FINANCIAL STABILITY REPORT

First Half 2018

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*/ The cutoff date for this Report was May 4 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 (FSR), the Chilean financial system and both the internal and external payment systems have not recorded relevant disruption events. Despite the recent cyclical increase in economic activity, some agents have accumulated vulnerabilities due to a protracted period of low economic growth in the past years. Overall, available information to date indicates that both credit users and lenders would be able to accommodate the impact of different stress scenarios. However, scenarios involving low economic growth could represent important challenges.

External interest rates of some developed economies increased since last November, including those in the U.S. The U.S. Federal Reserve (Fed) maintained its benchmark rate unchanged in May, with future hikes expected for the current year, and a higher adjustment velocity for next year. Other developed economies have also increased their reference rates, and are expected to continue this process throughout the second half of this year. The European Central Bank maintained its accommodative monetary policy, no significant changes are expected in the short term. The above developments took place in a context of higher global growth both actual and expected for 2018 and 2019. Also, capital flows to emerging economies continued showing high dynamism, and the external funding cost for these economies remained at low levels, in a context of high risk appetite. These favorable financing conditions have also permeated locally. Bank funding short-term cost has evolved coherently with the monetary policy rate. Local sovereign interest rates have remained stable since last November, at a level below their historical average. Meanwhile, bond issuance long-term cost for firms and banks was close to historical lows.

As highlighted in previous Reports, a sudden worsening of external financing conditions continues to be among the most relevant external risks faced by the local economy. The change in the velocity of policy rate hikes in several developed economies, and the reduction of balance sheets among certain central banks, will continue pushing term premia upwards, these premia could also increase due to other elements linked to a more uncertain global economic environment, particularly in the medium term. The latter would increase long-term external interest rates, which could pass-through locally in a relevant magnitude. Internal vulnerability elements have been identified, under the risk scenario previously described, which are associated to the presence of financial agents with high sensitivity to medium

and long-term interest rate changes. Mutual funds maintain relevant fixed income positions; there is also a more active role of non-resident investors in this market. Moving forward, a normalization of risk appetite would have an impact on the external funding cost for emerging countries, including Chile, on top of increases of the base rate. Thus, a risk scenario including a term premia decompression and Chilean risk premium hikes (measured by the EMBI), could significantly increase the local long-term interest rate. The latter would happen despite the dampening effect provided by the flexible exchange rate regime.

Between the third and fourth quarters of 2017 the aggregate indebtedness of firms decreased, reaching 111% of GDP. The reduction in one year was 1.4% in real terms, due to lower growth in the external debt component, which in turn was mainly due to the peso appreciation during the aforementioned period of time. With respect to its highest level over GDP, which was recorded in the third quarter of 2015, the reduction in debt was 3.1% in real terms. Meanwhile, corporate bond issuances in the last two years —in a context of favorable financing conditions— were mainly used to refinance liabilities. Non-payment indicators showed moderate increases with respect to the previous Report, concentrated among certain real estate and financial services firms. Thus, a scenario where economic activity for these sectors would not increase in tandem with the rest of the economy, could worsen even further these developments.

The financial indicators of households exhibit some degree of deterioration, showing that the risks reported in previous FSRs still persist. The latter remain mostly linked to future developments in the labor market. Since last year's third quarter, mortgage debt increased mainly due to its average debt component evolution, which has been consistent with higher housing prices and an increased relevance of debtors holding two or more mortgages —some of which would be retail investors who acquire properties for leasing. Also, total consumer debt has decreased its growth rate among banks, however increasing its expansion among non-bank credit suppliers. By the end of 2017, household total indebtedness reached 46% of GDP. Administrative banking data shows that between 2015 and 2017, medium-high income debtors increased their indebtedness, meanwhile financial debt service rose across the entire income distribution. The latter development, besides increased usage of revolving credit among some agents since the end of 2017, suggests certain households have tighter financial margins. Moving forward the main vulnerability for the sector concentrates on future developments in the labor market, particularly among high indebted households, with little financial margin to face eventual income shocks.

Vulnerabilities described in previous FSRs persist for the banking system: a level of capital with lower margin with respect to previous years and the use of higher collateral to hedge credit risk. Since the third quarter of 2017, the banking system slightly increased its profitability, however, solvency remained lagging behind international standards. Despite a rebound in economic activity, a slower than expected recovery could deteriorate the quality of the banks' portfolio. Thus, the stress test indicate that, although the system has shown a slight reduction in risks related to the recovery of economic activity, banks continue with moderate levels of capitalization with respect to previous results. On the other hand, higher collateral requirements remain as an important credit risk coverage strategy in the individually evaluated commercial loan portfolio, representing 50% of these loans as a whole. In addition, the greater participation of non-bank suppliers of credit to households has increased the exposure of banks to this sector because these lenders tend to be financed with commercial loans granted by banks. In this context, the lack of a consolidated debt record limits the correct credit assessment of the different players in the credit market and, therefore, is a deficiency that should be addressed as soon as possible.

This Report includes a thematic chapter on financial technological innovations (FinTech) and financial stability, in which the potential effects of the different FinTech innovations – with more detail in the case of the distributed ledger technologies and cryptoassets – on the functions of the financial system are analyzed. In general, financial innovations involve threats and opportunities. It is estimated that the financial system could benefit from these, for example, through improvements in financial inclusion, increased competition, efficiency gains and cost reductions for consumers. However, such innovations may also present risks that must be adequately mitigated. At this point, FinTech applications do not pose a threat to financial stability. However, the situation may change in the future, especially considering the accelerated growth of this type of innovation. Among the most immediate risks are those to which users of cryptoassets are exposed, the emergence of entities that exercise functions specific to the financial system —but outside the supervisory scope— and the growing threats of cybersecurity. The evaluation of these risks presents challenges for regulatory entities in Chile, and the rest of the world, and probably will need to be addressed, through regulatory improvements, so that the most obvious benefits associated with the FinTech industry can fully materialize.

During this semester the Bank promulgated new regulations that seek to align local regulation with international standards. These refer to derivative clearing, a new general regulation framework applicable to high value payment systems and the publication for consultation of new rules on liquidity risk management in banking. Thus, a new regulation was issued allowing to establish conditions to net obligations arising from bilateral

derivative contracts, subscribed under master agreements recognized by the Central Bank. For high-value payment systems, the Principles for Financial Market Infrastructures were included into the Bank's regulation. Besides, the new liquidity regulation published in consultation will incorporate a gradual program to implement a regulatory limit for the short-term liquidity coverage ratio, advancing decisively in the guidelines of Basel III in this area. Regarding regulation issued by other entities, it is worth mentioning the new banking capital requirements established by the SBIF for derivative instruments cleared and settled through central counterparty entities.

The financial policy advances reported periodically through this Report have been significant in recent periods, however, significant gaps with respect to international standards persist in the Chilean financial system. These have the additional complexity of requiring legislative advances for their eventual closure. In this regard, these projects could be considered in an agenda that strengthens the financial system. In Box V.1 of this Report, we propose those matters that, from the perspective of the Bank, should be a priority in this agenda.

I. FINANCIAL MARKET TRENDS AND EXTERNAL RISKS

With risk and term premiums still low, the main risk to financial market stability involves a sharp correction in external financial conditions. Risk appetite remains high, and a sudden reversal could trigger significant adjustments in asset prices at both the international and local levels. At the same time, various geopolitical factors could present challenges for growth in the medium term.

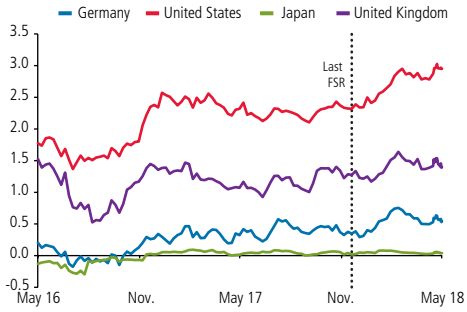
INTERNATIONAL FINANCIAL SITUATION

The recent scenario for advanced economies has evolved in line with the improved economic outlook and a normalization of interest rates. There is increasing uncertainty, however, as to whether the situation will remain favorable in the medium term.

In the developed economies, the economic growth forecast remains favorable for the next two years, with a high degree of synchronicity among countries. This outlook is largely explained by higher real growth, which has translated most recently into a steady increase in inflation around the world. At its May meeting, the U.S. Federal Reserve (Fed) kept the federal funds rate (FFR) in a range of 1.5 to 1.75%, and the market expects two additional hikes in 2018. Similarly, the Bank of Canada kept its policy rate at 1.25% at its April meeting, signaling that additional hikes will depend on the results of the NAFTA negations and other factors. In the United Kingdom, the Bank of England held its interest rate at 0.5% at its May meeting, and the market expects an increase in the second half of 2018. In Australia, market forecasts point to an increase in the fourth quarter of this year.

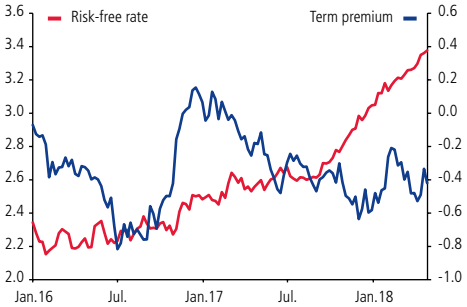
Since November, long-term interest rates increased between 15 and 50 bp in the main developed countries, as of the cutoff date of this *Report* (figure I.1). The ten-year U.S. Treasury rate recorded the largest jump, driven mainly by its risk-free component (figure I.2), while the term premium reacted weakly to the gradual reduction in the Fed's balance sheet initiated in October last year. In contrast, long-term sovereign rates in Chile have been relatively stable since the cutoff date of the last FSR (figure I.9).

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



Source: Bloomberg.

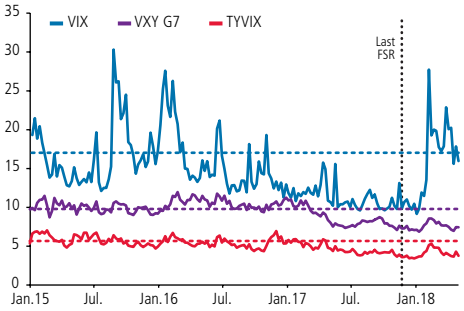
FIGURE I.2
Components of the U.S. sovereign bond rate (*)
(percent)



(*) Decomposition of the 10-year U.S. Treasury bond interest rate using the methodology described in Adrian et al. (2013).

Source: Federal Reserve Bank of New York.

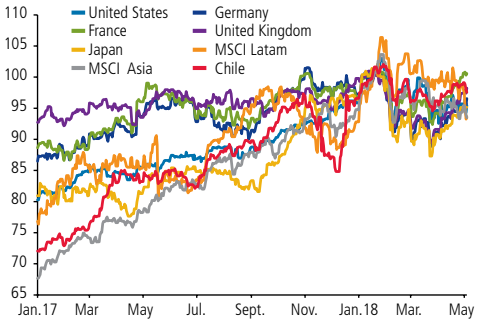
FIGURE I.3
Implied volatility (*)
(percent)



(*) 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.

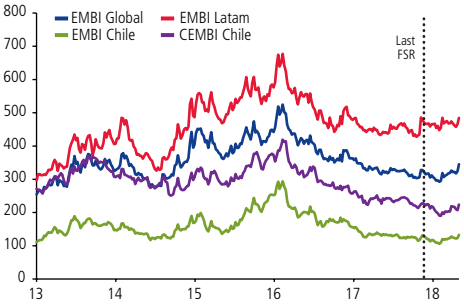
Source: Central Bank of Chile, based on data from Bloomberg.

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



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

FIGURE I.5
EMBI: Selected economies (*)
(basis points)



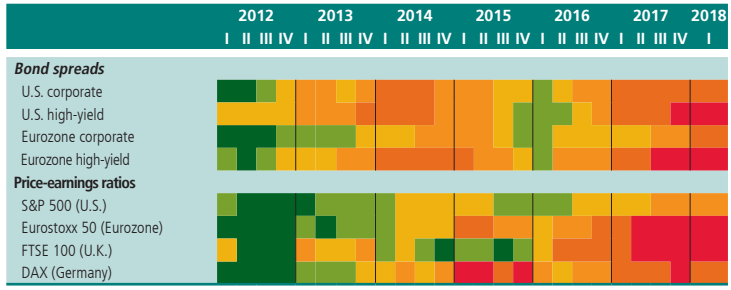
(*) Including the Corporate Emerging Markets Bond Index (CEMBI).
Source: Central Bank of Chile, based on data from Bloomberg.

Volatility indicators increased, while risk appetite remained high.

In early February, the VIX volatility index shot up to levels not seen since mid-2015, exceeding the average of the last six years (figure I.3). Stock prices around the world have also moved significantly since the start of 2018 (figure I.4). Both developments could be driven, in part, by fear of a possible trade war with global implications, and future developments surrounding this conflict could translate into additional fluctuations in these variables.

At the same time, risk appetite remained high, as shown by elevated asset prices above historical patterns (table I.1 and statistical appendix) and narrow spreads on low-risk private bonds and sovereign bonds (EMBI), which have generally remained stable since the cutoff date of the last FSR (figure I.5).

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.

Portfolio flows to emerging economies remained dynamic, particularly the fixed-income component, albeit with a slight reduction at the margin (figure I.6). In the case of Chile, fixed-income portfolio liabilities (nonresident investors) continued the upward trend recorded throughout much of 2017 (figure I.7), while residual short-term external debt—excluding loans related to foreign direct investment (FDI)—was stable and concentrated in commercial loans and trade credit (statistical appendix).

The macro-financial situation of emerging economies, while improving, evolved unevenly in terms of external and political vulnerability.

A wide range of emerging countries recorded an improvement in domestic vulnerability indicators in the last year, in areas such as corporate and household

indebtedness and housing prices. However, there is a wider dispersion in political and external vulnerability indicators (statistical appendix). At the same time, the growth outlook for these economies has followed an upward trend and is expected to stabilize around 5% from 2019 onward (*World Economic Outlook*, April 2018).

The main source of concern in the medium term is the indebtedness of the nonbank system in China. These loans—which carry a higher risk because they are off the balance sheet (Ahmed, 2017)—slowed in the most recent period, but they are still high as a share of GDP. Consequently, a possible financial deterioration of the Chinese economy could trigger an increase in global volatility, which could have a significant impact on the cost of external financing for Latin American economies (Alfaro et al., 2017).

As of the cutoff date of this *Report*, Argentina was experiencing substantial financial market volatility, leading the monetary authority to implement a series of interventions to stabilize the foreign exchange market. In this context, the Argentine government initiated negotiations for financial support from the IMF.

A number of geopolitical events have emerged recently, highlighting the possibility of a trade war between the United States and China.

In early March 2018, the United States announced a series of tariffs on products from several countries, including China. Subsequent announcements by both parties have increased uncertainty in the face of a possible trade war between the two countries, which would have both real and financial impacts at global level (box I.1). With regard to the latter, greater uncertainty could affect global financial asset prices.

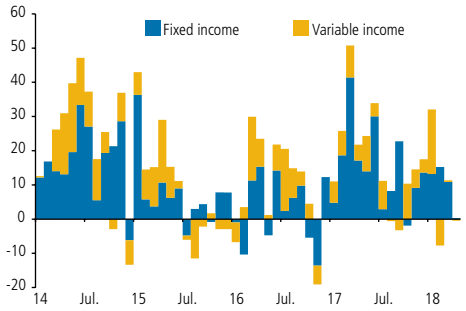
LOCAL FINANCIAL SITUATION

Local asset prices reflect favorable domestic financing costs, in line with the higher global risk appetite.

The local money market has operated normally. Interest rates on 30-day deposits have been in line with the evolution of the monetary policy rate and have not varied much among issuers (figure I.8). Onshore dollar rates recorded a significant and unusual increase in December 2017. The Central Bank responded by offering currency swap auctions to mitigate possible contagion to the money market[1]/. Ultimately, the increase was transitory and did not have much impact on the cost of bank financing.

[1]/ For details, see the Central Bank's press release published on 15 December 2017.

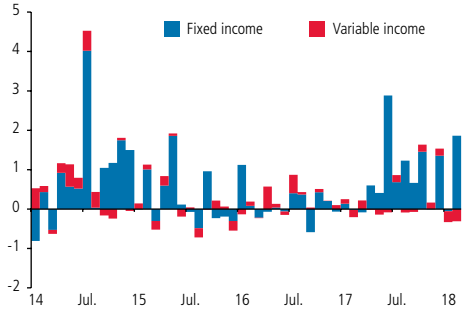
FIGURE I.6
Portfolio inflows to emerging economies (*)
(US$ billions)



(*) Emerging economies: Brazil, Bulgaria, Chile, China, Czech Rep., Hungary, India, Indonesia, South Korea, Malaysia, Mexico, Philippines, Poland, South Africa, Thailand, Taiwan, Turkey, and Ukraine.

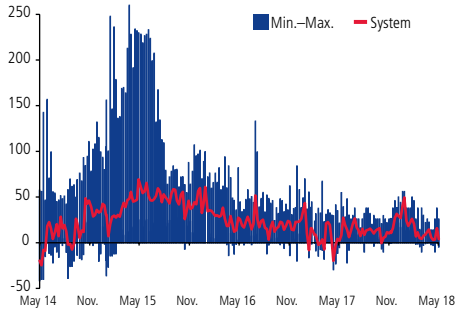
Source: Institute of International Finance.

FIGURE I.7
Portfolio inflows to Chile
(US$ billion)



Source: Central Bank of Chile.

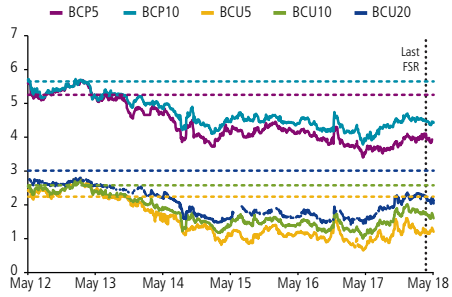
FIGURE I.8
30-day deposit rates (*)
(basis points, spread over MPR)



(*) 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 Santiago Stock Exchange.

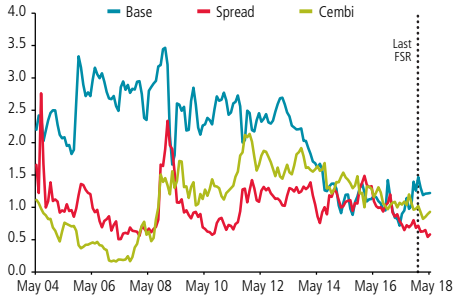
FIGURE I.9
Local sovereign bond interest rates (*)
(percent)



(*) Horizontal lines indicate the 2004–2016 average of the respective series.

Source: Central Bank of Chile.

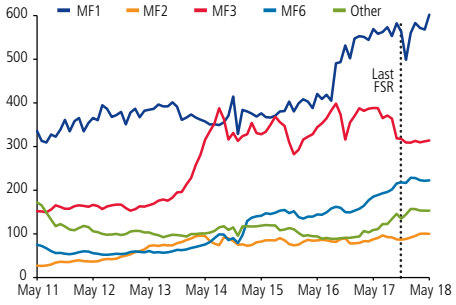
FIGURE I.10
Private bond rates (*)
(percent)



(*) Transactions on AA UF-denominated bonds from financial and nonfinancial firms, with a maturity of 4 to 6 years.

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

FIGURE I.11
Mutual fund holdings (*)
(UF million)



(*) Type of fund: MF1: Debt with a maturity of 90 days or less; MF2: Debt with a maturity of 365 days or less; MF3: Medium- and long-term debt; MF6: Free investment; Other: MF4, MF5, MF7, and MF8.

Source: Financial Markets Commission (FMC).

The spreads on long-term bank and corporate debt with different ratings were stable, as were sovereign rates, at levels near their historical lows (figures I.9 and I.10). The favorable domestic financing conditions continued to support dynamic local issues (chapter II).

Other local asset prices evolved as expected, albeit with some momentary fluctuations. In particular, the IPSA grew near 9% after the cutoff of the last FSR, with a few days of higher volatility in February. The peso appreciated against the U.S. dollar around 4% between November 2017 and the cutoff date of this *Report*. Nevertheless, internal estimates suggest that neither the IPSA nor the peso-dollar exchange rate has deviated significantly from benchmark values.

The size of type 3 mutual funds (MF3) has been stable at high levels, with a decrease in valuation risk at the margin. Nonresident (NR) investors continued to increase their share in the sovereign debt market.

Since the cutoff of the last FSR, mutual fund (MF) holdings were stable. In the period, type 1 funds (MF1) grew 1.6%, while type 3 funds (MF3) contracted almost 2.5%, though they remain high by historical standards (figure I.11). The average duration of MF3 decreased over the past quarters, thereby reducing the exposure to rate risk reported in the last FSR. However, internal estimates indicate that a scenario involving increases in medium- and long-term interest rates could trigger sharp fund withdrawals.

The pension funds (PFs) continued to reduce their exposure to local sovereign bonds and time deposits, shifting to private bonds (mainly from banks) and local variable-income and increasing their overseas investments (figure I.12). This has occurred against a backdrop of massive movements between the different types of funds in the current year (table I.2).

TABLE I.2
Weekly transfers between pension funds
(US$ million)

Month Week	Jan. 2	Jan. 4	Feb. 6	Feb. 8	Mar. 10	Mar. 12	Apr. 14	Apr. 16	May 18
Type A fund	206	-61	-508	79	458	-1.418	-417	-173	28
Type C fund	61	59	-75	46	70	1.108	-626	-34	14
Type E fund	-330	86	851	-166	-703	955	985	267	-41

(*) Data through 3 May 2018.

Source: Superintendence of Pensions.

The share of MFs and PFs in the local sovereign debt market remains high vis-à-vis the historical average, even after last year's disinvestment. At the same time, NR investors increased their share in this market, from 3.5% at year-end 2016 to around 11% in March 2018 (figure I.13). The increased participation was concentrated almost exclusively in five- and ten-year General Treasury bonds and, as discussed in the last FSR, reflects factors related to new larger-volume issues, the simplification of reporting to the Central Bank, and legal and regulatory changes that have facilitated the operation of international custodians in Chile.

The life insurance companies (LICs) did not introduce any major changes to their overseas investment portfolios, while the rebalancing of local assets has increased their exposure to variable-income instruments.

As of year-end 2017, the LICs had not adjusted the composition of their investment portfolio significantly, with only moderate portfolio rebalancing toward sovereign bonds, variable-income instruments, and real estate investments, to the detriment of local private bonds. The greater variable-income exposure of the portfolio—which increased from 7.7 to 8.7% of the total in the last year—should be monitored, given the possibility of an adjustment in these prices. Finally, as reported in the last FSR, the LICs kept their overseas investment at around 14% of the total portfolio as of the last quarter of 2017, with a similar risk profile, despite the increase in the overseas investment limit implemented by the Central Bank in March of last year.

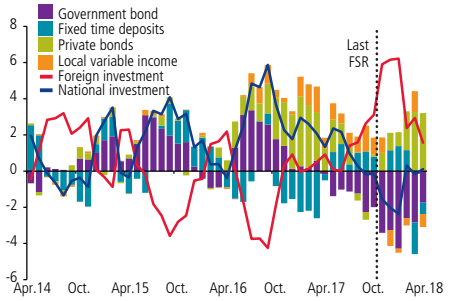
EXTERNAL THREATS TO FINANCIAL STABILITY

Changes in the speed of withdrawal of the monetary stimulus in developed economies, together with spread decompression (term and risk), could increase local long rates significantly.

As mentioned, the higher growth in the developed countries and the higher forecast for the next two years have translated into expectations of a gradual withdrawal of the monetary stimulus in these economies. However, the monetary policy normalization could occur faster than expected, to the extent that the effect of a more expansionary U.S. fiscal policy on the price level has not been fully incorporated. Members of the Fed and the market both pointed to faster FFR hikes after the May meeting, which will depend on the future evolution of inflation in the U.S. economy.

Risk and term spreads could increase significantly in the event of greater uncertainty about the expected trends in medium-term growth, inflation, and the FFR. Moreover, the need to fund the U.S. fiscal deficit has come just when the Fed is reducing its bond holdings, which, together with lower foreign demand for U.S. debt, could put upward pressure on medium- and long-term

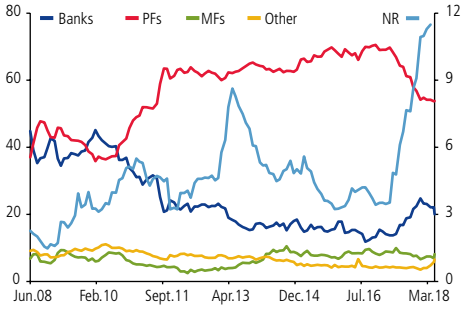
FIGURE I.12
Pension fund investment flows (*)
(US$ billion, three-month moving sum)



(*) Net movements per instrument, including purchases, sales, redemptions, and drawings and excluding derivative maturities, rebates, dividends, and coupon cuts.

Source: Superintendence of Pensions.

FIGURE I.13
Sovereign debt, by type of investor (*)
(percent)



(*) Data on NR investors are through March 2018.

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

sovereign rates. As a result, the external scenario has become more complex than described in the last FSR.

Internal estimates indicate that under a scenario of a 75 bp increase in the FFR and a 200 bp decompression of term and risk spreads within a period of 12 months, the local long-term interest rate would increase about 70 bp toward the end of 2018[2]/.

Sharp increases in local long rates could cause institutional investors to unload bonds, which would increase long rates even further.

Although the MFs and PFs have reduced their sovereign fixed-income investments at the margin, their relative share in this market remains high. Consequently, given the sensitivity of MF3 and type E PFs to changes in long-term interest rates, a sudden increase in long rates could trigger massive outflows from these funds and the corresponding sale of these instruments in secondary markets, which would exacerbate the initial rate increase. The impact will depend on the balance between the supply and demand for these securities, as well as on the reaction of nonresident investors, who are also highly sensitive to the long-term interest rate.

Risk appetite remains high according to various asset prices, but the recent upswing in global volatility adds a note of caution, given the potential impact on risk and term spreads.

In general, asset prices, spreads, and volatility indicators all point to a strong appetite for risk as of the cutoff date of this *Report*. However, the recent uptick in the VIX is a reminder that there could be new increases in this index in response to the materialization of different events, including geopolitical developments. This could lead to the decompression of term and risk spreads, with an impact on global asset prices.

2/ The risk scenario considers three 25-bp increases in the FFR at the June, September, and December 2018 meetings, a 100-bp increase in the term premium associated with the ten-year U.S. Treasury bond, and a 100-bp increase in the EMBI Chile.

BOX I.1
RISKS ASSOCIATED WITH THE U.S.-CHINA TRADE DISPUTE

In 2017 and in the final/past months, the resurgence and escalation of global protectionist measures have increased the risk of a possible trade war between the United States and China. Such a conflict could result in a slowdown in the global recovery, a deterioration of external financial conditions, and a risk for financial stability. This box describes the recent developments in the dispute and the main points of confrontation, providing a qualitative analysis of the potential effects on the external scenario and global financial conditions, as well as on the main financial variables in Chile.

Background

The recent trade tensions between the two economies materialized on 8 March, when the United States imposed tariffs on steel and aluminum imports (25 and 10%, respectively) from a number of countries, including China (table I.3). Days later, a series of trading partners were temporarily excluded from the measure, which together account for nearly 50% of U.S. steel imports.

TABLE I.3
Timeline of the U.S.-China trade dispute

Date	Announcement
08-Mar-18	U.S. imposes tariffs on steel and aluminum imports from several countries.
22- Mar -18	U.S. proposes the imposition of tariffs on a series of products from China in response to "unfair trade practices."
23- Mar -18	China announces retaliatory measures.
02-Apr-18	China begins to apply the first retaliatory tariffs on U.S. imports.
04- Apr -18	China announces a new list of products to be hit with an additional 25% tariff.
05- Apr -18	U.S. announces the assessment of new tariffs on specific products from China totaling US$100 billion.

Source: Bloomberg.

On 22 March, the United States announced a new 25% duty on a series of other products representing about US$50 billion in annual imports from China. The U.S. government also announced the evaluation of new restrictions on Chinese investments and threatened to complain to the World Trade Organization about the country's violations of intellectual property rights. On 2 April, China retaliated with tariffs on a variety of U.S. products, including 25% on pork and around 15% on another 120 products (including fruit).

Finally, on 5 April, the U.S. government asked the U.S. Trade Representative to evaluate additional measures for imposing tariffs on US$100 billion of imports from China, over and above the initial US$50 billion, such that China would be hard pressed to implement a trade retaliation of the same magnitude[1]/. Going forward, this could lead to other measures unrelated to trade, such as selling off U.S. Treasury bonds currently held in China's international reserves and/or changing the conditions for investment in China by U.S. companies[2]/.

Throughout this process, there was a mixed reaction by the financial markets to the various announcements. However, around the announcement of 22 March and the subsequent retaliation from China, the S&P 500 and other market indices fell to around the levels recorded in February.

Recent literature on protectionism

Numerous studies try to quantify the effects of an increase in global protectionism. In general, the results depend on the extent of the trade dispute and the sensitivity of the markets considered. An OECD study (2010) shows that for every additional dollar of tariff protection from a group of economies (Eurozone, United States, Japan, and China), exports contract US$2.16, on average, and world income by US$0.73. A report by the Peterson Institute for International Economics (Hufbauer et al., 2016) analyzes the impact of measures announced during the U.S. presidential campaign, based on a scenario involving an increase in tariffs on Mexican imports to 35% and on Chinese imports to 45%. According to the study, the United States would enter a recession after three years of retaliation in kind, due to the resulting decline in efficiency, higher inflation, and increases

[1]/ According to the Bureau of Economic Analysis, an agency of the of the U.S. Department of Commerce, goods exports from the United States to China were around US$130 billion at year-end 2017.
[2]/ The news has been fairly positive in the latter case, however, in that the Chinese authorities have announced a timeline for relaxing ownership limits for nonresidents in the financial and automotive sectors. These are two industries in which the United States has interests, and tensions have eased since the announcement.

in the Fed's interest rate. The IMF *World Economic Outlook* for October 2016 estimates the effects of a gradual increase in world tariffs to 10%. According to estimates, this scenario would lower global output by almost 2% in the long term, relative to the baseline scenario. Finally, Kutlina and Lakatos (2017) estimate that a coordinated withdrawal from free trade agreements at the world level would generate a loss in global income of 0.3% in three years relative to the baseline scenario, of which 75% would be concentrated in regions like emerging Asia and Latin America.

Possible risks to financial stability

China has nearly US$1.2 trillion in U.S. Treasury bonds as of February 2018, which is about 20% of total U.S. Treasury securities held by foreign countries and about 8% of U.S. public debt (figure I.14). This could imply a global risk in the event of a fire sale—a possible retaliation in the trade war—with the resulting impact on long-term U.S. Treasury interest rates.

FIGURE I.14
Stock of U.S. Treasury bonds held overseas
(US$ billion)

Source: U.S. Department of the Treasury.

Warnock and Warnock (2009) and the IMF (2011) quantify these effects. The former study estimates that foreign sales (purchases) of U.S. Treasuries equivalent to 1 percentage point of U.S. GDP would be associated with an increase (decrease) of 19 bp in the ten-year U.S. Treasury bond rate[3]/. The latter paper estimates that if China reallocated US$100 billion of its reserves (8.4% of the total) from U.S. Treasury bonds to emerging sovereign bonds, U.S. long rates would rise by 12 bp[4]/. A more drastic reduction in bond holdings would have a larger impact, due to the many sources of nonlinearity involved—in particular, the size of the operation, the speed of implementation, how the asset sale is communicated to the market, and the current supply and demand conditions in the market for U.S. fixed-income securities, with the latter also affected by the actions of the Treasury and the Fed.

A U.S.-China trade war could have significant real effects on the Chilean economy. Chile is a small open economy, with a large share of exports as a percent of GDP (around 25% in nominal terms). Moreover, nearly 40% of total nominal exports are sold to the two economies in question (around 27% to China and 13% to the United Sates). The local impact of a trade war would be magnified or diminished depending on the type of exports that are shipped to the affected regions. The Chilean copper industry could be negatively affected to the extent that copper is an input used to produce goods that are exported from China to the United Sates. In contrast, other industries (such as agriculture or the wine industry) could benefit from the trade barriers imposed on their U.S. competitors.

The effects through the financial channel would largely be felt via increases in the term premium component of external rates. Internal estimates indicate that a decompression of the term premium of 100 bp in 12 months—deriving from increased uncertainty in the market and/or the sale of U.S. Treasury bonds by China—combined with a permanent contraction of 0.2% in world GDP would imply an increase in the domestic long-term rate of around 50 bp after three years.

In sum, a trade dispute between the United States and China could have substantial effects for Chile. Depending on the intensity of the retaliation, the available estimates for a risk scenario point to a significant reduction in world growth, with emerging countries—and Latin America in particular—bearing the brunt of the impact. In the case of Chile, the main effects would translate into an increase in financing costs.

[3]/ This result could indirectly estimate the effect of a bond sale by China, given that the country's holdings are currently equivalent to approximately 7% of U.S. GDP.
[4]/ For reference, Bonis et al. (2017) estimates that for each US$100 billion reduction in bond holdings on the Fed's balance sheet (Treasury bonds and mortgage-backed securities), the 10-year Treasury rate would decrease approximately 4 bp, through the term premium.

II. CREDIT USERS

At year-end 2017, the financial position of local firms had not changed substantially relative to the last FSR, and credit risk indicators remained low, although some sectors showed signs of deterioration. In the residential real estate sector, new home sales were stable, while the growth rate of prices was somewhat higher than in past quarters. Households continued to take on more debt, and some indicators point to a tighter financial margin. The fiscal sector also recorded an increase in debt, reducing its buffer.

FIRMS

Corporate debt has been declining since late 2015, reaching 111% of GDP at year-end 2017 (figure II.1).

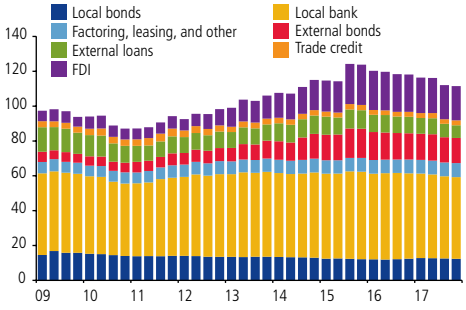
The debt of firms decreased 1.4% in real annual terms in the fourth quarter of 2017. This fall was driven the reduction in external financing, which, in turn, was largely explained by the appreciation of the peso over the course of last year. With regard to local debt, commercial loans were essentially flat, as in past quarters (chapter III). Factoring, leasing, and other sources of financing remained dynamic, providing a significant contribution to growth as of year-end (table II.1).

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

	2012	2013	2014	2015	2016	2017				Share	Contribution to growth
	IV	IV	IV	IV	IV	I	II	III	IV		
Local debt	7.2	6.9	1.8	3.8	1.9	2.7	2.3	1.9	1.3	60.4	0.8
Bank and other loans	9.4	7.3	2.9	5.4	1.1	1.5	0.8	0.5	0.7	49.2	0.3
Commercial loans (2)	9.5	7.4	2.4	5.8	0.8	1.4	0.1	-0.4	-0.2	42.0	-0.1
Factoring, leasing, and other	8.5	6.9	6.1	3.0	3.1	2.4	4.9	6.8	6.4	7.2	0.4
Local publicly traded securities	-0.8	5.3	-2.8	-3.3	5.6	8.5	9.9	8.4	4.0	11.1	0.4
External debt	9.4	26.7	27.3	22.2	-6.0	-5.4	-2.8	-5.1	-5.2	39.6	-2.2
Loans	0.3	2.9	15.2	4.3	-8.1	-6.2	-5.6	-14.5	-19.7	6.5	-1.6
Trade credit	-19.1	-0.7	-3.7	-1.2	-4.1	5.3	11.5	-0.4	7.0	2.6	0.2
Bonds	13.6	42.3	40.8	21.8	-7.2	-4.3	0.6	-0.1	-0.1	12.9	0.0
FDI-related loans	36.0	48.4	33.1	37.8	-4.4	-7.1	-5.8	-5.1	-4.1	17.6	-0.7
Exchange rate	-7.7	11.0	15.8	14.9	-5.3	-3.1	-2.3	-6.4	-4.5		
Total	**7.9**	**12.9**	**10.5**	**11.0**	**-1.5**	**-0.7**	**0.2**	**-1.0**	**-1.4**	**100.0**	**-1.4**

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

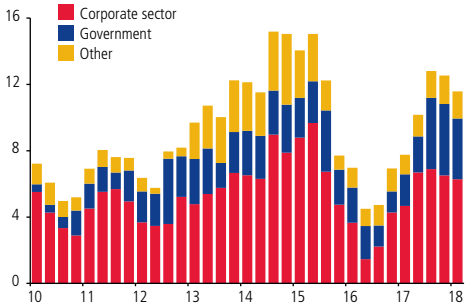
FIGURE II.1
Total debt with nonbank firms (*)
(percent of GDP)



(*) Based on firm-level data, except "Factoring, leasing, and other," 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.

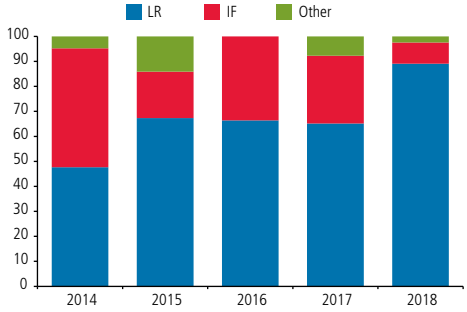
FIGURE II.2
Gross bond issues by nonbank firms (*)
(US$ billion, 12-month moving sum)



(*) Other includes local and overseas issues by firms in the financial services and mining sectors that report to the FMC, as well as issues by nonreporting firms.

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

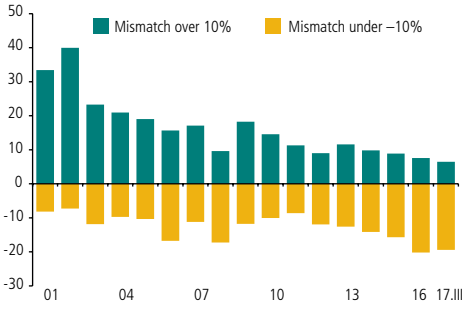
FIGURE II.3
Corporate bond issues: Use of resources (*)
(percent)



(*) Self-assessment reported by the FMC and in bond prospectuses. LR: Liability refinancing. IF: Investment financing.

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

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 FMC.

As reported in past FSRs, the gross issue of local and external bonds has increased significantly since mid-2016 (figure II.2). This is consistent with the favorable financing conditions, both domestically and overseas. In particular, local bond spreads are near their historical lows as of the cutoff date of this *Report* (chapter I). In this context, the funds received through these debt issues have largely been allocated to refinancing liabilities (figure II.3), such that the net debt flow has remained low (statistical appendix).

Financial indicators for the corporate sector are similar to those reported on past FSR (table II.2).

At year-end 2017, the profitability, debt-equity ratio, and interest coverage ratio of firms that report their financial statements to the Financial Markets Commission (FMC) were around the same as the previous year. The currency mismatch was also stable relative to past periods (figure II.4 and statistical appendix).

TABLE II.2
Financial indicators for the FMC corporate sector (*)
(percent, times)

	2009	2010	2011	2012	2013	2014	2015	2016	2017
Profitability									
Average	7.6	8.2	6.9	6.2	5.8	6.1	5.9	6.7	6.6
Median	6.6	7.5	7.5	6.1	6.2	5.7	5.4	5.6	5.3
Indebtedness									
Average	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Median	0.6	0.5	0.5	0.6	0.7	0.6	0.6	0.6	0.6
Interest coverage									
Average	3.9	4.4	3.5	3.1	2.9	3.1	3.1	3.3	3.3
Median	4.0	4.3	3.9	2.8	3.1	2.8	3.1	3.0	2.9

(*) Data as of December of each year. Excludes financial services, mining, and state-owned companies. Profitability (percent) is defined as earnings before interest and taxes (EBIT) over total assets. Indebtedness (times) is defined as financial debt over equity. Coverage (times) is defined as EBIT over annual financial expense.

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

As discussed in the last *Report*, stress tests on the corporate sector indicate that a deterioration of financing costs would have a relatively limited impact on firms. Specifically, a 200bp increase in the interest rate and a 20% depreciation of the peso would not increase firms' financial expense significantly, because a substantial share of corporate debt is medium and long term, and the firms have an appropriate foreign currency level of hedging.

The commercial portfolio in arrears, measured by the arrears rate (AR), continued its upward trend (figure II.5).

The AR has been increasing steadily since late 2016, due to the poor performance of firms in both productive and services sectors. This development is consistent with the less dynamic economy in recent years, which has affected firms' debt service

capacity. While in general the AR remains low by historical standards, some sectors have recorded a larger deterioration. Looking only at firms that use local banking services and that have not issued bonds or contracted external debt, the AR has increased, most notably in the real estate and other financial services sectors (figure II.6). In both cases, there has been an increase in the number of firms that have fallen into arrears, as well as firms with installments that are over a year past-due. The latter, which have sunk further into arrears, generally have lower arrears clearance rates (see FSR, Second Half 2015, box III.1). Consequently, a possible deterioration of these firms—for example, if the sector does not recover in line with the rest of the economy—could imply writing off the loans and liquidating the associated collateral, which could potentially have systemic consequences (see the FSR Second Half 2017, box III.2).

In sum, at year-end 2017, the aggregate debt level of firms as a share of GDP decreased relative to the cutoff date of the last Report, explained mainly by the external component. The favorable external and internal financing conditions gave rise to more dynamic gross bond issues, which were mainly used to refinance liabilities. At the same time, the recent period saw an increase in the commercial portfolio in arrears, with both new firms falling into arrears and others getting further behind. Overall, the deterioration has been limited and the arrears rate remains low from a historical perspective, but there are signs of vulnerability that need to be monitored. In particular, sectors that have recently had an increase in arrears could deteriorate further under a scenario where sectoral output does not grow in line with the rest of the economy.

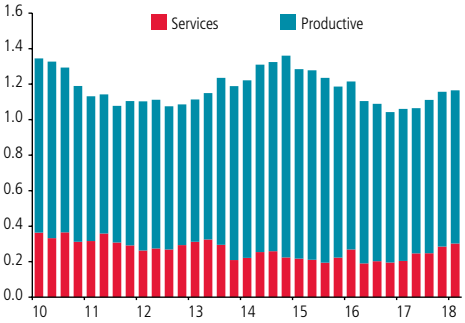
REAL ESTATE SECTOR

Since the last FSR, new home sales have been stable, while home prices increased, but at a lower rate than in the 2010–2015 cycle.

In the first quarter of this year, new home sales in Santiago remained around 8,000 units per quarter, which is around the average of the last decade (figure II.7). A large share of these units were completed or near completion at the time of sale, with immediate or quick delivery. In terms of supply, the stock of homes is still above the historical average, but some of these are in the early stages of construction, which should give firms in the sector some degree of flexibility in inventory management.

At year-end 2017, house prices grew above the rate recorded in the first quarters of last year, both at the national level and in the Metropolitan Region (MR). However, as discussed in the last FSR, this increase is part of a more moderate growth phase, after several years of significant price appreciation. Thus, in the 2010–2017 period, house prices grew approximately 50% in real terms (figure II.8). For 2017, the

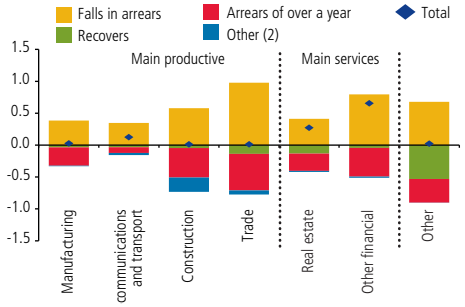
FIGURE II.5
Arrears rate by sector (*)
(percent of loans)



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

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

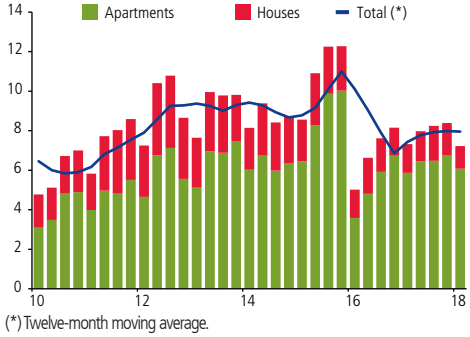
FIGURE II.6
Change in the arrears rate (1)
(1/1000 of total commercial debt)



(1) Change between September 2017 and March 2018.
(2) Includes changes not covered in the previous categories.

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

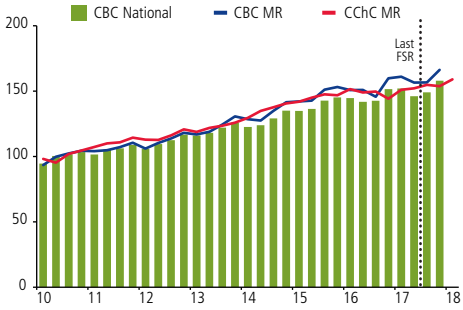
FIGURE II.7
New home sales in Santiago
(thousands of units)



(*) Twelve-month moving average.

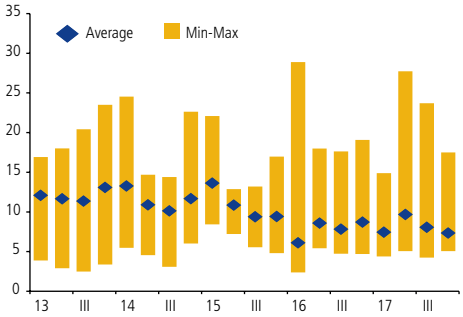
Source: Central Bank of Chile, based on data from the CChC.

FIGURE II.8
Real house prices
(fixed-based index: 2010=100)



Sources: Central Bank of Chile and CChC.

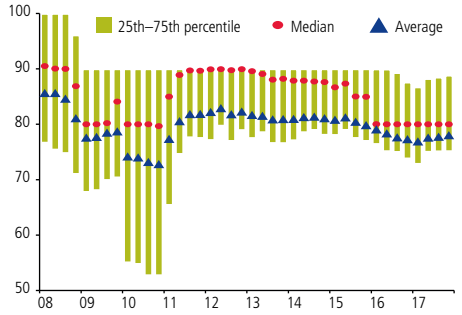
FIGURE II.9
Contract cancellation rate (*)
(percent of sales commitments in the same quarter)



(*) 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 FMC.

FIGURE II.10
Loan-to-value ratio
(percent)



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

Central Bank's national house price index (HPI)—which considers sales deeds on both new and used properties—increased 4.2% annually, with some variation between regions. In particular, the MR recorded somewhat higher annual growth in 2017, at around 5.5%. This trend continued in the first quarter of 2018 according to the Chilean Chamber of Construction (CChC), which maintains a price index covering new homes only, which are not necessarily deeded. These trends are confirmed using a price index based on repeat sales (box II.1).

In 2017, the contract cancellation rate generally remained low for companies that report to the FMC, although there is some heterogeneity (figure II.9). In turn, firms that do not report to the FMC—which rely primarily on bank financing—recorded an increase in arrears on commercial loans, due to a poorer performance by some companies in this sector (figure II.6).

The loan-to-value ratio is still concentrated around 80%.

As discussed in past FSRs, after the SBIF modified the regulations on mortgage lending, most banks adjusted their mortgage loan-to-value ratios to 80% or less, a trend that continued in early 2018 (figure II.10). The growth of mortgage flows remained positive, albeit with a slowdown in the most recent period (chapter III). This is in line with the dynamic contract signatures in late 2015 and with the average completion time for real estate projects.

Mortgage debtors with more than one loan continued to gain share.

As mentioned in the last FSR, the number of debtors with more than one bank mortgage continued to increase as a share of total debtors, reaching almost 30% at year-end 2017 (figure II.11). This trend, which has been going on for several years, could reflect an increase in retail investors, who, in the search for higher returns outside the traditional financial markets, are using residential properties as an investment asset, under a buy to let strategy. This trend, which has also been seen in other economies, should be monitored, given that a larger share of these investors could exacerbate price fluctuations in turbulent times (Haughwout et al., 2011; Albanesi et al., 2017). This possible increase in investors in the housing rental market has taken place in a context where the gross rate of return—that is, not taking into account vacancies, maintenance costs, taxes, and capital gains—has been stable at just under 6% (statistical appendix).

The office vacancy rate remains low.

In the office market, the vacancy rate remained low in the prime office segment (A/A+), at 6%. While this is a little higher than at year-end 2017, it is well below the level of past years, when vacancy rates were around 9%. For class B office space, the vacancy rate was under 10%, thus continuing the downward trend recorded throughout 2017 (statistical appendix). However, new supply could put upward pressure on the vacancy rate in the coming quarters. Rental prices in the office market, for both the A and B segments, were around the same level as on the cutoff date of the last *Report* (0.53 and 0.42 UF per square meter, respectively).

In sum, indicators of the residential real estate market reflect stable development after a period of adjustment, in terms of both prices and sales. Contract cancellation rates remained low for real estate companies that report to the FMC, while there was an increase the portfolio in arrears among some nonreporting companies. The upward trend in the share of bank debtors with more than one mortgage continued, which could represent a vulnerability in the event of a sudden change in house prices or disruptions in the rental market. A worsening of the labor market could represent a significant risk for this segment, as it would affect both the rental market and second mortgages.

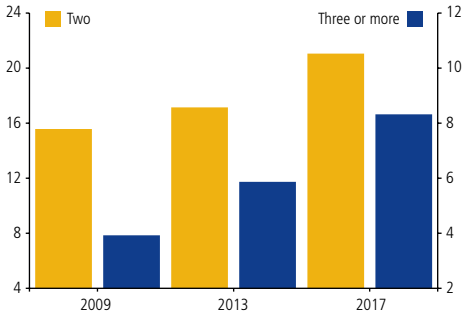
HOUSEHOLDS

Household debt continued to grow, reaching 46% of GDP at year-end 2017.

Administrative data on bank debtors indicate that both household debt-to-income and debt service ratios have increased in the last two years (SBIF, 2017). The latter has risen across all income segments, reaching 25% of income in the total sample (figure II.12). The increased debt, in turn, is concentrated in relatively higher-income households (figure II.13). These data reflect an increased use of credit lines by some debtors relative to their past patterns, with a corresponding reduction in their financial cushion.

The dynamic growth of bank mortgage debt reported in the last FSR continued in the first quarter of 2018, with a real annual growth rate of over 8%. This increase was mainly associated with larger mortgages, such that the number of debtors grew at a lower rate (figure II.14). This is consistent with both the recent trend in house prices and the increase in the share of debtors with more than one mortgage (figures II.8 and II.11). At year-end 2017, nonmortgage debt had a real annual growth rate near 7%. Over the course of the past year, there was a shift in the composition of consumer debt away from bank credit and in favor of nonbank lenders (table II.3).

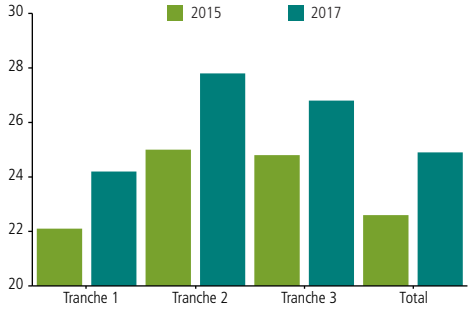
FIGURE II.11
Number of bank mortgage loans per debtor (*)
(percent of total)



(*) As of December of each year. Figures weighted by debt. Preliminary data for the fourth quarter of 2017.

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

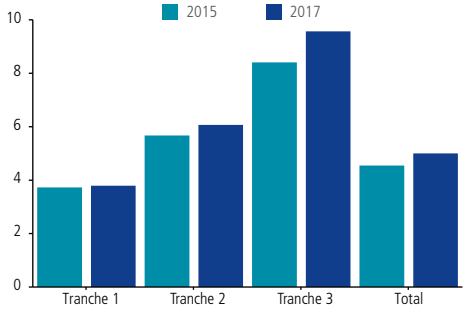
FIGURE II.12
Median debt service ratio by income segment (*)
(percent of monthly income)



(*) June of each year. For details, see the figure set.

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

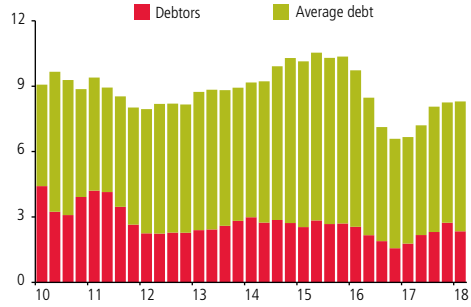
FIGURE II.13
Median indebtedness by income segment (*)
(times monthly income)



(*) June of each year. For details, see the figure set.

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

FIGURE II.14
Bank mortgage debt
(real annual change, percent)



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

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

	2010 IV	2011 IV	2012 IV	2013 IV	2014 IV	2015 IV	2016 IV	2017 I	2017 II	2017 III	2017 IV	2018 IV	Contribution to growth	Share
Mortgage	**6.8**	**7.3**	**7.6**	**8.9**	**9.9**	**9.6**	**6.7**	**6.8**	**7.3**	**8.0**	**8.1**		**4.7**	**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	4.3	52.7
Nonbank	-7.2	0.9	2.5	6.9	4.7	1.1	7.9	7.9	7.8	7.8	6.4		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**		**2.9**	**42.1**
Bank consumer	9.4	14.2	9.7	9.1	3.3	3.3	5.8	5.8	5.0	4.9	4.3	3.8	1.0	21.3
Nonbank consumer (1)	4.9	-0.2	-6.7	2.4	0.7	1.0	5.5	6.8	7.0	7.9	8.1		0.7	9.1
Other (2)	13.5	19.5	18.9	13.6	7.0	15.7	9.8	11.0	9.7	11.3	10.8		1.2	11.7
Total	**7.6**	**8.8**	**7.3**	**8.7**	**7.1**	**7.9**	**6.7**	**7.0**	**7.0**	**7.7**	**7.6**		**7.6**	**100.0**

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

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

The household arrears rate has increased for bank consumer loans, a sign that the risks reported in past FSRs are still present. These are concentrated in the future evolution of the labor market.

Bank default indicators were relatively stable for mortgage loans, but rose for consumer loans (chapter III and statistical appendix). For nonbank lenders, the consumer portfolio in arrears, which historically has been higher than for bank lenders, was relatively stable. Nonbank lenders account for an increasing share of total household debt, so a scenario characterized by a weakening of the labor market could lead to an expansion of arrears in this sector (box II.2). In contrast, a scenario involving higher interest rates would have a limited effect on household payment capacity, since most mortgages are contracted at a fixed rate and a relatively long maturity. In the case of consumer loans, the impact of higher rates would mainly be channeled through credit lines, affecting households that rely strongly on this product. These impacts could be amplified given the total possible effects of a rate hike cycle, mainly through the labor market channel.

The absence of a consolidated household credit registry constitutes a vulnerability for lenders.

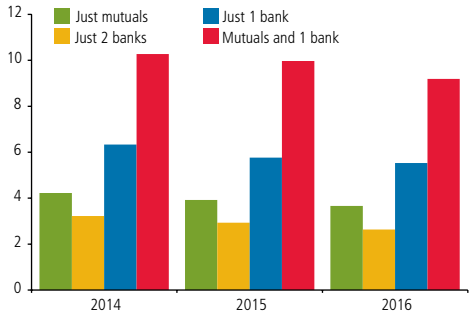
Several studies show that the total debt level is an important factor for determining the probability of default[1]/. The availability of this information is thus necessary for making an accurate credit assessment. When lenders do not know the total debt of a given household, they may underestimate the risk. For example, in the case of

[1]/ Stansell et al. (1976); Vandell (1978); Ingram et al. (1982); Campbell et al. (2015); Chan et al. (2015), etc.

mortgage debt, banks and mutual societies report to different supervisors, which do not pool the information; as a result, banks only have access to information on bank mortgages, and mutuals, on mutual mortgages. And in fact, debtors with both bank and mutual loans have a significantly higher default rate than debtors with loans from just one type of lender (figure II.15). While there are relatively few debtors with mortgages from multiple types of lenders, that is not the case with consumer loans. Consequently, the lack of a consolidated credit registry constitutes a defect that must be addressed as soon as possible (box V.1). Moreover, nonbank consumer lenders are usually funded through commercial loans, which means that the banking sector has an indirect exposure to the household sector through this channel (chapter III).

In sum, household debt continued to grow, driven mainly by the mortgage component, although nonbank consumer debt also increased. The traditional mortgage credit risk indicators remained low and stable, whereas the consumer portfolio saw an increase in arrears. In this context, a greater weakening of the labor market could reduce the household financial cushion further, potentially intensifying household default.

FIGURE II.15
Mortgage default rate (*)
(percent of debtors in each group)



(*) Arrears of 90 days or more. Data for September of each year. The available data do not allow the identification of debtors with more than one loan in a given bank. The share of each group, based on the number of debtors, according to the latest available data is as follows: just one bank: 89.2%; just two banks: 5.4%; just mutual: 4.4%; and mutual and one bank: 0.3%.

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

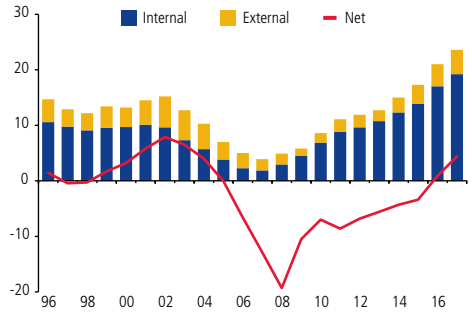
CENTRAL GOVERNMENT

Over the last ten years, the central government's debt level has steadily increased.

At year-end 2017, the gross debt of the central government was 24% of GDP, an increase of 3pp in the last year (figure II.16). The net debt also increased, to 4.4% of GDP. The growth of gross debt was largely explained by local debt, which reached US$56 billion (versus US$43 billion a year earlier). The majority of the debt is denominated in local currency (45% in UF and 37% in pesos). In foreign currency, the main denominations are dollars (10%) and euros (7%). With regard to maturity, 25% of total debt comes due in less than four years, 31% in five to nine years, and the remaining 44% in over 10 years.

The higher public debt level not only reduces the fiscal buffer, but could also affect some investors' perception of the country's sovereign risk. This could be significant given the increase in the share of nonresident investors in the local bond market (figure I.13), in a context of a low sovereign spread (EMBI) that has been following a downward trend (figure I.5).

FIGURE II.16
Central government debt
(percent of GDP)



Source: Dipres.

BOX II.1
A REPEAT-SALES HOUSE PRICE INDEX

The house price index (HPI) published regularly by the Central Bank of Chile since 2014 (see CBC, 2014) is calculated using a stratification method and census data on housing transactions. The two data sources are Form 2890 (F2890) for declaring the disposal and registration of real estate and the nonagricultural real estate survey (CBR), which are available with a one- and two-quarter lag, respectively.

To improve the timeliness of the publication of the house price index (that is, to reduce the current two-quarter lag), this box reports the calculation of a house price index using a repeat-sales methodology (RHPI). This consists in measuring the change in price when used homes are resold. With this approach, it is not necessary to use the CBR data, as the data from Form 2890 are sufficient. Therefore, the RHPI has a lag of just one quarter. A second reason for calculating the RHPI is to improve the comparability of prices. The fundamental challenge for constructing house prices is that the goods sold in consecutive periods are not homogeneous—as are, for example, the products included in the CPI. Thus, while the stratification method tries to establish comparability by constructing strata, and the hedonic method controls for the noncomparable component, the repeat-sales method exploits the fact that the best comparison for a real estate property is the same property. The one weakness with the assumptions of the methodology is that it does not take into account depreciation from the use of the building. This weakness, however, should be partially offset by homeowners' investment in improvements, renovations, and replacements necessary to maintain the quality of the home.

Results of the repeat-sales index

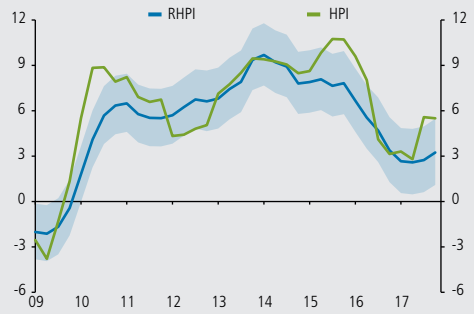
In this box, we calculate the value-weighted arithmetic price estimator proposed by Shiller (1990). This choice has at least two advantages. First, the use of a value-weighted estimator is justified by the fact that less expensive homes in Chile have risen in value more (on average) than more expensive homes. Second, an arithmetic index is preferable because some transactions may be well below market prices. These values would have a distortionary effect if the chosen index was geometric. In contrast, with a large sample, the arithmetic index is not significantly affected by this fact.

The analysis presented in this box is restricted to the Metropolitan Region. The main reason for this is that in order for the estimation to be reliable, there needs to be a reasonably large volume of used housing transactions in all periods, for the reasons cited above. Since 2011, total repeat sales in the

Metropolitan Region have exceeded 20,000 units in all quarters, with a maximum of 36,000 in 2015.

In line with the HPI, the RHPI shows a price growth phase that started in 2010 and slowed in 2016 (figure II.17). Taking the long view, the accumulated change between 2010 and 2017 is 60% for the HPI, 53% for the RHPI, and 53% for the CChC index.

FIGURE II.17
Repeat-sales house price index, Santiago Metropolitan Region (*)
(annual change in the four-quarter moving average, percent)



(*) VW-ARS estimator from Shiller (1990). The figure shows the four-quarter moving average of the growth rate of the index; the shaded area indicates the 95% confidence interval. Preliminary HPI data for year-end 2017.

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

Final reflections

Although both the CBC and the private sector currently maintain house prices indices for Chile, the importance of the sector merits additional estimates, published with the shortest lag possible. This box has presented the results of the estimation of a repeat-sales house price index for the MR, calculated using census data on used home sales. The index is complementary to the HPI and corroborates the existence of an upward phase in prices, from 2010 to 2015, followed by a slowdown starting in 2016.

BOX II.2
HOUSEHOLD FINANCIAL VULNERABILITY SCENARIOS

Household debt in Chile has increased over the past several years, from 36% of GDP in 2010 to 46% in 2017[1]/. In turn, the share of Chilean households with debt rose from 68% in 2011 to 73% in 2014[2]/. These trends have positive implications in terms of the expansion of financial inclusion, as consumers have more payment and financing alternatives (Beck et al., 2007). However, the growth of debt could also translate into greater financial risk for both debtors and lenders. The literature identifies two main channels the can lead to default: namely, income shocks (e.g., unemployment, healthcare costs) and—in the case of collateralized debt—a loss of value of the underlying asset (for example, a drop in housing prices). Empirical studies confirm the importance of both aggregate factors and idiosyncratic factors, or specific characteristics of the debtor, as determinants of default (Goodman et al., 2010).

While credit risk indicators remain low as of the cutoff date of this *Report*, there has recently been an increase in arrears on bank consumer debt, in a context where the labor market has started showing signs of recovery after a long period of sluggishness. At year-end 2017, nonmortgage debt (consumer, car, and other loans) represented 42% of total household debt. In terms of direct exposure, 41% of bank credit is extended to households, via consumer or mortgage loans. Given the high levels of household debt and the degree of the banking system's exposure to these debtors, understanding the dynamics and points of vulnerability associated with these liabilities is crucial from the perspective of financial stability. This box presents two exercises to address this issue, in order to quantify the potential impact of income shocks from the labor market on household risk indicators.

Household Financial Survey

The first exercise uses the 2014 Household Financial Survey (HFS) and considers two shocks: an increase in aggregate unemployment and a deterioration of job quality. Both shocks affect labor income and thus the arrears rate of (bank and nonbank) nonmortgage debt.

First, the probability that families with nonmortgage debt will have arrears of three months or more is estimated, based on the characteristics of each household (monthly income, ratio of nonmortgage debt to expected annual income, number of household members, and income of the County of residence) and the characteristics of each head of household (age, marital status, sex, and education). The exercise excludes debtors who only have revolving debt (credit cards and credit lines), because the HFS does not measure months of arrears on this type of debt[3]/.

Second, the exercise simulates individual unemployment and the length of unemployment for each worker[4]/, taking into account worker characteristics (age, education, sex, region, industry, and income quintile) and aggregate unemployment. The affected workers could lose 60%, 75%, 85%, or 95% of their labor income, depending on whether they are unemployed for 1, 2, 3, or 4 or more quarters, respectively.

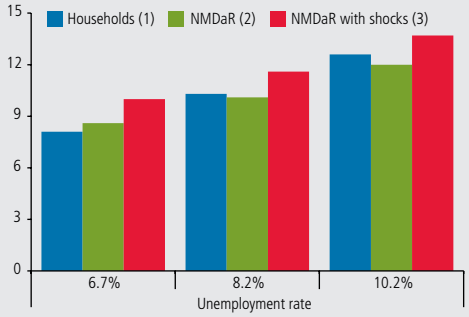
There are three scenarios: (1) a baseline scenario with 6.7% unemployment; (2) a stress scenario with 8.2% unemployment; and (3) a more extreme stress scenario with 10.2% unemployment. The analysis presents two risk measures: the percent of families with debt-at-risk (DaR) and the percent of nonmortgage debt-at-risk (NMDaR)[5]/. For each scenario,

[1]/ See FSR Second Half 2017, chapter II.
[2]/ According to the 2010 and 2014 Household Financial Surveys.

[3]/ According to the 2014 Household Financial Survey, the main types of nonmortgage debt that households carry are bank consumer loans (15.4% of all families), loans from S&Ls and family compensation funds (11.4% of families), loans or cash advances from retailers (7.0% of families), school loans (8,2% of families), and automobile loans (3.0% of families). The exercise excludes credit cards and credit lines (10.6% of families have bank credit card or credit line debt, but no other consumer loans; 27.5% of families have retail credit card debt, but no other consumer loans).
[4]/ Recessions affect labor income through both the increase in unemployment and its duration (Jones and Naudon, 2009; Madeira, 2015, 2016).
[5]/ The classification of household debt-at-risk is different from individual debt-at-risk. In the former case, it is enough for one household member to be in arrears for all of the household's debt to be classified as at-risk. The analysis includes all nonmortgage loans from different lenders.
[6]/ The Central Bank's stress tests indicate that the banks' provisions expense would increase from 6.7 to 11.6% in a recession (which would raise unemployment from 6.7 to 10.9%). The results reported here are comparable with the stress test results (FSR Second Half 2017; Martínez et al., 2017).

an additional NMDaR measure (called NMDaR with shocks) is calculated, as a consequence of the deterioration in job quality. The NMDaR as a measure of risk differs intrinsically from measures based on accounting or administrative data. The latter are individual in nature, focused on the risk of the debtor, whereas the NMDaR is based on the risk of the total household as an observation unit. In the exercise with additional job quality shocks, a given share of workers suffer a 20% loss of their labor income, as they move out of full-time jobs with a formal contract at large firms (over 50 employees) to more precarious jobs; while another share of workers lose 10% of their labor income due to a reduction in hours worked.

FIGURE II.18
Nonmortgage debt-at-risk, under scenarios with changes in aggregate unemployment and deterioration of job quality



(1) Percent of households with nonmortgage debt-at-risk.
(2) Percent of nonmortgage debt-at-risk.
(3) Percent of nonmortgage debt-at-risk with unemployment and job quality shocks.
Source: Central Bank of Chile, based on data from the 2014 HFS.

The results indicate that the share of families with debt-at-risk would increase from 8.1% in the baseline scenario to 10.3% in the moderate stress scenario and 12.6% in the extreme scenario (figure II.18). When the sample is disaggregated by income segment, the second segment (families with income in the 51st to 80th percentiles) is most affected by the unemployment and job quality shocks under the two risk scenarios, in terms of both the number of families and the amount of DaR. The NMDaR would increase a little less than the number of debtor families in arrears, since unemployment has a bigger impact on lower-income families. Finally, the deterioration in job quality would imply an additional increase in DaR of 1.4 pp vis-à-vis the baseline scenario[6]/.

[6]/ The Central Bank's stress tests indicate that the banks' provisions expense would increase from 6.7 to 11.6% in a recession (which would raise unemployment from 6.7 to 10.9%). The results reported here are comparable with the stress test results (FSR Second Half 2017; Martínez et al., 2017).

Bank credit registry

The second exercise uses administrative bank data to quantify the effect of changes in the unemployment rate on the prevalence of default, for both consumer and mortgage loans. Granular data on bank debt are only available since 2009, so the exercise does not cover the full economic cycle. Thus, the sample covers a period of a systematic decline in the household arrears rate, in a context of a reduction in the national unemployment rate. This complicates the identification of the relationship of interest, given that there are no episodes of increased default at the aggregate level in the available sample. However, the different geographical regions of the country followed divergent recovery paths after the global financial crisis and were also affected by idiosyncratic shocks (for example, changes in the copper price) that were not uniformly distributed across regions. It is thus possible to exploit the regional heterogeneity within Chile to identify the relationship between income shocks and default on both bank portfolios. The identification strategy consists in estimating a model with fixed regional and time effects on a panel that contains the unemployment rate and default rates by portfolio at the regional level. In other words, regional variation is used instead of national variation to identify the unemployment elasticity of default. The fixed-effects model takes into account unobserved time-invariant variables at the regional level (for example, local preferences) as well as unobserved variables that are common at the national level but change over time (for example, the monetary policy rate), the omission of which would bias the elasticity estimate in the direction of correlation between the unobserved variable and the occurrence of default.

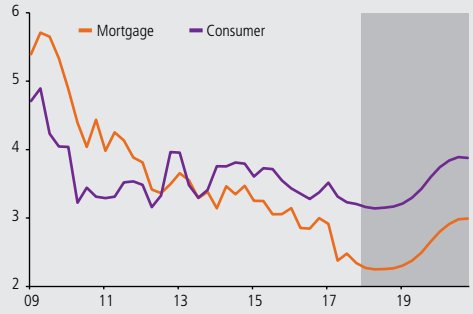
The model estimates the regional default rate at 90 to 180 days—that is, the number of debtors in the region in each quarter with arrears not exceeding six months—over the total number of debtors in the corresponding portfolio in the given region and period. The definition of this variable, in this time window, is crucial for the correct causal identification. The truncation is necessary given that the administrative data contain delinquent debt with over three years since the last payment was made. In a model that relates income shocks with arrears, it would not be very informative to correlate unemployment today with arrears going back three years. Truncating the dependent variable allows us to correctly associate the two events in time. That is, the estimated elasticity captures the sensitivity of default in a window of not more than three months after a change in

the unemployment rate. In particular, the first four lags of the quarterly regional unemployment rate are included on the right-hand side of the equation, together with the first lag of the regional arrears rate and fixed effects described earlier.

The estimation results indicate that the first two lags of the unemployment rate have a significant positive effect on the arrears rate. The total unemployment elasticity is around 0.2 for both portfolios (consumer and mortgage). That is, a 1pp increase in regional unemployment would translation into a 0.2pp increase in the arrears rate in both portfolios after six months. These results are similar, though not directly comparable, to those obtained by Alegría and Bravo (2016) using administrative bank data for the mortgage portfolio in a specification that employs available credit as a proxy for income. They are also similar to the findings reported by Madeira (2014) for the effect of changes in income on delinquency of consumer credit in the HFS.

Given the above results, the stress test is based on the extreme scenario defined earlier, where the national unemployment rate rises to 10.2% in two years. The simulation raises regional unemployment rates and then finds the future path for regional loan delinquency for each portfolio, which is finally aggregated at the national level. In this scenario, the exercise indicates that the national arrears rate would increase at a similar magnitude in consumer and mortgage debt over the next two years (figure II.19). The maximum level reached by the consumer arrears rate—which would go from 3.2 to 3.9% of debtors over the course of the next two and a half years—is similar to the increase recorded in 2010. Mortgage arrears would increase to 3.0%, the level recorded at year-end 2016. Given that the exercise reports the flow of new arrears of 90 to 180 days, the magnitudes should be interpreted as the inflow of new debtors in arrears.

FIGURE II.19
90- to 180-day default rate under the stress scenario
(percent of debtors in each portfolio)



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

Final comments

The evolution of the economic cycle and how it affects the labor market are crucial for financial stability. Given the degree of the banking sector's exposure to households in Chile, and considering that the main source of household income is wages, it is important to understand how these different forces interact. This box has presented evidence on the significance of income shocks for the occurrence of default. The exercises based on both survey and administrative data return similar results. Although there are methodological differences, the increases in credit risk are consistent and economically significant in both cases. In the face of a given shock, the first exercise shows an increase in households with nonmortgage debt-at-risk—from both bank and nonbank lenders—of 56% relative to the baseline scenario. The increase is 23% in the second exercise, which considers only bank consumer debt and uses a significantly shorter window. These findings confirm that the evolution of the labor market, debt holding, and lenders' exposure to them are critical elements to monitor.

III. LENDERS

In the first quarter of the year, bank credit was sluggish in all segments. With regard to credit risk, the use of collateral use of collateral to mitigate expected loss to mitigate expected loss continued to increase, which represents a vulnerability in the commercial portfolio in the face of risk scenarios. Stress tests indicate that the banking system continues to maintain a sufficient capital level to absorb the effects of a severe risk scenario, but there is a smaller buffer than in past years and yet no change in banks' dividend policies. Finally, the absence of consolidated data on debt, which would support a comprehensive risk assessment, accentuates vulnerability from banks' indirect exposure to the household sector via loans granted by nonbank lenders (NBLs).

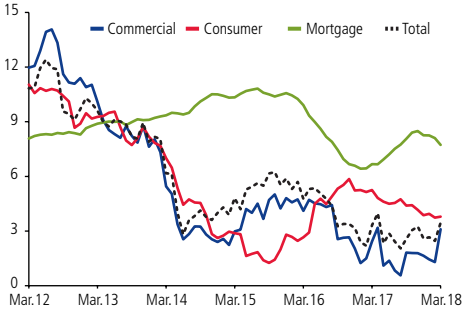
BANKS

Commercial loans were slow relative to their historical patterns, while household portfolios—consumer and mortgage—also decelerated in the first quarter of the year (figure III.1).

The growth of the commercial portfolio, relative to economic activity, has been persistently below its historical trend (figure III.2), in a context of low interest rates (chapter I). Nevertheless, credit data for March show a degree of recovery. This is consistent with the results of the Bank Lending Survey (BLS) for the first quarter of this year, which reported stronger demand in the corporate sector. Finally, granular data on the debt of firms point to an uptick in the trade sector (statistical appendix).

The consumer credit portfolio eased slightly, with a real annual growth rate of 4%. Revolving credit (cards and lines) recorded zero growth in real terms. There was a recomposition, however, where some debtors increased their use of these products relative to their historical patterns (chapter II). At the system level, the stock of mortgage loans also slowed in the first quarter of the year, with real annual growth rates below 8%, which is consistent with the phase of the residential real estate sales cycle (chapter II). This trend is mainly explained by the large banks, which had an average growth rate of 7% in March 2018, whereas medium-sized banks recorded a more dynamic growth rate of 10% the same month.

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



(*) Based on individual financial statements.

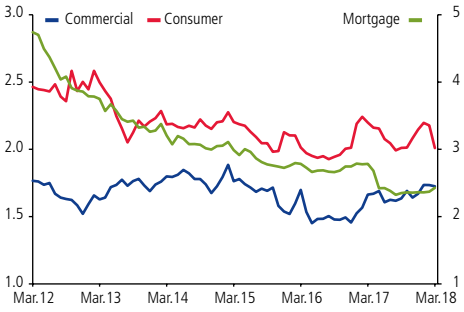
Source: Central Bank of Chile, based on data from SBIF.

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 moving windows (rolling) since January 1989.

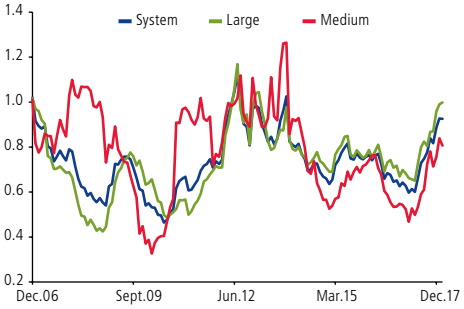
Source: Central Bank of Chile, based on data from the SBIF.

FIGURE III.3
Arrears of 90 days or more
(percent)



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

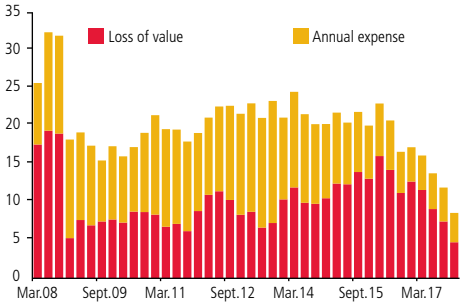
FIGURE III.4
Ratio of write-offs to commercial provisions expense (*)
(times)



(*) Annualized write-offs over annualized provisions expense with a 12-month lag.

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

FIGURE III.5
Cost of realized collateral (*)
(percent of the value of assets received in payment)



(*) Given the data limitations, calculations are based on commercial and mortgage loans. Quarterly data.

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

The results of the BLS for the first quarter show evidence of a weakening in the demand for mortgages, due largely to less favorable labor market conditions. Mortgage lending conditions were stable—after tightening in recent years due to regulatory changes—while active interest rates remained low from a historical perspective (statistical appendix).

Commercial credit risk indicators deteriorated relative to the last FSR, and prospective risk continues to be covered by a high share of collateral.

Arrears or Default indicators for the commercial and consumer portfolios have followed an upward trend since early 2016—although the latter reverted somewhat in the most recent period—while the mortgage segment has stabilized, after falling for several years (figure III.3 and statistical appendix). Levels remain low, but there has been a steady increase in commercial write-offs since mid-2017, especially in medium-sized banks.

In the individually appraised commercial loan portfolio, expected losses have increased in the last five years, reaching 6% in late 2017. In the same period, loan loss provisions were relatively constant due to the steady increase in the use of collateral to back these loans (table III.1). This trend continues to be a source of vulnerability for the banking industry (FSR Second Half 2017, box III.1).

TABLE III.1
Collateral in the individually appraised commercial loan portfolio
(percent of respective loans)

Estimator	2014		2015		2016		2017	
	II	IV	II	IV	II	IV	II	IV
Normal	44.4	45.2	45.0	45.0	46.9	49.0	48.8	49.4
Substandard	66.7	66.9	68.4	67.5	68.7	70.3	73.5	76.2
In default	57.4	60.0	62.0	60.6	62.7	65.6	66.5	67.8

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

Excessive use of collateral to cover credit risk could cause losses for the banking system from the sale of assets received in lieu of payment.

Local regulations on provisioning practices establish that bad loans must be written off for the full amount of the loan, without discounting any collateral associated with risk mitigation. Therefore, the greater use of collateral—as a substitute for loan loss provisions—to cover expected losses increases write-offs as a percentage of loan loss reserves. Once written off, the loan is removed from the balance sheet, and there is an accompanying unexpected increase in current provisions expense on the income statement. Thus, the lower the loss provisions set up in advance, the bigger the surprise at the time of the write-off, generating a significant cyclical effect on bank profitability. After the global

financial crisis in 2009, there was a significant increase in the ratio of write-offs to lagged provisions, which more than tripled in three years. This could be occurring again in the recent period, albeit on a lesser magnitude (figure III.4).

Another source of higher costs is the sale of assets received in lieu of payment, which is also subject to significant cyclical variation. Once the loans have been written off, there are costs associated with managing the assets and selling them off below value. Write-offs have recently started to increase, which implies an additional impact on bank profitability in the coming months. During the global financial crisis, asset management and sales costs peaked at over 30% of the value of the assets received around systemic stress events (figure III.5).

In the consumer loan portfolio, arrears turned upward in November of last year, but have recently started to revert. The materialization of a sharper deterioration will largely depend on the evolution of the labor market, in terms of both employment and job quality. In contrast to bank consumer loans, nonbank consumer loans have been growing steadily, increasing their share of the market. As of March 2018, nonbank consumer loans were equivalent to over 50% of bank consumer loans (see the section on NBLs below).

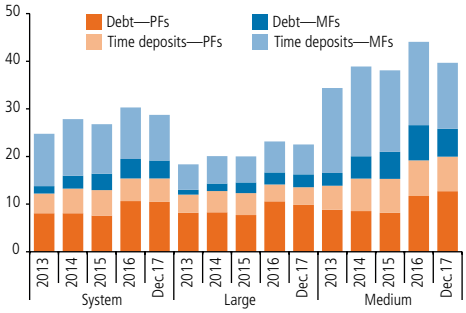
With regard to bank funding, fixed-income securities in the domestic market increased, to the detriment of overseas bonds.

In 2017, the banking system continued to issue local debt instruments. Medium-sized banks, in particular, have been active in this type of funding. The increased use of the local bond market was mainly offset by lower overseas issues and a smaller share of time deposits sold to the mutual fund industry (figure III.6). These funding dynamics imply a rollover of securities in a five-year horizon.

Profitability indicators increased slightly for the banking system, but equity solvency still lags behind international standards.

The annualized profitability of the banking system increased over the last year, with 12% ROE and 1% ROA in March 2018. Operating income recorded an annualized increase in the net interest margin (8 bp) and, to a lesser extent, commissions (3 bp). These results were partially offset by a reduction in the indexation margin (5 bp) in the period. The system's capital adequacy ratio (CAR) has been stable at around 13.7% since mid-2016. As indicated in past FSRs, one way to increase the capital base is through retained earnings. However, the banks have not made any significant changes in their dividend distribution policies (figure III.7). This is particularly important given that there are significant gaps—as indicated by both industry reports and the Banking Supervisor—relative to the new capital requirements contained in the draft bill to reform the General Banking Law (box V.1).

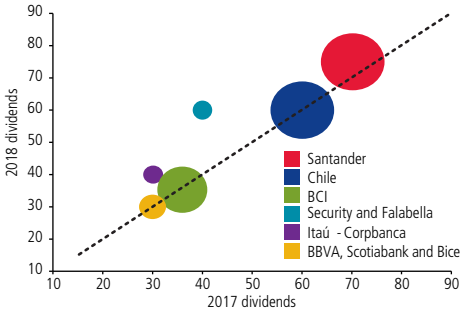
FIGURE III.6
Banking sector liabilities with institutional investors (*)
(percent of liabilities)



(*) Excluding subordinated bonds.

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

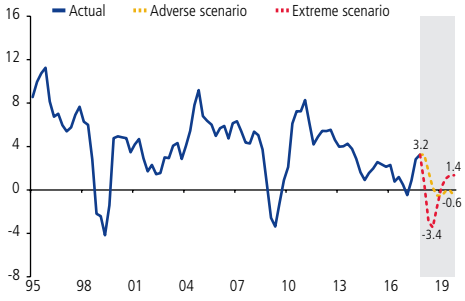
FIGURE III.7
Distribution of dividends (*)
(percent of earnings)



(*) The size of the circle represents 2017 earnings. BBVA, Scotiabank, and Bice overlap, as do Security and Falabella.

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

FIGURE III.8
Annual GDP growth (*)
(percent)



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

Source: Central Bank of Chile.

STRESS TESTS[1]/

Despite the recent cyclical uptick in output growth, the probability of a prolonged economic slowdown—or a slower recovery than expected in certain sectors—could deteriorate the banks' portfolio quality.

As mentioned, an adverse economic scenario, or continued slow growth in certain sectors, could affect the banks' commercial portfolio, due to lower income generation by firms. In the context of the slow economy of the past several years, one sign of difficulties in this segment is the volume of write-offs, which is still low but has been increasing steadily for almost a year. At the same time, a weakening of the labor market could increase credit risk in the personal banking segment, by reducing the debt service capacity of debtors.

As in past FSRs, stress tests are used to identify systemic financial strengths and weaknesses. However, they should not be interpreted as forecasts, given their partial nature and the fact that they do not take into account all the economic effects of the scenarios analyzed. This *Report* considers two stress scenarios: a severe scenario and an adverse scenario. 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 –3.4% in the most critical quarter and then converge to 1.4% in 2019. This scenario is intended to replicate past episodes of significant financial fragility. The adverse stress scenario is based on the 5th percentile of the distribution of the GDP forecast presented in the March 2018 *Monetary Policy Report*, which involves a persistent economic slowdown (figure III.8).

Both stress scenarios include a shift in the spot and forward yield curves for the peso, UF, and dollar, with increases of 300 bp for the short-term interest rate and 100 bp for the long rate and a 20% depreciation of the peso against the dollar. In general, the impact of the rate increases due to the market risk effect is channeled through term mismatches and the average portfolio duration.

[1]/ Based on the methodology described in the FSR Second Half 2013 and Martinez et al. (2017). Both the analysis and the results are regularly reported to the SBIF.

The stress tests indicate that a slow but steady decline in output carries a similar risk for the system as a severe scenario. Market risk remains low.

The tests conducted for this FSR use macrofinancial and accounting data on the banking system as of December 2017. Relative to the tests presented in the last *Report*, using data from June 2017, there is a reduction in initial profitability and margins, but a slight increase in the system's capital level. The return on equity (ROE) is 1.9 percentage points (pp) lower (12.2 versus 14.1%), while the CAR is 0.1 pp higher (13.6 versus 13.5%).

Market risk remains low and stable. Rate risk—valuation and repricing—has not changed significantly, while the system's exposure to currency risk fell slightly. Losses from credit risk are lower than in previous tests, due mainly to the economic recovery in recent quarters. Thus, the potential loss from total loans under the severe scenario is around 16.3% of system capital, versus 20.5 in the last test (table III.2). Under the adverse scenario, the risk is slightly lower: 14.6% of capital.

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

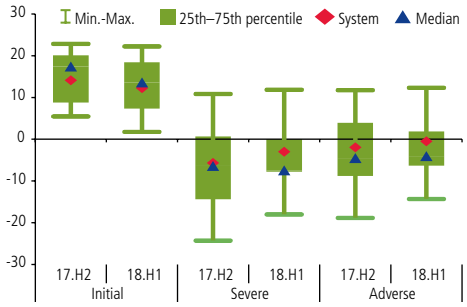
	Adverse			Severe		
	17.S1	17.S2	18.S1	17.S1	17.S2	18.S1
Initial ROE	11.3	14.1	12.2	11.3	14.1	12.2
Market risk	-0.8	-1.7	-1.7	-0.8	-1.7	-1.7
Valuation	-0.6	-1.0	-1.1	-0.6	-1.0	-1.1
Repricing	-0.6	-0.9	-0.9	-0.6	-0.9	-0.9
Currency	0.3	0.2	0.3	0.3	0.2	0.3
Credit risk	-18.1	-17.7	-14.6	-21.2	-20.5	-16.3
Consumer	-8.0	-8.0	-6.9	-9.8	-9.6	-8.1
Commercial	-7.4	-7.0	-6.3	-8.4	-8.0	-6.8
Mortgage	-2.6	-2.7	-1.3	-3.0	-2.9	-1.4
Margin	3.2	3.3	3.6	2.1	2.3	2.8
Ending ROE	-4.4	-1.9	-0.5	-8.7	-5.7	-3.0

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

Consequently, the system's ROE would reach –3% of Tier 1 capital under the severe scenario and –0.5% under the adverse scenario. Banks that together represent 72% of the system's Tier 1 capital (60% in the test in the last FSR) would have losses in the severe stress scenario. The figure is 57% in the adverse scenario (60% in the last FSR) (figure III.9).

Solvency would increase slightly under the severe stress scenario, with an increase in dispersion relative to the initial distribution (figure III.10). This is mainly because the banks that are most exposed to the risks of the stress scenario have a smaller capital base. Under the adverse scenario, the system's CAR is similar to the extreme scenario. The set of banks that keep their CAR

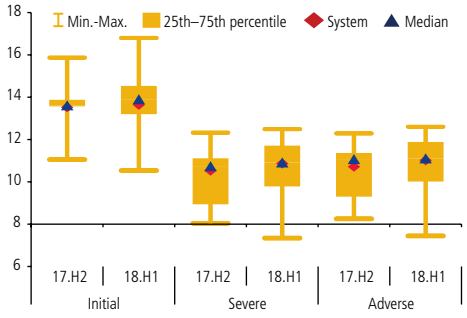
FIGURE III.9
Impact of stress scenarios on ROE (*)
(earnings over Tier 1 capital)



(*) 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. Minimums are the 1st percentile.

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

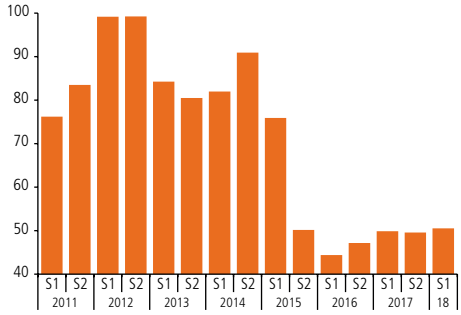
FIGURE III.10
Impact of stress scenarios on CAR (*)
(regulatory capital over risk-weighted assets)



(*) 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 SBIF.

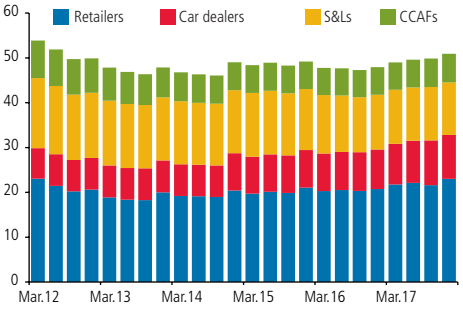
FIGURE III.11
Banks with CAR of 10% or higher in the severe stress (*)
(percent share of total assets)



(*) Results of stress tests in past FSRs.

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

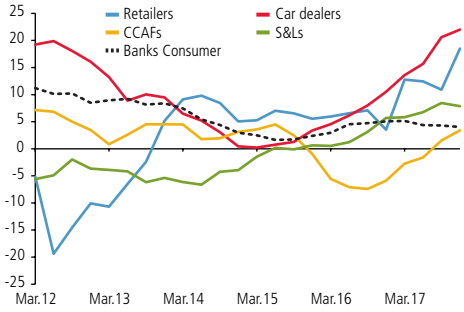
FIGURE III.12
Consumer loans from nonbank lenders (*)
(percent of bank consumer loans)



(*) Based on individual financial statements, including in the case of bank consumer loans used as the denominator.

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

FIGURE III.13
Real annual growth of loans (*)
(percent)



(*) Data for December 2017 are updated only for large retailers. Data on largest CCAFs are updated to December 2017.

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

over 10% represent 75% of system assets in the adverse scenario and close to 51% in the severe scenario, which is similar to the last test (figure III.11).

The slight reduction in the estimated risks under the applied stress test scenarios does not necessarily imply a reduction in prospective risks. On the one hand, the results are based on an improvement in initial output and the growth forecast. On the other, the risk variable—loan loss provisions—used as a base for the calculations has not increased, so the full effects of the deterioration of the credit quality of the individually assessed commercial loan portfolio are not yet incorporated.

NONBANK ENTITIESS[2]/

Consumer credit from nonbank lenders has increased, especially in the case of retailers and car dealers.

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 car dealers. 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). Finally, factoring and leasing companies mainly provide trade credit to businesses (chapter II)[3]/.

Nonbank consumer loans together were equivalent to about 51% of total bank consumer loans at year-end 2017, where retailers account for the largest share (figure III.12). As indicated above, households increased their debt with NBLs, with real annual growth rates of 18.5% for retailers, 3.4% for CCAFs, 7.9% for S&Ls, and 22% for car dealers. In the same period, bank consumer loans grew at around 4% (figure III.13). The consumer loan portfolio in arrears improved somewhat in late 2017 (figure III.14).

Mortgage loans issued by nonbank lenders (mutuals) and held in LIC portfolios have increased, recording a real annual growth rate of 5.6% in December 2017. While this growth has thus far been accompanied by a reduction in default, individuals who hold loans simultaneously from both mutuals and banks have systematically higher arrears rates (chapter II).

[2]/ All comparisons with the banking system in this section are based on individual banks' financial statements.
[3]/ Some NBLs are simultaneously involved in factoring, leasing, and car loans, so it is not feasible to directly disaggregate these loans by type of lender.

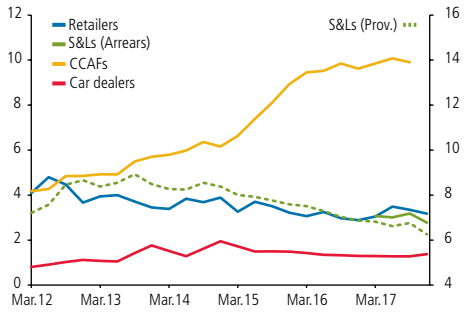
Factoring represented 4.3% of bank commercial loans at year-end 2017, growing 13% in real annual terms. The bank share shifted 32% (–10% when subsidiaries and related companies are taken into account), while the nonbank share grew 13%. Of the total (4.3% of bank commercial loans), nonbank factoring companies represent around 0.7%, bank-related companies, 1.4%, and banks, 2.2% (chapter II).

This context hihglight the relevance that this sector accounts in the banking system commercial loan portfolio

The banking sector is exposed to NBLs through commercial loans that fund their operations. In recent years, there has been an increase in these loans from medium-sized banks. At year-end 2017, exposure to NBLs—through commercial loans—represented 12.3% of regulatory capital for large banks and 27.1% for medium-sized banks, equivalent to 3.3 and 6.9% of their respective commercial loans. This indirect exposure to potentially riskier sectors constitutes an additional source of vulnerability, especially for medium-sized banks.

In sum, the increase in the share of NBLs in household and, to a lesser extent, commercial debt needs to be monitored, because the lack of transparency on total debt levels and debt service hinders a comprehensive assessment of credit risk. Additionally, the banking sector has an indirect exposure to households and firms through its commercial loans to NBLs. As discussed in past FSRs, several of these agents are subject to weaker requirements in terms of reporting, supervision, and corporate governance, which has become increasing clear in recent years.

FIGURE III.14
Arrears of 90 to 180 days (*)
(percent of loans)



(*) Data for December 2017 are updated only for large retailers. Data on CCAFs are updated to September 2017.

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

BOX III.1
FINALIZATION OF THE BASEL III STANDARDS

Establishing the Basel III standards was one of the most important measures taken on the international level in response to the global financial crisis of 2007–2009. The report "Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems," published in 2010, represented a major change from then-current standards. The most important innovations in terms of bank solvency were increasing the quantity and quality of required capital and establishing buffers over operating minima. In the case of liquidity standards, qualitative requirements were improved, and short- and long-term qualitative requirements were established for the first time.

Since then, the Basel Committee on Banking Supervision (BCBS) has continued to issue reports, following exhaustive review processes and public consultation, aimed at implementing and improving the new Basel III standards; especially in relation to the development of new methods for measuring credit, market, and operational risk—which until 2010 were governed by Basel II.

This review process, which extended over more than eight years, culminated last December, when the BCBS formally finalized the regulatory standards and announced the definitive guidelines for the following four key areas:

1. New models for calculating credit risk. The modifications include the following:

• Following an extensive discussion on the use of credit ratings from rating agencies, the BCBS ultimately decided to continue using its standardized approach for determining risk-weighted assets (RWAs). Alternative weights are included for some jurisdictions where the use of this type of rating is either prohibited or undesirable.

• For residential mortgages, the new weights depend on the corresponding loan-to-value ratios.

The use of internal credit risk models was restricted, mainly in relation to exposure to medium-sized and large corporations and to financial institutions (including banks)[1]/.

2. New standardized approach for operational risk.

• The standardized approaches and internal models[2]/ of Basel II were replaced with a single risk-sensitive standardized approach (with established parameters), to be used by all banks.

3. Changes to the calculation for determining the capital charge for the credit valuation adjustment (CVA) on bank exposure through derivative instruments and securitization transactions[3]/.

• A new CVA risk framework was developed, which is more sensitive to market risk factors and thus more consistent with the general regulation proposed by the BCBS in this area. The framework also includes a simplified approach for banks that do not have significant derivative exposure.

• The framework includes a simplified approach for banks that do not have significant derivative exposure.

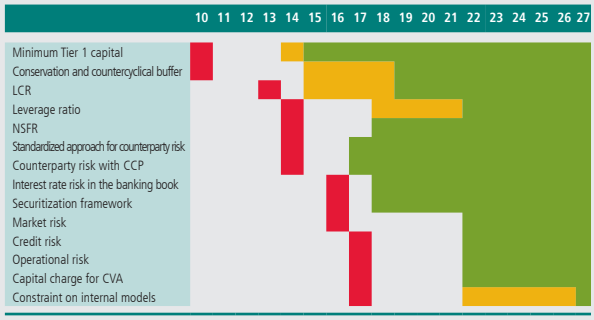
4. Definition of an output floor, that is, a maximum possible reduction in the calculation of total RWAs resulting from the use of internal models (output floor).

• Specifically, the calculation of RWAs for regulatory purposes cannot be less than 72.5% of total RWAs calculated using only the standardized approaches[4]/.

1/ There are two types of internal ratings-based (IRB) models: foundation IRB and advanced IRB. Under the new standards, the mentioned categories can only use the foundation IRB approach. In addition, for these and other categories, minimum values are included for certain model parameters.
2/ Advanced measurement approaches.
3/ This adjustment reflects the risk of a deterioration in the credit quality of a counterparty to derivatives or securitization transactions. This is in addition to the charge arising from exposure to derivative and securitization instruments.
4/ In other words, under this scheme, total RWAs cannot be less than 72.5% of the risks calculated using the standardized approach.

With regard to the implementation calendar (table III.3), the BCBS expects the majority of these regulatory guidelines to enter into effect in the next two to four years, with a longer timeline only for the output floor (2026).

TABLE III.3
Basel III implementation calendar



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

Monitoring these developments is particularly important for Chile, because as long as the current banking legislation is anchored to Basel I, the gap relative to international standards will continue to widen.

In this sense, it is critical for Congress to pass the banking reform bill currently under discussion, as it includes the necessary tools for the banking supervisor to begin implementing Basel III in Chile, which the Board of the Central Bank has publicly recommended[5]/.

Because the approval of the reform legislation is the starting point of a complex process of defining new regulatory standards, the draft bill considers a transition period of six years.

The necessary regulation for determining risk-weighted assets (credit, market, and operational) is particularly important, as it will include the definition of standardized approaches in the short term and the possibility of using internal models in the medium term. In the case of Chile, the possibility of using these internal models will be incorporated for the first time. During the Basel III process, there was an extensive debate on internal models, which led to establishing constraints on their use; these arguments must be taken into account with regard to implementation in Chile. The new regulatory framework is a very important step, which will present considerable challenges not only for the regulatory and supervisory authorities, but also for the banking system.

[5]/ In a statement on 12 June 2017, the Board asserted that "Adopting these standards in Chile is essential for securing the continuity of our financial integration with the rest of the world and ensuring that the banking system maintains and consolidates the strong solvency position exhibited in recent years, as outlined by the Central Bank in recent *Financial Stability Reports*.

IV. TECHNOLOGICAL INNOVATIONS AND FINANCIAL STABILITY

This chapter discusses innovations in financial technology (FinTech) and how they relate to the authority and objectives of the Central Bank of Chile, in particular with regard to financial stability; and proposes issues to consider in the local regulatory discussion.

INTRODUCTION

Technological innovation has a direct impact on the development of the financial industry. Innovations such as the launch of new payment cards, the installation of automatic teller machines (ATMs), the digitalization of processes, and the provision of online services have shaped the current financial industry.

However, a combination of new factors have contributed to increasing the velocity of change, which increases both their scope and their potential to be disruptive[1]/. Recent technological advances have facilitated the incorporation of innovations in the financial industry, which has been associated with both the entry of new participants and the introduction of new ways of providing financial services, whether through the development of new products and services or the incorporation of better technology in existing products and services. This phenomenon of technological breakthroughs in the financial industry has been termed FinTech. In response to the changing technological environment, financial regulators are increasingly incorporating FinTech in their agendas and, in some jurisdictions, adopting specific regulatory measures.

FinTech developments are important to the Central Bank of Chile (CBC) because innovations have the potential to affect the stability of the financial system, which is at the center of the Bank's mandate. Specifically, and without detriment to the authority of other regulators, it is the concern of the CBC that these innovations benefit the population, without threatening the stability of the financial system.

[1]/ Carney (2017) identifies factors such as the expansion of cellular telephony, the massification of the Internet, improvements in computers, advances in cryptography, and innovations in machine learning. The FSB (2017) indicates additional factors such as consumer preferences, especially among youth ("digital natives"); economic development and convergence; and higher post-crisis capital requirements and deleveraging that altered bank lending policies, opening space for new nonfinancial competitors.

There are several definitions of FinTech. For example, a simple, but broad definition is that it comprises digital applications to address financial intermediation problems[2]/. A more detailed, but equally broad definition is from the Financial Stability Board (FSB): "technologically enabled innovation in financial services that could result in new business models, applications, processes or products, with an associated material effect on the provision of financial services." Both definitions suggest that the concept of FinTech can encompass a wide range of products, services, or functions; and that it is dynamic, such that a financial service that has been available in the world for some years could still constitute FinTech in a given jurisdiction.

Given the breadth of FinTech, which includes, for example, electronic payment and transfer systems, distributed ledger technologies (DLTs), crowdfunding, and cryptoassets, it is necessary to establish some sort of classification of the different activities involved in order to analyze their implications and identify possible policy responses.

This chapter links the biggest FinTech innovations of recent years with the main functions of the financial system (table IV.1)[3]/. This provides the basis for discussing some of the potential effects of FinTech innovations on financial stability, which is followed by a review of the development of this industry at the local level. Finally, although some FinTech innovations, such as central bank digital currency (CBDC), may have an impact on monetary policy, they are not addressed in this chapter.

TABLE IV.1
Technology and possible applications, by financial system function

Financial system function	Underlying technology	Possible applications
Financial intermediation	DLT	Virtual assets and cryptocurrencies Transactional platforms Crowdfunding
Payment clearing and settlement, securities registration	DLT	New generation of FMIs
Retail payments and transfers	Application programming interface (API) Biometric authentication Cloud DLT	Mobile payments International remittances
Risk assessment and management	Big-data Artificial intelligence DLT	Robo-advisors InsurTech Digital banking SupTech

Source: Central Bank of Chile.

[2]/ Bank of Canada, staff discussion paper (2017).
[3]/ For reference, the FSB classifies FinTech activities by their economic function, as follows: payments, clearing, and settlement; deposits, loans, and fundraising; insurance; and investment management.

FINTECH AND FINANCIAL SYSTEM FUNCTIONS

1. Financial intermediation

Financial institutions (banks, insurance companies, fund managers, etc.) typically provide intermediation services, which are regulated and which consist in taking in or receiving money or funds form the public, with the objective of loaning those funds to people or firms or investing them in diverse assets and covering risks. These processes involve liquidity and maturity transformation.

Some FinTech innovations are challenging the foundations of this function. For example, new mechanisms are being developed for making payments and holding securities such as cryptoassets, and platforms are being created for executing transactions and exchanging funds and assets (both traditional and virtual) directly between parties, which can have an impact on the role of institutions that perform financial intermediation.

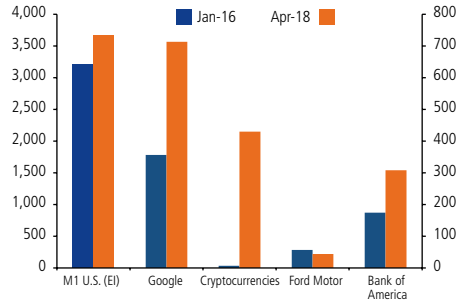
Cryptoassets

Distributed ledger technologies (DLTs) could allow important changes in the financial industry. As explained in box IV.1, a distributed ledger is, essentially, a database shared by several users or managers, where access to and/or incorporation of new records can be centralized or decentralized. One application of this technology that could be especially disruptive for the financial sector, though certainly not the only one, is the issue of tokens or cryptoassets, which would probably not exist otherwise. These assets are usually associated with a digital representation, using cryptographic techniques, of a means of payment, like the so-called cryptocurrencies; although they can also be associated with the representation of other types of instruments, such as securities.

The so-called cryptocurrencies aim to fulfill the same functions of currency issued by central banks (medium of exchange, a store of value, and a unit of account) (see box IV.2 for a more detailed analysis). Their market value has increased substantially in the last two years and now exceeds that of some large international corporation (figure IV.1). While some people argue that they allow the disintermediation of financial transactions—which could have an effect analogous to the impact of the Internet on other sectors (Ito et al., 2017)—for now that possibility is uncertain, given limitations such as their high price volatility. Moreover, since they are not legal tender, no person or business is obligated to accept them.

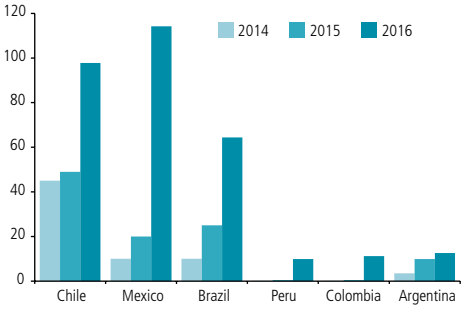
Cryptoassets that represent securities are similar to a stock in that they can confer rights over the issuer's equity. For example, initial coin offerings (ICO) allow issuers to raise capital through the issue of tokens, which can be traded in a secondary market.

FIGURE IV.1
Relative size of assets
(US$ billion)



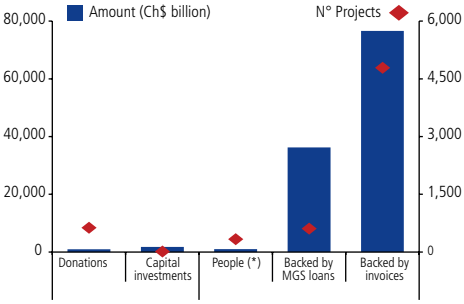
Source: Central Bank of Chile, based on data from the Fed, Ycharts, and Coinmarketmap.

FIGURE IV.2
Volume of alternative financing in Latin America
(US$ million)



Source: Abarca (2018), based on Ziegler et al. (2017).

FIGURE IV.3
Crowdfunding operations in Chile
(2012–2016)



(*) Through 2014.

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

In Chile, the regulatory framework does not allow the recognition of so-called cryptocurrencies as cash in circulation or foreign currency, and the FMC has similarly established that they cannot be considered securities. In this context, the purchase, holding, or sale of these assets is allowed in the private sphere. However, in the absence of specific regulations, people or entities that specialize in the commercialization of these assets and who purchase, use, or transfer them must comply with the general regulatory framework, as is the case with any other good or asset.

In April, the Chilean Financial Stability Board issued a public statement warning on the risks associated with the purchase and holding of cryptocurrencies.

Transactional platforms

There are a number of international platforms that allow financial system users to carry out online transactions. Thus far, this type of innovation has largely been centered on crowdfunding platforms, which are mechanisms for raising private capital through small contributions from a large number of people, but innovations are also taking place in other areas, such as insurance.

This type of platform offers services equivalent to those of financial intermediaries, but they operate under a different model. Basically, crowdfunding and similar platforms, like traditional intermediaries, channel funds between suppliers and demanders, but without performing maturity transformation or committing their own resources in the transactions. In the case of innovations that use tokens, investors—through a given platform—can buy these instruments directly as a representation of ownership of the issuing company, with a value that is tied to the undertaking. In this sense, as indicated earlier, a token is comparable to a share or other instrument that is traded in the traditional securities markets.

In Chile, the crowdfunding industry is significant, channeling volumes of transactions that are among the largest in the region (figure IV.2)[4]/. While the traded volumes are far from approaching those of the main lenders, some companies have reached a size on par with traditional lenders, and their operations have mainly been backed by invoices (figure IV.3).

In regulatory terms, lending operations are only subject to compliance with the law on the maximum conventional rate[5]/. However, if FinTech companies, as part of their operations, take in funds from the public or engage in brokering money, this must be evaluated by the banking supervisor[6]/. The development of this segment of the FinTech industry would benefit from the establishment of specific regulations, as have been adopted in other countries.

[4]/ Herrera (2016); Abarca (2018).
[5]/ Compliance with this law is supervised by the SBIF, based on a list of institutions that place funds through wholesale lending operations.
[6]/ SBIF reported a crowdfunding platform in 2012 for infractions of General Banking Law.

In other jurisdictions, crowdfunding platforms are mainly regulated under a market conduct approach, for example, with requirements on the provision of information to potential investors. In the United Kingdom, under the regulations of the Financial Conduct Authority (FCA), these platforms can only sell relatively illiquid assets to sophisticated investors or to ordinary investors who declare that they will not invest more than 10% of their net assets in this type of instrument. In the United States, these platforms must be registered with the Securities and Exchange Commission (SEC), and there are limits on both the companies seeking funding and the people who provide it.

2. Payment clearing and settlement; and securities registration

Financial market infrastructures (FMIs)—such as clearing houses, central counterparties, securities depositories, and large value payment systems—play a key role in the provision of clearing and settlement services, registration of payment orders, and securities transfers between financial entities. In all these areas, there is room for FinTech innovations, especially using DLTs, to change traditional operating methods.

There are several DLT projects associated with financial infrastructures. For example, the Australian Securities Exchange recently announced that it is replacing its clearing and settlement system with one based on DLT. Locally, the Santiago Stock Exchange recently announced the incorporation of DLT technology in its short-sale system.

In general, the local regulatory guidelines do not impose specific technological standards on financial infrastructures. Therefore, regulated entities should not face any major regulatory hurdles to the incorporation of DLTs in their operations.

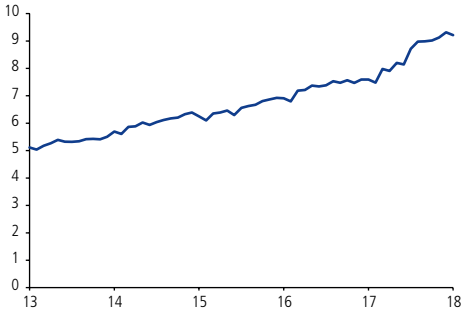
Finally, as discussed in box IV.1, it is not yet clear whether FMIs operating on DLTs could meet existing international standards (Bank of Canada, 2017).

3. Retail payments and transfers

Innovations in this area are probably closest to users and thus have the biggest potential impact on financial inclusion. Moreover, the population as a whole would benefit from access to more efficient and secure means of payment, as well as a faster, more affordable means of transferring money.

In Chile, companies are developing applications for making payments and transfers using cellular telephones or other electronic devices, in a context

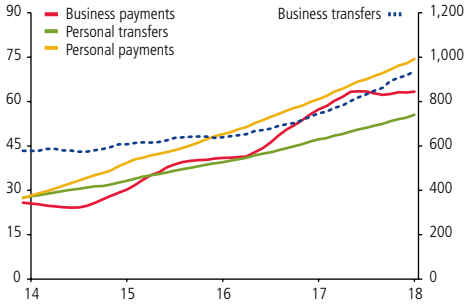
FIGURE IV.4
Number of customers who access their bank accounts by Internet in Chile (*)
(millions of customers)



(*) People and businesses that access their bank's private website using security codes or passwords. Measures the number of unique visitors, regardless of the number of visits during the period.

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

FIGURE IV.5
Internet transfers and payments, by user
(Ch$ trillion, annually)



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

in which Internet access is relatively high[7]/. The population has been steadily adopting these new technologies, as reflected in the number of bank customers who access their accounts online and who make online payments (figures IV.4 and IV.5).

In Chile, the innovation that has had the largest impact on the financial system is probably the *CuentaRUT* account by the state-owned bank, *BancoEstado*, which turns a basic demand account into a means of payment. While this might not be state-of-the-art technology, it is a good example of how technological innovation contributes to financial inclusion.

The regulations governing retail payments include Law 20,950, which authorizes the issue of prepaid debit cards by nonbank entities. In this line, the Central Bank's new guidelines on the Issue and Operation of Payment Cards[8]/ adopt an approach that facilitates the entry of new market participants, through the reduction of capital requirements and the redefinition of activities subject to regulation and supervision, which should contribute to the participation of FinTech companies in this market.

In some countries, FinTech innovations, such as cryptocurrencies and/or distributed ledger technology, are being applied to cross-border remittances, in order to provide a faster, more efficient alternative to traditional channels.

Payment activities, especially those that involve taking in money from the public, are among the central concerns of financial regulators, since they have a direct impact on the public faith[9]/. Consequently, FinTech companies that participate in this type of activity are generally subject to clear regulations that do not discriminate by type of company.

4. Risk assessment and management

The rapid increase in the ability to process large volumes of information ("big data") and developments in the area of artificial intelligence, among other innovations, allow the emergence of applications that improve risk assessment capabilities. This should contribute to increasing the quality of decisionmaking processes by people, firms, and financial intermediaries, as well as by regulators and supervisors.

Artificial intelligence applications could facilitate repetitive tasks that involve human judgment, such as auditing, investment management, credit assessment, and legal decisions. DLTs may also improve shareholder registries, supporting more efficient corporate elections and more frequent votes on a larger number of issues (Yermack, 2015).

[7]/ According to the OECD, Chile has 75.2 mobile broadband contracts per 100 inhabitants, surpassing other member countries such as Belgium, Israel, Turkey, Portugal, and Mexico.
[8]/ See FSR First and Second Halves 2017.
[9]/ One of the Central Bank's two legal mandates is to safeguard the normal functioning of the internal and external payment systems and is thus authorized to establish regulations for the financial infrastructures and the large-value and retail payment systems.

Thus, electronic investment platforms have led to an increase in both the supply of assets and the available information on a growing number of companies (World Economic Forum, 2015), as well as financial consulting based on automated tools ("robo-advisors").

These technological developments can also provide new tools for traditional financial intermediaries, such as lenders and insurance companies, to help improve their internal risk assessment processes. For example, mortgage loans from FinTech intermediaries in the United States increased their market share from 2% in 2010 to 8% in 2016. The evidence shows that these companies process applications faster than traditional mortgage lenders without incurring higher default rates; that they can adjust their supply more elastically in the face of exogenous shocks; and that in segments where these companies are present, debtors tend to refinance their loans more frequently when it is in their interest to do so (Fuster et al., 2018).

InsurTech

Technological innovations in the insurance industry, "InsurTech," contribute to improving insurance companies' risk assessment. They have also changed the way they sell their products, from facilitating product comparison and purchasing to developing new products such as peer-to-peer (P2P) insurance.

As mentioned, having more information available and the ability to process it should contribute to better risk estimation and fraud detection, as well as the creation of new types of product. However, this could also lead to the exclusion of some people or firms. For now, at the global level, investments in InsurTech companies are similar in magnitude to investments in the FinTech payment industry, but lower than in the loan industry[10]/.

Few countries have made regulatory changes in relation to this industry. China, India, and Russia have made some adjustments aimed at improving access to these services, through the electronic sale of some products. In Chile, there are few InsurTech startups, which are mainly oriented to quoting and comparing products and brokering insurance. As such, they operate alongside insurance brokerage that are registered with the Financial Market Commission (FMC).

Incorporation of technology in supervision (SupTech)

Just as financial intermediaries benefit from technological advances, so too do supervisors, in what is known as SupTech. This involves not only understanding new technologies, but also incorporating them, to the extent possible, as an additional tool for monitoring and control functions and thus improving their ability to analyze and anticipate risks to financial stability. Similarly, RegTech is the use of technology by businesses and financial entities to improve their compliance with regulatory requirements.

[10]/ In the first nine months of 2016, approximately 60% of risk capital investment was allocated to loans, 14% to payments, and 13% to insurance (Citi Global Perspectives and Solutions, 2017).

Supervisors can face significant challenges to the extent that supervised institutions begin using technologies that, at least in principle, are unfamiliar to the supervisor. For example, how should they evaluate the operational risk of a DLT? Is the credit risk measured by an artificial-intelligence-based algorithm being correctly managed?

POSSIBLE IMPLICATIONS FOR FINANCIAL STABILITY[11]/

As mentioned earlier, when financial intermediaries transfer resources from depositors or investors to other agents in the economy, they engage in liquidity and maturity transformation. This entails some inherent risks, such as leveraging; maturity or currency mismatch; counterparty, liquidity, and operational risks; and so on. When one or more of these risks materializes, the costs to the affected entity and, potentially, to the economy as a whole can be large. It is therefore important to mitigate the risks through good management on the part of the financial intermediaries and through adequate regulation and supervision.

To the extent that FinTech innovations are related to financial intermediation, they are exposed to the same risks and, therefore, can have either a positive or a negative impact on financial stability depending on how the risks are (or are not) present in these operations and how they are mitigated. Given the diversity of FinTech innovations, it is important to distinguish among the different types, since they do not all assume the same risks or benefits, although there is a good degree of overlap.

In general terms, the benefits of FinTech innovations for financial stability come with risks that must be contained. Thus, even when the innovations can contribute, for example, to increasing financial inclusion, that should not come at the expense of consumer protection[12]/. Similarly, innovations can improve efficiency and reduce the transaction costs of financial services, but they can also amplify a number of existing risks. Furthermore, containing risks can be a difficult challenge for companies with no experience in risk mitigation, as well as for the traditional regulatory and supervisory systems. They can also generate interactions that are difficult to assess and monitor from the perspective of financial stability.

[11]/ The analysis in this section is theoretical and does not take into account legal considerations deriving from the country's legal system.
[12]/ An inadequate framework for financial consumer protection can have adverse effects on financial stability. See FSR Second Half 2010, box VI.1.

Financial inclusion versus consumer protection

Innovations that contribute to financial inclusion involve those that deepen the payment market, giving people who do not participate in the financial system access to payment instruments; and crowdfunding platforms, which give people and firms an alternative funding channel[13]/. While numerous studies suggest that financial inclusion can have both positive and negative effects on financial stability, recent evidence shows that the positive effects outweigh the negative when inclusion occurs within an appropriate regulatory and supervisory framework. Thus, an expansion of financial inclusion can help households be better prepared to manage the impacts of a financial crisis, diversify financial institutions' funding sources, and deepen the financial system (Cihák et al., 2016; Hannig and Jansen, 2010; Morgan and Pontines, 2014; Sahay et al., 2015).

The risks include contagion or loss of confidence among consumers. Moreover, an increase in the supply of financial services outside the circle of formal regulatory and supervisory processes—where consumer protection and market conduct are, in practice, subject to the discretion of each firm—allows companies to sell financial services that are not backed by adequate safeguards and facilitates practices that are conducive to abuse or even pyramid schemes (Bartoletti et al., 2017).

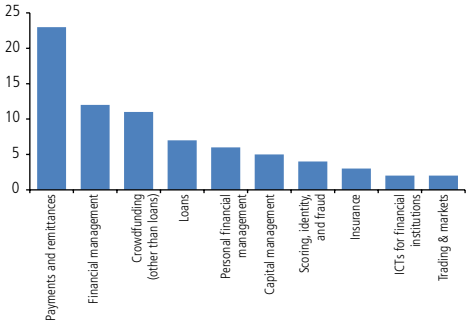
Elements that could be explicitly regulated include, for example, the information that crowdfunding platforms must provide to potential investors; procedures for managing potential conflicts of interest; and, in the case of cryptocurrency brokers and/or custodians, the actions consumers can take if they do not receive the assets they paid for or if the assets are subsequently stolen.

Consequently, a number of countries now subject some of these innovations to supervision by the specialized entities in charge of safeguarding and monitoring market conduct. In the United Kingdom, FCA regulations cover crowdfunding, some ICOs, and contracts for difference (CFDs), as well as other innovations. In Mexico, the FinTech Law specifies that so-called financial technology institutions, which include both crowdfunding and electronic payment funds, must be authorized by the National Banking and Securities Commission and are subject to other regulatory requirements.

Increased efficiency and lower transaction costs versus possible amplification of risks

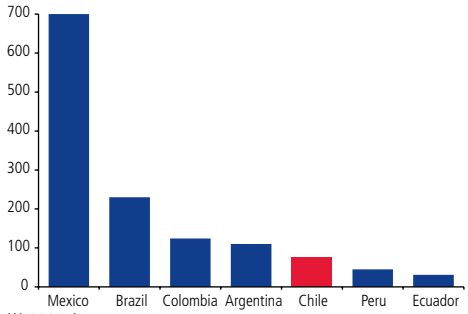
[13]/ There is evidence that this type of platform has increased the supply and liquidity of financial assets for an increasing number of small firms in developed economies (World Economic Forum, 2015) and promoted the use of credit in segments with low banking penetration (de Roure et al., 2016) and in developing countries (CGFS and FSB, 2017).

FIGURE IV.6
FinTech companies in Chile, by business segment (*)
(number)



(*) Data through December 2017.
Source: Central Bank of Chile, based on data from Finnovista.

FIGURE IV.7
FinTech companies, by country (*)
(number)



(*) 2018 data.
Source: Central Bank of Chile, based on data from Finnovista.

Greater efficiency and lower transaction costs are probably the main reasons that new entrants can participate in this industry[14]/. Examples include new intermediation and transaction platforms, robo-advisors, and international remittances using cryptocurrencies. In addition to improving risk assessment, through the combination of more available information and increased processing capacity, the increased efficiency contributes to increasing competition, which should benefit the users of these services.

In the specific case of DLTs applied to financial market infrastructures, a reduction in clearing times would lower the costs associated with margins and guarantees. Another possible benefit is that the distribution of information among different nodes strengthens the system against the risk of operating problems in one of its participants.

At the same time, FinTech innovations can also have a negative impact on financial stability if the associated risks are not duly managed. While these risks are also present in the traditional financial system, in the case of FinTech there are additional factors that can exacerbate the threat.

A first difficulty is regulating and supervising entities with cross-border operations, which can offer services in a country without being physically present or legally constituted in that country. Consequently, coordination with foreign supervisors is critical.

The rest of this section discusses the main financial stability risks to date deriving from the FinTech industry.

(i) Operational and cybersecurity risks. These risks are becoming increasingly important as more technology is incorporated into financial industry processes, but they can represent an even bigger threat in the FinTech industry, given the technological nature of the business and the fact that some of these technologies are very new, so there is no prior experience in their use.

(ii) Asset laundering and terrorist financing. This is always a material risk in financial intermediation, but there are factors that make it even more significant in the FinTech industry, over and above the cross-border nature of many FinTech operations[15]/. These include the difficulty of establishing sufficiently robust know-your-customers procedures, especially in the case of cryptocurrencies, which are pseudo-anonymous; and the fact that the framework for the prevention of money laundering does not necessarily specifically incorporate this type of entity.

[14]/ Digital payments and mobile banking have expanded access to financial services in developing countries, with positive effects on saving and economic growth (Andrianaivo and Kpodar, 2012; Furche et al., 2018; Klein and Mayer, 2011; Ouma et al., 2017).
[15]/ For reference, some studies estimate that 25% of Bitcoin users and 44% of Bitcoin transactions correspond to illegal activities such as drug trafficking (Foley et al., 2018).

(iii) Price risk. A particular risk of the so-called cryptocurrencies is their high price volatility, which can generate huge gains or losses in a short period of time. This is a concern from the perspective of financial stability, to the extent that the effects of losses could propagate through the financial system. Some channels through which contagion could occur are leveraged investments in these assets or the potential exposure of regulated entities through derivative contracts with cryptocurrencies as the underlying asset.

(iv) Finality risk. In the case of DLT applications for financial infrastructures, some experiments indicate that on decentralized DLT platforms, it is not possible to guarantee the finality (unconditionality and irrevocability) of transactions because there is always the possibility, however small, that a payment will be reversed or unwound.

(v) Risk from automation. Process automation, such as the use of algorithms or artificial intelligence, can increase the risk of synchronized market behavior. If several institutions use the same information as the basis for their credit policies or investment decisions, there could be an increase in procyclicality and volatility due to a higher correlation of investment flows. One example of this is a flash crash, when the stock market plunges for no apparent reason, exacerbated by the synchronized behavior of market participants.

For now, the FinTech wave does not appear to represent a major risk to financial stability, primarily because it is still relatively small. The situation could change quickly, however, given how fast some of these technologies are being adopted. Regulators need to incorporate this dimension in their financial stability analysis, although the necessary information for doing so is not always possible given that these entities are outside the regulatory perimeter.

FINTECH INDUSTRY IN CHILE

FinTech companies operate in a variety of areas in Chile. According to Finnovista, there were 75 FinTech startups in the country last year, an increase of 34% over 2016. These companies are mostly dedicated to capital management, business financial management, crowdfunding, and payments (figure IV.6). In Latin America, Mexico, Brazil, Colombia, and Argentina have more FinTech startups than Chile (figure IV.7). Few of these companies are currently involved in regulated activities.

Because the development of the FinTech industry is relatively recent[16]/, and a large share of their operations do not require registration or prior authorization,

[16]/ The IDB estimates that 60% of FinTech companies in Latin America started up between 2014 and 2016 (IDB, 2017).

information on the magnitude of the industry is scarce, deriving mainly from surveys or information that the companies choose to divulge.

In terms of relevance as financial sector participants, some of these companies have recorded high growth rates, but they are still relatively small. Nevertheless, it is important to consider not only the amounts involved, but also the number of people who do business with these financial services providers. If a lot of people are affected, problems in a few companies could potentially undermine public confidence.

Finally, although FinTech companies are not subject to a specific legal or regulatory framework, that does not mean that they are completely unregulated. The regulatory perimeter is founded on a number of laws and regulatory bodies, which establish requirements for the provision of specific financial services. Additionally, the more general regulatory framework—such as the guidelines on the prevention of money laundering and terrorist financing, consumer protection, and tax regulations—in principle does not require specific guidelines for compliance.

CONCLUSION

The CBC is closely watching the development of the FinTech industry, at both the local and international levels, including the regulatory responses of different jurisdictions[17]/, the so-called regulatory sandboxes[18]/, and technology accelerators. To keep up with and understand the different innovations, the Bank has made technology a priority in its 2018–2022 Strategic Plan[19]/.

The financial system could benefit from these innovations, for example, through improvements in financial inclusion, increased competition, efficiency gains, and cost reductions for consumers. However, these innovations also raise risks for financial stability, and it is important to ensure that these risks are adequately mitigated.

[17]/ The so-called FinTech Lay in Mexico establishes a legal framework for this type of activity, confers powers to the regulators, and should provide clarity to the regulated companies.
[18]/ The United Kingdom's FCA defines sandboxes as a "safe space" where companies can test innovative products and services, business models, and delivery mechanisms, without immediately incurring the normal regulatory consequences of carrying out the activity in question. Herrera (2018) argues that regulatory sandboxes are a cost-effective tool for regulators to learn first-hand what FinTech companies are doing, in order to implement a balanced regulation proportional to their business, without hindering innovation.
[19]/ One of the five priorities of the Central Bank's 2018–2022 Strategic Plan is to improve the Bank's capacity to understand, manage, and incorporate technological changes, in relation to both its operations and management and its institutional objectives. There are three related lines of action: (i) technology observatory, (ii) TechLab, and (iii) FinLab.

Although the risks are estimated to be relatively small due to the early stage of development of the sector, the situation could change quickly and unexpectedly. It is thus important to increase the quantity and quality of the available information, so as to be able to anticipate potential risks.

With regard to the regulatory framework for this industry, financial regulation is justified to the extent that market operations involve the public faith and personal savings; there are information asymmetries between suppliers and demanders of financial products and services; and there are externalities that make the social cost of a crisis exceed the private cost and the cost of regulatory compliance. When these elements are present, a regulatory perimeter is defined, which can and should be modified when there is evidence of the existence of situations that carry a risk to financial stability and merit some type of regulation[20]/.

At the same time, the CBC will become directly involved only in those regulatory aspects where it has explicit authority, such as issues relating to the means of payment and foreign exchange operations. Other issues fall under the jurisdiction of other authorities, and it may well be the case that financial innovation exposes regulatory vacuums that necessitate new laws or the modification of existing laws.

The diversity, growth, and speed of FinTech innovations described in this chapter show that the regulation of this industry is a very complex task. The most immediate challenges include the risks to which users of so-called cryptocurrencies are exposed; the rise of entities that are performing financial system functions, but are outside the supervisory perimeter; and the growing cybersecurity threats.

The coordination of the different authorities is critical in this area, due to the possible intersection of regulatory powers and responsibilities that could arise in relation to FinTech operations. It is also important to monitor the cross-border dimension of FinTech innovations, which by nature could result in regulatory arbitrage and/or complicate the application of local regulations. This highlights the importance of coordination with regulators outside the country.

[20]/ See FSR First Half 2016 (box V.2) for a discussion of the foundations for financial regulation and the definition of the regulatory perimeter.

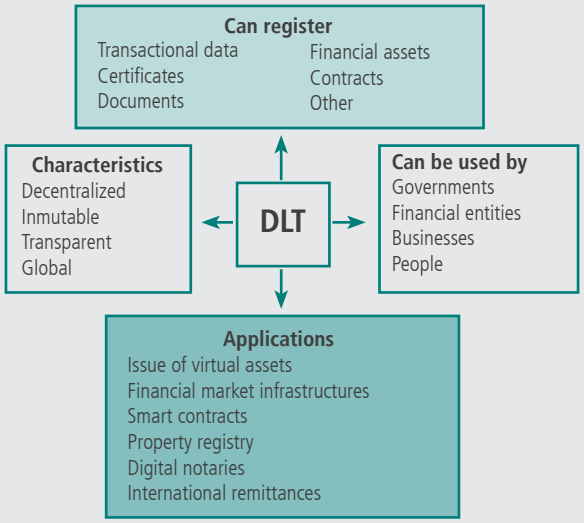
BOX IV.1
DISTRIBUTED LEDGER TECHNOLOGIES

FinTech innovations have a lot of potential impacts on financial system functions, many of which are possible thanks to the use of distributed ledger technology (DLT).

A DLT is a system for recording and storing data. DLTs have the following characteristics: (i) data are distributed across multiple users and managers or nodes; (ii) they follow a specific protocol; and (iii) they are based on cryptographic systems. DLTs can be either centralized or decentralized, depending on who has access to and/or can alter the ledgers[1]/.

The major potential advantages of DLTs over traditional ledger systems managed by a central administrator include the following[2]/: (i) the difficulty of altering or falsifying records, since they are practically immutable; (ii) transparency, since users can see the ledgers; (iii) auditability, since users can track transactions; (iv) efficiency; and (v) low cost[3]/ (diagram IV.1).

DIAGRAM IV.1
Main characteristics of DLT



Source: Central Bank of Chile.

[1]/ Blockchain is a decentralized DLT that anyone can access and modify, if they meet the operating requirements for doing so.
[2]/ Bank of Canada, "FinTech: Is This Time Different? A Framework for Assessing Risks and Opportunities for Central Banks," Staff Discussion paper (2017).
[3]/ One of the criticisms of blockchain is its high consumption of electricity and computer processing resources.

The potential advantages of DLTs have led to the development of innovations that could be more disruptive to the functioning of the financial system in the future and could potentially introduce levels of disintermediation in this industry. To date, these innovations include cryptoassets, which represent new ways of operating for the financial market infrastructures (FMIs), and smart contracts. This box reviews the characteristics, potential uses, and possible risks of these applications.

Cryptoassets

Cryptoassets that are meant to function like banknotes and coins issued by central banks are know as cryptocurrencies. They are founded on the technical possibility of issuing digital assets that are irreplicable and immutable, by being transferred through a DLT. The bitcoin is the best-known example of this type of asset.

For this type of DLT to work, it requires people, known as miners, to act as system nodes and make available their computer processing capacity (and the associated electricity), so that the ledgers are updated whenever transactions occur. The miners' incentive for performing this function is a payment in cryptoassets for the first person to solve a difficult mathematical problem that is easy to verify once solved.

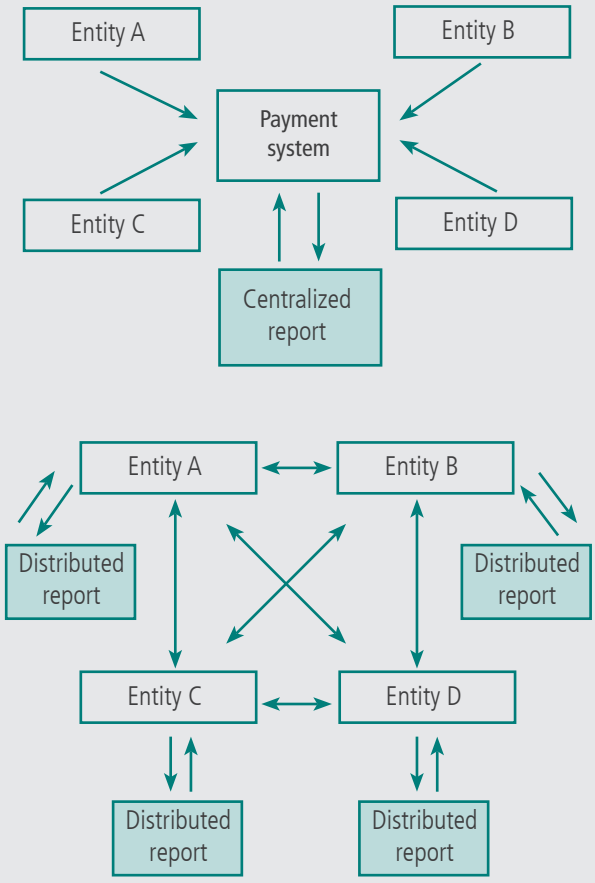
Another type of cryptoasset acts like a security, such as a stock, in that it confers equity rights over the issuer. This is the case of initial coin offerings (ICO), which raise capital in exchange for digital tokens.

Possible uses of DLTs in financial market infrastructures

The potential benefits of DLT are closely related to the needs of FMIs, such as central counterparties, clearing houses, and payment systems. For example, the basic function of a securities clearing house is to allow users to exchange securities using robust security protocols, which in theory could be done with a DLT at a low cost and with a minimum margin of error.

For FMIs to function properly, the different parties need to have confidence in the system, which traditionally was ensured through the existence of a central administrator. DLTs would allow the elimination of this administrator without a loss in confidence since, at least in theory, the nature of the technology directly ensures the recording and immutability of transactions. They could also make the system more resilient to crashes deriving from operational problems with one of the participants (diagram IV.2). In DLT experiments for FMIs, only a limited number of participants are authorized to manage the ledgers, and no miners are involved in the operations.

DIAGRAM IV.2
Centralized technology versus DLT in FMIs
(centralized ledger and distributed ledger)



Source: Central Bank of Chile.

DLTs allow transaction orders, clearing, and settlement to be executed in a single step. Currently, orders occur in a matter of microseconds, but clearing and settlement can take days, incurring margin and guarantee costs. A DLT infrastructure with known users could combine the roles of centralized markets and over-the-counter contracts, increasing transparency, information, competition, and liquidity, as well as reducing operating costs (Cong and He, 2018; Malinova and Park, 2016).

The possibility of developing new DLT-based FMIs in the future has captured the interest of the Basel Committee on Payments and Market Infrastructures (CPMI), which has analyzed the use of this technology[4]/, including whether DLTs would comply with the principles for FMIs[5]/. For example, one pilot experiment showed that it is not clear how some decentralized DLTs could comply with the principle of transaction finality (unconditionality and irrevocability)[6]/.

Smart contracts

Smart contracts, in which DLTs are used to record contractual commitments or agreements between two or more parties, have the potential to produce changes even beyond the financial system. These immutable contracts establish that, under specific circumstances or conditions, predefined actions will be self-executed, without the need for an intermediary. For example, it is possible to register a rental contract on a DLT that includes a clause for self-executing guarantees, which would provide a greater degree of protection than is currently provided under traditional contract systems.

Other examples include pilot experiments with digital notaries, which allow the custody and trading of real estate, precious metals, international remittances, or digital assets. Applications have also been developed for managing electricity networks and state archives (such as health, education, or identification services). In Chile, the National Energy Commission recently announced that it will use this technology to certify the quality of public data on the national electricity sector.

[4]/ "Distributed Ledger Technology in Payment, Clearing, and Settlement" (CPMI, 2017).
[5]/ Joint Committee Report on Risks and Vulnerabilities in the EU Financial System (2017).
[6]/ Chapman et al. (2017).

Final considerations

The potential benefits of distributed ledger technology lie not only in making existing processes more efficient, but also in potentially changing the way financial transactions are carried out in the future. Under some scenarios, this technology could eliminate functions or entities that currently have a role in the financial system (CPMI, 2017).

However, despite the potential benefits, this technology also carries risks, including operational and behavioral risks, which must be duly taken into account by the regulators.

For example, the use of smart contracts on DLT networks could increase a liquidity crisis through the incorrect use of collateral and possible market collusion (Cong and He, 2018). There could also be malicious attacks on one or more DLT nodes, in an effort to alter existing transactions or incorporate fictitious transactions. Finally, DLTs in which the participants are pseudo-anonymous are conducive to money laundering and the exchange of illicit goods, as discussed in box IV.2.

At the international level, several financial institutions such as banks and stock exchanges, as well as some central banks (Brazil, Canada, United Kingdom, and Singapore), have invested in developing this technology and conducting proof-of-concept tests and analysis. In the case of central banks, efforts have centered on large-value payment systems. Preliminary results suggest that the benefits of centralized systems are not always clear, and improvements are needed before DL technology can be widely adopted.

BOX IV.2
CRYPTOASSETS

Cryptoassets are a type of asset generated using distributed ledger technology (DLT) (Box IV.1). They can have a wide range of functions, such as representing a security, understood as an equity right vis-à-vis the issuer, or being used as a means of payment and serving functions similar to money. In the latter case, crypoassets are commonly called cryptocurrencies, the focus of this box. Chapter IV analyzes cryptoassets from a broader perspective.

Money serves three functions: (i) a medium of exchange or payment; (ii) a unit of account; and (iii) a store of value. Whether or not cryptoassets fulfill these functions is a common issue in international financial policy discussions. The consensus in these circles is that they do not, at least for now.

Cryptocurrencies are not a good medium of exchange, since they are of limited acceptance. No country has recognized them as legal tender, so no one is obligated to accept them to settle a liability. Furthermore, the way they work implies that it takes longer to validate a transaction than under traditional alternatives. Their high price volatility limits their use as a unit of account or a good store of value. This is partly due to the fact that there is no issuer to ensure the stability of the asset's value[1]/.

When a centralized entity like a central bank issues money, that issue represents a liability for the entity, which must carry a corresponding asset on its balance sheet. The liability is further backed by intangible assets in the form of the issuer's reputation and the public's trust. Furthermore, the issuer usually has the stated objective of maintaining the value of the currency over time. These properties uphold the public faith and lead participants in the economy to accept the legally issued money.

None of these properties apply to cryptocurrencies, which are issued or made available to the public by private developers, using decentralized technologies and operating outside any jurisdiction. There is no clear governance structure and no balance sheet, and the currency is not backed by user confidence or the expectation that others will be willing to exchange the cryptocurrency for goods, services, or money.

[1]/ Centralized currencies do not always fulfill these roles, as in the case of hyperinflation. When this occurs, the public looks for substitutes, such as the currencies of other countries.

The private issue of currency that is not part of the money supply is not something new. The innovative feature of cryptocurrencies, in addition to the underlying technology, is that they have a global reach, with no regard for borders or regulatory frameworks.

Some central banks are experimenting with digital currencies, some based on DLTs and some not. The incentives are various: in some cases, the goal is to reduce operating costs, counterfeit risks, and other problems associated with cash currency, while in others, such as Sweden, the idea is to give the public access to money from the Central Bank in a scenario of strong substitution of cash for electronic money. These experiments are in the very early stages, so the potential consequences are not discussed in this chapter.

Diagram IV.3 outlines some of the most common terms used in this discussion.

DIAGRAM IV.3
Money and its potential substitutes

<table>
<tr><td rowspan="4">Money issued in a centralized system</td><td rowspan="2">Central Bank money</td><td>Cash (bills and coins)</td><td rowspan="2">Digital currency issued by the Central Bank (possible)</td></tr>
<tr><td>Central Bank deposits</td></tr>
<tr><td colspan="2">Commercial bank money</td></tr>
<tr><td colspan="2">Electronic money</td></tr>
<tr><td rowspan="2">Potencial substitutes</td><td>Digital or virtual</td><td colspan="2">Cryptoassets or tokens (e.g., bitcoin, ethereum, ripple)</td></tr>
<tr><td>Physical</td><td colspan="2">Physical tokens, commodities, privately issued bills (e.g.,: issued by local authorities)</td></tr>
</table>

Source: Central Bank of Chile.

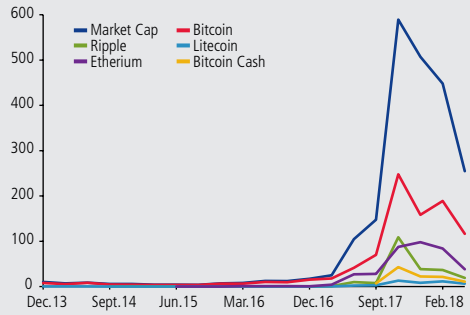
Cryptocurrencies are not the same as electronic money. The latter is a digital representation of cash currency that allows users to utilize credit extended by a specific issuer or to store funds on a device (typically a card or a phone) or on the Internet for the purpose of making payment trasnactions[2]/.

[2]/ European Union Directive 2009/110/CE defines electronic money (e-money) as "electronically, including magnetically, stored monetary value as represented by a claim on the issuer which is issued on receipt of funds for the purpose of making payment transactions… and which is accepted by a natural or legal person other than the electronic money issuer."

Development of the cryptoasset market

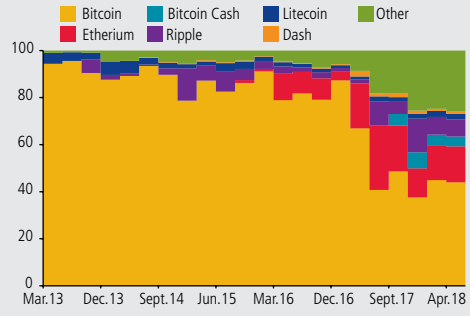
In recent years, the number of cryptocurrencies has increased significantly, as has their market capitalization (figure IV.8). It began in 2008, with the publication of the seminal bitcoin paper[3]/, There are currently over 1,500 cryptocurrencies, which together have a market value of over US$300 billion. Although it has lost market share, bitcoin continues to dominate over other cryptoassets, accounting for 43% of this type of asset transaction (figure IV.9). Finally, cryptoasset ownership is highly concentrated. Various estimates indicate that approximately 95% of bitcoins are held in 4% of digital wallets in the system (figure IV.10)[4]/.

FIGURE IV.8
Cryptocurrency market capitalization
(US$ billion)



Source: Central Bank of Chile, based on data from coinmarketcap.com and cryptocurrencychart.com.

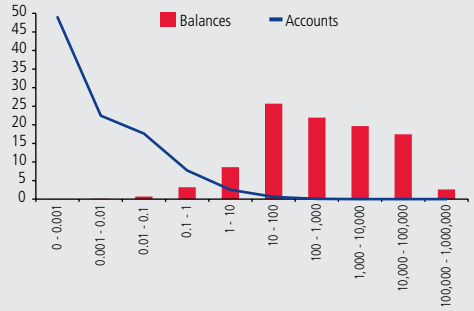
FIGURE IV.9
Cryptoasset market share



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

[3]/ Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System" (2008).
[4]/ It is possible to find out the account in which each bitcoin is held, but it is not possible to uncover the identity behind these accounts, some of which may thus pertain to entities that are holding the assets in custody for third parties.

FIGURE IV.10
Concentration of bitcoin holdings
(percent, April 2018)

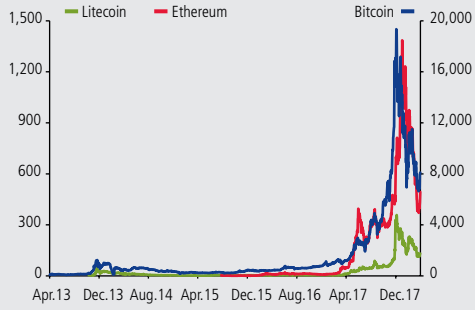


Source: Central Bank of Chile, based on data from BitInfoCharts.

Underlying risks of cryptocurrency development

An important source of risk with this type of asset derives from their high price volatility (figure IV.11). Moreover, cryptocurrency brokers and custodians are not regulated; they can be constituted in any jurisdiction; and it is very hard to know with any certainty whether they employ appropriate operational and cybersecurity risk mitigation measures.

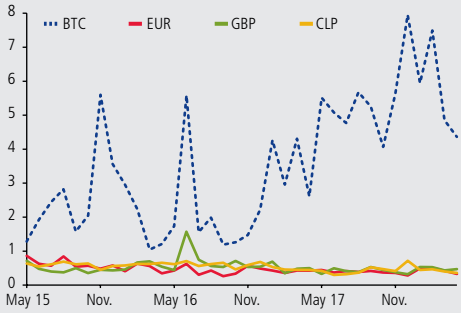
FIGURE IV.11
Selected cryptocurrencies price
(US$/unit)



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

With regard to price volatility, the evidence indicates that cryptocurrencies are much more volatile than traditional currencies (figure IV.12). Thus, investments in these assets can generate very large returns in a short period—or equally large losses.

FIGURE IV.12
Volatility of dollar exchange rate
(monthly average of 5-day coefficient of variation)



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

With regard to brokerage and custody, there have been several international cases of theft from unregulated entities providing custody services, resulting in total loss for the clients. In the event that brokers do not deliver the cryptoassets for which they receive payment, or even when they do not exist, it can be very difficult to take legal action, because they may be constituted in jurisdictions with weak supervisory and regulatory systems.

Countries have adopted a range of approaches for dealing with these entities. While some jurisdictions have tried to impose limitations, others have sought to bring them into the regulatory perimeter, requiring them to register with a supervisor and imposing market conduct measures for consumer protection and standards for the prevention of money laundering and terrorist financing.

In fact, money laundering and terrorist financing are first-order concerns. The global reach of cryptoassets facilitates the large-scale cross-border transfer of resources, many of which are pseudo-anonymous. That is, while it is possible to fully track the movements of these assets, it is not necessarily possible to uncover the identity of the owners of the accounts or digital wallets in which they are deposited.

Thus far, the direct exposure of financial institutions to cryptoassets appears to be limited. They could have indirect exposure, however, to the extent that they are giving loans to people or firms that acquire these assets, which could have negative effects in the event of a sharp price reversal. Moreover, exposure could increase with the expansion of products such as derivatives with cryptocurrencies as the underlying asset, which have been available in the United States since last year.

Regulatory situation in Chile

Ten years after the introduction of cryptoassets, several jurisdictions have developed a regulatory response, depending on the specific circumstances, mandate, and powers of the authorities involved. Thus, the adopted approaches include trying to prohibit or restrict cryptoassets and the associated activities (brokerage and ICOs), warning the public about the risks, and explicitly incorporating activities such as brokerage and ICOs in the regulatory perimeter. No monetary authority has defined or recognized cryptocurrencies as money or legal tender.

In Chile, the Financial Stability Board has analyzed whether the expansion of development activities involving so-called cryptocurrencies represents a relevant risk for the Chilean financial system. In April, the Board issued a public warning on the risks associated with buying and holding these assets and agreed to continue analyzing and monitoring developments in this area. Thus, the regulatory response has been in line with other countries.

In Chile, there are no impediments to people conventionally accepting cryptoassets in exchange for goods or services, as they might exchange or barter any other asset[5]/. Nevertheless, it is important to bear in mind that the legal framework does not recognize cryptoassets as legal tender or currency[6]/.

The FMC, in turn, has established that under the current legal framework, cryptoassets do not constitute securities for the purposes of the Securities Market Law. Consequently, the entities involved in brokering these assets are not subject to the FMC supervisory perimeter.

From a legal perspective, in the event that a more extensive regulatory response is deemed necessary, so as to bring cryptoassets and related activities inside the regulatory perimeter, the legislative framework would need to be modified. This is an open discussion, which should take into consideration the experiences of other jurisdictions, such as Mexico and the United Kingdom.

[5]/ The principle of freedom of choice.
[6]/ Legal tender is made up of banknotes and coins issued by the Central Bank, in virtue of the power vested in the institution as sole issuer (Article 28 ff. of the Basic Constitutional Act); and documents that are legally recognized as representing a monetary commitment, such as personal checks, cashier's checks, bills of exchange, and promissory notes. Foreign exchange is defined in the Basic Constitutional Act as banknotes and coins from foreign countries, regardless of denomination or physical characteristics, and bills of exchange, checks, credit cards, payment orders, promissory notes, bank drafts, and any other document that constitutes a payment obligation in that currency.

V. FINANCIAL REGULATION

This chapter reviews the most important issues in the debate on financial regulation at the local and international levels in the first half of 2018.

NATIONAL REGULATION

REGULATION ISSUED BY THE CENTRAL BANK

New chapter on the payment systems

Following a public consultation, the CBC issued the new Chapter III.H of its Compendium of Financial Regulations (CFR), which establishes a general regulatory framework for the payment systems, explicitly endorsing and requiring compliance with the Principles for Financial Market Infrastructures (PFMI)[1]/.

Consequently, the real-time gross settlement (RTGS) system, managed by the Central Bank of Chile, and the local-currency large-value clearing house (CCAV), managed by Combanc S.A., must comprehensively comply with the PFMIs.

This general regulatory framework does not replace specific regulations applicable to these systems, which remain fully in force and which now correspond to Chapters III.H.4 and III.H.4.1 (in the case of the RTGS system) and Chapter III.H.5 (in the case of the CCAV) of the Compendium of Financial Regulations.

Through the new regulations, the Bank reinforces its dedication to following and safeguarding a set of internationally accepted standards and contributes to fulfilling the commitment assumed in January 2017 by the Ministry of Finance, the CBC, the SBIF, the Superintendence of Pensions, and the SVS (now the FMC), according to which each authority will gradually implement the PFMIs in accordance with its respective regulatory and supervisory framework.

[1]/ See FSR Second Half 2016 (box VI.1).

New norms on the recognition and regulation of master agreements for bilateral derivative contracts

In April, a new Chapter III.D.2 was incorporated into the Compendium of Financial Regulations, following a public consultation, to improve the Bank's regulations on master agreements for derivative contracts and the applicable terms and conditions.

The main objective is to move toward the greatest possible convergence with international recommendations and practices.

The new regulation specifically establishes that the parties to these agreements who opt for the new voluntary scheme under the new regulatory guidelines can freely enter an agreement on the acceleration (early calling) and corresponding close-out netting of the respective contracts.

However, in the event of specific crisis situations prior to forced liquidation (which are identified in Appendix 2 of the Chapter), affecting a bank or other institutional investor, there is a mandatory period of two business days from the date of the respective event, prior to the execution of the close-out netting process. This mechanism is possible only when the aforementioned process is executed at the express request of the counterparty that is not affected by the situations identified in the regulation, such that it cannot be an automatic acceleration.

Furthermore, in these cases, the payment of the balance resulting from the close-out netting will be enforceable only after the crisis has been normalized or a forced liquidation or bankruptcy process initiated, whichever comes first.

Public consultation on proposed regulatory limits for short-term liquidity, as part of Basel III

In May, the Central Bank opened a public consultation to modify its regulation on banks' liquidity risk management, contained in Chapter III.B.2.1 of the Compendium of Financial Regulations.

In 2015, the CBC issued a new regulation on banks' liquidity risk management following the Basel III guidelines on qualitative and quantitative aspects, including the incorporation of new short- and long-term liquidity measures—namely, the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR), respectively. At that time, the Basel III liquidity ratios were incorporated solely as a reporting requirement, without establishing a regulatory limit on their levels.

Following implementation by the SBIF, banks began to report these indicators to the supervisor in March 2016. Since then, a sufficient data history has been accumulated for the CBC to move forward on the second phase announced in 2015: establishing a regulatory limit for the LCR.

The Central Bank's analysis shows that banks have progressively strengthened their liquidity position, as measured by the LCR, which was designed for measuring short-term liquidity under a systemic stress scenario. At the system level, the LCR increased from approximately 75% to 135% between March 2016 and March 2018. Given this improvement, and the fact that the indicator is being fully applied in a large number of jurisdictions in the context of the international implementation of Basel III, it is time to move forward on imposing a minimum limit[2]/.

Specifically, the published proposal introduces a calendar for the gradual implementation of a floor for the LCR, equivalent to the Basel proposal. Thus, starting in October 2018, the required minimum for the LCR will be 60%, which will increase by 10 percentage points a year until converging with a required minimum of 100% starting in October 2022. Other adjustments have also been introduced to facilitate a more efficient liquidity risk management by the banks.

This represents an important step in complying with the Basel III recommendations on short-term liquidity risk, reaching full convergence in 2022.

In this context, it is essential to do the same with the Basel III bank solvency requirements, once the banking legislation reform, presented in June 2017, has been passed. These standards incorporate mechanisms for containing systemic risks through additional capital charges for systemically important institutions, macroprudential tools, countercyclical buffers, and greater sensitivity of the minimum capital requirements to the different risks that affect bank management (credit, market, and operational risks). These standards have similarly been implemented by a large number of jurisdictions[3]/.

The implementation of these regulatory standards in Chile has become even more critical with the finalization of Basel III (see box III.1).

[2]/ In March 2018 the 27 member jurisdictions of the Basel Committee adopted the LCR. Approximately 70 nonmember jurisdictions are expected to issue LCR regulations by late 2018. See BIS, "Fourteenth Progress Report on Adoption of the Basel Regulatory Framework" (April 2018) (www.bis.org/bcbs/publ/d440.htm); and BIS, "Implementation of Basel Standards: A Report to G20 LEADERS on Implementation of the Basel III Regulatory Reforms" (July 2017) (www.bis.org/bcbs/publ/d412.htm).

[3]/ In March 2018 the 27 member jurisdictions of the Basel Committee adopted the risk-based capital standards, and in 26 of these jurisdictions the regulatory frameworks on countercyclical buffers and capital charges for systemically important banks are in force. See BIS, "Fourteenth Progress Report on Adoption of the Basel Regulatory Framework" (April 2018) (www.bis.org/bcbs/publ/d440.htm).

Proposal to end the calculation and publication of the reference exchange rate and the associated currency basket

The CBC published the reference exchange rate (dólar acuerdo) daily from 1983 to 10 January of this year. The rate was calculated based on a reference basket of currencies, which at the end of the period was made up of 80% U.S. dollars, 15% euros, and 5% yen.

The reference exchange rate fulfilled several functions. It was a benchmark for CBC exchange operations and an accounting representation of the Bank's foreign currency assets and liabilities. It was also part of foreign exchange policy from 1984 to 1999, when the floating exchange regime was adopted. From 1986 to 1991, it was used in the issue of promissory notes denominated in dollars and payable in pesos. None of these functions are currently performed.

In this context, and in line with the Bank's 2018–2022 Strategic Plan, which includes modernizing and updating foreign exchange regulations, the decision was made, following a public consultation, to discontinue the calculation and publication of the reference exchange rate and the associated currency basket.

REGULATION ISSUED BY OTHER AUTHORITIES

Updated SBIF regulations on bank capital requirements, with regard to derivatives exposure

The Superintendence of Banks and Financial Institutions (SBIF), following the recommendations of the Basel Committee on Banking Supervision (BCBS), established an applicable risk weight of 2% on exposure from derivatives that are settled and cleared through a central counterparty (CCP).

Thus, the SBIF has updated its capital requirements for exposure to CCPs, in recognition that although this exposure does carry a residual risk, this risk is much lower than in the case of bilateral clearing (directly between two parties). There is a broad international consensus on providing incentives to use CCPs, as evidenced in international standards and agreements, since they contribute to the reduction of financial risks, especially liquidity and operational risks.

SBIF regulations on outsourcing services through cloud computing and cybersecurity

In December 2017, the SBIF established minimum conditions that financial institutions must meet for outsourcing services using "cloud" technology, so as to mitigate the associated risks.

In January, the Superintendence issued regulations establishing requirements and guidelines on cybersecurity, which are mandatory for banks. Thus, SBIF

oversight will incorporate the evaluation of critical cybersecurity infrastructure management, including the physical infrastructure, hardware, and technology systems that store, manage, and support information assets that are critical for the functioning of the business and that, in the event of a malfunction, put the confidentiality, integrity and availability of the data at risk.

The main elements for managing cloud outsourcing and cybersecurity have been formally incorporated into the traditional SBIF solvency and risk management processes.

The operational resilience of banks is extremely important for the proper functioning of the payment systems. As is common knowledge, in March a number of banks and one card operator were affected by operational difficulties, causing problems for their customers. While the payment systems as a whole were not affected, and the large-value payment systems operated normally, the RTGS system extended its operations, as it has in the past, so as to avoid problems in clearing payment instructions issued by the affected banks. In this context, the new SBIF regulations should contribute to improving operational resilience, without diminishing the initiatives and best practices that the supervised entities can and should adopt voluntarily.

New risk-based supervision model for pensions funds and the unemployment fund

Following a public consultation, the Superintendence of Pensions (SP) approved in December of last year a new risk-based supervision (RBS) model for the pension fund managers (PFMs) and the unemployment fund manager (UFM), which went into effect on 1 May.

The objective of the new methodology, which replaces the approach used since 2010, is to improve the supervised entities' ability to identify, monitor, control, and mitigate the most critical risks they face.

In particular, the new model aims to push the PFMs and the UFM to better manage the risks that represent the greatest threat to the services they provide to their members and beneficiaries. The risks incorporated in the analysis include reputational, strategic, and market conduct risks.

Public warning on the risks of cryptocurrencies

At two meetings this year, Chile's Financial Stability Board (FSB) analyzed whether the expansion of developments in so-called cryptocurrencies represents a significant risk for the Chilean financial system, and a working group was established to continue monitoring the issue.

While the FSB considers that these assets do not currently represent a threat to financial stability, the members chose to issue a public warning, through a press release, on the risks associated with buying, holding, or investing in this type of asset. These risks include sharp price fluctuations, potential difficulties in selling or trading the assets, the absence of traditional assets as a guarantee in most cases, and potential losses from theft, fraud, or information problems. Box IV.2 provides more details on these assets and the main associated risks.

INTERNATIONAL REGULATION

International regulatory agenda

An essential development in international financial regulation in the last half was the finalization of the Basel III standards, published by the BCBS (a BIS committee). The publication, which represents the end of a reform process begun in 2010, includes the definitive guidelines for adopting the measures over the coming years. Thus, the BIS continues to support the international regulatory response to the global financial crisis (see box V.1).

As mentioned in the last FSR, the current U.S. administration has promoted a discussion to reconsider key aspects of the Dodd-Frank Act (DFA) of 2011, based on their adverse effects on banking.

In principal, this initiative would seem to imply a radical change in the regulatory framework in that country. Recently, however, the discussion has tended toward more modest proposals, most of which aim to alleviate the regulatory burden and modify some standardized restrictions so as to tailor them to individual institutions, especially in the case of smaller banks.

Thus, in March, the U.S. Congress reached a wide consensus to approve a partial reform of the DFA, which mainly exempts small banks from the requirements of the Volcker Rule[4]/ and reduces the regulatory reporting burden. The proposal also increases certain thresholds for stress tests and capital exercises. The initiative is more in line with the U.S. Treasury's proposed legal reform, representing a limited adjustment to the law in comparison with the bill known as the Financial CHOICE Act, which was introduced to Congress in 2016.

[4]/ The section of the DFA that limits the activities of banks that take in deposits from the public and are backed by government guarantees. See FSR Second Half 2013.

In additional, authorities such as the U.S. Federal Reserve and the FDIC have tended to converge on the idea of incorporating measures to alleviate the regulatory burden for certain entities, provided that the security and solvency of the financial system are not affected. In practical terms, in early April, the Fed published two proposals for public consultation, both to relax bank capital requirements. The first aims to adjust capital requirements from a standardized approach to a model based on the results of stress tests and capital exercises. The second relaxes the supplementary leverage ratio requirements for global systemically important banks (G-SIBs) in accordance with their degree of systemic risk. At any rate, the vast majority of the regulations being proposed and receiving support represent an adjustment of the post-crisis financial regulations in the united States, in the direction of international standards.

Finally, with regard to the impact of Brexit on European financial asset regulation, a discussion is underway to establish a transition period from 29 March 2019 to 31 December 2020, during which European laws will continue to be applied in the United Kingdom. The agreement would apply to international banks, investment firms, insurers, and central counterparties. This initiative would help defer the uncertainty and risks associated with Brexit, but it leaves open the question of what kind of trade and financial agreement will ultimately be adopted by the two economies.

Publication of the SOFR by the New York Federal Reserve

In 2014, the FSB recommended that jurisdictions review the robustness and appropriate use of benchmark rates due to recent cases of manipulation and the decreasing liquidity of unsecured interbank markets[5]/. In response, the most important jurisdictions have each established committees and initiatives to improve the process of defining unsecured interbank rates and to create alternative risk-free rates. On 3 April, the Federal Reserve Bank of New York published the Secured Overnight Financing Rate (SOFR) for the first time, thus becoming the first national authority to publish a new reference rate as an alternative to the London Inter-Bank Offered Rate (LIBOR)[6]/.

[5]/ Financial Stability Board, "Reforming Major Interest Rate Benchmarks" (July 2014).

[6]/ The LIBOR is intended to reflect the cost of interbank funding in the most commonly used international currencies. It is calculated based on a survey of 20 banks that participate in the interbank market in London, so it is not based directly on transactions. It is an unsecured rate, in that it reflects the cost of uncollateralized funding between banks, and it is reported for different maturities, from overnight through 12 months. In addition to the criticisms on the low interbank transactions backing it, the market and regulators are still smarting from the rate manipulation scandal during the financial crisis, when the survey participants who determine the rate were sanctioned for collusion, trying to reflect higher funding costs. Despite the scandal, the LIBOR is currently used as a benchmark for US$350 trillion in transactions (ICE Benchmark Administration).

The SOFR is based on repurchase transactions, that is, overnight loans secured with U.S. Treasury bonds. The calculation is based on information from multiple financial agents that carry out these transactions. The rate differs from the LIBOR in that it is overnight, secured, and based on real data. The volume of transactions underpinning the SOFR is estimated at US$700 billion, versus US$500 billion for the three-month LIBOR.7 However, the implementation is not without challenges. Because the SOFR is an overnight rate, futures derivatives must be created to generate benchmark rates at different maturities like the LIBOR. Consequently, the creation time and market participation will affect the transition to using the SOFR.

The Financial Conduct Authority of the United Kingdom indicated in July 2017 that it will stop backing the LIBOR as a reference rate in its current form, as of 2021, to be replaced by firmly transaction-based rates. In the meantime, banks and other institutions must plan an orderly transition from the LIBOR to other alternatives. The International Swaps and Derivatives Association (ISDA) is thus working on developing protocols to include clauses that allow transition from the LIBOR to another rate. The ECB, in turn, has created a group with participation by the European Commission, FSMA, and ESMA to identify and adopt a risk-free overnight reference rate.

In general, the managers of reference rates such as the LIBOR, EURIBOR (euro), and TIBOR (yen) have made efforts to improve the transactional basis of the rates. At the same time, improvements in overnight rates like the SONIA (pounds sterling), EONIA (euros), and the new SOFR are making them more attractive for regulators.

[7]/ Federal Reserve Bank of New York, Second Report of the Alternative Reference Rates Committee (ARRC) (March 2018).

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

Date	Organization	Regulation	Material and objectives
01-Dec-2017	FMC	NCG 421	Establishes the basic principles and good practices of reinsurance, as well as information that companies must report to the SVS, in the context of the application of the risk-based supervision (SBR) model.
26-Dec-2017	SP	Resolution 102	Approves the risk-based supervision (SBR) model of Superintendence of Pensions, applicable to pension fund managers (PFMs) and the unemployment fund manager (UFM), to improve their ability to identify, monitor, control and pushing them to better manage the risks that can threaten or affect the services they provide to their members and beneficiaries.
27-Dec-2017	SBIF	Modification of Chapter 20-7 RAN	Establishes minimum conditions that financial institutions must meet for outsourcing services using cloud computing, which they may employ to improve efficiency levels.
29-Dec-2017	CBC	New Chapter III.H of the *Compendium of Financial Regulations*	Endorses the Principles for Financial Market Infrastructures (PFMI) and expressly requires compliance in the real time gross settlement system and the domestic currency large-value clearing house.
10-Jan-2018	CBC	Modification of Chapter I of the *Compendium of Foreign Exchange Regulations*	Discontinues the calculation and publication of the reference exchange rate (dólar acuerdo) and the associated basket of currencies, since they are no longer used as in tool for foreign exchange policy.
24-Jan-2018	SBIF	New Appendix to Chapter 1-13 and N° 2 Chapter 20-8 RAN; Bank Circular 3633; Bank Circular Letter N°1; and S&L Circular Letter N°1	Specifies that banks must incorporate cybersecurity issues in their operational risk management and establishes several aspects of cybersecurity management, such as the definition and management of critical cybersecurity infrastructure and the generation of a database on cybersecurity incidents.
09-Mar-2018	SBIF	Modification of Chapters 12-1 and 12-3 RAN; Bank Circular 3634	Incorporates instructions for computing risk-weighted assets, necessary for determining a bank's minimum capital requirements with regard to derivatives that are cleared and settled through a central counterparty.
19-03–2018	SBIF	Modification of Chapter 1-13 RAN; Bank Circular 3635	Complements the elements of good corporate governance, in order to increase knowledge on the functioning of the Board.
02-Apr-2018	SP	NCG 220	Adds a new chapter establishing prohibitions on pension fund investments in hedge funds.
02-Apr-2018	SP	NCG 221	Clarifies other investments, specified in the regulations, that are not included in the calculation of the variable-income minimum and maximum limits.
09-Apr-201	CBC	New Chapter III.D.2 of the *Compendium of Financial Regulations*	Aligns the regulatory guidelines on the recognition and regulation of master agreements for bilateral (OTC) derivative contracts with international recommendations and best practices, without undermining the financial stability objectives that underlie the regulations issued by the Central Bank, especially when one of the parties is a bank or other institutional investor.

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

Date	Organization	Regulation	Material and objectives
11-Jan-2018	SBIF	Public Consultation Closed Regulations on Credit Risk Provisions	Provides standardized methodologies for computing credit risk provisions for collectively assessed loans, initiated in December 2014 with modifications to the calculation of provision for the residential mortgage portfolio.
27-Mar-2018	UAF	Public Consultation Closed Prepaid Card Issuers and Operators and Any Similar Payment Mechanisms	Establishes due-diligence and know-your-customer measures that are mandatory for prepaid card issuers and operators to acquire adequate knowledge of the people who use their products, as well as applicable elements of the prevention system and additional regulations.
13-Apr-2018	FMC	Public Consultation Closed Regulations on Assets that Make up Insurance Companies' Technical Reserves and Risk-Based Capital	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.
13-Apr-2018	FMC	Public Consultation Closed Increase in Limit by Issuer for Investment in National or Foreign Mutual and Investment Fund Shares; Loosening of Requirements for Investment in Syndicated Loans	Allows insurance and reinsurance companies to diversify their investment portfolios, by increasing, with the appropriate safeguards, their exposure to assets with higher expected long-term returns.

TABLE V.3
List of documents reviewed

Document	Title	Organization	Prudential regulation	Supervision	Transparency and governance	FinTech	Resolution	Other
1	Frameworks for Early Supervisory Intervention	BIS - BCBS		*			*	
2	Revisions to the Minimum Capital Requirements for Market Risk: Consultative Document	BIS - BCBS	*					
3	Pillar 3 Disclosure Requirements: Regulatory Treatment of Accounting Provisions: Consultative Document	BIS - BCBS	*		*			
4	Pillar 3 Disclosure Requirements: Updated Framework	BIS - BCBS	*		*			
5	Basel III: Treatment of Extraordinary Monetary Policy Operations in the Net Stable Funding Ratio: Consultative Version	BIS - BCBS	*					
6	Stress Testing Principles: Consultative Document	BIS - BCBS		*	*			
7	Basel III: Finalising Post-Crisis Reforms	BIS - BCBS	*	*				
8	Sound Practices: implications of FinTech Developments for Banks and Bank Supervisors	BIS - BCBS		*		*		
9	Structural Changes in Banking after the Crisis	BIS - CGFS	*		*		*	
10	Framework for Supervisory Stress Testing of Central Counterparties (CCPs)	BIS - CPMI						*
11	Central Bank Digital Currencies	BIS - CPMI				*		
12	Supplementary Guidance to the FSB Principles and Standards on Sound Compensation Practices	FSB		*				
13	Global Shadow Banking Monitoring Report 2017	FSB	*		*			
14	Governance Arrangements and Implementation Plan for the Unique Transaction Identifier (UTI)	FSB						*
15	Consults on Methodology for Assessing the Implementation of the Key Attributes of Effective Resolution Regimes in the Insurance Sector	FSB					*	
16	Guidelines for Position Calculation by Trade Repositories under EMIR	ESMA			*			
17	Orderly Liquidation Authority and Bankruptcy Reform	U.S. Department of the Treasury	*	*			*	
18	FinTech Action Plan: For a More Competitive and Innovative European Financial Sector	European Commission				*		
19	Commission Proposal for a Regulation on European Crowdfunding Services Providers	European Commission				*		
20	Identifying Market and Regulatory Obstacles to Cross-border Development of Crowdfunding in the EU	European Commission				*		

Source: Websites of each institution.

BOX V.1
TASKS PENDING FOR A MORE ROBUST FINANCIAL MARKET

Over the past several years, The stability of the Chilean financial system has benfited from a legislative, regulatory, and institutional framework of prudential supervision that promotes an adequate risk management and control, as well as a solid macroeconomic situation.

However, the local financial system still has gaps in some areas, not only in terms of the international recommendations developed after the global financial crisis of 2007–2009, but also vis-à-vis the implementation of some earlier standards.

This box identifies some improvements to the local financial regulatory framework that will be necessary to increase the robustness of the financial system in Chile, consistent with its current level of development.

Solvency requirements and risk management for the banking industry

In the area of solvency, international regulatory standards have evolved to require adequate levels of capitalization to cover the different risks associated with banking activity.

Basel I (1988) initially considered capital requirements only for credit risk. However, international standards have advanced substantially since then. An amendment to Basel I included a capital requirement for market risk. Then, in 2006, Basel II added operational risk into the capital requirements and introduced the use of internal models for operational and credit risks. The role of supervision and market discipline was also increased. Finally, after the international financial crisis, a new standard was developed (Basel III), requiring more and better capital, as well as the risk-mitigation tools (box IV.1).

In Chile, banking legislation remains anchored to Basel I. It is therefore crucial for Congress to move forward on the bill to modernize the General Banking Law (henceforth, the GBL reform).

The main objective of the GBL reform is to establish a framework that allows the implementation of solvency standards for the banking industry, thereby closing the gap with Basel III. In particular, the reform bill strengthens Tier 1 capital requirements, includes a capital conservation buffer, and incorporates the possibility of new capital instruments (perpetual bond and preferred stock) as part of regulatory capital. The bill also expands the authority to require a countercyclical capital buffer, impose higher requirements on systemically important institutions, and require additional capital for supervisory purposes (Pilar 2).

Resolution of financial institutions

Resolution refers to the restructuring of an insolvent financial institution using tools to safeguard the public interest, including the continuity of critical functions and financial stability, while also minimizing the cost to taxpayers.

Because the treatment of insolvent financial institutions has proven to be central for the normal functioning of the markets and for financial stability, international organizations have generated a series of standards and best practices, especially in virtue of recent insolvency experiences. In 2014, the Financial Stability Board published a report on the key attributes (KA) of effective resolution[1]/, which mainly provides recommendations for banks or deposit institutions, but also addresses the resolution of insurance companies and financial market infrastructures.

Currently, the implementation of bank resolution tools is the area where the most progress has been made. The most commonly used tools in advanced economies include systems for the purchase of assets and assumption of liabilities, the application of good bank–bad bank strategies, and the transfer of assets and liabilities to a bridge bank.

[1]/ FSB, "Key Attributes of Effective Resolution Regimes for Financial Institutions" (October 2014).

The GBL reform improves the authority's power to face crisis situations, strengthening the early intervention measures and establishing explicit protocols for restoring the solvency of a troubled bank. However, these measures do not strictly incorporate the key attributes in the resolution framework. As a result, the reform strengthens the supervisor's ability to manage a troubled bank in the early phases, but it does not incorporate more advanced resolution tools.

In particular, establishing a more advanced resolution scheme for banks in trouble or on the brink of insolvency will require developing additional legislation, which should be addressed once the current GBL reform is approved.

A more advanced scheme will also need to be developed for the financial market infrastructures (FMIs)[2]/, in particular, central counterparties[3]/.It will also be necessary to improve the resolution processes for insurance companies and savings and loan associations.

Deposit insurance

Chile currently has a government guarantee scheme for retail deposits by natural persons, which was included in the legislation after the financial crisis of the 1980s. The objectives of this guarantee are similar to those of deposit insurance in other countries, namely, to limit the risk of bank runs and and to protect the interests of small depositors. This guarantee, like the resolution framework, has never been used, and its stucture has not been altered since it was introduced[4]/.

Another consideration is that in order to guarantee the normal flow of payments in the event of a bank intervention or liquidition, the CBC has the legal obligation to provide the necessary liquidity to back the demand deposits of natural and legal persons. While this is different in nature to a deposit insurance scheme, it fulfills some of the same traditional objectives.

In light of international experience, the implementation of a deposit insurance scheme in line with the level of development of the national financial market should be studied. The current scheme has some characteristics that are not on par with international standards. For example, it is an ex post government guarantee, not a pre-funded deposit insurance scheme, so its capacity to address a given situation will depend on the government's financial position.

Any change in the deposit guarantee (or insurance) system must be consistent with the institutional framework for bank supervision, recovery, and resolution. It should also take into consideration the available evidence that has emerged from the last crisis and subsequent bank intervention and resolution experiences around the world.

Financial conglomerates[5]/

Financial conglomerates have a strong presenece in Chile, where they include not only the traditional financial companies, but also the pension fund managers.

While there are efficiency benefits to the financial sector deriving from the existence of conglomerates, their presence creates space for different sources of systemic risk, such as transparency and contagion problems. These vulnerabilities can imply a risk for financial stability, especially if they affect a bank within a conglomerate.

Chile has a silo-based supervisory framework. Securities and insurance companies are supervised by the Financial Markets Commission (FMC, formerly the Superintendence of Securities and Insurance). The Superintendence of Banks and Financial Institutions (SBIF) has supervisory power over the banking sector, bank subsidiaries, and nonbank credit card issuers. The Superintendence of Pensions (SP) supervises the pension industry.

The current design incorporates strict legal or regulatory hurdles that are useful for dealing with financial conglomerates. At the same time, there historically have been instances of cooperation between the sectoral supervisors, where the Committee of Superintendents has played an important role. However, important challenges remain in this area.

A first step toward strengthening financial supervision would be the integration of supervisory functions in a single entity, as proposed by the GBL reform with the absorption of the SBIF by the recently created FMC.

[2]/ Financial market infrastructures include payment systems, securities clearing systems, central securities depositories, central counterparties, and transaction repositories (TRs).
[3]/ See CPMI/IOSCO, "Resilience of Central Counterparties (CCPs): Further Guidance on the PFMI - Final Report" (2017).
[4]/ The GBL reform increases the coverage of the government deposit guarantee from 90 to 100% and the limit from 120 to 200 UF annually, without modifying the structure.

[5]/ For a more detailed discussion of financial conglomerates in Chile, see FSR Second Half 2013 (box V.I).

If the reform bill is passed, the institutional change would raise implementation challenges in the short term, but it would constitute a significant advance in terms of a more global supervision, facilitating the monitoring of conglomerates through better coordination and access to information. The potential powers of the FMC, as well as the prudential requirements, would still be defined according to the type of supervised entity, with no direct authority at the level of the conglomerate. Thus, the next step would be to start work on measures in this direction.

Risk-based supervision of insurance companies

In addition to their traditional functions, life insurance companies in Chile play a key role in the pension system, through life annuity plans and disability and survivors insurance, which reinforces the need for adequate regulation. The current regulatory and supervisory system in Chile is based on compliance with rules and limits, which does not necessarily adequately capture the risk profile of each company. International recommendations for the regulation and supervision of the insurance industry call for the use of risk-based supervision (RBS) models, centered on a principle-based regulation.

Since September 2011, a draft bill is being discussed in Congress to implement a risk-based supervision scheme, with proposed changes to the regulation and supervision of insurance companies in Chile. The bill introduces the idea of risk-based capital, in line with international good practices, which contemplate quantitative and qualitative requirements for insurance companies, in accordance with their assumed risks, management, and corporate governance, to help them mitigate the risks[6]/. Advancing on this reform is a precondition for truly achieving a consolidated supervisory framework in the future, as indicated above.

Integration of debt information

The main public credit registry in Chile is the debtor database managed by the SBIF, which contains detailed information—both positive (debt) and negative (default)—on all debtors in the banking system. At the same time, private entities collect credit-related information from a variety sources, to which bank and nonbank lenders have access. However, there is currently no single consolidated database covering all types of lenders and both positive and negative information, nor a specific regulation for the treatment of that information.

Nonbank lenders are important actors in the national credit market, accounting for around 40% of the stock of consumer loans, mainly to low-income households. A consolidated credit registry would give lenders access to better information for evaluating loan applications and thus improve their risk management. It would also improve debtors' access to credit, at a lower cost. Finally, it would promote competition in the credit market and provide a valuable tool for financial supervision and the monitoring of financial stability.

Final considerations

In addition to these pending tasks for strengthening the financial market, there are other areas for improvement.

In 2016. the World Bank released the results of its international evaluation of financial market infrastructures, which concluded that Chile has sufficiently developed infrastructures and a clear and transparent regulatory and supervisory framework[7]/. However, it also identified areas for improvement, some of which have yet to be addressed[8]/.

In the case of savings and loan associations, the applicable legal framework needs to be improved, especially in terms of harmonizing the prudential supervision criteria[9]/.

There are also challenges in terms of technological innovations in the financial sector, or FinTech, which are explored in chapter IV of this Report.

Finally, moving forward on the implementation of the initiatives discussed in this box is a high priority in terms of maintaining and consolidating the resilience of the Chilean financial system, which encompasses an increasingly diverse, complex, and interconnected network of people and firms. At the same time, convergence with widely accepted international standards is a precondition for progress on the integration of the Chilean financial system with the rest of the world.

[6]/ The proposal incorporates the recommendations of the International Association of Insurance Supervisors (IAIS) and the approaches developed by the European Union (Solvency II), Canada, the United States, Australia, and others.

[7]/ For more details on the international evaluation of financial market infrastructures in Chile, see the FSR Second Half 2016 (box VI.1).

[8]/ For example, progress has been made on ensuring legal certainty for the payment systems, through the modification of Article 35 of the Central Bank of Chile's Basic Constitutional Act, incorporated via Law N°20,956 establishing measures to boost productivity, passed in October 2016. At the same time, however, the legal framework applicable to central counterparties (Ley N°20.345) needs to be reviewed to clarify mechanisms for mobility and segregation of participants positions and collateral.

[9]/ For more details on the characteristics of S&Ls in Chile and possibilities for improving the regulatory and supervisory framework, see the FSR second half 2017 (box V.2).

REFERENCES

Aaron, M., F. Rivadeneyra, and S. Sohal. 2017. "Fintech: Is This Time Different? A Framework for Assessing Risks and Opportunities for Central Banks." Staff Discussion Paper 2017-10. Bank of Canada.

Abarca, I. 2018. "Desarrollo del crowdfunding en Chile." Working Paper N° 815. Central Bank of Chile.

Adrian, T., R. K. Crump, and E. Moench. 2013. "Pricing the Term Structure with Linear Regressions." Journal of Financial Economics 110(1): 110–38.

Ahmed, S. 2017. "China's Footprints on the Global Economy." Remarks delivered at the Second IMF and Federal Reserve Bank of Atlanta Research Workshop on the Chinese Economy 28 September. Board of Governors of the Federal Reserve System.

Albanesi, S., G. D. Giorgi, and J. Nosal. 2017. "Credit Growth and the Financial Crisis: A New Narrative." NBER Working Paper 23740.

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., C. Medel, and C. Moreno. 2017. "Un análisis del impacto de riesgos financieros externos sobre el premio por riesgo soberano en economías latinoamericanas." Revista de Análisis Económico 32(2): 131–53.

Andrianaivo, M., and K. Kpodar. 2012. "Mobile Phones, Financial Inclusion, and Growth." Review of Economics and Institutions 3(2): 30.

Bank of International Settlements. 2017. "Implementation of Basel Standards." Report to G20 Leaders on Implementation of the Basel III Regulatory Reforms. Basel Committee on Banking Supervision.

Bank of International Settlements. 2018. "Fourteenth Progress Report on Adoption of the Basel Regulatory Framework." Basel Committee on Banking Supervision.

Bartoletti, M., S. Carta, T. Cimoli, and R. Saia. 2017. "Dissecting Ponzi Schemes on Ethereum: Identification, Analysis, and Impact." University of Cagliari. Mimeo.

Basel Committee on Banking Supervision (BCBS). 1988. "International Convergence of Capital Measurement and Capital Standards." Basel, Switzerlandl: Bank for International Settlements.

Basel Committee on Banking Supervision (BCBS). 2010. "Basel III: A Global Regulatory Framework for More Resilient Banks and Banking Systems."

Basel Committee on Banking Supervision (BCBS). 2017. "Basel III: Finalising Post-crisis Reforms." Bank for International Settlements.

Beck, T., A. Demirgüç-Kunt, and R. Levine. 2007. "Finance, Inequality, and the Poor." Journal of Economic Growth 12(1): 27–49.

Bonis, B., J. Ihrig, and M. Wei. 2017. "The Effect of the Federal Reserve's Securities Holdings on Longer-Term Interest Rates." FEDS Notes. Washington: Board of Governors of the Federal Reserve System. April.

Campbell, J., and J. Cocco. 2015. "A Model of Mortgage Default." Journal of Finance 70(4): 1495–554.

Carney, M. 2017. "The Promise of FinTech: Something New under the Sun?" Speech at the Deutsche Bundesbank G20 Conference on Digitising Finance, Financial Inclusion, and Financial Literacy. Wiesbaden Germany.

Central Bank of Chile. 2013. "Encuesta Financiera de Hogares: Metodología y Principales Resultados EFH 2011-12."

Central Bank of Chile. 2015. "Encuesta Financiera de Hogares 2014: Principales Resultados."

Central Bank of Chile. 2014. "Índice de Precios de Vivienda en Chile: Metodología y Resultados." Economic Statistics Research Paper N°107. Research Division and Financial Policy Division. June.

Chan, S., A. Haughwout, A. Hayashi, and W. van der Klaauw. 2015. "Determinants of Mortgage Default and Consumer Credit Use: The Effects of Foreclosure Laws and Foreclosure Delays." Journal of Money, Credit, and Banking 48(2–3): 393–413.

Chapman, J., R. Garratt, S. Hendry, A. McCormack, and W. McMahon. 2017. "Project Jasper: Are Distributed Wholesale Payment Systems Feasible Yet?" Financial System Review. Bank of Canada. June.

Cihák, M., D. S. Mare, and M. Melecky. 2016. "The Nexus of Financial Inclusion and Financial Stability: A Study of Trade-offs and Synergies." World Bank Policy Research Working Paper 7722.

Citi GPS: Global Perspectives & Solutions. 2017. "Digital Disruption Revisited: What FinTech VC Investments Tell Us about a Changing Industry."

Committee on the Global Financial System (CGFS) and Financial Stability Board (FSB). 2017. "FinTech Credit." Bank of International Settlements and Financial Stability Board Report. May.

Committee on Payments and Market Infrastructures. 2017. "Distributed Ledger Technology in Payment, Clearing, and Settlement: An Analytical Framework."

Committee on Payments and Market Infrastructures. 2017. "Recovery of Financial Market Infrastructures: Revised Report."

Committee on Payments and Market Infrastructures. 2017. "Resilience of Central Counterparties (CCPs): Further Guidance on the PFMI. Final Report."

Cong, L., and Z. He. 2018. "Blockchain Disruption and Smart Contracts." Mimeo.

De Roure, C., L. Pelizzon, and P. Tasca. 2016. "How Does P2P Lending Fit into the Consumer Credit Market?" Bundesbank Discussion Paper N°30.

European Commission. 2009. "On the Taking up, Pursuit, and Prudential Supervision of the Business of Electronic Money Institutions." Directive 2009/110/EC.

Federal Reserve Bank of New York. 2018. "The Alternative Reference Rates Committee." Second Report.

Financial Stability Board. 2017. "Financial Stability Implications from FinTech." Financial Stability Board Report. 27 June.

Financial Stability Board. 2017. "Reforming Major Interest Rate Benchmarks: Progress Report on Implementation of July 2014 FSB Recommendations."

Financial Stability Board. 2014. "Key Attributes of Effective Resolution Regimes for Financial Institutions."

Foley, S., J. Karlsen, and T. Putniņš. 2018. "Sex, Drugs, and Bitcoin: How Much Illegal Activity Is Financed through Cryptocurrencies?" Mimeo.

Furche P., C. Madeira, M. Marcel, and C. Medel. 2018. "FinTech y la banca central en la encrucijada." Estudios Públicos 148: 39–78.

Fuster, A., M. Plosser, P. Schnabl, and J. Vickery. 2018. "The Role of Technology in Mortgage Lending." Staff Reports N°836. Federal Reserve Bank of New York.

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

Hannig, A., and S. Jansen. 2010. "Financial Inclusion and Financial Stability: Current Policy Issues." ADBI Working Paper N° 259. Asian Development Bank Institute.

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

Herrera, D. 2016. "Alternative Finance (Crowdfunding) Regulation in Latin America and the Caribbean: A Balancing Act." Discussion Paper N° 480. Inter-American Development Bank.

Herrera, D. 2018. "Sandbox regulatorio en América Latina y el Caribe para el ecosistema FinTech y el sistema financiero." Discussion Paper N° IDB-DP-573. Inter-American Development Bank.

Hufbauer, G. C., M. Noland, S. Robinson, and T. Moran. 2016. "Assessing Trade Agendas in the U.S. Presidential Campaign." PIIE Briefing 16-6. Peterson Institute for International Economics. September.

Ingram, F., and E. Frazier. 1982. "Alternative Multivariate Tests in Limited Dependent Variable Models: An Empirical Assessment." Journal of Financial and Quantitative Analysis 17(2): 227–40.

Inter-American Development Bank and Finnovista. 2017. "FinTech: Innovaciones que no sabías que eran de América Latina y el Caribe."

International Monetary Fund (IMF). 2011. "People´s Republic of China: Spillover Report for the 2011 Article IV Consultation and Selected Issues." Country Report 11/193. July.

International Monetary Fund (IMF). 2016. "Subdued Demand: Symptoms and Remedies." World Economic Outlook (WEO). October.

International Monetary Fund (IMF). 2018. "Cyclical Upswing, Structural Change." World Economic Outlook (WEO). April.

Ito, J., N. Narula, and R. Ali. 2017. "The Blockchain Will Do to the Financial System What the Internet Did to Media." Harvard Business Review. March.

Joint Committee (EIOPA, EBA, ESMA). 2017. "Report on Risk and Vulnerabilities in the E.U. Financial System."

Jones, I., and A. Naudon. 2009. "Dinámica laboral y evolución del desempleo en Chile." Journal Economía Chilena 12(3): 79–87.

Klein, M., and C. Mayer. 2011. "Mobile Banking and Financial Inclusion: The Regulatory Lessons." Policy Research Working Paper N°5664. World Bank.

Kutlina-Dimitrova, Z., and C. Lakatos. 2017. "The Global Costs of Protectionism." Policy Research Working Paper 8277. World Bank.

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

Madeira, C. 2015. "Identification of Earning Dynamics Using Rotating Samples over Short Periods: The Case of Chile." Working Paper N° 754. Central Bank of Chile.

Madeira, C. 2016. "Stress Tests de deuda de consumo en Chile." Mimeo.

Malinova, K., and A. Park. 2016. "Market Design with Blockchain Technology." Mimeo. University of Toronto, Canada. May.

Martínez, J. F., and D. Oda. 2017. "Characterization of the Chilean Financial Cycle, Early Warning Indicators, and Implications for Macro-Prudential Policies." Mimeo.

Morgan, P., and V. Pontines. 2014. "Financial Stability and Financial Inclusion." ADBI Working Paper Series No. 488. Asian Development Bank Institute.

Nakamoto, S. 2008. "Bitcoin: A Peer-to-Peer Electronic Cash System."

Organization for Economic Cooperation and Development (OECD). 2010. "Trade, Policy, and the Economic Crisis." Technical Report. May.

Ouma, S., T. Odongo, and M. Were. 2017. "Mobile Financial Services and Financial Inclusion: Is It a Boon for Savings Mobilization?" Review of Development Finance 7(1): 29–35.

Sahay, R., M. Cihák, P. N'Diaye, A. Barajas, S. Mitra, A. Kyobe, Y. Mooi, and S. Yousefi. 2015. "Financial Inclusion: Can It Meet Multiple Macroeconomic Goals?" IMF Staff Discussion Note N° 15/17. International Monetary Fund.

Shiller, R. J. 1990. "Arithmetic Repeat Sales Estimators." Journal of Housing Economics 1(1): 110–26.

Stansel, S., and J. Millar. 1976. "An Empirical Study of Mortgage Payment to Income Ratios in a Variable Rate Mortgage Program." Journal of Finance 31(2): 415–25.

Superintendence of Banks and Financial Institutions (SBIF). 2017. "Informe de endeudamiento 2017." SBIF. December.

Vandell, K. 1978. "Default Risk under Alternative Mortgage Instruments." Journal of Finance 33(5): 1279–96.

Warnock, F. E., and V. C. Warnock. 2009. "International Capital Flows and U.S. Interest Rates." Journal of International Money and Finance 28(2009): 903–19.

Yermack, D. 2015. "Corporate Governance and Blockchains." NBER Working Paper N° 21802.

World Economic Forum. 2015. "The Future of Financial Services." Final Report. June.

Ziegler, T., E. Reedy, A. Le, R. Kroszner, B. Zhang, and K. Garvey. 2017. "Hitting Stride: The 2nd Americas Alternative Finance Industry Report." Cambridge Centre for Alternative Finance.

GLOSSARY

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.

Assets in lieu of payment: Assets received by a bank or financial institution as full or partial payment of a loan in default.

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.

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 N° 13,196, the interest earned from recognition bonds and the oil price stabilization fund.

Central securities depository: 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.

Contracts for difference (CFDs): An agreement in which the parties exchange the difference in the value of an underlying asset between the date on which the contract is signed and the date it ends. If the value increases, the seller pays the buyer the difference; if the value decreases, the buyer pays the seller the difference. The underlying assets can be currencies, commodity prices, stock indexes, 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.

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

Crowdfunding: Collective or mass financing, where large funds are raised through small donations or investments by many people.

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.

DAX: Stock market index consisting of the 30 largest companies trading 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.

Euro Stoxx 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): U.S. Federal Reserve, the central bank of the United States.

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

Foreign private equity assets: an investment in a firm whose shares are not traded on the exchange, but rather are sold directly to 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.

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.

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.

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), automobile 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: A 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 (RSTED): 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-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: 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.

Term Premium: 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.

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).

ABBREVIATIONS

Achef: Association of Chilean Factoring Firms.
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: Basis points.
CAR: Capital adequacy ratio.
CAT: Cencosud Administradora de Tarjetas S.A.
CBC: Central Bank of Chile.
CBR: Conservador de Bienes Raíces (Real Estate Registrar).
CChC: Chilean Chamber of Construction.
CCP: Central counterparty.
CDBC: Central bank digital currency.
CEF: Consejo de Estabilidad Financiero (Chilean Financial Stability Board).
CEMBI: Corporate Emerging Markets Bond Index.
CGFS: Committee on the Global Financial System.
CNCI: Compendio de Normas de Cambios Internacionales (Compendium of Foreign Exchange Regulations).
CNF: Compendio de Normas Financieras (Compendium of Financial Regulations).
COMEX: Foreign trade.
CPMI: Committee on Payments and Market Infrastructures.
CRM: Reference currency basket.
CSD: Central securities depository.
DFA: Dodd-Frank Act.
DIPRES: Budget Office.
DLT: Distributed ledger technology.
DPF: Time deposits.
DR: Default rate.
DSR: Debt service ratio.
DTI: Debt-to-income ratio.
EBIT: Earnings before interest and taxes.
ECB: European Central Bank.
EMBI: Emerging Market Bond Index.
ESMA: European Securities and Markets Authority.
FCA: Financial Conduct Authority.

FDI: Foreign direct investment.
FDIC: U.S. Federal Deposit Insurance Corporation.
Fed: U.S. Federal Reserve System.
FEM: Formal exchange market.
FFR: U.S. Federal funds rate.
FI: Fixed income.
FMC: Financial Market Commission.
FMI: Financial market infrastructures.
FSB: Financial Stability Board.
FSI: Financial Soundness Indicators.
FSMA: Financial Services and Markets Authority.
FSR: Financial Stability Report.
G-SIB: Global systemically important banks.
G20: Group of Twenty.
GBI: Government Bond Index.
GBL: General Banking Law.
GDP: Gross domestic product.
GFSR: Global Financial Stability Report.
HFS: Household Financial Survey.
HPI: House price index.
ICO: Initial coin offering.
IMACEC: Monthly Indicator of Economic Activity.
IMF: International Monetary Fund.
INE: Natinal Statistics Institute.
IOSCO: International Organization of Securities Commissions.
IPoM: Monetary Policy Report.
IPSA: Selective Stock Price Index.
IRS: Chilean Internal Revenue Service.
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.
MC: Markets Committee.
MF: Mutual funds.
MINDHA: Ministry of Finance.
MPR: Monetary policy rate.
MR: Metropolitan Region.
NAFTA: North American Free Trade Agreement.
NBLs: Nonbank lenders.

NCG: Norma de Carácter General (General Regulation) of the SVS.
NIIP: Net international investment position.
NMDaR: Nonmortgage debt-at-risk.
NR: Nonresident.
NSFR: Net stable funding ratio.
OECD: Organization for Economic Cooperation and Development.
OTC: Over-the-counter.
PF: Pension funds.
PFM: Pension fund manager.
pp: Percentage points.
RAN: Recopilación Actualizada de Normas (SBIF banking regulations).
RHPI: Repeat-sales house price index.
ROA: Return on Assets.
ROE: Return on Equity.
RTGS: Reat-time gross settlement.
RUT: Chilean tax identification number.
RWA: Risk-weighted assets.
SBIF: Superintendence of Banks and Financial Institutions.
SEC: U.S. Securities and Exchange Commission.
SOFR: Secured Overnight Financing Rate.
SP: Superintendence of Pensions.
SUSESO: Superintendence of Social Security.
SVS: Superintendence of Securities and Insurance.
T-bill: U.S.Treasury bill.
T-bond: U.S.Treasury bond.
T-note: U.S.Treasury note.
UF: Unidad de Fomento, an inflation-indexed unit of account.
UFM: Uemployment fund manager.
USA: United States of America.
VAT: Value added tax.
VI: Variable income.
VIX: Chicago Board Options Exchange Volatility Index.
WEO: World Economic Outlook.

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