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Financial Stability Report

BANCO CENTRAL DE CHILE

Financial Stability Report

FIRST HALF 2010[1]

BANCO CENTRAL
DE CHILE

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[1] This is a translation of a document originally written in Spanish. In case of discrepancy or difference in interpretation, the Spanish original prevails. Both versions are available at www.bcentral.cl.

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[2] The statistical closing date of this *Financial Stability Report* was 25 May 2010.

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 trade operations.

The Central Bank's focus in the area of financial stability is centered mainly on the proper functioning of the system and the Chilean economy's access to the international financial markets. 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* 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 payments system, with the objective of promoting general knowledge and public debate with regard to the Bank's performance in fulfilling this function. The thematic chapter that closes this *Report* summarizes recent research papers generated by the Bank on topics related to financial stability.

The Board

Summary

The latent threat of financial difficulties in Europe has materialized quickly and strongly. The relative calm in world markets during the first months of 2010 was interrupted by financial instability originating when Greece's severe fiscal problems were recognized in early May, and which threatened to spread toward other countries with weak fiscal accounts in the region. Globally, this volatility has become a significant source of uncertainty that negatively affects the prices of comparatively riskier assets.

The intensity and velocity of the events of May this year reflect that economic and financial fragility persists in developed economies after the subprime crisis. Consumers and firms are still in a rather fragile situation in some of these economies. Additionally, banks' balance sheets in several of them still include deteriorated assets, while they deal with important financing needs for 2010. On the other hand, as was stated in the previous *Report*, government measures to support the financial sector and expansionary fiscal policies implemented during the subprime crisis significantly damaged the fiscal accounts in several economies, which at this point is an essential determinant of the present economic scenario.

The rescue plans of the EU, the ECB and the IMF, together with announcements of fiscal adjustment programs in Europe, permitted to partially stabilize the prices of key financial assets. Doubts persist, however, about whether the announced measures will be sufficient or feasible. That they are sufficient will depend on the performance of fiscal earnings—and, therefore, on economic activity—as well as on the cost of refinancing the debt. That they are feasible will depend on the capacity of the relevant authorities to carry out fiscal adjustments, very significant from a historical perspective. In that sense, and considering that fiscal sustainability is a key element in the origin of the current turbulences, the normalization of financial markets depends crucially on the approval and implementation of said adjustments, as well as on the evolution of fiscal deficits.

To this *Report*'s closing date, the impact of financial turbulences on emerging economies' financial asset prices has been limited. Variable- and fixed-income markets have posted smoother fluctuations than those in advanced economies. Foreign exchange markets have seen increased volatility and a widespread appreciation of the U.S. dollar, especially from May onwards. The significant capital flows to emerging economies of the first quarter of 2010 have either stabilized or reversed partially, especially those from stock portfolios. This, however, has not materially attenuated concerns in several emerging economies, particularly in Asia, over the creation of local asset price bubbles.

The domestic financial market has been fairly robust to external market instability. At the statistical closing of this *Report*, the main fluctuations have reflected on stock prices and the exchange rate and, to a lesser extent, on the private bonds market. There is no evidence of an effect of external turbulences on money market volumes or interest rates, or on interests over public debt securities. However, and as is highlighted in this *Report*, a high degree of uncertainty persists regarding the future behavior of tensions in the European financial system. Should this situation worsen, it could affect the riskier assets, in a context of increased risk aversion among international investors.

The spreads of Chilean sovereign bonds have remained stables, while local banks have managed to borrow abroad in similar conditions to those at the closing of the previous *Report*. In the financial account of the balance of payments it is worth singling out the recent reduction of external assets in pension funds. This phenomenon is consistent with worsened financial conditions in advanced economies as compared with Chile. The portfolio rebalancing of pension funds was also present during the subprime crisis and, in practice, it has seen increased demand for local fixed-income instruments as its balancing entry (i.e., term deposits and banking bonds).

Challenges posed by the normalization of fiscal accounts in Europe and the weakness of the European banking system are the reasons this *Report* identifies as the external risk scenario one where financial problems in international markets intensify, especially in European banks. This would translate into global economic growth being less than forecast in the *Monetary Policy Report*—especially in the euro area—, and into a decrease in foreign capital supply. For the Chilean case, this could mean increased costs or restricted access to external credit. Global financial stress could intensify due to bad news incoming from the fiscal front, be it failure to comply with or insufficiency of fiscal adjustments or, in the extreme, sovereign debt restructuring.

The risk scenario just described could be aggravated if compounded with an economic slowdown in the U.S. or China. In the U.S., the recovery is just beginning, and doubts remain regarding the behavior of credit and household consumption. In China, the slowdown could originate in the macroeconomic and financial policies adopted to deal with an overheating of the economy: high growth in banking credit, increased housing prices and recent indicators of higher inflation.

Indicators for liquidity, repayment capacity and profitability of firms reporting information to the SVS were—as of last December—in levels close to historical averages. In that sense, those firms may have reverted the negative effects they suffered from the subprime crisis. **Most recently, the earthquake and tsunami of 27 February (27-F) had fairly limited effects on the firms' financial situation**. Estimates of the impact of 27-F on the firms' repayment capacity signal focalized effects on SMEs in the regions directly affected (VI, VII and VIII). The bigger firms had insurance policies in place that mitigated the impact on their solvency indices, but payment delays could generate liquidity pressures. In aggregate terms, both big enterprises and SMEs will face the external risk scenario with a relatively solid position.

Total household debt as a fraction of disposable income has fallen since the last *Report*. Since mid-2008, household borrowing and financial burden ratios declined systematically, to stabilize somewhat below pre-subprime-crisis levels. Employment has also improved with respect to the scenario in last *Report*, although it has not yet returned to mid-2008 figures. **A mild impact of 27-F is expected on household credit risk in the affected regions.** This is associated to reduced employment and deteriorated homes. However, this higher household risk would have a limited impact on the banking industry. Accordingly, households should face the risk scenario with a better financial situation—on average—than that of end of 2008, but there will probably be considerably more vulnerable households, given the drop in employment and the regional effects of the catastrophe.

The banking industry has regained strength in the early months of 2010. The credit crunch beginning in end of 2008 has recently reversed. This scenario of increased activity has been accompanied by a slight narrowing of spreads, which, combined with data from the Credit Conditions Survey, suggest an increase in the supply of banking credit. Smaller enterprises located in the areas worst hit by the earthquake and tsunami, however, might face tighter lending conditions.

After stabilizing in mid-2009, the banking industry's past-due portfolio increased in March 2010, mainly driven by higher payment delays in the commercial portfolio. On the other hand, since the last *Report,* past-due mortgage loans has continued on the rise, pushed by the deteriorated quality of housing credit of state-owned BancoEstado.

Despite a broader definition of risk-weighted assets—extended to include contingent assets—the capital adequacy index of the system remains above 13%. Banking profitability has increased driven by a reduction in provisions, stronger lending and higher inflation. Stress tests show that the current levels of capitalization of the banking industry could allow it to absorb an episode of slower GDP growth, more expensive financing in pesos and a peso depreciation consistent with the risk scenario just described.

Although credit has recovered, the banking industry continues to report high levels of liquidity. However, some vulnerability persists in specific institutions. Treasury and retail banking remain highly dependent on institutional investments. Although individually the share of these banks in the industry's total assets is low (under 1%), it is important that their liquidity management policies consider the risks associated to such exposure.

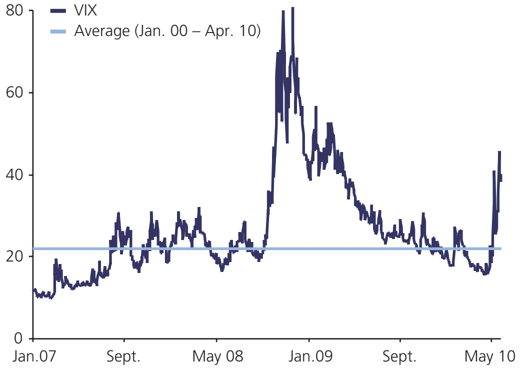
The banking system at large continues to face the challenge of keeping and diversifying the sources of external credit and properly manage credit risk within a context of economic recovery. In the global financial scenario, banks must pay special attention to their liquidity positions in foreign currencies and take the necessary steps to ensure smooth access to external markets. This consideration is particularly important because the European commercial banking industry accounts for a substantial fraction of the external financing of Chilean banks. In the risk scenario depicted in this *Report,* other forms of contagion cannot be disregarded, considering the presence of foreign banks in Chile.

The baseline scenario of this *Report* projects a recovery of economic activity and credit inflows during the second half of this year. However, the risk of a worsening of the financial situation in Europe is expected to persist for several months. The deterioration in external financial conditions and the world economic slowdown it could have a negative impact on the Chilean economy. However, the analysis contained in this *Report* also suggests that the Chilean financial system is prepared to properly confront this more restrictive external scenario.

I. Financial environment and risks

Figure I.1

Expected stock market volatility in the United States (*)
(percent)

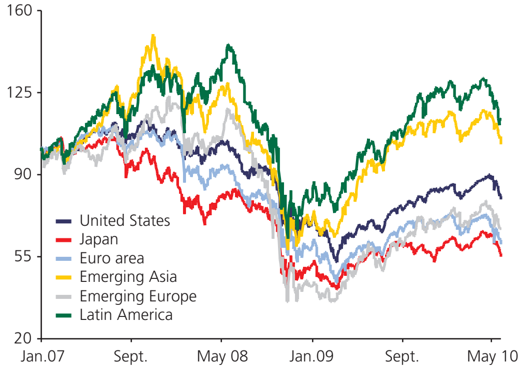


(*) Volatility implicit in S&P 500 stock options.

Source: Bloomberg.

Figure I.2

World stock markets
(local currency, baseline index Jan.07 = 100)



Source: Bloomberg.

This chapter reviews the recent conditions and developments in the international financial markets. It also describes and lays the foundation of the Central Bank of Chile's assessment of the main risk factors for national financial stability.

Development of the international financial crisis

The sovereign debt crisis in Europe has recently increased the risk aversion of international investors

Risk aversion increased in international markets at the beginning of the year, following the announcement of the worsening financial problems in Greece and the possibility of financial contagion to other European countries with high levels of debt—mainly Spain, Ireland, Italy, and Portugal. The risk that financial stability would deteriorate in Europe and uncertainty regarding the global economic recovery caused a sharp increase in stock market volatility, though not to the extent of the peaks observed during the subprime crisis (figure I.1).

The stock market indices for the emerging economies of Europe, Asia, and Latin America dropped around 14% from the peak recorded in April of this year; the advanced economies followed a similar trend (figure I.2). In 2010, the U.S. dollar has generally appreciated against other currencies, especially the euro (figure I.3). Global demand for more liquid, less risky financial instruments increased. Consequently, interest rates fell on long-term bonds in countries that traditionally play the role of safe haven (namely, the United States and Germany), while they rose on the sovereign bonds of countries more exposed to the sovereign debt crisis (figure I.4).

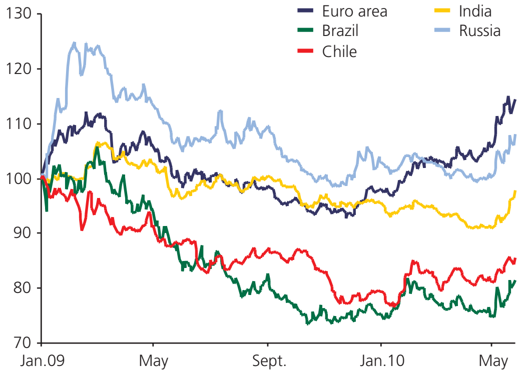
The global economic recovery has not yet solidified...

The advanced economies, in general, grew more in the first quarter of 2010 than expected in late 2009. Performance continued to be heterogeneous, however. The annual growth rate in the euro area was 0.5% and the United Kingdom contracted 0.3%, whereas the United States grew 2.5% and Canada, 6.1% (figure I.5). Emerging economies grew strongly, especially in Asia and Latin America. At year-end 2009, the highest growth rates were in China (10.7%), India (6.0%), and Brazil (4.3%).

Figure I.3

Exchange rates

(local currency versus U.S.dollar, baseline index Jan.09 = 100)

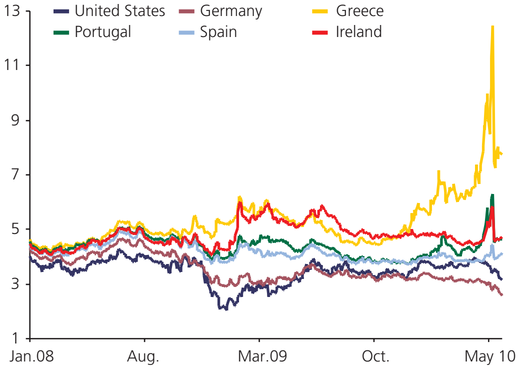


Source: Bloomberg.

Figure I.4

Interest rates on sovereign bonds (*)

(percent)



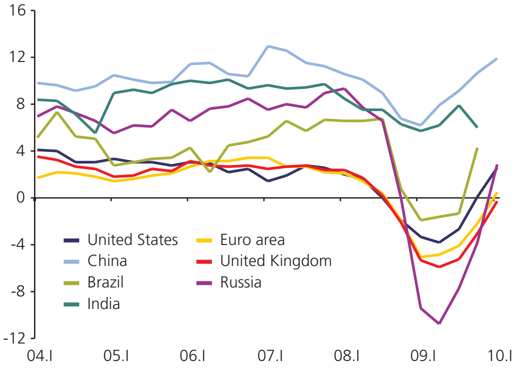
(*) Ten-year bonds.

Source: Bloomberg.

Figure I.5

GDP growth of the world's main economies

(annual growth rate, percent)



Source: Bloomberg.

Despite the recovery since the last *Report*, there are still risks in this area. First, China's growth could be attenuated by policy measures undertaken by the authorities to address signs that the economy is overheating: the strong growth of bank credit, incipient inflationary pressures, and growth in housing prices[1]/. China is currently the main driver of world growth, accounting for 50% of world growth between 2008 and 2010 (IMF, 2010a).

Second, in the United States, there are doubts about the sustainability of the recent recovery of domestic demand, given that the financial system continues to face problems from the subprime crisis. Banking institutions still have low-quality assets on their balance sheets, especially in the case of smaller banks. The securitization market remains closed, and it is unclear what will happen with housing demand once the tax-credit programs come to an end. These factors will slow the recovery of employment and sectors such as real estate (IMF, 2010a).

Finally, the economic growth of the euro area will be affected by the recent financial turbulence. On one hand, the situation in the banking system and private debt markets in the region have raised financing costs for households and businesses. On the other, the turbulence has driven the implementation of fiscal adjustments that are strongly oriented toward short-term spending reduction.

…and the European banking system is also facing important challenges

The European banking system has become more fragile since the emergence of the sovereign debt crisis at the beginning of the year (box I.1). The subprime crisis generated sharp losses from the revaluation of assets, while the lower economic activity increased credit risk. Additionally, the banking systems in Spain and Germany exhibit idiosyncratic characteristics of special concern. In Spain, the savings banks are facing financial problems that prompted the creation of the Fund for Orderly Bank Restructuring in 2009, while in Germany, more than 80% of the banking system's assets are held by institutions that posted negative earnings in 2008.

The financial fragility of the European banking system could be exacerbated by the strong presence of some banks in the European peripheral countries (Greece, Spain, Ireland, Italy, and Portugal) through bank lending, bond holdings, and the economies' share in bank equity (box I.1). It is difficult to assess the true extent of this exposure, given that information is generally limited in this area.

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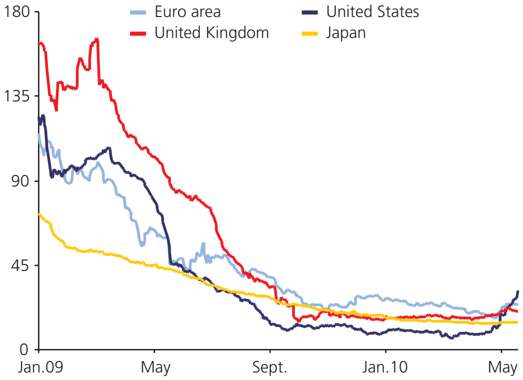
[1]/ The Chinese authorities have implemented macroprudential measures aimed at slowing the growth of bank lending to the real estate sector, including an increase in reserve requirements and regulatory changes to the loan-to-value ratio.

Figure I.6

Three-month liquidity conditions in the interbank market (*)
(basis points)

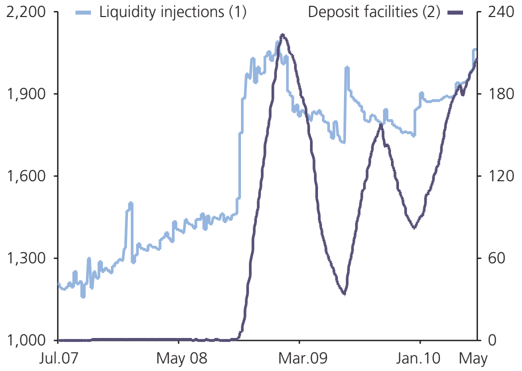


(*) Spreads between the Libor and the Overnight Index Swap (OIS) rate for each region.

Source: Bloomberg.

Figure I.7

Liquidity injections and use of ECB deposit facilities
(€ billion)



(1) Includes foreign currency assets, euro-denominated securities, other euro-denominated assets, other assets, long-term refinancing operations (LTRO), and main refinancing operations (MRO).
(2) Three-month moving average.

Source: Bloomberg.

In the interbank market, the Libor-OIS spread and bank deposits in the ECB continued to increase at the close of this *Report*, which suggests that banks are less willing to provide interbank loans (figures I.6 and I.7). However, the levels are still substantially lower than during the subprime crisis.

To reestablish market confidence and safeguard the financial stability of the euro area, the Council of the European Union, in conjunction with the ECB and the IMF, implemented an aid program

The initial aid program for Greece, announced in early May, provided €110 billion over the next three years, with the goal of stabilizing the economy and restoring market confidence. The member countries of the euro area will supply €80 billion in bilateral loans, while the IMF will grant a €30 billion loan to the Greek government. The IMF will monitor program implementation and compliance based on quarterly reviews. This program sought to cover Greece's financing needs through 2012 and committed the country to a series of structural reforms. However, it did not succeed in definitively reducing the sovereign risk premiums of the most vulnerable countries[2]/.

Consequently, in mid-May, the Council of the European Union, the ECB, and the IMF announced a new package for €750 billion over the next three years. The euro area member countries will provide €500 billion, of which €60 billion will be supplied through the extension of a "balance of payments" line. The remaining €440 billion will be supplied through bilateral loans and guarantees. This program includes loans through a special purpose vehicle (SPV) guaranteed by Member States. In addition, the IMF has opened special financing facilities, the U.S. Federal Reserve has reactivated its central bank swap lines, and the ECB has announced the sterilized purchase of sovereign bonds, which totaled €16.5 billion at the close of this *Report*.

In general terms, these measures can be grouped into two broad categories. The first includes measures that will facilitate the fiscal adjustment: the SPV loans, the balance-of-payments line, and the IMF financing facilities. The second category comprises mechanisms that limit the impact of the current turbulence on financial brokers and markets: the purchase of sovereign bonds (which reduces the losses of banks with exposure to these instruments and also facilitates the use of instruments in repo operations in the money market), the reactivation of the ECB's long-term refinancing operations (LTRO), and the U.S. Federal Reserve swaps.

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[2]/ Within the framework of this program, Greece has committed to reducing its fiscal deficit and starting on a decreasing path for debt as a percentage of GDP. To achieve this, the country plans to freeze public wages and pensions, reduce the budget, and increase taxes. In addition, it has committed to pro-growth policies and reforms with the goal of increasing the economy's competitiveness.

There is a consensus, however, that achieving the full efficiency of the support measures will require the implementation of deep fiscal reforms.

Some countries have already announced significant fiscal adjustments…

In the weeks following the announcement of the rescue plan, the European peripheral countries, together with Germany, France, and the United Kingdom, announced measures to reduce their fiscal deficits in the coming years. These measures are mainly focused on (i) stabilizing, or even cutting back, public employee wages; (ii) reducing spending on public infrastructure, cultural activities, and other government benefits, and (iii) cracking down on tax evasion.

In general, the fiscal adjustments pledged by the European peripheral countries compare positively with the IMF's estimates of the adjustments required to stabilize the debt (IMF, 2010b). For example, the IMF indicates that Greece needs a fiscal adjustment of 9.2% of GDP in the next 10 years, while the country has committed to an adjustment of 11% in the period 2010–14. The cases of Portugal and Italy are somewhat different, as data are not available for evaluating the full trajectory of the fiscal adjustments, so a comparison with the IMF estimates is more limited (table I.1).

Table I.1

Fiscal adjustments needed to achieve gross public debt objectives (1) (2)
(percent of GDP)

	Required adjustment		**Committed fiscal adjustment (3)**				**Total**
	2010-2020	**2010(f)**	**2011(f)**	**2012(f)**	**2013(f)**	**2014(f)**	**2010-2014**
Spain	9.4	1.9	3.3	0.7	2.3	--	8.2
Greece	9.2	5.5	0.5	1.1	1.7	2.2	11.0
Ireland	9.8	2.7	1.6	2.8	2.3	2.0	11.4
Italy	4.1	0.3	1.1	1.2	--	--	2.6
Portugal	7.8	2.1	2.7	--	--	--	4.8

(f) Forecast.
(1) The objective for the debt-to-GDP level for advanced countries is 60%, or lower if the initial level is lower.
(2) The adjustment is gradual between 2011 and 2020, and then the primary surplus is maintained through 2030.
(3) Forecast data from the last official budget, according to FitchRatings (2010).

Sources: IMF (2010b) and FitchRatings (2010).

…These measures were given a positive assessment when they were announced, but doubts remain

Initially, the announcements of these measures were positively received in the financial markets. In particular, the European stock market posted gains that partially offset the losses of the first two weeks of May, the dollar-euro parity stabilized at around 1.2, and sovereign risk premiums in the euro area partially reversed the hikes of the first half of May.

Doubts remain, however, about the feasibility of implementing the pledged fiscal adjustments. First, while adjustments of this magnitude have been made in the past (including in Greece in 1989–94), these are quite high[3]. For example, Greece and Spain have committed to reducing their fiscal deficits by 5.5% of GDP in 2010 and 3.3% in 2011, which are at the lower end of the historical distribution for spending adjustments in the advanced economies in 1990–2009 (figure I.8).

Second, the real impact of the fiscal adjustments will be greater for countries in the euro area, given the common currency, strong intra-regional trade (approximately two-thirds of the total), and rigid labor markets. Considering the political and economic costs involved, some countries may well prefer liability restructuring over fiscal consolidation. The fiscal situation is unlikely to be resolved in the short term, so the uncertainty in the public debt markets can be expected to last into the medium term.

The market's assessment is consistent with these concerns. The structure of sovereign risk premiums shows that the differential between five- and two-year CDS only partially recovered after the announcements of the rescue package and the fiscal adjustments, and in fact remained negative (figure I.9). The structure of CDS spreads thus suggests that the market considers the probability of a credit event to be greater within a horizon of two years than five[4].

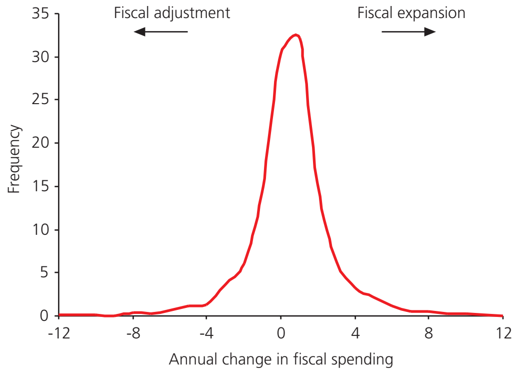
Despite the severity of the recent turbulence, the risk premiums on sovereign debt from emerging countries have not been very sensitive to the problems in the euro area

Although the international markets have fluctuated strongly since May of this year, the sovereign risk premiums in emerging market countries have been relatively stable. The CDS spreads for countries like Mexico, Brazil, Chile, Indonesia, and China rose 12, 24, 37, 11, and 17 basis points, respectively, since the beginning of the year, whereas the spreads for Portugal, Ireland, Greece, and Spain increased 235, 68, 434 and 98 basis points in the same period (figures I.10 and I.11).

Finally, foreign investment in emerging market stocks and bonds was at a level similar to the period before the subprime crisis (figure I.12). This sparked concern about the formation of local asset price bubbles in several emerging economies, especially in Asia.

Figure I.8

Distribution of the annual change in public spending (*)
(percent of GDP)

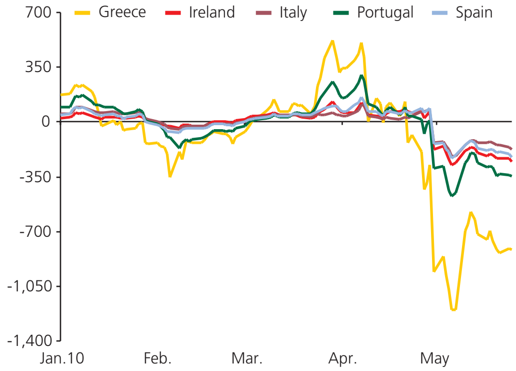


(*) 1990–2009.

Sources: World Bank (2009) and Moody's (2009).

Figure I.9

CDS spread differential (*)
(basis points)

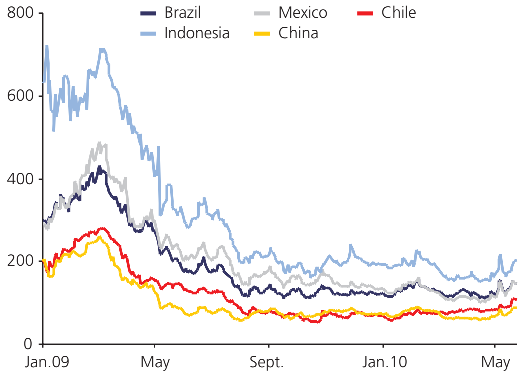


(*) Five-year CDS spread less the two-year CDS spread.

Source: Bloomberg.

Figure I.10

Sovereign default risk premiums in emerging economies (*)
(basis points)



(*) Measured through five-year CDS.

Source: Bloomberg.

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[3] Alcidi and Gros (2010) provide evidence of many successful fiscal consolidation processes.

[4] After the statistical closing date of this *Report*, FitchRatings lowered the sovereign risk rating of Spain's long-term local and external debt from AAA to AA+, in reflection of the rating agency's concern about the country's capacity to implement the fiscal adjustment program. Previously, S&P had similarly lowered Spain's rating in late April.

Main external threats to the financial stability of the Chilean economy

The possible repercussions of the sovereign debt crisis in Greece and the European peripheral countries constitute the main external threat to the financial stability of the Chilean economy.

The baseline scenario assumes that economic activity in the euro area will deteriorate somewhat as a result of the recent financial turbulence and the announced fiscal cutbacks, while risk aversion will remain around current levels. In this scenario, there could also be an increase in capital inflows to emerging economies in response to the relative deterioration of economic conditions in the advanced economies. In the particular case of Chile, the latter factor may not be significant, considering that the growing capital inflows to emerging economies recorded after the subprime crisis were concentrated in economies like Brazil, South Africa, and Poland (box II.1).

Another potential risk scenario is one in which the European sovereign debt problem worsens and spreads to other economies. This scenario is possible given the relative fragility of the financial systems of some advanced countries and the continuing doubts about whether the announced fiscal measures are adequate and feasible. The adequacy of the measures will depend on the evolution of fiscal income—and thus economic activity—and debt refinancing costs. Feasibility, in turn, will depend on the respective authorities' capacity to implement fiscal adjustments that are very significant from a historical perspective.

Contagion to the rest of the world can occur through real and/or financial mechanisms. The former is related to the contraction of world output, which generates a drop in external demand, while the latter is mainly associated with an increase in risk aversion on the part of international investors and an increase in the cost of external debt.

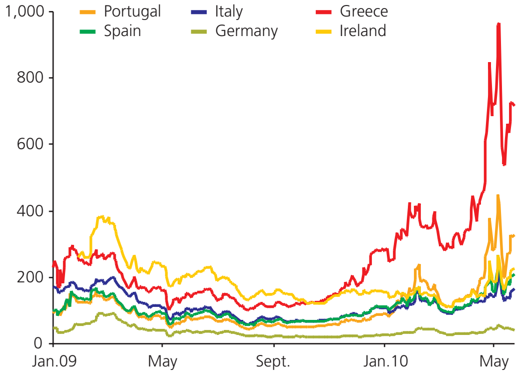
The lower global economic growth generated by this scenario would have a substantial impact on Chile. Given the importance of the national export sector, a slowdown in external demand under this scenario could have direct and indirect repercussions on other economic sectors. The severity of the impact would depend, to a large extent, on the impact of the financial turbulence and lower growth in the euro area, the output level in China, and the incipient economic recovery in the United States.

In the financial arena, international long-term interest rates would also increase significantly, due to the pressure of refinancing sovereign debt in the most advanced economies, the increase in risk aversion among international investors, and, in the case of a growth slowdown in China, the lower demand for fixed-income instruments from advanced economies.

In addition to the increase in long-term interest rates, under this risk scenario Chilean banks and firms could face greater difficulties in accessing short- and medium-term external financing. This reflects the fact that a large share of the external financing of these two sectors comes from Europe and the United States.

Figure I.11

Sovereign default risk premiums in advanced economies (*)
(basis points)

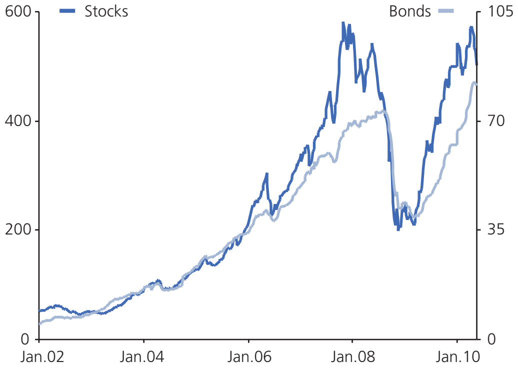


(*) Measured through five-year CDS.

Source: Bloomberg.

Figure I.12

Stocks of capital inflows to emerging economies
(US$ billion)



Source: Emerging Portfolio Fund Research.

Box I.1: **The financial situation of the European banking system**

The European banking industry is currently facing a series of challenges, which go well beyond the effects of the subprime crisis. While the turbulence that started with the Lehman Brothers bankruptcy seriously weakened the financial situation of the European banking system, the potential deterioration of economic conditions in the euro area could cause conditions to worsen even further.

Default rose sharply in the European banking system in 2009 and, combined with the losses of the previous year, has put substantial pressure on banks' capital adequacy levels[5]/. Consequently, the flow of credit to the euro area was paralyzed in late 2009 and thus far in 2010, contributing still further to the uncertainty regarding the economic recovery[6]/.

According to available data, the potential losses from writedowns of financial instruments, loans, and credits granted in 2007–2010 are expected to exceed €500 billion, of which a little more than €400 billion has been recognized to date (table I.2). This reduced banks' profitability in the euro area to around 7% in 2009, which is far below the 16% average recorded in the 2004–2007 period. While the banking system secured new capital contributions of nearly €500 billion in early 2010, it is unlikely that banks' profitability and capital adequacy ratios will return to their historical levels in the medium term.

Table I.2

Writedowns in the banking sector 2007–2010 (1)

	Loans	Financial instruments	Total
(Global Financial Stability Report, April 2010)			
Estimated	442	224	665
Recognized (2)	n.a.	n.a.	415
(ECB Financial Stability Review, June 2010)			
Estimated	360	155	515
Recognized	238	187	425

n.a.: Not available.
(1) Information reported through the fourth quarter of 2009.
(2) Does not include writedowns of loans granted in 2009.

Sources: ECB (2010) and IMF (2010a).

The increase in default has been generalized across the euro area, but the situation is relatively weaker in peripheral countries like Ireland, Greece, and Spain. In the Spanish banking system, default has increased for all types of credit, and the financial sector is considerably exposed to the real estate sector, which, according to the IMF, faces a risk of falling prices. Moreover, an important number of savings banks have had to be restructured with the help of the Fund for Orderly Bank Restructuring (FROB), created in 2009[7]/. The German Landesbanken, in turn, have yet to recognize substantial losses, and they are the most strongly affected by this factor to date[8]/.

The outlook for the rest of the European banking sector is not without difficulties. Banks in the peripheral countries are the most strongly affected, due to the exposure of the sector through cross-border loans, sovereign bond holdings, and equity shares. Cross-border operations with the euro area are approximately €2.4 trillion (table I.3). The European banking system's exposure to Greek sovereign bonds is between €55 and €85 billion, with Germany and France holding most of the assets (table I.4). In addition, the French banking system has an important share in the equity of some Greek banks. For example, Crédit Agricole is a shareholder in Emporiki (Greece), Banco Espírito Santo (Portugal), and Bankinter (Spain), and Société Générale owns 54% of Banco Geniki (Greece).

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[5]/ At year-end 2008, 80% of the assets in the German and Belgian banking systems were held by institutions that recorded negative earnings (IMF, 2010a).

[6]/ Credit from monetary and financial institutions, as defined by the ECB.

[7]/ Spain's Fund for Orderly Bank Restructuring (FROB), whose objective is to manage the process of restructuring credit entities and contribute to strengthening their resources, will reduce the number of existing banks without having to resort to intervention. The FROB was initially endowed with €9 billion, currently accounts for €12 billion, and can take on debt for up to €99 billion. To date, the fund has committed over €5.7 billion, but this figure is likely to increase considerably in the short term, given that several mergers have yet to close.

[8]/ The Landesbanken are regional banks whose ownership is generally shared among the local savings bank associations and the respective regional governments.

Table I.3

International assets of banks reporting to the BIS
(percent of total foreign assets in European peripheral economies) (1)

Creditor country	Greece	Ireland	Italy	Portugal	Spain	Total	Total (2)	Total (2) (3)
							(Percent of total assets)	(Percent of equity)
Austria	1.2	1.8	4.0	0.5	1.8	9.3	4.6	67.8
Belgium	0.9	8.3	5.8	1.0	5.3	21.3	10.1	224.1
France	2.0	2.1	13.4	1.0	5.3	23.8	7.9	192.2
Germany	1.2	5.5	6.0	1.4	6.9	21.0	9.9	230.1
Ireland	1.3	--	7.3	0.9	4.9	14.4	4.9	87.2
Italy	0.8	2.3	--	0.7	3.1	6.9	1.6	20.3
Netherlands	0.7	2.1	4.7	0.7	7.6	15.7	8.1	214.1
Portugal	5.9	12.5	3.2	--	16.6	38.1	14.9	248.4
Spain	0.1	1.2	3.8	6.6	--	11.6	2.9	43.7
Switzerland	3.5	1.0	1.2	0.2	0.8	6.6	4.6	87.1
United Kingdom	0.3	5.2	2.1	0.7	3.2	11.5	3.9	80.6

(1) Consolidated banking statistics, Table 9B, September 2009.
(2) Does not include bank exposure in the local market.
(3) For Germany, Spain, and France, the 2008 ratio of capital to assets is used. For the rest, 2009 data are used.

Sources: BIS and IMF.

Table I.4

Greek sovereign bond holdings by banks in the euro area

	€ billion	Percent of assets	Percent of capital
Germany	20-30	0.4-0.6	9-13
France	20-30	0.3-0.4	6-9
Other euro area (*)	15-25	0.1-0.2	2-3
Total euro area	**55-85**	**0.2-0.3**	**4-6**

(*) Includes Austria, Belgium, Netherlands, Ireland, Italy, Luxemburg, Portugal, Slovak Republic, Slovenia, and Spain.

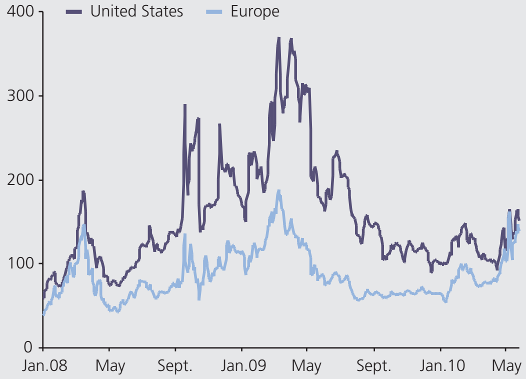
Sources: Central Bank of Chile, based on data from IMF and CEIC Data.

The high degree of interconnectedness among the European banking systems presents additional challenges, in the current context of fiscal restructuring in these countries. Any downgrading of the public debt rating in the European peripheral countries, reductions in the prices of public bonds, total or partial restructuring, or even a default on public debt could generate significant losses in the banking systems of several European countries.

Finally, the exposure of the European banking industry to the recent events in the peripheral countries has translated into less fluid operations in the interbank market and higher volatility in the financial markets in recent weeks. In fact, for the first time since the start of the sovereign debt crisis, the average CDS spreads of European banks rose nearly to the level of U.S. banks (figure I.13).

Figure I.13

Default risk premiums in the international banking system (*)
(basis points)



(*) Measured through five-year senior credit default swaps. Average of the five largest banks in each region, based on stock market capitalization.

Source: Bloomberg.

II. External financing

This chapter examines recent trends in and the outlook for the Chilean economy's external financing and international liquidity, in the context of the threats described in chapter I.

Conditions for access to external financing

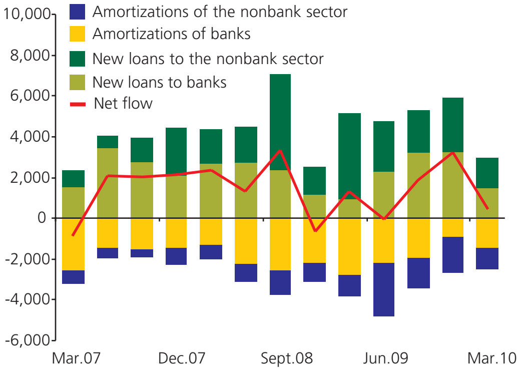
External financing conditions have been stable since the last Report

Chilean banks and firms have maintained similar access conditions for new short- and long-term external loans to those described in the last *Report*. New loans to firms have fluctuated around their average for the period from January 2006 to September 2008 (US$1.749 billion), as have new loans to banks (US$2.305 billion). In the first quarter of 2010, the private sector recorded a slightly positive net flow of debt (US$456 million) (figure II.1).

Figure II.1

External loan flows to residents

(US$ million)



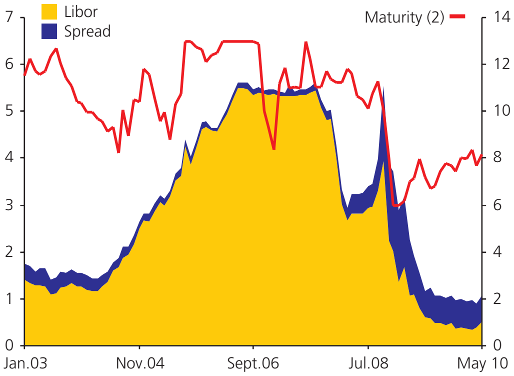
Source: Central Bank of Chile.

Short-term external financing flows to the resident banking sector remain near the levels recorded in the second half of 2009. The number of banks that are currently using external credit is about the same as before the subprime crisis. Despite the recent turbulence in international markets, the average maturity and spread for this financing has been relatively stable, although this could change if the financial market tension continues over time (figure II.2).

Figure II.2

Cost of short-term external financing for resident banks (1)

(monthly average, percent and months)



(1) Variable-rate bank loans.
(2) Moving quarter.

Sources: Central Bank of Chile and Bloomberg.

The financial account of the Chilean economy has registered net capital outflows

In the first quarter of 2010, the economy registered a net capital outflow. This is largely explained by the accounting recognition of assets associated with external reinsurance owed in relation to the earthquake. It implies an asset accumulation of around US$4.814 billion on the part of the insurance companies[1]. There was also a substantial increase in foreign direct investment inflows to Chile, primarily from the reinvestment of profits resulting from the strong increase in the copper price in the period, together

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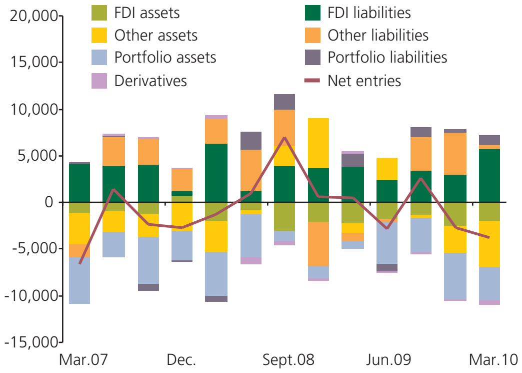
[1] This asset will be extinguished as the reinsurance is settled and the associated inflows are received.

Figure II.3

Financial account flows by instrument (*)

(US$ million)



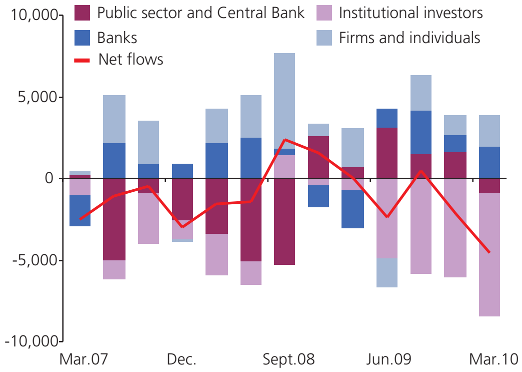
(*) Excluding reserve assets.

Source: Central Bank of Chile.

Figure II.4

Financial account flows by institutional sector (*)

(US$ million)



(*) Total net flows.

Source: Central Bank of Chile.

with a reduction in portfolio outflows (figure II.3). The latter reflects the fact that the pension fund administrators reached the legally imposed limits on variable-rate investment. The public sector has reversed the admission of flows recorded in 2009, accumulating assets in 2010, though at a lower rate than in previous years (figure II.4).

Finally, portfolio flows have not changed much since the last *Report*, with inflows of US$1.05 billion in first quarter of this year (compared with US$1.138 billion in the third quarter of 2009). This relative stability is explained, in part, by international investors' orientation toward emerging markets whose yields are more closely tied to an expected cycle of global asset price recovery (search for yield) (box II.1).

Nevertheless, there is a risk that external financing conditions could be negatively affected if the financial problems in Europe worsen

External loans to banks and firms originating in the euro area represented 41 and 57%, respectively, of total loans to the Chilean economy in March 2010. The share in the total remains significant when only considering loans originating in the European periphery:[2]/ 22% in the case of firms and 26% for banks.

Consequently, if the higher risk scenario described in chapter I were to be realized, access to a significant share of external financing could be affected. This could translate into higher interest rates, shorter maturities, and smaller loan amounts. This risk scenario would have a relatively limited impact on potential portfolio outflows, however, given the relative stability of portfolio flows in Chile in recent times, as mentioned above.

Liquidity and solvency

The Chilean economy's liquidity and solvency position continued to be favorable over the past few months, even as total external debt increased

Since the last *Report*, total external debt grew US$6.341 billion, which is explained by an increase of US$3.819 billion in corporate and personal debt and US$2.532 billion in bank debt. The latter, however, fell slightly in March 2010. Commercial loans recovered, growing US$958 million between September 2009 and March 2010 (table II.1).

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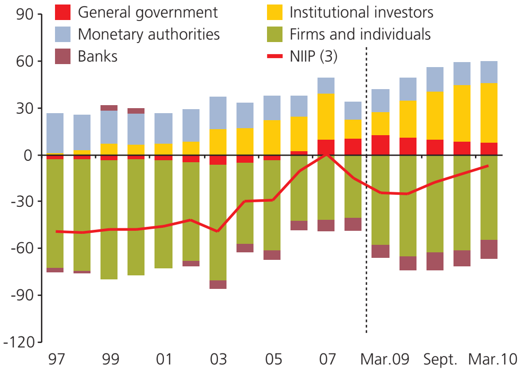
[2]/ Spain, Greece, Ireland, Italy, and Portugal.

Figure II.5

Net international investment position (1)

(percent of GDP) (2)



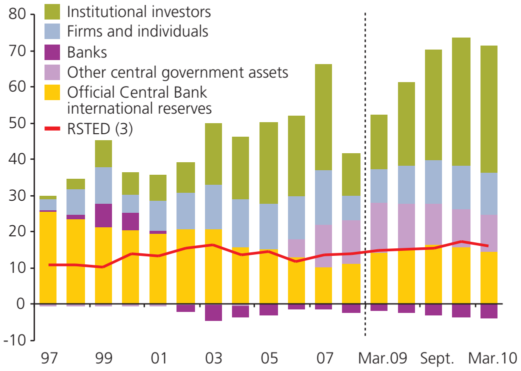
(1) The dotted line distinguishes annual from quarterly figures.
(2) GDP at constant real exchange rate (baseline index, March 2010 = 100).
(3) Net international investment position.

Source: Central Bank of Chile.

Figure II.6

Availability of net external financial liquidity (1)

(percent of GDP) (2)



(1) The dotted line distinguishes annual from quarterly figures.
(2) GDP at constant real exchange rate (baseline index, March 2010 = 100). External liquidity includes short-term loans, currency, deposits, and portfolio investment. Does not include derivative positions.
(3) RSTED: Residual short-term external debt.

Source: Central Bank of Chile.

Table II.1

External debt of the Chilean economy

(US$ million)

	2007	2008	2009		2010
	Dec.	Dec.	Sept.	Dec.	Mar.
Total external debt	55,733	64,318	68,393	74,041	74,734
Banks	10,408	13,140	12,969	15,531	15,501
Firms and individuals	41,351	47,944	51,519	54,519	55,338
Consolidated government	3,974	3,234	3,905	3,991	3,895
Short-term external debt (*)	10,977	14,619	14,740	17,477	16,906
Banks	974	3,055	6,053	7,508	6,238
Firms and individuals	9,987	11,549	8,682	9,961	10,662
Commercial loans	8,478	8,340	6,581	7,591	7,539
Consolidated government	16	15	5	8	6
Residual Short-term external debt	22,370	28,763	24,616	28,039	28,461
Banks	7,001	10,107	9,584	11,717	11,228
Firms and individuals	14,467	18,039	14,909	16,140	17,085
Commercial loans	8,479	8,426	6,581	7,591	7,539
Consolidated government	902	617	123	181	148

(*) Contractual maturity.

Source: Central Bank of Chile.

Despite the increase in external debt, solvency indicators remain similar to the levels recorded between 2001 and 2006 (table II.2). External debt was 45% of GDP at year-end 2009, which is just below the average for the 2001–2006 period (49%); it then dropped to 43% of GDP in March 2010. The net international investment position has improved significantly since the last *Report*. This is mainly due to positive valuation effects in the fourth quarter of 2009 and the first quarter of 2010, as well as asset accumulation in the period. By institutional sector, net liabilities fell slightly for individuals, firms, and banks, while net asset accumulation increased among the institutional investors (figure II.5).

Since September, the conventional liquidity indicators have deteriorated slightly, although they remain around the levels of the last two years (table II.2). The economy's liquid external assets are primarily made up of portfolio investment overseas (mainly by institutional investors and the government) and, to a lesser extent, foreign commercial loans and deposits held by firms and individuals. In net terms, these more than cover the total residual short-term external debt (figure II.6).

Table II.2

External liquidity and solvency indicators

(percent)

	Ave.	2007	2008	2009		2010
	01-06	Dec.	Dec.	Sept.	Dec.	Mar.
Solvency (1)						
External debt / GDP	49	34	38	45	45	43
Current account balance (moving year) / GDP	0.8	4.5	-1.5	0.7	2.6	2.8
External debt / Exports	133	72	83	115	119	112
Net international position / GDP (2)	-34.3	0.4	-14.7	-17.8	-12.1	-6.9
Liquidity (3)						
RSTED / External debt	31	40	45	36	38	38
RSTED / Official international reserves	83	132	124	95	111	111
RSTED / (Official int. res. + ESSF) (4)		72	66	62	76	77

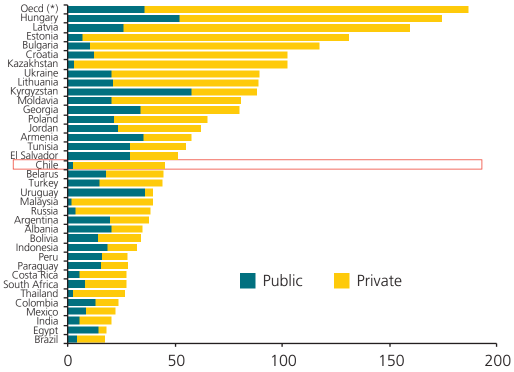
(1) September 2009 and March 2010 use GDP accumulated in four quarters.
(2) GDP at constant real exchange rate, baseline index March 2010 = 100.
(3) RSTED: Residual short-term external debt.
(4) ESSF: Economic and Social Stabilization Fund.

Source: Central Bank of Chile.

Figure II.7

External debt in 2009

(percent of GDP)



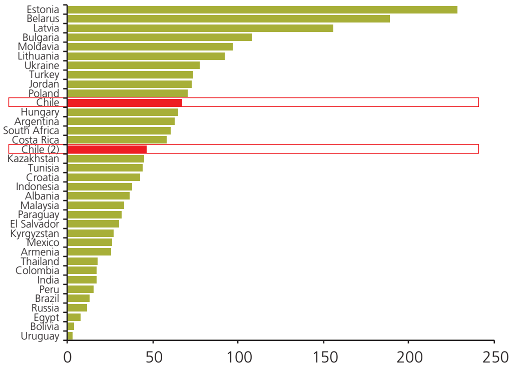
(*) Simple average. Excludes Chile.

Sources: Central Bank of Chile, World Bank, BIS, IMF and Ocde.

Figure II.8

Short-term external debt in 2009 (1)

(percent of international reserves excluding gold)



(1) Excludes foreign direct investment loans.
(2) Includes the Economic and Social Stabilization Fund.

Sources: Central Bank of Chile, World Bank, BIS, IMF, and Ocde.

Despite the changes in solvency and liquidity, these indicators still compare favorably at the international level. In terms of solvency, Chile's ratio of external debt to output is around the average of the emerging economies, and the public sector accounts for a low share of total debt. The contrast is particularly favorable vis-à-vis the Oecd countries (figure II.7). The country also has adequate levels of liquidity, measured by the ratio of short-term debt to international reserves, especially if the Economic and Social Stabilization Fund is considered in the calculation (figure II.8).

Finally, the external liquidity and solvency levels of the Chilean economy will allow both public and private entities to access external financing to cover part of the post-earthquake reconstruction, without substantially changing the country's external position. In the case of the public sector, which had a net credit position of 11.1% of GDP as of December 2009, the issue of sovereign bonds abroad provided for in the country's Reconstruction Program will not significantly alter these indicators. The additional debt considered in this program includes US$1.0 billion in foreign currency and US$500 million in domestic currency, which represent just 0.9% of GDP as of December 2009.

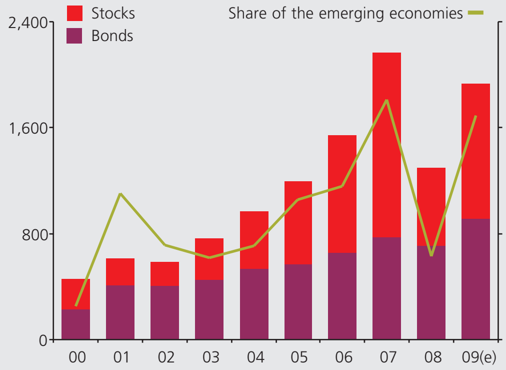
Box II.1: Portfolio capital inflows to emerging economies: recent trends

Portfolio inflows to emerging economies grew strongly in the second half of 2009[3]/. As a result, both the stock and the emerging country share in total foreign portfolio investment recovered to the levels seen before the Lehman Brothers bankruptcy. This trend is primarily explained by the strong increase in foreign investment in stocks and, to a lesser extent, by the growth of foreign investment in bonds (figure II.9).

Figure II.9

Stock of international portfolio liabilities in emerging economies

(US$ billion; percent)



(e) Estimate.

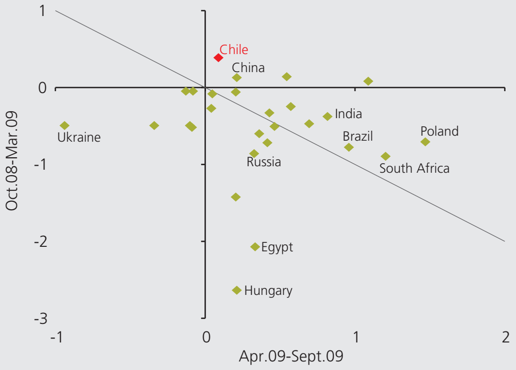
Sources: Bloomberg, CEIC data, IMF, and JP Morgan Chase.

The recovery of these flows has not been homogeneous at the country level. In the turbulent period after the fall of Lehman Brothers (April to September 2009), several economies recorded substantially higher portfolio investment inflows than the later outflows during the crisis period (October 2008 to March 2009). This group includes Poland and Brazil. Other countries, in contrast, registered significantly lower inflows than the original outflows (for example, Hungary and Egypt). In still other economies, such as Chile, flows were stable and positive in both periods (figure II.10)[4]/.

Figure II.10

International portfolio liability inflows to emerging economies (*)

(percent of GDP)



(*) Quarterly average, percent of 2007 GDP.

Sources: Central Bank of Chile based on CEIC Data and IMF.

This heterogeneous behavior can be analyzed from a financial perspective using a capital asset pricing model (CAPM). In 2009, there was a positive relationship between the inflows to each economy and the sensitivity of local stock returns to the aggregate market return (figure II.11)[5]/. This indicates that in this period, international investors were seeking higher returns, because the flows tended to go to economies that, in the face of expectations of a generalized increase in stock prices, generated a higher return than the general index. This behavior was different from 2008, when there is no evidence of a correlation between these variables.

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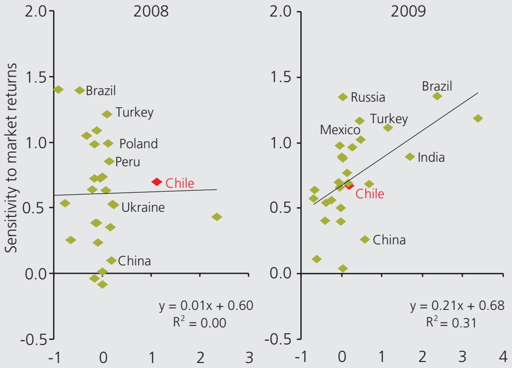
[3]/ Portfolio flows include foreign investment in stocks and bonds; the sample of emerging economies comprises 28 countries.

[4]/ The analysis generally looks at liability flows to emerging economies, because very few of these countries receive significant portfolio asset flows, as is the case of Chile.

[5]/ This sensitivity corresponds to the correlation between each country's stock returns and the aggregate for the sample of emerging economies (known as in the CAPM). The estimates consider 40 countries in the period 2000–09, with weekly data, where stock returns are measured through the MSCI and sovereign bond returns through the EMBI Global.

Figure II.11

Sensitivity of local stock market returns vis-à-vis stock portfolio flows (percent)



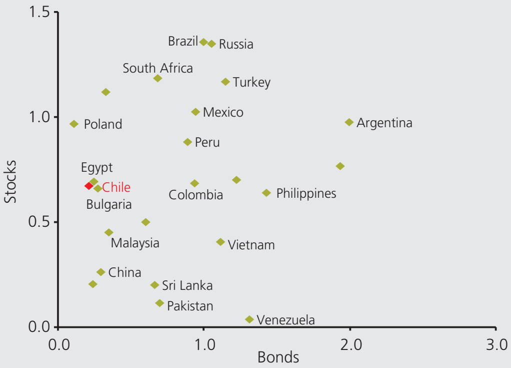
Source: Central Bank of Chile based on Bloomberg, CEIC Data and IMF.

Estimates of the determinants of market sensitivity to each country's stock returns show that both size and liquidity (turnover) are statistically significant.[6]/ In the particular case of Chile, sensitivity to market returns is relatively low compared with other emerging economies (figure II.12), and it is even lower for sovereign bond yields. Chile is therefore less vulnerable to significant changes in the investment portfolio of international investors.

Thus, in Chile, the challenge for financial stability stemming from the high volatility of international portfolio flows is lower than in other emerging economies, given that these investments are more stable (in terms of both flows and returns)[7]/.

Figure II.12

Sensitivity of local stock returns and sovereign bonds (*)



(*) Period 2007–2009.

Source: Central Bank of Chile based on Bloomberg.

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[6]/ These results are derived from annual panel estimates with fixed effects. Similarly, Portes and Rey (2005) show that gross international stock flows are positively correlated with the size of the origin and destination markets, among other variables.

[7]/ De Gregorio (2010) discusses the policy alternatives available to central banks to address sharp fluctuations in capital flows.

III. Domestic financial markets

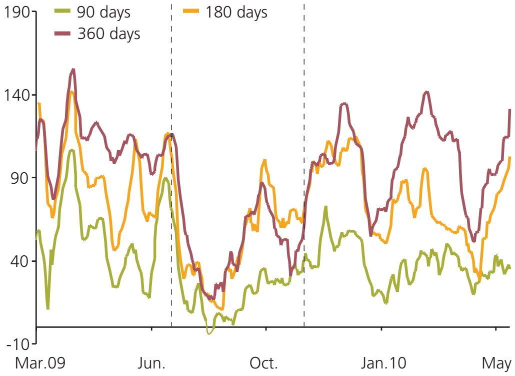
This chapter analyzes local financial markets, taking into account recent developments in activity, returns, and volatility.

Since the last Report, money market spreads have fluctuated around their historical averages, and activity has slowed in the interbank market

Figure III.1

Spreads between time deposits traded in secondary markets and the average interbank swap rate (*)

(basis points, percent)



(*) Five-day moving average. The dotted lines mark the dates of the introduction of the *FLAP* and announcement of its closing.

Sources: Central Bank of Chile and Bloomberg.

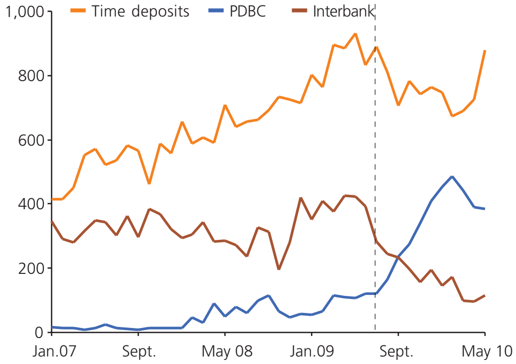
In recent months, for time deposits traded in secondary markets, the spreads over the average interbank swap rate have remained below the levels recorded in the months following the subprime crisis[1,2]/. The 90-day spread averaged 31 basis points following the introduction of the term liquidity facility (*Facilidad de Liquidez a Plazo*, or *FLAP*), which is substantially lower than in the last quarter of 2008 (100 basis points) (figure III.1). The compression of money market spreads mostly occurred after the introduction of the *FLAP*: through the first week of September 2009 average spreads were 9, 30 and 34, basis points for 90, 180, and 360 day, respectively. Spreads later became somewhat more volatile, though they stayed near their historical levels. Finally, they began increasing again in April 2010, which coincided with the gradual closing of the *FLAP* (box III.1).

While the *FLAP* was open, the volume of trade in the interbank market fell significantly, from a daily average of nearly Ch$400 billion in the first half 2009 to around Ch$100 billion from March to the close of the *Report*. This reflects a substitution of financing sources by the banks that were actively participating in the *FLAP* (figure III.2). The interbank market is expected to gradually return to its previous level of activity now that the facility has been closed.

Figure III.2

Peso money market transactions (1) (2)

(Ch$ billion)



(1) The dotted lines indicates the introduction of the *FLAP*.
(2) Daily average.

Sources: Central Bank of Chile, Santiago Stock Exchange, and DCV.

At the same time, the volume of Central Bank discount promissory notes (PDBC) traded in the secondary market quadrupled in the first half of 2010, relative to the amount traded prior to the opening of the *FLAP*, reaching a

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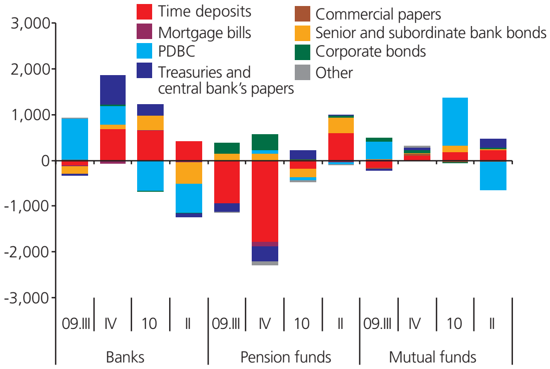
[1]/ Average interbank swaps provide a basis for extracting inflation expectations at different horizons; these operations are considered very low risk because only the contracted interest is settled. The secondary market rate on time deposits, in turn, is the observed rate on traded time deposits issued by banking firms, which have a residual maturity in line with the length of the interbank swaps (Sotz and Alarcón, 2007). The spread thus constitutes an indicator of liquidity conditions in the money market.

[2]/ The simple average of the spread between time deposits traded in secondary markets and the average interbank swap in the last quarter of 2008.

Figure III.3

Fixed-income investments and financial intermediation (*)
(changes in the stock, Ch$ billion)

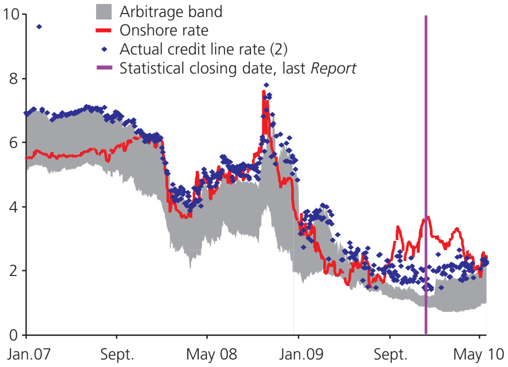


(*) Data through 20 May 2010.

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

Figure III.4

Dollar financing rates: actual and theoretical (1)
(percent)

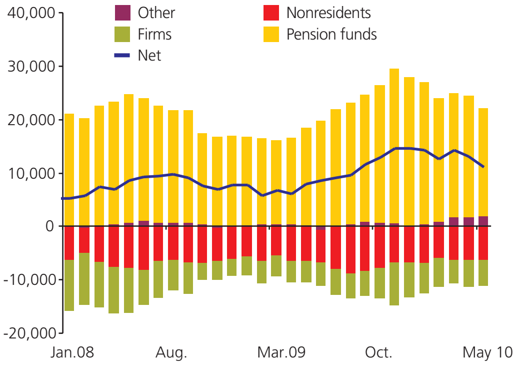


(1) One-year maturity.
(2) Dots indicate peak daily rates in local bank financing using external credit lines.

Sources: Central Bank of Chile and Bloomberg.

Figure III.5

The banking system's net position in forward operations
(US$ million)



Source: Central Bank of Chile.

daily average of almost Ch$400 billion. The more active PDBC trading is tied to the larger stock of these instruments, which the Central Bank issued to drain the funds injected into the system through the *FLAP* (box III.1). The mutual funds were the main buyers of the PDBCs, especially in the first quarter of 2010 (figure III.3). The assets managed by these funds have grown slightly since the last *Report*, thus remaining at historical peaks, especially in the case of type 1 funds.

Finally, time deposits traded in the secondary market were very dynamic in 2009. On one hand, in the last quarter of 2009 and the first quarter of 2010, local banks bought a large share of these deposits to use as collateral in the *FLAP* (box III.1). On the other, the pension funds systematically reduced their position in this asset class in the first quarter of 2010, in order to finance a greater exposure in foreign assets. However, as the pension funds reached the regulatory limit on exposure in variable-income instruments, they began investing in these deposits again, purchasing nearly Ch$594 billion in the second quarter of 2010. The pension funds' demand for bank bonds also increased in this period, as part of the process of rebalancing the aggregate portfolio, with a reduction in investment overseas (figure III.3)[3]/.

Since the last Report, short-term money market rates in U.S. dollars have converged to ranges consistent with lower pressures for foreign currency financing

Since late 2009, the onshore rate has approached the ceiling of the arbitrage band, for the first time since August of last year (figure III.4). This reduction has been accompanied by a similar adjustment in the financing conditions on external debt for local banks. The spread (over Libor) that these banks face is close to the CDS levels for Chile, and the risk premiums charged to local banks have also narrowed significantly. This reflects, in part, better access to foreign currency financing in international markets. This is also evidenced in the fact that Central Bank foreign currency swaps have not been used since end-December 2009.

The lower pressure for foreign currency financing is also a result of the decrease in hedging operations in the corporate sector, associated with a reduction in the foreign currency mismatch in the period (chapter IV), and the lower demand for hedging by the pension funds. The latter reduced their positions in U.S. dollar forward sales to the local banking system by US$6.2 billion from November 2009 to April 2010 (figure III.5). This reduction is explained by a slower growth rate of their foreign investment flows and by a change in hedging strategy, driven by the regulatory amendment establishing that hedging must reflect not only the currency of denomination but also the

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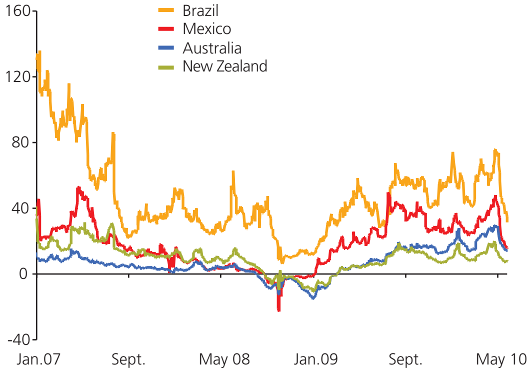
[3]/ In May, the pension funds reduced their overseas investment by nearly US$1.0 billion.

Figure III.6

Incentives for currency carry trade (*)

(index)



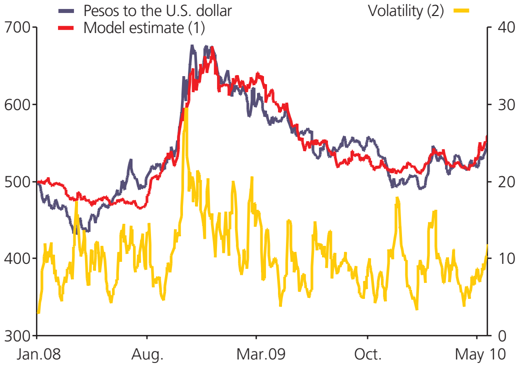
(*) Measured as the differential on three-month rates in Chile and the corresponding country, divided by the standard deviation of the exchange rate in a 20-day moving window. The higher the index, the greater the incentives for carry trade.

Sources: Central Bank of Chile and Bloomberg.

Figure III.7

Exchange rate

(pesos to the U.S. dollar)



(1) Error correction model (Cowan et al., 2007).

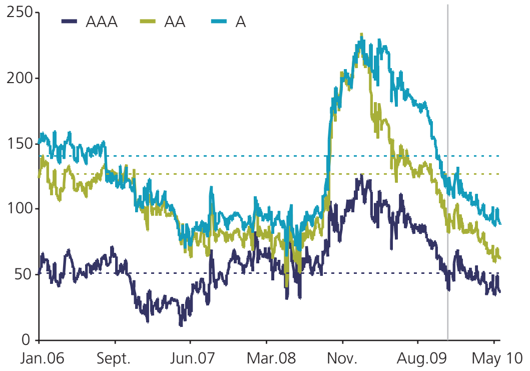
(2) Five-day moving measure of volatility calculated according to the methodology in Alfaro and Silva (2008). Data through April.

Source: Central Bank of Chile.

Figure III.8

Long-term bond spread (*)

(basis points)



(*) Representative corporate and bank bonds with over 9 years duration (over 11 years maturity). The dotted line shows the historical averages or the period 2001–2007. The gray vertical line corresponds to the statistical closing date of the last *Report*.

Source: Central Bank of Chile, based on LVA Indices.

underlying currency of the overseas investment (chapter VI). Consequently, hedging is currently near the regulatory limits, so these agents are not likely to significantly reduce their forward positions in the future.

The local banking system's net derivatives position with nonresidents has not fluctuated much, despite an increase in the interest rate differential between Chile and other economies such as Brazil and Mexico through early May. This situation could have created the conditions for market agents to structure currency carry trade transactions in order to arbitrage the differentials through early May, when the rate differential reverted. Had such incentives been present, they would have translated into an increase in long U.S. dollar positions in the currency derivatives market, reducing the upward pressure on the onshore rate (figure III.6).

Internal estimates suggest that in the last six months, exchange rate dynamics have closely followed the evolution of short- and medium-term determinants (figure III.7). Exchange rate volatility has been stable at around 10%. The largest fluctuations have been caused by specific events with transitory repercussions: namely, the regulatory change for the pension funds described above and uncertainty regarding the composition of reconstruction financing and the settlement of contracted reinsurance (between US$5.0 and US$7.0 billion) in relation to the earthquake in February. Volatility increased slightly near the close of this *Report*, due to the turbulence caused by the fiscal problems in Greece and the potential contagion to the rest of Europe.

In the fixed-income market, there is a strong demand for corporate bonds, and their spreads have fallen to historical lows

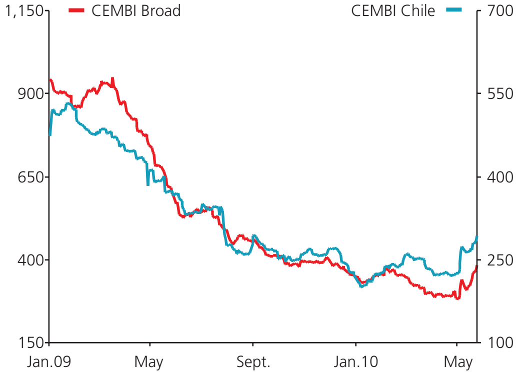
The rates on treasuries and central bank's papers have changed very little since the last *Report*. In the long-term corporate bond market, spreads have systematically fallen. Relative to the last *Report*, spreads on AA and A rated bonds dropped more than 20 basis points, while AAA bonds recorded somewhat smaller changes in the period. For all ratings, spreads are below their historical average; the difference is largest for AA bonds, at nearly 65 basis points (figure III.8). The primary market for corporate bonds shows a similar trend. In particular, some new issue spreads were historically low, in a context of excess demand relative to the amount supplied.

The evolution of corporate bond spreads in the Chilean market is very similar to the trend for comparable instruments in international fixed-income markets. Both have followed a downward trend since mid-2009, with only small, transitory divergences between the two series (figure III.9). Consequently, factors inherent to the local market may have been less influential in explaining the evolution of the spreads in this period. Given the close relation between the spreads in the local and international markets, events that increase the risk aversion of international investors could have a strong upward impact on this variable.

Figure III.9

Local versus foreign corporate spreads

(basis points)

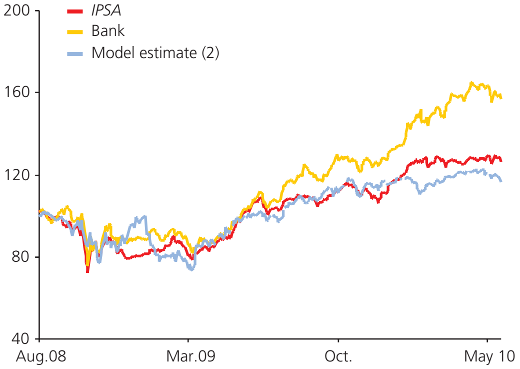


Source: JP Morgan.

Figure III.10

Local stock indices (1)

(baseline index ago.08=100)



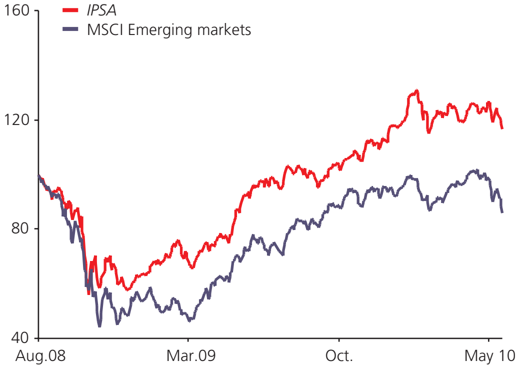
(1) Nominal profitability in local currency.
(2) Error correction model.

Sources: Central Bank of Chile and Bloomberg.

Figure III.11

Reference stock indices (*)

(baseline index Aug.08 = 100)



(*) Profitability in U.S. dollars.

Sources: Central Bank of Chile and Bloomberg.

The Chilean stock market has had a relative better performance than other emerging economies

As of the close of this *Report*, the *IPSA* has yielded 6.7% in nominal terms in 2010. This outcome is somewhat higher than suggested by fundamentals, and it is mainly explained by a strong performance in the financial sector (figure III.10)[4]/. The earthquake on 27 February affected the sectoral performance of the index, favoring the banking and manufacturing sectors, while the services sector was the hardest hit. These trends, while limited, are consistent with the real losses recorded in these sectors, as well as with expectations of improvements deriving from the reconstruction process.

From a more global perspective, the local index measured in U.S. dollars has performed better than stock markets in other emerging economies since the start of the subprime crisis. During the worst of the financial tension over the last two years, the *IPSA* fell substantially less than the MSCI Emerging Markets Index. For example, between August and December 2008, the *IPSA* in U.S. dollars dropped 36%, while the MSCI fell 44%. In May 2010, through the close of this *Report*, these figures were 8 and 14%, respectively (figure III.11).

The relative stability of the local financial markets in the past few months could be affected by the deteriorating conditions in international markets

Financial conditions have been stable in the peso and dollar money markets, the volatility of both the exchange rate and the *IPSA* has been fairly limited, and corporate spreads are at very low levels. However, some of these markets could be affected by contagion from the recent events in some European countries.

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[4]/ Benchmark estimate for the *IPSA*, based on an error correction model for the period 2003–2010. The explanatory variables included in the model are the stock market indices for Brazil and Mexico, the VIX, the nominal exchange rate return, commodity prices, short-term interest rates, long-term interest rates, and the volume of stocks traded in the secondary market.

Recuadro III.I: **Term Liquidity Facility *(FLAP)***

In July 2009, the Board of the Central Bank of Chile decided to reduce the MPR to 0.5%. To align financial asset prices with the monetary policy path, the Bank also established a term liquidity facility (*Facilidad de Liquidez a Plazo*, or *FLAP*) for banking firms, which falls under the rubric of unconventional monetary policy. This facility was used to loan funds at a fixed rate equal to the MPR on the day of the transaction, for periods of 90 and 180 days. Eligible collateral for the *FLAP* included Central Bank instruments, time deposits, and bank mortgage bills[5]/. In addition, the Bank announced the suspension of debt security issues with maturities of one year or longer, namely, two-year peso-denominated Central Bank bonds (BCP-2) and one-year Central Bank discount promissory notes (PDBC).

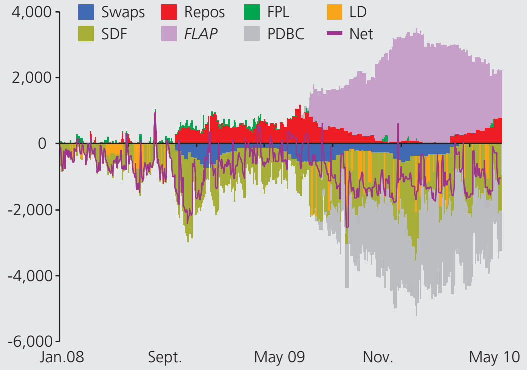
The *FLAP* was widely used by local banks, peaking at Ch$3.284 trillion in mid-January 2009, or 40% of the banking system's capital and reserves. To neutralize the injection of resources associated with the *FLAP*, the Central Bank made significant PDBC issues, with a maximum of Ch$3.0 trillion in early February (figure III.12). Both the use of the *FLAP* and the PBDC stock have gradually contracted as the last of the *FLAP* loans mature.

As intended, the main impact of this facility was to reduce market interest rates at the maturities at which the *FLAP* operated (figure III.13). A first impact was through expectations for the MPR, as reflected in the drop in the average interbank swap rate (known locally as the SPC) and its stability in the period from July 2009 to April 2010.

Figure III.12

Monetary operations of the Central Bank of Chile (*)

(Ch$ billion)



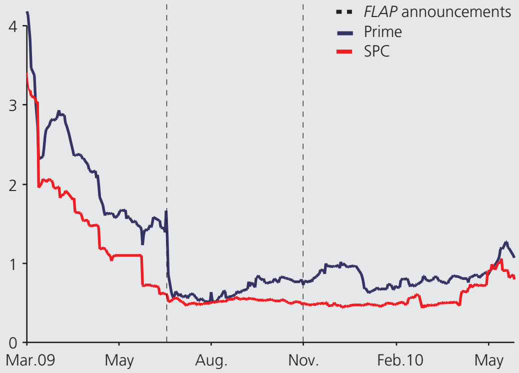
(*) SLF: Standing liquidity facility; LD: Liquid deposits; SDF: Standing deposit facility; and *FLAP*: Short-tTerm liquidity facility. PDBCs only consider the increase in the stock since the announcement of the *FLAP*.

Source: Central Bank of Chile.

Figure III.13

90-day prime and average interbank swap rates and *FLAP* announcements (*)

(percent)



(*) The opening of the *FLAP* was announced on 9 July 2009, and the closing of this facility was announced on 12 November 2009.

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[5]/ Traditionally, eligible collateral was restricted to Central Bank and Treasury instruments, but time deposits have been accepted since late 2008.

A second mechanism was the effect on the prime-SPC spread at different maturities. The estimates reported in table III.1 show that the introduction of the *FLAP* compressed the spreads significantly. Specifically, the introduction of the *FLAP* reduced the 90-day prime-SPC spread by 11 basis points, the 180-day spread by 28 basis points, and the 360-day spread by 81 basis points. The effects were strongest in the ten days following the announcement of the *FLAP*. For example, the 90-day spread fell ten additional basis points after the facility was announced. In contrast, the spread compression relaxed temporarily after the closing of the *FLAP* was announced[6]/.

Table III.1

Impact of the *FLAP* operations on the prime-interbank swap spread (1)

(basis points)

	Prime rate – average interbank swap rate spread		
	90 days	**180 days**	**360 days**
Dummy for the duration of the *FLAP* (2)	-11.08	-28.39	-81.13
Dummy for *FLAP* announcement (3)	-10.25	-20.52	-12.94
Dummy for closing of the *FLAP* (3)	3.61	14.05	12.90

(1) All parameters are significant at 1%. The estimates control for the Libor-OIS spread, the one-year CDS for Chile, and the VIX.

(2) Dummy for the duration of the *FLAP* takes a value of one after the announcement of the *FLAP* and zero in the rest of the period.

(3) Dummies for the announcement and closing of the *FLAP* equal one in the ten-day window after each announcement, and zero in the rest of the period.

Source: Central Bank of Chile.

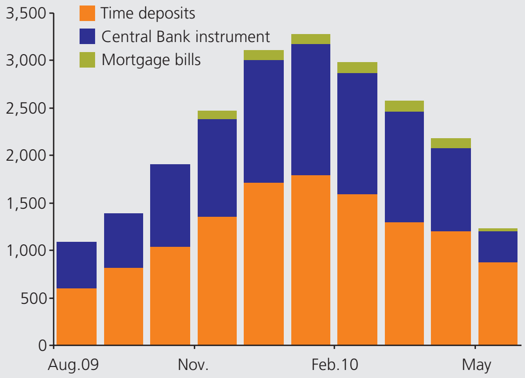
As indicated in this chapter, the volume of interbank loans fell substantially in the period during which the *FLAP* was operating, while the volume of PDBC transactions increased sharply. The lower activity in the interbank market is consistent with the objective of the banking institutions to reduce interest rate risk by obtaining financing at fixed rates and longer maturities. In the PDBC market, in turn, the mutual funds—which are traditionally concentrated in bank time deposits—increased their share of this trade.

Time deposits were the preferred collateral used for this facility, which shows the importance of the Central Bank's decision to expand the list of accepted guarantees for these operations. On average, time deposits represented 56% of the collateral put up, followed by Central Bank instruments at 41% and mortgage bills at 3% (figure III.14).

Figure III.14

FLAP and collateral use

(Ch$ billion) (*)



(*) Stocks in the middle of each month.

Source: Central Bank of Chile.

Through the close of this *Report*, the closing of the *FLAP* involved a concentration of maturities on specific dates. The biggest wave of maturing loans occurred on 5 May, when the repayment of funds to the Central Bank approached Ch$500 billion. A similar quantity was repaid over the course of the last week of May and the first week of June. These transfers did not have a large impact either on interest rates in the secondary market for fixed-income and other brokerage instruments or on the liquidity of the banks repaying the facility.

The normal operation of the money market is directly related to the accumulation of liquidity on the part of banks in order to repay the liabilities contracted through the *FLAP*, the gradual reactivation of the interbank market, and the return of the pension funds to the time deposit market. With regard to the first point, at end-April, the banking system was estimated to have accumulated liquidity on the order of Ch$2.5 trillion, which is comparable to the *FLAP* maturities of Ch$1.925 trillion[7]/. The pension funds, in turn, reactivated their participation in time deposits in two consecutive months (April and May).

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[6]/ On 12 November 2009, the Central Bank announced the gradual closing of the *FLAP*. The last auction was on 17 May, for a period of 28 days.

[7]/ Liquidity is here understood as the accumulation of available resources since the opening of the *FLAP*, in the form of the standing liquidity facility, liquid deposits, uncollateralized Central Bank instruments, and excess reserves.

IV. Credit users

This chapter examines the financial situation of credit users and evaluates the credit risk trend in the Chilean economy and its sensitivity to the risks described in chapter I.

Firms

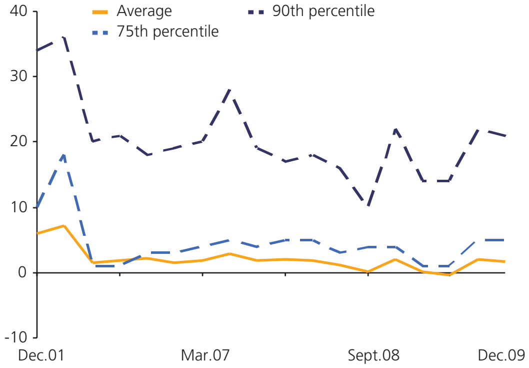
The growth rate of corporate debt has begun to increase, after slowing throughout much of 2009

The real growth of corporate debt is becoming more dynamic again, expanding 5.8% in annual terms in late 2009 and 6.0% in the first quarter of 2010, relative to the same periods one year earlier. This growth is primarily explained by local public offering securities and increased external debt (table IV.1). Currency mismatches remain low, however, and within historical ranges (figure IV.1).

Figure IV.1

Currency mismatches (1) (2)

(percent of total assets)



(1) Dollar liabilities less dollar assets, less the net derivatives position.
(2) Starting in September 2009, includes firms under IFRS accounting standards.

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

Table IV.1

Sources of financing

(real annual change)

	2007	2008	2009				2010
Indicator	IV	IV	I	II	III	IV	I
Bank loans	11.8	11.5	4.5	0.3	-0.7	-2.3	1.2
Commercial and foreign trade loans	10.9	12.5	5.5	0.0	0.9	-1.1	1.8
Factoring and leasing	18.5	4.2	-2.9	2.2	-12.6	-11.1	-2.9
Locally listed instruments (1)	6.1	14.7	22.0	30.0	27.1	18.3	9.2
External debt (2)	9.0	9.5	10.9	4.9	1.5	15.0	12.7
Commercial credits and loans	9.4	8.1	7.9	0.8	-3.6	12.7	8.9
Bonds	-3.0	20.0	37.6	26.7	22.5	21.2	15.9
Foreign direct investment loans	24.2	9.6	7.6	24.3	31.6	28.8	47.4
Total	**10.1**	**11.3**	**8.9**	**5.7**	**3.8**	**5.8**	**6.0**

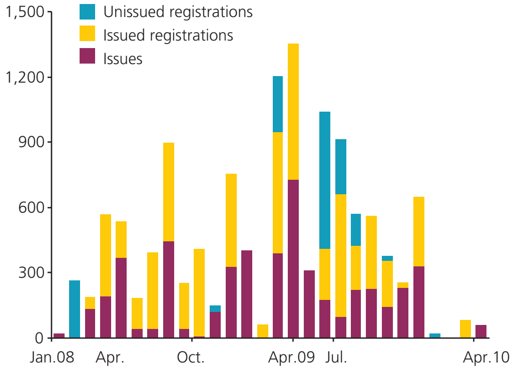
(1) Corporate bonds (except *Codelco*), securitized with commercial papers and nonbank assets.
(2) Includes foreign direct investment loans. Converted to pesos using the average exchange rate in the period from 2002 to March 2010.

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

Figure IV.2

Corporate bond issues and registrations (*)

(billions of April 2010 pesos)



(*) Includes bonds from firms registered with the SVS.

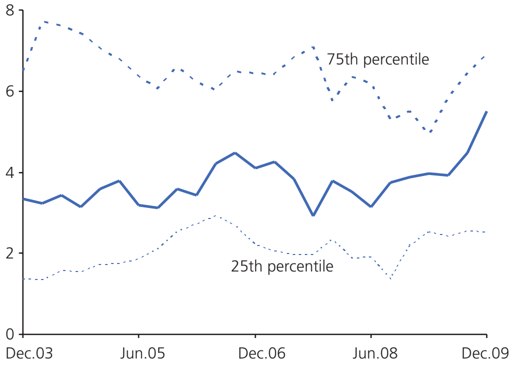
Source: Central Bank of Chile, based on data from SVS.

The available data point to a reduction in bond issues, compared with the same periods in previous years (figure IV.2). According to market sources, bond issues will be reactivated over the course of the year, although not to 2009 levels.

Figure IV.3

Payment capacity of firms (1) (2)

(times)



(1) Median interest coverage ratio, moving year.

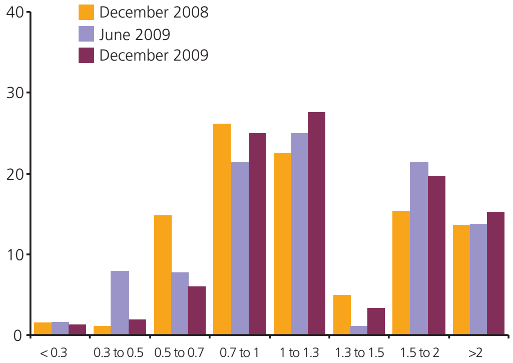
(2) Firms registered with the SVS, consolidated financial statements. Excludes mining.

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

Figure IV.4

Financial debt and liquidity ratio (*)

(percent)



(*) Percent of financial debt in firms, by acid test range (current assets less inventories, divided by current liabilities).

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

The growth of local public offering securities and external debt contrast with the evolution of banking debt, which recorded negative growth rates in the second half of 2009 and an increase of only 1.2% in the first quarter of 2010[1]/. The less dynamic trend in bank lending has occurred in a context of lower debt costs. Between December 2008 and December 2009, the average monthly interest rate on 30- to 89-day peso-denominated commercial loans fell approximately 13 percentage points, and no significant changes have been recorded this year (chapter V).

In the medium term, bank debt is expected to recover as a source of financing. The Lending Conditions Survey carried out by the Central Bank for the first quarter of 2010 indicates that lending conditions have been stable, after loosening somewhat in the previous period. However, tighter conditions are expected in the areas affected by the earthquake, especially in the case of small and medium-sized enterprises (SMEs).

After the subprime crisis, the corporate sector's indicators of payment capacity, profitability, and liquidity are similar to or greater than their historical average

In the past three months, the main financial indicators have improved for firms registered with the Superintendence of Securities and Insurance (SVS), and in some cases the current levels are more favorable than their historical average. Interest coverage—which measures a firm's capacity to make its interest payments using income from operations—rose from 3.9 times in December of 2008 to 5.5 times in December of last year, which is significantly above its historical average (figure IV.3). The evidence, however, is different at the extremes of the distribution. Return on assets increased from 4.2% in December 2008 to 5.6% in December 2009.

Firms have been recovering their liquidity levels since the subprime crisis (figure IV.4). In December 2008, 43.6% of financial debt was held by firms with a liquidity indicator of less than one. The share fell to 38.8% in June 2009 and 34.3% in December 2009. On aggregate, liquidity averaged 1.6 times in December, which is below the historical average of approximately two times.

Preliminary data for March 2010 indicate that firms in sectors such as forestry, commodities, and retail performed favorably relative to March 2009. This is mainly explained by the low basis for comparison (as a result of the subprime crisis) and greater operating efficiency.

Credit risk indicators vary by firm size

The improved financial indicators reported by the largest firms (registered with the SVS) are consistent with the stability of the impaired assets index reported by the banking system. Based on data from a sample of

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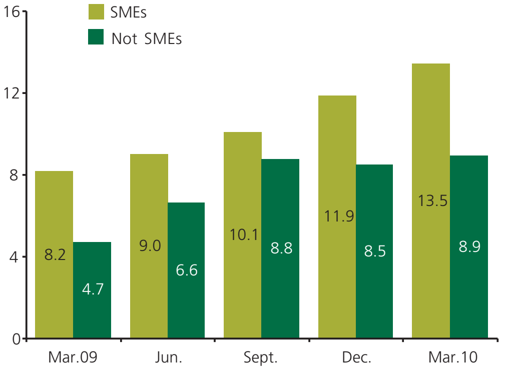
[1]/ The calculation considers commercial loans, foreign trade credits, bank leasing and factoring. The over 4% real annual growth of commercial loans cited in chapter V excludes foreign trade.

Figure IV.5

Impaired commercial loan portfolio (1) (2) (3)

(percent of commercial portfolio in each segment)



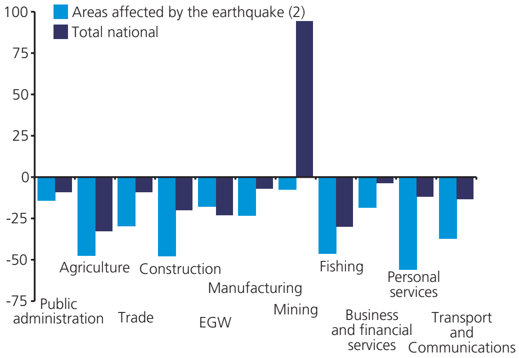
(1) Loans to borrowers for whom there is evidence that they will not meet their liabilities under the contracted terms, with no possibility of recovering the loan.
(2) Sample of approximately 190,000 firms.
(3) SMEs: Firms with annual sales up to UF100,000. Not SMEs: Firms with annual sales over UF100,000.

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

Figure IV.6

Sectoral sales

(real annual change in March 2010) (1)



(1) Sales reported by the Department of National Accounts.
(2) Regions VI, VII, and VIII.

Source: Central Bank of Chile.

approximately 190,000 firms, the ratio between the impaired portfolio and commercial loans to the largest firms has been stable at around 8.7%, on average, since the last *Report*[2]/. This contrasts with the case of SMEs, where this indicator rose from 10.1% in September 2009 to 13.5% in March 2010 (figure IV.5).

In some sectors, the financial situation could deteriorate as a result of the earthquake, especially among smaller firms, although these effects are estimated to be relatively minor

The lower economic activity deriving from the earthquake could have important effects on the liquidity and payment capacity of firms, especially in the most affected regions. The recent evidence on the evolution of sales reveals a steep drop in output in the areas affected by the earthquake; sectors such as agriculture, fishing, and construction have been the hardest hit (figure IV.6). This contraction has been particularly sharp among smaller firms, which are highly sensitive to the economic cycle and generally have less insurance (figure IV.7).

To gauge the potential effects of the earthquake on credit risk, two exercises were carried out based on the impact on the impaired commercial loan portfolio. The first considered the effects of lower growth on default probabilities and business closures (box IV.1). The second used data from the Lending Conditions Survey, where the banks reported their estimates of the net losses attributable to the earthquake in the affected regions (VI, VII, and VIII) for the first quarter of 2010.

The results of these two exercises reveal only a slight increase in the impaired portfolio. In the first exercise (scenario 1), the impaired portfolio is estimated to expand from 12% to 13% in the case of SMEs and from 8.5% to 8.7% for large firms. The second (scenario 2) generates similar conclusions (table IV.2). Large firms have certain safeguards in that they have insurance, but the lag between the damage claim and its settlement and payment can create liquidity needs in the short term.

In sum, although the earthquake is not expected to have significant effects on credit risk, a slower-than-projected recovery scenario in the affected regions and a deepening of the crisis in Europe could generate an important reduction in the payment capacity of firms[3]/. As analyzed in chapter I, lower global output could translate into a substantial drop in Chilean exports, especially in sectors such as beverages, mining (except copper and iron), basic chemicals, paper and wood pulp, and fruit, since Europe is an important destination market for these exports[4]/.

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[2]/ This credit risk indicator for firms has only recently been included in the analysis (SBIF), and although there are no historical records for making longer comparisons, it is useful because it incorporates the banks' estimates of the potential default. The more traditional indicators are analyzed in chapter V.

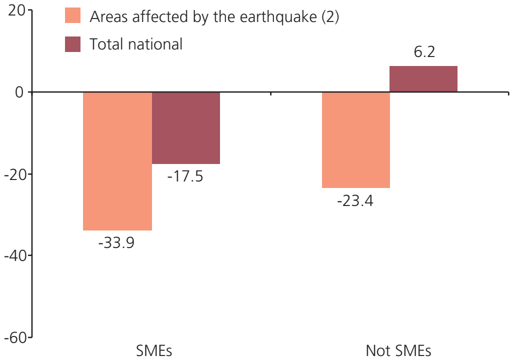
[3]/ An additional concern with regard to the sovereign debt crisis in Europe is the importance of this region as a direct external financing source for domestic firms and as an indirect source through local banks. The latter point is discussed in chapters II and V.

[4]/ The European Union represented 46.1%, 37.3%, 32.8%, 26.7% and 21.9% of the exports of these sectors, respectively, in the period from January to April 2010. Source: Central Bank of Chile.

Figure IV.7

Sales by size of firm

(real annual change in March 2010) (1)



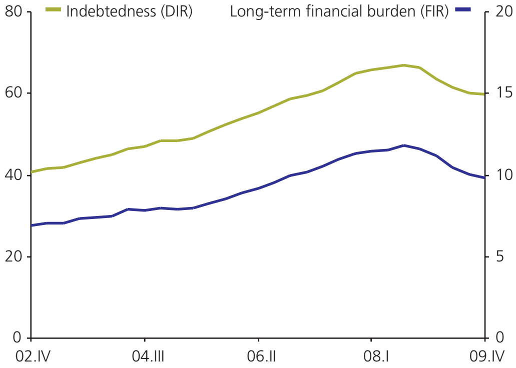
(1) Sales reported by the Department of National Accounts.
(2) Regions VI, VII, and VIII.

Source: Central Bank of Chile.

Figure IV.8

Indebtedness and long-term financial burden

(percent of disposable income)



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

Table IV.2

Impaired commercial loan portfolio under alternative scenarios (*)

(percent of commercial portfolio by segment)

Segment	Baseline scenario	Scenario 1	Scenario 2
SMEs	11.9	13.0	12.7
Not SMEs	8.5	8.7	9.3
Total	**9.6**	**10.1**	**10.5**

(*) Baseline scenario corresponds to December 2009.

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

Households

The financial position of households has strengthened in terms of their debt level, which compares favorably with the years before the subprime crisis (2006–2007)

In 2009, households continued to take on more debt, but at lower rates converging to 5% (table IV.3). This growth is the result of more dynamic bank lending, which more than offset the contraction recorded by credit from retailers. Nearly 50% of the retail credit contraction is explained by portfolio transfers from two retailers to consumer banks.

The debt-to-income ratio (DIR) has stabilized in the last six months at a level similar to the years preceding the subprime crisis (around 60%) (figure IV.8). The financial burden-to-income ratio (FIR) recorded a similar behavior. Both indicators peaked in September 2008, to then fall over the following four quarters. The increase in 2008 is also detected in the Household Financial Survey, which further reveals that the trend occurred mainly in households that started with a low to medium financial burden (box IV.2).

The contraction of the financial burden starting in the third quarter of 2008 is essentially due to the growth of disposable income and, to a much lesser extent, a reduction in interest rates[5]/. The normalization of interest rates, as in the forecast scenario in the March *Monetary Policy Report*, would imply a slight increase in the financial burden, from 9.8% to 10.4%.

Employment has improved relative to the levels seen throughout much of 2008 and 2009, but it has not completely normalized

Employment at the household level shows a slight improvement relative to the levels recorded in mid-2009, partially reversing the deterioration that occurred between the last quarter of 2008 and the third quarter of 2009 (figure IV.9). However, the share of households with no unemployed members decreased to 84.4% of the total, down from an average of 86.5% in the period preceding the subprime crisis (2006–2007). The share of households in which at least one member is employed decreased marginally, to 96.6% in the first quarter of 2010, versus an average of 97.4% in 2006–2007.

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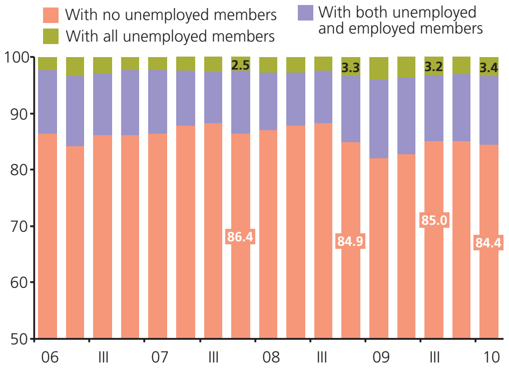
[5]/ The financial burden considers interest payments and amortizations.

Figure IV.9

Household employment situation

(percent of total households)



Source: Employment and Unemployment Survey of Greater Santiago, University of Chile.

Table IV.3

Household debt

(real annual change, percent)

	2006	2007	2008	2009				Contribution to growth (1)
	IV	IV	IV	I	II	III	IV	
Mortgage	24.1	16.1	12.9	8.9	7.4	6.3	7.3	4.0
Bank	13.9	15.3	13.1	9.6	8.7	7.9	8.6	4.0
Nonbank (2)	28.3	20.7	11.7	4.7	-0.5	-3.3	-0.5	0.0
Consumer	22.1	11.0	4.4	2.0	1.7	3.0	1.6	0.7
Bank	21.0	7.0	-0.3	-2.1	-1.7	0.2	2.2	0.5
Nonbank	23.7	16.3	10.2	7.1	5.8	6.2	1.0	0.2
Retailers	26.6	19.1	12.0	7.8	4.5	1.0	-8.3	-0.7
FCF (3) (3)	41.9	12.5	9.6	5.8	6.6	10.9	8.3	0.4
Cooperatives	22.1	20.0	11.6	12.1	6.9	13.4	5.6	0.2
Other(4)	11.3	13.8	7.6	4.9	6.2	6.7	6.7	0.4
Total	**17.3**	**13.6**	**8.9**	**5.6**	**4.7**	**5.0**	**4.7**	**4.7**

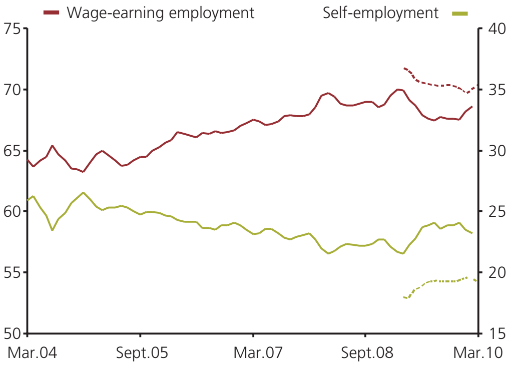
(1) Percentage points.
(2) Includes securitized mortgage debt.
(3) FCF: Family compensation funds.
(4) Includes car financing, student loans, and insurance companies.

Sources: Central Bank of Chile, SBIF, SuSeSo, and SVS.

Figure IV.10

Employment by category (*)

(percent of total employment)



(*) The dotted lines represent the New National Employment Survey series.

Source: INE.

In terms of the quality of employment, the share of wage-earning jobs in total employment has been contracting since March 2009, but this trend evened out and even improved at the margin, reaching relatively high levels in January and February 2010 in comparison with the last five years. This is corroborated by both the INE's traditional employment measure and the new national employment survey (figure IV.10).

Some components of household wealth evolved positively in the past year, reversing the deterioration of 2008

Housing prices grew 3.4% annually, on average, between 2006 and 2009. In the same period, the return on pension savings was 8.2% annually (figure IV.11). Thus, the value of the main assets that make up household financial wealth is currently higher than in the period preceding the subprime crisis[6]/.

However, the earthquake on 27 February is expected to increase household credit risk moderately

The earthquake's impact on household credit risk is analyzed through two mechanisms. The first is the reduction in household income, due to an increase in unemployment in the most affected economic sectors. The second is the loss of wealth resulting from the total or partial destruction of housing and other tangible goods.

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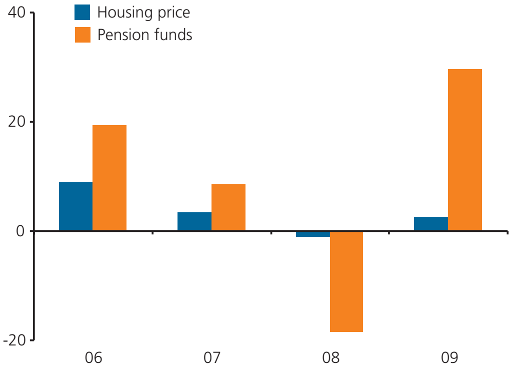
[6]/ Housing and pension savings represent 68% and 17% of household wealth, respectively, according to the 2007 Household Financial Survey.

Figure IV.11

Return on main financial assets of households
(real annual, percent)



Source: Central Bank of Chile, based on Collect and SP.

Table IV.4

Change in household debt-at-risk due to the earthquake (*)
(percent of the respective loan portfolio)

	Retailer	Bank	
		Mortgage	Consumer
Approach 1	3.69	2.81	2.60
Approach 2	n.a.	0.60	1.21

(*) Debt-at-risk is defined as the debt position of households with an FIR above 75% and a negative financial margin of less than –20%.

Source: Central Bank of Chile, based on data from the 2007 Household Financial Survey and the SBIF.

The 2007 Household Financial Survey is used to simulate the effects of these two shocks, and the results indicate that debt-at-risk changes little with respect to the baseline case. Debt-at-risk is lower when the simulations are based on data from the appendix to the Lending Conditions Survey, which reports banks' expected losses in their mortgage loan portfolio in the affected regions (table IV.4 and box IV.1). This result is primarily explained by the banking system's low exposure to the affected regions, which account for 1.8% of the total consumer loan portfolio and 2.9% of the total mortgage loan portfolio[7]/.

These estimations reveal that the increase in unemployment could have a larger effect on household credit risk than the destruction of housing. Consequently, the evolution of employment in these areas should be closely monitored.

The favorable household financial situation could be affected in a risk scenario like the one described in this Report

The most recent information suggests that households have become slightly less vulnerable, although this could be challenged by the effects of the earthquake and the threats from the international environment. A deepening of the problems in Europe could cause exports to contract further, with a negative impact on employment generation.

Finally, it is important to bear in mind that the above analysis is based on aggregate data, whose evolution is not necessarily representative for different income strata. This heterogeneity may be important for assessing the payment capacity of the highest risk segments of the population, especially in the face of financial stress.

Consolidated government

The fiscal situation has changed considerably in recent months, with higher real and projected deficits than forecast in the last Report

The central government closed 2009 with a deficit of 4.4% of GDP, which is well above the 3.6% forecast in October of that year (figure IV.12). This difference is primarily due to lower tax revenue and higher expenditure than estimated. For 2010, the forecast of the accrued deficit was raised from 1.3% of GDP, estimated in early April 2010, to almost 2.0% of GDP. This reflects the inclusion of several adjustments, mainly the updating of the macroeconomic assumptions and the incorporation of higher expenditures stemming from new commitments together with the implementation of the reconstruction plan and the government program[8]/.

To finance the total cost of the reconstruction plan (US$8.431 billion)

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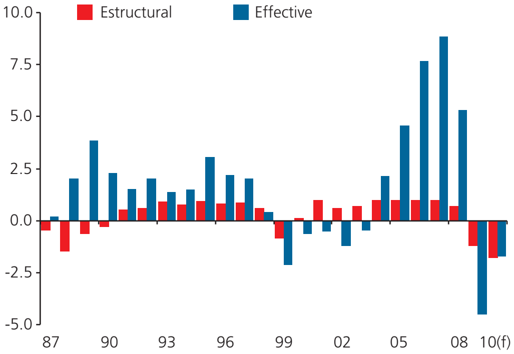
[7]/ This exercise includes retailers, but not other nonbank financial institutions, such as the savings and loan cooperatives or the family compensation funds. Some of these institutions could have a higher concentration of credit in the VI to VIII regions, possibly causing a more significant worsening in their profitability and/or solvency.

Figure IV.12

Central government balance

(percent of GDP)



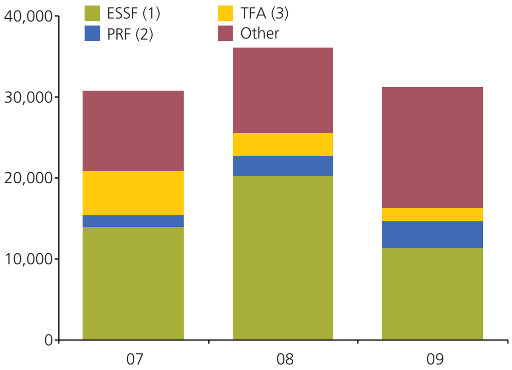
(f): Forescast.

Source: Ministry of Finance.

Figure IV.13

Financial assets of the central government

(US$ million)



(1) ESSF: Economic and Social Stabilization Fund.
(2) PRF: Pension Reserve Fund.
(3) TFA: Other Treasury financial assets.

Source: Ministry of Finance.

and the government program (US$9.255 billion), as well as the accrued deficit initially estimated for this year, a diversified financing strategy was announced, in which the different sources include higher taxes (16%), own resources (17%), and external debt (7%). Other sources have also been mentioned, such as the disposal of dispensable nonfinancial assets, liquidation of financial assets (Economic and Social Stabilization Fund, ESSF), additional internal/external debt, and economic growth.

The 2009 deficit was financed with own resources and higher debt, but the central government maintained a net credit position, with a low debt level by international standards

The 2009 deficit was financed through the sale of central government financial assets (mainly from the ESSF) and the issue of bonds authorized in the 2009 Budget Law[9]/. Financial assets decreased around US$4.9 billion in 2009, to 17.2% of GDP in December 2009 (figure IV.13), while gross financial liabilities grew from 5.2% to 6.1% of GDP in the same period.

Despite the expansion of debt in 2009, the central government continued to hold a net credit position in both local and foreign currency (figure IV.14). In addition, debt as a share of GDP continued to be low by international standards (figure IV.15).

The central government's net credit position is expected to decrease further in 2010

Based on the current level of assets and debt and the projected deficit for this year, the central government's net credit position is expected to reach around 9% of GDP in 2010.

Given the projected deficit for this year, the required contribution to the Pension Reserve Fund is 0.2% of 2009 GDP, or about US$3.3 billion. This implies that the Treasury must raise net resources of approximately 2.0% of GDP in 2010. To do so, there is a series of options: the sale of financial assets (whose balance was US$31.0 billion at year-end 2009), the sale of nonfinancial assets, and an increase in internal or external debt. At the close of this *Report*, US$2.3 billion in internal debt has been issued, and an announcement has been made regarding a foreign debt issue with a ten-year maturity, of which US$1.0 billion would be denominated in U.S. dollars and US$500 million in Chilean pesos. The latter would be the first of its kind carried out by the Chilean Government.

The 2010 Budget Law authorizes new debt issues of up to US$7.8 billion, in national or foreign currency[10]/. Should the total allowable amount be used, the gross debt of the central government would rise from 6.1% in 2009 to almost 9.0% of GDP in 2010.

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[8]/ This last figure would be consistent with a structural deficit of 1.8% of GDP, according to announcements by the same authority.

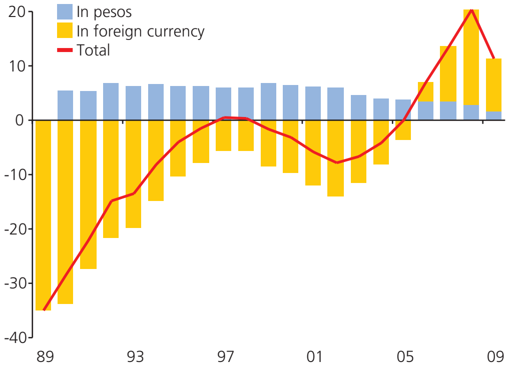
[9]/ The issue is estimated to be near the limit established in the Budget Law (US$3.0 billion).

[10]/ Includes liabilities contracted to settle the payment of recognition bonds.

Figure IV.14

Net positions of the central government (*)

(percent of GDP)



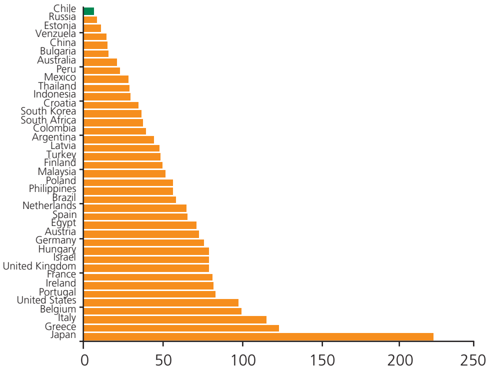
(*) A positive (negative) number implies a net asset (liability) position.

Source: Ministry of Finance.

Figure IV.15

Public sector debt forecast for 2010

(percent of GDP)

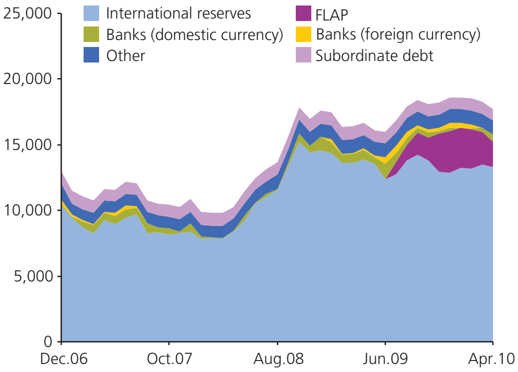


Source: Moody's (2009).

Figure IV.16

Assets of the Central Bank of Chile

(millions of pesos)



Source: Central Bank of Chile.

The size of the Central Bank's balance sheet has begun to shrink, due to the gradual withdrawal of the liquidity support programs

The size of the Central Bank's balance sheet shrank approximately Ch$320 billion in the first quarter of 2010. This is explained by the gradual reduction in the use of the Term Liquidity Facility (*FLAP*), without an equivalent increase in repo operations. Thus, the aggregate balance of repos and the FLAP contracted Ch$919 billion between December 2009 and 30 April 2010 (figure IV.16). The monetary base—the counterpart to these operations—did not change much in the period, so part of the adjustment was reflected in a drop in the balance of Central Bank debt.

In accordance with the usual accounting principles, the Central Bank's net worth went from –$1.96 billion on 31 December 2009 to –$2.001 billion on 15 May 2010. That is, there was a small contraction relative to the close of 2009. This is mainly explained by the fact that the exchange rate on those dates fluctuated very slightly (Ch$531.75 to the dollar versus Ch$532.23). As frequently pointed out, the Central Bank holds a net debit position in local currency and a net credit position in foreign currency, so the accounting results are sensitive to exchange rate fluctuations.

Box IV.1: Methodology for measuring the effects of the earthquake on household and corporate credit risk

Household credit risk

To estimate the size of the earthquake's impact on household payment capacity, a simulation exercise was carried out using the 2007 Household Financial Survey, in which two effects were considered: income and wealth. The income effect could come from an increase in unemployment in the directly affected regions (VI, VII and VIII); the wealth effect, from the loss of equity caused by damage to homes.

The income effect is modeled using the estimated contraction in sectoral output in the affected regions and extrapolating the increase in unemployment. This was then used to compute the probability of becoming unemployed for each head of household pertaining to a given economic sector. The unemployment of the head of household has a direct impact on the household's income, affecting the household's debt indicators (which rise) and financing margin (which falls)[11,12]/.

To estimate the wealth effect, the exercise assumed the total destruction of homes older than 40 years, located in the directly affected regions. The remaining houses in these areas were assigned probabilities of serious and minor damage. All of these criteria were calibrated with actual data on damaged and destroyed homes provided by the Ministry of Finance. These estimates were then used to simulate what would happen with the financial burden of households affected by the earthquake. In the case of a home that was totally destroyed, it was assumed that the household would buy a new home if it had enough resources to apply for a mortgage loan. If not, an average monthly rent was assigned according to socioeconomic level and the region in which the household is located.

Finally, these exercises were used as the basis for estimating the increase in debt-at-risk, defined as debt held by households with an FIR of over 75% and a financial margin of less than –20%[13]/.

Corporate credit risk

To measure debt-at-risk among firms, econometric estimations were used to approximate the effect of lower economic activity on the probabilities of default and business closures.

With regard to default probabilities, Ahumada and Oda (2008) find that a one-percentage-point reduction in output increases the probability of default by 0.07 percentage point among SVS-registered firms with the best risk rating. For firms with a lower rating, the effect is 0.36 percentage point (table IV.5).

Table IV.5

Elasticities used in the simulations (*)

Segment	Nonpayment	Closure
SMEs	0.36	0.10
Not SMEs	0.07	0.00

(*) Percentage points in the face of a 1% change in the output level.

Sources: Ahumada and Oda (2008) and Álvarez and Vergara (2010).

To calculate the debt in default, the former parameter was used for large firms and the latter for SMEs[14]/. Based on projections of the reduction in sectoral growth in the (directly) affected and unaffected regions, the share of debt in default was estimated by sector. This exercise was complemented with estimates carried out by Álvarez and Vergara (2010) on the effect of lower economic activity on the probability of business closures (table IV.5). Assuming an extreme scenario, all of the debt of a closed firm would be in default. These default and business closure probabilities were applied to the commercial loan portfolio by sector and firm size, to determine the amount of the normal portfolio that would become impaired. In the case of large firms, an elasticity of zero was assumed, given their lower vulnerability to shocks and the existence of insurance.

Finally, for both household and companies debt, a second methodology was applied based on loss estimates, net of guarantees, reported by banks in the appendix to the last Lending Conditions Survey. These estimates are disaggregated by type of loan (consumer, mortgage, and commercial) for SMEs and by economic sector for the total commercial portfolio. Because the responses provided a range for the losses, the upper end of the reported range was used in both cases.

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[11]/ The unemployed head of household is assumed to earn zero income.

[12]/ The financial margin is household income less total expenditure, as a share of income.

[13]/ FIR is the ratio of the financial burden to disposable income. See Fuenzalida and Ruiz-Tagle (2009) for the justification for using these parameters.

[14]/ There are no empirical studies on the relationship between default on debt and economic activity in a broader group of firms than those registered with the SVS. Evidence for other countries can be found, for example, in Carling et al. (2007).

Box IV.2: **Household Financial Survey, 2007–2008**

To date, the Central Bank of Chile has completed three versions of the Household Financial Survey: a representative national urban survey in 2007, and a representative panel of the Santiago Metropolitan Region in 2008 and 2009[15]/.

This box presents a first set of results for the 2007 and 2008 versions[16]/. The 2008 Survey covered 1,207 households in the Santiago Metropolitan Region and is comparable with the 2007 Survey, which included 4,021 households at the national level, of which 2,427 are located in Greater Santiago.

The 2008 Survey was carried out from November 2008 to January 2009, when the subprime crisis had a significant impact in terms of an output contraction and a rise in unemployment. Consequently, a comparison of 2007 and 2008 shows an increase in the total number of households with debt, especially among low-income households (first stratum) with consumer debt ("Nonmortgage" in table IV.6). Debt to retailers fell notably across all income strata. Even so, households with retailers debt continued to far exceed the share of households with bank debt.

This lower lending activity on the part of retailers reduces the importance, at least in number, of households with debt, in terms of both banks and retailers. This is relevant from the perspective of financial stability, because with the current configuration of the borrower database, it is not possible for the different credit issuers to see the total debt of these households. At the aggregate level, 16% of households have debt with these two sources of credit.

The increased lending by the family compensation funds generates the same phenomenon. However, the magnitude of this problem, while growing, is lower than in the case of the retailers. Of the total households, 3.5% have debt with both types of issuers.

Table IV.6

Debt holdings (*)

(percent of household in the stratum that hold the indicated type of debt)

	Stratum 1		Stratum 2		Stratum 3		Total	
	2007	2008	2007	2008	2007	2008	2007	2008
Debt holdings	**60.8**	**64.6**	**75.6**	**75.8**	**75.7**	**77.3**	**69.5**	**71.5**
Nonmortgage	57.9	60.4	70.6	66.9	66.6	63.7	64.3	63.4
Bank	13.6	14.6	25.9	30.9	45.1	40.2	25.8	26.5
Retailers	48.7	47.7	57.2	54.2	45.3	40.4	50.6	47.9
Banks and retailers	11.2	9.1	19.2	21.9	27.6	21.5	18.1	16.4
Compensation funds	7.0	9.0	6.8	10.1	4.9	4.2	6.4	8.1
Banks and compensation funds	1.6	2.2	2.5	6.0	2.4	2.5	2.1	3.5
Mortgage	8.3	8.2	21.2	22.3	36.8	40.3	19.9	21.1

(*) Stratum 1: income deciles 1 to 5; Stratum 2: income deciles 6 to 8; Stratum 3: income deciles 9 and 10.

Source: Central Bank of Chile.

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[15]/ For more detail, see www.bcentral.cl.

[16]/ The publication of revised statistics on the distribution of income in Chile could imply revisions to these results.

In the highest income strata, the share of households with consumer debt shrank, while households with mortgage debt grew. In the highest income stratum, households with this type of debt increased 3.5 percentage points.

The behavior of household financial assets in the period is consistent with the expected adjustments in a crisis situation. Financial asset holdings decreased 5% between 2007 and 2008 (from 17.0% of households in 2007 to 12.6% in 2008). This trend was influenced, in particular, by the reduction of financial assets in the highest income segments, which reached nine percentage points in the same period (from 35% to 26%). At a general level, the drop in financial asset holdings could be due to the sale of assets to cover reductions in other income, as well as the liquidation of assets that have lost value and have a negative future outlook.

An indicator that is widely used in the literature to characterize the household debt level is the financial burden-to-income ratio (FIR). While the average FIR fell for all households between 2007 and 2008, the median and the 75th percentile rose (table IV.7). This implies that the increase in the financial burden occurred in households that started with a low or medium financial burden, and not in households whose financial burden was already very high. Even in the 75th percentile of the distribution, the FIR remained below 31% in the period.

Table IV.7

Ratio of financial burden to monthly income

(percent)

	2007			2008		
	Average	**Median**	**75th percentile**	**Average**	**Median**	**75th percentile**
Stratum 1	25.1	4.9	22.9	22.4	6.9	25.0
Stratum 2	29.7	9.2	25.7	27.5	12.0	30.8
Stratum 3	21.0	10.6	27.1	20.2	12.7	27.7
Total	**25.5**	**8.0**	**25.5**	**23.5**	**10.1**	**27.6**

Source: Central Bank of Chile.

To provide a clearer idea of the implications of the financial burden levels, table IV.8 reports the households with debt-at-risk in the 2007 and 2008 Surveys[17]. The results show that the households with debt-at-risk represented less than 5% of total households in both 2007 and 2008.

The low share of households with debt-at-risk in the economy is a very positive result in terms of financial stability.

The results of future Household Financial Surveys will complement the analysis of household behavior across the cycle. The thematic chapter contained in this *Report* provides an example of the topics that can be analyzed with this type of survey.

Table IV.8

Households at financial risk

(percent)

	2007	2008
Stratum 1	6.9	6.7
Stratum 2	2.2	3.2
Stratum 3	3.3	1.3
Total	**4.4**	**4.2**

Source: Central Bank of Chile.

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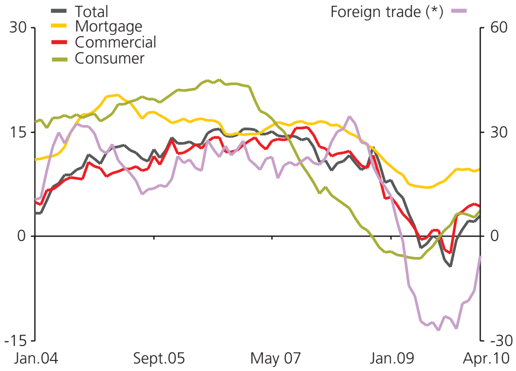
[17] See box IV.1 for a definition of debt-at-risk.

V. Banking system

Figure V.1

Growth of loans

(real annual change, percent)



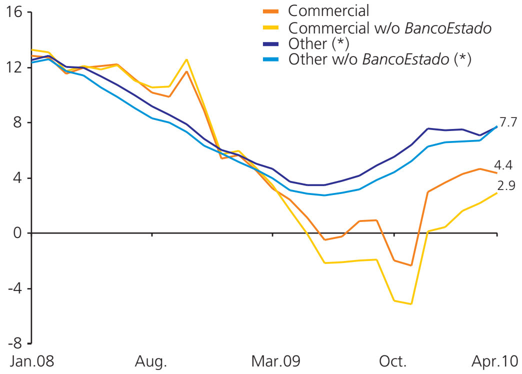
(*) Loans measured in U.S. dollars.

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

Figure V.2

Growth of loans

(real annual change, percent)



(*) Includes mortgage and consumer loans.

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

This chapter analyzes the financial strength of the local banking system, which is directly related to its degree of exposure to credit, market, and liquidity risk and its capacity to absorb adverse shocks.

Banking activity picked up in the first months of the year

After falling in real terms in the second half of 2009, banking sector lending began to show signs of recovery in January of this year (figure V.1)[1]/. Much of this recovery has been driven by loans to non financial companies. Commercial loans (57% of the system's total loan stock) posted real annual growth of over 4% in the first four months of 2010, which is substantially higher than 1.4% average in 2009. Foreign trade loans (7% share) stopped falling.

Nevertheless, private banking activity is still weak, as can be demonstrated by isolating the effect of *BancoEstado* (figure V.2). While the majority of institutions reduced their loans in 2009, *BancoEstado* recorded growth near 17%. Although this expansion was concentrated in large firms, the bank constituted additional provisions during the year, which should enable *BancoEstado* to face the risk of deterioration of this new portfolio.

Lending rates and loan-deposit spreads contracted in the first months of the year

The banking system's lending rates fell in 2009, especially on commercial loans between 30 and 89 days (figure V.3)[2]/. These rates dropped over 13 percentage points between December 2008 and December 2009, while deposit rates fell around six percentage points in the same period. Consequently, loan-deposit spreads narrowed to around the levels seen before September 2008.

Interest rates on consumer loans were adjusted upward in January, but they have come back down to levels similar to the period preceding the international financial crisis. The spreads for these loans, however, remain higher than the 2007–2008 average.

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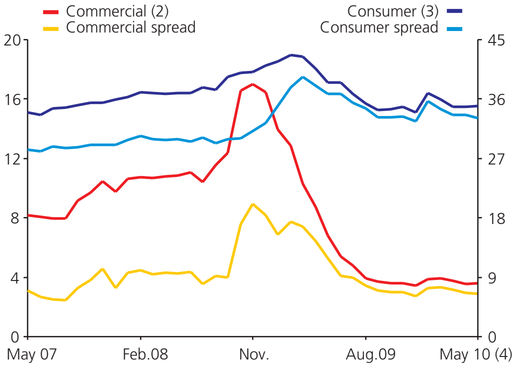
[1]/ These contractions have intensified in recent months, given the high basis for comparison since late 2008. This is explained by the fact that, in response to the international financial crisis, domestic firms used their full bank credit lines to accumulate liquidity, thereby increasing the credit stock.

[2]/ More than 50% of the banking system's commercial loan flows in pesos have maturities of 90 days or less (Matus et al., 2009).

Figure V.3

Bank lending rates and spreads (1)

(annual percent)



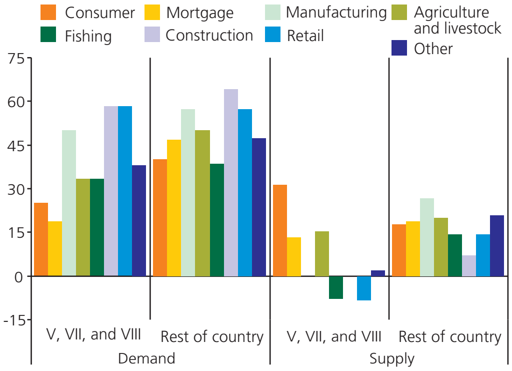
(1) Representative maturities and currencies for each loan segment. See Matus et al. (2009).
(2) Pesos, 30 to 89 days.
(3) Pesos, 6 months to one year.
(4) Data as of 14 May 2010.

Source: Central Bank of Chile.

Figure V.4

Perception of credit supply and demand for individuals and SMEs (1)

(net percent of responses) (2)



(1) Responses in the appendix to the Lending Conditions Survey, first quarter of 2010.
(2) Negative values indicate a weaker demand perception and less flexible supply conditions.

Source: Central Bank of Chile.

The growth rate of loans is expected to continue rising throughout the rest of 2010

Risk rating agencies' reports and some press releases from bank shareholders' meetings reflect expectations of a 10% growth rate in bank loans for 2010.

In addition, the appendix to the Lending Conditions Survey of the banking system for the first quarter of 2010 shows that the sector expects both the supply and demand for business and personal loans to expand over the course of the year, in accordance with expectations of an upturn in economic activity in the second half (figure V.4). SMEs located in the regions that were most affected by last February's earthquake, particularly those that operate in vulnerable economic sectors (such as fishing and retail sales), could face tighter lending conditions (chapter IV).

Nonperforming loans deteriorated slightly in the most recent period …

The banking system's default indicators grew steadily through mid-2009; they were then relatively stable until February of this year, but they began to rise again in March and April (figure V.5). This largely reflects the behavior of nonperforming commercial loans, which reached 1.4% of total loans in April, the highest figure of the last five years (figure V.6)[3]/.

Nonperforming consumer loans, in turn, continued falling after the close of the last *Report*, stabilizing at around 0.6% in the first four months of this year. The temporary payment relief granted by the banks and adjustments to the regulatory framework adopted by the Superintendence of Banks and Financial Institutions (SBIF)—designed to facilitate the fulfillment of liabilities for borrowers in good standing who were affected by the earthquake—will probably help keep this indicator stable in the first half. However, an increase in unemployment in the most affected regions could lead to a deterioration in the quality of this portfolio (chapter IV).

The evolution of the credit quality of housing financing continues to be closely linked to the portfolio performance of *BancoEstado*, which has a market share of over 25%. The deterioration of housing loans financed with nonendorsable mortgages explains almost 60% of the increase in this institution's nonperforming mortgage loans.

….and provisions continue in an upward trend

Provisions have been growing since early 2009. The system's provisions ratio increased more than 50 basis points between June 2009 and April 2010, mainly in the commercial segment (figures V.5 and V.7). This was due, in part, to the fact that as of January 2010, banks have to constitute provisions for contingent loans that were not previously included as provisions, such as unused open credit lines[4]/. Because these new provisions were incorporated as additional provisions and were charged to a balance sheet account rather than an income account, as is customary, loan loss provisions did not increase.

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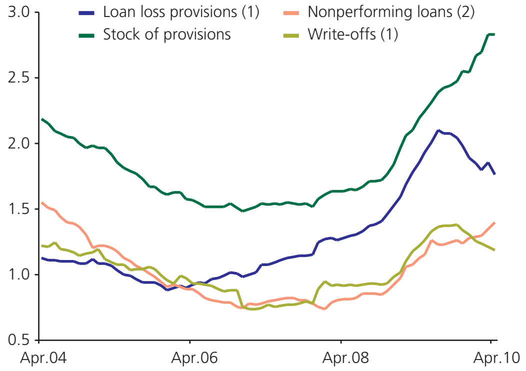
[3]/ The default rate (delinquent 90 days or more) was 2.9% for the total portfolio and 2.2% for the commercial portfolio.

[4]/ See box V.2 of the *Financial Stability Report*, Second Half 2008.

Figure V.5

Credit risk indicators

(percent of total loans)



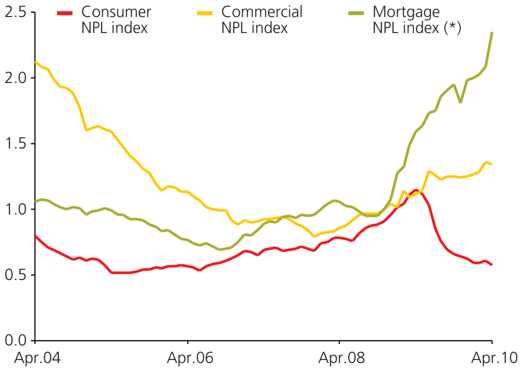
(1) Moving years ending in each month.
(2) The figure for April is preliminary.

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

Figure V.6

Nonperforming loan index by loan segment

(percent)



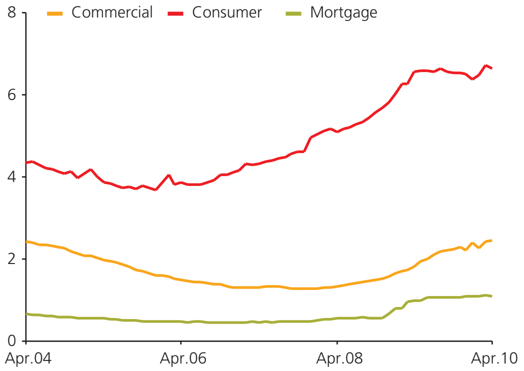
(*) The figure for April is preliminary.

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

Figure V.7

Provisions index

(percent of total loans)



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

The banking system also accumulated additional provisions for almost Ch$80 billion between February and April. These reserves are earmarked to absorb the deterioration of the payment capacity of some firms as a result of the earthquake, as well as the higher provisions requirements based on individual company assessments, once the new regulatory framework on provisions enters into effect[5]/.

The system's profitability has increased, especially in banks with a strong presence in the consumer segment

The banking system's earnings have increased in the last several months. As a result, in April of this year, the annualized return on equity (ROE) was 19% and return on assets (ROA) was 1.4%, for the system average (figure V.8). This is explained, in part, by the higher inflation recorded in recent months, which, when combined with a net asset position in indexed operations (mainly loans), contributed to raising the net interest margin in the first four quarters of the year. In addition, the fact that a substantial share of the increase in provisions in January was not recognized as an expense contributed to keeping loan loss provisions relatively stable in the period.

The lower loan loss provisions for the consumer portfolio, registered in August 2009, has also contributed to improving the return on equity of banks with a strong presence in this segment. Retail banks, on average, increased their annualized ROE from –4% in April 2009 to over 9% in April 2010 (figure V.8). An increase in unemployment in the regions that were most affected by the earthquake could deteriorate the quality of this portfolio, impacting profitability. However, preliminary estimates indicate that the effects should be limited (chapter IV).

In 2009, an important share of bank profitability stemmed from treasury business[6]/. Although the interest rate hikes expected by the market would push earnings downward in this line of business, this should be offset by the favorable outlook for lending activity and higher inflation.

Despite the increase in risk-weighted assets, the system's capital adequacy ratio is still over 13%

As a result of the recovery of bank lending, credit-risk-weighted assets have been growing, partially reversing the drop recorded since late 2008 (figure V.9). Nevertheless, the system's capital adequacy ratio (CAR) continued to increase in the second half of 2009, reaching 14.3% in December. The improvement in this indicator is largely explained by additional reserves for over Ch$160 billion—which increased Tier 2 capital—as well as higher earnings and capital increases in some banks in the second half of the year[7]/.

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[5]/ See chapter B-1 of the *Compendium of Accounting Standards*, by the SBIF.

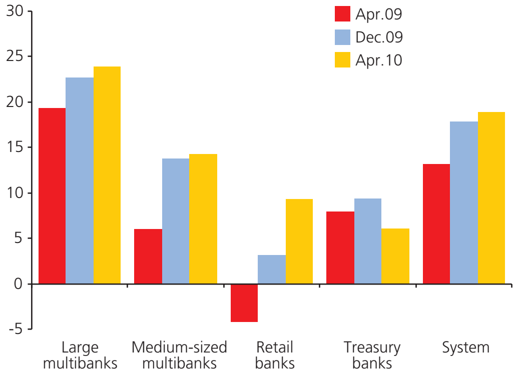
[6]/ *Financial Stability Report*, Second Half 2009.

[7]/ The additional provisions can be recorded as part of supplementary capital up to a limit of 1.25% credit-risk-weighted assets. For the system as a whole, this ratio was 0.41% in March 2010.

Figure V.8

Return on equity distribution (*)

(percent of equity by bank group)



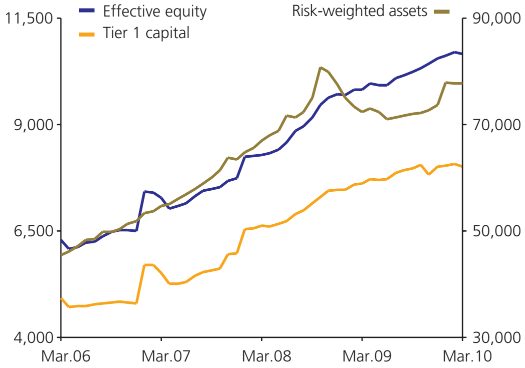
(*) Moving years ending in each month.

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

Figure V.9

Composition of the capital adequacy ratio

(Ch$ million)

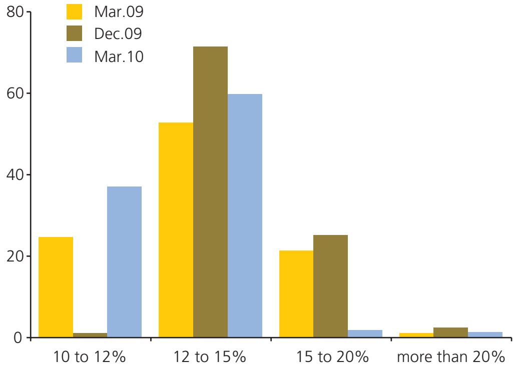


Source: Central Bank of Chile, based on data from SBIF.

Figure V.10

Distribution of the capital adequacy ratio

(percent of risk-weighted assets in each category)



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

As of January of this year, banks must comply with additional capital requirements in relation to contingent loans[8]. The increase in risk-weighted assets from this item caused the system's CAR to drop approximately 60 basis points in the first months of the year. While this indicator could potentially drop further, the impact on the solvency of the banking system is estimated to be low, given banks' dividend payment policies[9].

Nevertheless, in March 2010, the CAR exceeded 12% in 21 banks, which represent over 60% of the system's risk-weighted assets (figure V.10).

While bank lending has recovered, liquidity levels are still high…

Banks' liquidity position has steadily improved since September 2008. In the first four months of this year, the stock of liquid assets represented around 18% of total system assets (figure V.11). The normalization of the international financial markets in the period contributed to facilitating banks' access to credit lines and the issue of bonds overseas. Preliminary data for May indicate an increase in available funds.

In the local market, interest rates remained low, which led different economic agents to hold highly liquid instruments. These deposits recorded real annual growth rates of almost 28% in the first four months of the year, and their share in total financing sources thus increased to over 18% in the month of April (figure V.12).

Another factor favoring the growth of bank liquidity was the unconventional measures implemented by the Central Bank of Chile in 2009, in particular, the short-term liquidity facility (*FLAP*). This facility, which provided financing at maturities of up to 180 days and at a rate equal to the MPR, peaked at Ch$3.3 billion in mid-January of 2010 (chapter III).

…in part due to the increase in institutional time deposits

The stock of time deposits in the system ended the falling trend observed since late 2008 and has been stable since December 2009, despite the continued low interest rates on this type of deposit (figure V.12).

The growth of time deposits in the mutual fund portfolios has recently been reinforced by the pension funds, whose holdings of time deposits have stabilized after shrinking between August 2008 and November 2009 (figure V.13). This reflects the fact that the pension funds have reached the upper limits on foreign variable-income investment in type A and B funds (chapter III).

Treasury and retail banks continue to depend strongly on institutional financing. Individually, the share of these banks in total system assets is low (less than 1%), but their liquidity management policies still need to take into account the risks carried by this exposure[10].

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[8] See footnote number 4.

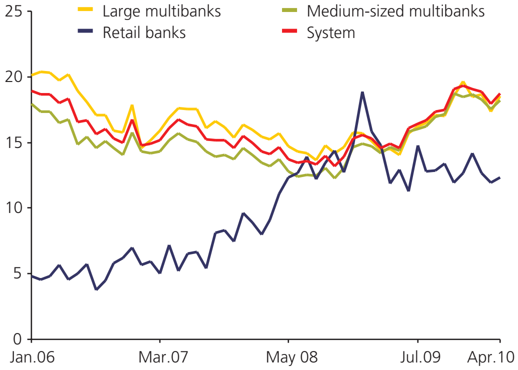
[9] This is applied to banks that distribute a larger share of earnings relative to provisions.

[10] In the last week of September 2008, interest rate hikes had a negative impact on the valuation of short-term mutual funds, leading a significant number of members to cash in their shares. This put even more upward pressure on bank deposit rates traded in secondary markets and on short-term prime deposit rates.

Figure V.11

Liquid assets in the banking system (*)

(percent of total assets)



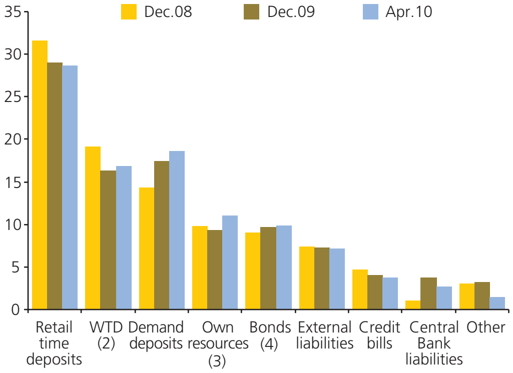
(*) Cash, plus negotiable and available-for-sale instruments.

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

Figure V.12

Bank funding

(percent of total liabilities) (1)



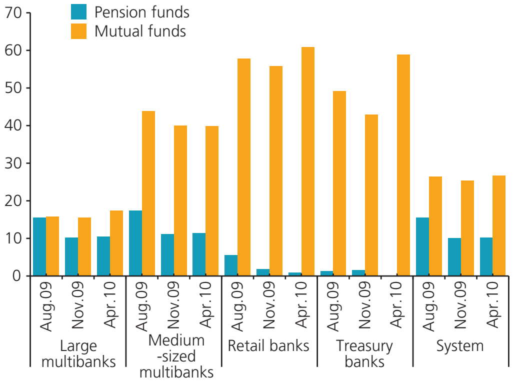
(1) Total liabilities net of contingent liabilities and reasonable value of derivative instruments.
(2) WTD: Wholesale time deposits, including mutual funds and pension funds.
(3) Includes Tier 1 capital, provisions, net reasonable value of derivative instruments, and earnings.
(4) Includes senior and subordinate bonds.

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

Figure V.13

Time deposits of institutional investors

(percent of time deposits)



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

Bank exposure to currency risk is low, despite the increase in external debt

Towards the end of 2009, the banking system recorded a substantial increase in (nonderivative) foreign-currency-denominated liabilities. This reflected a greater use of foreign credit lines and the issue of nearly US$1.5 billion in senior bonds in international markets between November 2009 and April 2010 (figure V.14). Nevertheless, currency risk exposure in nonderivative instruments was relatively stable in the first months of 2010, at around US$12 billion (figure V.14).

As a counterpart to this trend, the banking system expanded its net asset position in foreign currency derivative instruments through November 2009, mainly due to the growth of currency hedging operations with pension funds (figure III.5). Since that date, these hedges have decreased—partly in response to the regulatory change governing the pension funds' currency hedging operations (chapter III)—such that the mismatch from derivatives operations was stable in the first four months of the year.

Consequently, the banking system's total exposure to currency risk was low and stable in the first several months of the year, with a total mismatch that does not exceed 3% of Tier 1 capital (figure V.14).

Other market indicators confirm that external agents have a positive assessment of the Chilean banking system

Since the last *Report*, the national banking system has maintained the strengths of the past several years. This can be seen in the favorable evolution of the stock indices, the credit rating on debt securities (an average of AA+ for long-term local-currency deposits), and the discount rates on long-term debt securities[11]/. In addition and as previously mentioned, the banks have maintained a fluid access to the international credit markets, which signals that external agents have a positive assessment of the Chilean banking system.

However, this evaluation is sensitive to the materialization of the risk scenario described in chapter I

The risk of a global economic contraction could translate into a credit slowdown and a higher default probability for households and firms, especially those in the tradables sector (chapter I).

Another relevant risk is foreign currency financing. In March 2010, 41% of the banking system's external loans came from European banks, and the figure was as high as 100% in some individual local banks. External loans represent less than 8% of total bank liabilities, and during the last international crisis Chilean banks were able to diversify their creditor matrix. Nevertheless, a deepening of the financial problems in Europe could generate an additional negative impact, especially considering the increased use of foreign credit lines to finance assets that are not associated with foreign trade, as seen in the last several months (figure V.15).

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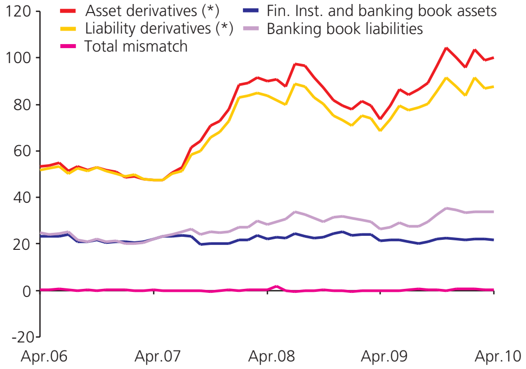
[11]/ The downward revision of the risk rating on the banking system's subordinate bonds, carried out by a local rating agency in March 2010, stems from a methodological change applied by the rating agency rather than an increase in the agency's perception of risk.

Figure V.14

Foreign currency balance of the banking system

(US$ billion)



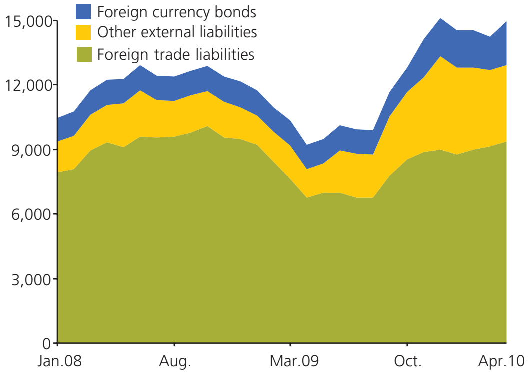
(*) Includes notional value of foreign currency forwards and swaps.

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

Figure V.15

Foreign currency liabilities of the banking system

(US$ million)

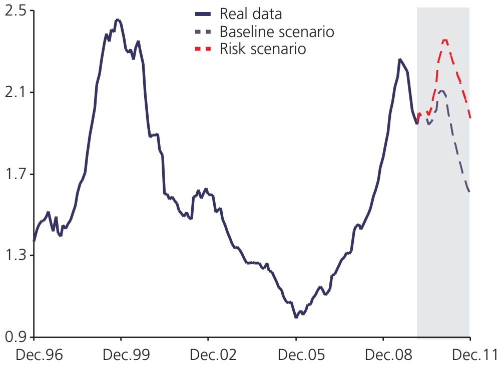


Source: Central Bank of Chile, based on data from SBIF.

Figure V.16

Loan loss provisions under risk scenarios (*)

(percent of loans)



(*) Excluding foreign trade credits.

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

In fulfilling its role as intermediary in corporate and pension fund currency hedging operations, the Chilean banking system maintains a net liability (sales) position in currency forwards with counterparties overseas, close to US$6.0 billion in mid-May 2010 (almost 3% of the system's assets). This market contracted during the last international financial crisis, recording reductions in gross and net currency derivative positions, in the number of counterparties, and in the length of the contracts. Even though this market has recovered since mid-2009, the current situation of the European banking industry exposes it to new contractions. In addition, throughout the world, these contracts have been requiring higher guarantees (safeguards in the Credit Support Annex, or CSA), relative to the precrisis situation.

Finally, given the current international environment and the presence in Chile of banks with a foreign parent bank or foreign controlling interest, there is a risk of parent-subsidiary contagion through higher financing costs or other mechanisms. In the case of local banks, however, there are objective conditions that could mitigate these sources of contagion, such as the banks' low degree of dependence on the parent for financing; the fact that Chilean banking law requires that the subsidiary keeps all of its capital in the country in order to operate as a financial entity in the local market, and corporate governance requirements.

The impact of the realization of the risk scenario described in chapter I on banks' profitability and solvency is analyzed in the next section.

Stress tests

Stress tests are analytical tools that contribute to identifying weaknesses and sizing up financial strengths in a given moment of time. Given their partial nature, they do not necessarily uncover all the effects of specific risk scenarios. Consequently, they should not be interpreted as projection exercises[12]*/.*

The stress tests reveal that the banking system has an adequate financial position to operate normally and has the capacity to absorb the materialization of a severe risk scenario

The risk scenario is consistent with the main threats to the financial stability of the Chilean economy described in chapter I[13]/. The main assumptions include a 20% increase in the exchange rate over a period of 15 days, an interest rate hike of 250 basis points in the short term and 100 basis points in the long term, a stagnation of output in late 2010, and unemployment rates near 10%.

The stress tests are based on data up to January 2010 and take into account the adverse effects of the earthquake on 27 February in two ways. First, these effects are included in the evolution of economic activity. Second, the tests incorporate the banks' loss estimates, net of guarantees, as reported in the Lending Conditions Survey for the first quarter of 2010.

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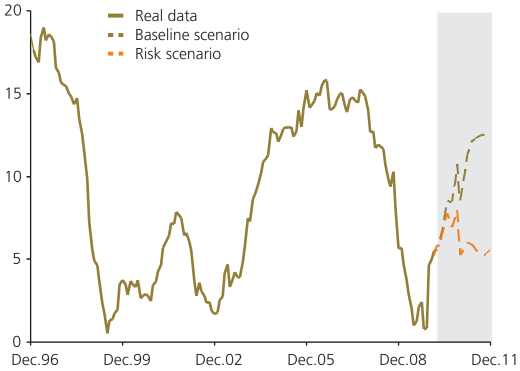
[12]/ This analysis is based on the methodology described in Jara, Luna, and Oda (2008) and Alfaro, Calvo, and Oda (2009). Both the analysis and the results are regularly disclosed to the SBIF.

[13]/ The baseline scenario used in these tests is consistent with the forecast for economic activity described in the Central Bank of Chile's *Monetary Policy Report* for March 2010.

Figure V.17

Growth of loans under risk scenarios (*)

(real annual change, percent)



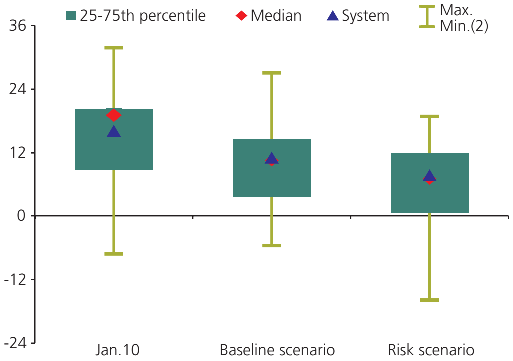
(*) Excluding foreign trade credits.

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

Figure V.18

Impact of different risk scenarios on return on equity (1)

(percent)



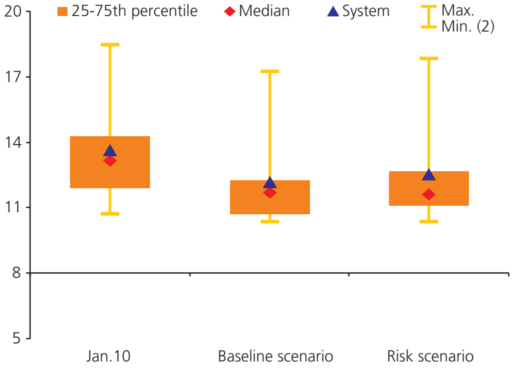
(1) Figures are weighted by the Tier 1 capital of each institution in September 2009.
(2) Minimums correspond to the first percentile.

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

Figure V.19

Impact of different risk scenarios on the capital adequacy ratio (1)

(percent)



(1) Figures are weighted by the Tier 1 capital of each institution in September 2009.
(2) Maximums correspond to the 90th percentile.

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

In these tests, credit risk is measured through the ratio of loan loss provisions to loans, which decreased from 2.2% in September 2009 to 2.0% in January 2010[14]. In the baseline scenario, this indicator would rise to 2.1% over the course of one year, mainly due to losses generated by the earthquake (0.4% of loans). In the risk scenario, it would increase to 2.4% (figure V.16).

Within the current context of a recovery of lending, the annual growth rate of bank loans would reach 9.3% in January 2011 under the baseline scenario, versus 5.4% under the risk scenario in the same period (figure V.17).

In the stress tests, system losses associated with credit risk are 5.8% of the system's capital under the baseline scenario and about 7.3% under the risk scenario, including 3.6% losses from the earthquake. In addition, the increase in loans and the favorable evolution of margins in the baseline scenario partially offset this risk by increasing return on equity by 2.1%, versus 1.5% in the risk scenario.

Market risk has increased relative to previous stress tests. Losses in the valuation of financial instruments due to changes in the yield curve are on the order of 1.4% of the system's capital in the risk scenario, while losses from asset and liability renewal are under 1.3% of capital in the same scenario.

Finally, currency risk exposure remains low for the system, because the majority of institutions maintain a relatively matched foreign exchange position. Thus, a rise or fall in the exchange rate does not significantly affect bank profitability.

In January 2010, the banking system reported profitability of 16.1% of capital (net of income from financial intermediation). The stress tests use that month as a point of reference and assume normalization (relative to 2009) of net income from financial intermediation. The results show that the losses generated by credit, market, and earthquake-related risks reduce the system's profitability to 11% in the baseline scenario and 7.7% in the risk scenario (figure V.18).

At the same time, the system's CAR remains around 12.2% in the baseline scenario and 12.5% in the risk scenario (figure V.19). The higher ratio under the risk scenario reflects the lower growth of lending and, therefore, of risk-weighted assets, vis-à-vis the baseline scenario.

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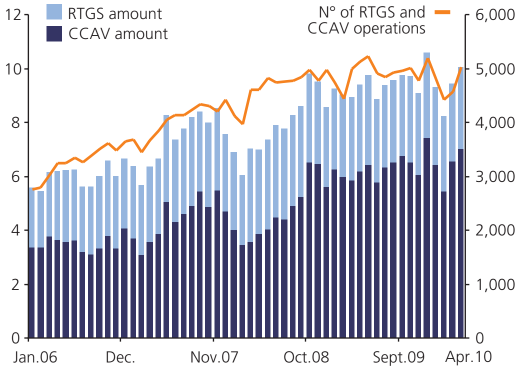
[14] Loans exclude foreign trade credits.

VI. Financial regulations and infrastructure

Figure VI.1

Payments settled in the LVPS (*)

(Ch$ trillion, thousands of operations)



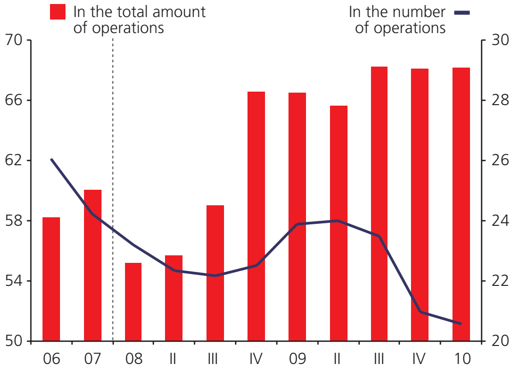
(*) Daily averages.

Sources: Central Bank of Chile and Combanc.

Figure VI.2

Share of the RTGS system in the LVPS

(percent)



Sources: Central Bank of Chile and Combanc.

Payment systems and financial infrastructure

The payment systems have a fundamental role in the performance of the economy, the effectiveness of monetary policy, and financial stability. The Central Bank of Chile has the responsibility of regulating and supervising the safe and efficient functioning of these systems.

Large-value payment systems

The large-value payment systems (LVPS) are made up of the real-time gross settlements (RTGS) system and the large-value payment clearing house (Cámara de Compensación de Pagos de Alto Valor, or CCAV). Both systems process interbank, client account, and delivery versus payment (DVP) transactions. The RTGS system settles gross transactions immediately in the accounts of each bank, whereas the CCAV nets the transactions for each bank at the end of the day and then clears them through the RTGS system.

The use of an RTGS system has become an international standard, recognized for its contribution to the functioning of the economy and the preservation of financial stability, especially as it significantly reduces the risks in the payment systems. Currently, over 100 economies with a medium to advanced level of development use an RTGS system operated by the central banks of each country[1]/. In the particular case of Chile, the fact that private entities are permitted to provide complementary services in the LVPS contributes to further reducing operating risks in the payment systems as a whole[2]/.

In the first quarter of 2010, the average daily amount settled in the LVPS was Ch$9 trillion, of which Ch$6.1 trillion was settled directly in the RTGS system and Ch$2.9 trillion was first cleared by the CCAV and then settled in the RTGS (figure VI.1). The level of operations in the LVPS has been relatively stable since 2009—after expanding strongly in the preceding years—which could reflect the fact that the Chilean economy was less dynamic in this period.

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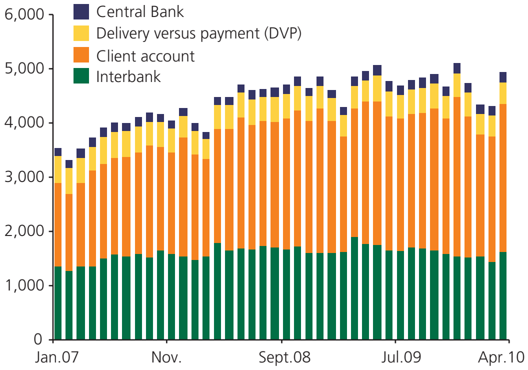
[1]/ World Bank (2008).

[2]/ This function is currently carried out by the private corporation, "*Sociedad Operadora de la Cámara de Compensación de Alto Valor (Combanc S.A.)*," which operates under the regulatory framework established for this purpose by the Central Bank of Chile.

Figure VI.3

Types of payments settled in the LVPS (*)

(number of operations, in thousands)



(*) Daily averages.

Sources: Central Bank of Chile and Combanc.

Table VI.1

Main retail means of payment

	2008	2009
	(Value in Ch$ billion)	
Checks	383,734	336,650
Automatic teller machines	10,913	13,729
Nonbank credit cards	4,973	4,636
Bank credit cards	3,400	3,713
Debit cards	1,961	2,580
Internet transfers	n.a.	n.a.
	(Number of operations in thousands)	
Checks	248,840	223,418
Automatic teller machines	270,894	333,311
Nonbank credit cards	219,812	205,540
Nonbank credit cards	79,866	82,056
Debit cards	106,159	142,218
Internet transfers	170,577	220,106

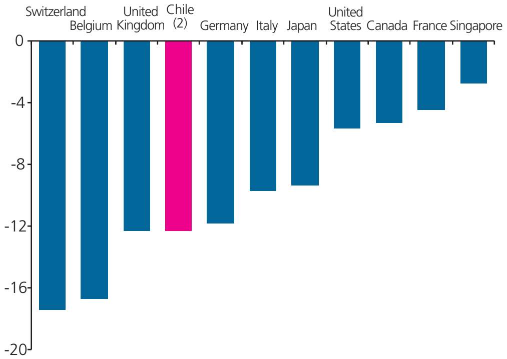
n.a.: Not available.

Source: SBIF.

Figure VI.4

Use of checks as a means of payment

(annual change, percent) (1)



(1) 2008 relative to 2007.
(2) 2009 relative to 2008.

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

The number of transactions settled directly in the RTGS system continues to display a downward trend in terms of the share in the total number of transactions processed in the LVPS. This share fell from just over 24% in the second quarter of 2009 to approximately 20% in the first quarter of 2010. However, the RTGS system continues to account for the largest share in terms of the amount settled—well over 65%—in the last six quarters analyzed (figure VI.2).

The composition of the transactions settled in the LVPS has not changed significantly over time. The majority are interbank operations, including both client account and own account settlements (53% and 34%, respectively). DVP operations, which correspond to securities market operations, represent 9% of the total, and the Central Bank accounted for 4% (figure VI.3).

Retail payment systems

The retail payment systems are used to make payments and transfer funds between individuals and/or firms. They process a large number of low-value transactions, normally tied to the sale and purchase of goods and services.

The main retail means of payment recorded an increasingly diverse performance in 2009, and the substitution of check payments with electronic transactions (mainly debit cards, credit cards, and Internet transfers) continued to accelerate.

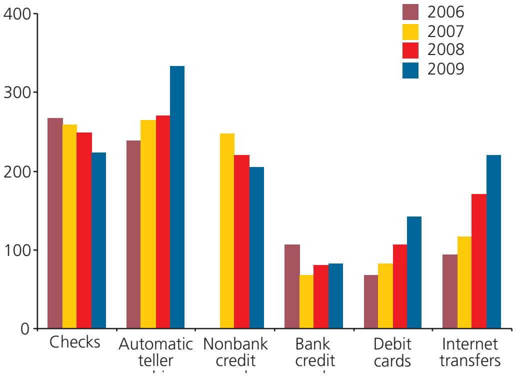
The number of payments made with checks, which contracted by less than 5% in annual terms in previous quarters, fell nearly 12% in the first quarter of this year, or approximately Ch$47 trillion. As a counterpart to this trend, withdrawals from automatic teller machines (ATMs) grew 25.8%, debit card payments, 31.6%, and credit card payments, 9.2%. In terms of amount, however, the sum of all of these payment increases was less than Ch$4 trillion, which is far below the drop in check payments. This suggests that Internet transfers are the main substitute for check payments. Data are not available on the amounts transferred, but the increase in the number of transfers was close to 50 million transactions in the last period (table VI.1).

The drop in the number of check payments is a process that is occurring in financial systems around the world, and it coincides with the development of alternative electronic payment systems. Between 2007 and 2008, check payments fell over 10% in countries like Germany and the United Kingdom, which is comparable to the trend in Chile in the period under analysis (figures VI.4 and VI.5).

Figure VI.5

Retail means of payment

(millions of transactions)



(*) Data available since 2007.

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

Financial regulation

Developments in the country's financial regulation

Modifications to the Pension Fund Investment Rules (www.spensiones.cl)

On 26 January 2010, the Superintendence of Pensions issued Resolution 16, which establishes new rules on currency hedging for the pension funds. In general terms, the new guidelines specify the following: (i) the definition of hedging was broadened to distinguish between the currency of denomination and the underlying currency; (ii) a limit was established on hedging operations that use the currency of denomination, at 50% of the value of the foreign currency investment by type of fund; (iii) the period for eliminating excess currency hedging by type of fund was extended from 10 to 90 business days; and (iv) the pension funds must justify to the Superintendence any increase in their currency of denomination hedging contracts, whether to comply with minimum hedging limits or to reduce the volatility of fund profitability.

Special measure adopted in response to the earthquake on 27 February (www.sbif.cl and www.svs.cl)

In response to the earthquake that affected the country, the SVS and SBIF have adopted special measures aimed at facilitating damage settlement and customer service.

The SVS authorized an abbreviated procedure for settling damages to homes affected by the earthquake. The SBIF, in turn, recommended that banks bolster areas related to the reception of damage claims for insurance contracted on assets underlying home mortgage loans (i.e., mortgage insurance) and relaxed the regulations on business hours and places of operations for banks in the affected regions, among other measures.

Corporate governance regulations (www.svs.cl)

In accordance with modifications to the Securities Market Law incorporated after the recent enactment of new legislation on corporate governance (*Financial Stability Report*, Second Half 2009), the SVS established the corresponding regulations. These regulatory instructions established mandatory standards on information and transparency that are applicable to a corporation's relevant shareholders and upper management, as well as various requirements on securities custody, among many other elements.

Documents of interest published by national and international organizations

"Progress since the St. Andrew's Meeting Implementing the G20 Recommendations for Strengthening Financial Stability" (FSB, April 2010, www.financialstabilityboard.org)

The Financial Stability Board (FSB) will keep monitoring further implementation of its reform program, reviewed in previous *Reports*[3]. This progress report focuses on the development of policies at the international level, together with the national or regional implementation of the G20/FSB recommendations.

Highlights of the paper include an update on initiatives for strengthening capital and liquidity standards—the majority of FSB members have fully adopted Basel II—and the implementation of central counterparties (CCP) for clearing credit default swaps, in both the United States and the European Union[4]. The report also recognizes, however, that is necessary to move forward on the centralized trading of sufficiently standardized derivatives. Other highlights include the leadership of Germany, Japan, and the United States in the implementation of measures oriented toward the consolidated supervision of systemically important institutions.

Another topic reviewed in the report is the development of macroprudential tools. In North America and Europe, the authorities have created entities whose objective is the broad supervision of their respective financial systems and the coordination of responses to possible systemic problems. Some jurisdictions have also made progress on initiatives oriented to strengthening the exchange of information between local authorities.

Despite these developments, the report recognizes several areas that still need work, such as the convergence in over-the-counter (OTC) market reforms to prevent regulatory arbitrage and the implementation of reforms in clearing practices.

"Policy Perspectives on OTC Derivative Market Infrastructure" (U.S. Federal Reserve, Staff Report 424, www.newyorkfed.org)

The development of OTC derivatives markets is closely tied to the causes of the 2008–2009 financial crisis. From this perspective, the document discusses mechanisms—which should be promoted by regulatory bodies—to improve the operation of these markets. In particular, the channels considered include strengthening transparency and reducing counterparty risk, mainly by developing mechanisms to promote greater standardization of these operations and, in general, modernization and improvement of market infrastructure.

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[3] The Financial Stability Board (FSB) is the successor to the Financial Stability Forum (FSF), established in June 2009; its members include all of the G20 nations.

[4] Canada, China, Japan, Russia, and South Africa have given clear signals of imminent advances in CCP clearing for their over-the-counter derivatives market.

"Strengthening the Resilience of the Banking Sector" (BIS/Basel Committee on Banking Supervision, December 2009, www.bis.org)

This consultative document contains proposals for strengthening global capital and liquidity regulations, with the objective of promoting a more resilient banking system.

The main proposals point to raising the quality, consistency, and transparency of regulatory capital, strengthening capital requirements for counterparty risk, incorporating complementary debt indicators into the Basel II capital framework, developing tools to reduce procyclicality (which build up capital buffers during booms for use in periods of stress), and introducing a minimum global liquidity standard.

"Report and Recommendations of the Cross-Border Bank Resolution Group" (BIS/CBRG, March 2010, www.bis.org)

This document presents recommendations for developing a policy framework for crisis resolution, in light of the recent experience. These recommendations address the role of the authorities in managing all types of situations that affect financial entities, the development of more coordinated resolution processes at the national and international levels, the reduction of the complexity and interconnections in the operations of financial groups, the development of contingency plans for all systemically important financial entities, the granting of sufficient legal powers to the authorities in order to transfer contractual relations between financial entities, and the development of exit mechanisms for public intervention processes.

"Thematic Review on Compensation" (FSB, March 2010, www.financialstabilityboard.org)

This document outlines the principles endorsed by the FSB members to promote sound compensation practices that support financial stability, reducing the incentives to take on excessive risk. It reports on progress made, especially in the development of compensation schemes supervised by the board of the financial entities. With regard to the better alignment of compensation schemes with prudential risk taking, a large number of FSB members report advances. Finally, the document recommends finalizing and implementing the regulatory initiatives in these areas during 2010.

References

a/ Ahumada, L., and D. Oda (2008). "Probabilidad de incumplimiento y clasificaciones de riesgo de las empresas registradas en la SVS." Paper presented at the Annual Meeting of the Economics Society of Chile. September.

Alcidi, C., and D. Gros (2010). "The European Experience with Large Fiscal Adjustments." VOXeu.org. 28 April.

Alfaro, R., and C. Silva (2008). "Volatilidad de índices accionarios: el caso del IPSA." *Cuadernos de Economía* 45 (November): 217–33.

Alfaro, R., D. Calvo, and D. Oda (2009). "Riesgo de crédito de la banca de consumo." *Revista de Economía Chilena* 12(3): 59-77.

Álvarez, R., and S. Vergara (2010). "Exit in Developing Countries: Economic Reforms and Plant Heterogeneity." *Economic Development and Cultural Change* 58(3): 537–61.

Arellano, C., and A. Ramanarayanan (2010). "Default and the Maturity Structure in Sovereign Bonds." Working Paper. 30 April.

c/ Carling, K., T. Jacobson, J. Lindé, and K. Roszbach (2007). "Corporate Credit Risk Modeling and the Macroeconomy." *Journal of Banking and Finance* 31 (March): 845–68.

Central Bank of Chile. *Financial Stability Report*. Several issues.

Central Bank of Chile (2010). *Monetary Policy Report*. March.

Cowan, K., D. Rappoport, and J. Selaive (2007). "High Frequency Dynamics of the Exchange Rate in Chile." Working Paper 433. Central Bank of Chile. November.

d/ De Gregorio, J. (2010). "Enfrentando el desafío de los flujos de capitales." Presentation at the Bank of Spain and IE Business Leadership Forum. 10–11 May.

e/ European Central Bank (2010). Financial Stability Review. June.

f/ FitchRatings (2010). "Sluggish Recovery Key Risk for Spain." Special Report. 28 May.

Fuenzalida M., and J. Ruiz-Tagle (2009). "Riesgo financiero de los hogares." *Revista de Economía Chilena* 12(2): 35–53.

i/ IMF (2010a). Global *Financial Stability Report*. April.

IMF (2010b). Fiscal Monitor. 14 May.

j/ Jara A., L. Luna, and D. Oda (2008). "Stress Tests on the Chilean Banking Sector." Financial Stability Report, Second Half 2007. Central Bank of Chile. January.

m/ Matus J., D. Oda, and N. Silva (2009). "Caracterización de las colocaciones bancarias en Chile." Estudios Económicos Estadísticos N° 73. Central Bank of Chile. March.

Moody's (2009). "Moody's Statistical Handbook: Country Credit." November.

p/ Portes R., and H. Rey (2005). "The Determinants of Cross-Border Equity Flows." *Journal of International Economics* 65(2):. 269–96. March.

s/ Sotz C., and F. Alarcón (2007). "Mercado swap de tasas de interés y expectativas de TPM e inflación." *Revista de Economía Chilena* 10(2): 97–102.

w/ World Bank (2008). "Payment Systems Worldwide: a Snapshot. Outcomes of the Global Payment Systems Survey 2008." World Bank, Payment Systems Development Group.

World Bank (2009). "World Development Indicators." April.

Glossary

Acid liquidity: The acid-test ratio, or the ratio between current assets net of inventory and current liabilities.

Additional provisions: Bank provisions in excess of the required level, which are not attributed to any particular loan portfolio.

Available-for-sale instruments: Financial instruments that are not included in either the negotiable instruments category or the held-to-maturity investment category.

Average interbank interest rate swap (*promedio cámara*): Derivatives contract between two parties, who carry out an exchange of flows at future dates, between a fixed rate established when the contract is written and a variable rate (fixed-for-floating swap). The variable rate corresponds to the average interest rate in the interbank clearing house (*cámara*), which in turn is derived from the average clearing house index.

Basel II: The second accord issued by the Basel Committee on Banking Supervision (BCBS), with the goal of creating an international standard for the banking industry's operation and risk control. Basel II is based on three pillars, which seek to foster greater stability of the financial system: (1) minimum capital requirements aimed at making resource allocation more sensitive to credit and market risks; (2) procedures for improved supervision; and (3) greater market discipline.

Basis point: Unit of measure of the volatility of a bond that is traded in financial markets, equal to one one-hundredth of one percent (0.01%).

CAPM: Capital asset pricing model. Frequently used in finance to determine the theoretically required rate of return of an asset, taking into account sensitivity to nondiversifiable risk (also known as market risk), the return of a representative market portfolio, and the return of a risk-free asset.

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

CCAV: Large-value payment clearing house (*Cámara de Compensación de Pagos de Alto Valor*). Electronic system of interbank payments that operates as a netting engine, with procedures to ensure the final clearing of the net results of each settlement cycle in the RTGS system.

CDS: Credit default swap. A derivative instrument that provides insurance against the credit risk of the issuer of a given underlying sovereign or corporate bond. The institution that grants the CDS commits to covering the loss associated with a previously established credit event occurring before the bond's maturity date.

CEMBI Broad Premium: Measures the differential return on corporate bonds in U.S. dollars issued by a set of emerging economies in international markets, relative to U.S. Treasury bonds.

CEMBI Chile Premium: Measures the differential return on corporate bonds in U.S. dollars issued by a Chilean firm in international markets, relative to U.S. Treasury bonds.

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

Commercial papers: Documents issued by corporations specially authorized by the Superintendence of Securities and Insurance (SVS), with the goal of attracting funds directly from the public to finance the short-term operations of the issuer (working capital).

Consolidated government: Total central government and the Central Bank of Chile.

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

CSA: Credit Support Annex. An annex to ISDA contracts that provides additional credit protection on over-the-counter derivatives operations. ISDA contracts are standard contracts developed by the International Swaps and Derivatives Association (ISDA).

Currency carry trade: An investment strategy in which an investor contracts debt in one currency at a low interest rate and invests the funds in instruments denominated in a different currency yielding a higher interest rate. When the instrument matures, the investor converts the funds into the original currency to pay off the debt.

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).

Currency risk: Exposure to losses caused by adverse changes in the value of the foreign currencies in which the instruments, contracts, and other transactions recorded on the balance sheet are denominated.

Currency swap: A contract between two parties establishing a commitment to exchange the specified notional principal and fixed interest in one currency for the specified notional principal and fixed interest in another currency, at a future date and at a pre-established price. In this type of contract, the notional principal must be specified in both currencies.

Default: The nonpayment of the interest or principal on a legally contracted debt.

Delinquency of 90 days or more: Total amount of a loan that is 90 days or more past due, even if only some of the loan payments are past due.

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

DVP: Delivery versus payment. A clearing mechanism that links a securities transfer system with a funds transfer system, guaranteeing that the delivery of the securities occurs simultaneously with the payment thereof.

EBITDA: Earnings before interest, taxes, depreciation, and amortization. Used as an approximation of the operating cash flow.

EMBI Global Premium: The most common measure of risk in emerging economies. Measures of the differential return on emerging economies' sovereign debt in U.S. dollars issued in international markets, relative to U.S. Treasury bonds.

EMBI Premium: The most common measure of an economy's risk. Measures the differential return on a country's sovereign debt in U.S. dollars issued in international markets, relative to U.S. Treasury bonds.

ESSF: Economic and Social Stabilization Fund (*Fondo de Estabilización Económica y Social*, or FEES). Created in 2007 by Decree with Force of Law DFL 1, of 2006 issued by the Finance Ministry. The Fund's objective is to accumulate the surplus flows that are generated by the application of the structural balance rule, and it will serve as a source of financing in future deficit periods.

External debt: Includes bank debt, bonds, and other overseas loans, as well as loans associated with foreign direct investment (FDI).

Factoring: A financing option oriented toward small and medium-sized enterprises, which allows such firms to obtain liquidity by selling or assigning their accounts receivable. The receivables are usually made up of invoices, checks, and drafts. The firm receives a cash advance in exchange for transferring the right to collect payment on the accounts to the factor, which could be either a bank or a specialized firm called a factoring company.

Financial debt: Debt that pays interest, measured as bank debt, plus public liabilities (bonds and commercial papers).

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

FIR: Financial burden-to-income ratio. Measures the payments that households must make to fulfill their consumer and mortgage loan commitments, as a percentage of their available income.

FLAP: Term liquidity facility (*Facilidad de Liquidez a Plazo*). Financing provided by the Central Bank of Chile to banking entities, at maturities of 90 to 180 days and at a fixed rate for the full period of the operation. The guarantees required for these operations are the same as those for overnight loans.

Forward: A contract between two parties, establishing a commitment to exchange a certain quantity of an asset on a future date, at a predetermined price.

FPD: Standing deposit facility (*Facilidad Permanente de Depósito o Depósito de Liquidez*). Operations through which the Central Bank contributes to banks' liquidity management by accepting deposits. The deposits collect interest on the agreed maturity date, as established in the Central Bank's financial regulations.

FPL: Standing liquidity facility (*Facilidad Permanente de Liquidez*). Financing instrument loaned by the Central Bank of Chile to banks via the purchase of securities with a repurchase agreement. This window is contracted at an interest rate and maturity established in the Central Bank's financial regulations.

FRP: Pension Reserve Fund (*Fondo de Reserva de Pensiones*). A fund created by the Fiscal Accountability Law, whose objective is to complement the financing of fiscal liabilities deriving from the state minimum pension guarantee on old age, disability, and survivor's pensions and welfare benefits. It is managed by the Central Bank of Chile in its capacity as fiscal agent, under investment guidelines defined by the Finance Ministry's Decree 1.382 and complementary instructions.

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, Russia, the European Union, and a group of other economies, including Brazil, India, China, and South Africa, among others.

Herfindahl index: A measure of industry or market concentration, defined as the sum of the squares of the market shares of the n largest firms. The index ranges from 1/n (perfect competition) to 1 (monopoly).

IFRS: International Financial Reporting Standards. A set of standards issued by the International Accounting Standards Board (IASB), whose goal is the comparable and transparent revelation of financial statement information, for all participants in the world capital markets.

Impaired loans: Loans for which there is evidence that the borrowers will not fulfill their obligations under the contracted payment terms, without the possibility of recovering the debt through guarantees, legal actions, or the contracting of different terms. A loan is considered impaired when it is past due by 90 days or more.

Interest coverage ratio: A measure of payment capacity, defined as the ratio of EBITDA or operating flows 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.

Landesbanken: A group of state-owned banks in Germany that constitute the main offices of the regional savings banks (Sparkassen) and that operate as universal banks.

Liquidity risk: The risk that a counterparty (or participant in the payments system) will not be able to meet its obligations when they come due, although it may be able to do so in the future. Liquidity risk does not necessarily imply that the counterparty is insolvent.

Listed instruments: Instruments issued by firms and traded in the capital market.

LTRO: Longer-term refinancing operation. A monthly open market operation carried out by the Eurosystem, usually with a maturity of three months, using variable interest rate auctions for which the volume is announced in advance.

LVPS: Large-value payment systems. Comprises the RTGS and CCAV systems.

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.

MSCI Emerging Markets Index: An index created by Morgan Stanley Capital International to measure the stock market performance in different regions.

Multibanks, large: Banks with a large market share and a high degree of diversification in their operations (loans and derivative and nonderivative financial instruments).

Multibanks, medium-sized: Banks with a smaller market share than large multibanks, but as much diversification.

Negotiable instruments: Easily transferable instruments acquired with the objective of reselling them in the short term in order to make gains from arbitrage or fluctuations in the market rate or price.

Net interest margin: Difference between interests and adjustments earned and paid by the banks, measured relative to total bank assets.

NIIP: Net international investment position. The difference between the economy's external assets and liabilities.

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.

OIS: Overnight indexed swap. An interest rate swap in which the floating rate is the geometric average of an overnight rate (published daily) up to the day of payment. In the United States the calculation is based on the federal funds rate, which is published daily.

Onshore dollar rate: Estimate of the external rate relevant to the national foreign exchange market, which is, in general terms, derived from the covered interest rate parity.

Onshore dollar spread: The difference between the onshore rate and the Libor. It is therefore a proxy for the cost of financing in U.S. dollars in the national market vis-à-vis the international market.

Overnight rate: The rate at which the banks grant immediate financing to other banks.

Over-the-counter: A term used to describe the trading of financial instruments directly between two parties, without going through the organized securities exchanges.

Prime deposit rate: Interest rate that financial institutions offer their best clients on short- and medium-term deposits.

Repos: Repurchase (reverse repurchase) agreements. A sale (purchase) collateralized with an agreement or commitment to repurchase (sell back) the security.

Repricing: A component of interest rate risk, corresponding to the exposure to losses caused by rolling over of assets and liabilities with different maturities under different financial conditions.

Residual short-term external debt: External debt coming due within 12 months of a given date (that is, short-term external debt plus the current portion of long-term external debt).

Retail banks: Banks whose main business is consumer lending.

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 an index of capital adequacy (known as the Basel index), which is internationally accepted as a measure of bank solvency.

RTGS: Real-time gross settlements system. Electronic interbank payment system managed by the Central Bank of Chile, in which the processing and clearing of transactions is carried out continuously, individually, and in real time.

Savings banks: Financial institutions in Spain (known locally as *Cajas de Ahorro*), which are limited liability companies run as foundations (whereas commercial banks are corporations) and must therefore earmark a share of dividends to social ends or have government representation on the board, although they are private entities.

Secondary market deposit rate: The interest rate at which bank deposits are traded in the secondary market of the Santiago Stock Exchange.

Senior bonds: Ordinary long-term bond issued by banks.

Sovereign bonds: Debt instruments issued by the government of a country in local or foreign currency. In the case of a foreign-currency-denominated sovereign bond, the selected currency generally corresponds to a more stable economy.

SPV: Special Purpose Vehicle. A subsidiary entity whose operations are limited to the acquisition and financing of specific assets and that has an asset and liability structure and legal status that ensure the fulfillment of obligations even if the parent company goes bankrupt.

Subordinate bonds: Long-term bonds issued by banks, with an average maturity of not less than five years and with no prepayment clauses. Because subordinate bonds are repaid after the claims of other creditors are settled in the case of bank liquidation, a share of these bonds is computed as capital.

Subprime: A loan segment of the U.S. financial market. They are loans (usually mortgages) granted to borrowers whose characteristics and payment history are below the average standards of the banking industry, such that they present a greater default risk than the average for other loans. The loans granted to borrowers that satisfy the average standards of the banking industry are called prime.

Swap: Derivatives contract between two parties, who carry out an exchange of flows at future dates. One of the most common swap contracts is the interest rate swap, in which the parties exchange predetermined flows at a fixed rate, set when the contract is written, for predetermined flows at a variable rate.

Tier 1 capital: Paid-in capital plus bank reserves and period earnings, net of the provision for the distribution of dividends.

Tier 2 capital: Bank equity exceeding Tier 1 capital. Includes subordinated bonds, up to 50% of Tier 1 capital, and general provisions up to 1.25% of risk-weighted assets.

Treasury banks: Banks that are dedicated to investment in derivative and nonderivative financial instruments and that do not have loans.

Type 1 fund: Mutual funds that invest in short-term debt instruments, with a duration of 90 days or less.

Type A fund: The highest risk category of the five types of pension funds, invested in fixed- and variable-income instruments. The upper limit on variable-income investments is 80% of the value of the fund; the obligatory lower limit is 40% of the value of the fund.

Type B fund: The second-highest risk category of the five types of pension funds, invested in fixed- and variable-income instruments. The upper limit on variable-income investments is 60% of the value of the fund; the obligatory lower limit is 25% of the value of the fund.

VIX: Stock volatility index calculated by the Chicago Board of Trade, and the most commonly used measure of general volatility in the markets at the international level. Measures the implicit volatility in S&P 500 options contracts.

Abbreviations

Achef:	*Asociación Chilena de Empresas de Factoring* (Chilean Association of Factoring Companies).
BIS:	Bank for International Settlements.
BCP:	Central Bank bonds expressed in pesos.
DCV:	*Depósito Central de Valores* (Central Securities Depository).
U.S.:	United States of America.
EMBI:	Emerging Market Bond Index.
IMF:	International Monetary Fund.
INE:	Instituto Nacional de Estadísticas (National Statistics Bureau).
CPI:	Consumer price index.
IPSA:	*Índice de Precios Selectivo de Acciones* (Selective Stock Price Index).
Libor	London Inter-Bank Offered Rate.
MSCI:	Morgan Stanley Capital International.
OECD:	Organization for Economic Cooperation and Development.
PDBC:	Central Bank discount promissory note expressed in pesos
GDP:	Gross domestic product.
SMEs:	Small and medium-sized enterprises.
SP:	*Superintendencia de Pensiones* (Superintendence of Pensions).
SBIF:	*Superintendencia de Bancos e Instituciones Financieras* (Superintendence of Banks and Financial Institutions).
SuSeSo:	*Superintendencia de Seguridad Social* (Superintendence of Social Security).
SVS:	*Superintendencia de Valores y Seguros* (Superintendence of Securities and Insurance).
S&P:	Standard and Poor's.
MPR:	Monetary policy rate.
UF:	*Unidad de Fomento* (an inflation-indexed unit of account).

Household indebtedness in Chile: Analysis and implications for financial stability

This document summarizes the main results of research projects carried out by the Financial Policy Division during 2009 on issues related to household debt in Chile. This initiative is part of an annual research plan, focused on topics that are relevant to the stability of the national financial system. This publication is the first issue under this initiative.

Introduction[1]/

Household indebtedness has become an important topic in the international debate on financial stability, whether for its rapid growth or the levels reached in the last decade (Debelle, 2004; Ma et al., 2009; Karasulu, 2008)[2]/. Chile has not escaped from this phenomenon, recording significant growth in household debt. For example, household debt grew at an average annual real rate of 12.8% between 2000 and 2009, causing the debt-to-income ratio to rise from 35.4% to 59.9% in the period.

There is a broad consensus that more and better access to credit allows households to absorb temporary fluctuations in their income and/or expenses, thus improving their well-being. However, higher debt also presents challenges in macrofinancial terms. First, given the higher exposure of financial institutions to households, the sector should be continuously monitored for possible systemic effects. Second, both market infrastructure and prudential regulation must evolve in line with the growing supply of products and financial institutions oriented toward this segment. Finally, from a macroeconomic perspective, household indebtedness increases the economy's sensitivity to financial shocks.

The recent literature on these topics indicates that assessing the economic implications of household indebtedness and, in particular, the associated financial risks, requires detailed microeconomic data. This data makes it possible to determine household exposure to different shocks, the distribution of the financial burden, and the relationship between assets and liabilities. The latter, however, is especially difficult to analyze, given the lack of systematic and detailed data on asset holdings and the high percentage of no response and underreporting on financial surveys. The latter is most frequent in the wealthier segments of the population (Cannari et al., 2008)[3]/. Consequently, this document mostly focuses on aspects related to household debt (liabilities).

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[1]/ This document was coordinated and elaborated by the Financial Research Group of the Central Bank of Chile, under the direction of Roberto Álvarez and Luis Opazo. The following researchers participated in the project: Karla Flores, Alejandra Marinovic, José Matus, and Nancy Silva (section I); Mauricio Calani, Pablo García, Daniel Oda, Jaime Ruiz-Tagle, and Francis Vella (section II); Juan Pablo Montero, Daniel Oda, Nancy Silva, and Jorge Tarziján (section III); Rodrigo Alfaro, Natalia Gallardo, and Roberto Stein (section IV); Rodrigo Caputo, Juan Pablo Medina, and Claudio Soto (section V); and Gabriel Aparici and Fernando Sepúlveda (section VI). Olympia Bover, Rómulo Chumacero, Miguel Fuentes, Rodrigo Fuentes, Francisco Gallego, Borja Larraín, and Ricardo Paredes provided helpful comments and reviewed the research. The opinions and arguments expressed herein do not necessarily reflect the official position of the Central Bank of Chile or its Board.

[2]/ For example, at year-end 2007, household debt represented more than 80% of GDP in South Korea and over 100% of GDP in the United States and the United Kingdom.

[3]/ The lack of data on household asset management is one of the reasons that there are so few microeconomic studies in this area. One of the most recent exceptions is Calvet et al.(2008 and 2009), which analyze a detailed database on household asset holdings in Sweden in the period 1999–2002. More general studies include Bilias et al. (2009), Choi et al. (2004), and Ameriks and Zeldes (2004).

The importance of a microeconomic analysis is further supported by the recent financial crisis. The accumulation of debt in specific segments of the population (subprime sectors), as well as certain characteristics of the associated contracts, played a central role in triggering the problems in the U.S. mortgage market. While aggregate data could be useful in monitoring the development of macrofinancial vulnerabilities[4]/, they must be complemented with data that can more precisely and more quickly identify the magnitude of the financial risks associated with household debt[5]/.

The central objective of this paper is to analyze household indebtedness in Chile from the perspective of financial stability. The main conclusions from the research project are the following:

(i) As in other economies, household debt has grown substantially in Chile in the last decade. There is no evidence of significant restrictions on access to credit at the household level, which is based on a pronounced increase in the use of banking services and the dynamic growth of nonbank lenders (basically large retailers).

(ii) While the households' higher indebtedness and greater access to credit can potentially have a negative effect on credit risk, the evidence for Chile indicates that this has been limited. Furthermore, variables that played an important role in generating the current international financial crisis, such as the misalignment of housing prices, were not present in the Chilean case.

(iii) The Chilean banking industry has featured several mergers in the past few years, which has reduced the number of participating institutions. This raises questions about the degree of competition in the industry. Previous results on competition in the banking system are, in general, mixed. However, the recent evidence discussed in this document, which focuses on household credit, does not reject the existence of competition in this segment of the banking system.

(iv) The analysis of the relationship between access to credit and the economy's sensitivity to different shocks depends on the type of shock observed. Greater access to the financial system can help smooth real shocks, such as an output contraction, whereas the opposite occurs with financial shocks, such as an increase in international spreads.

(v) The international discussion on regulatory changes related to household indebtedness has centered on the following issues: (a) the scope of supervision, (b) countercyclical tools, and (c) consolidated supervision. The relevance of this discussion for Chile is tied to the development of the local financial market. This points to the need to study and take into consideration the particularities of the Chilean market to accurately determine the potential applicability of the recommendations.

The rest of the document is divided into six sections. The first describes the main stylized facts on household indebtedness in Chile. The second section analyzes the role of credit restrictions and their implications. The third section explores the degree of competition in the banking system in the provision of credit to households and analyzes the role of retailers in Chile. The fourth section assesses the potential magnitude of the credit risk of consumer debt, using a microeconomic focus. The fifth section evaluates the presence of financial frictions in the access to credit from a macroeconomic perspective. Finally, the sixth section contains a brief analysis of the discussion that is currently underway at the international level on financial regulatory initiatives related to household indebtedness.

I. Household indebtedness in Chile: General features[6]/

I.1 Growth of debt: An overview

Household indebtedness in Chile has grown significantly in the last decade[7]/. In aggregate terms, the average annual growth rate of total household debt was 12.8% in the 2000–2009 period[8]. Consumer and mortgage debt recorded average annual real growth rates of 14% and 12%, respectively, in the same period. This growth is considerably higher than the growth of the economy (around 3.6% on average), causing the stock of debt to increase from 22% to 39% of GDP between 2000 and 2009.

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[4]/ Buyukkarabacak and Valev (2010) find that periods of household credit growth are a statistically and economically significant predictor of a later banking crisis.

[5]/ For example, Mian and Sufi (2009), based on microeconomic data at the borrower household level in the United States, estimate that indebtedness from higher housing prices is responsible for an important share of the rapid increase in household leveraging in the 2002–2006 period and the increase in default in the subsequent period (2006–2008).

[6]/ This section is mostly based on (2010) and Ruiz-Tagle and Vella (2010).

[7]/ The expansion period in this decade was preceded by a period of significant growth in household credit (1998–2099), which ended with a strong credit contraction in 1999, with the closure of numerous nonbank financial institutions (financial corporations). This phenomenon, however, differs from the period starting in 2000 in several ways (Central Bank of Chile, 2008).

This debt dynamics is similar to trends in other advanced and emerging economies. According to the IMF (2006), the average annual real growth rate of household credit was 21% between 2000 and 2005 in a sample of 30 countries, while the average GDP growth of these economies was 4.1%. At the regional level, growth was strongest in emerging Europe, with annual rates of 48%, while average growth in Latin America and the more developed nations fluctuated around 9% annually.

According to the same study, this phenomenon is consistent with the presence of common global elements in the development of the financial markets. These include the reduction of inflation and interest rates, financial liberalization, and lower competition for financial resources among households and firms, which is explained by improved access to credit in the business sector.

While household debt has grown in almost all countries, there are important differences (Beck et al., 2009). This indicates that idiosyncratic factors in each economy could play a significant role in explaining household debt. In this sense, the facts and analysis contained in this document are an important contribution to a better understanding in this area.

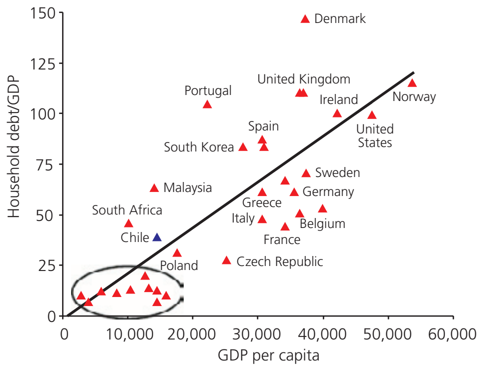
As figure 1 illustrates, the ratio of household debt to GDP tends to increase with income. In Chile, the household debt level is in line with the income level, based on a lineal relationship between income and debt (figure 1).

With regard to payment capacity, measured as the ratio of debt service to income (the financial burden-to-income ratio, FIR), international comparison is limited by the availability of data (figure 2)[9]. However, the FIR level in Chile is higher than in advanced countries like Italy, Germany, and Sweden, but slightly lower than other countries in the same group. This suggests that specific characteristics of the country, other than income level, could be important in explaining these differences.

Figure 1

Household debt: International comparison (*)

(percent, U.S.dollars)



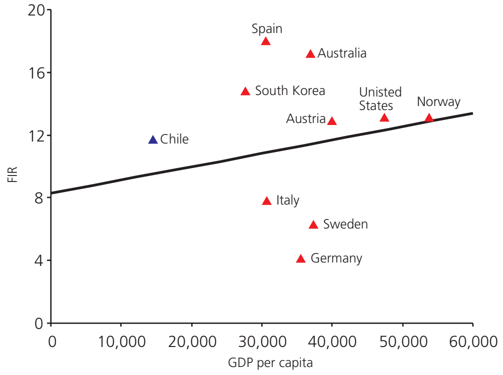
(*) Data for 2008. Countries inside the circle: India, Indonesia, Colombia, China, Brazil, Romania, Turkey, Mexico, Argentina and Russia.

Sources: McKinsey & Company, IMF, and central banks of Colombia, South Africa, Turkey, Argentina, Malaysia, and Czech Republic.

Figure 2

Household financial burden: International comparison (*)

(percent of disposable income, U.S.dollars)



(*) 2008 data.

Sources: McKinsey & Company and IMF.

Greater household debt has both positive and negative aspects. On one hand, the growth of debt indicates that the financial system is fulfilling one of its fundamental roles, namely, that of acting as an intermediary of financial resources and facilitating households' access to financing. On the other hand, the growth of debt and the resulting increase in debt service can be a source of concern with regard to household payment capacity, especially in the face of income shocks. While the international comparison does not suggest that Chile's debt level is exceptionally high, it is necessary to carry out a more formal analysis on the implications for household credit risk (section IV).

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[8] This figure includes bank and nonbank debt (retailers, family compensation funds, and other debt) and is expressed in real terms.

[9] For a more detailed analysis of the international comparison of household indebtedness, see Central Bank of Chile (2006).

I.2 Sources of household financing

The main lenders to Chilean households are banks, which financed 72% of the total stock of household debt in 2008 (table 1). Banking institutions represent 85% of financing in the mortgage loan segment and 55% in the consumer segment.

Table 1

Household debt

(percent of respective total)

	2004	2005	2006	2007	2008
Total debt					
Bank	71.8	72.6	72.3	71.6	71.5
Nonbank	28.2	27.4	27.7	28.4	28.5
Consumer debt					
Bank	57.4	57.7	58.0	55.9	55.2
Nonbank	42.6	42.3	42.0	44.1	44.8
Retailers (1)	15.0	15.6	14.7	16.1	15.9
FCF (2)	8.5	7.6	8.9	9.0	9.3
Cooperatives	4.7	5.2	5.3	5.7	5.7
Other (3)	14.4	14.0	13.2	13.3	13.8
Mortgage debt					
Bank	83.7	85.7	85.7	85.6	85.5
Nonbank (1)	16.3	14.3	14.3	14.4	14.5

(1) Includes securitized debt.
(2) FCF: Family compensation funds.
(3) Includes car financing, student loans, and insurance companies.

Sources: Central Bank of Chile, SBIF, SuSeSo and SVS.

The dominance of banks in lending to households is also seen in other economies (IMF, 2006). As analyzed in section III, however, large retailers are highly active in the consumer loan segment in Chile, accounting 16% of the stock of household consumer debt in 2008.

The mortgage loan segment has recently undergone important changes, which have more to do with the type of instrument used than the financial institutions participating in the market. In particular, the use of non endorsable mortgage loans has increased since 2004 (table 2). Between 2004 and 2008, the share of non endorsable mortgage loans increased from 24.3 to 61.1%, at the expense of mortgage bills. This expansion is mainly explained by increased flexibility in the credit conditions on this type of mortgage loan, in terms of maturity, type of interest rate (variable and mixed), and, in particular, the required debt-to-collateral ratio (Matus et al., 2010)[10]. These factors, which reflect the non endorsable nature of these loans, have more than offset the lower relative cost of mortgage bills. However, the less flexible financing structure of mortgage bills relative to non endorsable loans should be minimized by the recent increase in the percentage of the property value that can be mortgaged with bills (100%) in the case of clients with a good risk rating.

Table 2

Mortgage loans

(percent of total household debt)

	2004	2005	2006	2007	2008
Bank	**83.7**	**85.6**	**85.8**	**85.7**	**85.5**
ML (1)	24.3	40.2	47.9	55.0	61.1
EML (2)	10.7	9.5	8.6	7.7	6.9
LC (3)	48.7	35.9	29.3	23.0	17.5
Nonbank (4)	**16.3**	**14.4**	**14.3**	**14.4**	**14.5**

(1) Mortgage loans.
(2) Endorsable mortgage loans.
(3) Letters of credit.
(4) Includes securitized debt.

Sources: Central Bank of Chile, SBIF and SVS.

I.3 Use of banking services and the cost of household debt

Decomposing the growth of bank consumer debt held by households into that of the number of borrowers and the average amount of the debt is useful for gauging the degree of household use of banking services. The historical trend for these three variables reflects the fairly flat evolution of the number of borrowers in the first part of the 1998–2008 period (figure 3). The growth of bank consumer debt was close to zero until 2002, with a 13% growth rate in the average amount offset by a reduction of the same magnitude in the number of borrowers. After that year, the increase in indebtedness was driven mainly by the number of borrowers. Between 2003 and 2008, the number of borrowers expanded 55%, while the average amount rose 34%. This suggests that the use of banking services—or, equivalently, access to consumer credit—has intensified in the last few years[11]/.

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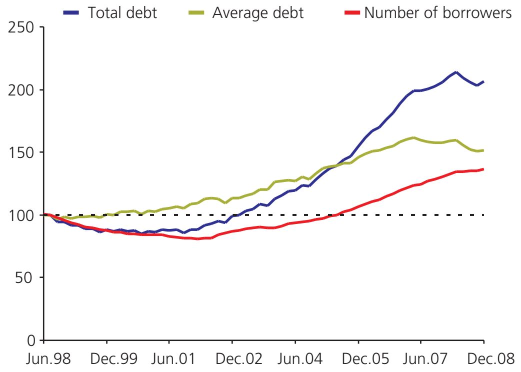
[10] Current regulations do not establish a limit on the debt-to-collateral ratio for non endorsable mortgage loans. For mortgage bills, there was a general limit of 70% for all classes of borrowers through the end of 2009.

Figure 3

Bank consumer debt (*)

(baseline index Feb.98=100)



(*) Total and average debt expressed in millions of December 2008 pesos. Data available through that date.

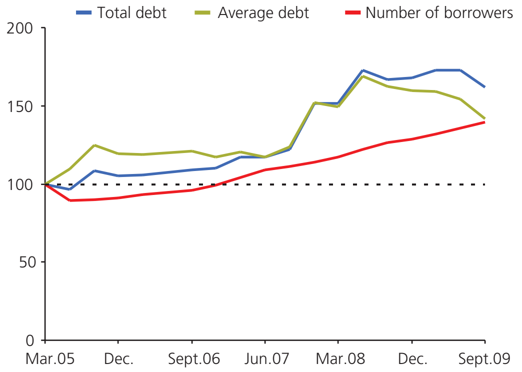
Source: Authors' elaboration, based on data from SBIF.

In the case of mortgage debt, the evidence is somewhat different, but still consistent with a higher degree of banking use. Between 2005 and 2008, the growth of mortgage debt was mainly led by the average amount rather than the number of borrowers. However, two trends stand out. First, the growth of the number of borrowers was still significant from 2005 to 2008 (29%). Second, the number of borrowers continued to grow even when the growth rate of mortgage debt fell (figure 4).

Figure 4

Bank mortgage debt (*)

(baseline index Mar.05=100)



(*)Total and average debt expressed in millions of December 2008 pesos. Data only available since 2005.

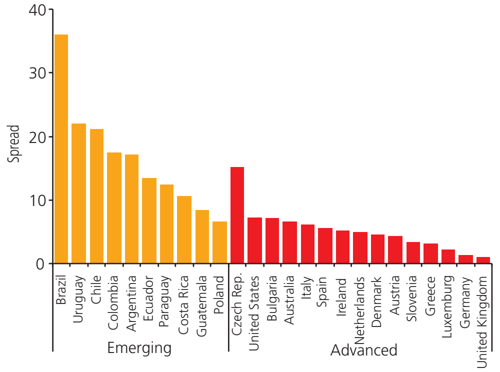
Source: Authors' elaboration, based on data from SBIF.

In general, the cost of credit in Chile is tightly related to the economic cycle, and it has closely followed the path of the monetary policy rate (Matus et al., 2010)[12]/. Sepúlveda (2009) compares the spreads on bank consumer loans, defined as the difference between the interest rate on these loans and the interest rate on time deposits, for a sample of 25 countries in the period 2006–09. The author finds that the consumer loan spread in Chile is fairly high relative to the emerging economies in the sample (figure 5)[13]/ During the subprime crisis, the spread in Chile rose in line with increases in other emerging economies, although the magnitude was greater. The increase was almost completely reversed in the past year, and the spread has returned to the levels seen before the crisis (figure 6).

Figure 5

Bank consumer loan spread (*)

(percent)



(*) In 2007. Difference between the interest rate on consumer loans and the interest rate on time deposits, at the same maturities.

Source: Sepúlveda (2009).

There are many possible explanations for these differences in the spreads of various economies. Factors cited in the literature include the degree of competition in the industry, macroeconomic stability, the risk profile of credit users, and the efficiency of the judicial system in protecting creditors' rights in the event of default[14]/. Given the range of hypotheses, it is impossible to establish, a priori, whether or not the level and/

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[11]/ The next section formally analyzes household access to credit, from a microeconomic perspective.

[12]/ Berstein and Fuentes (2003) find that the degree of pass-through from the monetary policy rate to the interest rate on bank loans in Chile is not instantaneous, but it is almost complete in the long run. Espinosa-Vega and Rebucci (2003) report evidence that although the degree of pass-through is not complete in the long run, Chile is not particularly different from the other economies analyzed.

[13]/ The choice of countries was determined by the availability of data and the comparability of the rates used.

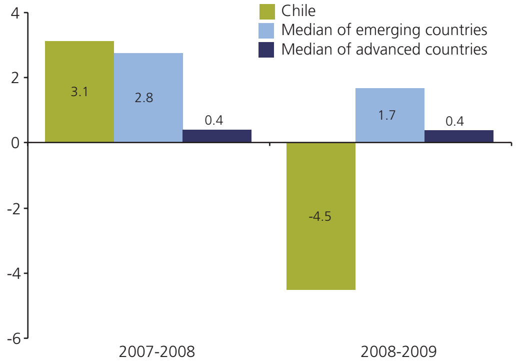
[14]/ Laeven and Majnoni (2005), for example, find that the differences in the cost of credit among countries are determined by structural characteristics, such as the efficiency of the judicial system.

or change in the spread in Chile are low or high. In this sense, although the present document analyzes some of the factors mentioned above (for example, the degree of competition, section III), a more complete assessment of the determinants of the spread would require a deeper analysis.

Figure 6

Bank consumer loan spread (*)

(absolute change, percent)



(*) Difference between the interest rate on consumer loans and the interest rate on time deposits, at the same maturities, in December of year.

Source: Central Bank of Chile, based on data from IMF and Sepúlveda (2009).

I.4 Microeconomic characterization of households with debt

Information from the 2007 Household Financial Survey reveals that debt is highly concentrated in the households with the highest income[15, 16]/. The poorest quintile of households accounts for just 4.6% of total debt, while the richest quintile holds almost 50% (table 3). This coincides with the distribution of credit-constrained households: nearly a quarter of households in the first (poorest) quintile face restrictions on access to credit, versus only 4.8% of households in the highest income quintile (table 3)[17]/.

Table 3

Debt and distribution of income

(percent of total debt, number of households and total income)

Income quintile	Debt	Households with debt	Households with credit restrictions	Income
1	4.6	53.2	25.0	2.5
2	7.5	65.3	19.7	5.3
3	14.5	65.5	17.6	9.4
4	26.3	68.0	12.0	18.7
5	47.2	64.8	4.8	64.2
Total	**100.0**	**63.4**	**15.8**	**100.0**

Source: Ruiz-Tagle and Vella (2010).

In principle, the difference in access to credit, as well as the high concentration of debt, could reflect the unequal distribution of income in the Chilean economy[18]/. However, an international comparison—albeit limited by the availability of data—suggests that there is no direct relationship between access to credit and distribution of income. Persson (2009) compares the distribution of debt by income quintile for four economies and finds that Sweden and Chile display a relatively similar pattern, even though they differ notably in their income distributions. This could be an indication that institutional characteristics and other aspects of public policy could be more important for explaining the unequal distribution of debt among households.

In Chile, the distribution of debt according to other household characteristics is consistent with economic theory. In line with life cycle theories, the largest share of debt is held by households in which the head of household is between 35 and 54 years old (table 4). Also, as the education level of the head of household rises, both the household's share in total debt and the share of households with debt also increase (table 5). Younger household heads (18–24 years) face the greatest credit restrictions, which suggests that less work experience and/or a relatively low education level could be limiting the supply of credit to this segment.

Table 4

Debt and the head of household's age

(percent of total debt, number of households and total income)

Age (years)	Debt	Households with debt	Households with credit restrictions	Income
18-24	0.7	64.8	27.4	1.5
25-34	13.4	67.1	18.5	9.5
35-44	28.7	75.2	15.0	21.1
45-54	37.9	71.9	16.3	30.2
55-64	15.9	57.1	17.0	24.5
Over 65	3.7	37.6	10.8	13.2
Total	**100.0**	**63.4**	**15.8**	**100.0**

Source: Ruiz-Tagle and Vella (2010).

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[15]/ For a description of the survey, its methodological approaches, and the main results, see Central Bank (2009a).

[16]/ Cox et al. (2006) show a similar pattern based on the 2006 Social Protection Survey.

[17]/ For more detail, see section II.

[18]/ Higher income households could have better access to credit and a greater debt capacity.

Table 5

Debt and the head of household's education level
(percent)

Head of household's education level	Debt	Households with debt	Households with credit restrictions	Income
Primary	3.0	51.6	23.2	6.7
Secondary	11.7	60.3	20.0	15.0
Tertiary	85.6	68.2	11.5	78.1
Total	**100.0**	**63.4**	**15.8**	**100.0**

Source: Ruiz-Tagle and Vella (2010).

The Household Financial Survey (HFS) also supports a detailed analysis of the type of household debt. The most common type of debt in the consumer loan category is with retailers (table 6). The only exception is in the highest income quintile, where a larger share of households has bank credit cards and credit lines. Consumer bank loans are positively related to household income. This suggests an important link between the socioeconomic conditions of the household and the financing products it uses, with retail credit cards being a significant source of financing at all income levels.

Table 6

Distribution of household consumer debt holdings
(percent of households with debt)

	Income quintile				
	1	2	3	4	5
Consumer debt	**52.7**	**69.5**	**66.0**	**68.7**	**62.3**
Bank loans	6.7	13.2	16.9	22.0	24.5
Loans from credit institutions (1)	2.6	6.1	5.7	3.1	2.5
Bank credit cards/lines	5.6	12.3	18.3	30.5	39.8
Retail credit cards	41.4	57.7	51.1	50.2	35.1
Car loans	0.0	1.4	2.9	4.1	6.2
Social organization loans (2)	8.1	7.5	7.8	6.7	3.0
Student loans	2.6	4.6	6.0	8.3	5.8
Informal debt (3)	6.3	5.7	5.1	4.4	3.1

(1) Includes cash loans from retailers.
(2) Includes loans with family compensation funds, cooperatives, and others.
(3) Includes loans from family or friends, secured loan companies, bondsmen, and other debts.

Source: HFS 2007, Central Bank of Chile.

The debt-to-income (DIR) ratio and the FIR do not vary substantially by income quintile in households that currently have debt (tables 7 and 8)[19]/. In general, however households in the lowest quintile present the highest financial burden indicators. The potential implications of the apparent greater financial vulnerability of the lower income quintiles is formally analyzed in section IV.

Table 7

Debt-to-income ratio of households by income strata
(number, percent of households, and percent of income)

Income quintile	Households (*)		FIR	
			Average	Median
	(Number)	(Percent)	(Percent)	
1	521,077	51.3	59.2	13.5
2	685,992	73.3	51.8	14.0
3	632,490	71.5	45.3	14.9
4	534,967	75.9	56.5	24.2
5	286,826	70.3	45.5	18.5

(*) Households that report having income and debt in 2007. The indicator is constructed as the ratio between variables imputed from the Household Financial Survey (HFS).

Source: HFS 2007, Central Bank of Chile.

Table 8

Ratio of household financial burden to income by income strata
(number, percent of households, and percent of income)

Income quintile	Households (*)		FIR	
			Average	Median
	(Number)	(Percent)	(Percent)	
1	521,077	51.3	35.3	17.2
2	685,992	73.3	29.7	16.3
3	632,490	71.5	26.4	16.1
4	534,967	75.9	24.6	15.9
5	286,826	70.3	21.2	13.4

(*) Households that report having income and debt in 2007. The indicator is constructed as the ratio between variables imputed from the Household Financial Survey (HFS).

Source: HFS 2007, Central Bank of Chile.

II. Access to credit

Households' access to the financial system is an important dimension in the analysis of the financial market. The literature shows that the availability of credit has significant benefits in the form of consumption smoothing, especially for lower income households, and it can also have a positive effect on income distribution (Beck and Demirgüc-Kunt, 2008). It is therefore necessary to evaluate whether the growth of debt described in the previous section stems the fact that more households than before have access to credit, or whether it reflects a higher indebtedness of households that already had access to credit.

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[19]/ These statistics are calculated for those households that report income and debt, so they should not be interpreted directly as evidence of equal access to debt.

II.1 Microeconomic approach[20]/

The definition of restrictions on access to credit is not trivial. Empirical studies adopt different positions. For example, Japelli (1990) and Bertaut and Haliassos (2004) define credit restriction as a situation in which an individual's demand for credit is greater than the supply that he faces. Gross and Souleles (2002) consider individuals to be subject to credit restrictions when they cannot access the lowest-cost credit options and must use more expensive options (such as credit cards or informal market loans).

Establishing an adequate definition of credit restriction—regardless of the approach adopted—requires data that can be used to differentiate credit supply and demand. This is generally possible with household surveys, due to the richness of the variables and information that they include. For Chile, Ruiz-Tagle and Vella (2010) use the 2007 Household Financial Survey and define households with restricted access to credit as follows: (i) they have applied for a loan and been denied, or (ii) they have not applied for a loan because they think they would be denied. Based on this definition, the authors find that approximately 16% of households face credit restrictions. This figure must be interpreted cautiously, however. While 16% is relatively low compared with estimates for the United States, which are in the range of 30% (Grant, 2004), it is high when compared with estimates for European countries[21]/. Moreover, the surveys on which these other estimates are based differ in certain aspects, reducing their comparability. For example, the surveys for Chile, Spain, and the Netherlands ask questions about restrictions in the last two years, Italy in the last year, and the United States in the last five years.

Determinants of credit access

The econometric analysis of the determinants of access to credit indicates that education, real estate assets holdings, income level, and having a work contract are positively related to having access to credit and, to some extent, reflect or are associated with permanent household income.

To provide an indication of the role of each of these variables, the probability that a head of household with primary education will face restrictions is 3% higher than in the case of someone with tertiary education, all else constant. In the case of having a work contract, the probability of credit restrictions is 5% less than for a household that does not have a contract. With regard to the household's real estate assets, an increase from the average value of the fourth quintile (Ch$57 million) to the average value reported in the fifth quintile (Ch$137 million) lowers the probability of credit restrictions by 4%.

With regard to variables related to the credit supply, the analysis finds that less financial depth increases the probability of credit restrictions[22]/. For example, if the average number of inhabitants per bank office rises from the sample minimum (537, VII Region) to the maximum (3.200, I Region), then the probability of credit restrictions increases 14% for households located in that area. This finding could imply that factors associated with the credit supply could play an equally important role in access to credit.

Determinants of debt levels

To estimate household demand for credit, the analysis considers mortgage and consumer debt separately[23]/. In the case of consumer debt, the main determinants are household income and the age and education level of the household head. The DTI ratio is concave and growing, and the semi-elasticity of weighted average income for the sample is an estimated 7%. For higher income households, the elasticity is around 2%, versus around 8% for lower income households. This implies that if a household's annual income were to increase from Ch$20 million to Ch$30 million, its debt would expand from Ch$1.9 million to Ch$3.8 million; if it increased from Ch$30 million to Ch$40 million, the debt level would rise from Ch$3.8 million to Ch$6.8 million[24]/.

The main result for mortgage debt is that, in contrast to consumer debt, households do not face statistically significant credit restrictions. The authors suggest that this result may be tied to the availability of explicit government support for lower income households. Specifically, 10% of mortgages are obtained through governmental institutions with substantial subsidies, while 25% are granted by *BancoEstado*, which specializes in smaller operations[25]/. The standard commercial practice is to establish monthly payments that are not excessive given the borrower's income, extending the contract maturity as necessary to meet that requirement[26]/. In practical terms, this should reduce potential credit restrictions for mortgages.

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[20]/ This section is based on Ruiz-Tagle and Vella (2010).

[21]/ For example, Crook and Hochguertel (2007) estimate restrictions of around 3% for the Netherlands in the 1990s and a similar level for Italy and Spain in 2004.

[22]/ Measured by the number of inhabitants per bank office. A higher ratio indicates less financial depth.

[23]/ In general terms, the results indicate the presence of important nonlinearities and, given the nature of the problem, semi-parametric estimates are more robust than more standard methods. The results reported below are based on this type of estimate.

[24]/ The average income of the subsample is approximately $28 million a year..

The role of credit restrictions

Based on the estimate of credit demand, it is possible to quantify the potential growth of debt in a scenario in which the restrictions on credit access were completely eliminated. In other words, if the 16% of households with restrictions had unrestricted access to financing sources, then we can calculate the magnitude of the aggregate increase in household debt. This exercise indicates that debt would increase around 1.2% if all restrictions were eliminated[27]/.

Such estimates suggest that the quantitative effect of the prevailing credit restrictions in Chile is small. This result is explained, in part, by the fact that the share of households with restrictions is low. Moreover, on disaggregating the 16% of households with restrictions, we find that only 5% of households are completely excluded from the financing system (households without debt), while the remaining 11% already have some level of access (households with positive debt). In addition, not only is the share of restricted households relatively low, but it is also concentrated in the lowest income quintiles, whose demand for credit is relatively low compared with the highest income quintiles.

II.2 Macroeconomic approach[28]/

Empirically, it is difficult to identify credit supply conditions, especially for aggregate estimates. Studies in this area are exposed to questions on the validity of the instruments or identification strategies used. The paper by Khwaja and Mian (2008), which assesses the effects of the liquidity shock triggered by unanticipated nuclear tests in Pakistan, is an exception in terms of having an exogenous event that directly affects the credit supply.

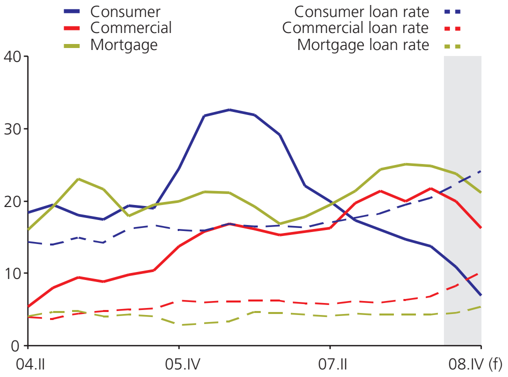
Calani et al. (2010) employ an identification strategy that uses information on contractual practices and quantitative rationing reported by commercial banks in the Survey of General Conditions and Standards in the Credit Market. The identification assumption is that these practices provide a source of exogenous variation in the credit supply, different from the interest rate, which allows estimating consistent elasticities for three types of loan: consumer, commercial, and mortgage. Studies for other countries with similar surveys conclude that they provide information for explaining the credit cycle, which also appears to be the case in Chile (box 1).

The results of Calani et al. (2010) can be applied to explain the relevance of credit supply and demand during the financial turbulence of late 2008. This episode is interesting because in that period, credit slowed significantly and interest rates rose (figure 7), generating the simultaneous occurrence of factors that affect credit supply and demand. This period was also characterized by a strong level of uncertainty in the financial markets.

Figure 7

Growth and cost of bank credit

(real change, percent)



(f) Forecast.

Source: Calani et al. (2010).

The results of this exercise are presented in table 9, which contains the estimates of the magnitude of the horizontal shift of the supply and demand curves—or, equivalently, the change in the quantity supplied or demanded at a given interest rate—in the period from the third quarter of 2008 to the first quarter of 2009. As the table shows, both consumer and mortgage loans exhibit a simultaneous slowdown in supply and demand. In the case of consumer loans, the contraction of supply implied a change in the annual growth rate of –8%, while the reduction in the growth rate of demand is estimated at around -13%[29]. For mortgage loans, the observed magnitudes of the slowdown in supply and demand are –9% and –8%, respectively.

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[25]/ This point is also addressed in the section on household credit risk.

[26]/ In general, commercial banks generally require that the monthly payment be less than or equal to 25% of monthly family income.

[27]/ The 1.2% estimate is obtained through semi-parametric estimates, which correct for nonlinearities and imply higher debt-income elasticity. Estimates based on traditional parametric models indicate that debt would increase 8.1%.

[28]/ This section is based on Calani et al. (2010).

Table 9

Results of comparative statics
(number and percent of households)

Type of loan	Curve	Change (*)
Consumer	Demand	-13.27
Consumer	Supply	-7.99
Mortgage	Demand	-8.57
Mortgage	Supply	-8.64

(*) Absolute horizontal distance (in percentage points) between the two curves at t0 and t1.

Source: Calani et al. (2010).

In sum, the evidence suggests that in the recent crisis, both consumer and mortgage loans recorded significant supply and demand shifts. These shifts together resulted in a contraction of credit growth and higher interest rates in the period under analysis.

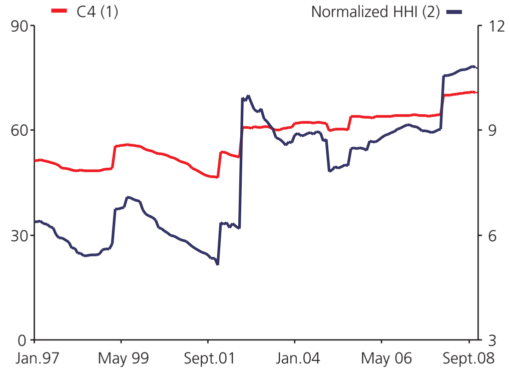
III. Competition and market structure

III.I Competition in consumer banking[30]

The Chilean banking industry has experienced a number of mergers in recent years, which has lowered the number of participating institutions and raised the indices traditionally used to measure competition (figure 8). This greater concentration, however, is not evidence of changes in the competition conditions in this market. The literature shows that there is not a direct relationship between concentration and competition. For example, the theory of contestable markets suggests that if barriers to entry are sufficiently low, the threat of new competitors can generate competitive behavior, independently of the number of existing firms (Baumol et al., 1982). Alternatively, the efficiency hypothesis indicates that the existence of economies of scale can increase the efficiency of larger firms. In such a case, higher concentration could be the result of a strategic decision by the most efficient firms to increase their market share (Demsetz, 1974). In both cases, the theory suggests that greater market concentration does not necessarily imply less competition.

Figure 8

Market concentration in bank consumer loans
(percent)



(1) Market share of the four main consumer loan suppliers.
(2) Herfindahl index.

Source: Oda and Silva (2010).

The available empirical evidence for Chile on the degree of banking competition is mixed[31]. The majority of these studies, however, evaluate the degree of competition at the aggregate of the banking industry, without distinguishing by business segment (commercial, consumer, and mortgage loans). In contrast, a recent study by Oda and Silva (2010) considers specifically the issue of bank consumer lending in Chile[32]. The methodology consists in estimating a multi-product translogarithmic function for the cost function, which is used to calculate the marginal cost of each bank. The bank's market share is then correlated with its estimated marginal costs, with the expectation that under a higher degree of competition, the most efficient banks will have a larger market share.

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[29] These figures correspond to absolute changes in the annual growth rate of the loans. For example, if the initial growth of the loan supply was y%, a contraction of z% implies that the final growth rate in the period will be y% – z%.

[30] This section is based on Oda and Silva (2010).

[31] Sepúlveda-Umanzor and Soto (2009) show that the greater concentration in Chile intensified the degree of competition in the period 1986–2006. Levy Yeyati and Micco (2007) find that Chile is the most competitive country in a sample of eight Lain American economies in 1993–2003. Bikker et al. (2006) locate Chile in the 10% of countries with the greatest competition in 1986–2006. However, Karasulu (2007) finds that the Chilean banking system has a statistically inferior level of competition, while and Claessens and Laeven (2003) find it to be equal to the sample average.

[32] The authors also apply the methodology to the commercial and mortgage segments.

Formally, to evaluate the degree of competition, the following equation is estimated:

$$\ln S_i = \alpha + \beta \cdot \ln CM_i + \varepsilon_i$$

The main parameter of interest is β (the Boone index), which measures how a bank's market share responds to changes in its marginal costs. A more negative value for this parameter indicates a higher degree of competition[33].

The results obtained by Oda and Silva (2010) indicate that for most of the period analyzed (1997–2009), the null hypothesis of an absence of competition in bank consumer lending ($\beta = 0$) can be rejected[34]. Only between the last quarter of 2003 and the same period in 2005, the evidence suggests the existence of a lower level of banking competition. This period is characterized by several mergers and acquisitions, which are reflected in a strong increase in market concentration. Finally, the evidence is not indicative of a current lack of competition in the supply of bank consumer loans.

III.2 Retailers[35]

The strong growth in the supply of credit from retailers is an important issue for the analysis of the financial market. From the perspective of competition in the consumer loan market, this phenomenon could be consistent with two hypotheses. First, the banks may have been exposed to strong competition due to the expansion of these institutions. Second, their positioning in the loan market could reflect segmentation by type of client and, therefore, the existence of a market that is not served by the banking entities and that has been challenged by the retailers.

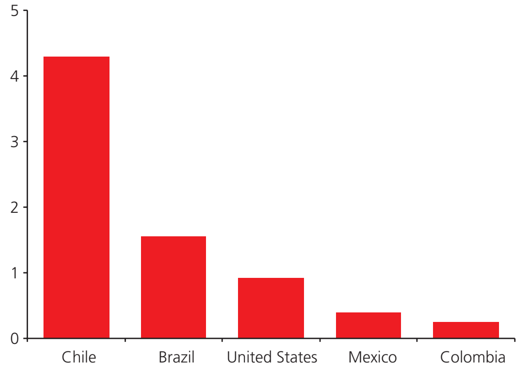
International evidence

The market penetration of large retailers is not specific to Chile, but its level is high compared with other economies. Figure 9 shows the ratio of retailers' to banking credit cards in 2007. As the figure shows, this ratio is substantially higher in Chile (4.3) than in the other economies[36].

Nevertheless, while the retailers are especially strong in the household segment in Chile, they have also accomplished significant market penetration in the other economies.

Figure 9

Ratio of retail credit cards to bank credit cards
(number of cards, times)



Source: Montero and Tarziján (2010).

Several factors explain these dynamics. In the United States, Johnson (2005) argues that this penetration is associated with improved credit scoring and the implementation of risk-based pricing. In Mexico, Ruiz (2004) suggests that the main factor behind the growth of retailers in the consumer credit market is the low use of banking services in the population. Finally, in the case of Brazil, credit cards began to expand in the early 1990s, when the banks were allowed to operate with more than one brand. This regulatory change drove the simultaneous growth of bank and nonbank cards, but in the end there was a larger stock of retail credit cards than bank cards.

Taking these factors into account, the rest of this section explores alternative explanations for the development of retail credit cards in Chile.

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[33] In the monopoly case, $\beta=0$ and market share is 1.

[34] For commercial and mortgage loans, the parameter records a different evolution over time, but within a similar range to the Boone index for consumer loans.

[35] This section is based on Montero and Tarziján (2010).

[36] The comparison of the ratio of bank credit cards to retail credit cards is a partial indicator and potentially subject to comparability problems (for example, amount of operations or limits, or differences in the segments of the user households). However, it is extremely difficult to get comparable data for a large sample of countries.

Hypotheses for the Chilean case

Montero and Tarziján (2010) explore the factors that could explain the growth of retailers as credit suppliers. After reviewing a long list of potential determinants of the market penetration of retailers, the authors conclude that there is no single factor that explains this phenomenon. Rather, several different elements have tended to complement and reinforce each other. Among the most important factors they emphasize the low level of use of banking services in the Chilean economy in the 1980s, and the banks' aversion to taking on risk in the lowest income segments, which are the retailers' main clients[37]/.

The authors argue that this phenomenon is not necessarily explained by a conservative behavior on the part of the banks after the financial crisis in the early 1980s, but it can be rationalized by using an oligopoly brand-stretching model[38]/. In this model, one of the possible results is that it is not profitable for the banks to serve the lower income segments, because it has negative consequences on earnings from services provided to higher income clients. In fact, for intermediate values of the level of bank concentration—as it is the case in Chile—and significant negative externalities in providing services to low income clients, it is possible to find an equilibrium in which the banks are concentrated in the high income segment, even though industry earnings are higher if both groups of clients were served.

The authors recognize that while this type of model could explain the positioning of retailers as credit suppliers to low income consumer segments, it is insufficient for explaining the current situation in this market. In the last few years, several commercial banks have developed specialized consumer divisions, and competition may intensify if they begin to participate more actively in the sector.

IV. Credit risk

IV.1 General overview

Households face different kinds of shocks, which can explain both the accumulation of assets (financial and real) and the use of debt to smooth intertemporal consumption. Such shocks, however, can also lead households to renege on their financial obligations, whether due to an inability to pay or due to strategic considerations (Kocherlakota, 1996; Kehoe and Levine, 2006, and Chatterjee et al., 2007)[39]/.

The nonpayment of financial liabilities is central to the link between household indebtedness and financial stability. As Alfaro and Cifuentes (2009) point out, credit risk is recognized by the regulators as the most important risk in banking (Ieda et al., 2007). The BIS (2006) argues that international experience points to the concentration of credit risk as one of the main causes of financial problems in the banking system, for both individual institutions and the system in general.

Although there is no consensus on how best to monitor and quantify the risk associated with household debt, the need for more detailed information at the borrower level is widely acknowledged. When these risks are analyzed solely on the basis of national accounts and aggregate financial data, it is not possible to characterize the joint distribution of financial expense and income, which is critical for identifying vulnerabilities in this sector (Persson, 2009)[40]/. In a more general framework, Ceccetti et al. (2009) highlight the need to explicitly consider the heterogeneity of agents in order to strengthen the models that are currently used to evaluate credit risk. Finally, the importance of a more granular approach to studying households is confirmed by the growing adoption, on the part of different economies, of household risk assessment methods based on microeconomic data[41].

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[37]/ Other factors considered include regulator differences that, in theory, favor the retailers: a more aggressive campaign to attract clients; lower transaction costs; and the lack of information sharing on client credit behavior.

[38]/ Pepall and Richards (2002) describe several cases that would fit within a brand-stretching model, but they do not specifically address the banking industry. Examples include the launching of sports items with the Coca-Cola logo in 1999 and Ralph Lauren's development of the Polo label.

[39]/ The concept of strategic nonpayment is related to the household's assessment of the benefits of nonpayment (more cash on hand) versus the potential costs (repudiation, exclusion from financial markets, and so on).

[40]/ Herrala and Kauko (2007) present a general description of the household credit risk assessment methods based on microeconomic and aggregate data.

In more general terms, the benefits of a microeconomic analysis are not limited to the technical aspects mentioned above, but also include the production of a financial assessment tool that is transparent, easily interpreted, and, ultimately, easy to communicate. As Drehmann (2008) points out, one of the objectives of stress tests is to communicate the system's financial vulnerabilities and risk, so that agents will internalize this information in their decisions. Practically all central banks include different types of stress test in their financial stability reports (Cihak, 2007).

IV.2 Financial vulnerability of households[42]

As mentioned earlier, households are exposed to macroeconomic and idiosyncratic shocks. With regard to the former, the literature mainly considers unexpected fluctuations in income, that is, changes in wages and/or unemployment. The latter, in turn, includes unforeseen health care costs, divorce, and other events.

The importance of these factors has been studied in other economies. For example, Keese (2009) shows that, in the case of Germany, the birth of children and the loss of employment are the main reasons why households become overindebted.

In the case of the United States, for the 1984–1995 period, Chakravarty and Rhee (1999) classify the main reasons for bankruptcy reported by households into the following five categories: (i) loss of employment (12.2%), (ii) bad use of credit (41.3%), (iii) marriage separation (14.3%), (iv) health care costs (16.4%), and (v) legal expenses (15.9%).

In the case of Chile, the financial vulnerability of households is directly related to labor income. Neilson et al. (2008) present evidence that changes in labor income are the main cause of households entering or leaving poverty, while changes in the household demographic composition, subsidies, and other factors play a less important role[43] According to the 2007 Household Financial Survey, 75% of average household income is labor income; this figure rises to 82% in lower income strata. Labor income thus plays a potentially important role in the analysis of household financial vulnerability (table 10).

Table 10

Composition of household income in Chile 2007
(percent of total)

Type of income	Stratum 1 (1)	Stratum 2 (2)	Stratum 3 (3)	Total
Labor (4)	68.5	68.1	81.7	75.0
Rent (5)	17.4	17.4	12.1	14.8
Pension (6)	13.6	12.0	2.7	7.8
Financial assets	0.3	1.8	2.9	1.9
Other income (7)	0.2	0.6	0.6	0.5

(1) Deciles 1 to 5.
(2) Deciles 6, 7, and 8.
(3) Deciles 9 and 10.
(4) Includes principal income, other income related to the main occupation (such as bonds), and secondary income.
(5) Includes imputed income from rent of own housing and real rent from other properties.
(6) Includes income from pensions (old-age or disability), subsidies, support from family members, life annuities, retirement, and other sources.
(7) Includes other income not reported in the previous items (such as earnings from a business or rental of agricultural property or transport vehicles).

Source: HFS 2007, Central Bank of Chile.

Fuenzalida and Ruiz-Tagle (2009) develop a methodology for evaluating household vulnerability to unemployment shocks. This can be considered as the extreme version of a wage reduction. The authors econometrically estimate the probability of unemployment, conditional on idiosyncratic variables at the household level (for example, marriage status, education level, type of labor contract, and so on) and also on aggregate variables (such as the aggregate unemployment rate and economic activity)[44]. Based on these estimates for unemployment, they carry out Monte Carlo simulations to assess the impact of an aggregate shock on the employment condition of household members in the Household Financial Survey. In practice, unemployment implies a deterioration of financial indicators of the households affected by a negative shock.

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[41] The 2007 Household Financial Survey for Chile is related to the survey carried out by Bank of Spain. The Riksbank (the central bank of Sweden) has an annual cross-sectional survey and a household panel. Other countries with data at the household level include Australia, Belgium, Germany, Finland, France, Hungary, Italy, Japan, Norway, Philippines, Thailand, the United Kingdom, and the United States (Herrala and Kauko, 2007).

[42] This section is based on Fuenzalida and Ruiz-Tagle (2009).

[43] The authors estimate that wage changes represent approximately 80% to 85% of the income fluctuations that lead to changes in the poverty status.

[44] Household unemployment probability is estimated using data from the biannual Social Protection Survey, which provides information for constructing a panel of 16,727 individuals for a period of 120 months.

To quantitatively establish the share of households that are financially vulnerable, the following criteria are used: (i) a financial burden-to-income ratio (FIR) above 75% (that is, more than 75% household income is allocated to meet financial commitments); and (ii) a negative financial margin of –20% or lower (that is, expenses exceed income by 20%).

The results are presented in table 11. In the baseline scenario—which considers the debt-at-risk of households whose members could lose their jobs at any time (implicit probability)—the share of households under financial stress is in a range of 13% to 16%, and debt-a-risk could reach 20% to 25%[45]/. In the case in which unemployment rises five percentage points over the baseline scenario (that is, slightly above the levels recorded during the Asian crisis), the share of households under financial stress would rise to 16% to 19%, and debt-at-risk would account for 22% to 28% of the current debt stock. Finally, the most extreme scenario considers an increase in unemployment of 15 percentage points, in which case, the share of financially vulnerable households would range from 25% to 28%, and debt-at-risk would increase to between 31% and 38%[46]/.

Table 11

Credit risk simulations (*)
(percent of each total)

	Households	Insured debt	Uninsured debt	Total debt
Baseline scenario	9.5	14.5	18.8	16.1
Baseline scenario + implicit unemployment probability	13.2-15.6	17.1-22.6	23.1-29.0	19.7-24.6
Δ + 5% unemployment	15.9-18.8	19.2-26.2	26.2-33.3	22.3-28.1
Δ + 10% unemployment	20.1-23.3	22.8-30.2	30.9-38.8	25.9-32.6
Δ + 15% unemployment	24.5-28.0	27.0-35.3	36.4-44.3	31.0-37.9

(*) Simulation intervals are p(2.5) to p(97.5).

Source: Fuenzalida and Ruiz-Tagle (2009).

These simulations suggest that the aggregate effects of increases in the unemployment rate are relatively limited. An unemployment shock of five percentage points—equivalent to an unemployment rate similar to the Asian crisis (11%)—would lead to an increase in total debt-at-risk of between 2 and 4 percentage points relative to the baseline scenario, which considers the implicit probability of unemployment. This result is, to some extent, consistent with the concentration of debt in the highest income quintiles (section I), with the econometric results negatively relating unemployment and education level, and with the fact that higher income households have a higher number of working members per household (table 12)[47]/.

Table 12

Household employment in Chile 2007
(average)

	Stratum 1 (1)	Stratum 2 (2)	Stratum 3 (3)	Total
Household members that work	1.3	1.5	1.9	1.4
Total household members	3.4	3.5	3.8	3.5
Employment (%)	38.7	41.0	48.9	41.4

(1) Deciles 1 to 5.
(2) Deciles 6, 7, and 8.
(3) Deciles 9 and 10.

Source: EFH 2007, Central Bank of Chile.

These results represent the highest potential level of debt-at-risk, for several reasons. First, the model does not consider individuals who are currently unemployed, but who could find new jobs. Second, in the case of unemployed workers, the simulations do not take into account potential income from unemployment benefits and similar sources, which—while relatively low in Chile—could help minimize the impact of the unemployment shock[48]/. Finally, the simulations do not consider the possibility of selling off assets to offset fluctuations in income. This is especially pertinent in the higher income segments, which not only have the largest share of the debt stock, but also account for the greatest share of assets.

While the methodology applied by the Central Bank of Chile is similar to those used in other economies, there are several areas that require further research[49]. The main limitation of the current approach is that it is essentially a partial equilibrium methodology. Basically, this approach does not take into account the risks to which households are exposed in their role as investors, as well as insurance benefits or other types of financial support contingent on the simulated shock (for example, loans from family members). The current approach also does not consider second-round effects stemming from nonpayment decisions made in response to the initial unemployment shock. In this regard, Santoso and Sukada (2009) suggest that a more integral assessment of the risks to which households are exposed requires a balance sheet approach like that proposed by Samphantharak and Townsend (2006). Finally, the simulations do not consider how debt-at-risk is distributed across financial institutions. This could be useful for evaluating whether debt-at-risk is potentially concentrated in institutions with low capitalization or less experience, among other possibilities.

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[45]/ 95% confidence intervals.

[46]/ The results are stable depending on the chosen cutoff for the FIR. Simulations for a negative financial margin of 20% and FIR values ranging from 50 to 75% show that the percentage of debt-at-risk does not present very significant fluctuations or discontinuities. Similar conclusions are obtained for alternative values of the negative financial margin (10%).

[47]/ Fuenzalida and Ruiz-Tagle (2009).

[48]/ If the worker is fired, he receives cash support equal to the last two paychecks received, divided into five decreasing monthly payments. If the worker quits, he receives approximately 25% of one month's wages for each 12 months paid into the unemployment insurance fund.

IV.3 Household credit risk[50]

The previous section estimates the financial vulnerability of households based on whether they fulfill the criteria of a negative financial margin (<–20%) and FIR (>75%). The results of Fuenzalida and Ruiz-Tagle (2009) are robust to changes around these values, but they need to be evaluated for a possible relationship between vulnerability and credit risk. In other words, it is necessary to assess whether or not the indebtedness level associated with an FIR of over 75% implies a high probability of nonpayment.

The nexus between debt-at-risk and credit risk is analyzed in Alfaro et al. (2010), who study the probability of nonpayment for households using data from the 2007 Household Financial Survey. Based on these estimates, the authors calculate the threshold probability over (under) which the households would not (would) pay their debt. In simple terms, this probability minimizes the difference between the estimated payment decision and the real decision of each household (box 2). The threshold probability can be interpreted as the probability of triggering the nonpayment decision.

Table 13 compares the threshold probabilities obtained by applying the probit models estimated by Alfaro et al. (2010) with the debt-at-risk criteria of Fuenzalida and Ruiz-Tagle (2009), that is, an FIR of over 75% and a financial margin below –20%. In general, the probabilities estimated by the former are fairly close to those implied by the stress tests in the latter. For example, the threshold probability estimated by Alfaro et al. (2010) for the consumer debt of the first quintile is 36%, while the implicit probability derived from Fuenzalida and Ruiz-Tagle (2009) is 38%. Moreover, except for the first quintile, the Fuenzalida and Ruiz-Tagle (2009) calculations tend to overestimate the share of households that could present credit risk, because the implicit probability is lower than the threshold probability. This, combined with the previous section, suggests that the approach used to evaluate the financial vulnerability of households is fairly conservative relative to the implicit credit risk.

Table 13

Estimated probability of nonpayment
(percent)

	Threshold probability A-G-S (1)	Threshold probability F-RT (2)
Mortgage debt	**17**	**15**
Consumer debt		
Quintile 1	36	38
Quintile 2	37	32
Quintile 3	23	19
Quintile 4	23	19
Quintile 5	13	11

(1) Threshold probability of nonpayment in Alfaro et al. (2010).
(2) Threshold probability of nonpayment in Fuenzalida and Ruiz-Tagle (2009).
Source: Alfaro et al. (2010).

IV.4 Credit risk: A more general perspective

The macrofinancial context of the 2008–2009 period was expected to increase household credit risk. Aggregate output contracted 1.7% in 2009, the unemployment rate was around 10%, bank lending to households contracted starting in mid-2008 (and has only recently recovered), and there was a large increase in macrofinancial uncertainty associated with the development and spreading of the subprime crisis[51].

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[49] The methodology used by Fuenzalida and Ruiz-Tagle (2009) is fairly in line with that used by the countries that pioneered this approach, namely, Norway and Sweden. Moreover, in the case of Chile, the approach is differentiated by the estimation of the unemployment probability as a function of individual characteristics, whereas in Sweden and Norway, the probability of becoming unemployed is assumed to be uniformly distributed across the population.

[50] This section is based on Alfaro et al. (2010).

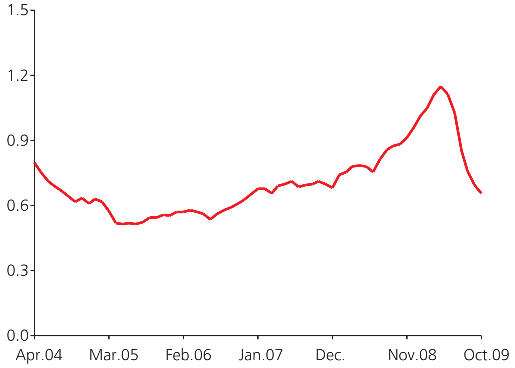
[51] Central Bank of Chile (2009b and 2009c).

According to microeconomic analysis, however, household credit risk remained fairly limited. The nonperforming loan index stayed below 1.2% and even fell 0.7% toward the end of the period (October 2009) (figure 10). Part of this reduction in the nonperforming loan index could be explained by an increase in loan renegotiation, as well as by the greater write-offs in 2009[52].

Figure 10

Nonperforming consumer loan index

(percent of loans)



Source: Central Bank of Chile (2009 b).

The sector's favorable performance in terms of credit risk could be associated with credit supply and demand factors (for example, lending policies) and more general factors that facilitate the functioning of the markets, such as regulation and supervision.

In this regard, Aparici and Sepúlveda (2010) analyze the importance of different factors that can contribute to reducing credit risk in the Chilean banking system. First, the rather incipient development of the market for structured financial instruments, in general, and mortgages, in particular, may have limited the overvaluation of housing prices, which played an important role in the recent subprime crisis[53]. In fact, the evidence for Chile indicates that housing prices are aligned with their macrofinancial determinants (box 3). Second, the bulk of home loans supplied by commercial banks is not specialized in high-risk segments, because the most vulnerable segments of the population receive state subsidies and are concentrated in *BancoEstado* (table 14)[54,55] Third, in the case of the consumer loan market, banks have developed commercial platforms specializing in services for relatively higher risk clients, through their so-called consumer divisions[56]. In practical terms, these factors have contributed to a higher specialization of the Chilean banking system with a better understanding of the potential credit risk of these segments, facilitating portfolio risk management. Finally, important regulatory safeguards have been maintained, especially in the case of banking entities, where the authority has more exhaustive supervisory mechanisms. These include monitoring portfolio rating processes for the purposes of constituting credit risk provisions, which are reflected in the banking system's provision coverage ratio, among other indicators (table 15).

Table 14

Housing subsidy and distribution of income

(percent of total income)

	Quintiles (q)					Accumulated
	1	2	3	4	5	q1 to q3
Beneficiary households	21.8	23.0	23.0	20.1	12.1	67.8
Registered households	24.9	25.3	21.2	18.2	10.4	71.4

Source: Aparici and Sepúlveda (2010).

Table 15

Provisions coverage index

(average)

Type of loan	2004	2005	2006	2007	2008	2009
Mortgage	0.50	0.47	0.49	0.48	0.57	0.51
Consumer	6.20	7.00	6.72	6.48	6.48	7.15

Source: Aparici and Sepúlveda (2010).

Additionally, given that the level of competition could influence the risk level that the banking industry is willing to take on, Oda and Silva (2010) analyze the relationship between competition and risk in the bank consumer loan segment in Chile. The results show that during the period of increasing

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[52] Central Bank of Chile (2009b).

[53] Mian and Sufi (2008) show that the appreciation of housing prices in the United States is associated with the increase of mortgage loans to subprime borrowers, and this greater loan supply was associated with the securitization of mortgage debt.

[54] The three lower income quintiles have access to direct subsidies of up to UF200 for homes with a commercial value of up to UF2,000, which are designed to complement prior savings of at least UF50.

[55] *BancoEstado's* share in the mortgage loan market averaged 25% in the last year.

[56] According to institutional reports of representative banks, the target household for these divisions has a monthly income of less than US$1,000.

concentration in the sector (2003–2005), credit risk levels fell, while loans expanded. One of the contributions of this study is that it is specifically focused on the consumer loan segment, and it thus represents a step forward in an area previously characterized by rather mixed results. For example, Chumacero and Langoni (2001) do not find evidence of a significant relationship between concentration and credit risk in the Chilean banking sector from 1989 to 2000, whereas Berger et al. (2008) do find evidence of a positive relationship between market power and credit risk, in a panel of 23 economies in 1999–2005.

V. Macroeconomic considerations

In aggregate terms, household consumption represented 60% of GDP in 2009. Given the importance of this component, household decisions could have strong macroeconomic consequences, particularly on the effectiveness of monetary policy. While there are many monetary policy transmission channels (Adrian and Shin, 2008; Bernanke, 2008; Curdia and Woodford, 2008, and Mishkin, 1996), household consumption decisions can be especially relevant through the following mechanisms:[57]/

(a) Interest rate channel. The general argument behind this conventional mechanism is that changes in the interest rate generate changes in the cost of credit, thereby affecting consumption and investment decisions.

(b) Wealth channel. This mechanism refers to the effects of monetary policy on assets and how these changes then affect household wealth and consumption decisions.

However, establishing the relative importance of each mechanism, together with its effect on household debt, presents considerable challenges and is also beyond the scope of this chapter. The rest of this section explores the macroeconomic repercussions of households' access to the financial market and provides a more detailed analysis of the importance of the wealth effect.

V.1 Household financing: Macroeconomic implications[58]/

In the literature, the process of financial deepening is linked to a greater capacity for households to smooth their pattern of consumption and a larger share of private credit in the economy.

However, the ability to smooth consumption depends not only on the existence of a financial system that provides credit to households, but also on the presence or absence of other frictions. In particular, the existence of information asymmetries and potential repudiation of debt (credit risk) are factors that reduce this capacity. In a scenario characterized by such frictions, the optimal debt contract establishes countercyclical payments, that is, larger payments in contractionary periods (Atkeson, 1991).

To approximate the macroeconomic effects of household indebtedness in Chile, we start from the simulations presented in Caputo et al. (2010) (box 4). These simulations are based on a stochastic general equilibrium model, which allows us to gauge the potential macroeconomic role of access to credit[59]/. In general, the results indicate asymmetric effects of the economy's response to different types of shocks. In particular, in the presence of an increase in the external cost of credit (a financial shock), the effect on the volatility of consumption and macroeconomic variables will be smaller to the extent that the percentage of households with access to credit is smaller. This derives directly from the existence of a small percentage of the population whose consumption pattern is tied directly to interest rate fluctuations. In contrast, in the case of a real shock, income and consumption fluctuations will be larger in the scenario with restrictions, because in this case the possibility for the households to smooth their consumption pattern will be restricted.

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[57]/ The so-called credit channel (Bernanke and Gertler, 1995) can have implications for the availability of credit to households, but it is more closely tied to the credit supply in general.

[58]/ This section is based on Caputo et al. (2010).

[59]/ This type of model corresponds to a stylized approximation of the economy, and this should be taken into account when evaluating the results. In fact, there are factors specific to each economy that characterize the operation of the credit markets and their effects on the rest of the economy, which are not explicitly considered in these models. For example, Cecchetti and Krause (2001) argue that a smaller presence of state banks, together with the introduction of deposit guarantees, would improve the efficiency of monetary policy conduct. Another example is associated with the structure of debt contracts, because monetary policy will be more effective to the extent that the structure of household financing is concentrated in variable interest rate contracts (Debelle, 2004).

With regard to the role of financial frictions, characterized by a lower degree of pass-through from the monetary policy rate to the market rate[60]/, the results show that the higher the degree of financial frictions, the greater the volatility implied by a financial shock. This is tied to the need for a more aggressive policy response to offset the increase in external financing costs. Finally, a real shock would have similar effects on aggregate variables (like consumption or output) under scenarios with different degrees of financial frictions. This is due to the fact that households can smooth their consumption pattern independently of the degree of rate pass-through, with differences only in the implicit cost of consumption smoothing (due to higher rates in the scenario with greater frictions).

V.2 Household wealth effect

The transmission of monetary policy through the so-called wealth effect argues that monetary policy decisions could affect household asset prices, thereby generating changes in the pattern of consumption[61]/. Studies for other economies suggest that this mechanism is economically significant. For example, estimates for the United States indicate that approximately half of the effect of interest rate changes on output and consumption is due to this mechanism (Ludvignson et al. 2002).

In general, and also in the case of Chile, the main household asset is the housing itself—approximately 70% of total assets, according to the Household Financial Survey—so the mechanism is closely linked to the evolution of housing prices. However, because the housing price series for Chile are not long enough to empirically evaluate the relationship between housing prices and the economic cycle, we approximate the issue indirectly, through results reported for other economies. Specifically, the analysis largely rests on studies for advanced economies (IMF, 2008; Calza, Monacelly, and Stracca, 2009).

Thus, the effect of changes in housing prices—in a scenario without frictions—is directly related to changes in the consumption pattern that, in turn, reflect permanent income effects: a higher housing price increases the value of the wealth. In the presence of credit frictions, however, housing plays an additional role, because it constitutes an asset that can be used as collateral. Therefore, an increase in housing prices relaxes credit restrictions, and may lead to increased household consumption. According to the IMF (2008), the role of collateral could be a predominant transmission mechanism.

Calza et al. (2009) present econometric estimates that can be used to estimate the magnitude and importance of the wealth effect in Chile[62]/. Specifically, they estimate a VAR to assess how the transmission of monetary shocks varies as a function of the degree of development in the mortgage market. To this end, countries are classified by the level of mortgage development (high or low), depending on the ratio of mortgage debt to output and the loan-to-value (LTV) ratio[63]/, on whether or not it is possible to capitalize on price changes (equity draw), and on whether the interest rate structure is fixed or variable. The main conclusions of Calza et al. are as follows:

(a) Consumption: this variable is most sensitive in countries where it is possible to capitalize changes in the housing price (equity withdrawal effect) and where variable-rate contracts predominate.

(b) Residential investment: the presence of high LTV ratios, capitalization, high mortgage debt as a share of output, and a variable interest rate structure lead to a greater sensitivity of investment to monetary shocks.

(c) Housing price: the sensitivity of the housing price, like residential investment, depends on the level of development in the mortgage market under study.

In the case of Chile, the classification criteria of Calza et al. (2009) allow inferring that the degree of development in the mortgage market is relatively low (table 16). The ratio of mortgage debt to output in Chile is 29%, which is below the median for the group of countries[64]. The practice of capitalizing on increased housing prices is absent in the Chilean market. The average LTV ratio is 63%, which falls within the second percentile of the sample. Finally, the interest rate structure on mortgage loans is predominately fixed (approximately 55%, according to the 2007 Household Financial Survey). All these factors suggest that the wealth effect in Chile could be relatively low compared with other economies.

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[60]/ This approach is similar to Curdia and Woodford (2008) and Taylor (2008).

[61]/ Ludvignson et al. (2002) present a detailed description of the debate on this transmission mechanism.

[62]/ Calza et al. (2009) estimate a VAR for 19 developed economies in the 1980–2007 period, with quarterly frequency. The vector of endogenous variables includes private consumption, residential investment, the consumer price index, housing prices, the interbank interest rate, and the real exchange rate.

[63]/ The cut-off criterion is that the debt and LTV ratios are under or over the group median.

This also suggests that the risks associated with significant fluctuations in housing prices and their macroeconomic effects should be lower in Chile than in the case of other economies (table 16). In addition, available estimates show that housing prices have been significantly linked to their macrofinancial fundamentals (box 3), so the probability of an abrupt reversal of housing prices is relatively low.

Table 16

Institutional differences in local mortgage markets

Country	Interest rate (*)	Debt value / Home value	Mortgage debt / GDP
		(Percent)	
Germany	Mostly F and M	70	43
Australia	Mostly V	80	74
Austria	F=75% and V=25%	60	20
Belgium	F=75%, M=19% and V=6%	83	28
Canada	F and M=92%, V=8%	75	43
Chile	F=57%, M=4% and V=39%	63	29
Denmark	F=75%, M=10% and V=15%	80	85
Spain	V≥75%, rest mostly M	70	40
United States	F=85% and M=15%	80	69
Finland	F=2%, V=97% and other=1%	75	27
France	F/M/other=86% and V=14%	75	26
Ireland	V=70% and rest mostly M	70	50
Italy	F=28% and rest mostly M	50	13
Japan	F=36% and M/V=64%	70-80	36
New Zealand	Mostly F	60	80
Norway	Mostly V	70	54
Netherlands	F=74%, M=19% and V=7%	90	68
United Kingdom	M=28% and V=72%	80-90	74
Sweden	F=38%, M=24% and V=38%	80	35
Switzerland	Mostly V	66	116

(*) F = fixed interest rate; M = mixed interest rate; V= variable interest rate.

Sources: HFS (2007), IMF (2008), and Calza et al. (2009).

VI. International initiatives in financial regulation[65]

There is an intense debate at the international level about the lessons and regulatory initiatives that can be derived from the subprime crisis, including initiatives recently promoted by the G20, the IMF, the Basel Committee, and the Financial Stability Board (FSB) (FSB, 2009, and BIS, 2009). Part of this debate centers on measures and recommendations that currently are not directly applicable to Chile, because they address markets and/or business practices that are not relevant given the level of development of the local market—for example, capital requirements for complex derivatives and securitized assets. Nevertheless, this discussion could become more important as these markets are developed and/or commercial practices are adopted following the experience of more advanced economies.

In the case of markets where households obtain financing, the main elements of the international discussion that are relevant for the case of Chile are as follows:[66]

(a) **Scope of supervision**

The importance of institutions with no direct supervision is an issue in the discussion of the origins and consequences of the subprime crisis (Brunermeier, 2009).

To illustrate this point, note that over 50% of the loans classified as subprime in the United States were granted by institutions and agents that were not subject to federal supervision (Paulson, 2008). Consequently, suggestions in this area point to reviewing the advisability of expanding the regulatory coverage and reach over financial entities that, considered individually, could be important from a systemic perspective, or over the aggregate share of financial entities that, although individually small, participate in important financial markets. For example, the proposed reform in the United States seeks to grant the Federal Reserve the authority to regulate and supervise the securitization and derivatives markets (Geithner, 2009).

(b) **Countercyclical tools**

The argument for promoting countercyclical regulatory tools is that financial institutions must strengthen their capital and liquidity indicators during expansive cycles, while in contractionary cycles there should be more flexibility to facilitate financial intermediation in regulated institutions. The underlying argument is that lending incentives get distorted in expansive cycles, which can help foster vulnerabilities. Proposals in this area are being developed by the regulatory authority in the United Kingdom (the Financial Services Authority, or FSA), in conjunction with the country's central bank (FSA, 2009).

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[64] The IDB (2005) shows that not only is mortgage debt as a share of output and total credit low in Chile, but this phenomenon is relatively generalized in Latin America. The factors assessed in this document are the following: (i) household payment capacity; (ii) the ability to use housing as collateral; (iii) risk of interest rate fluctuations; and (iv) risk of maturity mismatch.

[65] This section is based on Aparici and Sepúlveda (2010).

[66] For a more general analysis of the main aspects considered in the current discussion, see Central Bank of Chile (2009b). Other regulatory issues mentioned in that publication include the following: (i) increase in the minimum capital and liquidity levels, (ii) development of the derivatives market, and (iii) restructuring the financial system.

(c) **Consolidated supervision**

In both the United States and Europe, there are proposals to move from a supervisory system with an operational approach to one with a more systemic approach (Geithner, 2009; Council of the European Union, 2009). The operation approach—also known as the silo approach—is the most common system in place today, but it hinders the broader monitoring of interconnections between the institutions that make up a specific financial conglomerate.

The concentration of supervisory functions within a single organization does not guarantee the achievement of a consolidated supervision that completely avoids the occurrence of systemic events. The case of the United Kingdom is illustrative: even though the FSA is responsible for the bulk of supervisory services in that country, it was not able to prevent the need to support important U.K. financial institutions in the recent financial crisis (Bank of England, 2009).

These issues and their applicability to the case of Chile represent an important challenge, insofar as the currently available evidence on the magnitude of the potential benefits, as well as the role of idiosyncratic factors specific to each economy (such as the legal institutions in place in each economy and its market structure), is limited[67]/. Despite these limitations, the study and applied research of these matters is essential in the current context, especially considering that the country is moving toward the adoption of Basel II.

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[67]/ The design and implementation of countercyclical instruments is controversial. For example, in the case of the dynamic provisions applied in Spain, Saporta (2009) argues that the benefits are limited, whereas Saurina (2009) holds that they were useful for mitigating the effects of the financial crisis.

References

Adrian, T., and H. Shin (2008). “Financial Intermediaries, Financial Stability, and Monetary Policy.” Staff Report 346. Federal Reserve Bank of New York.

Alfaro, R., and R. Cifuentes (2009). “Estabilidad financiera, política monetaria y banca central: una introducción.” *Revista de Economía Chilena* 12(2): 5–10.

Alfaro, R., N. Gallardo, and R. Stein (2010). “The Determinants of Personal Debt Default.” Working Paper 574. Central Bank of Chile.

Ameriks, J., and S. Zeldes (2004). “How Do Household Portfolio Shares Vary with Age?” Working Paper. Columbia Business School.

Aparici, G., and F. Sepúlveda (2010). “Mercado de financiamiento a los hogares en el desarrollo de la crisis financiera de 2008/2009.” Mimeo. Central Bank of Chile.

Atkeson, A. (1991). “International Lending with Moral Hazard and Risk of Repudiation.” *Econometrica* 59(4): 1069–89.

Bank of England (2009). *Financial Stability Report*. June 2009.

Baumol, W. (1982). “Contestable Markets: An Uprising in the Theory of Industry Structure.” *American Economic Review* 72(1): 1–15.

Beck, T., B. Büyükkarabacak, F. Rioja, and N. Valev (2009). “Who Gets the Credit? And Does It Matter? Household versus Firm Lending across Countries.” CEPR Discussion Paper 7400. C.E.P.R.

Beck, T., and A. Demirgüç-Kunt (2008). “Access to Finance: An Unfinished Agenda.” *World Bank Economic Review* 22(33): 383–96.

Berger A., L. Klapper and R. Turk-Ariss (2008). “Bank Competition and Financial Stability.” Policy Research Working Paper 4696. World Bank.

Bernanke B. (2008). “Housing, Housing Finance, and Monetary Policy.” Paper presented at the Economic Symposium. Federal Reserve Bank of Kansas City, Jackson Hole, 31 August.

Bernanke, B., and M. Gertler (1995). “Inside the Black Box: The Credit Channel of Monetary Policy Transmission.” Working Paper 5146. National Bureau of Economic Research.

Berstein, S., and R. Fuentes (2004). “Is There Lending Rate Stickiness in the Chilean Banking Industry?” In L. Ahumada and R. Fuentes (eds.), B*anking Market Structure and Monetary Policy*. Central Bank of Chile.

Berstein, S., and R. Fuentes (2005). “Concentration and Price Rigidity: Evidence for the Deposit Market in Chile.” Working Paper 311. Central Bank of Chile.

Bertaut, C., and M. Haliassos (2006). “Credit Cards: Facts and Theories.” Working Paper 2006/19. Center for Financial Studies.

Bikker, J., L. Spierdijk, and P. Finnie (2006). “Misspecification of the Panzar-Rosse Model: Assessing Competition in the Banking Industry.” DNB Working Paper 114. De Nederlandsche Bank.

Bilias, Y., Georgarakos D., and M. Haliassos (2009). “Portfolio Inertia and Stock Market Fluctuations.” CFS Working Paper 2006/14.

BIS (2006). “Studies on Credit Risk Concentration: An Overview of the Issues and a Synopsis of the Results from the Research Task Force Project.” Working Paper 15. Basel Committee on Banking Supervision.

BIS (2009). “Strengthening the Resilience of the Banking Sector.” Consultative Document. Basel Committee on Banking Supervision.

Brunnermeier, M. (2009). “Deciphering the Liquidity and Credit Crunch 2007–2008.” *Journal of Economic Perspectives* 23(1): 77–100.

Buyukkarabacak, B., and N. T. Valev (2010). “The Role of Household and Business Credit in Banking Crises.” *Journal of Banking and Finance* 34: 1247–56.

Calvet, L., J. Campbell, and P. Sodini (2008). “Fight or Flight? Portfolio Rebalancing by Institutional Investors.” NBER Working Paper 14699. National Bureau of Economic Research.

Calvet, L., J. Campbell, and P. Sodini (2009). “Measuring the Financial Sophistication of Households.” Forthcoming in the *Quarterly Journal of Economics*.

Calza, A., T. Monacelli, and L. Stracca (2009). “Housing Finance and Monetary Policy.” Working Paper Series, 1069, European Central Bank.

Calani, M., P. García, and D. Oda (2010). “Estándares crediticios e identificación de oferta y demanda por crédito en Chile.” Working Paper 571. Central Bank of Chile.

Cannari, L., G. D'Alessio, and G. Marchese (2008). "Italian Household Wealth: Background, Main Results, Outlook." In Banca d'Italy (ed). Household Wealth in Italy.

Caputo, R., J. P. Medina, and C. Soto (2010). "Financial Shocks and Optimal Monetary Policy in Small Open Economies." Mimeo. Central Bank of Chile.

Ceccetti, S., P. Disyatat, and M. Kohler (2009). "Integrating Financial Stability: New Models for a New Challenge." Paper presented at the joint BIS-ECB conference on Monetary Policy and Financial Stability. Basel, Switzerland, 10–11 September.

Cecchetti, S. G., and S. Krause (2001). "Financial Structure, Macroeconomic Stability, and Monetary Policy." NBER Working Paper 8354. National Bureau of Economic Research.

Central Bank of Chile (2009a). "Encuesta Financiera de Hogares: metodología y principales resultados EFH 2007." July.

Central Bank of Chile (2009b). *Financial Stability Report*. Second half 2009.

Central Bank of Chile (2009c). *Financial Stability Report*. First half 2009.

Central Bank of Chile (2008). *Financial Stability Report*. Second half 2008.

Central Bank of Chile (2006). *Financial Stability Report*. Second half 2006.

Chakravarty, S., and E. Rhee (1999). "Factors Affecting an Individual's Bankruptcy Filing Decision." Mimeo. Purdue University.

Chatterjee, S., D. Corbae, Nakajima M., and J. Ríos-Rull (2007). "A Quantitative Theory of Unsecured Consumer Credit with Risk of Default." *Econometrica* 75(6): 1525–89.

Choi, J., D. Laibson, Madriana B., and A. Metrick (2004). "For Better or for Worse: Default Effects and 401(k) Savings Behavior." In Wise D. (ed.), Perspectives on the Economics Aging. University of Chicago Press.

Chumacero, R., and P. Langoni (2001). "Risk, Size and Concentration in the Chilean Banking System." *Economía Chilena* 4(1): 25–34.

Cihak, M. (2007). "Introduction to Applied Stress Testing." IMF Working Paper 07/59. International Monetary Fund.

Claessens, S., and L. Laeven (2003). "What Drives Bank Competition? Some International Evidence." *Journal of Money, Credit, and Banking* 36: 564–83.

Council of the European Union (2009). "Council Conclusions on Strengthening EU Financial Stability Arrangements." 2967th Economic and Financial Affairs, Luxemburg, October.

Cox, P., E. Parrado, and J. Ruiz-Tagle (2006). "The Distribution of Assets, Debt and Income Among Chilean Households." Working Paper 388. Central Bank of Chile.

Crook, J., and S. Hochguertel (2007). "US and European Household Debt and Credit Constraints." Discussion Paper 07-087/3. Tinbergen Institute.

Cunningham, T. (2006). "The Predictive Power of the Senior Loan Officer Survey: Do Lending Officers Know Anything Special?." Working Paper 2006-24. Federal Reserve Bank of Atlanta.

Curdia, V., and M. Woodford (2008). "Credit Frictions and Optimal Monetary Policy." Discussion Paper 0809-02. Department of Economics, Columbia University.

Debelle, G. (2004). "Household Debt and the Macroeconomy." *BIS Quarterly Review* 2004 (March): 51-64.

Demsetz, H. (1974). "Where Is the New Industrial State?" *Economic Inquiry* 12(1): 1–12.

Drehmann, M. (2008). "Stress Tests: Objectives, Challenges and Modelling Choices." *Sveriges Riksbank Economic Review* 2: 60–92.

Duca, J. (1995). "Credit Availability, Bank Consumer Lending, and Consumer Durables." Working Paper 95-14. Federal Reserve Bank of Dallas.

Espinosa-Vega, M. A., and A. Rebucci (2003). "Retail Bank Interest Rate Pass-Through: Is Chile Atypical?" Working Paper 221 Central Bank of Chile.

IDB (2005). "Foundations of Housing Finance." In *Unlocking Credit: The Quest for Deep and Stable Bank Lending*. Johns Hopkins University Press.

IMF (2008). "The Changing Housing Cycle and the Implications for Monetary Policy." *World Economic Outlook*. International Monetary Fund.

IMF (2006). "Household Credit Growth in Emerging Market Countries," Chapter II, Global Financial Stability Report, September: 46-73.

FSA (2009). "The Turner Review: A Regulatory Response to the Global Banking Crisis." March.

FSB (2009). "Improving Financial Regulation." Report of the Financial Stability Board to the G20 Leaders.

Fuenzalida, M., and J. Ruiz-Tagle (2009). "Riesgo financiero de los hogares." *Revista de Economía Chilena* 12(2): 35-53.

Geithner, T. (2009). "Financial Regulatory Reform: A New Foundation." U.S. Department of the Treasury.

Grant, C. (2007). "Estimating Credit Constraints among U.S. Households." *Oxford Economic Papers* 59: 583–606.

Gross, D. B., and N.S. Souleless (2002). "Do Liquidity Constraints and Interest Rates Matter for Consumer Behavior? Evidence From Credit Cards Data." *Quarterly Journal of Economics* 117(1): 149–85.

Herrala, R., and K. Kauko (2007). "Household Loan Loss Risk in Finland – Estimations and Simulations with Micro Data." Discussion Paper 5-2007. Bank of Finland.

Ieda, A., K. Marumo, and T. Yoshiba (2007). "A Simplified Method for Calculating the Credit Risk of Lending Portfolios." *Monetary and Economic Studies* 2000 (December): 49–82.

Japelli, T. (1990). "Who Is Credit Constrained in the U.S. Economy?." *Quarterly Journal of Economics* 105(1): 219–34.

Johnson, D. (2005). "Recent Developments in the Credit Card Market and the Financial Obligations Ratio." *Federal Reserve Bulletin* (Fall).

Karasulu, M. (2008). "Stress Testing Household Debt in Korea." IMF Working Paper WP/08/255. International Monetary Fund.

Karasulu, M. (2007). "Competition in the Chilean Banking Sector: A Cross-Country Comparison." *Economía* 7(2): 1–32.

Keese, M. (2009). "Triggers and Determinants of Severe Household Indebtedness in Germany." SOEP Paper on Multidisciplinary Panel Data Research 239. DIW Berlin.

Kehoe, T., and D. Levine (2006). "Bankruptcy and Collateral in Debt Constrained Markets." NBER Working Paper 12656. National Bureau of Economic Research.

Khwaja, A., and A. Mian (2008). "Tracing the Impact of Bank Liquidity Shocks: Evidence from an Emerging Market." *American Economic Review* 98(4): 1413–42.

Kocherlakota, N. (1996). "Implications of Efficient Risk Sharing without Commitment." *Review of Economic Studies* 63(4): 595–609.

Laeven, L., and G. Majnoni (2005). "Does Judicial Efficiency Lower the Cost of Credit?" *Journal of Banking and Finance* 29(7): 1791–812.

Levy Yeyati, E., and A. Micco (2007). "Concentration and Foreign Penetration in Latin American Banking Sectors: Impact on Concentration and Risk." *Journal of Banking and Finance* 31(6): 1633–47.

Ludvigson, S., C. Steindel, and M. Lettau (2002). "Monetary Policy Transmission Through the Consumption-Wealth Channel." *Economic Policy Review* (May): 117–33. Federal Reserve Bank of New York

Ma, G., E. Remolona, and I. Shim (2009). "Introduction." BIS Papers. In Bank for International Settlements (ed.), *Household Debt: Implications for Monetary Policy and Financial Stability*, vol. 46, pp. 1-3.

Matus, J. M., N. Silva, K. Flores, and A. Marinovic (2010). "Una visión global de la deuda financiera de los hogares chilenos en la última década." Estudios Económicos Estadísticos 81. Central Bank of Chile.

Medina, J. P., and C. Soto (2005). "Oil Shocks and Monetary Policy in an Estimated DSGE Model for a Small Open Economy Policy." Working Paper 353. Central Bank of Chile.

Mian, A., and A. Sufi (2009). "Houses Prices, Home Equity-Based Borrowing, and the US Household Leverage Crisis." NBER Working Paper 15283. National Bureau of Economic Research.

Mishkin, F. (1996). "The Channels of Monetary Transmission: Lesson for Monetary Policy." NBER Working Paper, 5464. National Bureau of Economics Research.

Montero, J. P., and J. Tarziján (2010). "El éxito de las casas comerciales en Chile: regulación o buena gestión?" Working Paper 565. Central Bank of Chile.

Neilson, C., D. Contreras, Cooper R., and J. Hermann (2008). "The Dynamics of Poverty in Chile." *Journal of Latin American Studies* 40: 251–73.

Oda, D., and N. Silva (2010). "Competencia y toma de riesgo en el mercado de créditos de consumo bancario chileno (1997–2009)." Working Paper 562. Central Bank of Chile.

Paulson, H. (2008). "Blueprint for a Modernized Financial Regulatory Structure." U.S. Department of the Treasury.

Pepall, L., and D. Richards (2002). "The Simple Economics of Brand Stretching." *Journal of Business* 75(3): 535–52.

Persson, M. (2009). "Household Indebtedness in Sweden and Implications for Financial Stability: The Use of Household-Level Data." In Bank for International Settlements (ed.), *Household Debt: Implications for Monetary Policy and Financial Stability,* vol., 46, pp. 124-135, Bank for International Settlements.

Ruiz-Durán, C. (2004). "Los desbancarizados: el problema de los mercados financieros segmentados." *Comercio Exterior* 54(7).

Ruiz-Tagle, J., and F. Vella (2010). "Borrowing Constraints and Credit Demand." Mimeo. Central Bank of Chile.

Sagner, A. (2010). "Determinantes del precio de la vivienda en Chile." Working Paper 549. Central Bank of Chile.

Samphantharak, K., and R. Townsend (2009). "Household as Corporate Firms: Constructing Financial Statements from Integrated Household Surveys." Working Paper. University of California at San Diego.

Santoso, W., and M. Sukada (2009). "Risk Profile of Households and the Impact of Financial Stability." In Bank for International Settlements (ed.), *Household Debt: Implications for Monetary Policy and Financial Stability,* vol. 46, pp. 46–74, Bank for International Settlements.

Saporta, V. (2009). "The Role of Macroprudential Policy: A Discussion Paper." Bank of England, November.

Saurina, J. (2009). "Dynamic Provisioning: The Experience of Spain." Crisis Response, Public Response for the Private Sector, Note 7. World Bank.

Sepúlveda, F. (2009). "Análisis comparativo internacional de tasas de interés de créditos de consumo." Mimeo, Central Bank of Chile.

Sepúlveda-Umanzor, J., and A. Soto (2009), "Concentration and Competition in the Banking Sector: A Look to Chile." Mimeo. Escuela de Negocios, Universidad del Desarrollo.

Taylor, J. (2008). "Monetary Policy and State of the Economy." Testimony before the Committee on Financial Services, February. U.S. House of Representatives.

Box 1: **Lending standards and the credit cycle in Chile**

The Central Bank of Chile has carried out the Survey of General Conditions and Standards in the Credit Market quarterly since 2003. The main objective of this survey is to collect qualitative information on the lending standards of commercial banks (in terms of maturities, amounts, credit scoring, among other indicators), and it covers all commercial banks operating in the national market.

This type of survey captures additional information on household debt that is not included in the Superintendence of Banks and Financial Institutions (SBIF) loan surveys. For example, it reveals whether loans are contracted, on average, at relatively short maturities, or whether or not this aspect of the debt contract is restrictive for borrowers. This type of information is useful for better understanding households' real access to the financial system.

International evidence suggests that lending standard surveys are useful not only in the ways described in the previous paragraph, but also because they provide information on the credit cycle itself. In particular, and mainly due to the size of the sample, the Senior Loan Office Opinion Survey on Bank Lending Practices implemented in the United States has been analyzed by various authors, with results that support this argument[68]/. For example, Lown and Morgan (2006) show that lending standards lead the credit cycle and innovations in the interest rate[69]/.

In the case of Chile, the length of the available series does not allow a formal analysis of causality between the cycle and lending standards. However, to approximate the dynamics and role of lending standards, correlations were calculated between loan growth and the net restrictions index for different types of lending standards, where an increase in the index is associated with tighter conditions in the banking industry[70]/. Correlations are also presented between loan growth and lags and leads of standards up to two quarters (tables 1.1 and 1.2).

Table 1.1

Correlation between consumer loan standards and consumer loans (2003–2009)

Standard reported in (t+j)	Amount	Maturity	Spread	Credit scoring	Card limit	Card payments	Requirements
j = -2	-0.848**	-0.827**	-0.746**	-0.730**	-0.727**	-0.599**	-0.779**
j = -1	-0.796**	-0.827**	-0.486*	-0.627**	-0.643**	-0.553**	-0.608**
j = 0	-0.590**	-0.593**	-0.210	-0.388*	-0.451*	-0.506**	-0.347
j = 1	-0.521**	-0.421*	-0.118	-0.316	-0.388*	-0.375	-0.284
j = 2	-0.489**	-0.341	-0.083	-0.258	-0.424*	-0.232	-0.229

* Significant at 5%; ** Significant at 1%.

Source: Authors' elaboration, based on the Survey of General Conditions and Standards in the Credit Market and SBIF.

Table 1.2

Correlation between mortgage loan standards and mortgage loans (2003–2009)

Standard reported in t+j	Payment amount	Complementary loan amount	Spread	Credit scoring	Requirements
j = -2	-0.386	-0.250	-0.006	-0.315	-0.340
j = -1	-0.271	-0.030	0.295	-0.106	0.025
j = 0	-0.094	0.228	0.399*	0.167	0.385*
j = 1	0.127	0.416*	0.422*	0.369	0.583**
j = 2	0.276	0.478*	0.308	0.347	0.628**

* Significant at 5%; ** Significant at 1%.

Source: Authors' elaboration, based on the Survey of General Conditions and Standards in the Credit Market and SBIF.

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[68]/ The survey has been applied since 1967, with an interruption between 1984 and 1990. The equivalent survey in the European Union is only available since 2003, and in Japan, since 2000.

[69]/ See also Duca (1995) and Cunningham (2006).

[70]/ The index measures the difference between the share of banks that report that they are more or moderately more restrictive and the share that report that they are less or moderately less restrictive, in each quarter.

The main results are the following:[71]/:

Consumer loans. In general, there is a negative correlation, which implies more restrictive standards in periods of credit contraction. In the case of standards associated with the amount, maturity, and limits on credit cards, the correlation with loan growth is negative and statistically significant, even when two lags and forwards are considered. This suggests that changes in standards lead, and are led by, loan growth. In contrast, standards related to the spread, credit scoring, and requirements tend to display a negative and statistically significant correlation only when the standard lags are considered. Thus, the changes in these standards tend to lead the loan cycle, and not vice versa.

Mortgage loans. The growth of mortgage loans is positively and significantly correlated with two-quarters-forward values of standards on complementary loan amounts, spreads and requirements. These results contrast with those obtained for consumer loans. Periods of contractions in mortgage loans lead the loosening of mortgage lending standards by at least two quarters, with the latter to some degree acting as a countercyclical factor. The international evidence does not analyze mortgage loans separately, so it is not possible to compare this result with other countries.

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[71]/ The results are robust to controls for type of bank (large banks and other banks).

Box 2: **Household credit risk and debt-at-risk**

Alfaro et al. (2010) estimate probit models for the decision to default on mortgage and consumer debt, using the 2007 Household Financial Survey[72]/. Specifically, the authors consider the following default model:

$$(1)\quad PD_i = N(\beta \cdot X + \gamma \cdot RCI_i)$$

where N is the cumulative distribution function of the normal distribution, PD_i is the default probability of household i, X is a vector of explanatory variables, and RCI_i is the financial debt-to-income ratio for household i.

Based on the results from equation (1), it is possible to estimate the default probability for each household, as follows:

$$(2)\quad PD_i^e = N(\hat{\beta} \cdot X_i + \hat{\gamma} \cdot RCI_i)$$

where "^" denotes the estimated coefficient.

To link the default probability with the decision to skip payments, the authors use the results of equation (2) to estimate the threshold probability, which meets the following conditions:

$$(3)\quad \overline{P} = arg\ min\ \Sigma_i (D_i - D^e(\overline{P}))^2$$

$$(4)\quad D_i^e = \begin{cases} 1 \ \ si \ \ PD_i^e \geq \overline{P} \\ 0 \ \ si \ \ PD_i^e < \overline{P} \end{cases}$$

where D_i^e is equal to one if the household defaults and zero otherwise; and D_i^e is the default decision derived from algorithm (4). Thus, the estimated default probabilities that are over the threshold probability ($\overline{P}$) are associated with households that decide to enter into delinquency, with the threshold probability corresponding to that which minimizes the quadratic prediction error in the nonpayment decision.

The implicit default probability in the stress tests of Fuenzalida and Ruiz-Tagle (2009) were estimated as follows:

$$(4)\quad PD_i^{F\&RT} = N(\hat{\beta} \cdot X_i + \hat{\gamma} \cdot 75\% \mid mf < -20\%)$$

where *mf* is the household financial margin, measured as household income net of debt service and total expenses, as a share of income.

$PD_i^{F\&RT}$ corresponds to the default probability estimated with the parameters from Alfaro et al. (2010) and imposing the debt-at-risk criteria from Fuenzalida and Ruiz-Tagle (2009), that is, FIR greater than or equal to 75% and a negative financial margin below –20%.

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[72]/ Consumer debt corresponds to nonmortgage debt.

Box 3: **Housing prices**

In a recent study, Sagner (2010) uses data from the 2007 Household Financial Survey to examine the determinants of housing prices in Chile. An interesting aspect of this work is the use of data on housing prices purchased by households in different years, which allows the author to analyze how macroeconomic factors—such as economic growth and mortgage interest rates— affect the purchase price. It also includes information on housing characteristics (square meters of construction, number of rooms, among others), as well as socioeconomic characteristics of the neighborhood supplied by Mapcity.

The main result of the study is that the evolution of housing prices can be mainly explained by their economic fundamentals. Over 40% of the growth of housing prices is due to macrofinancial determinants, such as income and loan costs, and around 23% to local characteristics (table 3.1).

Finally, Sagner (2010) uses robustness exercises to show that the model and the estimated parameters do not change significantly in the later years of the sample (2000–2007). To illustrate this point, figure 3.1 presents the projected housing price for the last part of the sample period, which closely follows the real price.

Table 3.1

Real estate prices (1990–2007)
(percent)

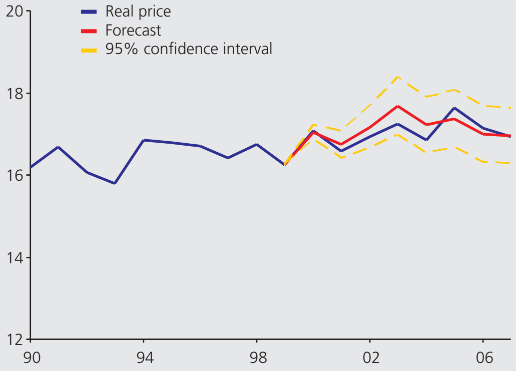
	Change 1990–2007
Data	**74.3**
Estimate	**61.3**
Housing characteristics (1)	-9.4
Distance to public goods (2)	5.4
Characteristics of the neighborhood (3)	22.6
Economic cycle (4)	42.7

(1) Age, square meters of construction, and plot size.
(2) Distance to Metro stations, green spaces, clinics, hospitals, and schools.
(3) Socioeconomic level of the neighborhood, Urban Renewal Subsidy, and fixed effects for the community.
(4) Household income, GDP growth, mortgage interest rate, and IPSA stock index.

Source: Sagner (2010).

Figure 3.1

In-sample forecast of housing prices
(logarithm)



Source: Sagner (2010).

Box 4: Financial markets and macroeconomic implications: Evidence from a general equilibrium model for Chile

Caputo et al. (2010) use a stochastic general equilibrium model to gauge the macroeconomic role of credit access in Chile. In particular, they consider the effect of different shocks under two alternative scenarios: (i) a scenario with restrictions on access to credit, and (ii) a scenario in which the pass-through of the monetary policy rate to market rates is low.

Restrictions on access to the credit market

The model calibrated by Caputo et al. (2010) considers households with and without access to credit. Following the terminology used in the study, the former are called financially unrestricted agents, and they are able to completely smooth temporary fluctuations in their income, whereas in the case of households with financial restrictions, consumption is determined by current income.

To evaluate the implications of restricting access to credit, the scenario considers that 75% of the agents are financially restricted, while the baseline scenario assumes that 100% of the agents have credit access[73]. In this context, the exercise simulates an unexpected increase of 100 basis points in the market interest rate—for example, associated with an increase in risk premiums—holding the monetary policy rate constant. Hence, this is a rate spread shock. The shock has adverse effects on consumption and GDP (table 4.1), but these effects are attenuated insofar as there are more financially restricted households. This result is consistent with the fact that for a large share of households (75%), the consumption pattern is not directly linked to interest rate fluctuations.

If the shock is real (a 4% drop in the growth rate of relevant external GDP), then income and consumption would fluctuate more under the scenario with restrictions (table 4.2). Thus, in contrast to the previous case, in the face of a real shock, the macroeconomic variables fluctuate more under a scenario with financially restricted agents. This may reflect the lower capacity of households to smooth their consumption pattern.

Table 4.1

Response of macroeconomic variables to a financial shock
(percent deviation from the stationary state)

	Credit restriction		Baseline scenario	
Variable	**6 periods**	**12 periods**	**6 periods**	**12 periods**
Output	-0.453	-0.207	-0.909	-0.395
Consumption	-0.995	-0.486	-2.028	-0.914
Inflation	0.012	-0.011	0.022	-0.030
Monetary policy rate	-0.023	-0.026	-0.067	-0.065

Source: Caputo et al. (2010).

Table 4.2

Response of macroeconomic variables to a drop in external output
(percent deviation from the stationary state)

	Credit restriction		Baseline scenario	
Variable	**6 periods**	**12 periods**	**6 periods**	**12 periods**
Output	-1.104	-0.578	-0.622	-0.413
Consumption	-0.737	-0.595	0.225	-0.217
Inflation	0.012	-0.015	0.019	-0.007
Monetary policy rate	0.041	-0.022	0.031	-0.008

Source: Caputo et al. (2010).

Financial friction: Lower interest rate pass-through

Caputo et al. (2010) present additional simulations that are similar to those described above, but assume a scenario with financial frictions, in which the pass-through of the monetary policy rate to the market rate occurs more slowly[74]. The authors assume that the market interest rate for consumers is a lineal combination of the market rate in the previous period and the contemporaneous policy rate. In this case, the scenario with higher frictions is associated with a higher degree of persistence in the market rate. The calibration of the rule for market interest rate movement in the baseline scenario is derived from the results of Berstein and Fuentes (2004); it considers a coefficient of persistence of 0.3 or, equivalently, 70% of the changes in the policy rate pass-through to the market rate in the first quarter. The scenario with higher friction in the pass-through considers a persistence coefficient of 0.7 and assumes that 100% of the agents have access to credit.

---

[73] The assumption that 75% of agents are restricted financial is obtained by calibrating the model to replicate some stylized facts characterizing the Chilean economy (Medina and Soto, 2005). This figure differs from that suggested by the 2007 Household Financial Survey, although the two figures are not strictly comparable due to the aggregate nature of the approach used here.

[74] This approach is similar to Curdia and Woodford (2008) and Taylor (2008).

The results differ substantially from the previous exercise (that is, where 75% of the agents were financially restricted). In the case of a 100 basis point financial shock, the scenario with greater persistence (0.70) registers a bigger drop in GDP and consumption (table 4.3). In this case, the increase in the cost of credit (the market interest rate) is more persistent, and output and consumption contract sharply even when there is a more aggressive monetary policy response. This result reflects the fact that the authority is less effective in offsetting the increase in financing costs.

Table 4.3

Response of macroeconomic variables to a financial shock
(percent deviation from the stationary state)

	Credit restriction		**Baseline scenario**	
Variable	**6 periods**	**12 periods**	**6 periods**	**12 periods**
Output	-1.682	-1.238	-0.909	-0.395
Consumption	-3.910	-2.796	-2.028	-0.914
Inflation	0.070	-0.052	0.022	-0.030
Monetary policy rate	-0.070	-0.146	-0.067	-0.065

Source: Caputo et al. (2010).

In the case of the shock associated with the 4% contraction in external output, the results suggest that there are no large differences associated with a change in the persistence of interest rates (table 4.4). With regard to the response of consumption and domestic output, the two cases are practically indistinguishable. This is due to the fact that agents can smooth consumption in both scenarios, albeit at a slightly lower cost in the scenario with more persistent rates.

Table 4.4

Response of macroeconomic variables to a drop in external output
(percent deviation from the stationary state)

	Credit restriction		**Baseline scenario**	
Variable	**6 periods**	**12 periods**	**6 periods**	**12 periods**
Output	-0.208	-0.320	-0.622	-0.413
Consumption	1.107	0.004	0.225	-0.217
Inflation	0.012	0.004	0.019	-0.007
Monetary policy rate	0.073	0.014	0.031	-0.008

Source: Caputo et al. (2010).

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