20 to 28% in the period. This reflects a number of demographic factors that have led to a restructuring of household preferences. As a result, Chile has a higher rental rate than developing countries but lower than developed economies (figure II.11). This suggests that if the trends of the last decade continue, the rental market could expand further.

Given that most rental contracts are between private parties with no centralized registry, there is little available information, and work is needed in this area. Based on listings on the website *Portal Inmobiliario*, it can be inferred that rental prices in the SMR, for both houses and apartments, have followed an upward trend since the first quarter of 2017. This recovery has taken place in a period of stability that has coincided with lower economic growth (statistical appendix).

Financial and payment indicators have weakened somewhat for companies in the sector.

For companies that report to the FMC, contract cancellation rates have remained low, with lower dispersion than in previous quarters (figure II.12). While this is a positive trend, the cash flow of this group of firms has decreased significantly in the last year (figure II.13). At the same time, real estate companies that do not report to the FMC—whose main source of financing is the local banking system—have fallen further behind on their loans, with arrears extending to over a year. Additionally, the Bank Lending Survey (BLS) signals that lending conditions remain tight for firms in this sector.

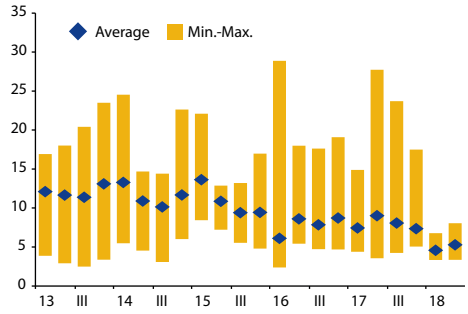
FIGURE II.11
OECD rental rates (*)
(percent)



(*) For Chile, the red bar corresponds to the 2013 CASEN Survey; the dots, the 2003 and 2017 CASEN Surveys, as indicated.

Source: Central Bank of Chile, based on data from the CASEN Survey and OECD.

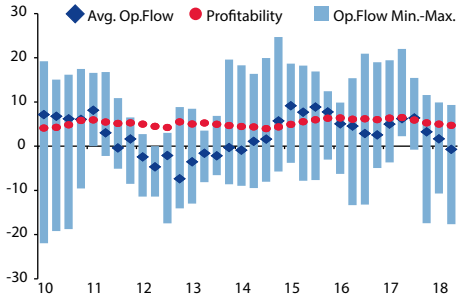
FIGURE II.12
Cancellation rate in real estate companies that report to the FMC (*)
(over quarterly sales, percent)



(*) Calculated based on the audited financial statements of 6 real estate companies (of a total of 7) that are supervised by the FMC. Average cancellation rate is weighted by committed units.

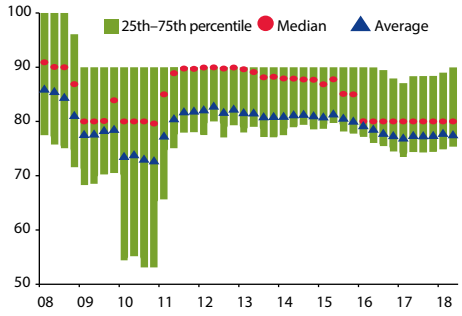
Source: Central Bank of Chile, based on data from the FMC.

FIGURE II.13
Cash flow and profitability of real estate companies that report to the FMC
(percent of assets)



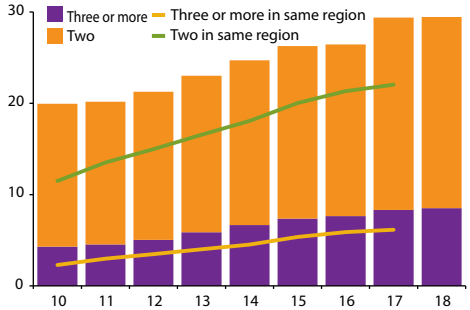
Source: Central Bank of Chile, based on data from the FMC.

FIGURE II.14
Loan-to-value ratio
(percent)



Source: Central Bank of Chile, based on data from the IRS.

FIGURE II.15
Number of mortgage loans and mortgage transactions per debtor (*)
(percent of total)



(*) Bars graph data on the number of bank mortgage loans weighted by debt (SBIF). Lines graph the number of mortgage transactions in a given region weighted by debt (IRS).

Source: Central Bank of Chile, based on data from the SBIF and IRS.

Financing conditions remain favorable, and the loan-to-value ratio was concentrated at 80%.

Mortgage interest rates remain low, near the minimum of the last 16 years. The loan-to-value (LTV) ratio is clustered around 80%, as has been the case since the modification of bank mortgage regulations in January 2016 (figure II.14). Nevertheless, the Bank Lending Survey points to somewhat looser mortgage lending conditions, based on second-quarter data (chapter III).

Mortgage debtors with more than one bank loan continue to account for approximately 30% of total bank mortgage loans as of the second quarter of 2018. As indicated in past FSRs, these agents could be taking out mortgages in order to invest in properties to rent. This is supported by the Household Financial Survey and by property transactions, with an increase in people with more than one mortgaged property in a given region (figure II.15). While this trend contributes to increasing the depth of the rental market, there are associated risks that should be monitored. First, the available information suggests some degree of geographical concentration of properties for rent, which reduces the diversification of risk among the owners. Second, as discussed in the last FSR, there is no consolidated debt registry that would allow lenders that participate in this market to know the total debt of potential borrowers, which limits their ability to conduct a thorough credit assessment. In fact, administrative data suggest important differences in the payment behavior of different types of mortgage debtors, depending on the type of lender financing the loan (box II.2).

The downward trend in vacancy rates continued for both office segments.

In the nonresidential real estate market, the vacancy rate in the prime office segment (A/A+) declined relative to the last FSR, to 4.1%. For class B office space, the vacancy rate was low and stable at around 9.4% (statistical appendix). The lower vacancy rate is consistent with trends of limited new supply and higher absorption. This could change in the future, however, as new supply could put upward pressure on the vacancy rate. Finally, office rental prices have been stable since the last FSR.

In sum, the residential real estate sector has evolved in line with the last *Report*. New house sales remain dynamic, as does the growth of prices. As discussed in the last FSR, the increase in the share of debtors with more than one mortgage loan could represent a source of vulnerability. While this trend contributes to the development of the real estate market, the investors are exposed to new risks, for example, from changes in both vacancy rates and housing prices. This development has been mitigated since the cutoff date of this *Report*, as the growth rate of this segment has slowed. Real estate companies that report to the FMC have seen a reduction in contract cancellation rates, but they demonstrate a lower capacity to generate cash flow. In the case of real estate companies that do not report to the FMC, there has been a deterioration in payment indicators, while bank lending conditions remain tight. These factors suggest a degree of increased vulnerability for firms in the sector.

HOUSEHOLDS

Household debt continued to grow in the second quarter of 2018, reaching 47% of GDP.

In the second quarter of 2018, total household debt grew at a somewhat slower rate than in the last FSR, with a slowdown in the mortgage component that was partially offset by dynamic nonmortgage debt (table II.3).

TABLE II.3
Household debt
(real annual change, percent)

	2010	2011	2012	2013	2014	2015	2016	2017				2018			Contribution to growth	Share
	IV	IV	IV	IV	IV	IV	IV	I	II	III	IV	I	II	III		
Mortgage	**6.8**	**7.3**	**7.6**	**8.9**	**9.9**	**9.6**	**6.7**	**6.8**	**7.3**	**8.0**	**8.1**	**7.6**	**7.1**		**4.1**	**57.9**
Bank	9.1	8.2	8.3	9.1	10.5	10.6	6.6	6.7	7.2	8.1	8.3	7.7	7.2	6.5	3.8	52.6
Nonbank	-7.2	0.9	2.5	6.9	4.7	1.1	7.9	7.9	7.8	7.8	6.4	6.1	6.6		0.3	5.3
Nonmortgage (*)	**8.7**	**10.7**	**6.9**	**8.4**	**3.5**	**5.7**	**6.8**	**7.4**	**6.7**	**7.2**	**6.9**	**6.8**	**7.8**		**3.3**	**42.1**
Total	**7.6**	**8.8**	**7.3**	**8.7**	**7.1**	**7.9**	**6.7**	**7.0**	**7.0**	**7.7**	**7.6**	**7.3**	**7.4**		**7.4**	**100.0**

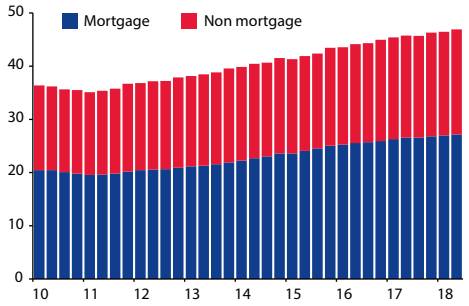
(*) Includes consumer bank debt with retailers, family compensation funds (CCAF), savings and loan associations, student loans (government-backed bank and Treasury loans, private bank loans, and Corfo), leasing and insurance companies, car loans, and central government (Fonasa and other). Starting in 2015. II, data for Cencosud are estimated based on Scotiabank's financial statements.

Source: Central Bank of Chile, based on data from the FMC, Dipres, SBIF, and Suseso.

Despite the slower growth of mortgage debt as of the cutoff of this *Report*, this component is still the largest household financial liability in terms of amount (figure II.16). The total stock of bank mortgage debt grew at a real annual rate of 6.5% in the third quarter—versus 8.3% on the cutoff date of the last FSR. The slowdown was concentrated in the average debt component, which—combined with recent mortgage lending dynamics—suggests a lower growth rate in the group of debtors with more than one mortgage (figure II.17). Despite the less dynamic growth, the large relative contribution of average mortgage debt is in line with the recent trend in house prices and with the increase in the share of debtors with more than one mortgage (figure II.15). The growth rate of nonmortgage debt, in turn, recovered relative to the last FSR, reaching 7.8% in real annual terms, driven by nonbank lenders (figure II.18). This latter development should be closely monitored, since nonbank debt generally has a higher delinquency rate than bank debt (chapter III).

According to the Household Financial Survey (HFS), both indebtedness and debt service increased significantly between 2014 and 2017 (box II.1). While the rise in these two indicators was recorded in all income brackets, it was largest for the median household of the upper income bracket, growing from 17 to 23% of disposable income between 2014 and 2017 (table II.5). These trends, together with the most recent data from administrative sources, point to a scenario in which households have less of a financial cushion, although household arrears have not increased significantly. However, the use of revolving credit has declined since the last FSR, which suggests a slight recovery

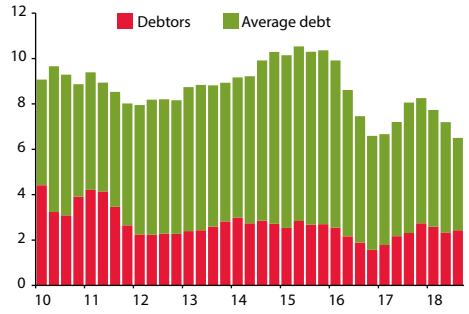
FIGURE II.16
Household indebtedness (*)
(percent of GDP)



(*) For more detail on the series and methodology, see the figure set.

Source: Central Bank of Chile, based on data from Dipres, SBIF, Suseso, and FMC.

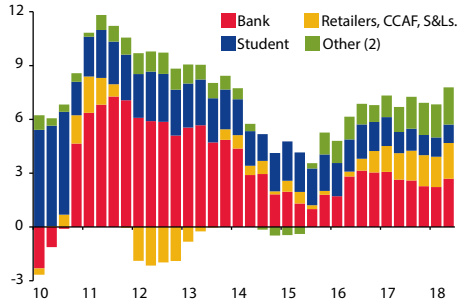
FIGURE II.17
Bank mortgage debt (*)
(real annual change, percent)



(*) Preliminary data for third quarter 2018.

Source: Central Bank of Chile, based on data from the SBIF.

FIGURE II.18
Nonmortgage debt (1)
(real annual change, percent)



(1) The share of the total debt stock is 21% for bank consumer debt, 9% for retailers, CCAF, and savings and loans associations, 7% for student loans, and 5% for other loans.
(2) Other includes leasing and insurance companies, car loans, and central government (Fonasa and other).

Source: Central Bank del Chile, based on data from the FMC, Dipres, SBIF, and Suceso.

of household financial margins (Córdova and Mir, 2018). Another risk mitigator has to do with the current macroeconomic context of higher growth, which should de used to rebuild a financial cushion.

Delinquency indicators have been stable since the last FSR.

Since the last *Report*, household arrears have been relatively stable both for bank mortgage and consumer loans and for the nonmortgage portfolio of nonbank lenders (chapter III). However, there are vulnerabilities associated with the higher indebtedness and debt service of households (box II.1) and the absence of a consolidated debt registry (box II.2).

In sum, household indebtedness has continued to rise since the last FSR, driven mainly by the growth of nonmortgage debt, with an increase in the share of nonbank consumer debt. The latter trend constitutes a vulnerability in the face of a possible income or rate shock, to the extent that nonbank loans generally have higher delinquency rates than bank loans. However, the traditional credit risk indicators have been stable at low levels, in both the mortgage and consumer portfolios. In terms of future risks, a possible scenario involving a labor market deterioration—which has become less likely since the last FSR—could trigger payment problems. A scenario of higher interest rates, in turn, would have a limited impact on household payment behavior, since mortgage loans (the main component of household debt) are written at fixed rates and relatively long durations. For consumer loans, the impact would mainly be through revolving credit (credit lines and credit cards), which could increase the debt service of households that use these products intensively.

BOX II.1
EVOLUTION OF HOUSEHOLD DEBT IN THE HOUSEHOLD FINANCIAL SURVEY

The Household Financial Survey (HFS) is carried out by Central Bank of Chile to generate detailed information on the financial situation of households. The results of the 2017 HFS were published in September this year; this represents the fourth version of the national urban survey (CBC, 2018a). This box compares the results of the 2014 and 2017 surveys to analyze how the household financial position has evolved in this period, with a focus on indebtedness. The main results indicate that between 2014 and 2017, the share of households with savings increased, while the share with debt was stable, although the debt level of households with debt rose across all income brackets.

Savings

Between 2014 and 2017, the share of households claiming to have saved in the 12 months prior to the interview rose from 26 to 36%, which represents a statistically significant increase. Among those who said they had saved, the majority did so on a monthly basis (65 and 62% in 2014 and 2017, respectively). With regard to the main reasons for saving, in 2017, 52% of households said it was to be prepared in the event of unexpected expenses, 15% for vacation, and 10% to buy a property.

Debt holdings

The share of households that has some sort of debt decreased from 73 to 66% between 2014 and 2017 (table II.4). This reduction in debt holding occurred across all income brackets and is statistically significant for the total population and for households in the first and second income brackets[1/].

This trend is mainly explained by a reduction in nonmortgage debt to retailers (CBC, 2018a). There was an increase in the holding of student debt (8 to 12%), mostly due to an increase in the share of households with government-backed student loans, while the share of Corfo loans and other market loans decreased. Mortgage debt holding increased substantially in the third (highest) income bracket (37 to 47%), associated with an increase in debt held to purchase properties other than the main residence. This is consistent with the increase observed in the holding of retail assets in the "other properties" category among households in bracket 3 (CBC, 2018b)[2/].

TABLE II.4
Debt holdings (1)
(percent of total households in each category)

Bracket	2014				2017			
	Total debt	Mortgage debt	Consumer debt (2)	Student debt	Total debt	Mortgage debt	Consumer debt (2)	Student debt
1	64.8	8.8	57.6	4.5	58.3*	9.5	49.2*	9.2*
2	78.7	23.5	69.1	11.7	71.2*	23.9	57.5*	16.0
3	82.8	37.4	69.6	12.5	79.6	46.5*	63.8	15.2
Total	72.6	18.9	63.4	8.2	66.4*	21.2	54.6*	12.4*

(1) An asterisk indicates a statistically significant change between 2014 and 2017 at the 5% confidence level.
(2) Includes bank and retail consumer loans, bank and retail credit cards, bank credit lines, and loans from family compensation funds and savings and loan associations. See footnote 1 for the definition of income brackets.

Source: Central Bank of Chile.

Indebtedness indicators

The monthly debt-to-income (DTI) ratio and the monthly debt service ratio (DSR) were used to assess the level of household indebtedness, basing the analysis on the median of both measures calculated for households with debt. The DTI or leverage ratio expresses household debt as a multiple of monthly income, while the DSR measures the share of household income that is allocated monthly to paying or servicing household debt (including interest).

The leverage of the median household in the total sample grew

[1/] Bracket 1: first through fifth income deciles (up to Ch$869,286 per month); Bracket 2: sixth through eighth income deciles (from Ch$869,287 to Ch$1,922,996 per month); Bracket 3: ninth and tenth income deciles ($1.922.997 per month and higher). Total: National urban population.

[2/] With regard to households' asset holdings between 2014 and 2017, the HFS results show a statistically significant increase in the total share of households with some sort of asset (85 to 89%). This increase is explained by an increase in financial asset holdings (26 to 34%). There was no significant change in the share of households with real assets (79 and 81%, respectively, in 2014 and 2017). Finally, a breakdown by type of real assets reveals a significant increase in "other real estate properties" for total households (13 to 17%). For more details, see CBC (2018a and 2018b).

from 1.6 a 3.5 times monthly income; the increase is statistically significant and occurred across all income brackets (table II.5). The DSR, in turn, increased from 20 to 25% for the median household with debt, which is statistically significant for the full sample and for bracket 3.

Disaggregating the growth of debt for the median DTI reveals that almost 40% of the growth was explained by an increase in the mortgage component, primarily due to an increase in the number of households with this type of debt (figure II.19). By income bracket, mortgage debt is most important for explaining increases

TABLE II.5
Monthly debt-to-income (DTI) ratio and monthly debt service ratio (DSR) (*)
(left: times; right: percent; household with debt in each category)

Bracket	Median DTI		Median DSR	
	2014	2017	2014	2017
1	1.3	2.2*	23.3	27.4
2	1.8	4.1*	18.6	22.8
3	3.0	7.5*	17.4	23.0*
Total	1.6	3.5*	20.1	24.7*

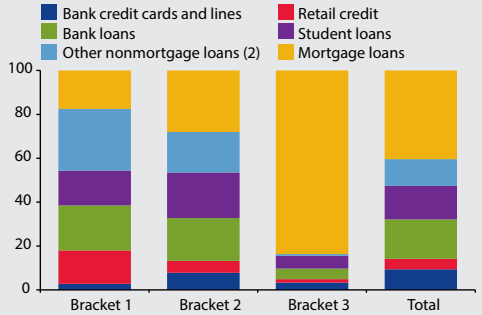
(*) An asterisk indicates a statistically significant change between 2014 and 2017 at the 5% confidence level. See footnote 1 for the definition of income brackets.

Source: Central Bank of Chile.

in the DTI for households in the upper income brackets, whereas nonmortgage loans contributed more to the growth of debt in bracket 1.

In the case of debt service, a disaggregation of the median DSR indicates that 67% of the growth was due to increases associated with mortgage payments, as well as bank credit lines and cards (figure II.20). By income bracket, the results for bracket 2 are similar to the full sample. In bracket 3, mortgage loans represent

FIGURE II.19
Decomposition of the growth of debt for the median DTI (1)
(percent of total growth in each category)



(1) Total debt in the third quintile of DTI. See footnote 1 for the definition of income brackets.
(2) Includes CCAF and S&L loans, car loans, and other nonmortgage loans.

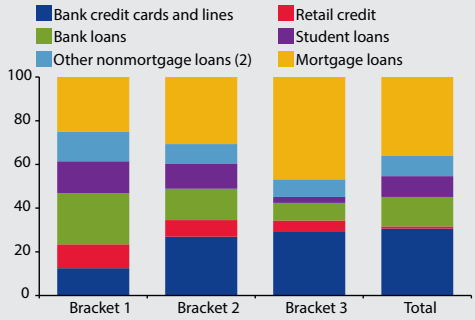
Source: Central Bank of Chile.

a larger share of the increase in the DSR, while in bracket 1, other bank loans are more important.

Perception of indebtedness and payment problems

Because an increase in debt ratios—especially the debt service ratio—could lead to a deterioration in household payment capacity, it is important to consider households' perceptions of their indebtedness and the share of households that say they

FIGURE II.20
Decomposition of the growth of debt service for the median DSR (1)
(percent of total growth in each category)



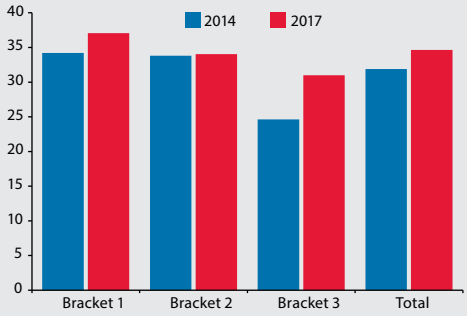
(1) Total debt service in the third quintile of DTI. See footnote 1 for the definition of income brackets.
(2) Includes CCAF and S&L loans, car loans, and other nonmortgage loans.

Source: Central Bank of Chile.

have problems paying some or all of their debts. The share of households that perceive their debt level as high or excessive was 35% in 2017, which is not significantly different from 2014 (figure II.21).

From 2014 to 2017, there was a deterioration in the payment of some forms of debt (table II.6). There was a sharp increase in the percentage of households with problems making credit card payments (9 to 16%) and other nonmortgage loan payments (13 to 19%). For mortgage debt, there was no change between

FIGURE II.21
Perception of high or excessive debt (*)
(percent of total households with debt in each category)



(*) An asterisk indicates a statistically significant change between 2014 and 2017 at the 5% confidence level. See footnote 1 for the definition of income brackets.

Source: Central Bank of Chile.

the two surveys. Looking at the payment behavior of households with outstanding credit card debt since 2014, there has been a significant reduction in the share of households paying more than the minimum monthly payment and an increase in payments equal to or less than the minimum. This could be an indication that households have less of a financial cushion for paying off their debts. It is important to note that these indicators have a different scope and time frame than the administrative and accounting measures of arrears usually reported in the FSR. Specifically, they consider arrears of less than 90 and include problems with credit card payments.

Conclusions

While the HFS shows an increase in the share of households with savings and a reduction in the percentage of households with debt, the survey also reveals a significant increase in the indebtedness and debt service ratios of households with debt, across all income brackets. Additionally, households increasingly report problems making payments on their credit cards and other nonmortgage debt. All these factors contribute to a scenario in which households have watched their financial margins shrink, reducing their ability to face future income and/or interest rate shocks. It is thus important to continue monitoring household indebtedness and payment behavior, given their major implications for financial stability.

TABLE II.6
Payment problems (1)
(percent of households with the respective debt in each category)

Bracket	2014			2017		
	Credit cards	Nonmortgage debt (excl. cards) (2)	Mortgage debt	Credit cards	Nonmortgage debt (excl. cards) (2)	Mortgage debt
1	12.4	15.0	12.2	22.8*	21.0	6.5
2	6.9	13.2	10.4	14.2*	19.4	5.5
3	3.3	9.3	2.1	5.6	14.3	2.0
Total	8.6	12.9	7.5	15.8*	18.8*	4.2

(1) A household is considered to have payment problems if at least one of its debts is in arrears. An asterisk indicates a statistically significant change between 2014 and 2017 at the 5% confidence level. See footnote 1 for the definition of income brackets.
(2) Includes loans from retailers, bank loans, CCAF and S&L loans, car loans, and student debt.

Source: Central Bank of Chile.

BOX II.2
INFORMATION ASYMMETRIES IN THE MORTGAGE MARKET

There is broad evidence in the classic economic literature on the effects of information asymmetries—scenarios in which one agent has more or better information than a counterparty—on the efficient allocation of resources, which results in price distortions and suboptimal equilibrium outcomes (Akerlof, 1970). These asymmetries are present in many markets, including the credit market (Jaffee and Russell, 1976). This box examines the case of the mortgage market in Chile, whose informational structure gives rise to strategic behavior and distortions in credit assessment. The implications of these asymmetries can be extrapolated to other segments—for example, the consumer segment—which are characterized by the same information failures described below.

In the particular case of the credit market, there are elements of both adverse selection and moral hazard, where the lenders do not know the true intention or payment capacity of the debtors and therefore must infer these characteristics based on information available from credit registries and other sources. Debtors, in turn, send signals to the lenders through their payment behavior and information on income and assets. When information is not shared among parties, and when the available information does not allow the identification of debtors in terms of their payment probability, the resulting uncertainty is reflected in credit rationing and increases in the differential between lending and deposit rates (Stiglitz and Weiss, 1981; King, 1986).

Information structure

EIn the case of Chile, the credit information system is dominated by negative information (e.g., arrears)[1/], with some positive information (e.g., on-time payments) [2/] (Turner, 2010; Álvarez et al., 2011). On the one hand, the SBIF maintains a debtor registry containing positive and negative bank information reported by banks and some savings and loan associations. On the other, the Chamber of Commerce collects information on debt arrears (both bank and nonbank) associated with a given debtor. Thus there is no consolidated registry of financial obligations. Rather, the available information is fragmented. Furthermore, there is a lag in updating the bank debtor registry, which creates a window of time during which debtors can engage in strategic behavior, in order to present themselves as having less debt than they actually do. Consequently, lenders could have an incomplete perspective of their clients' debt situation when they are assessing their payment capacity. Here, the literature recognizes two main channels through which mortgage default can occur: a lack of liquidity and negative equity. Under the liquidity channel, debtors stop paying when they receive an income shock that leaves them with insufficient funds. Debtors with a high level of debt service are more vulnerable to this risk. In the case of negative equity, homeowners default on their mortgage when the loan exceeds the value of the property. This mechanism is not very important in Chile, however, given the local institutional framework. Thus, access to complete information on the totality of a debtor's obligations is crucial for a correct assessment of credit risk (Elul et al., 2010; Goodman et al., 2010; Pagano and Japelli, 1993).

The analysis in this box is confined to the mortgage market in the period from 2012 to 2017. However, the conclusions obtained can be extrapolated to the consumer loan segment, which is characterized by a larger number of both lenders and borrowers than the mortgage segment [3/]. The analysis centers on two market participants who only partially share information: banks and mutual societies [4/]. Banks cannot observe mortgage debt contracted with mutuals, whereas mutuals do have access to bank debt information—published by the SBIF—for assessing loan applications, although they do not observe loans from other mutuals. Additionally, new bank loans are added to the registry with a lag. Finally, negative credit history information is

[1/] Negative event records include late payments, default, and a high debt level.
[2/] Positive event records include on-time payments, unused revolving credit, a debt level in line with income, and so forth.

[3/] According to SBIF data, there were over a million bank mortgage debtors in July 2018, versus 4.4 million consumer loan debtors (without discounting debtors who have both types of debt). In terms of lenders, banks (13 in July 2018), mutuals (12 in October 2018), and some S&Ls (4 in October 2018) participate in the mortgage loan market. The consumer loan market includes the former lenders plus the family compensation funds, retailers, car lenders, and others.
[4/] Also called endorsable mortgage management agencies (*Agentes Administradores de Mutuos Hipotecarios Endosables*, AAMHE).

available for both banks and mutual. Taken together, this creates a scenario in which neither type of institution is working with complete information.

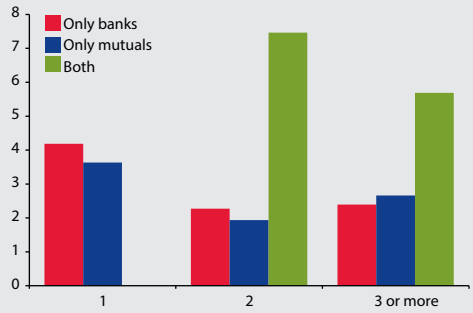
Background on the mortgage market

Banks are the main mortgage lenders in Chile, with a total of 1.1 million debtors and a mortgage portfolio equivalent to 29% of GDP in the third quarter of 2018. Mutual societies are nonbank mortgage lenders that are usually associated with life insurance companies; they serve a total of 65,000 debtors and have a portfolio equivalent to 2.4% of GDP. The main financing instrument used by banks is nonendorsable mortgage loans, which offer a lot of loan flexibility and usually finance 90% of the value of the property (figure IV.10). In contrast, mutuals generally use endorsable mortgage loans, with a loan-to-value (LTV) ratio of around 80%. This gap in the LTV between institutions narrowed after the introduction of new bank mortgage regulations in January 2016, when the median bank LTV was adjusted from 90 to 80% (figure II.14). Additionally, in July 2012—when changes were introduced to the Insurance Law—new regulations were applied to mortgage insurance [5/], in order to increase competition and reduce the costs of brokerage through public auctions of mortgage loan insurance (FSR, first half of 2012).

Types of mortgage debtors

The sample can be used to compare three groups of debtors: namely, those who have mortgage debt (i) only from banks, (ii) only from mutuals, and (iii) from both banks and mutuals. The "only mutuals" group has a somewhat lower default rate than the "only banks" group, in the case of both one and two lenders by type. This may reflect the relatively higher savings capacity necessary for choosing a mutual loan, given the lower LTV ratio. The group of debtors that simultaneously has loans from both banks and mutuals provides an opportunity to verify the hypothesis on the existence of distortions described earlier. Specifically, given that lenders do not share complete information, their credit assessment cannot take into account all financial obligations and thus underestimates the debtor's financial burden and default probability. The results support the hypothesis: the default rate in the group that holds mortgages with both banks and mutuals is more than double the rate of those with loans from just one type of institution (figure II.22). This finding is in line with other empirical studies, which conclude that a system characterized by more and better information can improve debtors' access to credit and lenders' credit assessment, thereby reducing the adverse selection and moral hazard problems (Brown and Zehnder, 2007)

FIGURE II.22
Mortgage default rate by type and number of institutions (*)
(percent of debtors in each group, third quarter 2017)



(*) 90- to 180-day default rate. The "only banks" group includes 95.2% of debtors; only mutuals, 4.4%; and both, 0.3%.

Source: Central Bank of Chile, based on data from SBIF and FMC.

In terms of sequencing, there is no evidence of a bias in the order of default, that is, there is no trend toward defaulting first one lender versus the other. However, for the group with loans from both types of lenders, the bank loan is usually granted before the mutual loan, with a median of 40 days between the two events. This period is less than the usual lag of 45 days before the bank mortgage appears in the debt report published by the SBIF, so the mutuals are not able to incorporate the new loan information in their credit assessment.

[5/] Joint SVS Rule N°330 and SBIF Rule N°3530 for Banks, N°147 for Savings and Loan Associations, N°62 for Subsidiaries; on the individual and collective contracting of mortgage insurance.

Conclusions

The absence of a consolidated system for reporting loan information hinders the identification and analysis of credit risk, especially in the case of debtors who have loans from more than one type of lender. A system containing both positive and negative information would help lenders predict default probabilities more precisely [6/]. In the particular context of the Chilean mortgage market, the evidence suggests that the existence of information asymmetries has an impact on the behavior of market agents, in particular in terms of default. Debtors who simultaneously hold loans from lenders that do not share debt information have a higher probability of default. This derives from a partial credit assessment, in which the debtor's total financial burden and default probability are underestimated. These findings confirm that the Chilean financial system needs to make progress in terms of closing the information gaps, in order to reduce distortions in both prices and equilibrium outcomes and to minimize the risks for financial stability (FSR, first half 2018, chapter II).

[6/] Barron y Staten, 2002; Powell et al., 2004; Turner et al., 2007.

III. LENDERS

Bank credit has accelerated slightly since the last FSR, with the exception of the mortgage portfolio. In terms of credit risk, arrears indicators have not changed significantly. However, the share of collateral to mitigate expected loss—in the individually assessed commercial portfolio—remains above the average of the last few years. At the same time, the banking sector has increased its funding of nonbank lenders (NBLs), thereby increasing its indirect exposure to household credit risk. Finally, bank capitalization decreased since the last FSR, despite substantial gaps relative to the standards established in the new General Banking Law (GBL). Stress tests indicate that the banking system continues to have an adequate level of capital to absorb the effects of a severe scenario, but there is less of a buffer than in past years.

BANKING SECTOR

Commercial loans were more dynamic than in the last FSR, in line with the improvement in the economy. Consumer loans had a stable growth rate, while the growth rate of mortgages declined (figure III.1).

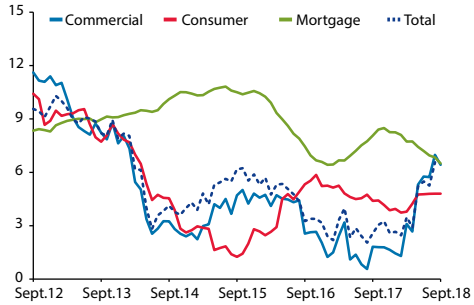
The commercial portfolio has been more dynamic in recent months, moving toward levels that reflect its historic relation to output (figure III.2). The recovery of commercial loans is consistent with the results of the Bank Lending Survey (BLS) for the third quarter of this year, which reports stronger demand and somewhat more flexible lending conditions for large firms (box III.1).

The consumer loan portfolio has grown steadily at around 5% in real annual terms in recent months, mainly due to installment loans. Revolving loans have grown less, with a downward trend in the growth rate: credit cards grew 0.4% in the period, while credit lines contracted by 2.3%.

The stock of mortgage loans in the system continued to slow in the third quarter of the year, with real annual growth rates below 7%, consistent with the decline in the number of operations (figure III.3). Through the first half of the year, this dynamic was mainly explained by the large banks, but the slowdown has become more generalized throughout the industry in recent months.

Nevertheless, the results of the BLS for the third quarter show a slightly more dynamic demand for mortgages. Lending conditions for these loans—which have tightened in recent years due to regulatory changes—have started to loosen again, while interest rates remain low from a historical perspective.

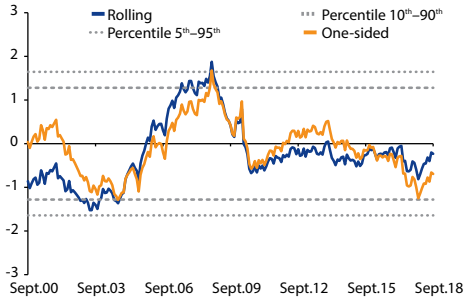
FIGURE III.1
Loan growth (*)
(real annual change, percent)



(*) Based on individual financial statements.

Source: Central Bank of Chile, based on data from the SBIF.

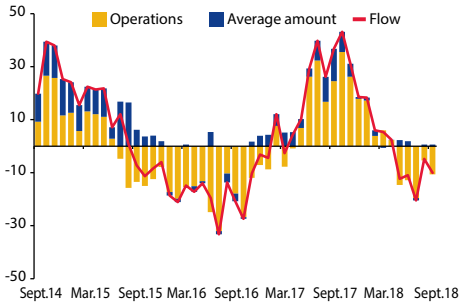
FIGURE III.2
Gap between commercial loans and the Imacec (*)
(number of standard deviations)



(*) Gap between the ratio of commercial loans to the Imacec and its own trend, obtained using a Hodrick-Prescott filter with a lambda of 33 million in cumulative windows (one-sided) and 10-year rolling windows since January 1989.

Source: Central Bank of Chile, based on data from the SBIF.

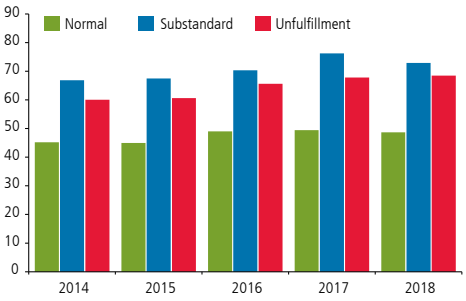
FIGURE III.3
Growth of mortgage loan flows (*)
(annual change, percent)



(*) Quarterly flow.

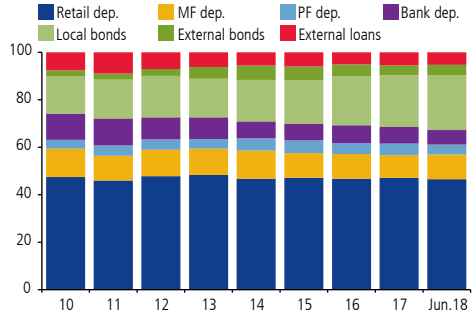
Source: Central Bank of Chile, based on data from the SBIF.

FIGURE III.4
Collateral of individually assessed commercial loan portfolio
(percent of respective class)



Source: Central Bank of Chile based on data from the SBIF.

FIGURE III.5
Composition of banking system liabilities (*)
(percent of liabilities)



(*) Excluding subordinated bonds.

Source: Central Bank of Chile, based on data from the FMC, DCV, SBIF, and SP.

Credit risk indicators have stabilized for the different portfolios since the last FSR (table III.1).

In the individually assessed commercial loan portfolio, expected loss has decreased slightly since February of this year, mainly due to a contraction in doubtful loans; while the collateral associated with this class of loans continued along its upward trend (figure III.4). Provisions also decreased in the period.

In the consumer loan portfolio, arrears stabilized at the system level in the third quarter, at slightly below the average of the past few years (table III.1). In parallel, the banking system recently recorded an increase in the volume of provision.

TABLE III.1
Credit risk indicators
(percent of respective portfolio)

Indicator	2013	2014	2015	2016	2017	2018	Average
Delinquency							
Commercial	1.7	1.7	1.5	1.5	1.7	1.7	1.7
Consumer	2.2	2.2	2.1	2.0	2.1	2.0	2.1
Mortgage	3.3	3.0	2.7	2.7	2.4	2.4	2.8
Write-offs w/o prov. (*)							
Commercial	0.8	0.7	0.7	0.6	0.9	0.9	0.8
Consumer	0.9	1.0	1.0	1.0	1.0	1.0	1.0

(*) Ratio of annualized write-offs over annualized loan loss provisions, with a lag of 12 months.

Source: Central Bank of Chile, based on data from the SBIF.

In contrast with bank consumer loans, loans from nonbank lenders (NBLs) have been dynamic since the last FSR. The share of this sector in the total increased, exceeding 50% vis-à-vis the consumer loans on bank balance sheets in June. This development has important implications for credit risk assessment, given that the majority of these NBLs have higher arrears rates than the average bank. This is also relevant given the system´s lack of a consolidated debt registry and the degree of opacity in the credit assessment process (box II.2).

With regard to bank funding, the share of retail deposits grew, while fixed-income issues in the domestic market continued to increase, to the detriment of overseas bonds.

The banking sector continued to issue domestic debt instruments in 2018 (figure III.5). In a shift since the last FSR, large banks have recently become more active in this type of funding. The pension funds' have increased their share in the liability structure of medium-sized banks, through the purchase of fixed time deposits (FTDs). These funding dynamics put a bit more pressure on rolling over securities at a five-year horizon, though it is still low.

Institutional funding remains a source of vulnerability for medium-sized banks, due to their exposure to pension funds through FTDs. This type of funding has been quite volatile over the past five years and had an important role in the 2009 crisis period (figure III.6).

The banking sector's liquidity position has been stable and above the regulatory limit (figure III.7).

The banks have adjusted their liquidity coverage ratios upward in anticipation of the entry into effect of the new regulatory framework and the associated provisions (box V.2). There is, however, a wide dispersion among institutions.

In the banking system, profitability ratios were stable, while equity solvency declined, maintaining the gap relative to international standards and the new capital requirements established in the new GBL.

The banking system's annualized profitability was stable at around a 12.0% ROE and 1.0% ROA in September of this year. In particular, among the operating components, there was a reduction in the interest margin and treasury management costs, which was partially offset by an increase in the indexation margin. The capital adequacy ratio (CAR) was 12.8% in August of this year.

RISK FACTORS

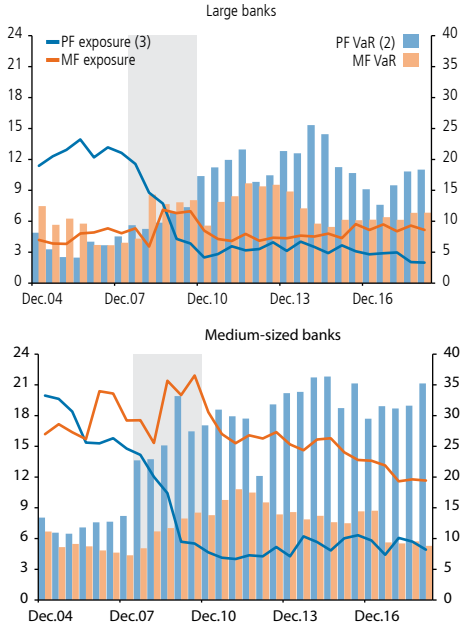
Despite the more dynamic output data in recent months—and the resulting improvement in initial conditions in the event of a shock—a risk scenario involving a slower recovery than expected could undermine the quality of bank portfolios.

An adverse economic scenario could affect the quality of the commercial portfolio, due to lower income generation by firms. The materialization of this scenario could also have a direct impact on banks' consumer portfolio and an indirect effect through commercial loans used to fund NBLs.

The capital adequacy ratio has decreased significantly over the last three years, widening the gap vis-à-vis the new standards.

The system's capital adequacy ratio (CAR) has fallen from 13.8% at year-end 2017 to 12.8% in August of this year. The recent reduction reflects higher leverage, due to local credit growth processes and overseas acquisitions. While the current level is in line with the present regulation, the new GBL is more demanding and requires an improvement in the capital base, which

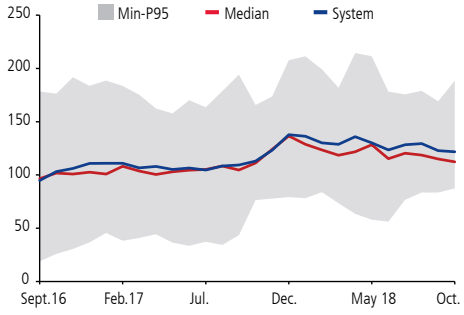
FIGURE III.6
Funding risk in the banking system (1)
(percent of liabilities)



(1) Gray areas indicate fragile period (Martínez et al., 2018). Excludes banks representing less than 5% of total system assets.
(2) Monthly value-at-risk at 99%, calculated in a 36-month rolling window.
(3) Exposure calculated as the share of each type of funding in the total liabilities of the group of banks.

Source: Central Bank of Chile, based on data from FMC, DCV, SBIF, and SP.

FIGURE III.7
Liquidity coverage ratio (*)
(percent of net outflows in 30 days)



(*) Calculated based on individual data.

Source: Central Bank of Chile, based on data from the SBIF.

has not been reflected in banks' dividend or capitalization policies (box V.1). As indicated in past FSRs, the CAR of the Chilean banking system is at the lower end of the distribution for a wide sample of countries (see FSR, first half 2016). Furthermore, the current gaps may actually be larger, given that the new GBL contemplates additional capital requirements for systemic important institutions.

Although the banking sector has not experienced any systemic operational risk events, there have been some individual cases affecting operational continuity in recent months.

Since the last FSR, operational continuity was temporarily and partially interrupted in some banks, due to attacks on their digital platforms. In addition to these cyber security incidents, the banking system also incurred losses due to fraud. Given the probability that this type of operational risk event will continue to be a threat, and given the potential impact on financial stability, it is critical for banks to invest resources in cyber security and control systems (box I.1).

STRESS TESTS[1]/

Stress tests indicate that despite the recovery of profitability and risk stabilization, the lower levels of capital relative to past tests have increased the system's vulnerability.

Stress tests evaluate the impact of credit and market risk under severe but plausible stress scenarios. The stress tests use macrofinancial and accounting data for the banking system, as of June 2018. They consider two stress scenarios: a severe stress scenario with a sharp contraction of GDP followed by a recovery in line with previous crises; and an adverse scenario in which persistent weak growth could represent a significant risk for lending activity (FSR, first half 2017, box IV.1). Stress tests are an analytical tool that contribute to identifying systemic financial strengths and weaknesses in a given moment of time. Given their partial nature, they do not necessarily uncover all the effects of specific risk scenarios. Consequently, they should not be interpreted as projection exercises. In this framework, credit risk is estimated using a model that relates loan loss provisions, which reflect the cost of default on the banks' portfolios, with macrofinancial variables, such as output and interest rates (box III.2). The calculation of market risk considers two types of exposure: currency and interest rates (broken down into valuation and repricing).

[1]/ Based on the methodology described in the FSR for the second half of 2013 and in Martínez et al. (2017). Both the analysis and the results are reported regularly to the SBIF.

The stress tests indicate that a small but persistent drop in output would represent similar risks for the system as a severe scenario. Market risk remains limited.

The severe stress scenario considers a sharp contraction of GDP in the short run and lower growth in the medium term: the annual growth rate would reach –1.7% in the most critical quarter and then converge to 1.4% in 2020. This scenario is intended to replicate past episodes of significant financial fragility [2/]. The adverse stress scenario is based on the fifth percentile of the distribution of the GDP forecast presented in the September 2018 *Monetary Policy Report* (figure III.8).

Compared with the last FSR, which was based on data through December 2017, there was an increase in initial profitability and margins, but the system's capital level is lower. Return on equity (ROE) is up 1.6 percentage points (pp) (13.8 versus 12.2%), and the CAR is down 0.7 pp (12.9 versus 13.6%). Market risk has fallen slightly in terms of rate risk, in both valuation and repricing, while currency risk has risen somewhat due to an increase in the currency mismatch [3/]. The test results include higher losses from credit risk than in the last round, mainly due to a weakening in the quality of the loan portfolio in a climate of output recovery. Thus, the potential loss of total loans under a severe stress scenario is around 17.2% of system capital, versus 16.3 in the last FSR (table III.2). Under an adverse scenario, this risk has fallen slightly, to 16.8% of capital. However, the risk of the adverse scenario is closer to the severe scenario than was the case in past tests. This convergence in the scenarios highlights the potential seriousness of a persistent economic slowdown.

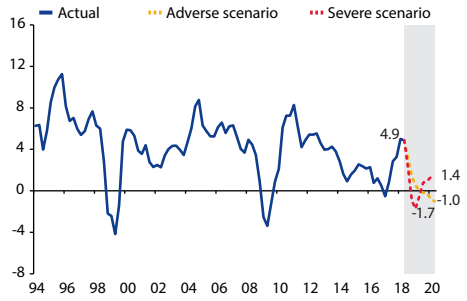
TABLE III.2
Impact of stress tests on profitability
(percent of Tier 1 capital)

	Adverse			Severe		
	17.S2	18.S1	18.S2	17.S2	18.S1	18.S2
Initial ROE	**14.1**	**12.2**	**13,8**	**14.1**	**12.2**	**13.8**
Market risk	**-1.7**	**-1.7**	**-1.3**	**-1.7**	**-1.7**	**-1.3**
Valuation	-1.0	-1.1	-0.8	-1.0	-1.1	-0.8
Repricing	-0.9	-0.9	-0.8	-0.9	-0.9	-0.8
Currency	0.2	0.3	0.3	0.2	0.3	0.3
Currency (VaR) (*)	-0.7	-1.0	-1.2	-0.7	-1.0	-1.2
Credit risk	**-17.7**	**-14.6**	**-16.8**	**-20.5**	**-16.3**	**-17.2**
Consumer	-8.0	-6.9	-8.2	-9.6	-8.1	-8.6
Commercial	-7.0	-6.3	-7.0	-8.0	-6.8	-7.0
Mortgage	-2.7	-1.3	-1.6	-2.9	-1.4	-1.6
Margin	**3.3**	**3.6**	**4.2**	**2.3**	**2.8**	**3.9**
Final ROE	-1.9	-0.5	0.0	-5.7	-3.0	-0.9

(*) Stressed VaR at 99% confidence. Not reported in previous tests. Excluded from total risk for comparative purposes.

Source: Central Bank of Chile, based on data from the SBIF.

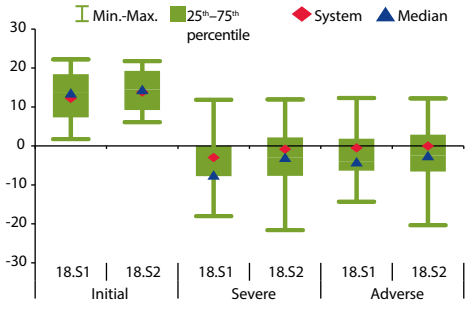
FIGURE III.8
Annual GDP growth (*)
(quarterly data, percent)



(*) Seasonally adjusted data. The shaded area indicates the test window.

Source: Central Bank of Chile.

FIGURE III.9
Impact of stress scenarios on ROE (*)
(earnings over Tier 1 capital, percent)

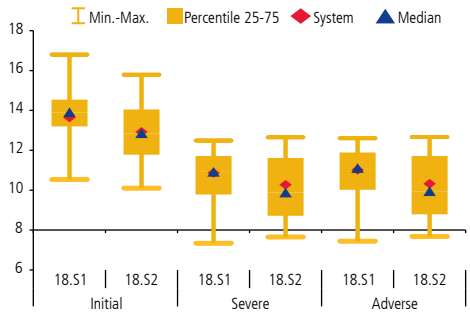


(*) Data weighted by the Tier 1 capital of each institution. Calculations do not include treasury, foreign trade, or consumer banks that have left the system. Minimums are the 1st percentile.

Source: Central Bank of Chile, based on data from the SBIF.

[2/] To complete the configuration of the stress scenario, market risk includes an exchange rate depreciation of 20% and a shift in the spot and forward yield curves, in both cases with an increase of 300 bp for the short-term interest rate and 100 bp for the long-term interest rate.
[3/] Considers a stressed VaR in 15-day changes in the exchange rate at 99% confidence. Thus, the foreign currency asset mismatch on the balance sheet is exposure to an appreciation of the exchange rate, while the liability mismatch is exposure to a depreciation.

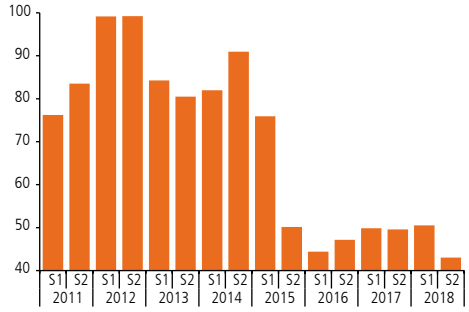
FIGURE III.10
Impact of stress scenarios on CAR (*)
(regulatory equity of risk-weighted assets)



(*) Data weighted by the Tier 1 capital of each institution. Calculations do not include treasury, foreign trade, or consumer banks that have left the system.

Source: Central Bank of Chile, based on data from the SBIF.

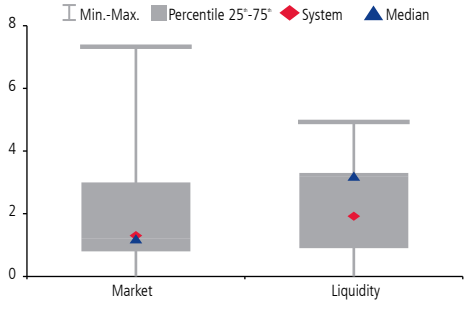
FIGURE III.11
Banks with CAR of 10% or higher in the severe stress scenario (*)
(percent share of total assets)



(*) Results of stress tests in past FSRs.

Source: Central Bank of Chile, based on data from the SBIF.

FIGURE III.12
Risks under severe stress scenario (*)
(losses over Tier 1 capital)



(*) Data weighted by the Tier 1 capital of each institution. Calculations do not include treasury, foreign trade, or consumer banks that have left the system.

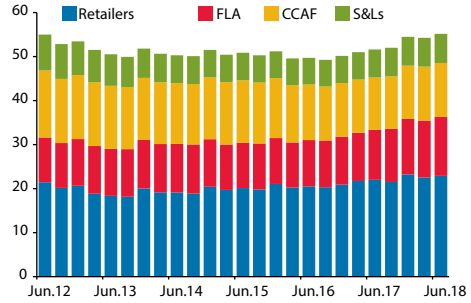
Source: Central Bank of Chile, based on data from the SBIF.

The tests show that the banking system would have smaller losses under the stress scenarios. The system's ROE becomes negative in the severe scenario, reaching –0.9% of Tier 1 capital, and zero under the adverse scenario. Within the system, banks that together represent about 56% of the system's Tier 1 capital would record negative profits in both the severe and adverse scenarios (72 and 57% in the last FSR, respectively) (figure III.9). However, solvency is reduced in the severe stress scenario, and dispersion increases relative to the initial distribution (figure III.10). This mainly reflects two factors. First, the banks' initial capital levels are lower, with greater dispersion. Second, the banks that are most exposed to the risks of the stress scenario have a lower capital base. According to the results, the distribution of the CAR is similar under the adverse and severe scenarios, and the set of banks that maintain a CAR over 10% under both stress scenarios represent 43% of system assets. This figure is lower than in the last FSR and low relative to previous tests (figure III.11). The results further show that two banks, representing around 10% of system capital, fall below the regulatory limit in the stress scenarios.

This round of stress tests included an analysis of liquidity risk, starting from the usual point. This is approximated as the additional cost of obtaining liquid assets to comply with a liquidity coverage ratio of 100%[4/], due to the loss in value of liquid assets and an increase in net outflows[5/], under a stress scenario. The magnitude of this risk component is equivalent to about 2% of system capital, and the distribution is related to the initial liquidity level and deposit dependency of each institution. The impact is similar in magnitude to that of market risk (figure III.12).

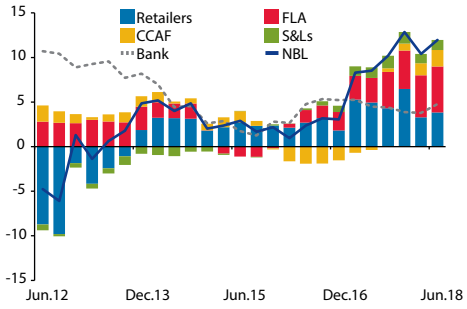
[4/] The proposed gradual compliance with the ratio establishes a first phase of 60%. The applied test thus represents an additional stress.
[5/] The loss of value of liquid assets incorporates valuation and currency risks, while the increase in net outflows is obtained through a VaR at 99% confidence for bank overdrafts and demand accounts.
[6/] The analysis in this section uses several comparisons or relativizations with bank data, all of which are based on the banks' individual financial statements.
[7/] Given that some NBLs give automobile loans and participate in factoring and leasing, it is not feasible to directly separate the type of lender in each case.

FIGURE III.13
Loans from nonbank lenders (NBLs)
(percent of bank consumer loans)



Source: Central Bank of Chile, based on data from the SBIF and FMC.

FIGURE III.14
Real annual growth of loans
(real annual change, percent)



Source: Central Bank of Chile, based on data from the FMC, SBIF, and Suseso.

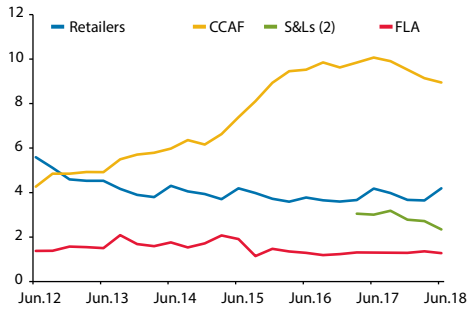
NONBANK LENDERS[6]/

Nonbank lenders (NBLs) give credit to households and businesses in the form of consumer, mortgage, and commercial loans. In the consumer portfolio, NBLs include retailers, family compensation funds (CCAF), savings and loan associations (S&Ls), and companies that provide factoring and leasing services and car loans (FLA)[7]/. The mortgage portfolio includes endorsable mortgage loans (*mutuos hipotecarios*) issued by banks and mutual societies and included among the assets held by life insurance companies (LICs) (box II.2). Finally, factoring and leasing companies mainly provide trade credit to businesses (chapter II).

Nonbank consumer loans together were equivalent to about 55% of total bank consumer loans as of the cutoff of this FSR (figure III.13). The composition has been stable, although the share of retailers and FLAs has increased since mid–2013. In June 2018, retailers accounted for 23%; CCAFs, 12.3%; S&Ls, 6.6%; and FLAs, 13.4%. Since the last FSR, households have taken on more debt with NBLs. Total nonbank loans recorded a real annual growth rate of 12%, while bank consumer loans grew around 5% in the same period (figure III.14). In terms of arrears, retailers saw a slight deterioration relative to the cutoff of the last FSR, reaching 4.2% (figure III.15). Factoring operations were equivalent to 4.3% of bank commercial loans in June 2018, with a real annual growth rate of 13%. Nonbank factoring companies represent around 0.7% of commercial loans, versus 1.4% for entities affiliated with the banking sector and 2.2% for the banks themselves.

The banking system has significant exposure to NBLs, through the provision of commercial-type loans. Medium-sized banks, in particular, have increased their loans to NBLs in recent years, especially to retailers. Bank exposure—through debt held by NBLs—represents 12.5% of regulatory capital in the case of large banks and 27.4% for medium-sized banks.

FIGURE III.15
Arrears of 90 to 180 days (1)
(percent of loans)



(1) Arrears of 90 to 180 days, except for the CCAF.

(2) Due to a change in format, data for S&Ls are available since March 2017.

Source: Central Bank of Chile, based on data from the SBIF and FMC.

In sum, the share of NBLs in household debt has increased since the last FSR. This represents a vulnerability, given the lack of transparency in indebtedness and debt service levels, which hinders the assessment of credit risk (box II.2). The banking sector has an indirect exposure to the business and household sectors through loans granted to NBLs. Many of these entities have weak corporate governance structures, as has become evident in recent years. The vulnerability described above takes on greater significance in the context of an economy in the midst of recovery.

BOX III.1
RECENT ACTIVITY IN THE COMMERCIAL PORTFOLIO

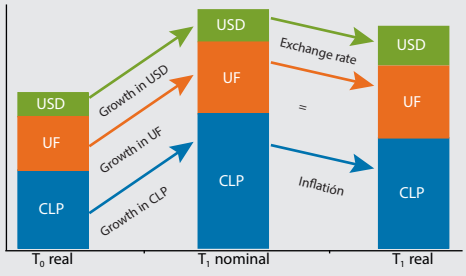
After several years of sluggish lending, commercial loans have recently become more dynamic. This box isolates the flow of new loans from the growth of the stock of loans, which includes changes deriving from other components.

The annual growth of the stock of loans approximates lending activity, but it is also influenced by several factors that are unrelated to the volume of new loans, such as changes in the exchange rate and write-offs in the period. To obtain more precise measures of credit that reflect the dynamism of the banking sector, we need to quantify the contribution of different components associated with specific valuation or amortization effects [1/], so as to isolate them from lending.

Valuation and the effects of currency composition

The growth rate of the loan stock approximates the change in the amount of the aggregate portfolio over time. These volumes can be expressed in the original currency or translated into some other unit. For the purpose of analyzing lending activity, commercial loans correspond to the sum of operations in various currencies (CLP, UF, USD, etc.), which are translated into pesos (the accounting currency) at the current exchange rate [2/] (diagram III.1).

DIAGRAM III.1
Real loan growth



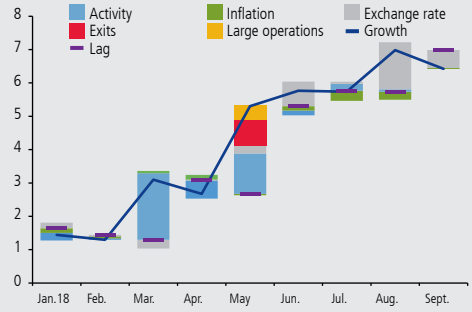
Source: Central Bank of Chile.

[1/] Among the specific effects, the methodology also allows for the quantification of the contribution of large loan operations used for purposes other than financing regular business operations. For more details, see Martínez and Oda (2018a).
[2/] Thus, the real growth of loans between two periods (from T0 real to T1 real in diagram III.1) is calculated as the aggregate change in loans in different currencies translated into UFs using the exchange rate in the corresponding period. For more details, review the diagram.

For example, a set of loans denominated in dollars, whose value in the original currency is fixed, can present changes in their accounting value in UF due to changes in the exchange rate and inflation. Thus, the effect of the currency dynamic on the growth of the commercial loan portfolio is determined by its composition. Therefore, growth in real terms calculated based on changes in the loan stock can be decomposed into volume effects in pesos, UFs, and foreign currency, inflation effects, and valuation effects, due to changes in the exchange rate. The contribution of each factor can be quantified to determine its share in the total growth of loans.

Applying this exercise to commercial loans reveals that exchange rate depreciation has a large effect on the growth of loans in this segment, given that around 15% of the portfolio is denominated in foreign currency. For example, after accounting for a large share of growth in previous months, the exchange rate effects reversed in September, and the recorded volume of loans was somewhat lower (figure III.16).

FIGURE III.16
Commercial loan growth
(real annual change, percent)



Source: Central Bank of Chile, based on data from the SBIF.

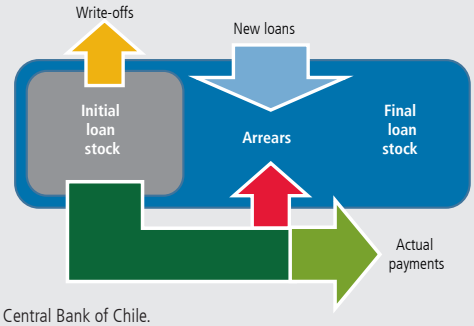
The analysis also shows that the significant increase in growth in May 2018 derived, in part, from specific new flows corresponding to large loan operations, as well as the exit of Rabobank from the system a year ago [3/].

[3/] The exit of a bank from the market implies a contraction of the loan portfolio. In the analysis of a year-on-year change, a lower initial value results in an increase in growth over the period.

Stock of loans and the flow of new loans

The change in the stock of loans is often used to approximate the flow of new loans. However, the changes in the total stock include amortizations, increases in arrears, and write-offs in the period. The loan stock expands when new loans are generated [4], and it contracts due to actual payments and write-offs in the period. Amortizations, in turn, are flows that must be subtracted from the loan, excluding unpaid installments (diagram III.2).

DIAGRAM III.2
Flow of loans

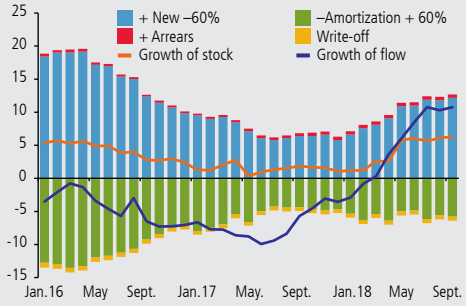


Source: Central Bank of Chile.

To differentiate the various elements described above, we use flow data on new loans, write-offs, and arrears. In the case of the commercial portfolio, the contribution of new loans to the growth of the stock is comparable to that of amortization[5], while the arrears component is of a similar magnitude to write-offs (figure III.17).

In the current year, the growth of loans is mainly explained by the generation of new credit. However, the annual growth rate of new loans has been in recovery since mid–2017, which is earlier than would be inferred from the analysis of the growth of the loan stock. Thus, monitoring the dynamics of the flow of new loans will help capture changes in trend sooner.

FIGURE III.17
Growth of stock and flow of commercial loans (*)
(percent)



(*) Excludes contingent loans.

Source: Central Bank of Chile, based on data from the SBIF.

Conclusions

Loan dynamics are typically measured though the real growth of the stock of loans. However, this indicator of lending activity can reflect various effects that are unrelated to the volume of new loans, so it is necessary to decompose the aggregate stock to more precisely identify the evolution of its components. This is particularly important in the case of the commercial portfolio, whose mixed composition implies a stronger impact from valuation effects. In fact, the recent growth of this portfolio has been tied to the depreciation of the exchange rate. Finally, the analysis of the flow of new loans provides additional information on recent activity and potential changes in trend.

[4] As mentioned, the growth of the stock of loans is influenced by changes in the exchange rate. However, to analyze the impact of the flow of new loans and isolate the valuation effect, this section uses amounts expressed in UFs. The exchange rate effect is lower for flows than for stocks, because the latter include older loans that are repriced according to the exchange rate.
[5] In both cases (the flow of new loans and amortizations), the growth contribution to growth was reduced by 60% for the purpose of the diagram.

BOX III.2
DECOMPOSITION OF CREDIT RISK IN BANK STRESS TESTS

Stress tests are a widely used tool for evaluating the resilience of the banking system. The test estimates the potential losses of banks in an extreme but plausible scenario. In this context, the definition of the scenarios and the evaluation of the effects of the component variables are essential for the interpretation of the results. This box describes the methodology for decomposing bank credit risk according to the origin of the shock (output, interest rate, and the exchange rate), to then assess how each affects credit risk in the banking system. The results show that while a contraction of output is the main risk factor, sharp changes in interest rates also have a significant impact on the banking system's loan portfolio.

Credit risk model

The stress scenario is generally defined as a strong contraction of output. However, the growth path under a stress scenario also incorporates the effect of the interest rate scenario. This scenario comprises a sharp increase in credit risk and reductions in the volume of loans and bank profitability, all of which demonstrate financial fragility as proposed by Goodhart et al. (2006), Laeven et al. (2012), and Martínez et al. (2018).

Although the scenario considers shocks to several macrofinancial variables, the methodology estimates the risk of the complete scenario. The credit risk model in the stress tests uses a parsimonious VAR specification that incorporates exchange rate, interest rate, and output shocks (Alfaro et al., 2009, Martínez et al., 2017).

In the applied model, which is made up of a system of equations, the interest rate shocks have both a direct impact on credit and an effect through economic activity (table III.3). For example, the exchange rate has a direct effect on loan growth and loan loss provisions, which, in turn, have an impact on themselves and on other variables, such as write-offs, which also feed back into the model dynamics.

The specification of credit risk, measured as annual loan loss provisions, is not linear with respect to the macrofinancial variables. Consequently, it is not possible to directly find the effect of each individual component of the scenario on final credit risk. Therefore, the semi-structural macrofinancial model of the stress test is sequentially estimated[1/] (table III.3). That is, the model is first solved with a given individual shock and the test results are recorded. The procedure is then repeated, adding a shock to another variable, until all the shocks are incorporated. This shows how each of the shocks—which in this case make up the severe stress scenario for the tests—affect the banking system's performance.

TABLE III.3
Credit risk model
(VAR specification)

	Variable							
Shock	1. TC	2. TI	3. PIB	4. Des.	5. Col.	6. Cas.	7. Prov.	8. Marg.
1. Exchange rate	X				X		X	
2. Interest rate		X	X		X		X	
3. GDP growth			X	X	X	X	X	
4. Unemployment				X		X	X	
5. Loans					X	X	X	X
6. Write-offs					X	X	X	
7. Loan loss provisions					X		X	
8. Margin								X

Source: Central Bank of Chile, based on Martínez et al. (2017).

Thus, each variable determines a risk path (*ceteris paribus*) and the simultaneous shocks on all the variables captures the risk of the complete scenario. This procedure is used below to carry out the decomposition under the severe stress scenario.

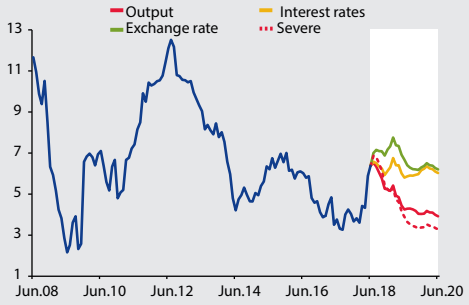
Impact of the shocks in stress scenario

Annual loan loss provisions in the stress scenario derive from the interaction of loan dynamics and the percent of loan loss provisions times the amount loaned. The estimates show that, although the interest rate and exchange rate shocks have a negative effect on loan growth, the output shocks have a larger impact (figure III.18).

[1/] For more details on the methodology for computing the contribution of each shock in the scenario, see Martínez and Oda (2018b).

Under the severe scenario, within the estimation window, there is a slowdown of credit that is similar in magnitude to past episodes of financial fragility. Furthermore, loan loss provisions as a percent of loans rise to around the level recorded during the global financial crisis (figure III.19). Thus, the shocks to the market variables have a significant effect in the short term that is comparable to the reduction in output.

FIGURE III.18
Loan growth in the severe scenario, by shock (*)
(percent)

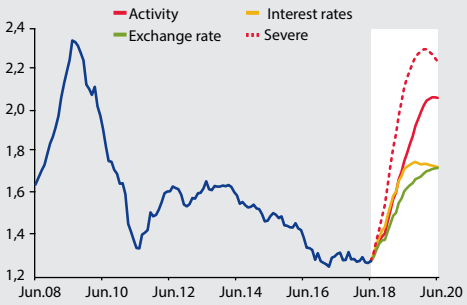


(*) The shaded area indicates the estimation period.

Source: Central Bank of Chile.

On the one hand, the sharp increase in loan loss provisions per loan due to the output shock is partially mitigated by the slowdown in credit. On the other, both the interest rate and exchange rate scenarios increase loan loss provisions considerably, while growth declines slightly. In this context, the effect of the market variables on credit risk is significant, mainly through the deterioration of the portfolio. When this is applied to the banking system, in a severe stress scenario, the output contraction is the main source of risk, but the sharp increase in interest rates accounts for around a quarter of total credit risk, and the exchange rate depreciation represents 1.7% of capital, equivalent to 15% of total credit risk (figure III.20).

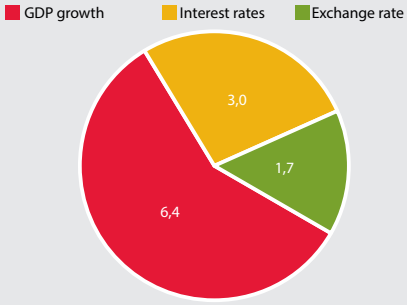
FIGURE III.19
Annual loan loss provisions in the severe scenario, by shock (*)
(prcent of loans)



(*) The shaded area indicates the estimation period.

Source: Central Bank of Chile.

FIGURE III.20
Credit risk disaggregated by shock
(percent of capital)



Source: Central Bank of Chile, based on data from the SBIF.

Conclusions

Stress tests evaluate the banking system's resilience under a stress scenario, represented by the path of different macrofinancial variables. The applied tests include credit risk, market risk, and liquidity risk.

The analysis indicates that while the financial variables have a direct impact on market risks, they are also important for the analysis of credit risk. Thus, interest rates and the exchange rate have an impact on credit risk over and above their effect on the market component. Consequently, the aggregate effect of these variables is a significant factor in the final test results.

IV. RESIDENTIAL REAL ESTATE SECTOR AND FINANCIAL STABILITY

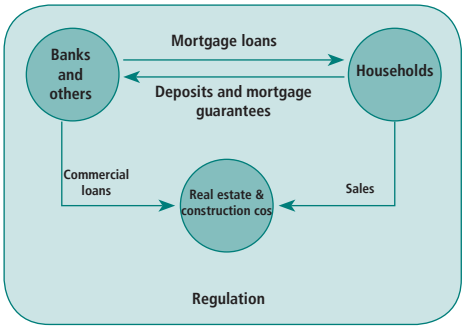
This thematic chapter addresses various facets of the residential real estate market, with a special focus on developments in the last decade and their implications for financial stability. The issues analyzed have to do with house prices, financing, and macroprudential measures. The analysis indicates that the growth of the sector has been consistent with the country's development, and there is no evidence of a buildup of financial risks in the sector.

INTRODUCTION

In Chile, the home is the household's primary asset and mortgage debt the main financial liability. At the same time, the portfolio associated with the real estate sector is the fastest growing in the Chilean banking system, and it is therefore continuously monitored for the *Financial Stability Report*. In recent years, progress has been made in terms of understanding and tracking the real estate sector, through sectoral analysis and reporting on relevant developments. This chapter continues the work in this area, aiming to expand our understanding of the Chilean residential real estate market, with a focus on financial stability considerations[1/].

The interaction between this sector and the rest of the economy and, in particular, with the financial system is a critical issue, considering that the real estate sector has been at the center of six major bank crises in developed economies since 1970 and eight major bank crises in Asia and Latin America since 1990[2/]. Furthermore, when the real estate sector is at the center of a crisis, the subsequent recession is two to three times more severe (Claessens, et al., 2009) and the recovery is slower (Jordà et al., 2016). Thus, understanding the real and financial interactions of the real estate sector with the rest of the economy is essential for preventing, understanding, and facing episodes of crisis. At the same time, analyzing the sector is a natural extension of the central bank's oversight role in countries where the market has reached a significant level of development, as is the case in Chile.

DIAGRAM IV.1
Real estate sector and interactions

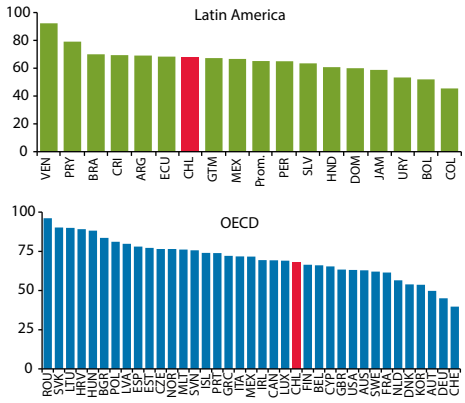


Source: Central Bank of Chile.

[1/] At the international level, before the international financial crisis, research on the real estate sector was not a key issue in the profession. For example, the first Handbook of Macroeconomics, published in 1999, does not contain a chapter on the real estate sector, and very few central banks included a section on the sector in their financial stability reports. This trend changed after the international financial crisis.

[2/] See Fischer (2017); Reinhart and Rogoff, (2009a, 2009b). In particular, the peak of the house price cycle most often occurs in the year prior to a large banking crisis. See Reinhart and Rogoff (2009b, p. 217).

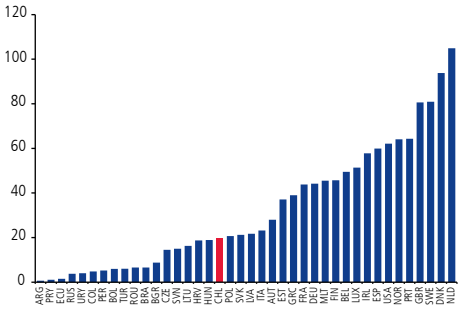
FIGURE IV.1
Home ownership in the OECD and Latin America (*)
(percent)



(*) Data for Chile are from the 2017 HFS, percent of households with real estate assets. For Latin America, the data are mostly for 2011, except for Chile. In that year, home ownership in Chile was 65.5% according the 2011 Casen survey. For OECD countries, the data are for 2014 (or as close as possible). In that year, the figure for Chile was 64.6% according to the 2013 Casen survey.

Sources: Blanco and Volpe (2015) and OECD Affordable Housing Database (2016).

FIGURE IV.2
Mortgage loans as a percent of GDP
(year-end 2013)



Sources: XXIX Meeting of South American Central Bank Governors, McKinsey Global Institute, and European Mortgage Federation.

The following sections look at the evolution of the residential real estate sector in the last decade, arguing that it has been consistent with the evolution of the macroeconomy and the country's development. The expansion of the middle class, the modernization of society, the high degree of urbanization, and the use of targeted public subsidy policies to help the poorest families buy a home have contributed to the strong development of the residential real estate sector in recent years. The Chilean financial system has played an important role in this development, based on household saving and traditional bank financial intermediation, in accordance with an adequate regulatory and supervisory framework. Another key factor has been the stable macroeconomic environment, in particular controlled inflation. Thus, there is currently no evidence of financial stability risks deriving from this sector. However, there are still issues that need to be adequately monitored, which are addressed in the chapter.

This chapter does not constitute an exhaustive analysis of the sector or the government's housing policy. Rather, the chapter focuses exclusively on the interaction between the residential real estate sector and the financial sector, households, and regulations, in order to assess the risks to financial stability[3/]. (diagram IV.1).

THE RESIDENTIAL REAL ESTATE SECTOR

Households' primary asset in Chile is their home. Chile has a high rate of home ownership, at between 60 and 70% depending on the source. This is similar to the rate in the United States, Canada, and the United Kingdom, where 64 to 69% of households are homeowners; as well as to the Latin American region, where the average homeownership rate is 65% (figure IV.1; see also Blanco and Volpe, 2015). The increase in household home ownership in recent years has been strongly influenced by the growth of household disposable income, government housing subsidies, and the development of the financial system, as an increasing share of the population has access to mortgage loans. Chile has one of the highest credit access rates in the region, and has made great strides in this area in the last two decades. In the 17-year period from 2001 to 2018, the number of outstanding mortgage loans almost tripled, adding around a million new loans.

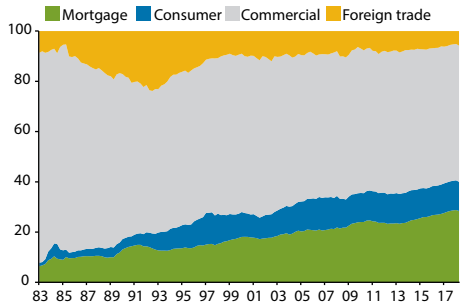
Mortgage debt is the principal financial obligation of Chilean households. In the second quarter of 2018, bank mortgage loans were equivalent to 24% of GDP; this is higher than other emerging economies, but lower than developed countries with a similar homeownership rate (figure IV.2). This type of debt grew from 18% of total bank loans in 2001 to 28% in the second quarter of 2018, thus becoming the fastest-growing portfolio on the banks' balance

[3/] Córdova and Cruces (2018) address demographic issues, the evolution of the real estate and financial sectors, and some issues related to housing policy in recent years. Calani (2018b) and Paillacar (2018) provide a more in-depth discussion of the technical details behind the conclusions presented in this thematic chapter.

sheets in the period (figure IV.3). The financing of home purchases in Chile, and their rapid growth, has been underpinned primarily by the banks, which in turn are funded mainly by local institutional investors (pension funds and mutual funds). This type of funding represents 30% of the banking system's liabilities. Thus, the Chilean system of home is based on long-term saving by households and traditional bank financial intermediation.

The government has also played an important role in the sector. It is estimated that in the last two decades, more than half of homes built were purchased with some kind of housing subsidy (Razmilic, 2010). The design of subsidy policies in Chile has a long history, evolving from direct housing provision programs in the early 2000s to a greater use of voucher-type demand subsidies, which finance all or part of the home purchase depending on the socioeconomic vulnerability of the household. Additionally, the government (central and municipal) is responsible for implementing the tax and regulatory requirements that have molded the sector's growth, for example, through tax benefits (DFL2), the real estate VAT, changes in zoning, changes in land use, and so forth.

FIGURE IV.3
Bank loans by portfolio
(percent of total)



Source: Central Bank of Chile.

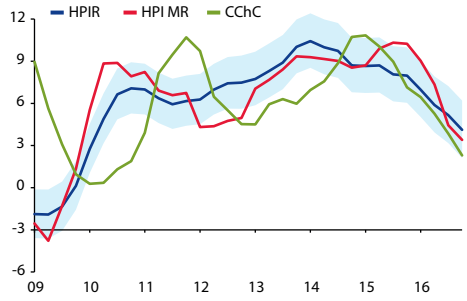
HOUSE PRICE DYNAMICS

Fluctuations in house prices are central to financial stability monitoring for several reasons, namely, their effects on bank balance sheets, household wealth, household financial constraints (Kaplan et al., 2017), and the macroeconomy in general, through their effect on the trend of the wealth-income ratio (Knoll et al., 2017) and the size of the financial sector (Jordà et al., 2016). This section provides a retrospective analysis of the house price cycle in Chile and house price determinants in the last decade. It also presents a series of statistical tests to detect episodes of unsustainable growth—also called episodes of exuberance (Martínez-García and Grossman, 2018) or bubbles—which could be associated with financial vulnerability.

a. Price cycles and bubbles

House prices at the national level (and at the MR level) grew on the order of 76% (83%) in real terms in the 2006–2016 period, according to the house price index maintained by the Central Bank of Chile. The new house price index for Greater Santiago, maintained by the Chilean Chamber of Construction (CChC), indicates a price increase of 70% in the same period (figure II.10). The growth rate of prices was not constant, however: there was a period of faster growth in the years after the international financial crisis—with real annual growth rates of over 7%—followed by a slowdown since 2016. Thus, there was an acceleration-deceleration cycle of approximately eight years between 2010 and 2017 (figure IV.4).

FIGURE IV.4
Growth of house prices in the MR (*)
(percent, annual, 4-quarter moving average)



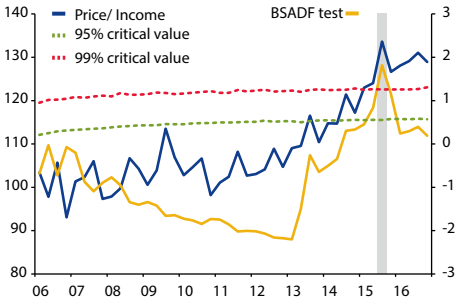
(*) The HPI and HPIR indices show price growth for the Santiago Metropolitan Region (SMR); CChC index shows price growth for Greater Santiago. For more details on the HPIR, box II.1 in the FSR for the first half of 2018.

Sources: Central Bank of Chile and CChC.

During price acceleration phases, the most immediate concern from the perspective of financial stability is that the growth is fundamentally misaligned. A number of statistical methods have been proposed for distinguishing this type of bubble from a sustainable growth path[4]/. This chapter focuses on the house price-to-disposable income (per capita) ratio and uses the methodology proposed by Phillips et al. (2011) and Phillips et al. (2015)[5]/. The use of the price-to-disposable income ratio is based on the fact that, as argued below, the most important determinant of the growth of prices is household income. Thus, if income is growing at a similar rate to prices, there is no reason to think there is a bubble. The tests are looking to identify episodes in which the growth of the price-income ratio shifts from being relatively stable to having a divergent dynamic. At the same time, it is important to bear in mind that not all periods of fast price growth, or sudden accelerations, are periods of exuberance. Sudden increases in the growth rate can also be explained by increases in the growth rate of other determinants or, more importantly, by sudden changes in regulatory or housing policies. Thus, only in the absence of an alternative explanation can the evidence found with this type of test be considered verification of the existence of a bubble (Mayer, 2011; Shiller, 2015).

The reading of this type of test is direct: a statistical value above the corresponding critical value signals a potential price bubble relative to income. These statistics and their critical values are calculated for the period from 2002 to 2016. The results indicate that there is no statistical evidence of a bubble in the full sample (table IV.1). Additionally, the BSADF test, which establishes the dates in which there might have been an episode of exuberance, returns a statistic above its critical value only in the second half of 2015—the period immediately before the real estate VAT entered into force, which coincided with the advance purchase of homes, as discussed in detail in previous FSRs (figure IV.5). In light of these tests, together with the existence of significant regulatory change, we argue that there is no statistical evidence supporting the existence of a bubble in the price-income ratio in the last decade.

FIGURE IV.5
BSADF test: price-income ratio, 2002–2016 (*)
(2006=100; no units for rest)



(*) Shaded areas identify potential bubbles.

Source: Central Bank of Chile.

TABLE IV.1
SADF and GSADF tests: house price-to-disposable income per capita ratio
(no units)

	Price-income ratio	Critical value		
		1%	5%	10%
Test				
SADF	-0,1	1,9	1,3	0,9
GSADF	1,8	2,6	1,9	1,6

(*) Critical values constructed based on the methodology proposed in Phillips et al. (2015).

Source: Central Bank of Chile.

[4]/ For example, Diba and Grossman (1988) use standard unit root and cointegration tests to analyze possible bubble behavior in the S&P index. For the real estate sector, Giglio et al., (2016), who study the housing markets in the United Kingdom and Singapore, study whether a freehold property's sale price is statistically different from the present value of leasehold contracts with extremely long maturities, arguing that if that is the case, then there is a housing bubble.

[5]/ In both articles, the authors propose a series of statistics based on the test Augmented Dickey Fuller (ADF) test, which is usually used to detect the presence of a unit root in a time series. The proposed tests allow the verification of three hypotheses: (i) the existence of a period of exuberance (SADF statistic); (ii) existence of multiple periods of exuberance (GSADF statistic); and (iii) existence and identification of the beginning and end of such episodes (BSADF statistic).

b. Determinants of house prices

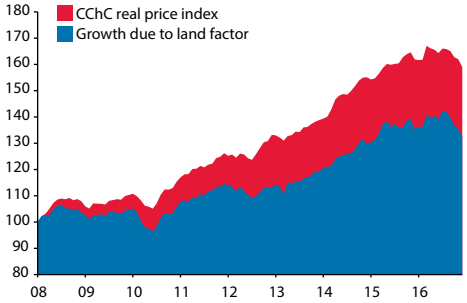
What other variables are important for determining house prices? To answer this question, it is useful to distinguish between variables that affect prices in the short and medium term versus in the long term. In the following discussion, we start with the latter and then analyze the role of the former.

At longer horizons, the evolution of house prices responds to the more structural variables of the economy. In particular, the evidence identifies the scarcity of land (in desirable locations), household disposable income, and the ability of households to use the financial system to leverage this income as the variables that determine the house price trend.

At the international level, Knoll et al. (2017) analyze the experience of 14 developed countries from 1870 to 2012, coming to two important conclusions. First, house prices were stable or fell slightly from the end of the nineteenth century to (at least) 1960. However, after 1960—or even since 1990 for some countries—house prices grew suddenly. Second, in a price decomposition exercise, the same authors conclude that 84% of the total increase in house prices between 1950 and 2012 can be attributed to the increase in land values. In the same vein, Gyourko et al. (2013) argue that in the United States, land values increased due to a strong preference for living in certain cities, combined with an inelastic supply of new real estate in the same cities. That is, the most important factor is not the scarcity of land per se, but rather the scarcity of land in the right place. Applying the methodology proposed by Knoll et al. (2017) to national data on building costs and new house prices in Santiago—both from the CChC—shows that in the 2008–2018 period, 63% of the increase in house prices can be attributed to the increase in land values (figure IV.6). The rest is explained by higher building/replacement costs[6/].

From a demand perspective, we can also distinguish between variables that affect the house price trend versus those that cause cyclical deviations from the trend. In the former group, the most important variables are household disposable income; demographic changes and urbanization; and households' increasing access to the formal financial system, in particular mortgage loans. From 2002 to 2016, prices grew around 70% (according to the repeat sales price index for the SMR), while income per capita grew just over 50% in real terms. In an international comparison, the difference between the growth rates of house prices and per capita income in Chile is moderate relative to developed

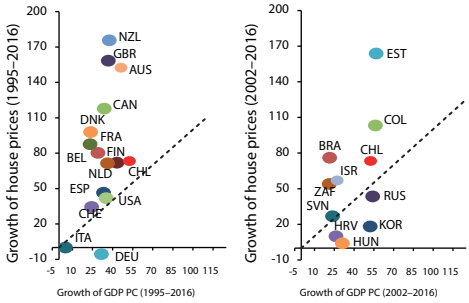
FIGURE IV.6
Decomposition of the growth of house prices (*)
(monthly index, 2008.I=100)



(*) The blue area shows an estimate of the growth of house prices if building costs had been constant since the start of the sample.
Source: Central Bank of Chile, based on data from the CChC.

[6/] Flores et al. (2018) provide an alternative estimate of the value of the land supply and the value of the housing stock at the national level in the 2012–16 period. They conclude that the value of the land supply increased 63% in the period of analysis.

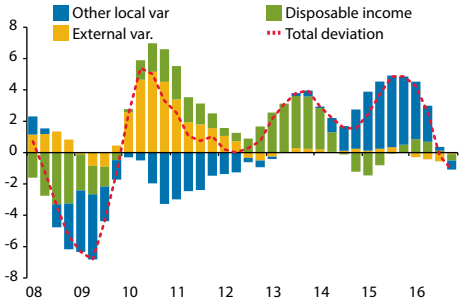
FIGURE IV.7
Growth of house prices and GDP per capita (*)
(percent)



(*) Data for Chile correspond to growth of the house price index based on repeat sales in the SMR in the period 2002.II–2016.II, so as to be comparable with the latest available data for the other countries in the sample.

Source: Central Bank of Chile, based on data from the BIS, OECD, and World Bank.

FIGURE IV.8
Deviations of the house price growth rate from its unconditional average: 2008–16 (*)
(percent)



(*) Contribution of different factors to the deviation from the estimated unconditional average. External variables include the VIX, GDP growth of trading partners, the EMBI Chile, and the copper price. Other local variables include the mortgage rate, capital flows to the local banking system, and building costs. Based on a quarterly SVAR estimation with restrictions that only allows income to have a long-term effect on house prices. Sample period: 2003–2016.

Source: Central Bank of Chile.

countries and similar to other emerging economies (figure IV.7). To understand this difference it is important to also consider the notable increase in the use of banking services in the period under analysis, as well as the increase in the number of households, all in a supply context of relatively inelastic urban land.

To analyze the deviations of house prices from their growth trend, we estimate an econometric model that considers—in addition to the real house price index at the national level—household disposable income, external variables (copper price, EMBI-Chile, VIX, and GDP of trading partners), and other local variables related to the real estate and mortgage market (mortgage interest rate, capital flows to the local banking system, and building costs). In the period of analysis (2002–2016), the average annual growth rate of house prices was 4.6%. According to the results of the exercise, the deviations of prices from that average in the last decade had different causes (figure IV.8). In particular, external variables and household income played a key role in the episode of below-average growth in 2008–2009 and the later recovery in 2010–2011. Similarly, the growth of household income largely explains the above-average growth of house prices in 2012 and 2013. Finally, in part of 2014 and all of 2015, the above-average growth of house prices is largely related to other local variables, in particular an idiosyncratic residual in the house price series. This is consistent with the advance purchase phenomenon and the acceleration in the growth of house prices between the announcement of the real estate VAT and its entry into effect in January 2016, which is discussed in the previous section and in past FSRs.

Based on the above discussion, we conclude that the growth of house prices has been consistent with the growth of household income and the financial development of the country over the past two decades, in a context of relatively inelastic land supply, at least in the largest urban center. At the same time, exceptional circumstances such as the tax reform in 2014 or the strong output shocks in 2009—and the later recovery—were important factors in house price dynamics in the short and medium terms.

FINANCING, RISK, AND PRUDENTIAL REGULATION

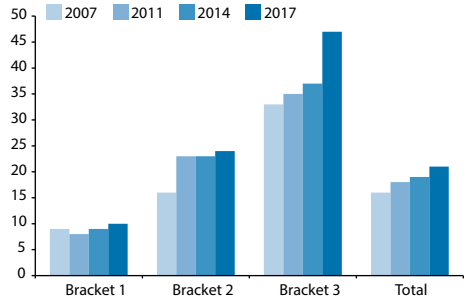
a. Financing for home purchases

According to data from the HFS, 21% of Chilean households reported having current mortgage debt in 2017, versus just 16% in 2007. The majority of these households (18% in 2017 and 14% in 2007) reported having mortgage debt to finance their principal dwelling. Notably, the growth in the share of households with access to mortgage debt has been persistent and comprehensive in terms of household income. One of the most interesting results of the 2017 HFS is the increase in the fraction of households with mortgage debt in the two highest income deciles (bracket 3), reaching 47% of households in those deciles according to the survey (figure IV.9).

With regard to mortgage lenders, the commercial banks are the most important source of home financing, accounting for almost 90% of the mortgage stock as of year-end 2017. The remainder is financed by mutual societies associated with life insurance companies and other lenders such as the family compensation funds (CCAF) and savings and loan associations (S&Ls). Within the banking sector, the state-owned *Banco Estado* has been the main lender in terms of the number of loans. As Micco et al. (2012) describe, the state bank has given a large number of low-income households access to home financing. It is the only commercial bank that provides financing to households that receive housing subsidies; in terms of amount, its mortgage loans are, on average, around 20% the size of mortgages in the rest of the banking system.

Currently, the most frequently used mortgage instrument is a non-endorsable mortgage loan (figure IV.10). The extensive use of this type of instrument is an important characteristic of the Chilean mortgage market, as it implies that the credit risk stays on the balance sheet of the issuing bank, such that the bank internalizes the risk when it grants a mortgage. With regard to the terms of mortgage loan agreements in the banking sector, there has been a decrease in the average applied interest rate in the last two decades and an increase in loan

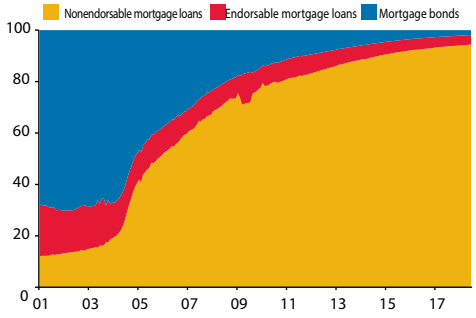
FIGURE IV.9
Mortgage debt holding (*)
(percent of total households in each category)



(*) Bracket 1 defined as income deciles 1 to 5; bracket 2, deciles 6 to 8; bracket 3, deciles 9 and 10.

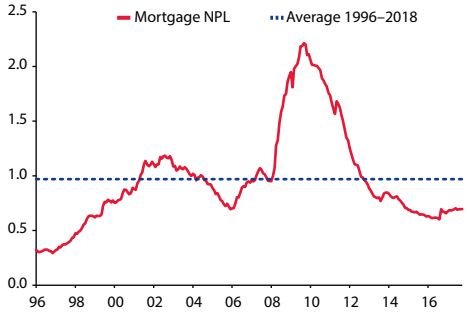
Source: Central Bank of Chile, Household Financial Survey.

FIGURE IV.10
Home financing instruments
(percent of the stock of mortgage loans)



Source: Central Bank of Chile, based on data from the SBIF.

FIGURE IV.11
Nonperforming loan ratio for mortgage loans
(percent of respective loans)



Source: Central Bank of Chile, based on data from the SBIF.

duration. From an international perspective, loan costs are higher in Chile than in developed economies but lower than for a sample of countries in the region[7/]. In Chile, 94% of the flow of bank mortgages (90% weighted by amount) is granted at a fixed rate (in UF), with an average duration of around 20 years. As a result, households have a low exposure to interest rate risk; instead, their main risk exposure through this type of debt is to income shocks and house prices.

b. Mortgage credit risk

Since 2010, there has been a systematic reduction in mortgage arrears and default indicators in Chile. In particular, the nonperforming loan (NPL) ratio, which measures the portion of the loan that is in arrears relative to the total principal, has fallen 1.5 pp from its peak of 2.2%—which was reached in the midst of the international financial crisis. A large share of this reduction occurred in a period in which the unemployment rate was also falling, and households were rebuilding their financial cushion. Currently, arrears are low from a historical perspective, despite the sluggish labor market in recent years: the NPL ratio is currently 0.7% of the corresponding loans, which is below the 1996–2018 average of 1.0% (figure IV.11). Given the importance of this debt from the perspective of both the lenders (28% of total bank loans in 2018) and the debtors (58% of household debt), tracking related trends is central to the supervision and monitoring of financial stability.

There are two main reasons that mortgage debt falls into arrears: first, the occurrence of liquidity shocks following income or expenditure shocks, which force the household to miss payments (nonstrategic default); and second, a situation of net negative equity (that is, when the debt exceeds the value of the asset) associated with price shocks (strategic default). The Chilean institutional structure establishes "full recourse" debt provisions, which means that in the event of default, if the amount received from the foreclosure sale is not sufficient to cover the repayment of the loan, the creditor can recover the unpaid balance with additional assets of the debtor that are unrelated to the direct mortgage collateral. This incentive structure reduces the incidence of strategic default, such that default is primarily associated with liquidity shocks (e.g., unemployment, unforeseen expenses).

Empirical evidence for the United States indicates that both aggregate shocks and debtor-specific shocks—especially unemployment—better explain default that strategic motives[8/]. For the case of Chile, several authors have examined the determinants of mortgage default in recent years. Alfaro and Gallardo (2012) analyze the loan default behavior of households in Chile using data from the HFS. Their analysis of mortgage debt concludes that income and income-related

[7/] The sample of countries comprises Canada, Chile, Colombia, Costa Rica, France, Japan, Mexico, Peru, and the United States.
[8/] See Elul et al. (2010), Sarmiento (2012), Bajari et al. (2008), Mayer et al. (2009), Gerardi et al. (2017) for an analysis for the United States using data for the period around the global financial crisis. In general, the conclusion is that income shocks combined with house price reductions increase the default probability significantly.

variables are the most robust and significant for explaining nonpayment, while demographic or personal variables have lower explanatory power. Madeira (2014) uses both the HFS and the National Socioeconomic Characterization Survey (Casen) to study the different risk factors that affect default among families during the economic cycle. With regard to mortgage default, he reports that it is positively associated with a low income, low liquidity (measured as a high ratio of debt service to income), and unemployment risk. Avanzini et al. (2015), who also uses the HFS, finds that household-specific financial conditions and their interaction with aggregate factors, such as house prices and the loan-to-value ratio, account for a significant share of mortgage default. Finally, Alegría and Bravo (2016), based on administrative data on new bank mortgage debtors, find that people who fall into arrears in the first year of the loan tend to have a smaller financial cushion, less liquidity, and a credit history with a previous default on consumer loans, and they tend to live in lower-income neighborhoods.

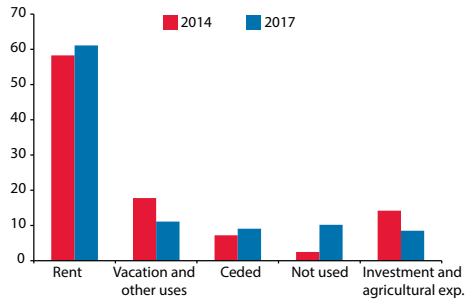
In sum, the empirical evidence indicates that mortgage default in Chile generally is not a strategic choice, but rather derives from income and unemployment shocks affecting households with little financial cushion. This reinforces the need to establish a unified debtor registry so that bank and nonbank lenders can adequately assess a loan applicant's financial cushion, to prevent the overindebtedness of households (box II.2).

c. Retail investors

A growing fraction of households have taken out more than one mortgage in recent years. At the end of the first half of 2018, almost 30% of bank mortgage debt was held by debtors with two or more mortgages (figure II.15). While not all of these debtors are buying a second property as an investment asset—either to rent it out or to earn capital gains—there is evidence that that is the case for a large share. As discussed in chapter II of this *Report*, the majority of debtors with more than one mortgage have their real estate assets in the same region, which suggests that the property is not a second home for personal use. In addition, evidence from the 2017 HFS shows that over 60% of households that take out a mortgage to buy a second home do so in order to rent it out (figure IV.12). For this analysis, households that use this investment strategy are called retail investors.

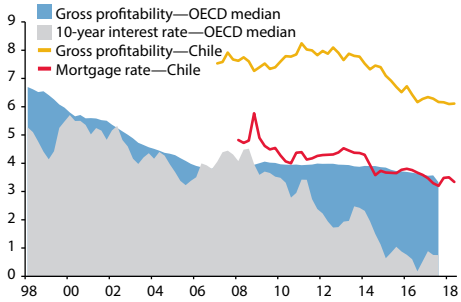
Retail investment is a relatively recent development in the real estate market, but its share of the mortgage and rental markets has grown systematically in recent years. These investors are not exclusively high-income households: 37% of households that own a second home financed with a mortgage, for the purpose of renting it out, pertain to the first eight income deciles, and a third of these have an income below the median.

FIGURE IV.12
Use of other properties
(percent of total other mortgaged properties)



Source: 2014 and 2017 Household Financial Survey.

FIGURE IV.13
Gross profitability of buy-to-rent investments: Chile and OECD countries (*)
(percent)



(*) Gross profitability does not include capital gains, maintenance costs, vacancy costs, taxes on rental income, sales taxes, or home ownership tax credits. Dotted lines show the quarter-on-quarter range for the sample of countries.

Source: Central Bank of Chile, based on data from the OECD and the *Portal Inmobiliario* website.

The existence of retail investors can be positive for the rental and mortgage markets for at least two reasons. First, these investors satisfy the housing needs of other households that don't want to (or cannot) buy a home (figure II.11). In particular, the trend could reflect a more structural phenomenon of demographic changes and the housing preferences of younger cohorts, which has been catalyzed in an environment of low interest rates (figure IV.13). Second, this type of supply is not concentrated in a few investors, which provides a degree of depth to the rental market. At the same time, given that the majority of these investors are households in the upper part of the income distribution, they have a higher probability than their renters of withstanding income and unemployment shocks without entering into default.

Given that the development of this segment of households is relatively recent, the resilience of their payment behavior in the face of an output or house price shock has not yet been put to the test. Nor have they had to decide whether to sell their real estate assets in response to the same shocks[9/]. This latter issue could be a source of concern if it acts as a mechanism for amplifying the initial shock. This potential vulnerability in the cycle and the importance of these developments in the rental market merit future research and monitoring.

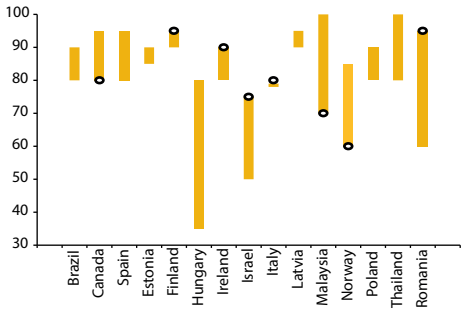
d. Macroprudential measures

There are at least two large sets of macroprudential measures that affect the real estate sector: limits on the size of household debt (limits on the loan-to-value, debt-to-income, and debt service-to-income ratios) and limits on lenders' credit risk (countercyclical capital buffer, reserves, loan loss provisions, and limits on asset concentration). The implementation of these measures has two main motivations: first, boom-bust cycles in the real estate market could potentially generate financial instability, as described above; and second, the existing instruments of microprudential regulation (e.g., resilience tests at the individual level) are perceived as either ineffective or costly (or both).

The real estate market has not been exempt from the use of macroprudential measures in Chile. In the 1970s, the introduction of mortgage bonds contained two restrictions on household debt service: a limit on the loan-to-value (LTV) ratio of 75% and a limit on the mortgage payment of 25% of disposable income[10/]. The reduction in interest rates from 2003 on, together with the introduction of non-endorsable mortgage loans (with no limit on the LTV ratio), produced a restructuring of the mortgage market toward the latter instruments.

[9/] With regard to the international evidence on how this type of investor can be an important factor, Albanesi et al. (2017) concludes that the growth of credit leading up to the crisis and the increase in default during the crisis were mostly concentrated in households that were retail investors. Similarly, Haughwout et al. (2011) show that in the U.S. states with the biggest rise and fall in house prices, a large share of mortgages were to retail investors, who were highly leveraged.
[10/] In 2009, the LTV limit was increased to 80% (100% for exceptional cases), to standardize conditions vis-à-vis endorsable mortgage loans. This measure was not motivated by prudential considerations.

FIGURE IV.14
Differentiated loan-to-value limits (*)
(percent of collateral value)



(*) Only some criteria for differentiation are described in the text. The size of the bars represents the degree of differentiation in the loan-to-value ratio based on type of institution, currency, associated insurance, real estate value, etc.

Source: Central Bank of Chile, based on Cerutti (2017) and Kuttner and Shim (2016).

Almost all mortgages are now effected through non-endorsable loans (figure IV.10). Before the crisis, the median LTV was 100% (figure II.14). In response, in January 2016 the SBIF introduced a change to the regulations on mortgage loan loss provisions, which substantially increased the provisions on loans with an LTV of over 80% in the event of default. The banking system quickly accommodated this new regulation as an implicit LTV limit. The provisions regulation influenced the supply of mortgage loans in the expected direction: banks tightened the supply of credit, in particular with respect to the size of the collateral. According to Calani (2018a), the LTV decreased 9.8% for the median debtor, due to the regulatory change. At the same time, loan loss provisions as a percent of mortgage loans increased from 0.7% in 2014 to 0.9% at year-end 2016. The lower leverage of households, combined with higher provisions in the banking system, imply that the financial system as a whole is more resilient to output or house price shocks.

The current provisions regulation is a step in the right direction for strengthening the stability of the financial system. Financial risks can accumulate in different market agents or segments and in different phases of the financial cycle. Therefore, macroprudential measures for the mortgage and housing market can and should be evaluated and reviewed regularly in virtue of this concentration of risk. When supported by an appropriate institutional framework, macroprudential policy can contribute to promoting financial stability, given flexibility on two dimensions: first, the ability to adapt to different phases of the financial cycle, in order to be proportional to the accumulation of risk; and second, the ability to target risks from specific agents[11]. This latter dimension has been addressed in several other countries, for example, though differentiation in LTV limits based on criteria such as the intended use of the mortgaged property (to live in or to rent), whether it is a first home, the geographical location, or some combination of the above (figure IV.14). The use of more than one measure can improve the effectiveness of the policy in general. For example, Kuttner and Shim (2016) show that LTV limits have more traction in lending dynamics if they are combined with limits on debt service to income. The consideration of these elements represents a logical next step in the road to strengthening the macroprudential policy framework for the mortgage market in Chile.

FINAL CONSIDERATIONS

The analysis carried out in this chapter highlights the importance of monitoring the real estate sector in order to safeguard financial stability. From a macroeconomic perspective of the sector, the chapter emphasizes at

[11]/ Neither aspect is free from difficulty. In the case of the former, the variety of available instruments and the absence of a consensus indicator of financial fragility makes the frequent a policy assessment and adjustment (as in the case of monetary policy) much more difficult. In the case of the latter, the regulator must be careful in that extremely targeted and uncoordinated measures can create space for evasion (IMF-FSB-BIS, 2016)

least four lessons. First, the development of the real estate sector has been consistent with the economic and financial development of the country. The growth of household disposable income, the expansion of the middle class and its access to banking services, and growing urbanization have driven the growth of mortgage debt as a percent of GDP and as a share of the banking system portfolio. Second, the same demand factors, combined with a relatively fixed stock of urban property, have driven up house prices, especially in the MR, although there is no statistical evidence of house price bubbles in the last decade. Third, the need for a consolidated debtor registry is a pressing issue for the financial system in order to achieve efficient risk management in the mortgage portfolio, particularly in the case of households with more than one mortgage. Finally, although there are no immediate risks for financial stability, this chapter identifies different market features and/or agents that merit ongoing monitoring in subsequent reports, as they represent potential sources of financial vulnerability in stress scenarios.

V. FINANCIAL REGULATION

This chapter reviews the most important issues in the debate on financial regulation at the local and international levels in the second half of 2018. Key developments include the passing of the new General Banking Law and the regulatory provisions on liquidity management requirements in the local banking system.

NATIONAL REGULATION

PASSING OF THE NEW GENERAL BANKING LAW

On 3 October, the National Congress passed a law modernizing banking legislation. The key elements of the new law are as follows: (i) adjustment of bank capital requirements to Basel III standards; (ii) early intervention mechanisms for troubled banks and crisis management; and (iii) incorporation and transfer of all SBIF powers to the Financial Market Commission (FMC). The implementation of this new legal framework raises a series of challenges for both the banks and the regulators. Box V.1 discusses the regulatory adjustments that must be implemented over the coming months.

In addition to changing the supervisory paradigm from a vertical (or silo) model to a unified (or integrated) model, the new law introduces the biggest changes in banking legislation since 1986. Nevertheless, the need for legal changes in the banking sector does not stop here. As discussed in box V.1 of the last FSR, it is still necessary to improve bank resolution mechanisms, in line with international recommendations, and to implement deposit insurance in accordance with the level of development of the national financial market.

REGULATIONS ISSUED BY THE CENTRAL BANK

New liquidity management requirements for the banking industry

The CBC modified Chapter III.B.2.1 of the *Compendium of Financial Regulations* (CFR) to incorporate minimum requirements for the short-term liquidity coverage ratio (LCR), a key component of the Basel III recommendations.

This represents the culmination of a process started by the CBC in 2015, with the incorporation of bank reporting requirements on two new short- and long-term quantitative indicators—namely, the LCR and the net stable funding ratio (NSFR), respectively. As indicated at that time, once there was a sufficient reporting history, specific minimum requirements were defined for the ratios, which are described in more detail in box V.2.

The SBIF opened a public consultation on changes to its regulations on the measurement and management of the liquidity position, so as to incorporate the aforementioned amendments to Chapter III.B.2.1 and introduce adjustments to the procedure for calculating the LCR and NSFR.

Adjustments to the regulations on payment card operators

The CBC published for public consultation various amendments to the regulations on payment card operators contained in III.J.2 of the CFR. The proposed changes facilitate the entry of new payment card frameworks into the country; establish a new category of operators, which can provide services based on a contract with another operator; and adjust the regulations on payment processing service providers that make payments and/or settlements to affiliated entities.

The proposed changes highlight the Central Bank's ongoing interest in promoting the continued development of the retail payments market, in order to contribute to financial inclusion while ensuring safe, efficient, and competitive conditions.

Integrated Derivatives Information System (IDIS)

The CBC opened a public consultation on the main regulations for the operation of an Integrated Derivatives Information System (IDIS), which seeks to expand the quantity and quality of the available information on transactions in this market, following international standards for financial market infrastructures. Chapter VI provides more background on this initiative.

REGULATIONS ISSUED BY OTHER ENTITIES

SBIF modifies its regulations on bank credit risk provisions

The SBIF modified its regulations to introduce standardized methods for calculating credit risk provisions in the collectively assessed commercial loan portfolio, which will enter into effect in July 2019. Until now, banks have used internal methods to calculate their provisions requirement for the collectively assessed commercial loan portfolio.

This change is part of a process currently underway at the SBIF to establish standardized models for calculating provisions for all portfolios. In 2014, standardized models were established for the mortgage portfolio, which entered

into force in January 2016. This round includes collectively assessed portfolios for commercial leasing, student loans, and generic business loans. Additionally, a standardized methodology has been announced for the consumer portfolio, together with a modification for the individually assessed commercial portfolio. As mentioned in this and past FSRs, the latter are particularly important given that the associated risk is mitigated by the local banking system through the use of collateral.

The banks can continue to use their internal methods, provided that they are duly approved by the SBIF through a formal review process. Thus, the standardized methods will constitution a prudential floor for internal methods that have not been expressly approved by the SBIF.

The SBIF estimates that as a result of this regulatory change, the banking system will have to increase its provisions by approximately US$300 million, which represents about 1% of current system equity and an increase in the NPL ratio from 3.7% to 4.7%, based on data for December 2017.

SBIF issues a series of regulatory changes on cyber security

The changes, published in August, aim to increase the available information on cyber security breaches and to raise cyber security standards in banking institutions. To achieve the former objective, the system for reporting breaches was improved through the creation of a digital platform set up by the SBIF specifically for this purpose. In addition, banks are required to appoint a management-level position responsible for communicating with the Superintendence at all times. For the latter objective, cyber security will become an explicit criterion in the evaluation of bank management, and the bank's board of directors must be directly involved in issues relating to cyber security, including an obligation to issue a statement on cyber security management at least once a year.

As is public knowledge, there has been a series of breaches of sensitive credit card information in recent months, which have forced the banks and the SBIF to take measures in each case, including verifying the status of issued cards, blocking assets, and notifying customers. Importantly, the information leaks did not derive from security breaches of the card issuers, but rather originated in one or more of the businesses that accept the cards as a means of payment. Given the interconnections between different entities involved in the operation of these means of payment, mitigating the risks of cyber attacks does not end with the regulation of issuers or their adoption of security measures, but must also extend to other suppliers, businesses, and users of credit and debit cards.

This highlights the need for both regulators and financial institutions to take measures to minimize the probability of cyber attacks, because the consequences can be serious, as discussed in box I.1.

FMC issues regulations on international standards that must be met by financial market infrastructures

The FMC has stipulated that securities clearing and settlement system operators, as well as securities depositories and custodians, must observe the international standards outlined in the Principles for Financial Market Infrastructures (PFMIs)[1/], effective 1 April 2019.

For this purpose, the management and oversight bodies of the aforementioned entities must observe the PFMIs in the definition of their policies, procedures, systems, controls, and mitigators so as to adequately manage the risks inherent in their business. Their self-assessments must be sent to the FMC for public disclosure.

The FMC measure is similar to the initiative recently adopted by the CBC for large-value payment systems (see the last FSR). Thus, the local financial regulators continue to implement measures to fulfill their commitment, assumed in January 2017, to apply the PFMIs in their policies, regulations, and supervisory procedures. This has translated into improvements in the assessment of international entities on the compliance with the PFMI in different jurisdictions (box VI.1).

FMC expands the investment options for voluntary pension savings (VPS) and collective voluntary pension savings (CVPS) offered by fund managers and securities brokers

Expanding the eligible instruments in which VPS and CVPS can be invested will allow fund managers and securities brokers to generate better risk-return combinations oriented toward a wider variety of customers, which should translate into more and better options for retirement saving and greater competition in these industries.

In the *Regulatory Report* on this change, the FMC cautions that the higher risk exposure of the VPS and CVPS resources deriving from the expansion of investment limits means that fund managers and securities brokers who offer these products must be meticulous in fulfilling their fiduciary duty, preparing a detailed investor profile for potential clients, and clearly communicating the risks inherent in the product. At the same time, the counterpart of higher risk is the potential increase in the return on retirement savings, which could have a positive social impact in terms of people's quality of life when they reach retirement age.

[1/] PFMIs are discussed in the Financial Stability Report, Second Half 2016.

INTERNATIONAL REGULATION

Rollback of the Dodd-Frank Act (DFA)

The Economic Growth, Regulatory Relief, and Consumer Protection Act, the largest reform of the DFA to date, was passed on 24 May of this year[2/]. This Act, which came out of a bipartisan agreement in the U.S. Senate, addresses wide-ranging criticisms of the 2011 DFA and incorporates changes in bank regulation, mortgage and student loans, retail credit reporting agencies, and capital formation. The Act represents a moderate change relative to the original Republican proposal—the Financial CHOICE Act—and more in line with, although less extensive than, the legal reform proposals published by the Treasury in 2017 and 2018.

The main changes in the regulation can be summarized as follows: (i) Regulatory relief for small banks (less than US$10 billion in total assets), including a reduction in the number of capital and leverage ratios they have to report, exemption from compliance with the Volcker Rule[3/], and a reduction in the frequency of regulatory reports; (ii) a change in the definition of systemically important banks (SIBs), raising the threshold from US$50 billion to US$250 billion in total assets for local SIBs and exempting banks with total assets of US$50 billion to US$100 billion from all prudential measures except the Basel III capital and leverage ratios; (iii) increased supervisory discretion for applying the regulation, with a change in the prudential regulation paradigm for banks between US$100 billion and US$250 billion in assets; (iv) regulatory relief for custodian banks, whose primary business is the provision of securities and asset custody services, allowing them to exclude certain liquid assets from total assets when calculating their leverage exposure, which will have a direct impact on three large custodian banks; (v) a boost to the municipal debt market, by allowing this type of debt to be included in liquidity ratios; and (vi) change in lending standards for the real estate sector through a series of measures that relax mortgage requirements and reduce the regulatory burden for small banks and originating lenders.

This reform represents a significant change vis-à-vis the DFA, but it does not infringe on any international agreements in the area of banking regulation (i.e., Basel III). In particular, the regulations have not changed for internationally active banks or for global systemically important banks (G-SIBs). In the same sense, the Fed published a regulation that limits the credit exposure to individual counterparties to 25% of Tier 1 capital[4/]. The DFA reform promotes a principle of proportionality in regulation, taking into account the complexity and diversity of institutions, as well as their size. Thus, for the first time, small

[2/] "S.2155 - Economic Growth, Regulatory Relief, and Consumer Protection Act" United States Congress, 2018.

[3/] Prohibition on the use of banks' own accounts for proprietary trading.

[4/] "Single-Counterparty Credit Limits for Bank Holding Companies and Foreign Banking Organizations" Board of Governors of the Federal Reserve System. June 2018.

banks will be exempted from the Basel standards imposed by the DFA, through compliance alternatives, in order to reduce their regulatory burden[5/]. In addition, the identification of systemic banks will change from a rules-based approach to a discretion-based approach. While the legal changes are limited, their impact on some sectors is unclear. The reform aims to strengthen certain aspects of the mortgage market, municipal debt, and targeted banks in small sectors, which played an important role in the last crisis and have been subject to restraints since the DFA.

The new Law creates space for regulatory changes in a context where supervisory bodies are increasingly biased toward proportionality in the application of the regulation. In the months since the act was passed, public consultations have been opened on regulations related to the simplification and adaptation of the Volcker Rule, the treatment of so-called highly volatile commercial real estate loans, the issue of regulatory provisions aimed at reducing the frequency of supervisory examinations for small banks, the classification of municipal bonds as high-quality liquid assets, and the extension of the living will deadline for the entire banking system[6/]. In other words, the regulators are rapidly implementing the new law while at the same time adjusting some current requirements.

International regulatory agenda

In July, the Basel Committee on Banking Supervision (BCBS) published the revised assessment methodology and higher loss absorbency (HLA) requirements for G-SIBs, which reconfirms the fundamental structure of the current G-SIB framework in effect since 2013[7/]. There is a general recognition that this framework fulfills its primary objective of requiring G-SIBs to maintain higher capital buffers and is providing incentives for them to reduce their systemic importance. Among the main changes, the new methodology establishes a cap on the weight of the substitutability category in the G-SIB calculation, because it was felt that the indicator overestimated the degree of systemic importance for banks that are dominant in the provision of payment, underwriting, and asset custody services[8/]. Additionally, it incorporates exposure from the activity of insurance subsidiaries in the indicators of total exposure, intra-financial system assets and liabilities (IFSA and IFSL), outstanding securities, and so forth. This methodology must be implemented by 2021 and HLA will be applied in 2023.

[5/] *Exemption from a regulation is called a regulatory off-ramp.*

[6/] "Proposed Revisions to Prohibitions and Restrictions on Proprietary Trading and Certain Interests in, and Relationships with, Hedge Funds and Private Equity Funds," OCC, Board of Governors of the Federal Reserve System, FDIC, SEC, CFTC. Federal Register, vol. 83, no. 137, July, 2018; "Expanded Examination Cycle for Certain Small Insured Depository Institutions and U.S. Branches and Agencies of Foreign Banks," OCC, Board of Governors of the Federal Reserve System, FDIC. Federal Register, vol. 83, no. 168, August, 2018; "Liquidity Coverage Ratio Rule: Treatment of Certain Municipal Obligations as High-Quality Liquid Assets," OCC, Board of Governors of the Federal Reserve System, FDIC. Federal Register, vol. 83, no. 170, August, 2018; "Regulatory Capital Treatment for High Volatility Commercial Real Estate (HVCRE) Exposures," OCC, Board of Governors of the Federal Reserve System, FDIC. Federal Register, vol. 83, no. 189, September, 2018; "Agencies Extend Deadline for Certain Resolution Plan Submissions," Board of Governors of the Federal Reserve System and (FDIC), August 2018.

[7/] "Global systemically important banks: revised assessment methodology and the higher loss absorbency requirement", BCBS. July 2018.

[8/] The BCBS G-SIB assessment methodology includes five categories in the calculation: size, cross-jurisdictional activity, interconnectedness, substitutability, and complexity. These categories have the same weight in the calculation (20%), and they are, in turn, made up of multiple indicators, which have different weights.

Along the same lines, the Financial Stability Board (FSB) published its principles on the execution of bail-in resolution strategies for systemically important institutions [9/]. The twenty-one principles include disclosures on the instruments and liabilities within the scope of the bail-in; valuations to support the application of the bail-in; processes to suspend or cancel the listing of securities, notify creditors, and deliver new securities following entry into resolution; securities law during the bail-in; processes for transferring governance and control rights to the new management; and protocols on communications to creditors and the market at large.

Finally, the FSB published a statement on the use and treatment of risk-free (or secured) benchmark rates[10/]. The last FSR describes some efforts in developed economies to implement overnight risk-free benchmark rates, as a replacement for traditional unsecured benchmark rates (e.g., LIBOR)[11/]. The FSB publication aims to guide the use of risk-free rates in the current transition, taking into account some of the shortcomings of this type of rate. In addition to the points discussed in the last FSR, it recommends caution on the adoption of rates derived from overnight risk-free rates as a replacement for LIBOR-type rates, which still have the advantage of being available at different terms. In this case, the transition should allow greater use of these overnight risk-free rates in derivative contracts to provide transaction support and representation for longer terms.

FinTech regulation

In July the FSB published for public consultation a Cyber Lexicon, which includes a set of 50 terms related to cyber security and cyber resilience in the financial sector. The objective is to support the work of regulators, supervisors, and financial market participants, by establishing a common understanding of related terms. According to the FSB, this should also contribute to improving the assessment and monitoring of financial stability risks, promoting the exchange of information as appropriate, and allowing international organizations to provide effective practices and guidance on cyber security and cyber resilience in the future[12/].

Also in July, the FSB published a report on the work that international bodies are undertaking in the area of crypto-assets and their effect on financial stability[13/]. While the report emphasizes that crypto-assets do not currently represent a material risk for financial stability, they have the potential to do so in the future. Consequently, the FSB is working in conjunction with the Committee on Payments and Market Infrastructures (CPMI) to developing metrics and a

[9/] "Principles on Bail-in Execution," FSB. June 2018.

[10/] "Interest rate benchmark reform – overnight risk-free rates and term rates," FSB. July 2018.

[11/] Financial Stability Report, First Half 2018, chapter V.

[12/] "Cyber Lexicon," Consultative document, FSB. July 2018.

[13/] "Crypto-assets: Report to the G20 on Work by the FSB and Standard-Setting Bodies," FSB. July 2018.

research framework for monitoring the financial stability implications of crypto-asset markets. Additionally, the CPMI has studied the impact of distributed ledger technology (DLT) and its applications. The International Organization of Securities Commissions (IOSCO) has established a network of experts to discuss experiences and share information on local and cross-border issues deriving from initial coin offerings (ICO). Finally, the BCBS is quantifying the materiality of banks' direct and indirect exposures to crypto-assets and monitoring developments related to crypto-assets and FinTech for banks and supervisors.

Finally, the U.S. Treasury published its final report in the series "*A Financial System That Creates Economic Opportunities,*" which covers nonbank financial institutions, FinTech, and innovation[14]/. The report includes nearly 80 recommendations for regulatory improvements that would support these sectors, the adoption of financial innovations, and incentives for their creation. In particular, some of the recommendations have to do with rethinking the regulation on the use of data to facilitate technologies that responsibly exploit financial data; modernizing the regulatory framework for a series of new products and financial activities; and facilitating regulatory sandboxes[15]/.

TABLE V.1
Main regulations issued in the second half of 2018

Date	Organization	Regulation	Material and objectives
25-Jun-2018	FMC	NCG 152	Relaxes the regulations establishing limits and requirements on assets that can be included in technical reserves and risk-based capital, to contribute to the development of the insurance industry.
06-Jul-2018	SBIF	Bank Circular 3.638	Establishes standardized methodologies to be used by banks for computing credit risk provisions for collectively assessed commercial loans, incorporated into Chapter B-1 of the *Compendium of Accounting Regulations.*
06-Aug-2018	CBC	Modification of Chapter III.B.2.1 CFR	Incorporates new requirements on liquidity risk management for banks, in line with Basel III standards, establishing minimum requirements for the short-term liquidity coverage ratio.
28-Aug-2018	CBC	Modification of Chapter III.H.2 CFR	Incorporates a "Contingency Protocol for Large-Value Payment Systems (CPLVPS)" to be used in the response to critical operational events, in order to complement the operational continuity systems currently available for the LVPS.
31-Aug-2018	SBIF	Modification of Chapters 20-8 and 1-13 RAN, CIRCULARS: Banks 3.640, Affiliates 70, S&Ls 170, Card Issuers 5 , Card Operators 4, Corporations 34.	Improves the quantity, quality, and timeliness of information on cyber security incidents and raises institutions cyber security management standards.
06-Sept-2018	FMC	Circular 2237	Establishes that clearing and settlement system operators and securities depositories and custodians that are subject to supervision by the FMC must comply with international standards (CPMI/IOSCO) in the definition of their policies and procedures and in comprehensive management of the risks inherent in their business.
12-Sept-2018	FMC	Circular 2238	Improves the expected return on retirement savings and promotes competition in the financial industry, by expanding the universe of eligible instruments for investing voluntary pension savings (VPS) plans and collective voluntary pension savings (CVPS) plans offered by general fund managers and securities brokers; and promotes competition relative to the alternatives offered by the pension fund managers (PFMs).

[14]/ "A Financial System That Creates Economic Opportunities: Nonbank Financials, FinTech, and Innovation," U.S. Department of the Treasury. July 2018.

[15]/ For a definition of sandboxes, See *Financial Stability Report*, First Half 2018, chapter IV, footnote 18.

TABLE V.2
Main regulations published for public consultation in the second half of 2018

Date	Organization	Regulation	Material and objectives
20-Aug-2018	FMC - SP	PUBLIC CONSULTATION CLOSED IMPROVEMENT OF THE ONLINE PENSION CONSULTATIONS AND OFFERS SYSTEM (SCOMP)	Facilitates analysis and decision making at the time of retirement, through a series of changes to the Pension Bid Certificates, issued by the SCOMP system and received by affiliates, to make it easier to understand the pension alternatives, the pension size, the differences between the plans, the payment of commissions, and so on.
21-Aug-2018	FMC	PUBLIC CONSULTATION CLOSED EXPANSION OF THE INVESTMENT OF VPS AND CVPS PLANS OFFERED BY FUND MANAGERS AND SECURITIES BROKERS	Improves the expected return on retirement savings and promotes competition in the financial industry, by expanding the universe of eligible instruments for investing voluntary pension savings (VPS) plans and collective voluntary pension savings (CVPS) plans offered by general fund managers and securities brokers; and promotes competition relative to the alternatives offered by the pension fund managers (PFMs).
23-Aug-2018	CBC	PUBLIC CONSULTATION CLOSED MODIFICATIONS TO THE REGULATIONS ON THE OPERATION OF PAYMENT CARDS	Improves the CBC regulations by relaxing the requirements associated with payment card frameworks with which operators can enter into a contract and adjusting the regulations for payment service processing (PSP) suppliers that make payments and/or settlements to affiliated entities.
04-Sept-2018	SBIF	PUBLIC CONSULTATION CLOSED CYBER SECURITY INCIDENT RECORDS IN THE INFORMATION SYSTEMS MANUAL	Collects information maintained by each bank on cyber security incidents, through the preparation of a monthly report, using the guidelines and minimum variables originally presented in Chapter 20-8 of the SBIF banking regulations (RAN).
02-Oct-2018	SBIF	PUBLIC CONSULTATION CLOSED MODIFICATIONS TO THE REGULATIONS ON THE MEASUREMENT AND MANAGEMENT OF THE LIQUIDITY POSITION	Incorporates the amendments to Chapter III.B.2.1 of the Central Bank of Chile's *Compendium of Financial Regulations* (CFR) and introduces some adjustments to the procedure for calculating the liquidity coverage ratio and the net stable funding ratio, among other changes.

TABLE V.3
List of document reviewed

Document	Title	Organization	Prudential regulation	Supervision	Transparency and governance	FinTech	Resolution	Other
1/	S.2155 - Economic Growth, Regulatory Relief, and Consumer Protection Act	United States Congress	*					
2/	Single-Counterparty Credit Limits for Bank Holding Companies and Foreign Banking Organizations	Federal Reserve Board of Governors	*					
3/	Proposed Revisions to Prohibitions and Restrictions on Proprietary Trading and Certain Interests in, and Relationships With, Hedge Funds and Private Equity Funds	OCC - Federal Reserve Board of Governors - FDIC - SEC - CFTC	*	*				
4/	Expanded Examination Cycle for Certain Small Insured Depository Institutions and U.S. Branches and Agencies of Foreign Banks	OCC - Federal Reserve Board of Governors - FDIC	*	*				
5/	Liquidity Coverage Ratio Rule: Treatment of Certain Municipal Obligations as High-Quality Liquid Assets	OCC - Federal Reserve Board of Governors - FDIC	*					
6/	Regulatory Capital Treatment for High Volatility Commercial Real Estate (HVCRE) Exposures	OCC - Federal Reserve Board of Governors - FDIC	*					
7/	Agencies extend deadline for certain resolution plan submissions Board of Governors of the Federal Reserve System Federal Deposit Insurance Corporation	Federal Reserve Board of Governors - FDIC		*				
8/	Global systemically important banks: revised assessment methodology and the higher loss absorbency requirement	BIS - BCBS	*	*				
9/	Principles on Bail-in Execution	FSB	*				*	
10/	Interest rate benchmark reform – overnight risk-free rates and term rates	FSB						*
11/	Cyber Lexicon	FSB				*		
12/	Crypto-assets. Report to the G20 on work by the FSB and standard-setting bodies	FSB		*		*		

Source: Websites of each institution.

BOX V.1
THE GENERAL BANKING LAW REFORM

On 3 October, the National Congress passed the new General Banking Law (GBL), which represents the biggest reform in terms of size and scope since the law's passing. This new legislation will raise bank solvency requirements in line with international standards defined under Basel III, merge the functions of the SBIF with the Financial Market Commission (FMC), and strengthen the early intervention mechanisms for troubled banks.

This box explains the scope of this reform and the coming challenges it will pose for authorities involved in the three key reform areas.

New solvency requirements

The new bank solvency requirements in the GBL will remain anchored to the Basel I standards. This makes the adjustment to the requirements particularly challenging as it implies a direct move from Basel I to III.

The basic idea of defining capital requirements through the ratio of regulatory capital (RC) to risk-weighted assets (RWA) is retained. This ratio is commonly known as the capital adequacy ratio (CAR).

Therefore, the fundamental modification lies in the definitions used to determine the components that make up the CAR.

The regulatory capital necessary for operating without constraints will be proportionally higher than share capital, further constraining the percent of subordinated bonds or voluntary provisions necessary to hold the regulatory minimum. Banks can also use "hybrid" instruments, which are of a higher quality than subordinated bonds (with characteristics closer to shares), but unprecedented in the local market and still undergoing assessment in markets where they are currently issued and traded [1,2]/.

The definition of RWA, to date determined solely based on (fixed) credit risk weights, will completely change. In addition to credit risk, the new legislation considers market and operational risk for determining RWA, and for the calculation, the FMC can establish, through its regulation, standardized methodologies or a framework for approving "internal models" (i.e., a bank's own methodology), in both cases subject to the prior approval of the Central Bank of Chile (CBC). Thus, one of the first challenges for the authorities will be to develop a new minimum regulation necessary for determining RWA, especially in terms of adequately adapting the Basel guidelines and suggestions to the local reality. At the same time, the banks must materially revise and improve their risk management processes, so as to satisfactorily comply with the new regulatory framework[3]/.

The new CAR requirement will consider a minimum floor of 8.0%. Regulatory capital must include at least 4.5% Tier 1 capital and can have a maximum of 1.5% hybrid instruments and a maximum 2% subordinated bonds[4]/.

This baseline requirement will entail additional Tier 1 capital of 2.5% of RWA (in the spirit of the capital conservation buffer defined in Basel III). In the event that a bank falls short of this minimum, it can either recapitalize organically through retained earnings or raise capital. The distribution of dividends will be restricted until the additional Tier 1 capital has been fully reinstated.

Additionally, the new solvency framework is intended to prevent the adverse effects implicit in institutions that—due to their size, interconnectedness, and other factors—have a greater potential to affect the financial system. With this objective, the FMC has been given the authority to establish a methodology, subject to approval by the CBC, for determining which banks are "systemic." Once identified, these banks may be subject to an additional Tier 1 capital requirement of up to 3.5% of RWA, among other requirements.

[1]/ Hybrid instruments include preferred shares and perpetual bonds; instrument quality refers to the capacity to absorb losses or limit the losses of other lenders in the event of insolvency.
[2]/ In general, this type of instrument has been issued in countries that have adopted Basel III.

[3]/ Chapter III.B.1.1 of the Central Bank's CFR establishes a uniform market risk requirement for banks at the regulatory level.
[4]/ If for some reason a bank is not able to reach the maximum allowed for hybrid instruments or subordinated bonds, it would have to meet the requirement with Tier 1 capital.

The solvency requirements described above, which are designed to be applied permanently, will be complemented by a countercyclical capital requirement tied to the conditions of the economic cycle, which will be applied intermittently and infrequently from a macroprudential perspective. This capital must be made up exclusively of Tier 1 capital, and it could reach up to 2.5% of RWA. Given the nature of this tool, the institutional coordination of its application will be the inverse to the system described above—that is, the CBC will make the decision to activate the countercyclical requirement, subject to approval by the FMC.

Its application is conceived for situations in which financial cycles are identified whose amplification could be incubating risks for the financial system as a whole (see the thematic chapter in the FSR for the second half of 2017). When the cycle reverts, the charge would be lifted.

The application of countercyclical capital is a central challenge in the Central Bank's financial policy implementation, which is based on the evaluation of financial risks as traditionally outlined in this *Report* .

The FMC, in turn, has the option of applying an additional requirement of up to 4% of RWA, to address risks that could potentially be detected through the supervisory process but that might not be fully covered by the framework described above. This requirement, which takes its inspiration from the so-called Pillar 2 originally established under Basel II, provides a supervisory tool designed to mitigate risks that are not covered by the minimum solvency requirements.

Given the nature of this set of instruments for constituting a capital base, the scope is much wider than the direct objective of increasing the solvency of the banking system. This framework of capital requirements will contribute to strengthening supervisory capacity, provide early warning mechanisms for banks facing insolvency situations, and establish additional costs for SIBs so as to limit their risks to the financial system as a whole. The incorporation of countercyclical capital will contribute to articulating the focus of the analysis and the definition of mechanisms for containing macroprudential risks traditionally managed from the Central Bank. The potential application of additional charges related to the supervisory process (Pillar 2) will strengthen the macroprudential focus.

In recognition of the complexity of implementing this set of requirements, both for the regulatory and supervisory authorities and for the supervised banks, the legislation establishes a period of 18 months for the FMC—once merged with the SBIF—to establish standards on RWA, systemic banks, the definition of hybrid capital instruments, and the implementation and supervision of countercyclical capital. Once these regulations have been enacted, the banks will have a period of four years to converge toward the requirements that will be applied under the new scheme (table V.4).

Integration of the SBIF and the FMC

The Superintendence of Banks and Financial Institutions (SBIF) has operated as an independent entity for over 80 years, establishing a long tradition in terms of its institutional culture and supervisory practice. Consequently, the merger of the SBIF with the FMC constitutes one of the most important events in the history of financial supervision in Chile.

The integration of supervisory processes into a single institution is a model that has been implemented in a number of advanced economies (Sweden, Austria, and Denmark, among others), whose biggest strength derives from its comprehensive approach to dealing with a more complex and interconnected financial system. In general, mechanisms for coordination between sectoral supervisors are wrought with limitations and frictions, which is one of key motivations for moving forward with this type of integrated model[5/].

In this case, the new integrated supervisor will conduct both prudential and market conduct supervision, for all regulated financial institutions, which represents an additional challenge in terms of balancing two naturally different objectives. However, the importance of the expected benefits of this new supervisory model justifies the higher cost and complexity of its administration.

[5/] The integrated model can present other problems, such as the conflict between the objectives pursued within a single entity (see Llewellyn, 2016; Calvo et al, 2018).

Strengthening early intervention mechanisms for troubled banks

The GBL reform improves the authority's capacity to address critical financial situations that can affect specific banks, establishing explicit protocols for reestablishing the solvency of a troubled bank in accordance with stipulations defined by the FMC, and, in more complex cases, increases its power to implement intervention measures through a designated inspector or provisional manager.

Although work remains in terms of the incorporation of more advanced resolution tools[6/], this reform represents a very important step for increasing the FMC's capacity to act in response to critical situations and will facilitate future developments.

Final considerations

The preparation, discussion, and passing of the new General Banking Law has been a long process, culminating in a major step forward in the modernization of banking regulation. At the same time, the reform raises considerable challenges, most immediately the effectuation of the successful integration of the SBIF into the FMC. Once that has been achieved, a number of important regulatory and supervisory challenges await.

In the medium term, at least, pending work in the area of banking legislation includes moving forward on the debate on the next steps for improving the resolution framework, including the possibility of developing a deposit insurance system in line with the development of the Chilean financial system.

TABLE V.4
Transition of bank capital requirements
(percent of risk-weighted assets, net of required provisions, unless otherwise indicated)

	Current	Year 1 (1)	Year 2	Year 3	Year 4
Tier1 capital (CET1), made up of paid-in capital and reserves	4.5	4.5	4.5	4.5	4.5%
CET1 + preferred shares (PS) and perpetual bonds (PB) (2)	4.5	6.0	6.0	6.0	6.0%
Maximum substitution of PS + PB with subordinated bonds and voluntary provisions		1.5	1.0	0.5	0.0%
Regulatory capital (CET1 + PS +PB + subordinated bonds + voluntary provisions)	8.0	8.0	8.0	8.0	8.0%
Additional Tier 1 capital (3)	0	0.625	1.250	1.875	2.50%
Total capital requirement	8	8.625	9.25	9.875	10.5%
Other capital requirements					
Additional Tier 1 capital for systemic banks (4	0	0.625	1-1.25	1-2.375	1-3.5%
Countercyclical capital (made up of CET1) (5)	0	0-0.625	0-1.25	0-1.875	0-2.5%
Leverage (CET1 as a share of total assets) (4)	3	3 - 3.5	3 - 4	3 - 4.5	3% - 5%

(1) Year 1 is the year the corresponding FMC regulations enter into effect.
(2) The years start when the FMC regulations on perpetual bonds and preferred shares enter into effect.
(3) Effective when the FMC issues the regulation on risk-weighted assets.
(4) Effective when the FMC issues the regulation on systemic banks.
(5) Effective when the FMC issues the regulation on countercyclical capital.

Source: Central Bank of Chile, based on the GBL.

[6/] For example, mechanisms for the purchase and assumption (P&A) of a troubled bank's liabilities or the separation of its assets into a bridge bank for transfer or sale.

BOX V.2
NEW BANK REQUIREMENTS FOR LIQUIDITY RISK MANAGEMENT

On 2 August, the Central Bank of Chile (CBC) modified the regulation on liquidity risk management applicable to the banking system, in order to implement a program based on quantitative liquidity requirements, using the liquidity coverage ratio (LCR). This liquidity indicator is an integral component of the Basel III standards. The objective is to measure banks' short-term liquidity in a systemic stress scenario. The ratio is defined as the high-quality liquid assets (HQLA) on the bank's balance sheet divided by the projected net cash outflow (NCO) in a 30-day window.

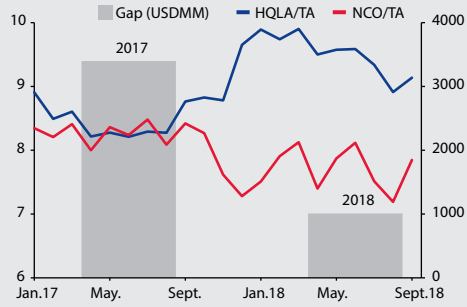
The implementation of regulatory limits for the LCR, recently published by the CBC, is the result of an initiative to modernize the Bank's liquidity regulation begun in 2015. On 22 January of that year, the Bank issued a new regulation on banks' liquidity risk management, following Basel III guidelines on both qualitative aspects and the incorporation of new quantitative indicators. At that time, Basel III liquidity indicators were incorporated only as a reporting requirement, without establishing a regulatory limit on their level.

Following an implementation process by the SBIF in 2015, the banks began reporting the new indicators in March 2016. Since then, the focus has been on accumulating a sufficient data history to support the entry into effect of the final phase announced by the Bank in 2015.

The Central Bank's analysis has shown that the banking system has progressively strengthened its liquidity position since the new ratios were introduced.

A first observation is that the HQLA gap at the system level has fallen sharply. In 2017, the average gap was estimated at over US$3 billion, versus US$1 billion in 2018 (figure V.1). This trend reflects an adjustment in the maturity profile that reduced the NCO and a small increase in HQLA as a share of system assets.

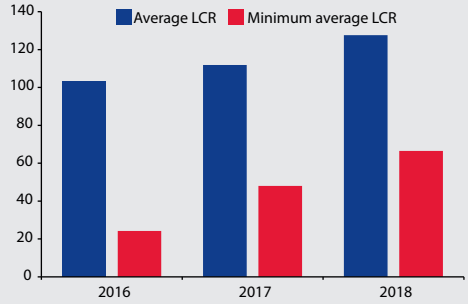
FIGURE V.1
Annual evolution of HQLA, NCO, and the HQLA gap for LCR = 100 at the consolidated level
(HQLA and NCO over total assets, in %; average annual HQLA gap in USDMM, right axis)



Source: Central Bank of Chile, based on data from the SBIF.

At the aggregate level, in the period of observation starting in March 2016, the banks have gradually improved their LCR. Taking the asset-weighted average, the LCR rose from just over 100% in 2016 to 128% in 2018, while the minimum LCR increased from 24% to 67% in the period (figure V.2).

FIGURE V.2
Annual evolution of the LCR (*)
(asset-weighted average)



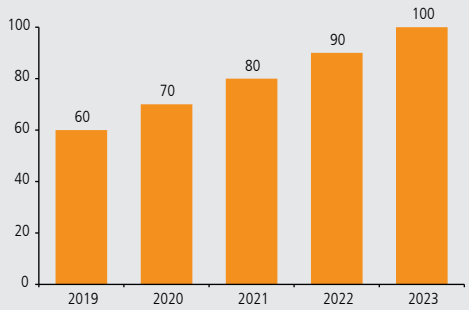
(*) The sample only includes banks with more than 0.5% of system assets.
Central Bank of Chile, based on data from the SBIF.

In addition to demonstrating an improvement in the liquidity level of the banking system, these figures reveal the degree of heterogeneity in the system, which was taken into account for the gradual implementation of the regulatory limit (see below). The average level of 128% is close to the average reported by the BIS in its international analysis, namely, 126% and 155% for two samples of banks established in member jurisdictions[1/].

Thus, given that a large number of jurisdictions have already applied the ratio in the context of the international implementation of Basel III, the decision was made to move forward on imposing a minimum level.

Because there is substantial variation in LCR levels across banks, as well as volatility over time, and given that banks will want to have a buffer above the regulatory minimum, a gradual implementation calendar was designed for establishing a minimum limit for the LCR equivalent to the Basel Committee's proposed level. Thus, starting in January 2019, the regulatory requirement for the LCR will be 60%, which will increase by 10 percentage points per year to 100% starting in January 2023 on (figure V.3).

FIGURE V.3
Minimum LCR required by regulation
(1 January of each year)



Source: Central Bank of Chile.

In accordance with Basel III, the CBC regulation requires banks to report the LCR in local and foreign currency separately. However, the regulatory limit defined by the Bank will be applied to the aggregate ratio comprising all the different currencies in which the banks operate. That is, there are no restrictions on offsetting liquidity requirements and sources in different currencies.

Finally, the CBC regulation includes a section that defines a basic protocol for handling noncompliance with the associated provisions, in terms of both maturity mismatches and the new LCR limit. This new section establishes that, in the event of noncompliance with these limits, the bank must report the situation to the SBIF and present a plan of action for bringing the respective limit(s) into compliance as quickly as possible. In the event that the bank does not report its noncompliance or does not present an action plan, or if the SBIF deems that the plan is inadequate, or if the plan is not executed satisfactorily or quickly enough, the regulation stipulates that the supervisor, in the exercise of its legal authority, has the power to dictate the imposition of measures or sanctions in accordance with the current legislation.

The new regulation represents a major step forward in complying with the Basel III recommendations on short-term liquidity risk, reaching full convergence in 2023. This regulation, together with the new bank solvency standards that will be implemented under the new General Banking Law (box V.1), will allow the full and comprehensive adoption of the Basel III guidelines in the Chilean banking system. These standards incorporate mechanisms for containing systemic risks—through additional capital charges for systemically important banks, macroprudential tools such as the countercyclical capital buffer, and increased sensitivity of minimum capital requirements to the different risks incurred in bank management (credit, market, and operational risks)—which have been implemented in a large number of jurisdictions.

[1/] These results correspond to the average of two groups of banks as of February 2017. The first group is a sample of 91 banks that are internationally active and that have Tier 1 capital of at least 3 billion euros; the second group comprises 68 banks that do not meet one or both of these two conditions (BIS, 2017).

VI. PAYMENT SYSTEMS

This chapter presents the main statistics on the payment systems and describes developments in financial infrastructure at the local and international levels.

LARGE-VALUE PAYMENT SYSTEMS

In Chile, the large-value payment systems (LVPS) are the real-time gross settlements (RTGS) system, which is managed by the CBC, and the large-value payment clearing house (CCAV), operated by Combanc[1]/. The RTGS system settles gross transactions in the accounts of each bank immediately upon receiving payment instructions, whereas Combanc nets the transactions for each bank at the end of the day and then clears them through the RTGS system.

LIQUIDITY AND RISK MANAGEMENT IN THE RTGS SYSTEM

The total amount of payments settled in the LVPS continues to increase, mainly due to an increase in over-the-counter (OTC) securities market operations settled directly in the RTGS system.

In the third quarter of 2018, the average daily value settled in the LVPS was Ch$18.1 trillion (equivalent to US$27 billion), which reflects an increase in payments settled directly through the RTGS system (+16.5%). The largest growth was payments deriving from bank client-account transactions and delivery-versus-payment (DvP) securities transactions[2]/ (table VI.1 and figure VI.1).

In contrast with the increase in the RTGS system, there was a reduction in the payments processed by ComBanc (–9% annually). In some cases, the decrease in transactions in this clearing house reflects the activation of counterparty limits between participant banks as part of their usual credit risk management mechanisms. This trend toward lower participation by ComBanc started in early 2018 (figure VI.2) and is in line with international recommendations in the area, which endorse the immediate settlement of payments.

[1]/ Their operations are governed by en the CBC *Compendium of Financial Regulations*, in particular Chapters III.H.4 and III.H.4.1 on the Real Time Gross Settlement System and Operating Rules, respectively, and Chapter III.H.5 on Large-Value Clearing Houses in National Currency.

[2]/ DvP transactions are coordinated using the switch service operated by ComBanc, where the transfer of securities occurs simultaneously with the cash payment, which can be made directly in the RTGS system or through ComBanc.

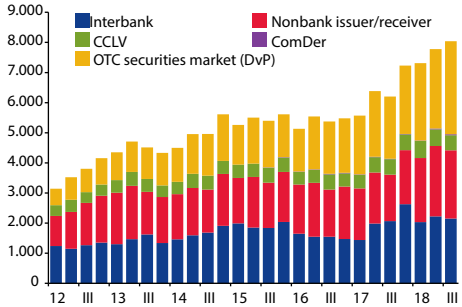
TABLE VI.1
Amounts cleared and processed in the large-value payment systems, LVPS (*)
(Ch$ billion)

	Third quarter	
	2017	2018
Payments settled in the RTGS	**11,686**	**13,610**
Interbank	2,070	2,152
Nonbank issuer/receiver	1,541	2,266
Securities market	2,592	3,088
CCLV	513	501
ComDer	15	31
OTC securities market (DvP)	2,063	2,557
Clearing houses (net)	282	330
Checks	53	53
ATMs	18	24
Combanc	211	253
Central Bank of Chile	5,202	5,774
Payments processed in Combanc	**4,949**	**4,501**
Interbank	1,178	1,105
Nonbank issuer/receiver	2,057	1,940
OTC securities market (DvP)	1,714	1,456
Total cleared in LVPS	**16,635**	**18,111**

(*) Daily averages for each quarter.

Sources: Central Bank of Chile, Combanc, CCLV, and ComDer.

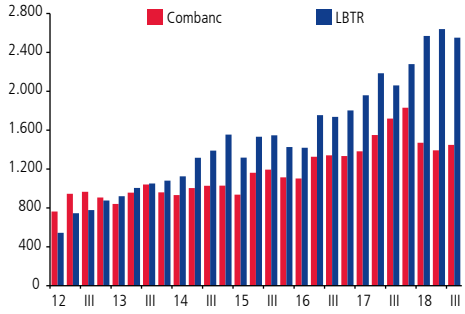
FIGURE VI.1
Evolution by type of payment settled in the RTGS (*)
(Ch$ billion)



(*) Daily averages for each quarter.

Sources: Central Bank of Chile, Combanc, CCLV, and ComDer.

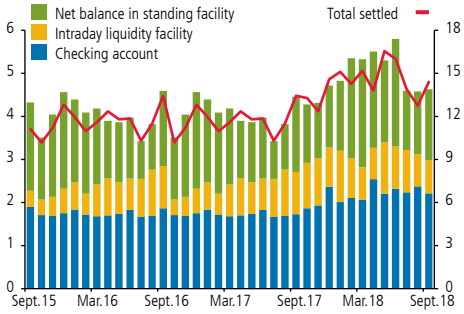
FIGURE VI.2
Settlement of OTC transactions (*)
(Ch$ billion)



(*) Quarterly averages.

Source: Central Bank of Chile.

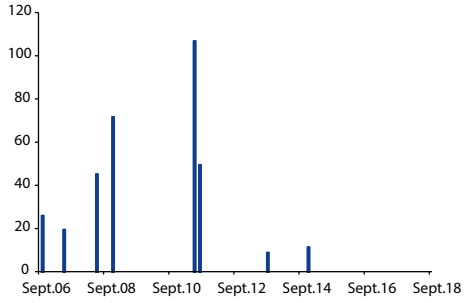
FIGURE VI.3
Liquidity in the RTGS system (*)
(Ch$ billion)



(*) Monthly average.

Source: Central Bank of Chile.

FIGURE VI.4
Service disruption in the RTGS system
(minutes per month)



Source: Central Bank of Chile.

The RTGS system continues to operate with a liquidity buffer.

Throughout the half, the participant banks in the RTGS system maintained an adequate liquidity buffer for carrying out their operations, as inferred from the higher balances maintained in their current accounts and the increased use of the Central Bank's deposit facilities. Consistent with this, there was less use of the intraday liquidity facility, which is always kept open by the CBC (figure VI.3).

OPERATIONAL RISK MANAGEMENT IN THE RTGS SYSTEM

Ensuring the operational continuity of the LVPS is a first-order concern for the CBC, directly related to its constitutional objective of safeguarding the normal functioning of the internal and external payment systems and, from a wider perspective, the stability of the financial system.

The specific operational security objectives established by the CBC continue to be met satisfactorily

The CBC has established two main objectives for the RTGS system in terms of operational security: maintaining operational continuity of at least 99.8%; and having the capacity to resume operations within two hours of a service disruption. These continuity objectives were fully met in 2018, the RTGS system is maintained at a maximum operational availability of 100%. This is the fourth consecutive year in which there have been no service disruptions, reflecting the Bank's constant concern for maintaining the efficiency and security of the system (figure VI.4).

The CBC continually monitors and adjusts the operational continuity procedures applicable to the RTGS system.

In addition to defining the regulatory framework for the RTGS system in accordance with international standards and best practices, the CBC has established operational continuity procedures to be used in the event of one or more contingencies affecting critical system elements, specifically, situations that might affect the ability of the participants or third parties to interact with the system in terms of connection, communication, or operation. Additionally, their terms and conditions are continually revised according to tests carried out by the CBC, as well as operational, technological, and/or computational developments within the RTGS system. In 2018, these procedures were updated to incorporate new contingency scenarios and new tools for their adequate management.

Some of the RTGS system's contingency procedures were put into practice in 2018

In 2018, the CBC had to use its contingency tools in the RTGS system in response to operational incidents in local banks. Specifically, on two occasions in the year, the RTGS system stayed open past the usual cutoff time for settlements, for longer than in prior contingency situations in years past (figure VI.5). Additionally, temporary operating platforms in the CBC building were provided for the direct operations of one of the affected entities, using physical spaces specifically designated for this type of situation (the RTGS system's contingency room).

REGULATION AND SUPERVISION OF THE LVPS

In 2018 important advances were made in the regulatory and supervisory framework governing the LVPS, which strengthen operational risk management through the monitoring and management of critical situations.

New contingency protocol for large-value payment systems

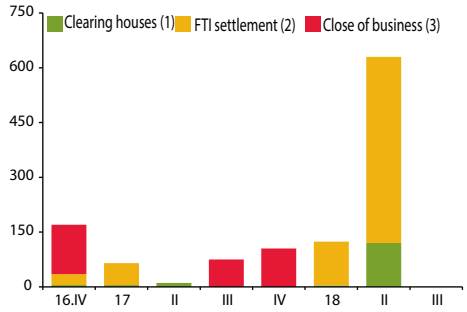
In August 2018, the CBC published Chapter III.H.2 of the *Compendium of Financial Regulations* (CFR), "Contingency Protocol for Large-Value Payment Systems," which strengthens the comprehensive risk management framework of the LVPS by complementing the existing structure of operational continuity safeguards and procedures established in each of the specific regulations.

The objective of this new chapter is to preserve the operational continuity of both the RTGS system and the large-value payment clearing house (CCAV) in response to critical operational events (COE), such as human error, cyber attacks, threats to the physical security of employees, hardware or software failures, and so on.

The LVPS contingency protocol is the result of joint work by the RTGS and ComBanc operators that began in 2016 with the goal of establishing an alternative or complementary operating system for both systems, in the event of a COE affecting the normal functioning of settlement and/or clearing processes [3/] (diagram VI.1). In the event that the LVPS contingency protocol is activated, the operating processes for the daily settlement cycle of the affected LVPS will be modified in accordance with regulatory stipulations, while all other requirements in terms of participation, financial safeguards, the availability of the intraday liquidity facility, and other provisions established in the regulations governing each LVPS will remain in force.

[3/] With regard to the Interfinancial Operations Clearing House, which corresponds to the old Chapter III.H.2, an updated version is retained as an alternative protocol available in the appendix to the new Chapter.

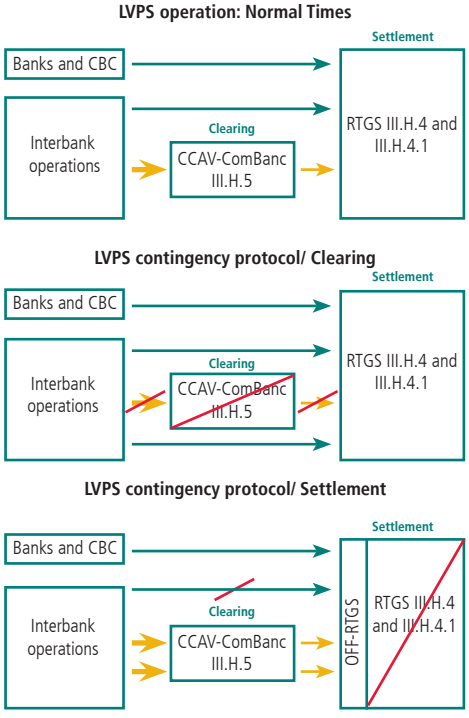
FIGURE VI.5
Delays and extensions in the RTGS system
(minutes per quarter)



(1) Delays in the check clearing house, ATM clearing house, and large-value payment clearing house (CCAV).
(2) Extensions of the cutoff time for interbank operations (fund transfer instructions, FTI), after 17:30 hrs.
(3) Extensions of the closing time for CBC operations (CAS-RTGS), after 18:15 hrs.

Source: Central Bank of Chile.

DIAGRAM VI.1
LVPS Contingency Protocol



Source: Central Bank of Chile.

Both operators formalized their voluntary adherence to this regulation through the signing of a joint agreement outlining the terms and conditions for implementing the LVPS contingency protocol. They are currently in the implementation phase (operational adaptations and simulation tests) to ensure the adequate functioning of the protocol, which will come on line in 2019.

New general regulation for large-value payment systems

As reported in the last FSR, the new Chapter III.H of the CFR entered into effect in January of this year, establishing a general regulatory framework applicable to payment systems and explicitly endorsing and requiring compliance with the Principles for Financial Market Infrastructures (PFMI). In particular, one of the principles (Principle 17) addresses operational risk management, requiring the identification of both internal and external sources of risk and the establishment of requirements for mitigating their impact through the use of systems, policies, procedures, and controls, among other issues. The disclosure framework (or self-assessment report) verifying compliance with the PFMI was submitted on time to the relevant authorities by the LVPS in accordance with the calendar stipulated in the regulation.

FINANCIAL INFRASTRUCTURES

In 2018, important progress was made in terms of the international implementation of the PFMIs, based on the monitoring carried out annually by the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) in a large number of jurisdictions. The positive results reflect the joint work initiated in 2015 by the CBC and the other financial authorities, in recognition of the importance of financial market infrastructures for the correct functioning of the financial system and of the PFMIs as guidelines for strengthening their regulation, supervision, and performance (box VI.1)

In this regard, to overcome the gap in the implementation of infrastructures known as trade repositories (TRs), important progress was made in the incorporation of the Integrated Derivatives Information System (IDIS), regulated and operated by the CBC, in accordance with the new Chapter III.D.3 of the CFR and the respective Operating Rules, which is currently open for public consultation.

The IDIS has been developed following international recommendations and best practices for TRs, constituting a new infrastructure for recording over-the-counter (OTC) derivatives transactions using an efficient, secure, and timely system. There are extensive benefits from incorporating this type of infrastructure in financial markets, including increasing the transparency and availability of information in the OTC derivatives markets, for both the authorities and the general public; promoting financial stability through appropriate risk management by financial institutions and effective monitoring and supervision by the authorities; and preventing market abuses.

The implementation of the IDIS Project will represent a substantial advance in terms of financial infrastructure development both for the CBC, in its role of safeguarding the stability of the currency and the normal functioning of internal and external payment systems, thereby contributing to protecting financial stability; and for the Superintendence of Banks and Financial Institutions (SBIF), in its role of bank supervisor.

The project is expected to materially increase the quantity and quality of the available information on this market, increasing the scope of the financial stability analysis regularly carried out by the CBC, contributing to the supervisory processes of the SBIF—and in the future of the FMC—and increasing the scope of private sector analysis through appropriate mechanisms for aggregate data provision. The materialization and consolidation of the IDIS will take some time, however, given the public consultation process for the regulatory framework and the transition period for ensuring system adaptation within the CBC and reporting firms.

RETAIL PAYMENT SYSTEMS

The use of payment cards continues to increase

As in past periods, the ratio of household consumption and payment card expenditures continues to grow. According to the latest available data, approximately 38.2% of total household consumption is paid for using a credit or debit card, which breaks down into 22.8% credit cards (6.1% nonbank cards and 16.7% bank cards), and 15.4% debit cards (figure VI.7).

In this period, the volume of transactions increased for all payment means, including checks. Internet transfers and debit cards grew especially strongly in the last year (table VI.2). In terms of the number of transactions, debit cards led the field, followed by Internet transfers, pushing ATM withdrawals out of second place (figure VI.6).

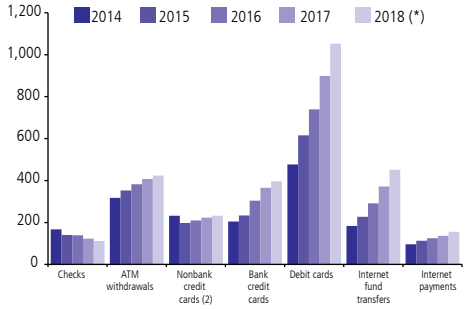
TABLE VI.2
Main retail means of payment
(Ch$ billion)

	2013	2014	2015	2016	2017	2018 (*)
Cheks	279,699	291,322	280,881	300,078	287,377	312,527
ATMs (withdrawals)	18,276	18,879	23,730	25,299	26,586	27,270
Nonbank credit cards	5,913	6,169	5,410	5,760	6,662	7,181
Bank credit cards	8,758	11,381	13,849	16,082	18,129	20,199
Debit cards	6,252	7,683	11,350	13,450	12,264	18,701
Internet transfers (personal)	27,505	32,648	39,123	46,551	54,066	63,679

(*) Latest available data: July 2018 (annualized).

Source: Central Bank of Chile, based on data from the SBIF.

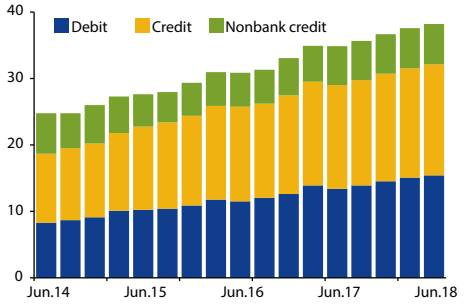
FIGURE VI.6
Retail means of payment
(millions of transactions)



(*) Includes correction of 2017 and 2018 data by a nonbank issuer. Latest available data: July 2018 (annualized).

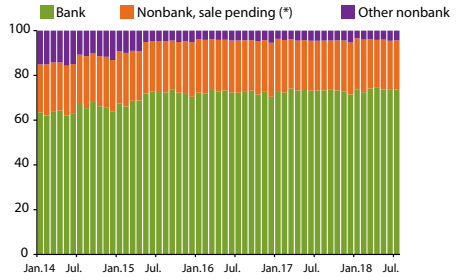
Source: Central Bank of Chile, based on data from the SBIF.

FIGURE VI.7
Total card expenditures
(percent of total household consumption)



Source: Central Bank of Chile, based on data from national accounts and SBIF.

FIGURE VI.8
Monthly credit card payments
(percent of total amount)



(*) Amounts associated with two nonbank issuers that are in the process of being bought out or taken over by banks.

Source: Central Bank of Chile, based on data from the SBIF.

The market share of nonbank cards will be contracted significantly, due to the recently authorized takeover of the largest nonbank credit card by a related bank. The purchase of nonbank cards by banks is not an infrequent event: two cards were bought out in 2013 and 2015, and another purchase was announced in late 2017. Therefore, given the two pending mergers, the market share of nonbank credit is expected to fall to approximately 4.2% of credit card use, versus a current 26% (figure VI.8). This implies that the associated loan stock will be brought within the traditional bank regulatory and supervisory perimeter.

The results of the 2017 Household Financial Survey (HFS) show that 90% of households have some sort of payment card. The most common electronic payment means, surpassed only by cash, is the debit card, which is used by 73% of households (up 8% from the 2014 HFS), followed by nonbank credit cards, at 44% (down 9% since 2014), and finally bank credit cards, at 28% (up 5% since 2014). The payment card with the most frequent use is also the debit card: of household that use a debit card, approximately 89% use it at least once a month, versus 64% for nonbank credit cards and 39% for bank credit cards. Finally, the HFS shows that 22% of households use automatic bill payment, 45% use electronic fund transfers, and 16% use checks (of which 53% use checks occasionally or less than once a month).

The implementation of the four-party model has not been without complications

In June of last year, after the law was passed allowing the issue of prepaid debit cards by nonbank entities, the CBC reformulated its regulatory framework on the Issue and Operation of Payment Cards. One of the main modifications was the incorporation of what is known as a four-party model for payment card operation, as a new alternative to the model that has traditionally been used in the country, not as a replacement. Since the publication of the new regulatory framework, there have been a number of events related to the retail payment market, but for various reasons the implementation of the four-party model has not proceeded as expected. This is addressed in detail in box VI.2.

BOX VI.1
RATING INCREASE IN INTERNATIONAL ASSESSMENT OF PRINCIPLES FOR FINANCIAL MARKET INFRASTRUCTURES IN CHILE

The Principles for Financial Market Infrastructures (PFMI), published in 2012 by the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO), are a set of international standards for financial market infrastructures (FMI), which according to international consensus include the payment systems (PS), central counterparties (CCP), securities settlement systems (SSS), central securities depositories (CSD), and trade repositories (TR).

FMIs support the clearing, settlement, and recording of financial transactions and, as such, are essential for the secure and efficient operation of the financial system. The importance of FMIs was manifest during the 2008 global financial crisis (GFC), which led the main multilateral institutions involved in this area (CPMI/IOSCO) to develop and update the international principles applicable to this type of infrastructure[1/] (PFMI).

Once the PFMIs had been defined in 2013, CPMI/IOSCO initiated an annual monitoring process that, so far, has been limited to the availability of an appropriate regulatory and legal framework[2/]. This box reviews the results of these assessments for Chile and describes the efforts taken by local authorities for improvement.

The first assessment results, published in August 2013, identified a significant compliance gap in Chile vis-à-vis other jurisdictions, assigning a minimum rating to all the FMIs in the local financial system[3/]. In this context, the Central Bank of Chile (CBC) began working, in conjunction with the other financial market authorities, to identify key areas for improvement in order to raise the country's international assessment. Following this logic, in 2015, the CBC and the Ministry of Finance asked the World Bank and the International Monetary Fund to undertake an assessment of PFMI compliance in Chile. The results of this assessment, published in 2016 on the Central Bank's website, provided the foundation for launching a series of initiatives to improve the local regulatory framework.

In January 2017, the Finance Ministry, the CBC, the SBIF, the Superintendence of Pensions, and the FMC publicly announced their commitment to gradually implementing the PFMI in accordance with their respective regulatory and supervisory frameworks. Consistent with this commitment, in January of this year, the CBC issued, following a period of public consultation, a new general regulation for the large-value payment systems (LVPS), which endorses and adheres to the PFMI for the component infrastructures (namely, the RTGS system and ComBanc). Over the subsequent few months, the FMC passed modification to its regulations, moving in the same direction.

These actions have achieved the desired results. In the most recent CPMI/IOSCO assessment, published in July 2018, all the FMIs in Chile received the highest rating, with the exception of the TRs (table VI.3).

[1/] Committee on Payments and Settlement Systems (CPSS) of the Bank for International Settlements (BIS) and International Organization of Securities Commissions (IOSCO), "Principles for Financial Market Infrastructures." April 2012.

[2/] While the complete monitoring process is carried out at three levels, thus far only Level 1 has been implemented in all jurisdictions, and it has been updated annually from 2013 to the present. The objective of Level 1 is to monitor whether the jurisdictions have completed the process of adapting their regulation, legislation, and policies so as to be able to implement the principles and responsibilities. Subsequent levels evaluate the content collected at Level 1 in depth and their practical application.

[3/] This rating could only be increased in 2014 in the case of the payment systems, but still under the maximum rating (rating 2). The ratings are as follows: Rating 1: Draft implementation measures not published; Rating 2: : Draft implementation measures published; Rating 3: Final implementation measures published; and Rating 4: Final implementation measures in force. Additionally, the PFMIs establish five responsibilities for the relevant authorities for FMIs: A: Regulation, supervision, and oversight of FMIs; B: Regulatory, supervisory, and oversight powers and resources; C: Disclosure of policies with respect to FMIs; D: Application of the principles for FMIs; and E: Cooperation with other authorities.

TABLE VI.3
Results of the Fifth Level 1 Monitoring Assessment CPMI/IOSCO (*)

	IMPLEMENTATION OF PFMIs			
	SP	DCV&CCLV	ECC	TR
Argentina	4	3/4	3	3
Australia	4	4	4	4
Belgium	4, EUR	4, EU	4, EU	4, EU
Brazil	4	4	4	4
Canada	4	4	4	4
Chile	**[2] 4**	**[1] 4**	**[1] 4**	**1**
China	4	4	4	4
European Union (EU) / Eurosystem (EUR)	4	4	4	4
France	4, EUR	4, EU	4, EU	4, EU
Germany	4, EUR	4, EU	4, EU	4, EU
Hong Kong	4	4	4	4
India	4	4	4	4
Indonesia	4	04-ene	1	NA
Italy	4, EUR	4, EU	4, EU	4, EU
Japan	4	4	4	4
Korea	4	4	4	1
Mexico	4	4	[3] **4**	[3] **4**
Netherlands	4, EUR	4, EU	4, EU	4, EU
Russia	4	4	4	4
Saudi Arabia	4	[1] **4**	[NA] **1**	4
Singapore	4	4	4	4
South Africa	4	4	4	2
Spain	4, EUR	4, EU	4, EU	4, EU
Sweden	4	4, EU	4, EU	4, EU
Switzerland	4	4	4	4
Turkey	4	4	4	4
United Kingdom	4	4, EU	4, EU	4, EU
United States	4	[3/4] **4**	[3/4] **4**	[1/3] **1/4**

(*) [ ]: rating from last update; X: rating changed in current update; /: When an infrastructure exists in more than one jurisdiction, there could be more than one rating.

With regard to TRs, the international consensus on their status as an FMI is relatively recent. It stems from one of the lessons of the GFC and is, in fact, one of the more visible changes in the current PFMI framework. This consensus specifically addresses the development of a TR for over-the-counter (OTC) derivatives. In several jurisdictions, this type of infrastructure has been recognized in the law, which adds an additional layer of complexity to moving forward on international assessments in this area[4/].

To address the issue of TRs, the CBC made the decision to exercise its authority broadly, in order to extend the derivatives information that it historically receives by virtue of its jurisdiction in foreign exchange matters. This led to the development of an Integrated Derivatives Information System (IDIS), through a new regulatory framework that was recently passed (for more information, see chapter VI of this FSR).

Pending challenges

CPMI/IOSCO have signaled that they will continue to monitor progress on compliance with the measures presented by jurisdictions in order to advance with the full implementation of the PFMIs in all applicable FMIs.

In the new assessment phases, it will be important to have in place effective supervisory processes consistent with the PFMIs, in addition to the legal and regulatory frameworks.

In general, the importance of scoring well on these assessments lies in establishing the appropriate foundations for the country's international financial integration in increasingly interconnected global markets.

Given the technical complexity of evaluating the functioning of each infrastructure, a case-by-case analysis of the different actors would be impossible. At the same time, the exercise of closely following the international consensus on FMI regulation, supervision, and management contributes, in itself, to increasing the resilience of the financial markets in Chile.

Therefore, for the case of Chile, the issue of regulations on the IDIS is important for recognizing this system as an FMI, as well as for adhering to the international recommendations established after the GFC.

Finally, in addition to updating the level 1 monitoring assessment, level 2 and 3 assessments will also be carried out, to verify in depth whether the content of the legislation, regulation, and/or policies, as well as the independent results of the infrastructures, are consistent with the principles and responsibilities. This comprehensive monitoring exercise is carried out by each jurisdiction, and Chile is one of the jurisdictions where the assessment is pending[5/]. Thus, the work and coordination among the authorities, infrastructures, and participants will continue being crucial for achieving the desired results.

[4/] One of the commitments of the G20 (2009) is to make the recording of OTC derivatives in TRs mandatory. This commitment has been implemented through diverse regulatory initiatives worldwide.

[5/] To date, level 2 assessments have been carried out in the following jurisdictions: European Union, Japan, United States, Australia, Hong Kong, Singapore, and Canada. Level 3 assessments have only been conducted for some specific CCP, with the global application of responsibilities through jurisdictions.

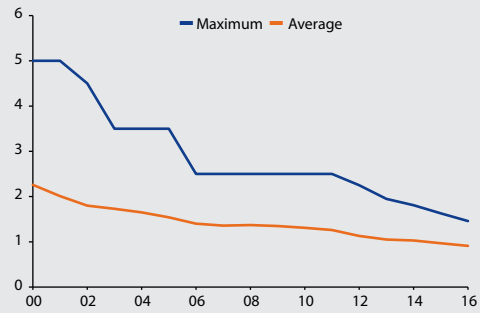
BOX VI.2
DIFFICULTIES IN IMPLEMENTATION OF FOUR-PARTY MODEL IN RETAIL PAYMENT MARKET

The Central Bank of Chile, in virtue of its legal objective to safeguard the normal functioning of the payment systems, is empowered to establish the prudential regulatory framework governing participants in the retail payment system, that is, issuers and operators of payment cards.

To date, the retail payment market functions under a peculiar model in Chile, where the banks have delegated the acquirer function (affiliation of merchants to the payment card network), for debit and credit cards, to a banking support services corporation (Transbank). Transbank acts in representation of the issuers, who hold the acquirer license from the international payment card brands.

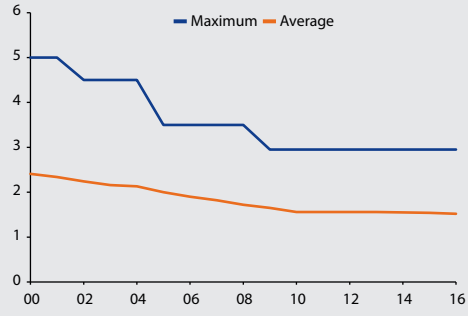
The effects of this model on competition have been analyzed on more than one occasion by the relevant authorities. Consequently, the prices charged to affiliated businesses ("merchant discount") are established in a Self-Regulation Plan (SRP), which was approved by the Competition Tribunal in March 2006. According to the provisions of the SRP, Transbank can change its commissions or fee model provided that the changes are subject to the provisions established in a prior agreement with the National Economic Prosecutor's Office and SBIF circulars, and that the values are below the levels approved in the 2006 SRP. Thus, the maximum and average fees charged by Transbank have fallen over time, for both debit and credit cards (figures VI.9 and VI.10, respectively).

FIGURE VI.9
Transbank merchant discount for debit cards
(percent)



Source: Central Bank of Chile, based on Competition Tribunal (2018).

FIGURE VI.10
Transbank merchant discount for credit cards
(percent)



Source: Central Bank of Chile, based on Competition Tribunal (2018).

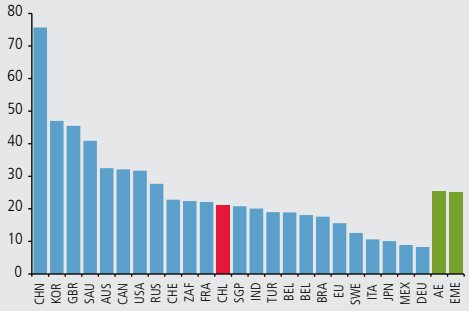
The most recent action by the Competition Tribunal affecting the Transbank SRP is a Resolution issued this year, ordering the modification of the SRP to eliminate discrimination by business category or sector and establishing new criteria for merchant discounts[1/].

In addition to this type of action aimed specifically at the acquirer market, in January 2017 the Competition Tribunal recommended that the Executive Office issue or amend laws or regulations to promote competition in the retail payment industry[2/].

The CBC has closely followed these processes and recommendations in the formulation of its regulatory framework on the issue and operation of payment cards. Thus, in June of last year, the CBC incorporated a broad set of amendments to this regulation, including elements to facilitate and allow the functioning of the so-called four-party model[3/]. This model is used for retail payment systems in the majority of the advanced economies, and its implementation should contribute to increasing competition in this market, which should be reflected, for example, in more attractive terms for affiliated merchants and cardholders and an increase in the coverage of acquirer networks[4/].

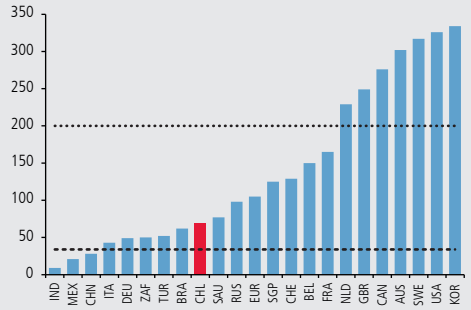
With regard to coverage, three are over 21 million active cards in the country. Payments using these cards, measured both as a share of GDP and as the number of payments per capita, is higher than most emerging economies, although still far from countries with more developed payment card markets (figures VI.11 and VI.12).

FIGURE VI.11
Value of card payments
(percent of GDP, 2016)



Source: Central Bank of Chile, based on data from the SBIF and BIS-CPMI.

FIGURE VI.12
Number of annual card payments (*)
(average per capita, 2016)



(*) Dotted line: advanced economies; dashed line: emerging economies.

Source: Central Bank of Chile, based on data from the SBIF and BIS-CPMI.

Since the regulatory change, a number of innovative initiatives have been announced in this market, including new card issuers, the development of acquirer networks, and so on. However, the implementation of the four-party model is still nascent.

Four-party model

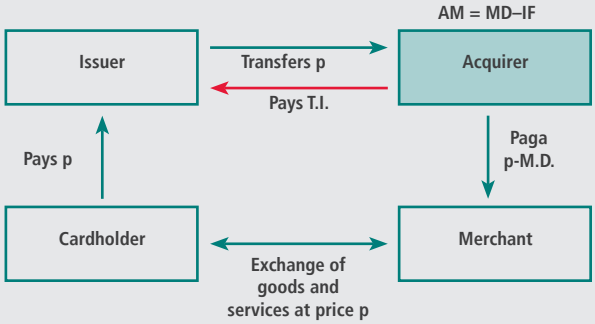
Under a four-party operating scheme, in virtue of the internal regulations of payment card systems, a payment card with a given brand must be accepted by any merchant that accepts other cards under that brand (the "honor all cards" rule). Thus, the acquirers (entities that relate directly with the merchants) do not need the consent of the issuers (entities that relate directly with the cardholders) to process payments with their cards, and the issuers do not need a contractual link to the acquirers for their cards to be accepted by merchants[5/].

In the four-party model, the merchant discount (MD) charged on sales is distributed between the issuers and the acquirers through the so-called interchange fee (IF) that the acquirer must pay to the issuer, which is usually determined by the brand. The difference between the MD and the IF is the acquirer's margin (AM) (diagram VI.2).

[1/] Competition Tribunal Resolution 53/2018, in response to a suit by Farmacias Cruz Verde. Transbank appealed to the Supreme Court to contest this resolution; the appeal is currently in process.
[2/] Regulatory Amendment Proposal 19/2017, by which the Competition Tribunal proposed, among other measures, a prohibition on coordinated action by banks in acquirer services and the setting of the interchange fees.
[3/] Cardholders, merchants, card issuers, and acquirers.
[4/] The coverage of the payment card network can affect the collection of value added tax.

[5/] The Chilean legislation refers to "Issuers" and "Operators," terms that are also used in the CBC regulations. For practical purposes, the definition of Operators is equivalent to the international concept of an "Acquirer".

DIAGRAM VI.2
Fees applied in a four-party model



Source: Central Bank of Chile.

The magnitude of the IF has a direct impact on the issuers' and acquirers' incentives. A high fee gives issuers an incentive to issue more cards—and, in turn, a large number of cards in circulation makes it more attractive for merchants to accept them. A low fee gives acquirers an incentive to expand their network, since they will earn more on each transaction carried out with one of their affiliated merchants.

To the extent that issuers and acquirers earn higher rents, their incentives to expand the network of affiliated merchants increases, but the counterpart to those higher rents is higher direct costs for the affiliated merchants.

Difficulties in the implementation of the four-party model

In Chile, this scheme has, to date, functioned only for cards issued overseas that are used in the country. However, for cards issued in Chile, the issuers pay a processing fee directly to Transbank (TT) and receive the full MD that Transbank charges the merchants.

Thus, the rents obtained from the acquirer service are essentially transferred to the card issuers and do not make up part of Transbank's income [6/].

The application of a four-party model, in contrast, would imply that if Transbank takes on the role of operator/acquirer, it would cease to receive the Transbank fee and would begin to receive an AM. To the extent that the share of the rents that must be transferred to the issuers approximates the fee charged to the merchants, Transbank's income per transaction, in its role as acquirer under the four-party scheme, would decrease and in some transactions could even be negative.

In this context, the decision by one of the main bank card issuers not to renew its contract with Transbank, wherein it delegates the acquirer services, tends to challenge the current market structure in Chile. Although this decision does not affect the bank's customers, it does produce a new equilibrium in the acquirer market in the country. This new balance should be positive in the long run, but in the immediate term it could generate frictions for the different market participants.

Future developments

For the CBC, it is important that the retail payment market continues to develop in a way that contribute to financial inclusion and under adequate conditions of security, efficiency, and competition.

The full implementation of a four-party model, suggested by the competition authority in Chile and explicitly established in the CBC regulations, would be an important step in this direction. However, this necessarily requires that the different private agents use all possible opportunities to resolve the frictions that currently impede its functioning.

The CBC hopes that the various initiatives that have been announced by industry participants can materialize, and it remains disposed to implement new regulatory adjustments, within the scope of its authority, to contribute to the development of this market.

With regard to the recommendations of the Competition Tribunal on promoting legislation to regulate or set interchange fees in Chile, it is important to take into account the experience of jurisdictions that have moved in this direction, such as the European Union, Australia, and the United States.

The experience in these markets has led, in some cases, to a reduction in merchant discounts, but the application is not without difficulties. Given that it is a two-sided market, any measures taken on one side can have an effect on the other. Thus, a reduction in the issuer's margins through lower interchange fees can translate into fewer benefits or even higher fees for cardholders.

[6/] According to Transbank's financial statements, 61% of income comes from the billing for issuer services, 21% from commissions charged to merchants for foreign card transactions cards in Chile, and 18% income from billing for merchant services.

REFERENCES

Akerlof, G. A. 1970. "The Market for Lemons: Quality Uncertainty and the Market Mechanism." Quarterly Journal of Economics 84(3): 488–500.

Albanesi, S., G. De Giorgi, and J. Nosal. 2017. "Credit Growth and the Financial Crisis: A New Narrative." NBER Working Paper 23740. National Bureau of Economic Research.

Alegría, A., and J. Bravo. 2016. "Análisis de riesgo de los deudores hipotecarios en Chile." Revista de Análisis Económico 31(2): 37–64.

Alfaro, R. 2009. "La curva de rendimiento bajo Nelson-Siegel." Working Paper 531. Central Bank of Chile.

Alfaro, R., and N. Gallardo. 2012. "The Determinants of Household Debt Default." Revista de Análisis Económico 27(1): 55–70.

Álvarez, N., A. Fernandois, and A. Sagner. 2018. "Medida de aversión al riesgo mediante volatilidades implícitas y realizadas." Working Paper 818. Central Bank of Chile.

Álvarez, N., A. Fernandois, and C. Saavedra. 2018. "Ejercicio de tensión para fondos mutuos de renta fija." Mimeo.

Álvarez, R., R. Cifuentes, and K. Cowan. 2011. "Análisis de los potenciales efectos del Proyecto de Ley sobre Tratamiento de Información sobre Obligaciones Financieras y Económicas." Central Bank of Chile.

Avanzini, D., J. F. Martínez, and V. Pérez. 2015. "A Micro-Powered Model of Mortgage Default Risk for Full Recourse Economies, with an Application to the Case Of Chile." Working Paper 41. Irving Fisher Committee on Central Bank Statistics, BIS.

Bajari, P., Ch. Sean Chu, and M. Park. 2008. "An Empirical Model of Subprime Mortgage Default from 2000 to 2007." NBER Working Paper 14625. National Bureau of Economic Research.

Bank for International Settlements. 2018. "International Banking and Financial Market Developments." Quarterly Review. Bank for International Settlements. September.

Barron, M., and M. Staten. 2002. "The Value of Comprehensive Credit Reports: Lessons from the U.S. Experience." In Credit Reporting Systems and the International Economy, edited by Margaret M. Miller. MIT Press.

BCBS. 2018. "Global Systemically Important Banks: Revised Assessment Methodology and the Higher Loss Absorbency Requirement." July.

BIS. 2017. "Basel III Monitoring Report." February.

Blanco, A., and F. Volpe. 2015. "Alquiler en números: La tenencia de vivienda en América Latina y el Caribe." Inter-American Development Bank.

Board of Governors of the Federal Reserve System. 2018. "Single-Counterparty Credit Limits for Bank Holding Companies and Foreign Banking Organizations." June.

Board of Governors of the Federal Reserve System and FDIC. 2018. "Agencies Extend Deadline for Certain Resolution Plan Submissions: Board of Governors of the Federal Reserve System Federal Deposit Insurance Corporation." August.

Brown, M., and C. Zehnder. 2007. "Credit Reporting, Relationship Banking, and Loan Repayment." Journal of Money, Credit, and Banking 39(8): 1883–1918.

Calani, M. 2018a. "Can Regulation on Loan Loss Provisions for Credit Risk Affect the Mortgage Market? Evidence from Administrative Data in Chile." Mimeo.

Calani, M. 2018b. "Dinámica de corto plazo en precios de vivienda en Chile." Mimeo.

Calvo, D., J. C. Crisanto, S. Hohl, and O. Pascual. 2018. "Financial Supervisory Architecture: What Has Changed after the Crisis?." FSI Insights 8. April.

Central Bank of Chile. 2018a. "Encuesta Financiera de Hogares 2017: Presentación Principales Resultados."

Central Bank of Chile. 2018b. "Encuesta Financiera de Hogares 2017: Principales Resultados."

Cerutti, E., J. Dagher, and G. Dell'Ariccia. 2017. "Housing Finance and Real-Estate Booms: A Cross-Country Perspective." Journal of Housing Economics 38(C): 1–13.

Claessens, S., M.A. Kose, and M.E. Terrones. 2009. "What Happens during Recessions, Crunches, and Busts?" Economic Policy 24(60): 653–700.

Córdova, F., and A. Cruces. 2018. "Demografía habitacional en Chile." Mimeo.

Córdova, F., and A. Mir. 2018. "Asimetría de la distribución de cupos bancarios como indicador de alerta temprana." Mimeo.

CPSS/IOSCO. 2012. "Principles for Financial Market Infrastructures."

CPMI/IOSCO. 2018. "Implementation Monitoring of PFMI: Fifth Update to Level 1 Assessment Report." July.

Diba, B. T., and H. Grossman. 1988. "Explosive Rational Bubbles in Stock Prices?" American Economic Review 78(3): 520–30.

Elul, R., N. Souleles, S. Chomsisengphet, D. Glennon, and R. Hunt. 2010. "What "Triggers Mortgage Default?" American Economic Review 100(2): 490–94.

Fernández, J., and F. Vásquez. 2018. "Clasificación de empresas chilenas de acuerdo a su tipo de deuda." Mimeo.

Fischer, S. 2017. "Housing and Financial Stability." Speech delivered at the DNB-Riksbank Macroprudential Conference Series. Amsterdam, Netherlands, 20 June 2017.

Flores, R., J. Perez, and F. Uribe. 2018. "Valoración de la tierra de uso residencial y su contribución al valor de mercado de la vivienda en Chile." Estudios Económicos Estadísticos 126. Central Bank of Chile.

FSB. 2018. "Crypto-Assets: Report to the G20 on Work by the FSB and Standard-Setting Bodies." July.

FSB. 2018. "Cyber Lexicon." Consultative Document. July.

FSB. 2018. "Interest Rate Benchmark Reform: Overnight Risk-Free Rates and Term Rates." July.

FSB. 2018. "Principles on Bail-in Execution." June.

Gerardi, K., K. Herkenhoff, L. Ohanian, and P. Willen. 2017. "Can't Pay or Won't Pay? Unemployment, Negative Equity, and Strategic Default." FRB Atlanta Working Paper 2013-04. Federal Reserve Bank of Atlanta.

Giglio. S., M. Maggiori, and J. Stroebel. 2016. "No-Bubble Condition: Model-Free Tests in Housing Markets." Econometrica 84(3): 1047–91.

Goodhart, C. A. E., Sunirand, P., and Tsomocos, D. 2006. "A Model to Analyze Financial Fragility." Economic Theory 27(1): 107–42.

Goodman, L. S., R. Ashworth, B. Landy, and K. Yin (2010). "Negative Equity Trumps Unemployment in Predicting Defaults." The Journal of Fixed Income 19(4): 67.

Gyourko, J., C. Mayer, and T. Sinai. 2013. "Superstar Cities." American Economic Journal: Economic Policy 5(4): 167–99.

Haughwout, A., D. Lee, J. Tracy, and W. van der Klaauw. 2011. "Real Estate Investors, the Leverage Cycle, and the Housing Market Crisis." Federal Reserve Bank of New York Staff Report 514. New York.

International Monetary Fund (IMF). 2018. "A Decade after the Global Financial Crisis: Are We Safer?" Global Financial Stability Report (GFSR). International Monetary Fund. October.

International Monetary Fund (IMF). 2018. World Economic Outlook (WEO): Challenges to Steady Growth. International Monetary Fund. October.

International Monetary Fund – Financial Stability Board – Bank of International Settlements. 2016. "Elements of Effective Macroprudential Policies: Lessons from International Experience." 31 August 2016. Available online at https://www.imf.org/en/News/Articles/2016/08/30/PR16386-IMF-FSB-BIS-publish-Elements-of-Effective-Macroprudential-Policies

Jaffee, D., and T. Russell. 1976. "Imperfect Information, Uncertainty, and Credit Rationing." Quarterly Journal of Economics 90(4): 651–66.

Jordà, Ò., M. Schularick, and A. M. Taylor. 2016. "The Great Mortgaging: Housing Finance, Crisis and Business Cycles." Economic Policy 31(85): 107–52.

Kaplan, G., K. Mitman, and G. Violante. 2017. "The Housing Boom and Bust: Model Meets Evidence." NBER Working Paper 23694. National Bureau of Economic Research.

King, M. A. 1986. "Capital Market Imperfections and the Consumption Function." Scandinavian Journal of Economics 88(1): 59–80.

Knoll, K., M. Schularick, and T. Steger. 2017. "No Price like Home: Global House Prices, 1870–2012." American Economic Review 107(2): 331–53.

Kuttner, K., and I. Shim. 2016. "Can Non-Interest Rate Policies Stabilize Housing Markets? Evidence from a Panel of 57 Economies." Journal of Financial Stability 26: 31–44.

Laeven, L., and Valencia, F. 2012. "Systemic Banking Crises Database: An Update." IMF Working Paper 12/163.

Llewellyn, D. 2006. "Institutional Structure of Financial Regulation and Supervision: the Basic Issues." In Aligning Financial Supervision Structures with Country Needs, edited by A. Fleming, D. Llewellyn, and J. Carmichael, pp 19–85. World Bank.

Madeira, C. 2014. "El impacto del endeudamiento y riesgo de desempleo en la morosidad de las familias chilenas." Notas de Investigación. Economía Chilena 17(1): 88–102.

Martínez, J. F., R. Cifuentes, and J. S. Becerra. 2017. "Pruebas de tensión bancaria del Banco Central de Chile: Actualización." Working Paper 801. Central Bank of Chile.

Martínez, J. F., J. Matus, and D. Oda. 2018. "Taxonomy of Chilean Financial Fragility Periods from 1975." Working Paper 822. Central Bank of Chile.

Martínez, J. F., and D. Oda. 2018a. "Descomposición de tasas de crecimiento." Mimeo.

Martínez, J. F., and D. Oda. 2018b. "Identificación de los efectos de los factores de riesgo macro-financieros en los ejercicios de tensión." Mimeo.

Martínez-García, E., and V. Grossman. 2018. "Explosive Dynamics in House Prices? An Exploration of Financial Market Spillovers in Housing Markets around the World." Globalization and Monetary Policy Institute Working Paper 342. Federal Reserve Bank of Dallas.

Mayer, C., K. Pence, and S. Sherlund. 2009. "The Rise in Mortgage Defaults." Journal of Economic Perspectives 23(1): 27–50.

Mayer, C. 2011. "Housing Bubbles: A Survey." Annual Review of Economics 3(1): 559–77.

Micco, A., E. Parrado, B. Piedrabuena, and A. Rebucci. 2012. "Housing Finance in Chile: Instruments, Actors, and Policies." IDB Working Paper 132. Inter-American Development Bank.

OCC, Board of Governors of the Federal Reserve System, FDIC, SEC, and CFTC. 2018 "Proposed Revisions to Prohibitions and Restrictions on Proprietary Trading and Certain Interests in, and Relationships with, Hedge Funds and Private Equity Funds." Federal Register 83(137). July.

OCC, Board of Governors of the Federal Reserve System, and FDIC. 2018a. "Expanded Examination Cycle for Certain Small Insured Depository Institutions and U.S. Branches and Agencies of Foreign Banks." Federal Register 83(168). August.

OCC, Board of Governors of the Federal Reserve System, and FDIC. 2018b. "Liquidity Coverage Ratio Rule: Treatment of Certain Municipal Obligations as High-Quality Liquid Assets." Federal Register 83(170). August.

OCC, Board of Governors of the Federal Reserve System, and FDIC. 2018c. "Regulatory Capital Treatment for High Volatility Commercial Real Estate (HVCRE) Exposures." Federal Register 83(189). September.

Oxford Economics. 2018. "Assessing the Economic Implications of Brexit." Technical Report. October.

Pagano, M., and T. Jappelli. 1993. "Information Sharing in Credit Markets." Journal of Finance 48(5): 1693–1718.

Paillacar, M., 2018. "Períodos de comportamiento explosivo o de desalineamiento fundamental en los precios de vivienda." Mimeo.

Phillips, P. C., Shi, S., and Yu, J. 2015. "Testing for Multiple Bubbles: Historical Episodes of Exuberance and Collapse in the S&P 500." International Economic Review 56(4): 1043–78.

Phillips, P. C., Wu, Y., and Yu, J. 2011. "Explosive Behavior in the 1990s NASDAQ: When Did Exuberance Escalate Asset Values?" International Economic Review 52(1): 201–26.

Powell, A., N. Mylenko, M. Miller, and G. Majnoni. 2004. "Improving Credit Information, Bank Regulation, and Supervision: On the Role and Design of Public Credit Registries." Policy Research Working Paper 3443. World Bank.

Razmilic, S., 2010. "Precios, subsidios e incentivos: Cómo los programas habitacionales terminan por predeterminar el precio de las viviendas sociales." Master's Thesis in Urban Planning. MIT.

Reinhart, C., and K. Rogoff. 2009a. "The Aftermath of Financial Crisis." American Economic Review 99(2): 466–72.

Reinhart, C., and K. Rogoff. 2009b. This Time Is Different: Eight Centuries of Financial Folly. Princeton University Press.

Sarmiento, C. 2011. "The Role of the Economic Environment on Mortgage Defaults during the Great Recession." Applied Financial Economics 22(3): 243–50.

Shiller, R. J. 2015. Irrational Exuberance. Princeton University Press.

Spence, A. 1973. "Job Market Signaling." Quarterly Journal of Economics 87(3): 355–74.

Stiglitz, J.E., and A. Weiss. 1981. "Credit Rationing in Markets with Imperfect Information." American Economic Review 71(3): 393–410.

Turner, M. 2010. "The Consequences of Prohibiting Credit Inquiry Data in Chilean Credit Files: PERC White Paper." Policy and Economic Research Council (PERC).

Turner, M. , R. Varghese, and P. Walker. 2007. "On the Impact of Credit Payment Reporting on the Financial Sector and Overall Economic Performance in Japan." Information Policy Institute.

United States Congress. 2018. "S.2155 — Economic Growth, Regulatory Relief, and Consumer Protection Act." May.

U.S. Department of the Treasury. 2018. "A Financial System That Creates Economic Opportunities Nonbank Financials, FinTech, and Innovation." July.

GLOSSARY

Application programming interface (API): A set of rules and specifications followed by software programs to facilitate communication between programs; an interface between different software programs to facilitate their interaction.

Arrears rate (AR): Also called portfolio in arrears. A measure of credit risk calculated as the ratio of loan installments that are past due by over 90 days to the total debt. For commercial loans to firms, the delinquent installments are past due by up to three years; for commercial loans to people, up to one year; for consumer loans, up to 180 days.

Automatic bill payment: A service for paying bills automatically through a bank account on a preestablished due date specified by the user and offered by a merchant.

Banks, large: Banks with a large market share and wide diversification of operations (loans and derivative and nonderivative financial instruments).

Banks, medium-sized: Banks with a smaller market share but equally diversified operations as the large banks.

Basel III: A set of new capital and liquidity requirements for the banking industry, developed by the BIS with the aim of substantially strengthening the Basel II capital framework. The objectives include the following: raise the quality, consistency, and transparency of the capital base; strengthen risk hedging; introduce leverage limits; promote a countercyclical capital framework; and introduce a global liquidity standard. These requirements will be implemented gradually through 2019.

Brexit: The term used for the result of the referendum establishing that the United Kingdom will withdraw from the European Union, held on 23 June 2016.

Buy-and-hold investors: Investors that, due to the nature of their liabilities, pursue a passive investment strategy, in which they keep the instruments in which they invest in their portfolio for a long time, independent of the short-term price fluctuations in the market.

Capital adequacy ratio (CAR): A measure of a bank's financial soundness, measured as the ratio of regulatory capital to credit-risk-weighted assets.

Central counterparty (CCP): An intermediary that acts as the buyer for all sellers and as the seller for all buyers in a given market.

Central government: Institutions associated with the three branches of the state (executive, legislative, and judicial), as well as Law 13,196, the interest earned from recognition bonds and the oil price stabilization fund.

Central securities depository (CSD): A financial organization that provides securities accounts and central custody services and plays an important role in guaranteeing securities trade.

Clearing houses: Entities that settle financial instrument transactions between participating members, without acting as a central counterparty to the transactions.

Close-out netting: The process of early termination and settling, in the event of insolvency of one of the counterparties to multiple OTC derivative contracts under a single master agreement, through which all the contracts are reduced to a single net liability for one of the parties.

Contract for difference: An agreement through which the participants exchange the difference in the value of an underlying asset between the contract start and end dates. If the value increases, the seller pays the difference to the buyer. If the value decreases, the buyer pays the difference to the seller. The underlying assets can be currencies, commodity prices, stock indices, interest rates, etc.

Credit risk: The possibility that a bank borrower or counterparty will fail to meet its contractual obligation, whether in interest or capital.

Credit valuation adjustment (CVA): Adjustment reflecting the risk of a deterioration in a counterparty's credit rating (i.e., counterparty credit risk) on derivatives or financial securities transactions.

Currency mismatch: The difference between foreign currency liabilities and foreign currency assets, less the net position in derivatives (the difference between buy and sell positions in derivatives contracts). An alternative measure is calculated as the difference between external debt and the net derivatives position, scaled by exports minus imports.

Cyclically Adjusted Price-Earnings (CAPE): Measure of the market value of U.S. securities. The ratio between the value of the S&P 500 index and the 10-year average net income after taxes, adjusted for inflation.

DAX: Stock index consisting of the 30 largest companies on the Frankfurt Stock Exchange.

Debt service ratio (DSR): Measures the payments that households must make to fulfill their consumer and mortgage loan commitments, as a percentage of their disposable income.

Debt-to-income (DTI) ratio: Measures the debt held by households with different financial and nonfinancial entities as a percentage of their disposable income.

Default of 90 days or more: The total amount of a loan that is past due by 90 days or longer, even if only some of the monthly payments are past due.

Default rate (DR): The ratio between the number of debtors with arrears of over 90 days and the total number of debtors in the corresponding portfolio.

Delinquent loans: Loans with arrears of over 90 days from the maturity date. The full amount of the loan is considered delinquent for accounting data, versus the total debt for administrative data.

Emerging Market Bond Index (EMBI): An indicator calculated by JPMorgan that measures the return on government bonds issued by emerging market countries (sovereign bonds), with a specific structure and liquidity.

Eurostoxx 50: Stock market index covering the 50 largest companies in the Eurozone.

External formal secondary market: Market in which the financial instruments that are eligible for overseas investment by the pension funds must be traded, together with other investments that are made in international markets, without detriment to the pension funds' trading of securities from foreign issuers on a domestic FSM, pursuant to the Securities Market Law.

Factoring: A financing operation in which accounts receivable are transferred to a financing company (the factor). These accounts are typically part of a firm's current operations.

Federal funds rate (FFR): Monetary policy rate of the U.S. Federal Reserve.

Federal Reserve System (Fed): The U.S. Federal Reserve is the central bank of the United States.

Financial infrastructures: Institutions that enable the effective operation of financial markets, including payments systems, central counterparties, securities settlement systems, central securities depositories, and trade repositories.

Foreign private equity assets: Private equity is an investment carried out in firms whose shares are traded not on the exchange, but rather directly among investors.

Formal Exchange Market (FEM): A group of banks and currency exchange houses authorized by the Central Bank of Chile, to which they report all transactions.

Forward guidance: A communication tool used by central banks to signal their future monetary policy decisions in the medium term, so as to influence the expectations of economic/financial agents.

Four-party model: Industrial organization of retail payment markets comprising cardholders, merchants, issuers, and acquirers, where issuers have contracts with acquirers and cardholders, and acquirers have contracts with issuers (and brands) and merchants.

FSB Working Group on Operational Continuity (FSBWGOC): A working group established in December 2016 by Chile's Financial Stability Board (FSB) with the objective of analyzing the operational risks of the payment system and its participants and proposing legal and regulatory changes as needed to mitigate these risks and their impact on the financial system.

FTSE 100: Stock market index covering the 100 companies with the highest market capitalization on the London Stock Exchange.

G20: An international forum for cooperation and consultation among developed countries and emerging economies, on issues related to global economic stability. Members include the seven most industrialized countries in the world (G7), Russia, the European Union, and a group of other economies, including Brazil, India, China, and South Africa.

G7: An international forum for cooperation and consultation among the seven largest industrialized economies in the world: Canada, France, Germany, Italy, Japan, United Kingdom, and United States.

Goods received in payment: Goods received by the bank as payment for all or part of the liability in arrears.

High-quality liquid assets (HQLA): An asset that can be liquidated in markets in a stress period and, in most cases, can be used in central bank operations. Some HQLA have discounts or haircuts.

House price index (HPI): Estimated using a stratification or mixed adjustment method, based on anonymized administrative records from the Chilean IRS on actual transactions on new and used residences at the national level.

Indebtedness: Ratio of financial indebtedness, measured as Financial debt/ (Equity plus minority interest).

Interest coverage ratio: A measure of repayment capacity, defined as the ratio of earnings before interest and taxes (EBIT) to financial expense.

Interest rate risk: Exposure to losses caused by adverse changes in interest rates, which affect the value of the instruments, contracts and other transactions recorded on the balance sheet.

International custodian: Custodian or securities depository with primary residence overseas.

Intraday liquidity facility: Financing granted by the Central Bank of Chile to banking entities through the RTGS system. This facility operates daily through the purchase of financial instruments with a repurchase agreement. The terms and conditions of these operations are contained in the Central Bank's financial regulations.

IPSA (Índice de Precio Selectivo de Acciones): Selective Stock Price Index covering the 40 largest companies on the Santiago Stock Exchange.

Leverage: Measure of the banks' debt level over equity; used as a complementary tool to capital adequacy requirements.

Liquidity ratio: Official reserves in foreign currency over short-term liability financing needs in foreign currency.

Loan-to-Value (LTV) ratio: The ratio of a given loan to the value of the underlying asset purchased, usually a home.

Loans in default: Debtors and their loans for which there is little chance of recovery, due to a weak or null capacity to pay. This portfolio includes debtors who must undergo a forced debt restructuring, as well as any debtor with arrears of 90 days or more in the payment of interest or principal on a loan.

Market risk: The potential loss in value of the net positions held by a financial entity, as the result of adverse changes in market prices.

Master agreements for derivative contracts: Standardized contracts that allow the counterparties to establish the general terms and conditions for derivative transactions, establishing standard protocols, for example for defining default and transaction settlement procedures.

MF1: Type 1 mutual funds, which invest in short-term debt instruments with a duration of 90 days or less. This mutual fund invests in short-term debt securities and medium- and long-term debt securities. The duration of a Type 1 fund's investment portfolio must be 90 days or less. Shares are invested in short-, medium-, and long-term debt instruments.

MF2: Type 2 mutual funds, which invest in short-term debt instruments with a duration of 365 days or less. This mutual fund invests in short-term debt securities and medium- and long-term debt securities. The duration of a Type 2 fund's investment portfolio must be 365 days or less. Shares are invested in short-, medium-, and long-term debt instruments.

MF3: Type 3 mutual funds, which invest in medium- and long-term debt instruments, with a minimum duration of over 365 days. This mutual fund invests in short-term debt securities and medium- and long-term debt securities. A minimum and maximum duration are defined for the investment portfolio. This information must be contained in the definition adopted by the fund, and it must be longer than 365 days. Shares are invested in short-, medium-, and long-term debt instruments.

MF6: Type 6 mutual funds, which can be freely invested. These funds are not classified under the definitions of types 1 through 5. The investment policy is unrestricted, but while they are not subject to regulated guidelines, they must establish internal regulations.

Net international investment position (NIIP): The difference between the economy's external assets and liabilities, at the end of a given period.

Nonbank lenders (NBLs): Nonbank entities that provide consumer, mortgage, and commercial loans, including retailers, family compensation funds (CCAF), savings and loan associations (S&Ls), car dealerships, life insurance companies, and leasing and factoring companies.

Nonperforming loans (NPL) ratio: A measure of credit risk, calculated as the ratio between nonperforming loans and total loans.

Nonperforming loans: Bank loans, or a fraction thereof, that are past due by up to 90 days from the maturity date. On loans with fixed monthly payments, only the amount of the past-due payment is considered, although the full amount of the loan could be transferred to the nonperforming portfolio if acceleration clauses are enforced.

Normal loans: Loans to debtors with the payment capacity to meet their obligations and commitments, for whom there is no sign that this condition will change, based on an evaluation of their economic-financial situation.

Office class (A+, A, B, C): Classification used to categorize offices according to their characteristics, from high to low. The characteristics considered are location, access, floor plan size, absence of pillars, ceiling height, access control, closed-circuit TV, security equipment, fire detectors and extinguishers, air conditioning, elevator speed, structured cabling, and whether the building has Leadership in Energy and Environmental Design (LEED) certification.

Operational risk: Exposure to losses deriving from deficient internal processes, personnel and systems or external events, including legal risks but excluding strategic and headline (or reputational) risk.

Output floor: Percent of risk-weighted assets calculated using a standardized approach, which establishes the floor of RWAs calculated for regulatory purposes.

Over-the-counter (OTC): A term used to describe the trading of financial instruments directly between two parties, without going through the organized securities exchanges.

Pension fund investment regime: Regime regulating specific investment issues for the pension funds, which by nature require more flexibility and detail, and setting investment limits that promote adequate fund diversification. The regime is elaborated by the Superintendence of Pensions and approved by the Technical Investment Board and the Ministry of Finance.

Prepaid debit cards: A physical, electronic, or computer device that has a unique identification system, tied to a fund provision account opened by the card issuer for the purpose of crediting sums of money deposited therein by the purchaser; and whose utilization as a payment instrument amounts to a financial liability for the issuer vis-à-vis the public or affiliated commercial establishments or services.

Principles of Financial Market Infrastructures (PFMIs): 24 principles developed by the Committee on Payments and Market Infrastructures (CPMI) and IOSCO, aimed at systematizing and diffusing international best practices and legal and regulatory standards applicable to financial market infrastructures.

Regulatory capital: Tier 1 (core) capital plus Tier 2 (supplementary) capital. The latter mainly includes subordinated bonds and additional provisions.

Residual short-term external debt: External debt coming due within 12 months of a given date (that is, short-term external debt plus the current portion of long-term external debt).

Return on assets (ROA): Measured as the ratio of earnings after taxes, amortizations, and extraordinary items to total assets.

Return on equity (ROE): Measured as the ratio of earnings after taxes, amortizations, and extraordinary items to shareholders' equity plus minority interest. It is the shareholders' return.

Risk appetite: The quantity and type of risk that economic agents are disposed to pursue, retain, or assume.

Risk-based capital: The higher capital level derived from a comparison of the capital necessary for maintaining debt ratios, the solvency margin, and the minimum capital required by law.

Risk-weighted assets (RWA): Bank assets weighted on the basis of five risk categories, set forth in Article 67 of the General Banking Law. The ratio of capital to risk-weighted assets serves as a measure of capital adequacy (known as the Basel ratio), which is internationally accepted as a measure of bank solvency.

S&P 500: Stock index based on the market capitalization of the 500 largest companies that are publicly traded in the United States.

Secondary market: A market where financial assets are traded after issue. Every transaction implies a purchase/sale between investors.

Securities depository: Special-purpose corporation whose sole objective is to receive publicly offered securities and facilitate their transfer.

Shadow banking: Financial intermediation conducted outside the banking system.

Spread: The excess yield of a given financial asset relative to the risk-free return, charged by investors for tolerating an additional risk level.

Standing deposit facility: Overnight liquidity absorption facility, where the CBC receives deposits in pesos, which earn interest after one day.

Standing liquidity facility: Overnight liquidity window, where the Central Bank of Chile purchases eligible financial assets in exchange for an amount in pesos, equivalent to the present value of the assets discounted at the current market rate for the day of the operation, less haircuts and margins. All operations include a repurchase agreement to buy back the instrument on the next bank business day. The Central Bank charges interest on the amount initially loaned in pesos.

Term spread: The excess yield charged by investors in exchange for holding a long-term bond to maturity, rather than in selling and reinvesting in a bond with a shorter-term series in the same time period.

Tier 1 capital: Paid-in capital plus bank reserves and period earnings, net of provisions for the distribution of dividends.

Trade repository: An entity that maintains a centralized electronic registry (database) of financial transactions.

Traditional assets: Fixed- and variable-income financial instruments, such as bonds and stocks, respectively.

Treasury bill (T-bill): A fixed-income security issued by the U.S. Department of the Treasury, with a maturity of up to one year.

Treasury bond (T-bond): A fixed-income security issued by the U.S. Department of the Treasury, with a maturity of 30 years. T-bonds were reintroduced in February 2006.

Treasury note (T-note): A fixed-income security issued by the U.S. Department of the Treasury, with a maturity of 2, 3, 5, or 10 years.

Vacancy rate: Square meters available for rent or sale, calculated over the current stock.

Virtual currencies: Also known as digital currencies. A virtual or digital (i.e., not physical) token that has some, but not all, the characteristics of a currency and can also have the characteristics of a commodity or other asset.

Called cryptocurrencies when their issue and transaction validation require cryptographic mechanisms.

VIX: Chicago Board Options Exchange (CBOE) stock volatility index, based on S&P 500 index options contracts (at one month).

Yield curve: The ratio of the yield or return of fixed-income securities to their maturity.

ABBREVIATIONS

AAMHE: *Agentes Administradores de Mutuos Hipotecarios Endosables* (Mutual societies).

Achef: *Asociación Chilena de Empresas de Factoring* (Chilean Factoring Association).

AM: Acquirer's margin**.**

AR: Arrears rate.

BCBS: Basel Committee on Banking Supervision.

BCP: Central Bank bonds denominated in Chilean pesos.

BCS: *Bolsa de Comercio de Santiago* (Santiago Stock Exchange).

BCU: Central Bank bonds denominated in UFs.

BIS: Bank for International Settlements.

BLS: Bank Lending Survey.

BOE: Bank of England.

bp: kt,CAE: State-backed loans.

CAPE: Cyclically adjusted price-earnings.

CAR: Capital adequacy ratio.

CASEN: Socioeconomic Characterization Survey.

CAT: *Cencosud Administradora de Tarjetas S.A.*

CBC: Central Bank of Chile.

CBR: *Conservador de Bienes Raíces* (Real Estate Registrar).

CC: Retailers.

CCAF: *Cajas de Compensación y Asignación Familiar* (Family Compensation Funds).

CCAV: Large-value clearing house in national currency.

CChC: *Cámara Chilena de la Construcción* (Chilean Chamber of Construction).

CCP: Central counterparty.

CEMBI: Corporate Emerging Market Bond Index.

CFER: Compendium of Foreign Exchange Regulations.

CFR: Compendium of Financial Regulations.

CGFS: Committee on the Global Financial System.

COE: Critical operational events.

ComDer: *ComDer Contraparte Central S.A.*

COMEX: Foreign trade.

Corfo: *Corporación de Fomento de la Producción* (Chilean Development Corporation).

CPMI: Committee on Payments and Market Infrastructures.

CSD: Central Securities Depository.

CVPS: Collective voluntary pension savings.

DAX: Deutscher Aktienindex.

DFA: Dodd-Frank Act.

Dipres: *Dirección de Prespuestos* (Budget Division).
DLT: Distributed Ledger Technology.
DR: Default rate.
DSR: Debt service ratio.
DTI: Debt-to-income ratio.
DvP: Delivery versus payment.
DXY: Dollar index.
EBIT: Earnings before interest and taxes.
ECB: European Central Bank.
EMBI: Emerging Market Bond Index.
EME: Emerging Market Economy.
EMIR: European Market Infrastructure Regulation.
EPFR: Emerging Portfolio Fund Research.
EPU: Economic Policy Uncertainty Index.
EZ: Eurozone.
FDI: Foreign direct investment.
Fed: U.S. Federal Reserve System.
FEM: Formal exchange market.
FFR: Federal funds rate.
FI: Fixed-income.
FLA: Factoring, leasing, and car loans.
FLI: Intraday liquidity facility.
FMC: Financial Market Commission.
FMI: Financial market infrastructures.
FOMC: Federal Open Market Committee.
Fonasa: *Fondo Nacional de Salud* (National health insurance).
FSB: Financial Stability Board.
FSB: Financial Stability Board.
FSI: Financial Soundness Indicators.
FSR: Financial Stability Report.
FTD: Fixed time deposit.
FTSE 100: Financial Times Stock Exchange 100.
G-SIB: Global Systemically Important Banks.
G20: Group of Twenty.
G7: Group of Seven.
GBI: Government Bond Index.
GBL: General Banking Law.
GDP: Gross domestic product.
GFC: Global financial crisis.
GFSR: Global Financial Stability Report.
GSOCEF: FSB Operational continuity working group.
HFS: Household Financial Survey.
HLA: Higher Loss Absorbency.
HPI: House price index.

HQLA: High-quality liquid assets.
ICO: Initial Coin Offering.
IDIS: Integrated Derivatives Information System.
IF: Interchange fee.
IMF: International Monetary Fund.
INE: *Instituto Nacional de Estadísticas* (National Statistics Institute).
IOSCO: International Organization of Securities Commissions.
IPoM: Monetary Policy Report.
IPSA: Selective Stock Price Index.
IRS: Chilean Internal Revenue Service (*Servicio de Impuestos Internos*).
ITL: Income Tax Law.
Latam: Latin America.
LCR: Liquidity Coverage Ratio.
LIC: Life insurance companies.
LOC: Central Bank of Chile's Basic Constitutional Act.
LTV: Loan-to-Value ratio.
LVPS: Large-value payment systems.
LVPSCP: Large-Value Payment System Contingency Protocol.
MC: Markets Committee.
MD: Merchant Discount.
MF: Mutual funds.
MiFID: Markets in Financial Instruments Directive.
MiFIR: Markets in Financial Instruments Regulation.
MINDHA: Ministry of Finance.
MPR: Monetary policy rate.
MSCI: Morgan Stanley Capital International.
Nafta: North American Free Trade Agreement.
NBL: Nonbank lender.
NCG: *Norma de Carácter General* (General Regulation) of the SVS).
NCO: Net cash outflow.
NIIP: Net international investment position.
NMDAR: Nonmortgage debt at risk.
NPL: Nonperforming loan ratio.
NR: Nonresident.
NSFR: Net Stable Funding Ratio.
OECD: Organization for Economic Cooperation and Development.
OR: Operational risk.
OTC: Over-the-counter.
PAC: Automatic bill payment.
PF: Pension funds.
PFM: Pension fund managers.
PFMI: Principles for Financial Market Infrastructures.
pp: percentage points.
PS: Payment systems.

RAN: *Recopilación Actualizada de Normas* (SBIF banking regulations).

RC: Regulatory capital.

ROA: Return on assets.

ROE: Return on equity.

RTGS: Real-time gross settlement system.

RUT: Chilean tax identification number.

RWA: Risk-weighted assets.

SMR: *Santiago Metropolitan Region.*

S&Ls: Saving and loan associations.

S&P 500: Standard and Poor's 500.

SBIF: *Superintendencia de Bancos e Instituciones Financieras* (Superintendence of Banks and Financial Institutions).

SEC: U.S. Securities and Exchange Commission.

SOMA: Open Market Operation System.

SP: *Superintendencia de Pensiones* (Superintendence of Pensions).

SRP: Self-regulation plan.

SSS: Securities settlement system.

Suseso: *Superintendencia de Seguridad Social* (Superintendence of Social Security).

T-Bill: U.S. Treasury bill.

T-Bond: U.S. Treasury bond.

T.Note: U.S. Treasury Note.

TDLC: *Tribunal de la Libre Competencia* (Competition Tribunal).

TR: Trade repositories.

TT: Transbank.

UF: *Unidad de Fomento*, an inflation-indexed unit of account.

UK: United Kingdom.

USA: United States of America.

VAT: Value added tax.

VI: Variable-income.

VIX: Chicago Board Options Exchange Volatility Index.

VPS: Voluntary pension savings.

VXY: Chicago Board Options Exchange DXY Volatility Index.

WEO: World Economic Outlook**.**

WTO: World Trade Organization**.**

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