# Financial Stability Report

SECOND HALF 2005

BANCO CENTRAL
DE CHILE

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[1/] In case of any discrepancy, the Spanish original prevails.

# Contents*/



*/ The statistical closing of the *Report* was on 30 November 2005.

# Foreword

As established in its Basic Constitutional Act, the objectives of the Central Bank of Chile include safeguarding monetary stability and the normal functioning of internal and external payments. These objectives are not fully independent. Monetary stability is one of the basic conditions for the proper functioning of the payment system, which is also related to incentives, regulations, and the infrastructure that support the operation of the financial system. To fulfill its objective in this area, the Bank continuously tracks developments in international capital markets and the domestic financial sector, seeking to identify trends that could, in the short or medium term, have an impact on the financial stability of the economy or the functioning of the payment system.

Financial stability refers to the preservation of the fundamental functions of credit and savings intermediation, the provision of payment services, and risk allocation that are performed by the financial institutions and markets. In this area, the design and implementation of adequate policies for regulation, supervision, and financial transparency play an important role in strengthening the ability of the economy and its financial system to face disturbances of different origins, both internal and external.

The *Financial Stability Report* covers the analysis of developments in the financial and macroeconomic environment both in Chile and abroad that are relevant for the stability of the financial system; trends in the indebtedness and payment capacity of the main credit users in the economy, including households, nonfinancial companies, and the consolidated government sector; an analysis of the financial position of nonbank financial intermediaries, including pension funds, insurance companies, and mutual funds; and the impact of these developments on the banking system and the country's international financial situation.

The *Financial Stability Report* is a semiannual publication based on publicly available information. It analyzes the state of the financial system as a whole, not of individual financial entities. This work is complementary to projects carried out by other supervisory organizations with respect to these entities or to groups of institutions with similar characteristics.

The publication of this *Report* is intended to contribute to the public discussion and analysis of issues that are relevant for the development and stability of the Chilean economy.

**The Board**

# I. Summary

**The economic environment continues to be favorable for financial stability.** The short-term prospects of the Chilean economy are good. Economic activity and employment continue to expand on a path that exceeds the trend. Core inflation and inflationary expectations remain contained. Consumer, corporate and government revenues continue to grow, and interest rates are low, although above mid-year levels. Nonperforming loans have fallen, favoring the financial strength of the banking system. The fiscal surplus is near 4% of GDP, and the external accounts are balanced.

**This positive economic situation bolstered a surge in consumption and investment in 2005.** Interest rates continue to stimulate the expansion of credit. Household debt has continued rising at high rates, which surpass the growth rate of household income. Housing prices have registered a significant increase in the last year. Corporate debt has also risen, but at a more moderate rate that is below the growth of their profits. The public sector, in contrast, has reduced its financial obligations thanks to the high copper price and the application of the fiscal surplus rule. The Chilean economy's foreign indebtedness has remained stable.

**For 2006, a somewhat less favorable environment than in 2005 is expected.** The prices of copper and other export products should decline, and world interest rates and country risk premiums should rise. Domestically, output, employment, and corporate profits are expected to lose some momentum, converging toward trend values. The cost of credit should also continue to rise. Under these circumstances, it is normal that some debtors may face difficulties covering their financial commitments. This pattern should slow or reverse the decline in credit risk indicators that has been observed over the past two years.

**In the current scenario, the main risks for financial stability are largely external.** In the short term, the risks stem from a possible acceleration of international inflation; in the medium term, from the possibility of a disruptive correction in the global current account imbalances. An increase in the inflationary trend in developed economies could bring a large and widespread increase in interest rates and a slowdown of the world economy, especially if housing prices in developed economies show a major downward correction. At the same time, a reduction in the demand for assets in dollars —given that the United States absorbs more than 70% of net international savings to finance its current account deficit— could result in a significant depreciation of this currency, higher interest rates, and probably increased financial volatility and higher risk premiums. Moreover, without a compensatory increase in spending in Europe or

Asia, the world economy could experience a slowdown. In the face of this type of scenario, the emerging economies —including Chile— would lose their momentum, the prices of their exports would drop, their cost of external financing would rise, and their currencies would tend to depreciate. Most emerging countries are currently in a better position than in the past to face this type of scenario, but their situation would surely deteriorate.

**The domestic financial system's ability to face these risks continued to expand in the last six months.** Monetary policy and the exchange rate remain sufficiently flexible to adjust to changes in the environment. The financial mismatches of national firms are within reasonable limits, and their operating flows comfortably exceed their financial expenses. They thus have room for maneuver with which to sustain a deceleration of sales or an increase in financial volatility. Banks' exposure to market risk is low, and the sum of their equity, profits, and provisions is adequate for facing the historical risks of their credit portfolio.

**The financial system's vulnerability to shocks in the international financial markets continues to be limited.** The Chilean economy maintains a favorable country risk rating. The need for immediate net international financing is null, or moderate when normalized by the terms of trade. The public sector and the banks obtain a minor share of their financing in international markets, because a high percentage of the external debt corresponds to nonfinancial companies. In addition, the country enjoys an adequate international liquidity position relative to its short-term external financial commitments. The Central Bank has international reserves that alone surpass total short-term external obligations. Both the Central Bank and the government have fluid access to external financing should they need it, and the banks, pension funds, and other institutional investors hold significant liquid investments abroad.

**However, some areas of the financial system require special attention.** These include the increase in consumer debt and the growing importance of mutual funds in the intermediation of liquidity and financial risk in the domestic capital market. Consumers' greater accumulated debt and their increased sensitivity to interest rates could accentuate the historical fragility of consumer portfolios. The banking system's exposure to household credit risk continues to be relatively minor, but this development should continue to be evaluated. At the same time, the greater volatility of the mutual funds' financing structure tends to accentuate the volatility of liquidity and prices in local debt and equity markets, as has occurred in recent weeks. This is also a development that should continue to be monitored.

**Over the course of the past year, various initiatives were implemented to strengthen financial infrastructure and regulation.** In the area of payments, highlights include the creation of the new clearing house for interbank payments, the interconnection of the payment systems with the securities depository, and, more recently, the project to improve regulations on the issuing and operation of nonbank credit cards. These initiatives will improve the security and efficiency standards of internal payments. With regard to market risk, a key initiative is the modernization of banking regulations on market risk, valuation of financial instruments, and transactions involving options and other derivatives. The banking system continues to advance toward implementing the Basel II capital adequacy

framework. In light of the previous analysis, it is considered important to give priority to initiatives aimed at improving the coverage and quality of financial information on consumers and smaller firms, as well as initiatives oriented at perfecting markets for hedging financial risk, especially interest rate risk.

**In sum, the prospects for maintaining the financial stability of the Chilean economy are favorable.** Nevertheless, excessive confidence in the continuity of this scenario could prove dangerous. In the past, the domestic expenditure and indebtedness of the Chilean economy grew disproportionately during the world economy's expansionary stages, only to contract violently in the deceleration phases. This pattern had negative consequences for the macroeconomic and financial stability of the Chilean economy. The response of demand and debt has thus far been moderate and coherent with the transitory nature of prevailing international conditions. This is the expected result of the current macroeconomic policy scheme. In complementary fashion, consumers, firms, and financial intermediaries must take into account in their decisions the possibility of scenarios that are less favorable than the current one. Moreover, it is necessary to continue examining the evolution of the risks identified in this *Report* or others that may appear in the future.

# II. Macroeconomic and financial environment

*This chapter reviews the external conditions facing the Chilean economy, as well as the main internal macroeconomic and financial developments. This environment has a significant influence on the behavior of economic agents and can affect their liquidity and solvency positions. It is therefore fundamental for the analysis of the economy's financial stability.*

## II.1 International scenario

The international environment continues to be positive for the Chilean economy. The combination of high commodities prices, a high growth rate for the world economy, low world interest rates, and compressed country risk premiums have contributed to shaping a favorable scenario for growth and financial stability. The environment is expected to remain favorable, despite an anticipated normalization of commodities' prices and of the cost of external financing.

Nonetheless, relevant risks persist in the international scenario, although they are more moderate today than they were a few months ago. These include, in the short term, the threat of acceleration of global inflation, and, in the medium term, the possibility of a disorderly correction of the global imbalance between savings and investment. Such events could cause sudden and significant increases in the international interest rates, intensify volatility in exchange and financial markets, cause an abrupt fall in international commodities' prices, and, perhaps, a slowdown of world growth.

### II.1.1 Recent developments

***The world economy continues to grow dynamically***

World growth continues to be led by the United States and China, although Japan has also increased its contribution, stimulated by the recovery of domestic demand. Europe, in turn, recently began to post more dynamic growth indicators. The growth prospects of the emerging economies are positive, supported by the greater world expansion and the high price of commodities. In global terms, world growth, weighted by purchasing power parity, is expected to be slightly above 4% in 2005 and 2006, which is higher than the historical average of the last decade and similar to expectations six months ago (table II.1).

***Demand for commodities, especially from China, is expanding faster than supply, triggering significant price increases***

**Table II.1**

World growth

(twelve-month variation, percent)

| | Average | | 2005 (f) | 2006 (f) |
|---|---|---|---|---|
| | 1990-1999 | 2004 (e) | Current FSR | Current FSR |
| U.S. | 3.1 | 4.2 | 3.6 | 3.3 |
| Euro area | 2.1 | 1.8 | 1.0 | 1.7 |
| Japan | 1.7 | 2.7 | 1.8 | 1.8 |
| Rest of Asia (1) | 7.9 | 8.2 | 7.4 | 7.2 |
| China | 9.7 | 9.5 | 9.0 | 8.3 |
| Latin America (2) | 2.8 | 5.8 | 3.7 | 3.2 |
| World at PPP (3) | 3.2 | 5.1 | 4.1 | 4.1 |
| World at market exchange rate (4) | 2.4 | 4.0 | 2.7 | 2.9 |

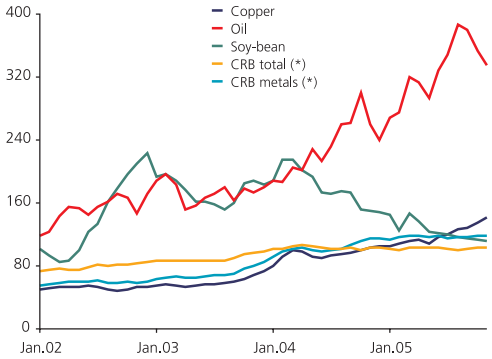
(1) China, South Korea, Hong Kong, Indonesia, the Philippines, Malaysia, Singapore, Thailand, and Taiwan.
(2) Argentina, Bolivia, Brazil, Colombia, Ecuador, Mexico, Paraguay, Peru, Uruguay and Venezuela.
(3) Regional growth weighted by the share in world GDP at PPP. The countries considered represented 87% of world GDP in 2004.
(4) Weighted world growth at market exchange rate (average for 2003–2004), considering the same sample of countries listed in note (3).
(e) Estimate.
(f) Projection.

Sources:
International Monetary Fund.
Central Bank of Chile.

**Figure II.1**

Commodity prices

(index: January 2002=100)



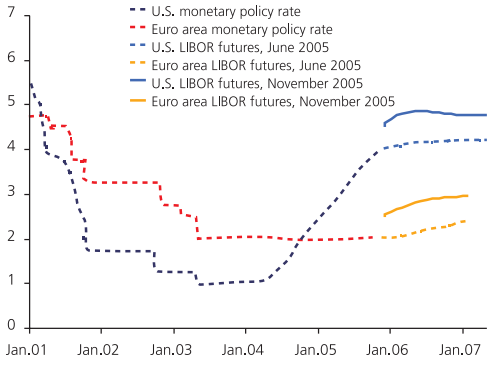

(*) CRB: Commodity Research Bureau.

Source: Bloomberg.

**Figure II.2**

Monetary policy rates and three-month LIBOR futures for the United States and the euro area

(percent)




Source: Bloomberg.

Commodities' prices have remained high. Key points include the buoyant demand from China and India and negative factors in the supply of some goods (figure II.1), as well as the greater participation of institutional investors and hedge funds, which have accumulated speculative positions in commodities markets. These factors have been relevant for the price trends of both energy and metals, which have prolonged their expansionary cycle beyond expectations. Agricultural prices have remained stable. In the medium term, however, prices are expected to normalize as supply responds to the price increases.

### *Short-term international interest rates continue to rise, although at different rates depending on the currency*

Over the last five quarters, the Federal Reserve has gradually eased off on its monetary policy, as the expansion of the U.S. economy has consolidated. A similar situation has occurred in other developed economies, such as Canada, New Zealand, and, to a lesser extent, Australia. The European Central Bank, in contrast, recently introduced the first increase in its policy rate after more than two years of holding it stable. The markets anticipate that the European normalization process will not be as sharp as that of the United States. Finally, Japan is not expected to make any material adjustments in the orientation of its monetary policy, at least in the short term (figure II.2).

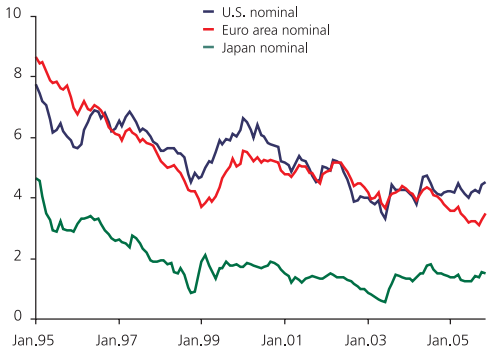
### *The markets anticipate that short-term rates will continue to increase in the coming quarters, a process that could be intensified by an increase in inflationary risk*

The federal funds rate is expected to be around 4.75% toward the end of 2006, with the short-term rate in the euro area around 2.75%. The

**Figure II.3**

Ten-year government bond yields in developed economies

(percent)

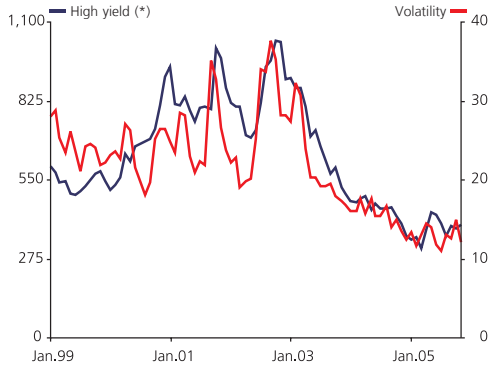



Source: Bloomberg.

**Figure II.4**

Corporate risk premiums and options' implicit risk

(basis points, percent)



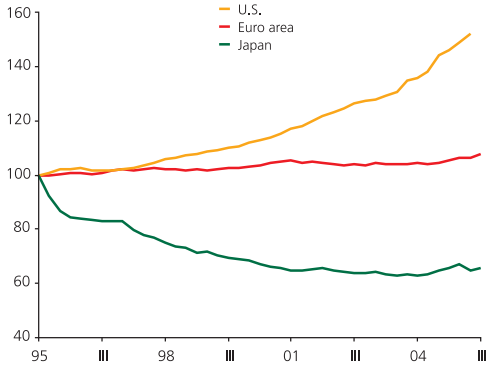

(*) Corporate bond risk premium in developed markets with a risk rating below investment grade (CCC to BB), according to S&P.

Sources:
Bloomberg.
JP Morgan Chase.

**Figure II.5**

Real price of housing in developed economies

(index: first quarter 1995 =100)




Source: Bloomberg.

prospects for a monetary policy correction have risen in recent months, following the generalized increase in total inflation stemming from the higher prices of fuels and other commodities. The markets fear that the combination of supply shocks and reduced excess capacity will ultimately affect the inflationary trend and speed up or intensify monetary policy adjustments. To date, however, core inflation measures and medium-term inflationary expectations are still anchored in most of the industrialized economies, which mitigates the risk of sudden interest rate hikes.

### *Long-term international interest rates have increased moderately, but they remain below their historical averages*

The long-term interest rates of the main industrialized economies, which had been below their historical averages, have started to show moderate increases in recent months (figure II.3). The main adjustments have occurred in the United States, while in the euro area and Japan they remain more stable. In real terms, the interest rates are below 2% per annum in the majority of industrialized economies, which is below the expected growth of the world economy. Their recent evolution has been attributed to the increase in the net propensity to save in emerging economies, particularly the Asian and oil-exporting countries; to the slow demand from Europe and Japan; and to the lower inflation risk premiums thanks to enhanced credibility of monetary policies. In the future, a moderate and gradual normalization of long-term interest rates is expected, as long as there is no sudden increase in inflationary expectations or a change in investor preferences with regard to the dollar.

### *The dollar is strengthening in international markets, but the risk of weakening persists in the medium term*

The dollar has exhibited an appreciating trend in international markets, thereby partially reversing the depreciation accrued through June 2005[1]/. This trend holds with respect to the currencies of both developed and emerging economies, with the exception of currencies corresponding to exporters of commodities. This recent trajectory reflects the evolution of short-term interest rates, which has favored yields on dollar investments relative to other currencies, and the growth of the United States in excess of that of other industrialized countries. Nonetheless, depreciating forces will continue to act on the dollar in the medium term, given the need to correct the massive current account deficit of the U.S. economy. The risk of a more sudden depreciation also still exists, owing to the possibility that international investors become less willing to continue building up dollar assets at the current high rate.

### *Credit risk premiums remain low in developed economies, and resources administered by the hedge funds increase*

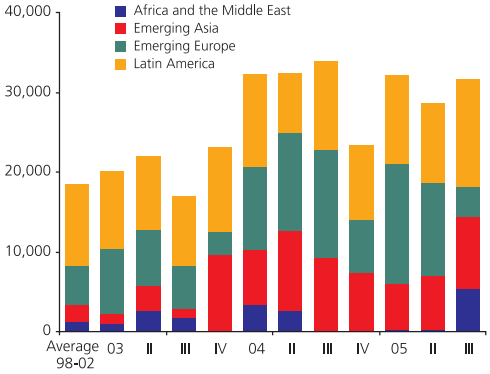
The abundant liquidity in international financial markets and the reduction of absolute returns have continued to motivate a search for yield through a variety of asset classes and investment vehicles. This process, combined

[1]/ However, it remains depreciated by around 18% in real multilateral terms, relative to the levels of the first quarter of 2002.

**Figure II.6**

Bond issues in emerging economies

(US$ million)

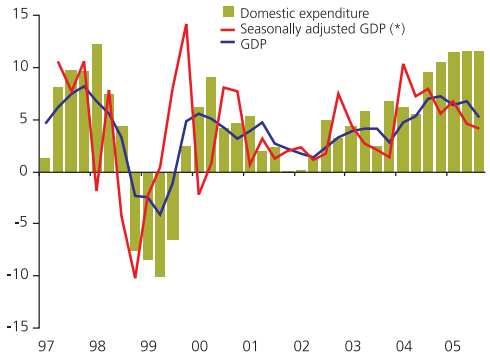



Source: JP Morgan Chase.

**Figure II.7**

Growth in GDP and in domestic expenditure

(real annual change, percent)



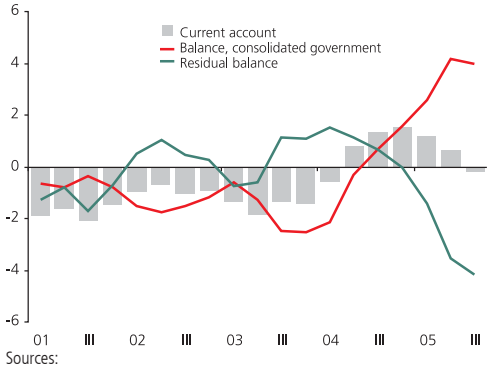

(*) Annualized quarterly change.

Source: Central Bank of Chile.

**Figure II.8**

Current account and balance of the consolidated government

(moving year, percent of GDP)




Sources:
Ministry of Finance and Central Bank of Chile.

with the favorable growth environment, has resulted in lower corporate risk premiums. Investors have tended to invest in securities backed by corporate bonds, using low-cost debt, as well as in credit default swaps and credit insurance. In the past few months, however, a slight correction has occurred in the premiums on relatively riskier bonds, due to the increase in long-term interest rates (figure II.4).

***Real estate prices in the United States and other industrialized economies are increasing at a more moderate pace, but the risk of a significant correction is still present***

Housing prices continue to increase in some regions of the United States, buoyed by favorable liquidity conditions and the emergence of new alternatives in mortgage financing (figure II.5). However, the expected trajectory of interest rates could cause this process to stop or even be reversed, as has occurred in other developed economies (e.g. the United Kingdom and New Zealand)[2]/. A sharper correction of housing prices could hurt consumer confidence, consumption, investment, and growth in the United States and, ultimately, in the world.

***The fundamentals of emerging economies show sustained improvements, while the institutional funds increase their investments in debt instruments***

Most emerging countries are benefiting from the favorable international environment. In the last two years, a generalized improvement has been seen in the fiscal accounts, together with a reduction in public debt ratios and improvements in their composition, especially through the reduction of the proportion of short-term maturities in foreign currency. Other observed trends include a generalized reduction in external savings requirements and greater availability of liquidity and international reserves. The rating agencies have ratified these advances by granting better country risk ratings to these economies, and the markets have rewarded their performance with lower credit risk premiums and higher prices for local assets. This has continued to stimulate the active issuing of sovereign and corporate bonds, especially in Brazil and Mexico in Latin America (figure II.6).

Emerging premiums are expected to rise in step with international rates. However, the better financial situation of emerging economies will probably help to moderate the impact on the cost and availability of international liquidity, although this risk is still present.

## II.2 The domestic scenario and financial markets

### II.2.1 The domestic scenario

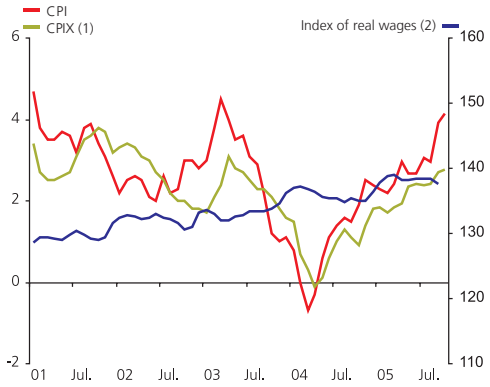
Economic activity continues growing above potential, although at more moderate rates than in past quarters. The main contribution comes from domestic demand (figure II.7). Consumer expenditures are growing rapidly, despite the negative effect of higher fuel prices on consumer's real income.

[2]/ The effects could be amplified by the increasing use of variable-rate financing and the shorter horizon of investments, given that the majority of cases involve the purchase of a second home.

**Figure II.9**

Inflation and real wages

(annual change, percent)



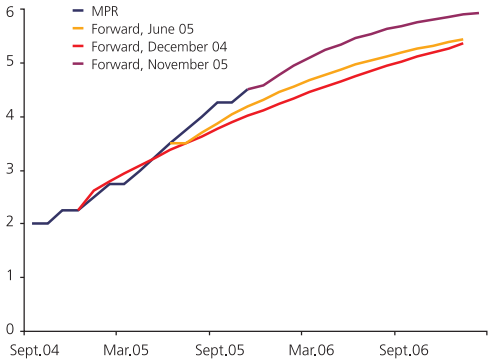

(1) Core inflation: CPI minus fuels, perishables, regulated tariffs, indexed prices, and financial services, leaving 70% of the total basket.
(2) Base: April 1993=100.

Sources:
INE and Central Bank of Chile.

**Figure II.10**

Monetary policy rate and the forward curves

(percent)

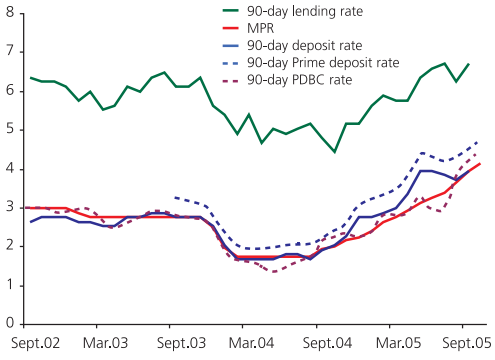



Source: Central Bank of Chile.

**Figure II.11**

Short-term interest rates

(annualized nominal rates, monthly averages)




Source: Central Bank of Chile.

This evolution is backed by the increase in employment (especially waged), real remunerations, and the greater availability of credit. Gross capital formation continues to post a sustained expansion in its equipment and construction components, driven by the interest rate level and the gradual drawdown of excess installed capacity. Exports, in turn, are clearly slowing, but this is mainly tied to copper shipments. Agricultural and industrial exports continue to grow at significant rates, driven by the favorable world growth environment and the generally good export price levels.

In sum, the current cyclical trends do not differ markedly from what was seen six months ago. This, however, carries with it an expansion of domestic demand that is greater than the growth of activity, which can already be seen in the gradual reversal of important positive current account balances registered in recent years. The current account balance for the rolling year ending in September was –0.2% of GDP. This aggregate figure, however, is made up of heterogeneous behaviors in the savings-investment balance of the public and private sectors. While the public sector has accumulated a higher-than-expected surplus this year owing to the application of the structural surplus rule, the private sector posted a deficit equivalent to over four percentage points of GDP (figure II.8).

The increase in fuel prices has had significant effects on the annual inflation of the consumer price index (CPI) —which was more than 4% in October— and it will probably continue to do so through part of the first half of 2006. The response of the core inflationary trend has been slight, however, and is in line with (or even below) the projections in last September's *Monetary Policy Report*, despite the higher oil prices. The recovery of real wages has been relatively moderate in this phase of the cycle. Private inflation expectations remain anchored to the target (figure II.9).

## II.2.2 Financial markets

The performance of the main financial markets continues to be marked by the low interest rates prevailing since the third quarter of 2003, although these have recorded an important rise since last September.

***The normalization of the monetary policy rate, which was initiated in September 2004, continues, and short-term bank rates have followed***

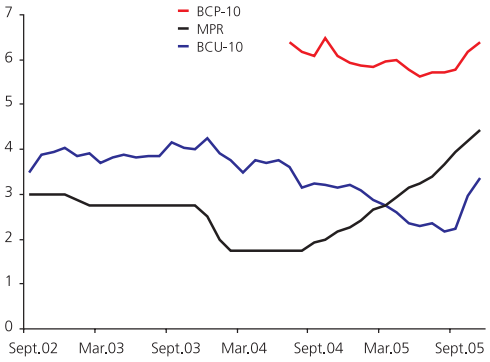
The normalization of the monetary policy (MPR) rate has continued in the recent period. After five rises of 25 basis points each, the MPR sat at 4.5% in November, thus accruing a total increase of 125 basis points since mid-year (figure II.10). In recent months, market expectations with regard to future increases in this rate have strengthened. Short-term bank rates have followed the evolution of the MPR, with minor differences between deposit and interbank rates (figure II.11).

***While long-term rates remain at record lows, the recent trend is to rise, mainly as a result of increases in international rates***

Long-term interest rates began to recover in September, after several months of being stable or even falling slightly, which offset the increase in domestic short-term rates. Interest rates on two-year peso bonds (BCP-2), five-year peso bonds (BCP-5), and ten-year peso bonds (BCP-10) increased around 240, 120, and 25 basis points, respectively, between September 2004 and

**Figure II.12**

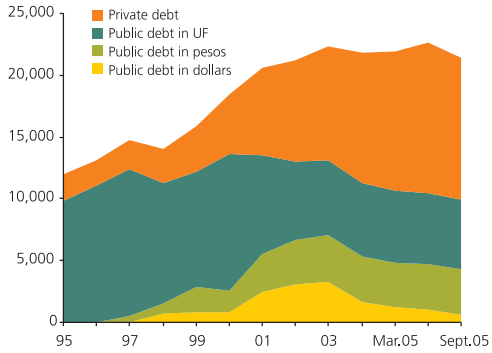
Central Bank of Chile interest rates
(monthly averages, percent)




Source: Central Bank of Chile.

**Figure II.13**

Total stock of bonds (*)
(billions of pesos of September 2005)

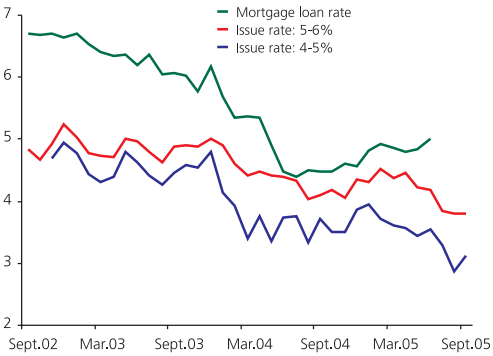



(*) Includes bank, corporate, infrastructure concessionaires, Central Bank, and Treasury notes.

Source: Central Bank of Chile.

**Figure II.14**

Mortgage bill and endorsable mortgage loan rates (*)
(percent)




(*) Market rate for mortgage bills with a duration of 5 to 6 years and an AA rating.

Source: Central Bank of Chile.

the end of November 2005. Long-term indexed bond rates, which had maintained a downward trend since late 2003, began to rise in September 2005. Five-year UF-denominated bonds (BCU-5) have risen by around 130 basis points since September 2004; they accumulated rise of about 175 basis points between August and November 2005 alone. While ten-year UF-denominated bond rates (BCU-10) registered a similar rise in this period, they are still below the level observed in September 2004 (figure II.12).

Long-term rates have been in line with the recent behavior of international interest rates. Changes in market expectations with regard to the increase in the MPR and the evolution of inflation in Chile are additional factors. However, the correction of local currency interest rates, especially UF rates, has been sharper than movements at the international level, especially in the month of October. This situation is related to mutual funds' portfolio adjustments and redemptions, which appear to have accentuated market movements.

Other factors specific to the Chilean bond market could also be influencing long-term rates, but their importance appears to be minor in quantitative terms. In September, the Treasury started issuing bonds in the local market again, reflecting the positive financial conditions.

### *Corporate bond issues continue, offsetting the fall in state instruments and mortgage bills*

Corporate bond issues have continued to grow and have offset the lower sales of state and mortgage bills (figure II.3). The lower placement of government and Central Bank bonds in 2004 and 2005 was the financial counterpart to the fiscal surplus and its application to prepayments on foreign and domestic debt. The reduction in mortgage placements stems from the refinancing of mortgage loans and the development of new products in this area.

Mortgage loan rates continued to fall in the second half of the year, with the exception of the prepayment option component (figure II.14). Corporate bond rates, in turn, have closely followed the evolution of long-term Central Bank bond rates, posting a notable recovery in September and then falling for the rest of the year (figure II.15).

### *As in other emerging economies, the local stock exchange registered positive returns during the year*

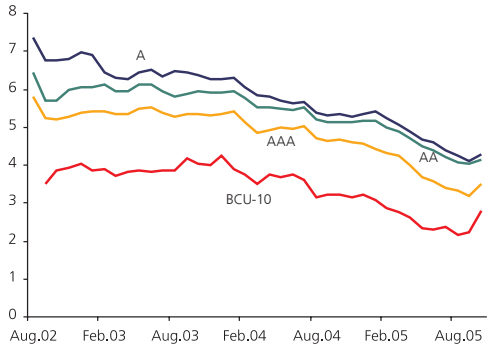
Stock market indicators have continued to show good performance, accruing a nominal peso yield of 13% at November. However, the rising trend broke in September, and share volatility then increased slightly.

The performance of the selective stock price index (IPSA) has been similar to that of indexes in other emerging countries, such as Brazil and Mexico, although at a lower pace. This is consistent with the increased flow of capital toward emerging economies registered since long-term rates began to fall. As of November, the IPSA yield in dollars reached around 21%, outperforming developed country indexes (Dow Jones, Nasdaq, and FTSE, among others), but below yields in other Latin American economies, such as Argentina, Brazil, and Mexico (figure II.16).

**Figure II.15**

Corporate bond rates

(percent)

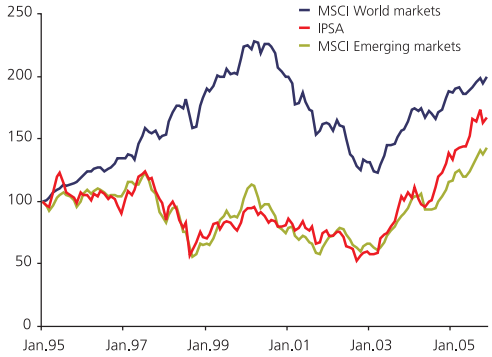



Sources:
LVA indices.
Central Bank of Chile.

**Figure II.16**

International stock market indices

(indices in dollars, January 2003=100)

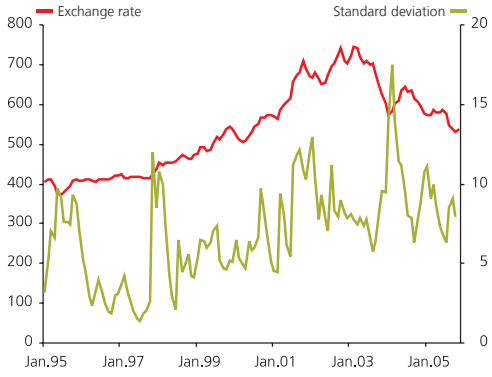



Source: Bloomberg.

**Figure II.17**

Nominal exchange rate

(pesos/US$, percent)




Source: Central Bank of Chile.

### *The exchange market continues to be volatile*

The Chilean peso has appreciated since the last *Report* of June 2005. The exchange rate averaged $524 to the dollar in the last week of November, which implies a nominal appreciation of the peso of 6% since the beginning of the year.

From a longer perspective (for example, since 2002), the appreciation of the peso partly reflects the depreciation of the dollar in international markets. In recent months, its evolution has been influenced by the Chilean economy's better terms of trade, particularly the higher price of copper. It can be expected, however, that a good part of the increase in the terms of trade will not be permanent and that the different agents take this into consideration in their consumption and investment plans, as, in fact, the public sector does with its structural surplus rule.

The financial factors that have contributed to a lower exchange rate include an adjustment of the nominal exchange rate toward a level more in line with the economy's fundamentals, after its previous evolution was partially influenced by exchange arbitrage between the Chilean peso and the Brazilian real. These hedging operations with other currencies, carried out by foreign operators aiming to take advantage of inflation differentials between the currencies, have had repercussions on the exchange rate and explain, for example, the depreciation of the peso relative to the dollar in the first half of the year. However, there have not been any apparent changes in the interest rate differentials between Chile and the United States that could explain the exchange rate movements.

Although the volatility of the peso relative to the dollar has tended to increase since the last *Report*, with an annual average of 8.5%, it continues to be lower than in 2004 (10.6%). In the first half of the year, the trend was similar to that exhibited by other currencies. This changed, however, starting in the last quarter of the year: the volatility of the peso accumulated a drop of 3.5 percentage points through November, whereas the volatility of the euro, the Argentine peso, and the real increased by 0.3, 0.5, and 2.8 percentage points, respectively (see figure II.17).

## II.3 Risk assessment

### *There is heightened concern for a gradual acceleration of inflation in developed countries*

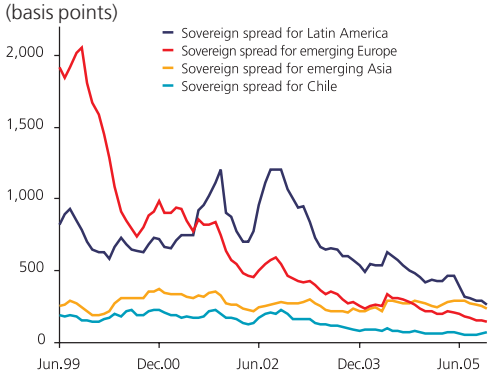
Although core inflation measures remain contained, the markets have not discarded the possibility of a greater transfer of the increases in fuel and other commodities prices to the inflationary trend. This obligates the developed economies' central banks to implement a faster and stronger monetary policy adjustment path. Higher short- and long-term interest rates could imply important adjustments in housing prices in the developed economies, particularly in some regions of the United States; this could slow consumption and growth in the world economy and reduce the prices of commodities.

In this scenario, the cost of financing for emerging economies would increase faster and more sharply, especially in more indebted countries and with lower risk rating. However, as indicated earlier, the application

**Figure II.18**

Financing conditions for sovereign bonds from emerging economies

(basis points)

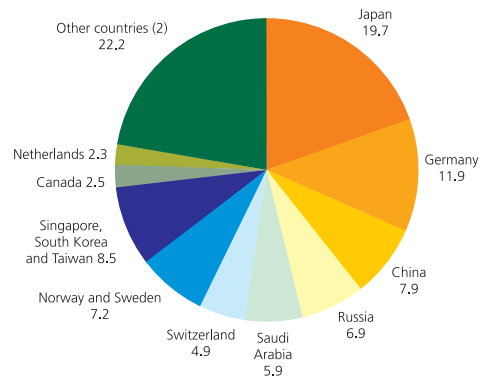



Source: Bloomberg.

**Figure II.19**

Net exporters of capital in 2004 (1)

(percent)



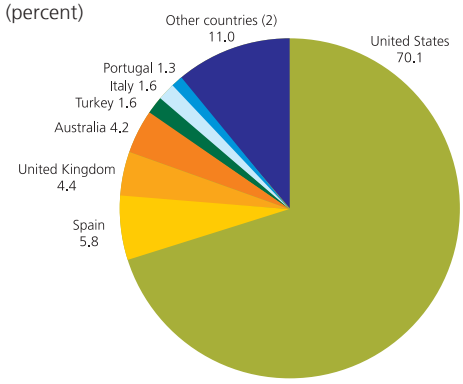

(1) Measured by country's current account surplus.
(2) Includes all countries with shares in the total surplus of less than 2.1%.

Source: *Global Financial Stability Report*, September 2005, IMF.

**Figure II.20**

Net importers of capital in 2004 (1)

(percent)




(1) Measured by country's current account deficit.
(2) Includes all countries with shares in the total deficit of less than 1.3%.

Source: *Global Financial Stability Report*, September 2005, IMF.

of prudent fiscal policies, more flexible exchange rate systems, and better terms of trade have tended to reduce the vulnerability of most of these economies to this type of external shock (figure II.18).

There is always the latent possibility that certain isolated credit events could cause changes in agents' willingness to invest in instruments in emerging economies. The credit premiums in these economies have been maintained at record low levels, so this sort of correction could lead to more pronounced increases in the premiums and reduced availability of international liquidity. However, this risk appears less probable at the present time.

***The risk of a disorderly, unsynchronized adjustment of global imbalances persists, but the probability appears to be lower than it was a few months ago***

International investors and some central banks have continued to accumulate dollar assets to finance the enormous current account deficit of the United States (figures II.19 and II.20). This accumulation increases their risk exposure in that currency, and progressively reduces their willingness to continue investing in it. Maintaining the current situation for a prolonged period could increase the risk of a sudden depreciation of the dollar, which would raise inflation and interest rates in the United States and lead to a generalized correction in asset prices, including financial and housing assets. A contraction of expenditures in the United States without a compensating increase in demand in the rest of the world could lead to a deceleration of world growth and a substantial reduction in commodities' prices. In this scenario, the probability could increase for a widespread contraction of credit to emerging economies, a significant increase in its cost, and economic slowdown.

***The most relevant domestic risks are related to the impact of oil prices on economic activity and inflation and to the pace of the normalization of the terms of trade***

The baseline scenario in this *Report* considers that the normalization of monetary policy will continue for several quarters, in a context in which inflation returns to the target range toward the middle of 2006 and consumption and investment do not accelerate further. The growth of activity would thus gradually be reduced from the figures of recent months toward a rate closer to 5%.

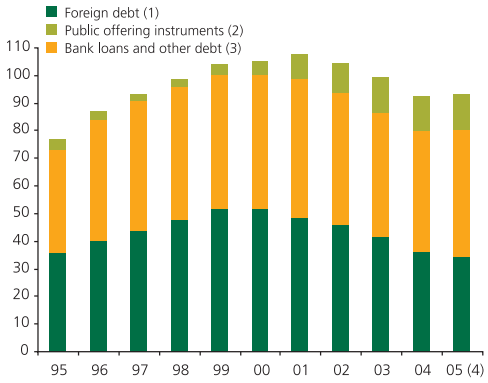
A number of events could alter this panorama, with potential macrofinancial implications. First, the high oil prices could induce stronger contractionary effects, which could be combined with a stronger direct inflationary impact; this is similar to the projections for the world economy. Second, a sharp normalization of export prices (especially copper) that happens faster than predicted could induce a significant drop in public savings, even in the presence of the current structural surplus rule. This would place a degree of pressure on the external accounts and provoke an adjustment in private spending, especially if the normalization of global financial conditions is stepped up and the evolution of domestic demand does not follow its expected gradual moderation. This scenario would also imply a higher exchange rate. Third, the continuation of the strong expansion of economic activity and expenditure of recent years, if external conditions allow it, cannot be ruled out.

# III. Macroprudential analysis

**Figure III.1**

Total debt

(percent of GDP)



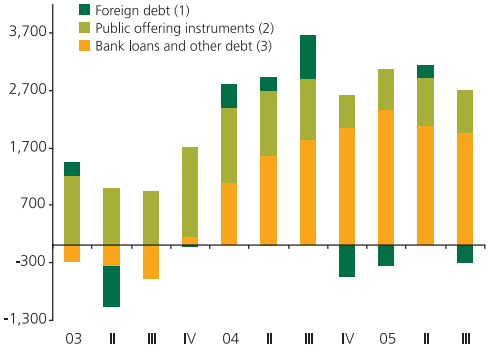

(1) Converted to pesos, using the average exchange rate for the period 2003–2005.
(2) Includes corporate bonds (except Codelco), securitized bonds with nonbank underlying assets, and commercial papers.
(3) Considers commercial loans, foreign trade, leasing, and factoring.
(4) Preliminary figures as of October.

Source: Own calculations, based on data published by SVS, SBIF, and ACHEF.

**Figure III.2**

Financing sources

(annual flows, billions of pesos of September 2005)




(1) Converted to pesos, using the average exchange rate for the period 2003–2005.
(2) Includes corporate bonds (except Codelco), securitized bonds with nonbank underlying assets, and commercial papers.
(3) Considers commercial loans, foreign trade, leasing, and factoring.
(4) Preliminary figures as of October.

Source: Own calculations, based on data published by SVS, SBIF, and ACHEF.

## III.1 Firms

*This chapter reviews the financial situation of nonfinancial firms, with a special emphasis on indicators of solvency, indebtedness, and payment capacity. Nonfinancial firms capture nearly two-thirds of local bank credit, 25% of the funds generated by the nonbank financial system, and around 75% of the economy's foreign debt.*

In the last two years, nonfinancial firms have strengthened their ability to absorb adverse macroeconomic shocks. The higher growth of both the world and the domestic economy has been reflected in higher profits and greater financing with own resources. The reduction of long-term market rates has driven the recomposition of their liabilities toward debt at lower, fixed rates. As a result, the total debt of firms has grown at moderate rates that are below nominal output. The leverage of registered firms[1]/ has remained stable, and their interest coverage ratio has continued to improve. These trends have held steady over the past few months, although there are signs of moderation.

### III.1.1 Sources of financing

In October 2005, corporate debt financing reached $57,418 billion. After a sustained recovery since mid-2003, total debt of this sector experienced moderate, stable growth: the real annual rate for the last twelve months was around 5%, which is lower than the growth of output. Total corporate debt amounted to 93% of GDP in October (figure III.1)[2]/.

***Instruments continue to be issued on the securities market, but bank loans still represent the largest share of corporate debt***

Financing through the securities market has continued to increase steadily. The growth rate is above the average for total corporate debt, with twelve-month constant real rates above 10% in the last year (figure III.2). Notable developments include the growth of corporate bonds beginning in the second quarter of 2005, despite the lower issue of bonds by infrastructure concessionaires (figure III.3). As of October, total bonds issued by firms reached $1,372 billion, which is higher than the level of October 2003 and 2004. Total volume issued this year is expected to

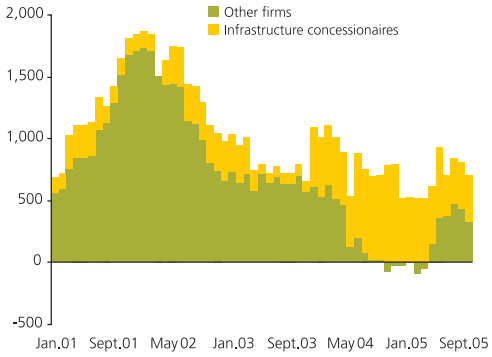
[1]/ Corporations listed in the Securities Registry maintained by the Superintendency of Securities and Insurance (SVS).

[2]/ Preliminary figures.

**Figure III.3**

Corporate bonds

(annual flows, billions of pesos of September 2005)

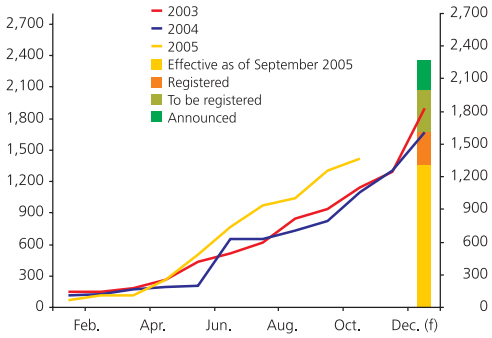



Source: Own calculations, based on data published by SVS.

**Figure III.4**

Corporate bond issues (*)

(placements accrued at the end of the period, billions of pesos of September 2005)




(*) Includes securitized bond issues.

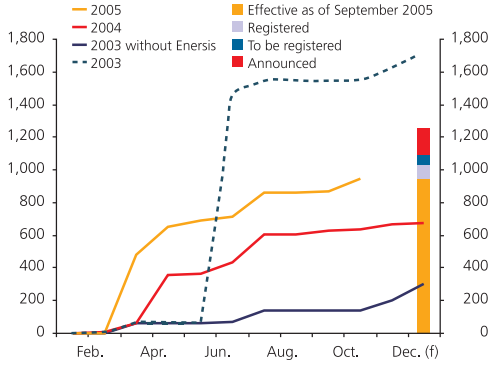
(f) Projection as of December 2005, estimate based on data available as of November.

Source: SVS.

**Figure III.5**

Stock issues

(placements accrued at the end of the period, billions of pesos of September 2005)




(f) Projection as of December 2005, estimate based on data available as of November.

Source: SVS.

exceed total issues of previous years (figure III.4). Bonds currently represent around 12% of total corporate debt.

Bank loans continue along the same trend since mid-2004, with a real annual rate of increase on the order of 8%. Credit to large firms has been less dynamic, however, as a result of substitution with financing from the domestic stock and bond market. Currently, bank credit represents close to 49% of firms' debt financing, the sector's foreign debt remains stable in nominal terms, and its share of total debt has fallen to 38%.

***Stock placements continue to be an attractive financing alternative***

Favorable conditions in the stock market since 2003 have led new firms to enter the exchange this year, with total offerings of $472,000 billion. In addition, previously listed firms have made new offerings to increase their capital. As of October 2005, total stock offerings reached nearly $950 billion, which is 41% higher than total issues in 2004 (figure III.5).

## III.1.2 Financial indicators

The analysis of the financial situation of the nonfinancial corporate sector is based on the Fecu[3]/ of firms registered in the Securities Registry maintained by the Superintendency of Securities and Insurance (SVS). These account for 20% of the banking system's business loans, one third of the current stock of firms' foreign debt, and, by definition, the totality of the domestic market's public offerings.

***Profitability continues to develop favorably and to be higher in the tradables sector***

Increased sales have continued driving operating income and, therefore, the profitability of firms. Measured as net income for the period over net worth, profitability reached 12.7% in the six months ending in September 2005, thus maintaining the favorable pattern observed since early 2003. At an aggregate level, the operating margin (operating income over sales) displayed a similar trend, reaching 15.0% in the same period (figure III.6).

The tradables sector[4]/ has continued to be highly dynamic, albeit with signs of moderation (figures III.7 and III.8). The mining and forestry sectors are particularly notable, as they continue to benefit from foreign demand conditions and, in the case of mining, from high prices in international markets, while maritime services and transport have seen gains from dynamic exports. The nontradables sector, in turn, has continued to perform markedly worse than the tradables sector[5]/. Within this aggregate, however, important sectoral differences are observed. Regulated utilities (electric[6]/

[3]/ *Ficha Estadística Codificada Uniforme* (Uniform Codified Statistical Form), which contains quarterly financial statements and their respective notes.

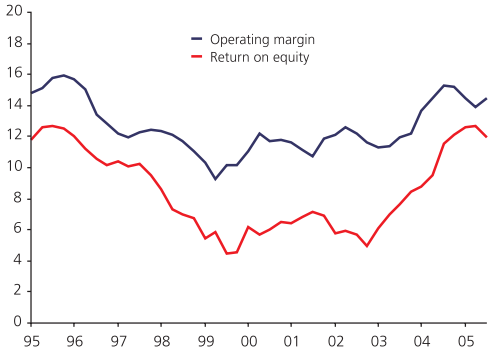
[4]/ The tradables sector includes mining, forestry, foods, and maritime services and transport.

[5]/ The nontradables sector includes retail, railway and road transport, telecommunications, construction, electricity, water utilities, and gas.

[6]/ The electricity sector posted an improvement in its earnings and indicators in the third quarter of 2005.

**Figure III.6**

Profitability and operating margin (*)
(four-quarter moving average, percent)

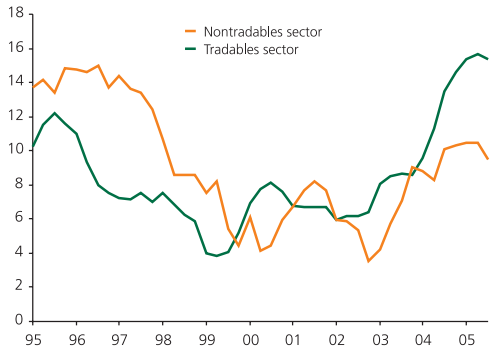



(*) Indicators calculated based on individual financial statements.

Source: Own calculations, based on data published by SVS.

**Figure III.7**

Profitability, tradables (1) and nontradables (2) sectors
(four-quarter moving average, percent)




(1) Includes mining (excluding Codelco), forestry, foods, and maritime transport and services.
(2) Retail, railway and road transport, telecommunications, construction, electricity, water, and gas.

Source: Own calculations, based on data published by SVS.

**Figure III.8**

Operating margin, tradables (1) and nontradables (2) sectors
(four-quarter moving average, percent)


(1) Includes mining (excluding Codelco), forestry, foods, and maritime transport and services.
(2) Retail, railway and road transport, telecommunications, construction, electricity, water, and gas.

Source: Own calculations, based on data published by SVS.

and water companies) and telecommunications[7]/ have posted a poorer performance, while retail and infrastructure have done better.

Financing costs for the group of firms analyzed did not increase significantly in the period, despite the rise in interest rates. One of the main reasons for this stability has been these firms' ongoing process of refinancing liabilities, which has included the issue of fixed-rate debt instruments. This has allowed the firms to stabilize their average financing costs, which reached 6.8% in the six months ending in September 2005 (measured by the ratio of financial expenses[8]/ over interest-bearing debt) (figure III.9). These costs can be expected to rise, however, in line with the increases in short- and long-term interest rates.

***Corporate indebtedness remains stable, and firms' interest rate coverage continues to improve, albeit with signs of moderation***

At the aggregate level, the degree of indebtedness has remained stable at around 0.7 times shareholders' equity, which is similar to the level observed since late 1999. This stability, however, reflects uneven developments at the sectoral level. In some sectors with greater investment needs —such as infrastructure concessionaires, water utilities, and railway and road transport— the level of indebtedness has grown rapidly in recent years. Other sectors, such as telecommunications and electricity, have significantly reduced their debt, whether through a reduction in investment or through significant increases in their operating flows.

Indebtedness, measured as total liabilities over market capitalization, was 0.23 times in September 2005. This has been low in historical terms, reflecting the market's favorable perception of firms' future profits. In aggregate terms, the indicator of interest coverage[9]/ has continued to show sustained improvements since 2002, reaching 4.7 times in September when calculated using individual balance sheets and 7.9 times when calculated with consolidated balance sheets. At the sectoral level, this indicator shows a strengthening of payment capacity in all sectors in the sample, although it is still below its historical average[10]/ in some specific sectors, such as electricity and retail (figure III.10).

### III.1.3 Sources and uses of funds

The growth in operating flows observed for the group of firms under analysis, which began in 2004, persisted through September. This reflects the continuing favorable foreign and domestic demand conditions seen throughout the period (figure III.11). At the sectoral level, the increase in operating flows has mainly been associated with the mining sector and sectors tied to domestic demand (retail and construction).

Consequently, own resources continue to be the main source of financing for these firms. Retained earnings as a percent of total assets has stayed

[7]/ Includes firms with and without regulated services.

[8]/ Financial expenses include deferred or paid interest, premiums, and commissions.

[9]/ Measured through the ratio of operating flows or Ebitda (earnings before interest, taxes, depreciation, and amortization) over financial expenses.

[10]/ Calculated for the last ten years.

**Figure III.9**

Average financial cost (*)

(percent)

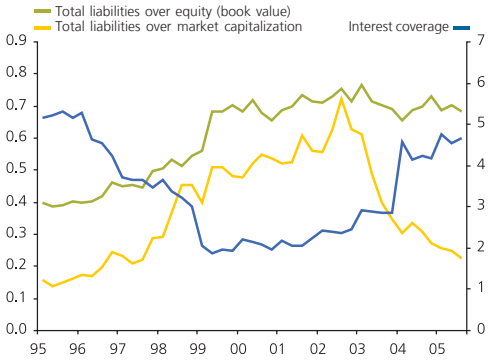

(*) Calculated as financial expenses over interest bearing debt.

Source: Own calculations, based on data published by SVS.

**Figure III.10**

Debt-to-equity ratio and interest coverage

(times)

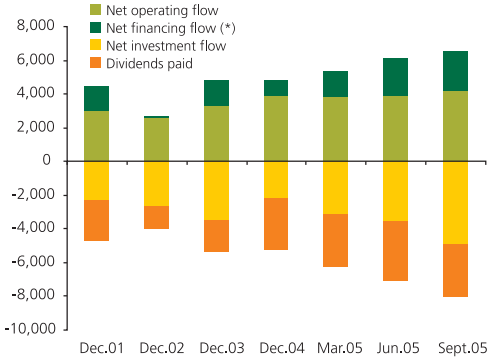



Source: Own calculations, based on data published by SVS and BCS.

**Figure III.11**

Cash flow statement

(moving year, billions of pesos of September 2005)




(*) Excludes dividends paid.

Source: Own calculations, based on data published by SVS.

around 20% since the beginning of 2004, after registering a gradual increase from the trough of 15% of late 2002. The greater operating flows have also translated into a strong increase in the amount of dividends paid —although when measured as a share of net income, dividends have been relatively constant since 2004, with average rates of 72%.

Among the uses of funds, investment has registered an upsurge. This includes not only investment oriented toward the expansion of productive capacity (fixed assets), but also investment in other firms (permanent investments)[11]/ (figure III.12). This upsurge, which is seen most clearly in the current year, has led firms to draw on external sources of financing, all of which have shown a positive evolution in this period. In particular, financing through stock issues has continued to grow strongly, accruing a new peak between January and September 2005. The flows associated with the issue of debt instruments, in turn, recovered part of the buoyancy observed between 2001 and 2004, but they continue at levels below those registered in that period (figure III.13).

By sector, railway and road transport and infrastructure concessionaires have recorded significant investment flows. These have involved an intensive use of financing with external resources, in particular bond issues.

### III.1.4 Outlook and risks

The external environment of economic growth, terms of trade, and interest rates continues to be favorable for both national firms tied to the export sector and firms oriented toward the domestic market (chapter II). This is also reflected in the risk ratings on debt securities issued by nonfinancial firms in the local market, which show some improvement relative to the previous *Report* (table III.1).

**Table III.1**

Evolution of risk ratings (1)

(April – October 2005)

| | N° firms | Percent over n° firms | Percent of outstanding debt | Average change (2) |
|---|---|---|---|---|
| Downgrades | 5 | 7 | 3 | 1 |
| Unchanged | 55 | 77 | 93 | |
| Upgrades | 11 | 15 | 4 | 1 |

(1) Risk rating agencies taken separately.
(2) Measured in notches.

Source: Own calculations, based on data published by SVS.

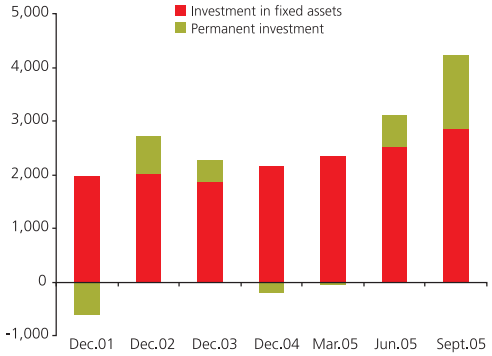
As forecast in the last *Report*, however, a degree of moderation can already be seen in the earnings of firms oriented to the external sector. Firms focused on the local market, in contrast, should consolidate their improved earnings, considering the favorable outlook for domestic demand. Short- and long-term interest rates continue their process of normalization, which should be reflected in a gradual increase in firms' financing costs.

[11]/ Includes related firms as well as other corporations.

**Figure III.12**

Net investment flows

(moving year, billions of pesos of September 2005)

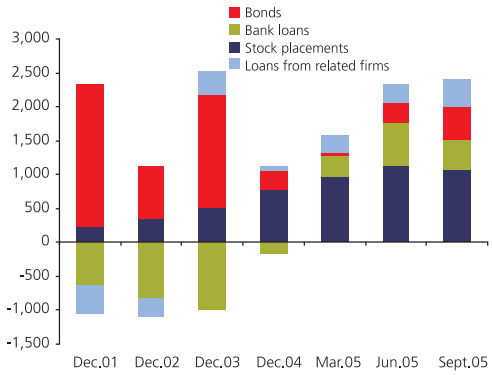



Source: Own calculations, based on data published by SVS.

**Figure III.13**

Net financing flows from outside sources

(moving year, billions of pesos of September 2005)

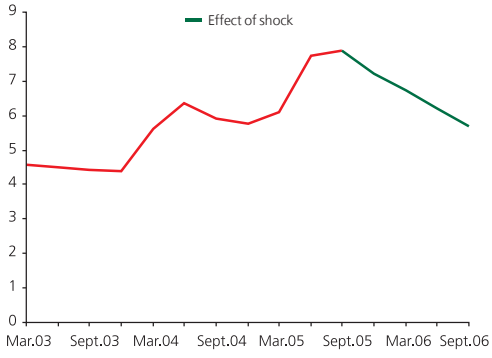



Source: Own calculations, based on data published by SVS.

**Figure III.14**

Stress tests to interest rates and operating income: effect on the interest coverage indicator

(times)




Source: Own calculations, based on data published by SVS.

All of the above should lead to somewhat weakened payment capacity indicators in the coming quarters.

The materialization of scenarios featuring lower economic growth and increased interest rates, as described in earlier sections, would negatively affect firms' ability to generate funds, but without jeopardizing their payment capacity. The sectors that potentially would be the most seriously affected by a drop in foreign demand include exporters of food products, forestry, maritime transport, and mining. The sectors that potentially would be the most strongly affected by falling domestic demand and sharp increases in interest rates include construction, foods for domestic consumption, and retail. The exposure of the local banking system is significant only in the second group and in food exporters.

## III.1.5 Stress tests

This section reviews how the corporate sector's financial stability would be affected by a deterioration of the macroeconomic scenario, consisting in a significant increase in domestic interest rates, a severe depreciation/ appreciation of the peso, and a slowdown of economic growth lasting a year[12]/. As shown below, the strengthening of the financial position of firms over the past several quarters should not only keep the effects of these shocks under control, but it should also hold them below the levels calculated in the last *Report*.

### *An increase in the interest rate and a drop in operating income*

This section describes the joint impact of a 550 basis point increase in the short-term interest rate and a 20% fall in operating income on the payment capacity of the corporate sector. These shocks are applied individually to each one of the firms in the sample under analysis and maintained for one year. In aggregate terms, the joint effect of this shock would be a fall in the coverage indicator to 5.7 times after one year (figure III.14)[13]/.

As mentioned earlier, the firms potentially most affected by falls in domestic demand and an interest rate hike would be those tied to construction, retail, and food producers for domestic consumption. These sectors prefer to use the local financial system, and they employ an intensive use of short-term financing. Consequently, the interest rate shock would be transmitted relatively fast among these firms. The tests show that after the shock, these sectors would maintain an interest coverage level above 4 times, except for the retail sector, which would end in a relatively less comfortable position because it is starting from a tighter coverage level. In the case of sectors tied to tradable goods, the robust initial situation of these firms would allow them to maintain a very comfortable position, even after the described shock (table III.2).

[12]/ The tests were developed using data contained in the consolidated financial statements of the firms registered in the Securities Registry.

[13]/ From 7.9 times in September 2005.

**Table III.2**

Combined stress test: effect on sectoral interest coverage indicators (*)
(times)

| | Tradables | Nontradables | Retail | Construction | Food |
|---|---|---|---|---|---|
| Pre-shock level | 14.5 | 4.7 | 5.3 | 14.3 | 7.0 |
| Post-shock level | 10.6 | 3.4 | 3.4 | 8.2 | 4.5 |

(*) Considers an increase in interest rates, a fall in operating income, and an increase in the exchange rate.

Source: Own calculations, based on data published by SVS.

The effects of the shock on debt at risk —measured as the share of debt held by firms with an interest coverage indicator under 1— would be low. The domestic bank debt in the hands of these firms would move from 7.2% to 7.6% after the shock. The share of external debt at risk would rise from 0.6% to 1.6% and, in the case of domestic bonds, would hold steady at 5.6%.

### Exchange rate variations

To quantify the exchange rate risk exposure facing the corporate sector, the available data on assets and liabilities in foreign currency was analyzed for the firms in the sample, as well as the foreign currency flows tied to their economic activity[14]/. The methodology used consisted in measuring the effects of an immediate, one-time 30% rise/fall in the exchange rate on the net balance sheet position in foreign currency of each firm and on their net flows in foreign currency for a period of one year. In September 2005, the firms in the sample exhibited a much lower balance sheet mismatch than was described in the last *Report*.

The net effect of a 30% exchange rate hike would be a fall in the interest coverage indicator of 0.6 time one year later, to 7.3 times[15]/. The nontradables sector would suffer the largest deterioration: its coverage indicator would fall 1.2 times in the period.

Overall, this shock would produce a larger impact than the interest rate and operating income shock, in terms of the redistribution of debt around the coverage indicator. The share of debt held by firms with interest coverage of less than 1 would rise from 7.2% to 8.6% in the case of local bank debt; from 5.6% to 11.0% in the case of domestic bonds; and from 0.6% to 6.6% in the case of foreign debt. As in the previous *Report*, however, the firms with interest coverage of less than 1 are mostly public firms or with guaranteed debt, and whose risk rating is AAA.

In contrast, an appreciation of the peso would strengthen the payment capacity of the whole sample. Nevertheless, some firms in the export-oriented foods sector would display a fall in the interest coverage indicator. This worsening would be contained, however, and, with a few specific exceptions, would not compromise the firms' payment capacity. The fall in

[14]/ The latter were calculated individually for each firm in the sample, based on data on imports and exports and financial expenses in foreign currency. The sample comprises firms listed in the Securities Registry, excluding Codelco, Enap and those that keep their books in US dollars.

[15]/ From 7.9 times in September 2005.

the exchange rate would produce an increase in the share of debt associated with firms with interest coverage of less than one, from 7.2% to 7.7%.

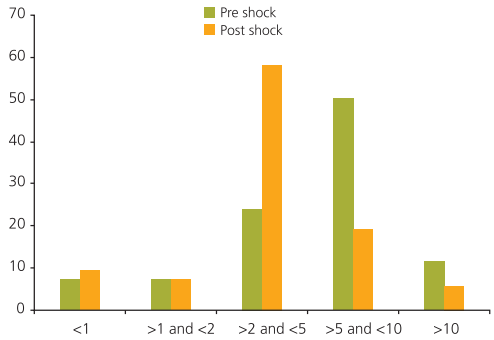
Finally, we evaluated the impact of simultaneous shocks to the interest rate, operating income, and the exchange rate on the profitability and payment capacity of the corporate sector. A depreciation of the peso triggered, in aggregate terms, a fall in the ratio of earnings over assets of 200 basis points, to 4.1% one year later;[16]/ a reduction in the interest coverage ratio to 5.3 times;[17]/ and an increase in the share of bank debt held by firms with an interest coverage of less than 1, from 7.2% to 9.3%. It would also imply that the bulk of the sample would move from the coverage range of 5 to 10 times to the range of 2 to 5 times (figure III.15). This indicates that while their payment capacity would fall, the majority of firms would continue to comply with their debt service. At the sectoral level, the impact on interest coverage would be greater for the tradables sector than for the nontradables sector[18]/.

In the case of an appreciation, meanwhile, the results would be a drop of 140 basis points in earnings over assets, to 4.7%; a fall in the coverage indicator to 6.1 times; and an increase in the share of bank debt held by firms with a coverage of less than 1, from 7.2% to 11.3%. As in the previous case, a drop in the interest coverage ratio would be greater in the tradables than the nontradables sector[19]/.

**Figure III.15**

Combined stress test: distribution of local bank debt around the interest coverage indicator

(percent)

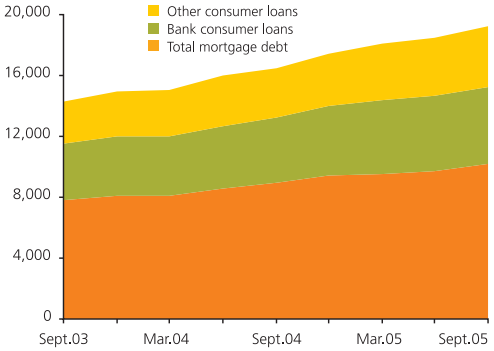



Source: Own calculations, based on data published by SVS.

**Figure III.16**

Household debt breakdown

(billions of pesos of September 2005)




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

## III.2 Households

*This section analyzes the financial situation of households, with a focus on the evolution of their indebtedness and payment capacity. Consumer debt is a significant asset on the balance sheets of banking institutions and other domestic credit providers.*

Total household debt continues to follow the growth trend described in previous *Reports*, driven mainly by consumer loans with maturities of one year or more and variable-rate mortgage loans. Household credit risk indicators remain contained, but household exposure to income reductions or interest rate hikes is higher than in the past.

### *Consumer debt continues to grow faster than consumer income, supported by a positive macroeconomic scenario*

Total household debt increased nearly 15% on a real annual basis between the last quarter of 2004 and September 2005, and 17% (same basis) in September. This growth was driven mainly by bank mortgage loans, which recorded a real annual variation of 17% in September 2005, and by consumer loans with maturities of one year or more (including banks, retailers, and other issuers), which grew 21% in the same period (table III.3). Between June and September 2005 household disposable real income grew 9%, the highest increase of the annualized series.

[16]/ From 6.1% in September 2005.

[17]/ From 7.9 times in September 2005.

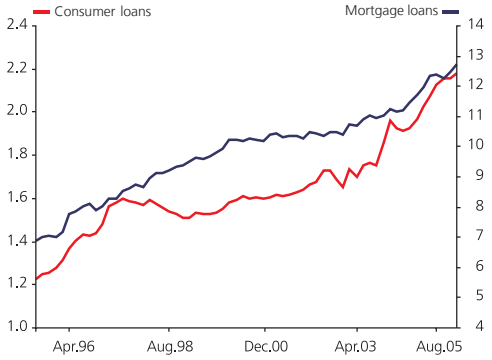
[18]/ The indicator falls from 14.5 to 10.1 times for the tradables sector and from 4.7 to 3.0 times for the nontradables sector.

[19]/ The indicator falls to 11.1 times for the tradables sector and to 3.7 times for the nontradables sector.

**Figure III.17**

Bank mortgage and consumer loans, by debtor

(millions of pesos of September 2005)

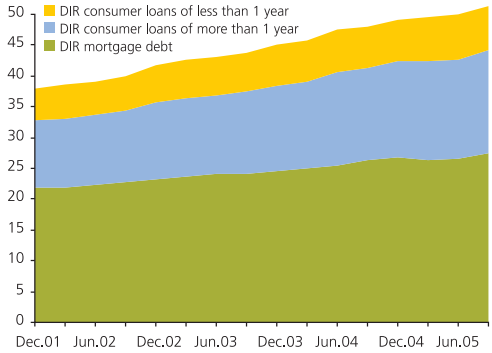



Source: SBIF.

**Figure III.18**

Debt-to-income ratio (DIR)

(percent)

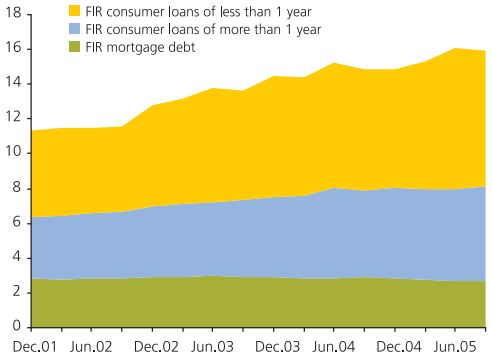



Sources:
SBIF.
SVS.
SuSeSo.
Central Bank of Chile.

**Figure III.19**

Financial burden-to-income ratio (FIR)

(percent)




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

**Table III.3**

Debt by component

(real annual change, percent)

| | 2004 | | 2005 | | |
|---|---|---|---|---|---|
| | III | IV | I | II | III |
| Mortgage | 14 | 16 | 15 | 14 | 13 |
| Bank | 17 | 19 | 20 | 18 | 17 |
| Other (1) | 1 | 5 | -9 | -5 | -5 |
| Consumer (2) | 16 | 16 | 20 | 17 | 21 |
| Bank | 15 | 16 | 19 | 20 | 19 |
| Retailers (3) | 21 | 17 | 16 | 15 | 17 |
| Other consumer (4) | 26 | 24 | 24 | 18 | 22 |
| Total | 15 | 16 | 17 | 15 | 17 |

(1) Securitized bank endorsable mortgage credits and housing leasing contracts, and endorsable mortgage credits held by insurance companies.
(2) Includes university loans and nonbank car loans.
(3) Reduced sample that includes Falabella, Almacenes Paris, and D&S.
(4) Private compensation funds, insurance companies and cooperatives.

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

Interest rates on the main loans (mortgages and consumer loans), which had been maintained at historically low levels, began to rise when the normalization of monetary policy was initiated. Between September 2004 and November 2005, the rate on consumer loans with maturities of one year or more increased by 130 basis points, while mortgage rates rose 66 basis points. The monetary policy rate was raised by 275 basis points in the same period.

In line with the trend described in the last two *Reports*, variable-rate mortgage loans continue to replace fixed-rate loans (figure III.16). The share of the latter in total mortgage debt fell from 32.9% in June 2004 to 23.6% in September 2005, while the category "other" (made up primarily of variable-rate mortgage loans) increased its share in total mortgage debt from 10.8% to 21.7% in the same period. This implies a greater exposure of households to interest rates.

Average obligations per debtor have continued to increase faster than wages (figure III.17). This has been particularly notable in the case of consumer loans, starting in December 2003. Consumer bank debt per debtor was $2.3 million in August 2005[20]/, which is approximately four times the amount registered a decade ago and 14% more than in August 2004, in constant pesos. This increase has been generalized across the different segments of debt level.

### *The long-term financial burden remains relatively stable*

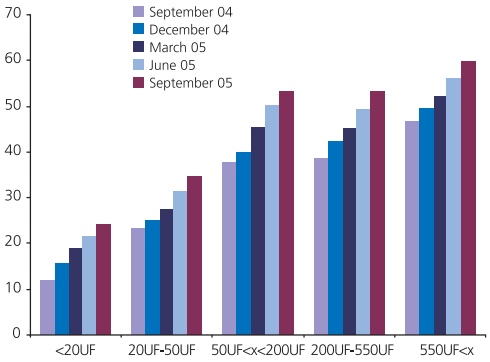
The ratio of total estimated debt to disposable income (DIR) has maintained its growth trend, though at somewhat lower levels, reaching

[20]/ Latest available data.

**Figure III.20**

Average maturity, by size of loan (*)

(months)

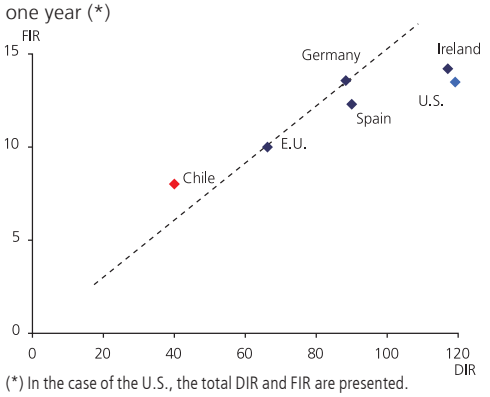



(*) Weighted by amount granted.

Sources:
SBIF and Central Bank of Chile.

**Figure III.21**

Indicators on consumer loans with maturity of more than one year (*)



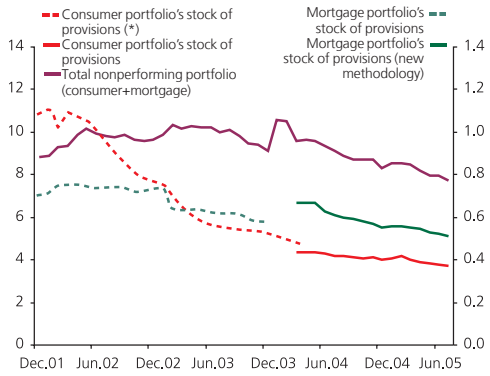

(*) In the case of the U.S., the total DIR and FIR are presented.

Source: Central Bank of Chile.

**Figure III.22**

Indicators on the consumer and mortgage portfolio risk of the banking sector

(percent of respective loans)




(*) Consumer loan loss provisions are constructed from a representative sample of banks.

Source: SBIF.

51.3% in September 2005 (figure III.18). The ratio of the total estimated financial burden to disposable income (FIR) was 15.9% in September 2005[21]/ (figure III.19). The FIR for debt over one year was stable at around 8%, as a result of the low interest rates and the lengthening of maturities on consumer loans. The FIR for mortgage debt and consumer debt over one year was also stable. In particular, the maturities on consumer bank loans increased (figure III.20).

As highlighted in previous *Reports*, household debt is lower in Chile than in the main developed economies. For the current level of indebtedness, however, the financial burden is higher than it is in other countries[22]/ (figure III.21). This is due to differences in debt composition between consumer and mortgage debt, as well as to differences in credit conditions and interest rates.

### *Loan portfolio risk indicators remain low*

Household loan portfolio risk indicators have remained stable, with a downward trend (figure III.22). Nonperforming loan (NPL) indicators[23]/ for housing and consumer loans were 0.9% and 0.6%, respectively, in October. The stock of provisions of the consumer portfolio as a percentage of total loans fell from 4.4% to 3.7% between March 2004 and September 2005; the figure for the mortgage portfolio went from 0.7% to 0.5% in the same period. The stock of provisions of the consumer portfolio of the savings and loan cooperatives continued to decrease, as in pervious periods, hitting 3.7% in September 2005. The stock of provisions for loans granted by retailers rose from 6.3% to 6.5% as a percentage of total loans in the same period.

## III.2.1 Stress tests

One of the stress tests undertaken consisted in measuring the impact on the financial burden of a stress scenario in which disposable income falls 1% and the interest rate rises 550 basis points. The estimates show that the financial burden (FIR) would increase from 15.9% to 18.4%, mainly as a result of the reduction in disposable income (200 basis points). After one year, the impact of the increase in interest rates would be less (50 basis points), owing to the fact that a large share of outstanding mortgage and consumer loans are fixed rate[24]/.

[21]/ Preliminary estimate.

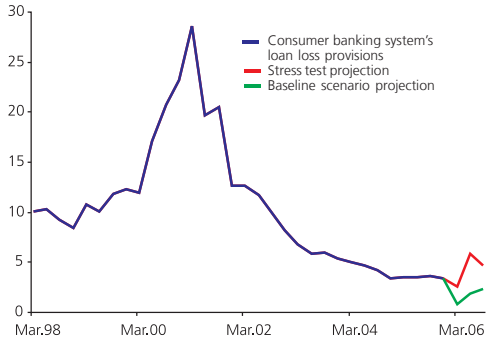
[22]/ FIR indicators were constructed, since other countries' financial burden indicators are not comparable with Chile's. See *Financial Stability Report*, First Half 2005. Data for the United States and the European Union correspond to 2003, and the rest of the countries to 2004. The exercise used information from financial and monetary institutions, the European Central Bank (ECB), Bundesbank, the Bank of Spain, the Central Bank and Financial Services Authority of Ireland, Ameco, and others.

[23]/ The NPL indicator corresponds to the total volume of overdue loans over total loans. A current loan is transferred to the nonperforming loan account whenever one of its installment payments becomes overdue by more than 90 days. In contrast with the accounting methods of other countries, Chilean accounting standards classify as nonperforming only the past-due installment, not the total outstanding value of the loan.

[24]/ The exercise assumed that 20% of variable-rate mortgage loans are exposed to the shock.

**Figure III.23**

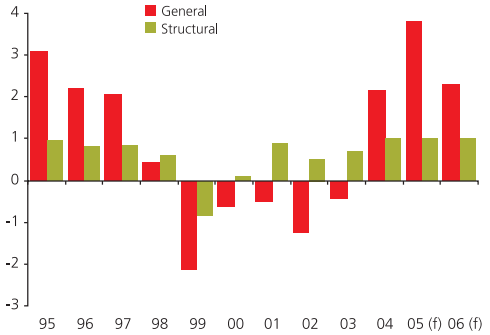
Stress test: effect on loan loss provisions
(percent of total consumer loans)




Sources:
SBIF.
Central Bank of Chile.

**Figure III.24**

General and structural balance of the total central government
(percent of GDP)




(f) Projection.

Source: Budget Division, Ministry of Finance.

A second stress test projected consumer loan loss provisions as a percentage of total consumer loans in the face of a shock similar to the one described above. This test considered a scenario in which interest rates rose 550 basis points while at the same time GDP fell 1%. The net effect on the consumer loan loss provisions indicator would be a rise from the current 3.5% to 5.3% after one year (figure III.23)[25]/.

## III.3 Consolidated government

*This section describes the financial situation of the consolidated government sector, which includes the central government and the Central Bank of Chile. Its potential effects on the availability and cost of the country's domestic and foreign financing make it relevant for the analysis of financial stability*[26]/.

The consolidated government sector will present a financial surplus in 2005 and probably also in 2006. The approved budget for 2006 is compatible with the structural surplus rule of 1% of GDP, which the government has been applying since 2001. Compliance with the budget will translate into significant actual surplus and new reductions in the public debt. Although the Central Bank is expected to continue posting a financial deficit in 2005 and 2006, this will be more than compensated by the central government's surplus.

As is known, a share of the fiscal surplus resources has pre-paid debt, leaving more room for the private sector to issue debt. In 2006, the net debt of the consolidated government sector is expected to be near zero.

### *The fiscal surplus estimates have been revised up, and thus a greater reduction of central and consolidated government debt is expected*

The surplus estimates for 2005 and 2006 have been corrected upward in the case of the central government and downward for the Central Bank. In 2005, the central government will generate an actual general surplus of 4% of GDP, which is consistent with the structural surplus rule of 1% of GDP (figure III.24)[27]/. This upward correction in the projection is mainly explained by the copper price, which has remained at a higher-than-expected level (generating higher cyclical earnings); higher tax income, especially from the private mining companies; and higher economic growth (particularly of domestic demand), which translates into higher tax revenues.

Projections for 2006 point to a central government surplus of over 2% of GDP, in accordance with the approved Budget Law[28]/. Beginning in 2006,

[25]/ While this shock is smaller than the shock applied in the banking system stress tests, it is consistent with those tests for two reasons: first, here the shock takes place gradually instead of all at once in the period; and second, the dynamics of this model includes lags, so the full adjustment occurs in two years instead of one.

[26]/ The consolidation of the data for the central government and the Central Bank eliminates items that represent liabilities (assets) for the central government and assets (liabilities) for the Central Bank. These items are fiscal promissory notes with the Central Bank, fiscal deposits at the Central Bank, and Central Bank securities held by the central government.

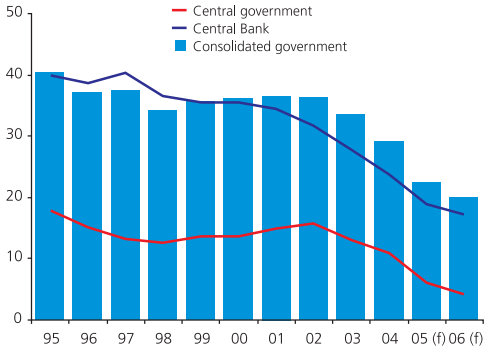
[27]/ In October 2005, the fiscal authority estimated the general surplus for 2005 at 3.8% of GDP.

[28]/ In September 2005, the fiscal authority projected general surplus for 2006 at 2.3% of GDP.

**Figure III.25**

Gross debt

(percent of GDP)



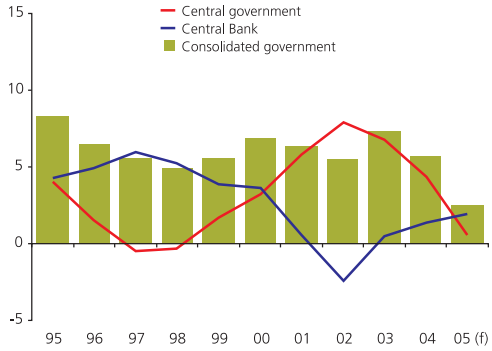

(f) Projection.

Sources:
Ministry of Finance.
Central Bank of Chile.

**Figure III.26**

Net debt

(percent of GDP)




(f) Projection.

Sources:
Ministry of Finance.
Central Bank of Chile.

the methodology used to calculate the structural surplus will incorporate a correction for the cyclical component of tax revenues from the private mining companies.

The accounting balance of the Central Bank in 2005 will be lower than predicted in the previous *Report*, due to a larger than expected appreciation of the peso. The Central Bank will thus end 2005 with a deficit of over 1% of GDP. However, this figure turns into a deficit of 0.8% of GDP when using a methodology that is compatible with the measurement of the central government's balance. This occurs because the cost of the Central Bank's liabilities is larger than its asset yields and because its equity is negative[29]/. Based on the assumption that the exchange rate will remain at current levels, the Central Bank's deficit should be around 0.2% of GDP in 2006.

With regard to financing, in September the central government resumed issuing debt in the domestic market. Valued at approximately $270 billion (US$510 million), the issues corresponded in equal parts to ten- and twenty-year UF-denominated Treasury bonds. The resources from the fiscal surplus and the bond placements were used to finance programmed amortizations and to prepay government debt with the Central Bank (US$1.96 billion) and debt financed under the copper law (*Ley Reservada del Cobre*). The funds were also used to increase the balance of the Copper Compensation Fund. As a result, the gross debt of the central government was reduced from 10.9% of GDP at the end of 2004 to 9.0% in June 2005, and it is expected to end 2005 at around 6.0%. Projections for 2006 indicate that gross debt will be reduced even further, to a level around 4% of output (figure III.25). The net debt of the central government will be reduced in 2005, from 4.3% of GDP in December 2004 to 1.6% in June 2005 to finish the year near 0.5% of output (figure III.26).

The Central Bank, in turn, has offset the monetary impact of the payments received from the central government through a lower rollover rate on its maturing debt. This has translated into a significant reduction of the Central Bank's stock of debt and, therefore, into greater room for private sector issues. In addition, the Central Bank has paid its maturing dollar notes (BCX) with liquid resources in dollars. Thus the gross debt of the Central Bank fell from 27.8% of GDP in December 2003 to 23.8% in December 2004 and to 21.6% in June 2005, and it is expected to finish the year near 19.0% of GDP. In 2006 it should continue to fall, coming close to 17% of output.

In contrast, the value of the Central Bank's net debt rose to levels of around 2% of GDP at the end of 2005, from 1.4% in December 2004, due to the impact of the appreciation of the peso on the value of international assets in local currency. In the consolidated government sector (the central government plus the Central Bank), gross and net debt fell during the year, and they are expected to be around 22% and 2% of GDP, respectively. This decreasing trend should continue in 2006, and the consolidated government sector's gross debt will probably be around 20% of GDP while its net debt will be near 0%.

[29]/ The accounting balance of the Central Bank —which includes the change in the valuation of assets— is very sensitive to fluctuations in the dollar, because the Central Bank has a long position in foreign exchange.

**Table III.4**

Sovereign bond risk ratings

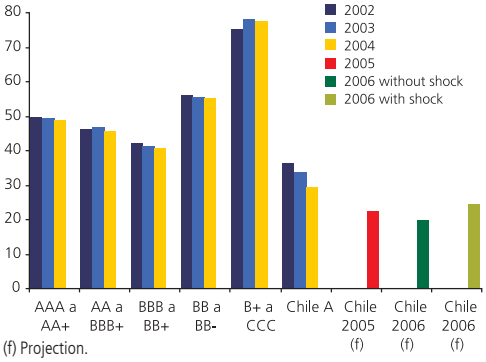
| | 2003 | 2004 | 2005 |
|---|---|---|---|
| Standard & Poor's | A- | A | A |
| Moody's | Baa1 | Baa1 | Baa1 |
| Fitch | A- | A- | A |

Sources:
Standard & Poor's.
Moody's.
Fitch.

**Figure III.27**

Public debt

(percent of GDP)




(f) Projection.

Sources:
Moody's.
Standard & Poor's.
Central Bank of Chile.

***Public finances contribute to the maintenance of lower and more stable financing costs in domestic and foreign capital markets***

Compliance with the fiscal rule has made a very important contribution to the credibility of Chile's public finances among investors and, therefore, has supported the reduction in interest rates through a lower country risk rating and greater room for private sector financing. Thus, the way the surplus is being used has had positive repercussions on the perception of international markets with regard to the soundness of public finances, which has generally been highlighted in the reports by risk rating agencies (table III.4)[30]/. In addition, the risk premium on Chile's sovereign debt has continued to fluctuate at historically low levels of around 70 basis points.

### III.3.1 Stress tests

The fiscal situation continues to be very robust to adverse scenarios that could arise in 2006. The financial soundness of the consolidated government sector would not be materially affected even under an extremely negative scenario involving an increase in the interest rate of 550 basis points, a fall in the copper price to US$0.60 per pound, a fall in GDP growth to –1% for one year, and an increase in the exchange rate of 30%. Basically, at the end of that year, the gross debt of the consolidated government sector as a percentage of GDP would be located around two percentage points above its expected value for the end of 2005, but five percentage points below the level in 2004 (figure III.27). Although an increase in the country risk premiums would be expected in this scenario —and, therefore, in the cost of external financing facing the Chilean economy—, Chile's risk premium is not likely to increase above the mean for emerging economies with a similar risk rating. This is so because compliance with the fiscal rule guarantees that the accumulation of debt is transitory and that future fiscal surpluses are used to repay it, among other reasons.

## III.4 External financing of the Chilean economy

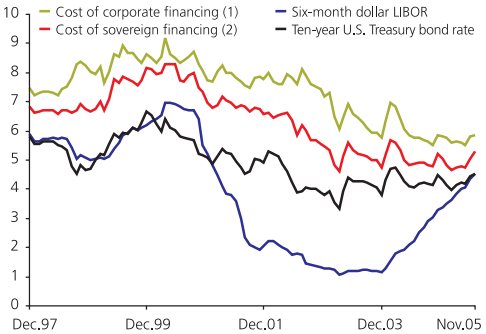
*This section presents the evolution of the Chilean economy's external debt, as well as the potential impact of the most significant risks for the normal functioning of external payments. External debt currently represents around 42% of GDP. At the same time, 38% of financing for local firms comes from foreign sources.*

The Chilean economy's external debt has been stable, and the conditions for access to international financing have remained favorable (although they are less advantageous than in the first half of the year). Reflecting the growth of the economy and particularly of exports, the external liquidity and solvency indicators have continued to improve, strengthening the economy's position for facing a possible worsening of the external scenario.

**Figure III.28**

Cost of external financing

(percent)




(1) *Chile empresas* index + Ten-year U.S. Treasury rate.
(2) Chile EMBI global index + Ten-year U.S. Treasury rate.

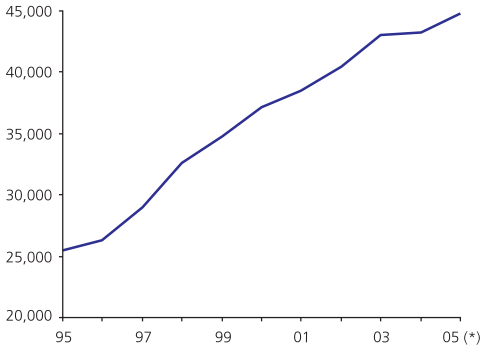
Source: Bloomberg.

[30]/ Fitch, Standard & Poor's, and Moody's maintained their country risk rating for Chile at A, A and Baa1, respectively, in the second half of 2005.

**Figure III.29**

External debt

(US$ million)



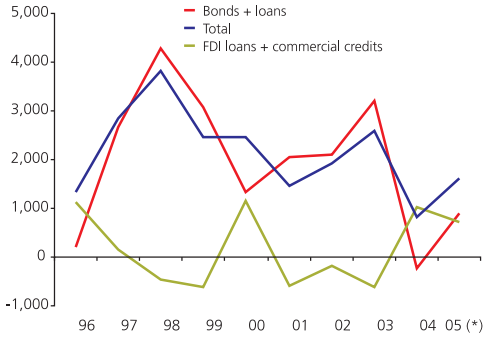

(*) Figures as of October 2005.

Source: Central Bank of Chile.

**Figure III.30**

Net debt flows, by type of instrument

(US$ million)



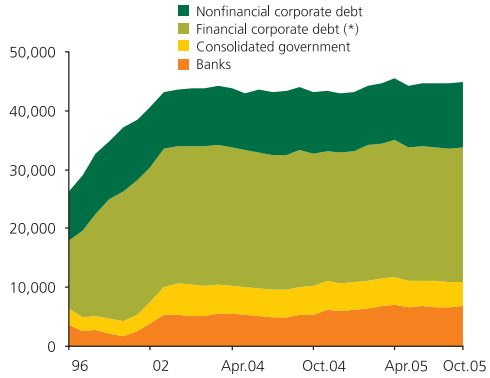

(*) Accrued through October 2005.

Source: Central Bank of Chile.

**Figure III.31**

External debt, by institutional sector

(US$ million)




(*) Financial debt excludes commercial credits and FDI-related loans.

Source: Central Bank of Chile.

## III.4.1 Recent developments and outlook

### III.4.1.1 Conditions for access to external financing

Access to external financing for the Chilean economy continues to be very favorable, despite the fact that short- and long-term international interest rates have increased since mid-year. The risk rating on sovereign bonds rose slightly[31]/ compared to the first half (8 basis points), while the corporate premium fell (30 basis points) in the same period (figure III.28).

However, firms have given preference to domestic financing during this year. The only foreign bond issue in 2005 corresponded to Codelco's issue in September[32]/.

### III.4.1.2 Evolution of external debt

External debt, which grew moderately in the first months of 2005, has been stable since April, reaching US$44.8 billion in October (figure III.29). This evolution reflects the Chilean economy's low need for external financing in the current climate (table III.5). All sectors, with the exception of the consolidated government, have slightly increased their foreign debt in this period. The government continues reducing its long-term obligations and has not rolled over its maturing international bonds. Nor has it issued any new bonds. The increase in the external debt of the corporate sector is explained by the growth of foreign trade credits associated with the expansion of exports and imports and by the Codelco bond issue. Other sources of foreign financing for firms (bank loans and loans tied to foreign direct investment) fell in the same period. Unlike in 2004, however, firms practically have made no prepayments of external loans (figure III.30). The greater external debt of banks is explained by the increase in bank loans, given that maturing international bonds have not been rolled over and no new bonds have been issued.

**Table III.5**

External debt of the Chilean economy

(US$ million)

| | 2002 | 2003 | 2004 | 2005 | |
|---|---|---|---|---|---|
| | Dec. | Dec. | Dec. | Apr. | Oct. |
| Total external debt | 40,504 | 43,068 | 43,283 | 44,669 | 44,800 |
| Short-term external debt, by sector | 5,652 | 7,176 | 7,625 | 8,088 | 7,350 |
| Banks | 1,289 | 2,426 | 2,319 | 2,029 | 1,217 |
| Firms and individuals | 4,352 | 4,741 | 5,290 | 6,046 | 6,127 |
| Consolidated government | 11 | 9 | 16 | 13 | 6 |
| Long-term external debt, by sector | 34,852 | 35,892 | 35,658 | 36,581 | 37,450 |
| Banks | 2,536 | 2,996 | 3,967 | 4,760 | 5,712 |
| Firms and individuals | 28,750 | 28,344 | 26,970 | 27,141 | 27,746 |
| Consolidated government | 3,566 | 4,552 | 4,721 | 4,680 | 3,992 |

Source: Central Bank of Chile.

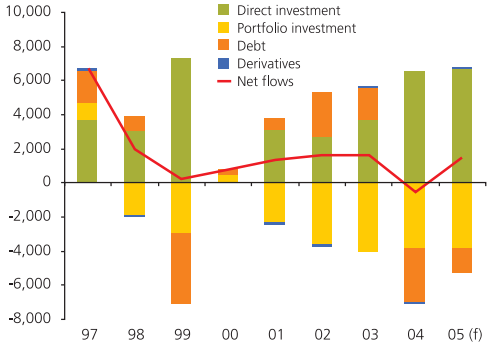
[31]/ The increase observed in the monthly average of the EMBI-Global index for Chile in November is also influenced by the incorporation of the Codelco bond issued in September, which has a larger spread than the rest of the bonds included in the calculation of this index.

[32]/ The issue was for US$500 million, at 30 years and with a spread of 118 basis points, which is lower than the economy's corporate spread. This reflects the favorable conditions in international financial markets.

**Figure III.32**

Net flows of the financial account of the balance of payments (*)

(US$ million)



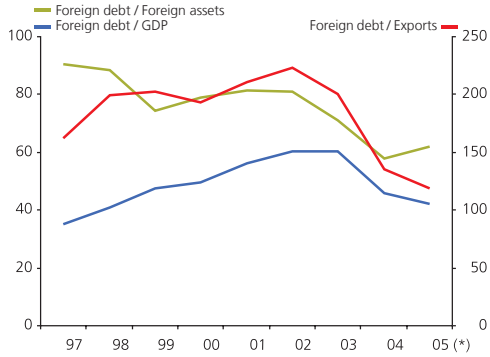

(*) Excludes reserve assets.
(f) Twelve-month flows accrued through October.

Source: Central Bank of Chile.

**Figure III.33**

External solvency indicators

(percent)



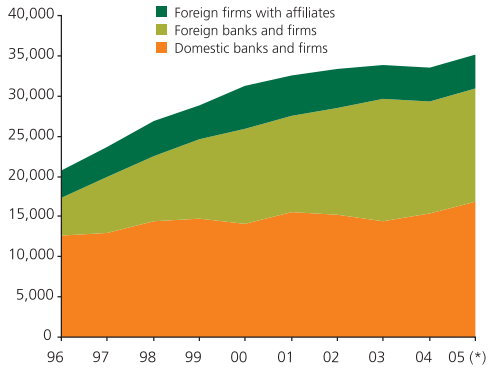

(*) Indicators as of September.

Source: Central Bank of Chile.

**Figure III.34**

Private sector external debt, by debtor's country of origin

(US$ million)




(*) Figures as of September.

Source: Central Bank of Chile.

The share of bonds and bank loans —sources that are relatively more sensitive to changes in market conditions— in total external debt has continued declining, while that of commercial credit has increased. This development, which is related to the strong expansion of foreign trade, has more than offset the reduction of loans tied to foreign direct investment. Consequently, financing from sources that are less sensitive to market fluctuations has approached record highs (figure III.31).

#### III.4.1.3 Evolution of other external financing flows

Foreign direct investment (FDI) in the form of capital investment has continued to increase, reaching levels comparable to those seen in the late 1990s. In the period, almost all of this flow has been accounted for by a reinvestment of profits by foreign-owned firms in Chile, while the FDI peak in the late 1990s was associated with a wave of corporate mergers and acquisitions. The FDI flow in the form of debt has been reversed relative to past year, reaching an outflow of US$330 million between May and October of 2005, mainly as a result of prepayments made by mining companies. Thus the net FDI flow (capital and debt) reached US$4.7 billion in the aforesaid period, which is significantly higher than the same period a year earlier (table III.6 and figure III.32).

**Table III.6**

Financial account flows of the balance of payments

(millions of dollars)

| | May 04-Oct.04 | Nov.04-Apr.05 | May 05-Oct.05 |
|---|---|---|---|
| Liabilities | 2,971 | 4,188 | 4,881 |
| Foreign direct investment (capital) | 3,603 | 3,211 | 5,024 |
| Reinvestment of profits | 2,949 | 3,500 | 4,136 |
| Portfolio investment (capital) | -52 | 181 | 268 |
| Debt | -230 | 1,182 | -14 |
| Bonds | -186 | 510 | -245 |
| FDI-related loans | 573 | -315 | -328 |
| Loans and other financing | -617 | 987 | 559 |
| Derivatives | -350 | -386 | -397 |
| Assets | 3,553 | 3,958 | 3,602 |
| Foreign direct investment (capital) | 192 | 656 | 834 |
| Portfolio investment (capital) | 1,676 | 1,821 | 2,469 |
| Debt | 1,920 | 1,828 | 784 |
| Derivatives | -235 | -348 | -485 |

Source: Central Bank of Chile.

Inflows from portfolio investments in the form of capital investment have stayed at relatively low levels, reaching US$270 million since April. However, total portfolio investment (capital and debt) in the period amounted to an inflow of just US$20 million, due to net amortizations of bonds in the order of US$250 million.

### III.4.2 Indicators of external solvency and liquidity

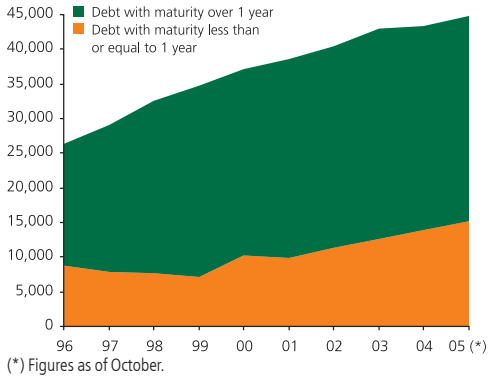
#### III.4.2.1 Indicators of external solvency

The economy's external solvency indicators have continued to improve, as a result of the slower growth of foreign debt, the faster growth of GDP, and increased exports (figure III.33).

**Figure III.35**

External debt, by maturity

(US$ million)



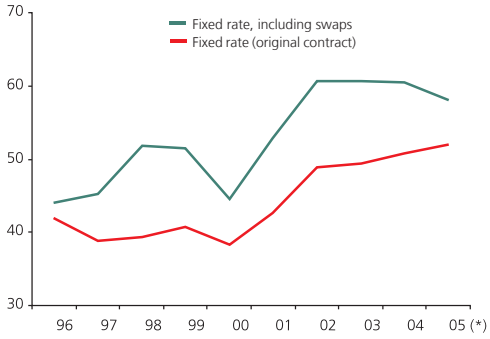

(*) Figures as of October.

Source: Central Bank of Chile.

**Figure III.36**

Fixed-rate external debt

(percent)



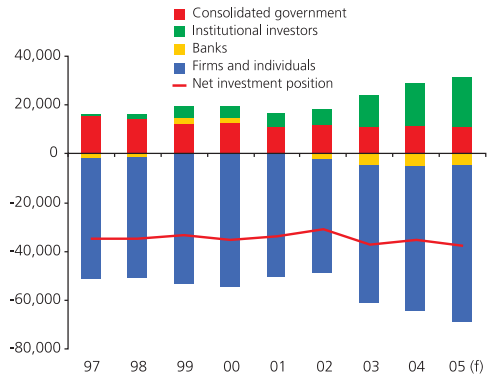

(*) Figures as of September.

Source: Central Bank of Chile.

**Figure III.37**

Net international investment position, by type of institution

(US$ million)




(f) Projection as of October, adding financial account transactions to the stocks as of December 2004.

Source: Central Bank of Chile.

Foreign debt over GDP and foreign debt over exports have fallen steadily since 2002, to 42% and 119%, respectively, in September 2005[33]/. In the past year, the drop in the former indicator is explained primarily by the faster growth of output measured at nominal peso value. Combined with an appreciation of the peso, this more than offset the moderate growth of external debt in the period.

Compared with other economies with a similar export structure (that is, with a significant share of commodities), Chile's external debt remains in the intermediate range between economies with an equivalent risk rating and developed economies. In contrast with similar economies, however, Chile's external debt continues to be characterized as mainly private (79%). The public sector's share has remained low and stable over the past few years; in particular, the consolidated government sector accounts for just 9% of total external debt.

A high percentage of private debt pertains to foreign-owned firms and banks (52% in September 2005), and around a quarter of these contracts correspond to debt with a foreign parent company, a trend that has been maintained over the last ten years (figure III.34). These characteristics can favor the economy's external solvency and financial stability, because the affiliated firms can count on the financial backing of their foreign parent companies to administer their liabilities. In the first half of 2005, foreign-owned firms and banks explained more than half the increase in private debt flows. However, they represented only 12% in September, due to the strong increase of bank commercial credit starting in July.

The rate and term structure of foreign debt also contribute to the country's external stability. In October 2005, outstanding short-term debt represented 34% of total external debt and 15% of GDP, reducing the economy's external liquidity needs (figure III.35). Fixed-rate external debt remained at high levels (52%). This figure appears even higher if adjusted for the interest rate swap operations of firms that hold foreign debt (figure III.36), which raises the share to approximately 58% (figure estimated for September 2005)[34]/.

In general terms, international assets and liabilities have been rising in recent years, which would be reflecting the country's greater financial integration. As of October 2005, the net debt position of the economy increased by 6%. This trend has been quite stable over the past three years, mainly due to the increase in liabilities of both individuals and the corporate sector (figure III.37).

The use of financial derivatives to hedge currency risks continues to grow in both long and short positions, according to notional contracts. At market value, the economy holds a net long position, as a result of a net long bank exposure as natural hedging of its debtor position, which is partially offset by short positions in other sectors.

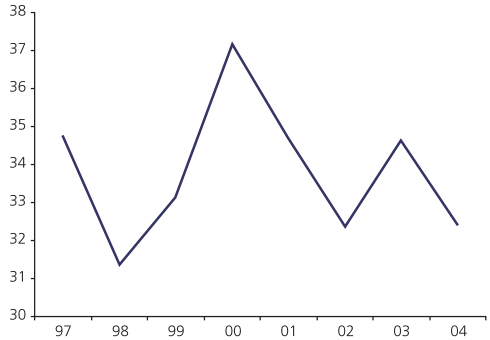
[33]/ The same pattern is found when adjusted for the long-term copper price (US$0.99 per pound).

[34]/ For an analysis of the effects of these swap operations, see Godoy and Selaive (2005) in *www.bcentral.cl/esp/publ/politicas/pdf/iefdic2005.pdf*.

**Figure III.38**

Share of the nontradables sector in the net international investment position

(percent)

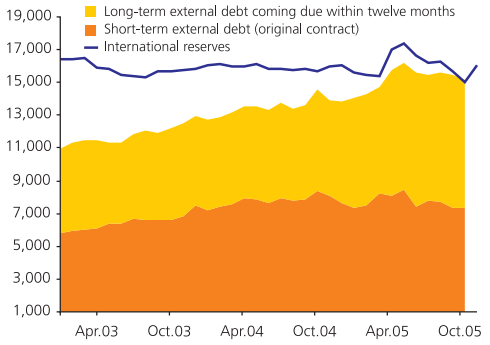



Source: Central Bank of Chile.

**Figure III.39**

External liquidity

(US$ million)

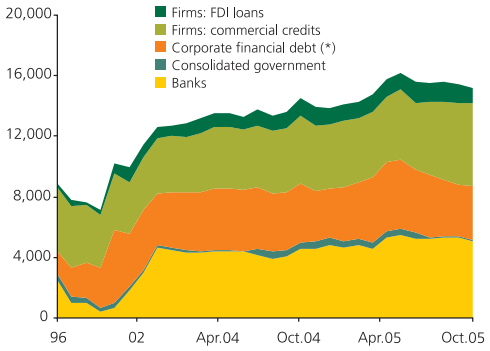



Source: Central Bank of Chile.

**Figure III.40**

Outstanding short-term external debt, by institutional sector

(US$ million)




(*) Excludes commercial credits and FDI-related loans.

Source: Central Bank of Chile.

The net debtor positions in nontradables sectors can expose the economy to exchange rate risk. However, these sectors only represent a third of the total net debtor position of the Chilean economy (figure III.38).

Finally, almost 60% of the stock of liabilities of the international investment position is foreign direct investment, which by its nature is more robust to changes in market liquidity conditions. However, this position is constructed over the base of financial account flows, such that it does not take into account variations in prices or in the exchange rate. Because an appreciation of the peso was observed in November relative to December 2004, the net debtor position could be expected to be larger than was previously reported.

Net capital outflows, measured by net portfolio investment flows (capital investment) have continued to be high and are comparable to the average of the last four years. These flows continue to be led by the natural growth of pension funds' investments abroad.

### III.4.3 Indicators of external liquidity

The economy's external liquidity remained stable at adequate levels during the past six months, since the observed drop in the Central Bank of Chile's international reserves was offset by a reduction in outstanding short-term foreign debt since May.

After increasing in the first months of the year, international reserves fell to US$1.35 billion between May and November. This was mainly due to the payment of dollar bonds, included in the program to reduce the Central Bank's international reserves (figure III.39). Additional amortizations are expected in the order of US$260 million for this item in December, although the ultimate evolution of international reserves will also depend on other cyclical factors, such as the behavior of the short-term foreign currency deposits that banking institutions make at the Central Bank to fulfill their technical reserve requirements.

Outstanding short-term external debt fell slightly, which helps contain the Chilean economy's exposure to changes in the availability of international liquidity (figure III.40). This evolution is attributable to fewer loans associated with FDI, banks' payment of short-term credit lines, and the payment of a long-term bond by the consolidated government, which has offset the increase in corporate trade credit.

### III.4.4 Outlook and risks

The outlook for the horizon of the *Report* signals that the solid external financial position of the economy and its sectors should hold. The slower growth of foreign debt should also continue, based on low net external financing needs resulting from the comfortable saving levels of the government and, to a lesser extent, the corporate sector. This should be reinforced by the maintenance of aggregate and sectoral developments that imply that a favorable composition of terms, interest rate conditions, ownership structure, and use of interest and exchange risk hedging instruments for external debt should continue. Projections indicate that conditions will remain favorable for access to foreign financing based on

low spreads of short- and long-term debt, in a context of gradual rises in international interest rates. Associated with this scenario, the international rating agencies are expected to keep the Chilean economy's sovereign risk rating at "stable" or "positive".

Nevertheless, there are risks of deviating from the baseline scenario in this *Report* (see Summary) such as a worsening of access conditions to external financing or a possible fall in the price of copper. In an extreme case, i.e., a sudden hike in external interest rates above expected levels, the economy would see an increase in the cost of external financing not only through higher base rates, but also through higher risk premiums in contracting new debt. Moreover, higher rates would also increase the external debt service that has already been contracted at variable interest rates, at a ratio of US$200 million for each 100 basis points. Thus, the direct effect on the balance of payments of a 550 basis point increase in external interest rates would be a larger debt service (capital outflow) of around US$1.1 billion, with an equivalent rise in the current account deficit. The effect of a fall in the copper price to US$0.60 per pound (the historical minimum of the last twenty years) would imply, assuming constant volumes, an additional worsening in the current account deficit by approximately US$4.4 billion, or 4.2% of GDP, maximum[35]/.

In any case, the economy is characterized by a macroeconomic policy framework based on an open capital account, a floating exchange rate, an inflation-targeting monetary policy, prudential regulation of the financial system, and a solid position of public finances, all of which should allow the economy to adequately face a situation of this nature. The Central Bank's holdings of international liquidity should contribute to mitigating these risks.

[35]/ This analysis includes a conservative estimate of the effect of the lower copper price on the returns on foreign direct investment in Chile. Should this risk materialize, the actual current account deficit would probably be less.

# IV. Financial institutions

## IV.1 Nonbank financial sector

*This chapter reviews the evolution of asset portfolios and the financial risks to which nonbank financial intermediaries (NBFI) are exposed. The NBFI include pension funds (PF), life insurance companies (LIC), and mutual funds (MF), which together hold investments that amount to approximately 95% of GDP. The investment decisions of the NBFI affect the financing conditions of the end users of credit and the banks, so their analysis is relevant to the financial stability of the economy.*

The portfolio composition of the nonbank financial intermediaries (PF, LIC, and MF) continues the trend exhibited over the past two years, characterized by a "search for yield" in an environment of low interest rates, reduced term premiums, and a gradual reduction in the supply of government notes and mortgage bills. This has translated into increases in the share of domestic and foreign variable-income instruments —conditioned on the existence of limits to some investors' specific investments— and changes in the composition of fixed-income securities, in which bank deposits have been slowly replacing positions in government notes and mortgage bills. However, these trends have been somewhat less pronounced since early 2005 (table IV.1).

**Table IV.1**

Investment portfolio of nonbank financial institutions

(percent)

| Instrument | 2002 | 2003 | 2004 | 2005 | | |
|---|---|---|---|---|---|---|
| | Dec. | Dec. | Dec. | Mar. | Jun. | Sept. (p) |
| State | 25.9 | 22.1 | 17.4 | 17.1 | 16.9 | 16.0 |
| Deposits | 22.3 | 16.8 | 20.4 | 21.6 | 21.5 | 21.6 |
| Bank bonds | 3.0 | 2.6 | 2.4 | 2.5 | 2.9 | 3.1 |
| Mortgage bills | 12.5 | 10.8 | 8.7 | 7.9 | 7.1 | 6.6 |
| Endorsable mortgage loans | 2.3 | 2.2 | 1.9 | 1.9 | 1.9 | 1.9 |
| Corporate bonds (*) | 10.8 | 12.8 | 13.0 | 12.3 | 12.9 | 12.9 |
| Domestic stocks | 7.3 | 10.9 | 11.9 | 12.6 | 12.9 | 13.2 |
| Investment abroad | 11.8 | 16.7 | 19.0 | 19.7 | 19.6 | 20.2 |
| Other | 4.0 | 5.1 | 5.2 | 4.5 | 4.4 | 4.7 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 |

(*) Includes commercial papers.
(p) Provisional figures.

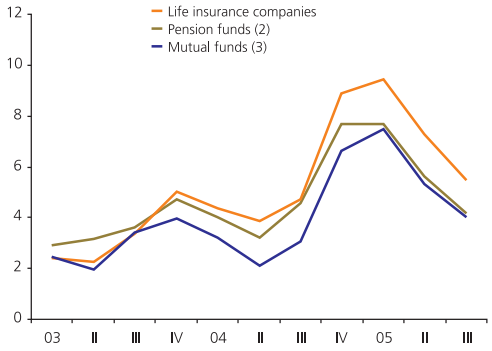
Sources:
SVS.
SAFP.

The most influential factor in the portfolio decisions of the NBFI in 2005 was the evolution of interest rates. Despite the rise in the monetary policy rate (MPR) beginning in September 2004, market rates on long-term

**Figure IV.1**

Prepayment of mortgage bills (1)

(percent of initial stock)



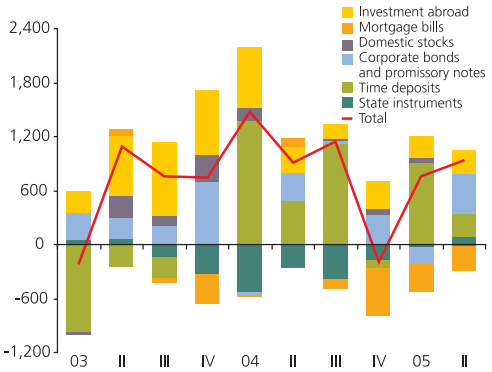

(1) Quarterly prepayments over the initial stock of mortgage bills in each period.
(2) Considers PFs and PF administrators (AFPs).
(3) Considers mutual fund and general fund administrators.

Source: Own calculations, based on data from DCV.

**Figure IV.2**

Nonbank financial institutions' portfolio, net of return on investments

(quarterly flow, billions of pesos of September 2005)

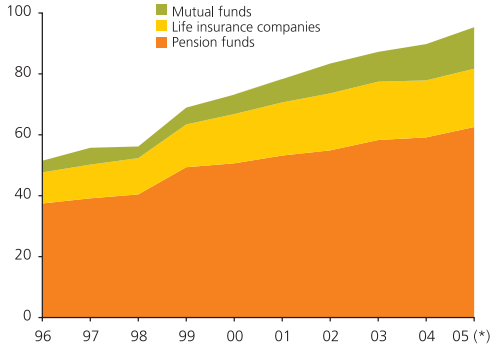



Source: Own calculations, based on data published by SVS and SAFP.

**Figure IV.3**

Relative importance of the nonbank financial institutions

(percent of GDP)




(*) Data as of September 2005.

Sources:
SVS, SAFP and Central Bank of Chile.

instruments continued to fall through the third quarter of 2005, provoking a reduction in the differentials between short- and long-term rates (chapter II). This "flattening" of the yield curve favored an increase in holdings of shorter-term deposits on the part of the NBFI, especially the PF. Another contributing factor in this process was the more pronounced increase in short-term bank deposit rates relative to the MPR, both at the end of 2004 and between May and June 2005.

Another important effect related to the environment of lower rates was the significant volume of mortgage loan refinancing operations, as low long-term interest rates turned attractive the prepayment of mortgage bills and endorsable mortgage loans with new loans contracted at lower rates (chapter III). The high rate of prepayment reduced the portfolio share of these debt instruments and highlighted the reinvestment risk in the balance sheets of the NBFI. In the case of mortgage bills, prepayment peaked at the end of the first quarter of 2005 and has since lost significance as the interest rate normalization process has advanced (figure IV.1).

The lower yields on domestic fixed-income instruments and the resulting search for higher relative yields by the PF, LIC, and MF have also contributed to the increase in the holdings of domestic stocks and investments abroad. The greater share of stocks appears consistent with the performance of the local stock exchange during 2005, whose index posted a real gain in pesos of 30% since 2004. Supply factors associated with higher saving levels by the public sector have contributed to a reduction in the government's share in NBFI portfolios.

Net investment flows by instrument provide additional evidence of the portfolio changes mentioned above, although the growth of variable-income instruments —domestic and foreign— in the aggregate has slowed down due to the reduced gap between maximum allowed investment and current investment. At the same time, more funds are being allocated to corporate bonds and time deposits, instead of mortgage bills (figure IV.2).

Given the relative size of the resources administered and their weight in the demand for local financial instruments (table IV.2), a reallocation of the NBFI portfolio could have important effects on shallow markets, generating price movements that could affect the financing conditions of other agents, such as banks, firms, and households. This factor could take on even greater significance in a scenario of steeper interest rate hikes. However, the long-term investment horizon of NBFI, especially those related to the management of pension funds, mitigates this effect (*Global Financial Stability Report*, IMF, September 2005) (figure IV.3).

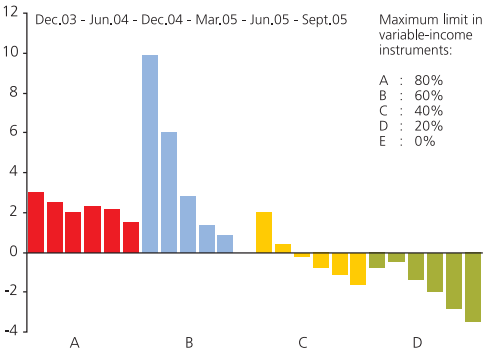
### IV.1.1 Pension funds

Pension funds investment in variable-income instruments shows sustained growth, mainly because of important increases in foreign securities (table IV.3). One of the factors that have contributed to this greater investment has been the transfer of contributors from more conservative funds (C, D, and E) to relatively riskier funds (A and B). This phenomenon dates from September 2003. Contributor preferences have tended to raise the PF's demand for domestic and foreign variable-income assets, as a result of the larger share of these instruments in the riskier funds. The gap between maximum allowed investment and current

**Figure IV.4**

Gap between maximum allowed investment and current investment in variable-income instruments, by type of fund (*)

(percent relative to the limit for each fund)




(*) Each bar corresponds consecutively to the periods defined in the figure.

Source: SAFP.

investment in variable-income instruments has progressively been exhausted in each type of fund, reaching $72 billion in September 2005 and then holding only for the A fund (figure IV.4).

**Table IV.2**

Investments of nonbank financial institutions

(percent, billions pesos)

| Market share | Nonbank financial institutions | | | | Stock (1) |
|---|---|---|---|---|---|
| | Pension funds | Life insurance companies (p) | Mutual funds | Total | |
| State instruments (2) | 33.3 | 9.7 | 5.0 | 48.0 | 19,517 |
| Time deposits | 32.6 | 1.2 | 18.0 | 51.8 | 24,320 |
| Mortgage bills and bank bonds | 33.3 | 29.9 | 9.6 | 72.7 | 7,734 |
| Corporate bonds and promissory notes | 31.5 | 48.3 | 9.4 | 89.1 | 8,433 |
| Domestic stocks | 8.3 | 0.6 | 1.4 | 10.3 | 75,340 |

(1) Total market stock in billions of pesos of September 2005.
(2) Central Bank, Treasury (BTU), and recognition bonds.
(p) Provisional figures.

Sources:
SVS.
SBIF.
SAFP.
INP.
Central Bank of Chile.

**Table IV.3**

Pension funds' portfolio, by instrument

(percent of portfolio, billions of pesos of September 2005)

| Instrument | 2002 | 2003 | 2004 | | 2005 | | |
|---|---|---|---|---|---|---|---|
| | Dec. | Dec. | Jun. | Dec. | Mar. | Jun. | Sept. |
| State | 30.0 | 24.7 | 21.2 | 18.7 | 18.5 | 18.1 | 16.9 |
| Mortgage bills | 11.1 | 8.9 | 8.3 | 6.8 | 6.0 | 5.4 | 4.9 |
| Time deposits | 21.2 | 15.0 | 18.2 | 19.4 | 20.3 | 20.6 | 20.7 |
| Corporate bonds and promissory notes | 7.2 | 7.7 | 7.1 | 7.1 | 6.8 | 7.1 | 6.9 |
| Domestic stocks | 9.9 | 14.5 | 14.4 | 15.7 | 16.1 | 16.2 | 16.3 |
| Fixed-income investments abroad | 4.0 | 3.0 | 3.3 | 2.4 | 1.6 | 1.0 | 0.5 |
| Variable-income investments abroad | 12.1 | 20.8 | 24.2 | 24.8 | 26.3 | 26.9 | 28.3 |
| Other | 4.4 | 5.4 | 3.5 | 5.2 | 4.4 | 4.7 | 5.5 |
| Total investments (billions of pesos) | 27,414 | 31,358 | 32,607 | 35,162 | 36,288 | 37,341 | 38,367 |

Source: SAFP.

With regard to the limit on investing abroad, the gap between maximum allowed investment and current investment for the total funds reached 1.2% in September 2005. The evolution of the exchange rate, however, has eased the pressure on this restriction over the course of the year (figure IV.5).

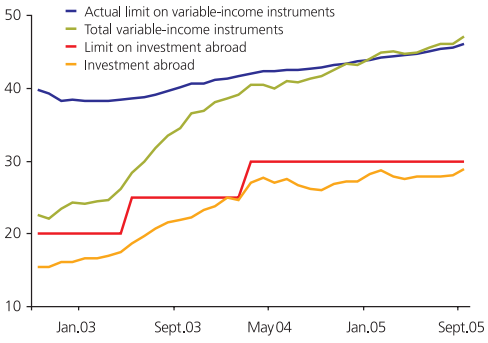
In the baseline scenario, based on the normalization of interest rates, the relative profitability of the different types of funds is expected to be better balanced. Nonetheless, scenarios featuring greater financial stress could generate some reversal of the flow of resources transferred to the relatively riskier funds. If the movements and transfers of affiliates are triggered by historical profitability, they could accentuate the price adjustment of the instruments in the markets.

The share of fixed-income instruments in the PF portfolios has followed the same trend as the NBFI in general, characterized by an increase in time deposits and a reduction of positions in state instruments and mortgage bills. The increase in bank deposits, the majority of which are

**Figure IV.5**

Limits on pension fund investments

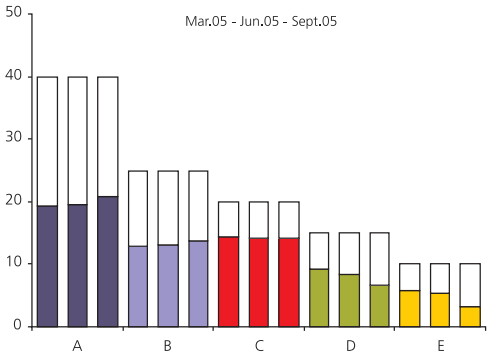
(percent of fund)




Source: SAFP.

**Figure IV.6**

Currency risk exposure, by type of fund (*)
(percent unhedged relative to the limit for each fund)

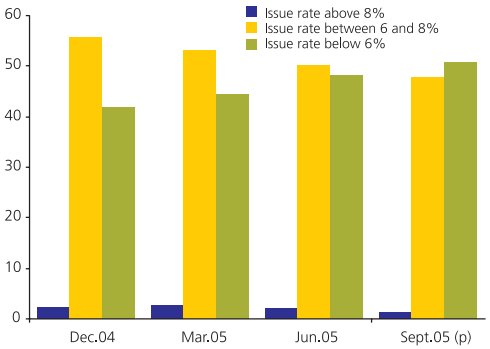



(*) Each bar corresponds consecutively to the periods defined in the figure.

Source: SAFP.

**Figure IV.7**

Mortgage bills of the LICs (*)
(percent)

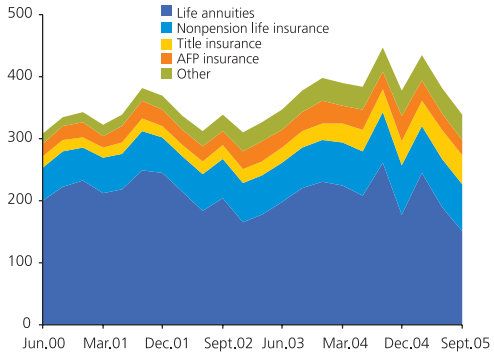



(*) Includes only mortgage bills with information on rates (50% of total mortgage bills in the portfolio).
(p) Provisional figures.

Source: SVS.

**Figure IV.8**

Direct premiums of the LICs
(quarterly flow, billions of pesos of September 2005)




Source: AACh.

for less than one year (81% of pension funds' total deposits), has tended to moderate over the course of the year. Nonetheless, the level reached means that the PF possess 33% of total bank deposits outstanding. The growth in deposits exhibited this year averages a real 28% per year. However, the gap between maximum allowed investment and current investment in fixed-income instruments by issuer has remained at around 65% of the funds' value.

The average maturity of the debt instruments of PF increased 5% since the close of the last *Report*, which is explained by the longer maturity of the state and corporate instruments. However, on considering the relative share of fixed-income instruments in the total portfolio, the total exposure of the PF to changes in interest rates remains constant for the period. The share of the portfolio exposed to exchange rate fluctuations was 14% in September 2005, with no material variations relative to the average for the year. The level of exchange rate hedging has grown considerably, reflecting the increase in the amount invested abroad: net sales in forward contracts reached US$11.7 billion. In September 2005, the PF's unhedged investments in all five types of funds were well below the maximum amounts allowed, despite the significant growth in investments abroad (figure IV.6).

### IV.1.2 Life insurance companies

In 2005, the share of investments by LIC in private debt instruments and investments abroad showed marginal increases, in line with the longer-term trend of the portfolio composition of this industry (table IV.4). Low interest rates have driven the companies to seek new investment strategies to maintain their portfolio yields, which has translated into a greater exposure to credit risk[1]/. Moreover, the composition of the investment portfolio has been affected by the high prepayment rates on mortgage instruments. In March 2005, LIC held a significant share of mortgage bills in potentially prepayable ranges, considering the going market rates at that point in time. However, the recovery of long-term rates at the end of the third quarter has partially arrested that phenomenon (figure IV.7).

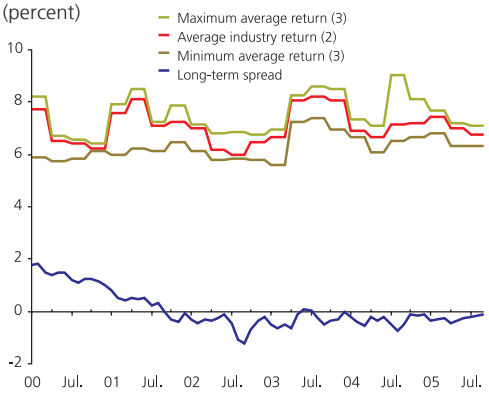
Total life insurance sales registered a real annual fall of 5% in September 2005. This is explained by a negative growth rate of 16% for annuities, while the remaining types of life insurance grew steadily, to an annualized 8% in September (figure IV.8). Annuities were affected by the low sales rates offered by the companies during the year and by the higher rates of programmed withdrawals offered by the Pension Fund Administrators. An analysis of a proxy for the LIC's long-term spread, i.e., the difference between the return on long-term state instruments and the sales rate of annuities, reveals that it remains very close to zero. This explains, in part, the decision to progressively incorporate other, relatively riskier instruments to improve portfolio yields (figure IV.9). Over 70% of the current investment yield levels are explained by the contribution of debt securities, especially corporate instruments, and, to an increasing degree,

[1]/ See Figueroa and Parrado (2005), included in *www.bcentral.cl/esp/publ/politicas/pdf/iefdic2005.pdf*.

**Figure IV.9**

Long-term spread in life annuities and return on investments (1)

(percent)



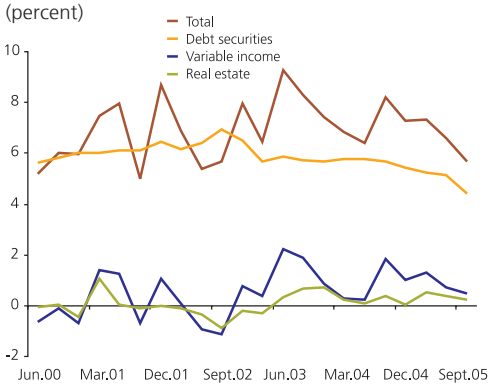

(1) Referential estimate of the long-term spread; difference between the rate on long-term state instruments and the life annuity sales rate.
(2) Quarterly return series.
(3) Corresponds to the maximum (minimum) average by size segment.

Source: SVS.

**Figure IV.10**

Return on investments

(percent)




Source: SVS.

by the profitability of variable-income instruments (figure IV.10). At mid-year the industry projected a 14% drop in total premiums for this year in real terms, but the higher long-term rates could favor a recovery of annuity sales in the coming quarters. In the medium term, the expected growth of household income should support a greater penetration of this type of insurance and, therefore, a greater volume of investment resources administered by the LIC.

**Table IV.4**

Life insurance companies' portfolio, by instrument

(percent of portfolio, billions of pesos of September 2005)

| Instrument | 2002 | 2003 | 2004 | 2005 | | |
|---|---|---|---|---|---|---|
| | Dec. | Dec. | Dec. | Mar. | Jun. | Sept. (p) |
| State | 19.3 | 17.7 | 17.1 | 17.0 | 16.5 | 16.1 |
| Time deposits | 1.9 | 1.2 | 1.8 | 2.6 | 2.3 | 2.6 |
| Bank bonds | 7.9 | 7.5 | 7.2 | 7.2 | 7.5 | 7.7 |
| Mortgage bills | 20.6 | 18.7 | 14.7 | 14.0 | 12.8 | 11.9 |
| Endorsable mortgage loans | 10.3 | 10.2 | 9.2 | 9.0 | 9.1 | 9.3 |
| Corporate bonds and promissory notes | 24.6 | 29.4 | 33.3 | 31.9 | 33.5 | 34.6 |
| Domestic stocks | 2.8 | 3.0 | 3.4 | 3.9 | 3.9 | 3.9 |
| Investment abroad | 2.4 | 1.9 | 2.6 | 3.2 | 3.2 | 3.0 |
| Real estate investments | 7.0 | 7.2 | 7.4 | 7.5 | 7.5 | 7.5 |
| Other | 3.2 | 3.2 | 3.3 | 3.9 | 3.6 | 3.3 |
| Total investments (billions of pesos) | 9,174 | 10,385 | 11,283 | 11,505 | 11,670 | 11,751 |

(p) Provisional figures.

Source: SVS.

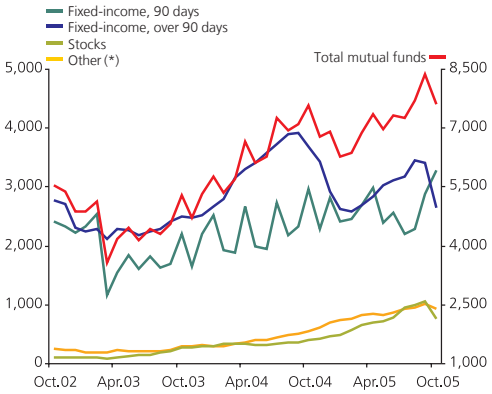
The industry's performance indicators were not significantly affected during the year, even considering the low interest rates and the deceleration of sales. Trends for the year include a fall in the contribution margin and an increase in administrative costs. Profitability indicators show less variation in the short term, because they are primarily accounting indicators based on historical costs. In this case, the lower interest rates generate counteracting effects in the investment result: on the one hand, the sale of fixed-income instruments in this period contributes positively to income, while on the other, the lower yields on the new investments that replace those instruments have a negative effect. Differentiating LIC by size reveals the dispersion of profitability during the year, showing a significant increase among medium-sized companies and a shrinkage of 8% among the smallest (table IV.5).

The limitations inherent in the statistical analysis of the LIC's balance sheets, the significant volume of prepayments registered in the past year, and the greater credit risk have driven the implementation of new forms of monitoring the solvency of the LIC and their claims payment capacity. In this spirit, the Superintendency of Securities and Insurance (SVS) issued a regulation incorporating an asset sufficiency test, which will enter into force in 2006. Under the framework of this new requirement, the LIC must evaluate their capacity to pay their commitments, adjusting their asset and liability flows based on prudential criteria and determining the sufficiency of their asset flows relative to their liability flows once the adjustment is realized.

**Figure IV.11**

Net equity, by type of fund

(billions of pesos of September 2005)



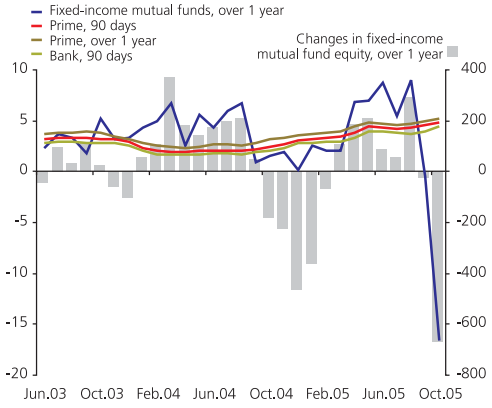

(*) Includes non-restricted, mixed, structured and institutional funds.

Source: SVS.

**Figure IV.12**

Comparative profitability of instruments

(annualized monthly rates, billions of pesos)




Sources:
SVS.
Central Bank of Chile.

**Table IV.5**

Life insurance companies' indicators (1)

(percent)

| Indicators | 2002 Dec. | 2003 Dec. | 2004 Jun. | 2004 Dec. | 2005 Mar. | 2005 Jun. | 2005 Sept. |
|---|---|---|---|---|---|---|---|
| Return on equity | 1.2 | 20.5 | 11.5 | 14.7 | 21.0 | 16.2 | 17.3 |
| Large | 0.9 | 27.2 | 9.7 | 12.1 | 18.8 | 13.6 | 15.1 |
| Medium | -3.6 | 17.2 | 9.3 | 10.8 | 20.6 | 17.0 | 20.3 |
| Medium-small | 9.5 | 12.7 | 17.0 | 22.8 | 28.4 | 23.5 | 20.5 |
| Small | 5.3 | 16.7 | 17.7 | 24.8 | 23.7 | 16.6 | 17.1 |
| Earnings over sales | 1.3 | 12.4 | 8.1 | 9.2 | 14.3 | 11.9 | 12.3 |
| Large | 0.6 | 17.5 | 8.5 | 9.0 | 12.7 | 10.0 | 11.4 |
| Medium | -2.1 | 8.0 | 5.3 | 6.5 | 12.9 | 11.2 | 13.7 |
| Medium-small | 9.9 | 6.9 | 8.1 | 10.7 | 17.2 | 15.7 | 7.8 |
| Small | 9.5 | 21.5 | 32.3 | 22.5 | 43.0 | 28.8 | 29.5 |
| Admin. expenses over sales | 13.9 | 14.5 | 14.1 | 15.1 | 13.9 | 15.9 | 16.9 |
| Large | 12.3 | 12.0 | 12.0 | 12.0 | 8.4 | 11.2 | 12.0 |
| Medium | 8.6 | 8.5 | 9.3 | 11.8 | 15.9 | 15.2 | 16.0 |
| Medium-small | 27.5 | 26.8 | 27.8 | 24.4 | 31.5 | 30.2 | 35.3 |
| Small | 31.2 | 32.6 | 22.9 | 29.8 | 24.9 | 24.4 | 25.1 |
| Technical results of insurance (2) | 1.8 | 14.5 | 9.2 | 12.3 | 15.1 | 14.1 | 15.0 |
| Return on investment | 6.5 | 8.2 | 6.7 | 7.2 | 7.4 | 7.0 | 6.8 |
| Operating income / Technical income | -43.3 | -40.9 | -38.0 | -38.2 | -34.3 | -36.0 | -34.6 |
| Contribution margin (2) | -27.4 | -24.6 | -21.4 | -20.5 | -19.1 | -18.5 | -16.3 |

(1) Size of the institution is defined by market share: large (over 6%), medium (3 to 6%), medium-small (1 to 3%), and small (less than 1%).
(2) Over direct premiums.

Sources:
SVS.
AACH.

## IV.1.3 Mutual funds

Mutual fund equity has continued to increase since the close of the last *Report*, showing a real average twelve-month growth rate of 12% in the first three quarters of 2005. In October, however, a net outflow of resources of 9% was recorded. This is explained by the rise in long-term rates and the lower yields on domestic stocks in that month (figure IV.11).

One of the most notable facts in this industry has been the cycle experienced by the medium- and long-term fixed-income funds (more than one year). These funds administer very liquid resources that are sensitive to short-term variations in the interest rate. The upsurge in long-term rates starting in October provoked a new reversal in these funds (23% in real terms) and led investors to privilege shorter-term investments, specifically in money-market funds with maturities of less than ninety days (figure IV.12).

The good performance by the stock market through the end of the third quarter of 2005 stimulated the growth of equity (stock) mutual funds and other types of funds that incorporate variable-income instruments in their portfolios. Structured funds, in turn, have recorded steady growth since their introduction in late 2003[2]/.

[2]/ Structured funds are mutual funds with mixed investment strategies (fixed yield, variable yield, and derivatives), which offer a guaranteed minimum return tied to the performance of a specified asset and subject to a minimum holding period.

The growth path of each type of fund has affected the structure of the MF system's portfolio. Over the course of the year, stocks have registered a significant increase in the portfolio, practically doubling as a result of the strong growth of funds with a strong emphasis on variable-income instruments. At the same time, mortgage bills and time deposits have seen a reduction. Despite this drop, however, time deposits demanded by MF continue to be an important source of financing for the banking system, accounting for 18% of banks' total deposits (table IV.6).

**Table IV.6**

Mutual funds' portfolio, by instrument

(percent of portfolio, billions of pesos of September 2005)

| | 2002 | 2003 | 2004 | 2005 | | |
|---|---|---|---|---|---|---|
| Instrument | Dec. | Dec. | Dec. | Mar. | Jun. | Sept. |
| State | 15.3 | 15.1 | 11.5 | 10.2 | 12.0 | 11.6 |
| Time deposits | 66.8 | 57.7 | 56.4 | 58.0 | 54.7 | 52.2 |
| Bank bonds | 0.6 | 0.6 | 1.6 | 1.5 | 1.9 | 2.3 |
| Mortgage bills | 5.0 | 6.8 | 8.9 | 7.2 | 6.8 | 6.5 |
| Corporate bonds | 4.2 | 6.9 | 7.3 | 6.4 | 7.1 | 7.1 |
| Commercial papers | 0.7 | 3.3 | 2.5 | 2.5 | 2.5 | 2.3 |
| Domestic stocks | 1.4 | 4.8 | 6.5 | 8.7 | 10.1 | 12.4 |
| Investment abroad | 5.4 | 4.3 | 4.0 | 4.4 | 3.9 | 4.6 |
| Other | 0.6 | 0.6 | 1.2 | 0.9 | 1.0 | 1.0 |
| Total investments (billions of pesos) | 4,860 | 5,315 | 6,908 | 7,305 | 7,694 | 8,339 |

Source: Own calculations, based on data from SVS.

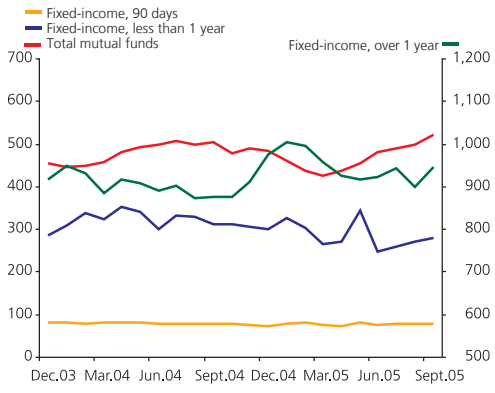
One of the main attractions of saving in mutual funds is the liquidity that these financial vehicles can offer their participants. This depends, however, on the depth of the financial markets in which they operate relative to the size of the portfolios administered, among other factors. Changes in the expected returns or other exogenous events that induce an abnormally large volume of contributions or withdrawals may put pressures on the prices of some financial instruments. This type of situation is of interest considering the high growth experienced by the mutual fund industry in Chile in the past few years. Given the transaction volumes in the local secondary markets, however, it would be possible to absorb significant equity variations in the short term. By way of illustration, consider a variation equivalent to two and a half times the historical equity volatility of money market funds, which are concentrated in financial intermediation instruments; this would be equivalent to four days of transactions in the secondary market. In the case of medium- and long-term fixed-income funds, an equivalent equity variation is estimated to be equal to two days of transactions in the secondary fixed-income market. In the case of stock or equity funds, the ratio of the equity volatility to the volume of transactions in the stock exchange equals three days of transactions.

The evolution of portfolio duration measures for the mutual funds provides evidence on the funds' sensitivity to the interest rate cycle. The trend through September 2005 indicates that mutual funds increased the duration of their portfolios as a result of the growth of medium- and long-term fixed-income funds in the period. This increase in interest rate risk exposure negatively affected the industry in the recent upward cycle of long-term interest rates (figure IV.13). Exposure to foreign currency risk has remained stable at around 8% of the portfolio, accruing a net sales position equal to US$120 million as of September 2005.

**Figure IV.13**

Duration of fixed-income mutual funds and of the system total

(days)




Source: SVS.

## IV.2 Banking sector

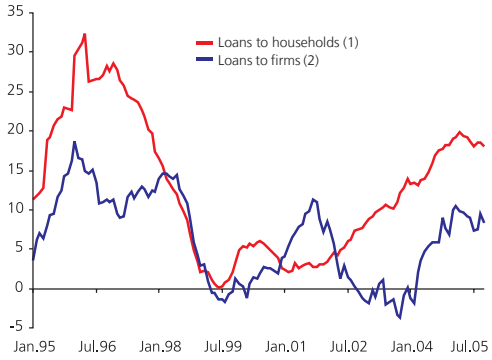
*This section presents the situation of the local banking system —whose assets are currently approaching 100% of GDP— from the perspective of financial stability. The analysis centers on the evolution of the sector's activity, its capital solvency, and its exposure to credit, market, and liquidity risk.*

Bank credit has continued to expand more than economic activity. In the last two years, the banking sector has increased its exposure to the retail segments in relative terms. The main indicators of credit risk have continued to improve in the recent period, in a context of stronger corporate and household income. The profitability of the banking system has remained relatively stable since 2001, as a result of a reduction in loan portfolio costs (provisions plus write offs and alike) and an increase in operating efficiency, which have partially offset the gradual reduction in the net interest margin. Capital adequacy indices have tended to fall, given the higher growth of loans. This, in any case, does not appear to constitute a restriction on the expansion of banking credit in the coming months. All the banking institutions currently exhibit a capital adequacy index of over 10%. At the same time, a narrowing of liquidity gaps and a greater exposure to interest rate risk have been observed in the margin, despite the larger long-term bank bond issues registered in 2005. In sum, the situation of the banking sector as a whole remains solid. Nevertheless, given the overall risk outlook, it seems advisable to persevere in the prudent management of credit and market risk exposure, so as to be prepared to face an unforeseen worsening in the international scenario or in the other sectors of the economy.

**Figure IV.14**

Growth in loans

(real twelve-month variation, percent)




(1) Mortgage and consumer loans.
(2) Commercial and foreign trade loans.

Source: SBIF.

### IV.2.1 Activity, profitability, and capital solvency

The growth of bank credit continued to accelerate in 2005, maintaining the trend it began in early 2004. Total loans increased a real annual 12.1%, on average, in the January–October period. This figure is considerably higher than the 8.1% registered in 2004 (figure IV.14).

#### *Credit exposure to the household sector increases*

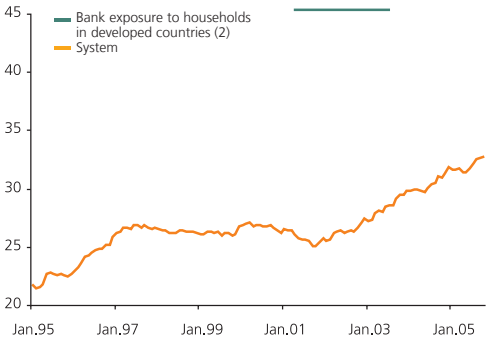
While the growth of bank loans to the corporate sector was significant in 2005, at nearly 9% annualized in real terms, the greatest expansion was registered in the household sector (consumer and housing), which exhibited an average real annual growth rate of about 19%. This is consistent with the favorable evolution of consumption and housing purchases stimulated by low interest rates, which have led the banking system to a historical peak of credit exposure to the household sector, at over 30% (figure IV.15).

In contrast with previous periods, the most significant growth of household loans in the current cycle was recorded in the largest banks, whose share in this segment increased from 62% in 1998 to nearly 70% in 2005. This reflects the growth strategies developed by some institutions during this period, including loan portfolio purchases and mergers[3]/.

**Figure IV.15**

Bank exposure to households (1)

(percent)



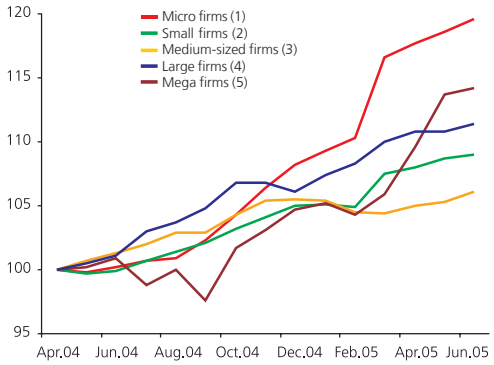

(1) Mortgage and consumer loans over total loans.
(2) Average of developed European countries (2002).

Sources:
Own calculations, based on data from SBIF.
European Central Bank.

[3]/ The market share of larger banks in consumer loans rose from 49% in 1998 to 64% in 2005, while it fell from 77% to 75% in mortgages.

**Figure IV.16**

Bank loans to firms, by amount of debt
(Index: April 2004=100, based on the stock of loans)

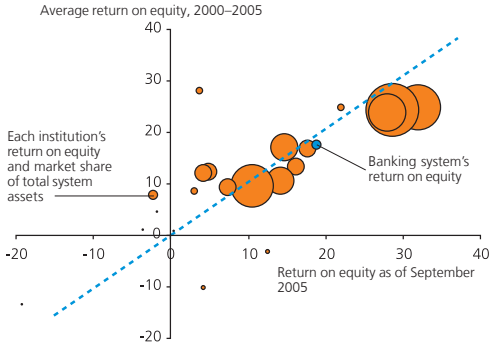



(1) Firms with debt of less than UF 500.
(2) Firms with debt between UF 500 and UF 4,000.
(3) Firms with debt between UF 4,000 and UF 18,000.
(4) Firms with debt between UF 18,000 and UF 200,000.
(5) Firms with debt over UF 200,000.

Source: Own calculations, based on data from SBIF.

**Figure IV.17**

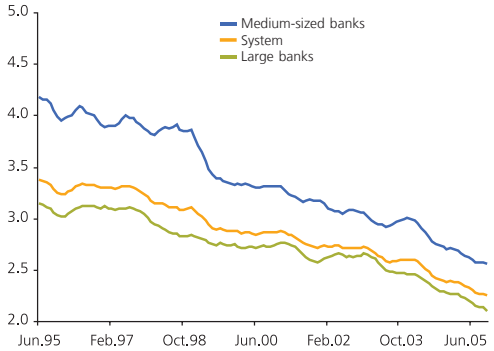
The banking system's return on equity
(percent)




Source: Own calculations, based on data from SBIF.

**Figure IV.18**

Operating efficiency (*)
(percent)




(*) Overhead costs over total assets.

Source: SBIF.

As a result, household credit exposure is currently relatively more concentrated in entities whose businesses and sources of income are, in principle, more diversified.

The expansion of bank credit to the corporate sector, in turn, began to recover in early 2004. Since then, loans to this sector have been highly and steadily dynamic, with real annual growth rates over 9% in 2005. More dynamic growth has even been observed in the micro business segment (figure IV.16): although it represents less than 2% of total loans to the sector, this segment grew, on average, 19% in real terms during the year.

### *Bank profitability remains high and stable*

Between 2001 and October 2005 (with the exception of 2002), the banking system's return on equity exceeded 15%. In the past year, capital yields have been stable at over 18%, exceeding the average of the last five years (17%).

The reduction in loan loss provisions and the continuous improvement in operating efficiency have contributed to maintaining these high profitability ratios. In particular, the group encompassing the largest banks and the institutions oriented to the consumer segment has obtained annualized profitability rates on the order of 30% in 2005.

While the larger private banks appear to continue taking advantage of economies of scale to increase their operating efficiency, the consumer banking system has also been able to expand in an environment of low relative risk. As of October 2005, the larger banks' operating costs were the equivalent to 2.1% of total assets (figure IV.18). Niche banks oriented toward the consumer segment have benefited particularly from the drop in loan loss provisions and the maintenance of high net interest margins.

The increase in operating efficiency and the reduction in loan portfolio costs have been transferred to customers through lower net interest margins.

Since early 2004, the net interest margin has been situated at a historical low, equivalent to 3% of total assets. Despite this stability, its components have developed unevenly, to the extent that money market financing costs[4]/ rose above the average deposit rate during the year (figure IV.19). This reflects the change in the composition of bank liabilities, which essentially stems from the strong growth of demand deposits. These cost-free liabilities, together with the higher bond issues, have allowed banks to bring their average interest payments to near 2% of assets.

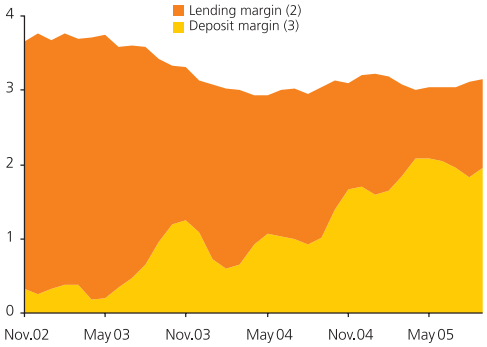
### *Capital adequacy indices remain above 10%, although they have been pushed downward by the growth of bank assets*

As a result of the strong expansion of loans, the capital adequacy index began to fall in 2004, recording a drop of 70 basis points to date.

[4]/ Captured by the evolution of the three-month average interest rate of Central Bank two-year peso bonds (BCP-2).

**Figure IV.19**

Breakdown of the net interest margin (1)
(percent)

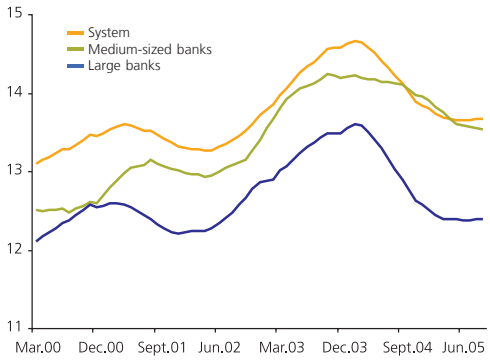



(1) Equal to net annual income from interest and indexation, as a percent of total assets. Indexation does not include peso operations that are indexed to the exchange rate variation.
(2) Difference between interest and indexation earned as a percent of total assets and the three-month moving average of the BCP-2 rate.
(3) Difference between the three-month moving average of the BCP-2 rate and interest and indexation paid as a percent of total assets.

Sources:
Own calculations, based on data from SBIF and Central Bank of Chile.

**Figure IV.20**

Capital adequacy index (*)
(twelve-month moving average, percent)




(*) Regulatory capital over risk-weighted assets.

Source: Own calculations, based on data from SBIF.

Nevertheless, the current level (13.3%) is above its historical average, owing to capital in excess of the regulatory minimum accrued in previous years (figure IV.20). Moreover, regulatory capital has expanded approximately 11% in the last year, as a consequence of the larger subordinate bond issues (around US$600 million) and capitalization of earnings (around US$230 million).

All told, the current level of capital adequacy does not appear to constitute a restriction on the continued growth of bank credit, to the extent that the current levels of earnings retentions and subordinate debt issues are maintained.

## IV.2.2 Credit risk

### *Credit risk indicators continue to improve*

Thanks to the current macroeconomic climate, the payment capacity of the banking system's debtors has improved notably since early 2003. The volume of nonperforming loans has fallen steadily in the period, to annual rates of 13%. Similarly, the main indicators of credit risk have reflected a relative improvement in loan quality. Nonperforming loans as a percentage of total loans amounted to 1% in October 2005, its lowest level in eight years. The methodology used to calculate nonperforming loans in Chile differs from the practices of other financial systems; an approximation to these standards would raise the nonperforming loan index to nearly 3% (box IV.1). The stock of provisions is 1.7%, thus reflecting a coverage level of 60%. Finally, the increase of loan loss provisions and write-offs, measured through provision expenses, was 1% of loans in October, its lowest since 1998 (figure IV.21).

## IV.2.3 Credit risk stress tests

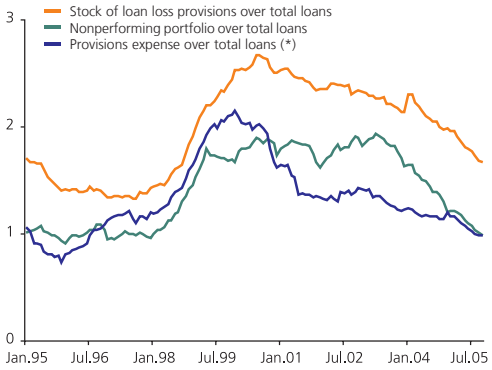
One of the main risk scenarios that the local banking system could face involves the combination of a relatively sharp slowdown of economic activity and an unexpected interest rate hike. In the past, such scenarios caused significant drops in the payment capacity of debtors, increased provisions, and, in many cases, direct write-offs of unrecoverable loans. The appearance of this type of risk scenario can thus be expected to trigger a significant change in the evolution of loan loss provisions and write-offs, with a direct effect on profitability and the capital adequacy level of individual banking companies.

The credit risk stress tests performed for this analysis considered the historical evolution of loan loss provisions and write-offs for each banking institution. This involved taking the maximum historical level of loan loss provisions in a given year, which fluctuated between 63 and 500 basis points depending on the type of institution and the composition of its loan portfolio. The results of this exercise show that the system's aggregate profitability could fall from 18% to 5% of capital as a direct consequence of the increase in provisions and the drop in the interest-generating margin. At the individual level, the exercise indicates that some relatively smaller institutions could have losses. At the system level, however, the impact would be lower, because these institutions represent less than 20% of total system assets. The capital adequacy index, in turn, would stay above 10%

**Figure IV.21**

Credit risk indicators

(percent of loans)



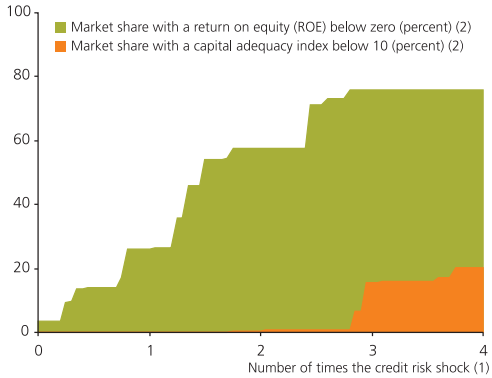

(*) Annualized based on the twelve-month moving sum of the monthly flow.

Source: SBIF.

**Figure IV.22**

Impact of the credit risk shock

(as of August 2005)



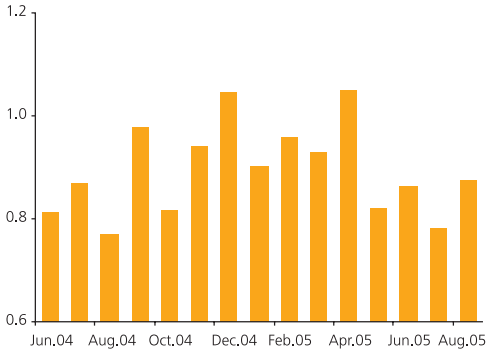

(1) Measured as a function of the maximum annual increase in provisions expense over loans.
(2) For different magnitudes of the shock.

Source: Own calculations, based on data from SBIF.

**Figure IV.23**

Seven-day maturity gap (*)

(times core capital)




(*) Difference between expenses and income flows.

Source: Own calculations, based on data from SBIF.

in all banking institutions (figure IV.22). The capital adequacy index for the system as a whole would thus be immune to a credit risk shock of this nature and would maintain its current level of 13.3%. This is explained by the fact that accrued earnings would largely offset the losses generated in this scenario, and the calculation of the indicator generates compensatory effects associated with the larger volume of provisions.

## IV.2.4 Liquidity, financing sources, and market risks

### *Liquidity gaps have shrunk*

In the past year, the growth of banking credit has been financed mainly through short-term funds (demand and time deposits, liquid assets, and credit lines), such that the share of capital and fixed-income instruments has diminished[5]/. As a result, the banking system's liquidity gaps have fallen since late 2004, while its interest rate risk has risen slightly. Thus, the widening in the gap between liabilities and assets coming due in less than seven days, which the system experienced at the beginning of this year, has been eliminated (figure IV.23). The change in the term structure of the banking system's financing sources has translated into a marginal increase in interest rate risk exposure, due to the increase in the gap between asset and liability duration from 4.9 to 5.3 months between September 2004 and August 2005[6]/. The composition of rate risk shows that more than 80% of the exposure comes from the banking book[7]/, which is consistent with the faster growth of the loan portfolio relative to the financial investment portfolio (figure IV.24).

However, a process of restructuring the banking system's liabilities has been underway since September 2004, correcting the aforementioned tendency. In particular, banks whose interest rate and liquidity risk exposure increased in the past year account for the largest growth in long-term debt issues (approximately US$1.6 billion). This has been partly offset by smaller mortgage bill issues. As a whole, the share of fixed-rate financing sources in total bank financing has fallen to its lowest level in ten years.

## IV.2.5 Market risk stress exercises

The mismatch in the duration of the banking system's assets and liabilities exposes the regulatory capital to changes or shifts in the term structure of interest rates. Thus, for example, upward shifts of the interest rate curve reduces earnings, because of both the fall in the net interest margin (repricing gaps) and the loss in portfolio value. In addition, the change in the interest rate structure directly reduces regulatory capital, because of the lower economic value of the permanent portfolio.

To evaluate the effects of a scenario involving an interest rate hike, we assumed an increase in the yield curve of 300 basis points for the segment

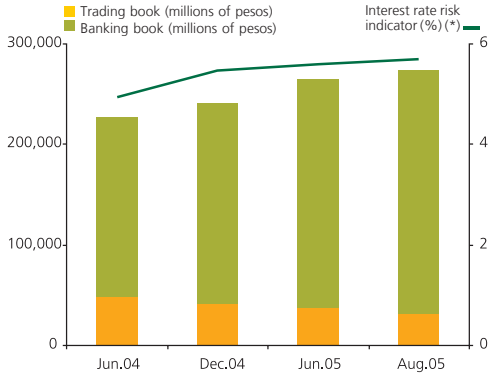
[5]/ The characteristics of bank financing and its liquidity risk exposure are analyzed in the paper by Jara and Winkler (2005), included in *www.bcentral.cl/esp/publ/politicas/pdf/iefdic2005.pdf*.

[6]/ Latest available data.

[7]/ The banking book is made up of assets that the bank does not intend to transfer in the short term.

**Figure IV.24**

Composition of the system's exposure to interest rate risk (millions of pesos and percent)




(*) Interest rate risk exposure over regulatory capital.

Source: Own calculations, based on data from SBIF.

of up to five years and 550 basis points for the upper segment. The results of this exercise show that capital returns could be reduced from 18% to about 12% and that the capital adequacy index could fall slightly, by somewhat less than 50 basis points.

The individual results of the exercise, through August 2005, indicate that all banks would maintain a capital adequacy index of over 10%, which is explained by both the profitability level and the initial equity situation of the institutions.

Given the low currency risk exposure that characterizes the local banking system, nominal exchange rate variations of up to 30% would cause a low impact on the system's profitability, and its effect on the capital adequacy index would be null.

### IV.2.6 Outlook

The data available to date indicate that the banking sector as a whole maintains a solid financial position. Nevertheless, scenarios combining a slowdown of economic activity and employment growth and sharper increases in market interest rates could be expected to cause a rise in loan loss provisions and, possibly, a reduction in the net interest margin. This could be particularly significant for banks that have increased their level of household credit exposure, since consumer loan provisions appear to be especially sensitive to adverse macroeconomic scenarios.

Consequently, it is important for banking institutions to persevere in the prudent management of credit and market risk exposure, identifying the most relevant scenarios for each institution and adopting the necessary safeguards. They will thus be adequately prepared to face any unforeseen worsening in the international situation or in other sectors of the economy.

# Box IV.1: **Adjusted nonperforming loan index**

**Table IV.7**

Nonperforming loan index
(percent, various countries)

| | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|
| Brazil | 5.6 | 4.8 | 4.8 | 3.9 |
| Chile | 1.6 | 1.8 | 1.6 | 1.2 |
| Mexico | 5.1 | 4.6 | 3.2 | 2.5 |
| Colombia | 9.7 | 8.7 | 6.8 | 3.3 |
| United States | 1.3 | 1.4 | 1.1 | 0.8 |
| England | 2.6 | 2.6 | 2.5 | 2.2 |
| Japan | 8.4 | 7.2 | 5.2 | 2.9 |
| South Korea | 3.3 | 2.4 | 2.6 | 1.9 |
| Malaysia | 17.8 | 15.8 | 13.9 | 11.8 |
| Israel | 8.2 | 9.8 | 10.5 | 10.5 |
| Czech Republic | 13.7 | 10.6 | 4.9 | 4.1 |

Source: IMF, Global Financial Stability Report. September 2005.

Methodological differences complicate the comparison of the nonperforming loan index of the Chilean banking system with that of other banking systems[8]/ (table IV.7).

The treatment of nonperforming loans varies across countries in several aspects, including the percentage of a default loan that is transferred to nonperforming loans and the point at which a loan is considered overdue. In relation to the latter, the Chilean regulation[9]/ establishes that a default loan is classified as nonperforming when it becomes 90 days overdue. It further establishes that nonperforming loans should incorporate only the percentage of the loan that is default, and that this can only be accelerated 90 days after a judicial complaint is filed on the loan[10]/.

The box presents an adjustment to the nonperforming loan portfolio measure that incorporates the acceleration of unpaid loans, to facilitate international comparisons.

### Nonperforming loan adjustment

A first adjustment to nonperforming loans, performed by the Superintendency of Banks and Financial Institutions (SBIF), presents nonperforming loans based on default equal to or greater than 30 days[11]/. This adjustment, however, maintains the criterion of classifying as nonperforming only the unpaid portion of the default loan. Considering data for September 2005, the system's nonperforming loan index increases from 1.01% to 1.22%. If the total outstanding balance of the default loan is classified as nonperforming —that is, if the overdue loans that currently only consider a share of the total debt are "accelerated"— then the nonperforming loan index reaches 2.8%.

Carrying out this latter adjustment requires information on specific characteristics of the bank debt, such as default, maturity, the existence of acceleration clauses, and type of loan. SBIF estimates[12]/ indicate that the unaccelerated share of overdue loans represents 1.6% of commercial

[8]/ See *World Bank* (2003).

[9]/ Chapters 8–26 of SBIF's *Recopilación Actualizada de Normas*.

[10]/ This is valid exclusively for loans payable in installments or loans contracted with acceleration clauses.

[11]/ "Indicators subject to stress" on the SBIF website. As of May 2005.

[12]/ Estimates were presented in the framework of preparing the Financial Sector Assessment Program (FSAP) for Chile (IMF and World Bank, 2004).

**Table IV.8**

Adjusted nonperforming loan index

(percent, September 2005)

| | Commercial | Consumer | Mortgage | Total |
|---|---|---|---|---|
| Nonperforming loan index | 1.5 | 0.6 | 0.9 | 1.0 |
| Adjustment | 1.1 | 1.4 | 5.3 | 1.8 |
| Adjusted nonperforming loan index | 2.6 | 2.0 | 6.2 | 2.8 |

loans, 2.2% of consumer loans, and 3.7% of housing mortgages. The differences are explained mainly by the respective duration of the loans. For example, in the case of housing mortgages, which can be contracted for up to 30 years, this adjustment translates into an increase of over six times the original nonperforming loan indicator (from 0.9% to 6.2%). For business loans, on the other hand, the adjustment is relatively minor (from 1.5% to 2.6%). Table IV.8 presents the estimates of the nonperforming loan index for each type of loan.[13]/

While the methodology used in this exercise is not perfect, the estimation allows a better comparison of the current levels of nonperforming loans with international standards. The result obtained —namely, an increase from 1.0% to 2.8%— compares favorably with the level of default in the banking systems of Latin American countries, although it is slightly higher than it is in more economically developed countries.

In any case, nonperforming mortgage loans, which represent 19% of total nonperforming loans, do not necessarily constitute expected losses, since housing loans are backed by real collateral covering a high fraction of the loan.

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International Monetary Fund, "Chile: Financial Stability Assessment." 2004.

Superintendency of Banks and Financial Institutions (SBIF), "Cartera Vencida. Tratamiento de Colocaciones e Inversiones Financieras Vencidas," Chapters 8–26 of *Recopilación Actualizada de Normas.*

Superintendency of Banks and Financial Institutions (SBIF), "Indicadores de Riesgo Sujeto a Tensión," http://www.sbif.cl/sbifweb/servlet/InfoFinanciera.

Standard & Poor's, "Latin American Banks: A Look at the Asset Quality Picture." May 2003.

World Bank, Working paper 1, "Bank Loan Classification and Provisioning Practices in Selected Developed and Emerging Countries." 2003.

[13]/ These estimates assume that the characteristics of the different types of loan, in terms of default and duration, are held constant from the start of the SBIF implementation. This generates a slight downward bias, considering that the average duration of loans has increased in recent years.

# V. Financial regulations and infrastructure

*This chapter reviews recent developments and initiatives in the area of financial guidelines and prudential regulation, both in Chile and abroad, as well as aspects related to the functioning and development of payment systems and the infrastructure that supports the workings of the financial markets.*

## V.1 Financial guidelines and prudential regulations

### V.1.1 Regulations issued by the Central Bank of Chile

*Market risk (January 2005)*

In January, the Central Bank of Chile issued new regulations on market risk (interest rate and currency) that banking companies and established financial corporations in the country must observe and that entered into force on 4 July 2005. This new regulatory framework is oriented toward promoting adequate management and monitoring of financial risks. It incorporates international standards and recommendations on the matter, such as the 1996 Amendment to the Basel Committee's 1988 Capital Accord and the 2004 recommendations on the administration and supervision of interest rate risk incorporated in the Second Pillar of the New Capital Accord (Basel II).

The principal characteristics of the new regulations include the following:

- The role of the board of directors of financial institutions in the formulation of a "Policy on the Administration of Market Risks" in line with the scale and complexity of the entity's operations and consistent with the standards and criteria for evaluating management and solvency established by the Superintendency of Banks and Financial Institutions (SBIF). The board of directors should keep itself informed on the market risk exposure of its respective institution and compliance with the approved policy.
- The establishment of quantitative limits on exposure to interest rate risk in the trading book and on exposure to currency risk in the balance sheet, as a function of the financial institution's actual equity and its exposure to credit risk.
- The incorporation of a basic or "standardized" methodology for measuring and monitoring market risk exposure, to be applied by all financial institutions. Nevertheless, institutions with a level A solvency classification and with prior authorization by the SBIF can apply their own "internal" models that are equally effective for measuring and monitoring the limits of market risk exposure.

- The obligation to periodically carry out "stress tests" with regard to all activities that generate market risk exposure, considering scenarios that are relevant to the institution's balance sheet structure and the scale and complexity of its operations.

### *Standing liquidity facility (January 2005)*

Also in January, modifications were made by the Central Bank to the rules and procedures through which it carries out its regular open market transactions. These changes are oriented toward perfecting the monetary policy tools employed to stabilize interbank domestic-currency loan rates around the monetary policy target rate (MPR) set by the Board.

Thus the Central Bank incorporated a new "standing liquidity facility in domestic currency" (*Facilidad Permanente de Liquidez*, or FPL), which allows banking institutions to access liquidity in domestic currency from the Central Bank on one-day terms through securities purchase transactions with a repurchase agreement (repos). In addition, operative aspects of the Liquidity Deposit were modified, renaming it the "standing deposit liquidity facility in domestic currency" (FPD). Operative aspects of the current "Credit Line Liquidity" were also simplified; its use remained subject to the express authorization of the Central Bank in exceptional cases or situations.

The use of the new standing liquidity facility is subject to an annual interest rate equal to the monetary policy rate plus 0.25. The standing deposit liquidity facility is associated with an annual rate equivalent to the monetary policy rate minus 0.25.

### *Modernization of regulations on derivatives transactions (June 2005)*

In the context of the program to modernize financial regulations, in June the Central Bank modified the regulations on derivative transactions, authorizing banking institutions to offer contracts with call and put options on currencies, realignment indices, and interest rates. This initiative is aimed at promoting the development and deepening of the Chilean financial market by broadening the local supply of financial risk hedging instruments.

Pursuant to the new regulation (which is included in chapter III.D.1 of the Compendium of Financial Regulations) banking entities that issue options must have a level-A solvency rating, in line with the classification referred to in article 61 of the General Banking Law. At the same time, to adequately manage and monitor the market risk associated with issuing this type of derivative, they must have access to models authorized by the SBIF for calculating the corresponding sensitivity and volatility factors.

This initiative is directly related to the new regulations on managing and monitoring market risk approved in January. It provides the basic criteria for quantifying the risks associated with open option positions, and limits their exposure as a function of the available capital floats once the charges related to credit risk exposure are deducted.

## V.1.2 Regulations issued by other supervisory organizations in the country

### *Criteria for the valuation of financial instruments and derivative products (SBIF, January 2005)*

The SBIF incorporated into its regulations the concept of fair value and the criteria for measuring it adequately. The objective was to support banking entities in the process of coming in line with international standards.

The determination of the fair value of financial instruments and derivative products constitutes a relevant element for the due administration of market risks and the application of the corresponding accounting criteria. The main characteristics of the regulations include the following:

- Definition of fair value: in general, it means the price at which a financial instrument would trade in a free and voluntary transaction among interested parties that are correctly informed and independent from each other. The fair value of a financial instrument should thus reflect the value that the entity would receive or pay to trade on the market.

- The role of the board of directors: banks should adopt documented policies and procedures for permanently valuing all the financial instruments that make up their positions at their fair value. At the very least, these policies should cover aspects such as models, methodologies, controls, and segregation of functions, and they should be reevaluated once a year.

### *New mortality tables for life insurance companies (SVS, April 2005)*

The mortality tables must reflect life expectancy indicators since life insurance companies use them to calculate their technical reserve requirements under current regulations, and these reserves must be sufficient to back up their financial obligations. The tables are also relevant for calculating retirement pensions under the "scheduled withdrawals" offered by the Pension Fund Administrators (AFP). Given that the tables were last updated in 1985, the Superintendency of Securities and Insurance (SVS) announced the use of new mortality tables in October 2004. These tables began to be applied to market life annuities as of March 2005.

In April 2005, the SVS extended the application of the new mortality tables to the stock of retirement annuity reserves, which represent 92% of total technical reserves. This modification was complemented with other regulatory changes oriented toward reducing the immediate impact of the new statistics on reserve levels. These include a one-point-a-year increase in the debt limit from 15 to 20 times the ratio; this implies, in practice, reducing the capital requirement from 6.7% of reserves to 5%. As a result of these changes, the required capital increases can be extended over a maximum of ten years. In aggregate terms, these are estimated at approximately US$200 million, assuming the current debt/equity ratio is maintained.

The periodic updating of mortality tables to reflect the longer life expectancies of the population contributes to a better financial

management of life insurance companies, as well as a greater transparency with regard to the solidity of their balance sheets and their capacity to respond to their pension liabilities. These factors are important for risk rating and the medium-term development of the sector.

### V.1.3 Documents of interest published by international organizations

***"Stress testing at major financial institutions: survey results and practice." Committee on the Global Financial System (CGFS). BIS. January 2005.***

Stress tests can be a valuable tool for evaluating the risks faced by banks and other financial institutions, because they quantify the impact of extreme, but plausible, shocks on their profitability and solvency.

This study presents the methodologies and practices used by an important group of banks and financial intermediaries to carry out their stress tests. In particular, the paper reviews the risk scenarios assumed and the developments in this tool over the past few years. Sixty-four banks and financial entities in sixteen countries participated in the study.

***"A framework for the surveillance of derivative activities." Eva Gutiérrez. Working paper WP/05/61. IMF. March 2005.***

At the world level, the use of derivative instruments has posted a significant increase over the last few years. This has been associated with the development of increasingly sophisticated products that are designed according to the user's needs.

This paper proposes a framework for the supervision of derivatives transactions carried out by financial institutions. The methodology is based on four pillars: (i) quantitative analysis of data on derivatives transactions; (ii) determining the necessary modifications to prudential regulation and supervision; (iii) evaluation of the infrastructure for mitigating risks; and (iv) evaluation of the degree of transparency of activities with derivative instruments carried out by financial institutions.

***"Enhancing corporate governance for banking organizations." Basel Committee on Banking Supervision. BIS. July 2005***

The adoption of adequate corporate governance practices in banking institutions is essential for earning and keeping the public's faith and confidence in the banking system. This is fundamental for the correct functioning both of this sector and of the economy as a whole. From the perspective of the banking industry, corporate governance is related to the way in which the business and other institutional matters are handled by the bank's board of directors and upper management.

This document presents a series of principles on healthy corporate governance practices, which are useful not only for the banks' boards of directors and upper management, but also for the supervisory organizations involved. It also provides a series of recommendations for other market agents that contribute to promoting healthy corporate governance practices. These recommendations are related to the role of

stockholders, external auditors, banking associations, government, employees, and supervisors.

***"The application of Basel II to trading activities and the treatment of double default effects."***
***Basel Committee on Banking Supervision.***
***BIS. July 2005***

The implementation of the new Capital Accord (Basel II) should promote a framework that reflects the significant transformations that have occurred over the last few years in bank trading activities, the financial markets, risk administration practices, and supervisory approaches.

The paper presents a proposal for the treatment of double default risk, which is related to the fact that the joint probability that both the debtor and the third party guaranteeing a loan do not comply with their payment obligations can be substantially lower than the probability of noncompliance by either one individually. In addition, this study presents an approach for the treatment of certain exposures from trading activities.

## V.2 Payments system and financial infrastructure

### V.2.1 Regulations

***Initiative to revise the regulatory framework on credit cards (October 2005)***

Considering developments in the payments industry over the past few years and its responsibility for the normal functioning of the payments system, in October the Central Bank, together with the SBIF, published a proposal for a new regulatory framework on issuing and operating credit cards. The comment period ended 14 November.

The central objective of the new regulatory framework is the adequate management and monitoring of credit, financial, and operating risks associated with the issue and operation of credit cards. The framework proposes establishing minimum prudential requirements that must be fulfilled by the respective issuers and operators. These requirements are ranked based on the importance of the respective cards as a means of payment in the economy and the risks introduced by its acceptance on the part of affiliated entities.

In the case of issuers other than banks and savings and loan cooperatives supervised by the SBIF, the importance of the cards as a means of payment is evaluated in accordance with the amount of transactions that are carried out with it in affiliated entities that are not related through ownership with the issuers. Particular consideration is given to cards used to effect payments and other transactions with unrelated entities for an amount equal to or more than one million UF annually. Credit card issuers and operators that satisfy this requirement must be listed in a Registry that the Superintendency will maintain for this purpose.

Issuers that do not meet this size criterion will not have to be listed in the Registry, nor will they be subjected to the prudential regulations established in the regulatory framework or supervision by the SBIF. These

issuers, however, must provide periodic information on the amount of payments carried out with the respective card. Otherwise, they must comply with the regulations that are applicable under ordinary legislation.

The proposal distinguishes between two categories of issuers and operators listed in the Registry. The first includes issuers and operators that have an arrangement with the unrelated affiliated entities that the payment of charges owed for the purchase of goods or the payment of services on the part of the cardholder or user will be made immediately or within a maximum period of three working days. This arrangement is believed to reduce the risks for affiliated entities. In particular, these issuers must maintain a lower minimum capital reserve than is required under the current regulatory framework, because they periodically submit to the SBIF a report evaluating their risk management and monitoring, produced by an independent entity.

The second category encompasses issuers listed in the Registry that have payment agreements exceeding the period described above. In this case, the current minimum capital requirement of 200,000 UF is upheld, but the liquidity requirement is raised for current liabilities with affiliated entities. These issuers must also comply with the regulations on risk management and monitoring established by the SBIF.

The regulatory framework stipulates that the SBIF will establish the minimum content of contracts between the issuer or operator and the cardholders or users regarding the use of the card as an instrument or means of payment. The SBIF will also establish the minimum content of contracts with affiliated entities and between the issuer and the operator. Moreover, the conditions and demands that an operator establishes for providing issuers and affiliated entities with the services specific to its line of business must be general and nondiscriminatory. They must further stipulate mechanisms that facilitate their interconnection with other networks and entities associated with the operation of the cards.

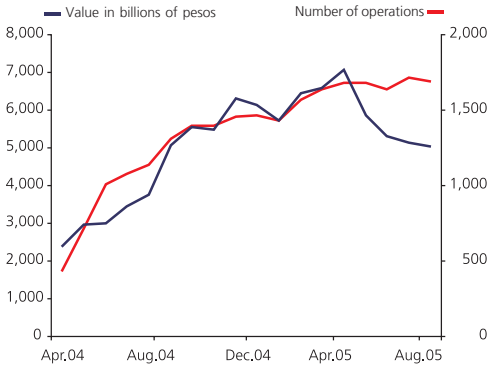
The SBIF, in exercising the powers conferred upon it by the General Banking Law with regard to the institutions subject to its supervision, will oversee compliance with this new regulatory framework and with other legal regulations that are applicable to the firms listed in the Registry, including those related to the conventional maximum rate. In the area of nonbank issuers and operators, the SBIF will execute the functions and authority that are conferred upon it by the General Banking Law with regard to the supervised institutions. The National Consumer Service will continue to monitor compliance with the provisions contained in the legislation on consumer protection.

### V.2.2 Large-value payments system: Recent evolution

The introduction in April 2004 of the Central Bank's real-time gross settlement (RTGS) system of liquidity for large-value payments generated an important change in the way interbank payments are carried out in the country. This system provides the market with a real-time infrastructure for transferring funds in domestic currency. In the RTGS system, payments are settled in gross and individually, insofar as the bank that issues the transfer instruction has sufficient resources in the account it maintains at the Central Bank.

**Figure V.1**

Payments settled in the RTGS system
(daily average for each month)




Source: Central Bank of Chile.

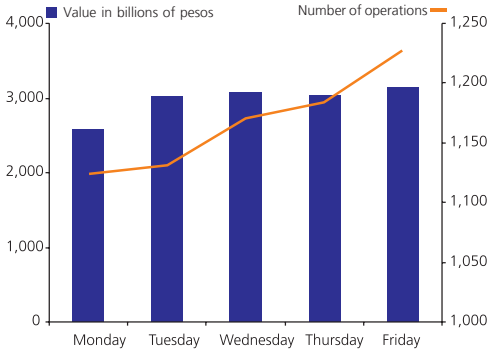
Liquid transactions in the RTGS system have increased steadily over time, reaching its peak in terms of volume in April and May 2005. In September, the volume of liquid payments totaled 35,540 transactions in the month, for a total amount equivalent to US$196.682 billion, that is, an average of 1,692 payments a day for an (average) amount of US$9.4 million each (figure V.1).

In the second half of the year, the RTGS system incorporated the delivery versus payment (DVP) model. This procedure allows synchronizing the transfer of securities in the Central Securities Depository (*Depósito Central de Valores*, or DCV) with payment settlements in the Central Bank. To implement the DVP model, a project was developed to interconnect the infrastructure through which the transfer of securities is effected (DCV) and the system for settling payments (RTGS).

Table V.1 presents compared statistics on the average daily payments settled in the RTGS system by type of transaction, in both value and volume. The figures indicate that, in terms of volume, payments between financial institutions have predominated: they represented 72% of total settlements, on average, in the third quarter. They are followed in importance by payments made by financial institutions through third-party accounts, which make up 16% of the total. The Central Bank's payments represent 6.4% of total payments and 21% of the value, reflecting the importance of the Central Bank's transactions with the financial system. The Intraday Discount Window, which participants can use to provide the liquidity necessary to operate in the system, was stable in terms of both the value of the payments and the number of transactions.

**Figure V.2**

Interbank payments settled in the RTGS system in 2005
(daily average)




Source: Central Bank of Chile.

**Table V.1**

Payments settled in the RTGS system, by type of payment
(daily average)

| | 2004 | 2005 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Jan. | Feb. | Mar. | Apr. | May | Jun. | Jul. | Aug. | Sept. |
| | | | | | (value in billions of pesos) | | | | | |
| Interbank | 2,228 | 3,203 | 2,791 | 3,091 | 2,861 | 2,964 | 3,112 | 3,081 | 2,988 | 2,700 |
| On behalf of third parties | 200 | 242 | 190 | 209 | 227 | 308 | 300 | 264 | 295 | 296 |
| From the Central Bank | 692 | 1,001 | 1,229 | 1,527 | 2,214 | 2,648 | 1,411 | 853 | 672 | 667 |
| Intraday discount window | 853 | 1,544 | 1,410 | 1,451 | 1,146 | 1,007 | 894 | 960 | 1,062 | 1,214 |
| Clearing house | 246 | 139 | 105 | 153 | 136 | 133 | 150 | 151 | 126 | 135 |
| Delivery versus payment (DvP) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 10 | 13 |
| Total | 4,218 | 6,129 | 5,725 | 6,431 | 6,584 | 7,059 | 5,868 | 5,311 | 5,153 | 5,027 |
| | | | | | (number of operations) | | | | | |
| Interbank | 796 | 1,071 | 1,050 | 1,137 | 1,173 | 1,205 | 1,237 | 1,179 | 1,256 | 1,195 |
| On behalf of third parties | 134 | 209 | 194 | 232 | 243 | 258 | 255 | 261 | 265 | 285 |
| From the Central Bank | 104 | 97 | 104 | 106 | 127 | 125 | 107 | 105 | 104 | 112 |
| Intraday discount window | 25 | 43 | 42 | 46 | 48 | 48 | 36 | 39 | 45 | 53 |
| Clearing house | 47 | 45 | 45 | 45 | 45 | 46 | 45 | 46 | 45 | 46 |
| Delivery versus payment (DvP) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 4 | 2 |
| Total | 1,106 | 1,463 | 1,434 | 1,566 | 1,636 | 1,681 | 1,681 | 1,635 | 1,718 | 1,692 |

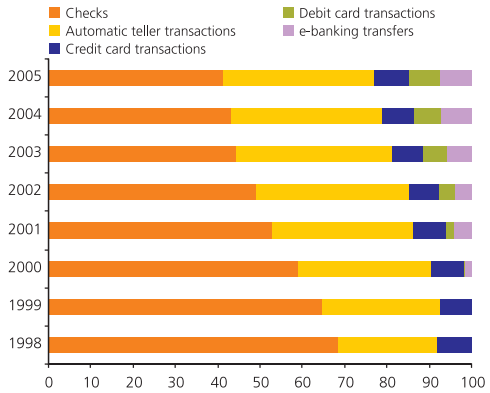
Source: Central Bank of Chile.

Figure V.2 presents the average weekly activity of the RTGS system by type of interbank payment. The figure reveals certain patterns, such as the increase in the number of transactions as the week progresses, with Friday

**Figure V.3**

Use of means of payment

(years, percent share in total number of operations)




Source: SBIF.

having the largest volume. Securities present less variability, with slower movement on Mondays. The rest of the payments channeled through the RTGS system behave, in a typical week, very similarly to interbank payments, with the exception of third-party payments, which clearly fall on Fridays.

### V.2.3 Retail payments system: Recent evolution

The low-value, or retail, payments systems—which are used to carry out payments and transfers of funds between individuals and/or firms—are characterized as processing a large number of relatively low-value individual transactions, normally tied to the sale of goods and services. The retail payments systems should be practical, trustworthy and efficient, given the service they provide the general public.

A variety of payment methods are used in Chile to carry out retail transactions, and they are constantly developing as a result of technological innovations and competition from the diverse suppliers operating in the market. Currently, the main methods of retail payment are bank checks, credit cards, debit cards, and the transfer of funds via the Internet. Figure V.3 presents statistics on the relative importance of each of these means beginning in 1998, including transactions at automated teller machines associated with cash withdrawals charged to bank checking accounts. As in other economies, the relative share of checks has been declining significantly over the past few years, and this space has been filled by the growing use of debit and credit cards, as well as automated tellers.

Table V.2 presents the evolution of the use of retail payment methods, in terms of total amounts and volume of transactions, starting in 1998. Despite their increasingly lower relative share, checks continue to be the most commonly used means of payment in the country. The figures accrued through the first two quarters of the year suggest that the use of checks will continue to fall. At the same time, debit cards show very fast growth, quadrupling their share over the past few years in terms of both the amount and volume of transactions.

**Table V.2**

Main retail means of payment

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 (1) |
|---|---|---|---|---|---|---|---|---|
| | | | | (value in billions of pesos) | | | | |
| Checks | 458,347 | 490,766 | 518,574 | 545,627 | 568,040 | 512,007 | 503,038 | 480,142 |
| Automatic teller machines | 3,265 | 3,944 | 4,969 | 5,795 | 6,710 | 7,058 | 7,673 | 8,277 |
| Credit cards | 718 | 731 | 920 | 1,010 | 1,072 | 1,269 | 1,495 | 1,812 |
| Debit cards | 6 | 8 | 31 | 175 | 319 | 597 | 804 | 859 |
| Internet operations | n.d | n.d | n.d | n.d | n.d | n.d | n.d | n.d (3) |
| | | | | (number of operations, in thousands) | | | | |
| Checks | 324,249 | 307,978 | 305,122 | 293,173 | 285,108 | 265,881 | 284,286 | 276,621 |
| Automatic teller machines | 111,191 | 131,486 | 161,576 | 184,980 | 210,930 | 221,464 | 233,617 | 238,831 |
| Credit cards | 37,943 | 35,534 | 39,832 | 41,974 | 42,427 | 46,121 | 50,799 | 55,882 |
| Debit cards | 364 | 469 | 1,972 | 11,490 | 20,459 | 34,058 | 42,645 | 48,407 |
| Internet operations | n.d | n.d | 7,969 | 22,400 | 23,184 | 34,065 | 46,556 | 50,372 |

(1) Annualized figures based on transactions carried out in the first half of 2005.
(2) Annualized figures based on transactions carried out only in the polling period (June and December).
(3) Not available.

Source: SBIF.

The use of bank credit cards also exhibits significant increases in the period in terms of the total amount and volume of transactions. Finally, Internet transfers of funds are estimated at 50 million transactions in 2005. This payment method, which was introduced fairly recently in the country, has registered significant growth rates in the past few years, reaching a volume of transactions comparable to that of debit and credit cards.

# Evolution of housing prices in Chile*

Authors: Paulo Cox** and Eric Parrado***

## 1. Introduction

The real estate markets of many developed countries have experienced a boom over the past several years. Housing prices have grown considerably faster than personal income and yields[1]/. Many observers and regulators have expressed concern for a possible correction of these prices in the developed economies and the potential impact on private consumption and the growth outlook both for these economies and for the world economy.

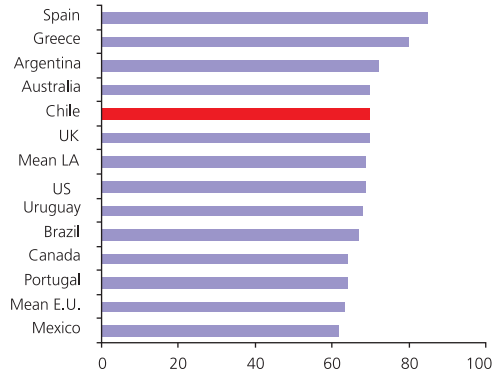
In the case of Chile, the lack of systematic series on housing, office and land prices makes it difficult to follow and analyze trends in the real estate market. This paper is a step toward filling in this absence of data. First, it describes the importance of the real estate sector in the Chilean economy and its interrelation with macroeconomic and financial stability. Next, it proposes and analyzes a set of housing price indicators for the city of Santiago, with the goal of systematically monitoring this market. The results show that housing prices have recovered significantly in the last two years, which is consistent with the increase in disposable income and the reduction in the cost of long-term financing. Apartment prices were less dynamic in the same period, which may be tied to the significant increase in supply and the change in its composition.

## 2. The Chilean real estate sector

In Chile, as in many other countries in the world, housing is the main component of households' wealth, and it constitutes households' main collateral to loans issued by the financial system. Consequently, fluctuations in housing prices influence the consumption and investment decisions of households, affecting their financial position and that of the financial entities that provide loans.

**Figure 1**

Share of owner occupied dwellings (2001)
(percent)




Sources:
De Ferranti et al. (2003).
Debelle (2004b).
Mideplan, based on data from the 2003 Casen survey.

According to the National Socioeconomic Characterization (Casen) survey, nearly 70% of all households own the dwelling they live in, while 17% of households are renters.[2]/ This home ownership rate is higher than the rate observed in developed countries or in other Latin American economies

* The opinions expressed in this document are the exclusive responsibility of the authors and do not necessarily represent the position of the Central Bank of Chile or its Board Members. We thank the *Asociación de Corredores de Propiedades* (ACOP) for providing data on housing prices in Santiago, and Valeria Salfate, of Mideplan, for obtaining Casen survey data. We are also grateful to Bernardo Canales for his collaboration and to Luis Óscar Herrera and Rodrigo Fuentes for their comments.

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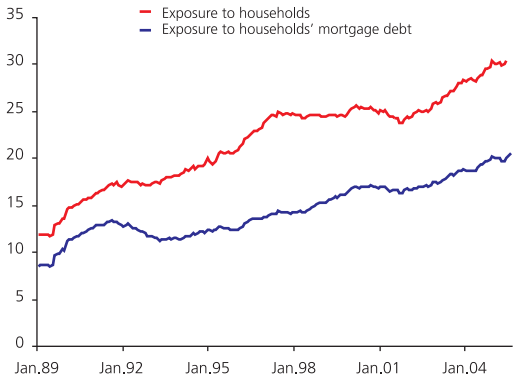
[1]/ The increase in property prices has been considerable in some areas of the United States, United Kingdom, Australia, France, Spain, and China. Some of these countries have reported, in their financial stability reports, the possible financial vulnerabilities that a correction of real estate asset prices could imply.

[2]/ The remaining percentage includes the following categories: granted by a family member or other person, granted for services rendered, usufruct, irregular occupation, and own home shared with other households.

**Figure 2**

Banks' exposure to households'mortgage debt: ratio of mortgage loans to total banking loans

(percent)

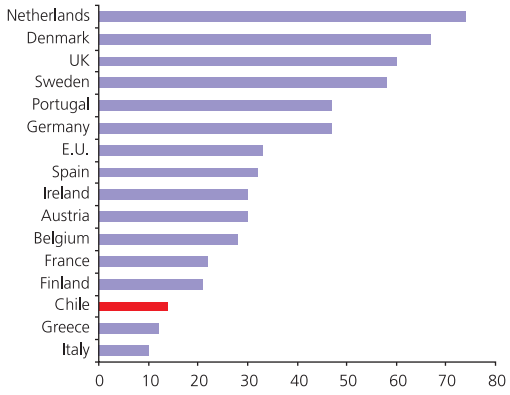



Source: Authors' calculations using data provided by SBIF.

**Figure 3**

Ratio of mortgage debt to GDP

(percent)




Sources:
ECB (2003).
SBIF.
Central Bank of Chile

(figure 1)[3]/. Of the total home owners, 73% live in houses that have been fully paid for; the remaining 27% (equivalent to 770,000 housing units) state that they are still paying a mortgage loan.

The volume of household mortgage debt represented 16% of GDP in June 2005. Bank exposure to mortgage loans represented 60% of total exposure to households— that is, around 20% of total loans (figure 2). Although the exposure of the financial system to households is significant, it is lower than the levels observed in developed countries (figure 3).

The banking system's exposure through credit to construction firms or real estate corporations is also significant. Loans to the building sector account for nearly 7% of total loans of the banking system, which is similar to the share of loans to manufacturing industries[4]/. The insurance companies are another important actor in the real estate sector: real estate investments represent nearly 8% of the insurance industry's total investments (the share is close to 30% if investment in mortgage bills and endorsable mortgage loans are included).

The above evidence reveals the relative importance of the real estate sector in our economy, given its role in the balance sheets of both households and the financial system. This implies that developments in this sector can have important impacts on aggregate demand and financial stability, through the financial system's exposure to changes in housing prices.

## 3. Effects on macroeconomic and financial stability

Household mortgage debt plays a fundamental role in the evolution of aggregate demand and the transmission of monetary policy, through several mechanisms. First, higher mortgage debt implies that households are more exposed to changes in interest rates, especially if the loans are contracted at variable rates, as has been the case in the recent expansion of bank mortgage loans. Thus, an unexpected interest rate rise would increase the financial burden of households and raise the cost of mortgage loans[5]/, thereby reducing consumption and aggregate demand. Second, the higher the debt, the more sensitive is household consumption to the evolution of employment, interest rates and income. Finally, mortgage debt or the holding of real estate has an important effect on consumption via changes in the real estate wealth of households. When the value of a dwelling increases, the household can extend its debt by using the housing appreciation as a guarantee for financing the consumption of other goods (the equity withdrawal effect). Households can even adjust the ratio of the value of the loan and the value of their dwelling (the loan-to-value ratio) —which falls with the increase in prices— so as to hold it constant, thus extending the amount of the loan[6]/.

[3]/ This shows that the lower income level of Latin American countries has not prevented high rates of home ownership, despite the low coverage of formal credit. However, the high rates observed could be explained by the various housing policies implemented by the respective governments. In the case of Chile, the results of the 2003 Casen survey indicate that 43.3% of the households that own the home in which they live have benefited from one of the State housing programs.

[4]/ The current information does not allow us to separate housing construction projects from other types of construction projects, so it is not possible to determine the direct exposure to this sector.

[5]/ Changes in the demand for housing appear to respond even to transitory short-term interest rate shocks, which can have a strong impact on the initial mortgage debt service. See, for example, Meen (2001) and Miles (2004).

[6]/ This would even allow the purchase of other assets at mortgage interest rates. Evidence of this type of effect is found in Ahearne et al. (2005), who examines data from 18 industrial countries; they show that housing prices are procyclical.

The real estate sector is also important for the financial system and its stability. The dependence between these sectors is direct, through the financing to home buyers and sellers. As highlighted earlier, however, real estate assets are used as collateral on loans with other ends, which also has implications for financial stability. Real estate assets (such as actual buildings or real estate investments) are often a significant component of the financial institutions' assets. Consequently, the real estate sector is important for the stability of the financial system, especially through fluctuations in housing prices, which raise the risk of default of both mortgage and consumer loans.

## 4. Housing prices and their implication for financial stability in Chile

### Information on housing prices

In Chile, there are few systematic and continuous indicators of housing prices, and scarce public data on the real estate market in general[7]/. This paper analyzes a set of housing price indicators (HPIs) for the city of Santiago. A first set of indicators is based on the effective prices of transactions involving houses and apartments as recorded by the Real Estate Registrar (*Conservador de Bienes Raíces*, or CBR) of Santiago (HPI-T). The source of this data is the Real Estate Agents' Association (*Asociación de Corredores de Propiedades*, or ACOP); the data set covers ten municipalities in Santiago[8]/. A second group of indicators is based on the price of houses up for sale in 19 municipalities in Greater Santiago[9]/. This data was collected by ACOP based on advertisements published in the newspaper *El Mercurio* (HPI-O).

These two sources differ in the frequency and representativeness of the data. The data provided by the CBR includes the values of all the transactions from January 2001 to December 2004[10]/. Listed prices, in contrast, are published by ACOP on a quarterly basis, and with a quarterly lag. The current sample covers the period between the second quarter of 2002 and the second quarter of 2005.

### Housing price indexes: methodologies and results

The construction of aggregate housing price indicators has several difficulties inherent to the type of asset under analysis. First, the high degree of heterogeneity of dwelling units makes it difficult to predict the value of one dwelling based on the price of another. Various attributes make them dissimilar, starting with the fact that no two dwellings occupy the same physical space. Second, it is difficult to know the value of a house if it is not traded in the market. Dwellings are generally sold following complex negotiations, which imply that the asking or listed price does not accurately reflect the house's value in the majority of cases. Finally, houses are sold infrequently, which limits the continuous monitoring of their value through time. In Chile, for example, data from the CBR of Santiago indicates that houses are sold every nine years, on average[11]/.

The literature proposes a number of methods that can be used to construct housing price indicators, taking into account the aforementioned problems. However, all the empirical methods have both advantages and disadvantages. The measures of a central trend, such as the mean and median values of houses in a set sample, are simple, easily constructed indicators, but they can present problems stemming from changes in the composition of the sample. For example, to the extent that incomes rise, the demand for certain housing attributes can be expected to change (in favor of improvements in the quality of construction, for example), which could cause a change in the price trend only by a change in the "type" of houses sold. Consequently, alternative indicators have been suggested to try to minimize these effects.

This study uses two additional methods to evaluate the importance of this type of consideration. First, in the case of the listed price of houses, we use a hedonic specification to control for the size of the lot and area of construction[12]/, while for apartments, we normalize the value of the dwelling by the area of construction. Second, based on the sample of transaction prices, we use the repeat sales method, which consists in identifying houses in the sample that are sold more than once during the period under study.

### Median prices

The most direct measure of housing prices is based on the median sales or listed price. From a statistical perspective, the median price is simply the price at the midpoint of all the prices observed in a given period. The economic interpretation is that the median corresponds to the "representative" price for that period. One of the main reasons for using medians rather than means is the wide dispersion in the observations, with markedly asymmetrical price distributions.

[7]/ Exceptions include the sales and listed price indicators for new dwellings in Greater Santiago, put together by the consulting firm Collect since 1993. In the case of land prices in Greater Santiago, the consulting firm Trivelli registers listed prices since 1982. Finally, the *Cámara Chilena de la Construcción* estimates a price indicator for the municipality of Ñuñoa, using the hedonic price method (see footnote 12).

[8]/ The following municipalities are considered: La Florida, La Reina, Las Condes, Lo Barnechea, Macul, Ñuñoa, Peñalolén, Providencia, Santiago and Vitacura.

[9]/ La Florida, La Reina, Las Condes, Lo Barnechea, Macul, Ñuñoa, Peñalolén, Providencia, Santiago, Vitacura, Huechuraba, Independencia, Quilicura, Recoleta, Renca, Puente Alto, La Cisterna, San Bernardo, and Maipú.

[10]/ The total volume sold per year is around 5% of GDP.

[11]/ Total repeated transactions over total transactions.

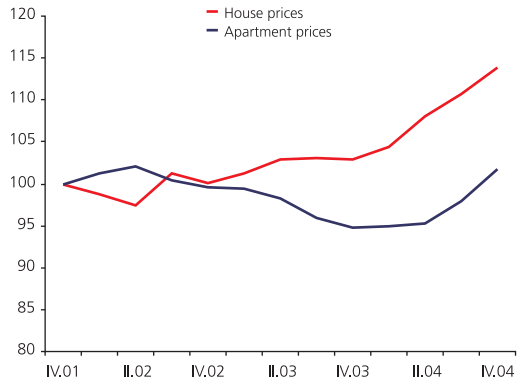
[12]/ The seminal empirical work on this methodology was carried out by Griliches (1961), while Rosen (1974) proposed the theory. Other useful references include Thibodeau (1995), Palmquist (1979), and Gillingham (1975). In the case of Chile, Morandé and Soto (1992), Morandé (1992), Bergoeing et al. (2002), and Desormeaux and Piguillen (2003) use the methodology to construct a continuous quarterly price indicator for the municipality of Ñuñoa in Santiago. Figueroa and Lever (1992) use this methodology to analyze the determinants of housing prices in Santiago.

Figures 4 and 5 present the evolution of transaction and listed price indicators for houses and apartments. They show the moving average of the median housing price for each of the quarters considered. In the case of transaction price indicators, house prices increased significantly in 2004, accruing a real increase of 10.6%. The apartment transactions price indicator, on the other hand, was less dynamic, which is consistent with the growth of the supply of apartments in Santiago[13]/. Thus, the apartment prices index increased 7.4% between the last quarter of 2003 and December 2004.

**Figure 4**

Transactions real price index (HPI-T)

(December 2001 = 100, moving average)

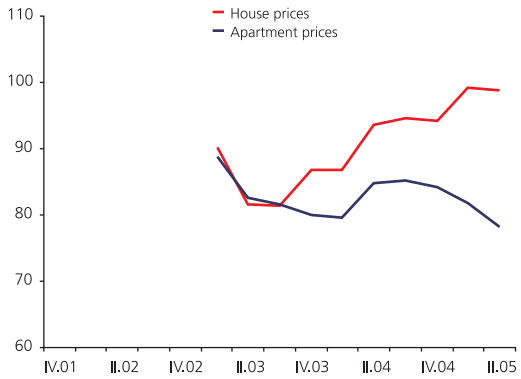



Source: Authors' calculations using data provided by ACOP (CBR).

**Figure 5**

Listed real price index (HPI-O)

(March 2003 = 100, moving average)




Source: Authors' calculations using data provided by ACOP (CBR).

In the case of listed prices, house prices registered a recovery beginning in 2003, although they were less dynamic. Between 2003 and June 2005, the listed price increased 9.5% in real terms, while the listed price of apartments fell 11.9% in the same period. As in the case of transactions prices developments in 2004, listed prices of houses and apartments were also vigorous registering similar increases in prices: 8.7% and 5.4%, respectively. However, listed prices of houses were less dynamic in the first half of 2005, accumulating an expansion of 4.8%. Listed prices of apartments, on the other hand, registered a decline of 7.3% in the same period.

It is important to highlight that the evolution of transaction and listed price indicators is similar for houses, but not for apartments.

### *Hedonic prices*

The hedonic price is based on the hypothesis that goods do not provide utility to the consumer by themselves, but through their properties or features[14]/. By extension, the price of a dwelling would be explained by the value of its attributes. Given the available data, the characteristics used in the following calculations include the size of the property and the square meters of construction.

The hedonic price regression is based on a model of constant elasticity of substitution, taking the form of a Cobb-Douglas function:[15]/

$$Log\left(P_{jt}\right) = \alpha + \beta_1 Log\left(MC_{jt}\right) + \beta_2 Log\left(MT_{jt}\right) + \varepsilon_{jt},$$

where $P_{jt}$ is the listed price of house $j$ in quarter $t$, $MC_{jt}$ the square meters of construction of the house, and $MT_{jt}$ the size of the lot in square meters[16]/.

Once we have estimated the coefficients associated with the house's characteristics (square meters of land and of construction) by quarter and municipality, we obtain the quarterly value of the representative house for each municipality, using the medians of the characteristics identified —size of the lot and the construction— of all the observations available by municipality. Finally, to obtain an aggregate indicator, the indicators obtained for each municipality are weighted by the municipality's share in the total listed volume of houses for the respective quarter.

The results indicate that the "sample" effect produced by changes in house size is not minor, although the observed trend is similar to the trend of median house prices (figure 6).

[13]/ For example, according to the consulting firm *Collect*, the total supply of new apartments in Greater Santiago increased 36% between the first quarter of 2003 and December 2004.

[14]/ See Lancaster (1966).

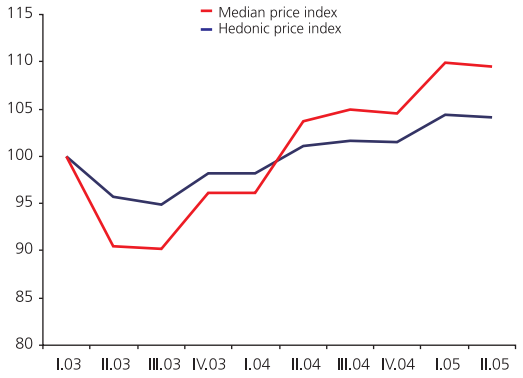
[15]/ Several works try to determine the functional specification between housing prices and housing characteristics. Despite these efforts, no consensus has been reached on the most representative functional form. See, among others, Rosen (1974) and Diewert (2001).

[16]/ From an economic perspective, the logarithmic functional form allows us to obtain a percentage measure of the change in prices in the face of percentage changes in the attributes (elasticities). That is, it is possible to calculate, for example, how much the price of a representative house would increase in percentage terms if there is a one square meter increase in the size of the lot or the construction. From this statistical perspective, preliminary regression results produce residuals that display a lower degree of heteroskedasticity than the residuals in linear specifications.

The comparable indicator for apartments is computed dividing the listed value by square meters. The differences between the two indicators, in this case, are explained by changes in the composition of the supply of relatively smaller apartments (figure 7).

**Figure 6**

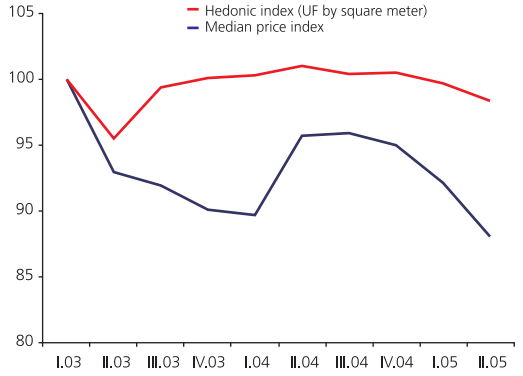
Median and Hedonic price indices of houses (using Ads)
(March 2003 = 100, moving average)




Source: Authors' calculations using data provided by ACOP.

**Figure 7**

Median and Hedonic price indices of apartments (using Ads)
(March 2003 = 100, moving average)




Source: Authors' calculations using data provided by ACOP.

## *Repeat sales*

The repeat sales indicator is based on the sales history of a single dwelling. Using the Santiago CBR sample, we identified all the dwellings that were sold more than once between 2001 and 2004. We then calculated the price variations of the identified houses, annualizing variations in sales that did not occur in consecutive years[17]/.

Table 1 shows the number of houses and apartments identified in the different years. We find a significant number of resold houses and apartments, which is notable given the short period considered. The number of transactions increases as the period is lengthened, as is to be expected.

**Table 1**

Number of repeated houses and apartments

**Houses**

| | 2001 | 2002 | 2003 |
|---|---|---|---|
| 2002 | 186 | | |
| 2003 | 174 | 285 | |
| 2004 | 166 | 247 | 401 |

**Apartments**

| | 2001 | 2002 | 2003 |
|---|---|---|---|
| 2002 | 86 | | |
| 2003 | 20 | 275 | |
| 2004 | 38 | 255 | 450 |

Source: Authors' calculations using data provided by ACOP.

Table 2 registers the median price change of houses and apartments. In general, the indicator becomes more robust when there are more transactions and a longer sales period. In the case of houses, the simple average of the price increase reached 4.5% in 2003 and 7.0% in 2004, which is consistent with the trend observed with the indicators presented above[18]/. For apartments, the median annualized price change was marginally positive.

**Table 2**

Median annualized price variations of houses and apartments
(percent)

**Houses**

| | 2001 | 2002 | 2003 |
|---|---|---|---|
| 2002 | 12 | | |
| 2003 | 2 | 7 | |
| 2004 | 4 | 5 | 12 |

**Apartments**

| | 2001 | 2002 | 2003 |
|---|---|---|---|
| 2002 | 0.7 | | |
| 2003 | 5 | 0.7 | |
| 2004 | -0.3 | 1.3 | 0.5 |

Source: Authors' calculations using data provided by ACOP.

[17]/ In the exercise, we assume that there are no changes in the quality or size of the houses over time (changes that would be produced with an extension, for example).

[18]/ On this occasion, we will not present the statistical model for repeated sales; instead, we will describe its main scope. This model has been used in measuring housing prices variations since it was proposed by Bailey, Muth and Nourse (1963); some extensions also implemented include those of Case and Shiller (1987, 1989). The worldwide most known index obtained with this method is the OFHEO (Office of Federal Housing Enterprise Oversight) of the US. It was developed by Freddie Mac and Fannie Mae and it is released on a quarterly basis. Freddie Mac and Fannie Mae are federal companies regulated by the OFHEO and their most important objective is to provided a secondary market of mortgage loans in the US.

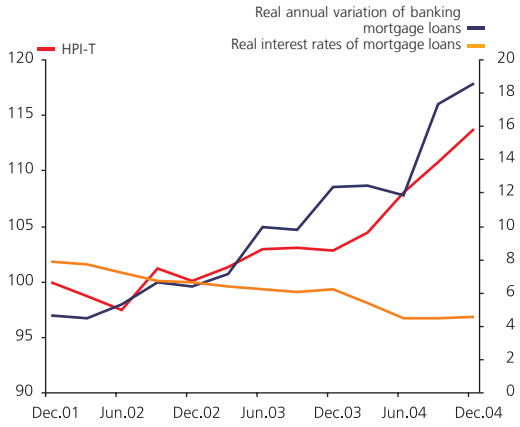
## 5. The evolution of housing prices and its foundations

The above evidence reveals a dynamic real estate market, reflected in a sustained increase in house prices over the past several quarters. The observed increase in housing prices, however, is not sufficient evidence that buyers are participating in price speculation. Changes in economic fundamentals could largely explain the price increases.

In particular, the recent evolution of housing prices has been accompanied by low interest rates and growth in disposable income. The low interest rate levels have helped drive the expansion of mortgage loans (figure 8). This effect is minor in the case of apartments because of the faster supply response and changes in the composition of supply.

**Figure 8**

HPI-T of houses, real interest rates and mortgage debt growth rate
(December 2001=100, moving average; percent)



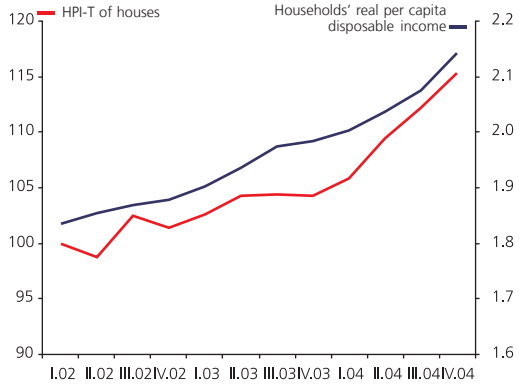

Sources:
SBIF.
Central Bank of Chile.
Authors' calculations using data provided by ACOP (CBR).

At the same time, our house sales price index (HPI-T houses), based on medians, and real disposable income per capita display a similar trend (figure 9). Consequently, the quotient of these indicators is stable, with low volatility. The correlation between these two variables is almost 97% in the 2002–2004 period, while a simple regression of the house price index against per capita income generates an $R^2$ of 93%.

The HPI-T for houses shows a similar trend when compared to the evolution of stock prices (figure 10)[19]/. It is also consistent with the stylized fact that changes in stock prices precede changes in housing prices[20]/.

**Figure 9**

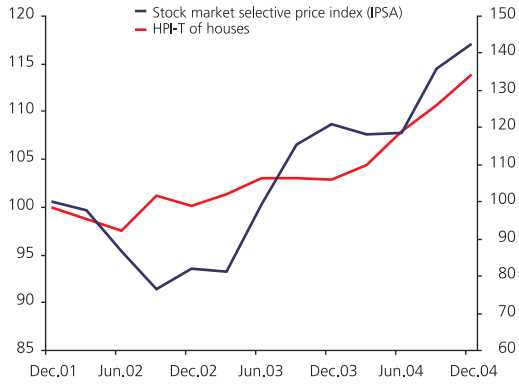
HPI-T of houses and households' real per capita income
(March 2002=100; millions of pesos)




Sources:
ACOP (CBR).
Central Bank of Chile.
Authors' calculations using data provided by ACOP (CBR).

**Figure 10**

HPI-T of houses and prices in the stock market
(December 2001 = 100)




Sources:
SBIF.
Central Bank of Chile.
Authors' calculations using data provided by ACOP (CBR).

The dynamism of house prices has been associated with a more active loan and stock market, which has not shown apparent signs of financial imbalances. The nonperforming mortgage loan indicator[21]/, for example, has been registering lower rates since early 2003, reaching 0.9% in September 2005.

## 6. Final comments

The availability of real estate data is clearly limited in Chile, which makes more complex the discussion of the possible vulnerability of households and the financial sector to risks

[19]/ The correlation coefficient between the IPSA and the HPI-T is 0.85. In addition, our estimates show that the IPSA Granger causes the HPI-T.

[20]/ See Borio and McGuire (2004).

[21]/ Nonperforming mortgage loans over total mortgage loans.

arising from real estate markets. This is particularly important in the case of Chile for two reasons. First, the international evidence suggests that housing prices affect strongly bank-based financial systems more than deeper financial systems. This is clearly the case in Chile because of the high exposure of the financial system to mortgage debt and households. Second, the negative effects deriving from housing price adjustments are greater for real assets (housing) than financial assets (stocks)[22]/. These factors raise the need for using a variety of indicators associated with the real estate sector, given its potential impact on financial stability.

This paper has proposed a set of housing price indicators for measuring the possible pressures that could be developing in the credit market. Using these price measures, we find that the sustained rise in home prices coincides with the sustained increase in disposable income per capita and the decreasing trend of long-term interest rates, factors that have strongly driven the expansion of mortgage loans. However, we cannot overlook the presence of factors that point to the beginning of strong dynamics of housing prices in Greater Santiago.

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[22]/ These factors are highlighted in IMF (2003) and Debelle (2004a and 2004b).

# Life insurance companies and financial stability in Chile*

Auhors: Luis Figueroa** and Eric Parrado***

## 1. Introduction

The importance of life insurance companies (LICs) in the Chilean financial system has increased significantly in the last decade. Since 1996, the sector has doubled the volume of assets administered as a percentage of gross domestic product (GDP), reaching 20% in the first quarter of 2005.

This paper presents the primary grounds for including LICs in the analysis of the financial stability of the Chilean economy. The importance of LICs within the Chilean financial system and the potential channels of transmission and interrelation with other economic agents provide arguments for monitoring the solvency position of this sector.

In particular, this document reviews the evolution of credit risk in LICs' investment portfolio. For this purpose, we calculate a capital adequacy measure that considers the credit composition of the assets, similar to the application of the Basel indices for banks. We also submit the LICs to different credit stress scenarios, with the goal of measuring, in equity terms, the credit risk exposure of the industry. Of the selected scenarios, the one featuring the potential noncompliance of economic groups, has the biggest impact.

In this context, the recent incorporation of the "asset sufficiency test" to current regulations in Chile, including the credit composition in the annuity matching standards, is a step forward in this area.

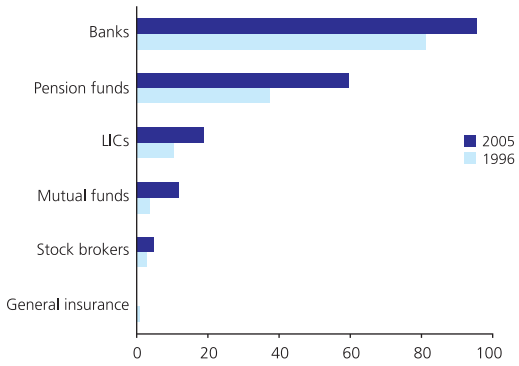
## 2. Evolution of the life insurance industry

Life insurance companies have earned growing importance in the Chilean capital markets. One of the factors that explain this evolution is the reform of the pension regime in the early 1980s and the modernization of the capital markets and the financial system afterwards. In virtue of these developments, LICs have managed to position themselves among the most important institutional investors in Chile, administering an equivalent of nearly 20% of GDP and becoming a focus of attention in the monitoring of financial stability (figure 1).

**Figure 1**

Relative importance of the LICs

(assets as a percent of GDP; December 1996 and March 2005)




Sources:
SVS.
SBIF.

The modification of the pension system in 1981 involved moving from a pay-as-you-go system to individual pension accounts, in which the affiliates' contributions are administered by a specialized corporation called a pension fund administrator (*Administradora de Fondos de Pensiones*, or AFP). The design of the new pension system also incorporated two alternatives for retirement, at the choice of the contributors: "programmed withdrawal," in which the retirement payments and funds continue to be administered by an AFP, and "life annuities," which are contracted directly

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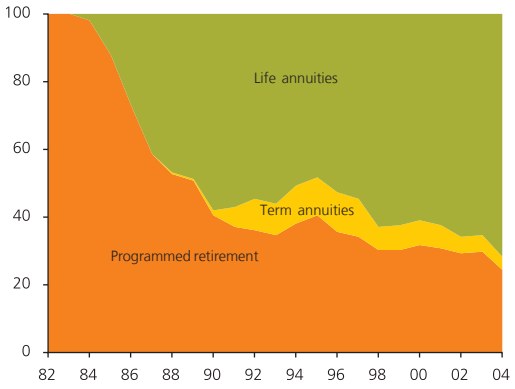
with an LIC[1]/. Since the reform, LICs have played an increasing role in administering the pensions of the system participants, and they now represent a share of nearly 70% of the total amount of pensions (figure 2). This situation has made life annuities the main product of LICs, accounting for 57% of sales, on average, in the last two years (figure 3)[2]/.

**Figure 2**

Pension options

(percent of total pension amount)

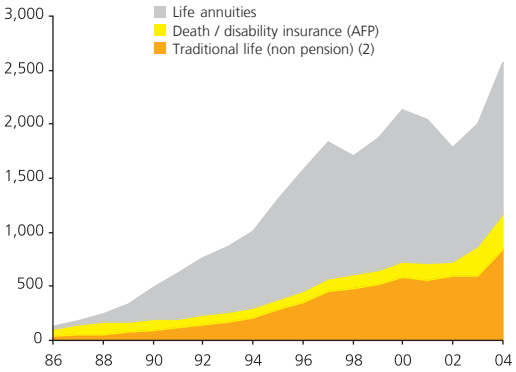



Source: SAFP.

**Figure 3**

Revenues from life insurance sales (1)

(US$ million, each year)




(1) Total annual direct premium.
(2) Includes title, health, accident, savings, and other nonpension insurance.

Source: SVS.

The pension reform included death or disability insurance, which is contracted with an LIC. This type of coverage represents a significant share of the industry's premiums, reaching 10% of total income from sales in 2004. Another recent regulatory change authorized LICs to administer voluntary pension savings (VPS) starting in 2001. The companies have accrued 10% of total voluntary pension savings to date and raised the volume of sales by over 3% of total premiums.

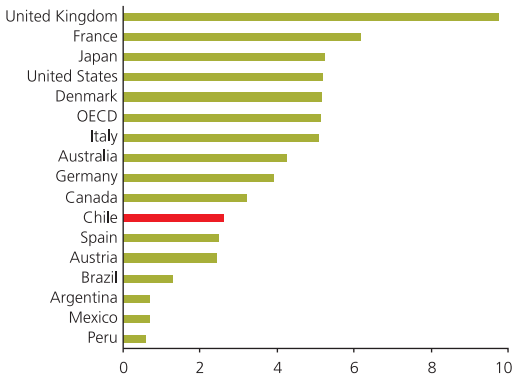
The country's per capita income has also increased, from around US$2,300 in 1990 to US$5,800 in 2004[3]/. This has given an additional boost to life insurance sales. At the same time, the development and deregulation of the financial markets have facilitated the introduction of new products and the expansion of life insurance. Another important factor is the recovery of mortgage debt from levels around US$2.1 billion in late 2003 to US$7.6 billion in September 2005. This trend has been associated with a greater volume of title insurance, which currently accounts for 10% of total life insurance. As a result of the interaction of these factors, the real annual growth rate of life insurance averaged 17% over the last decade.

The evolution of the industry places Chile among the countries with the greatest life insurance penetration in the Latin American context. Total premiums reached approximately 2.7% of GDP, equivalent to US$161 per capita annually at the end of 2004 (SVS, 2005). On comparing Chile with more developed countries, however, it is possible to find a significant gap in life insurance expenditures, suggesting there is potential growth for this sector (figure 4).

**Figure 4**

Life insurance premiums (*)

(percent of GDP, 2003)




(*) Includes pension and nonpension insurance.

Sources:
World Bank.
OECD.

[1]/ "Term annuity" or deferred life annuity arrangements were authorized in 1987. The law was reformed in 2004, creating two additional possibilities: variable life annuity and mixed pension (a combination of life annuity and programmed withdrawal).

[2]/ Life annuities in Chile provide a flow of fixed and indexed payments that LICs pay to their pensioners until death and that can be extended to other legal beneficiaries for a set period (life annuity with a guaranteed period). Against this flow, the policyholder pays the insurance company an initial premium (single premium), which accrues in the period of contribution to the pension system. Life annuities thus allow the policyholder to transfer the risk of longevity to the company. Under the programmed withdrawal arrangement, the resources could potentially be depleted, but they are held as part of the pensioner's equity, which constitutes an inheritance.

[3]/ Based on data from *International Financial Statistics* (IMF, 2005).

## 3. How the LICs relate to the financial market

The importance of LICs lies not only in the magnitude of their investments relative to the economy and in the strong development achieved by the industry, but also in their degree of interrelation with other economic agents.

The LICs are less exposed to a liquidity crisis than other financial institutions, because possible losses of confidence among consumers or changes in economic conditions do not necessarily translate into an immediate payment of liabilities by the LICs. Indeed, the companies' financial commitments are mostly long term. Moreover, two factors help prevent significant withdrawals of resources from this industry: the cost that must be assumed by the policyholders and, in some cases, contractual impediments to moving their savings to other options[4]/.

The solvency problems that could originate in an LIC are less likely (and less able) to directly affect the other sectors in the economy in the short term. In the case of a bank, in contrast, the nonpayment of its obligations or a crisis of confidence among its depositors is more likely to affect the chain of payments in the economy over a brief period.

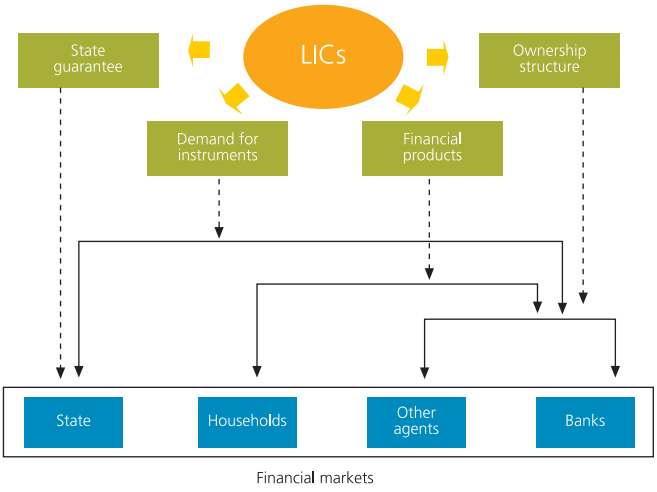
Corder (2004) identifies two factors for evaluating the extent of the potential impact that the suspension of services by a nonbank financial institution can provoke on the rest of the economy: the service must have a significant role in the economy, and the failure of an individual nonbank financial institution must be capable of generating significant problems in the provision of services by other firms in the same sector or in other sectors. As indicated above, LICs have achieved a position of importance in the domestic financial market, and the services they provide, especially in the pension area, are undoubtedly significant. At the same time, the development of the insurance industry is undeniably tied to consumers' confidence in life annuities as a product, and the insolvency of an important company can therefore generate a negative perception that affects the whole life annuity market[5]/.

From the perspective of financial markets, the risk of contagion and the threat to financial stability is greater when the LICs undertake banking-type activities or when there is growing interrelation between banks and insurers[6]/ [7]/. Minderhoud (2003) observes that the probability of contagion from the insurance sector to the banking system can increase in extreme situations. Trainar (2004), in turn, highlights that the transmission channels have not been clearly identified because they vary from one crisis to the next[8]/. In this sense, it is pertinent to examine the links between banks and LICs, and measure their importance as a potential source of instability.

In the case of Chile, it is possible to identify at least four avenues of interdependence between the market and LICs: ownership, financial products, state guarantees, and demand for instruments in the financial market (diagram 1)[9]/.

**Diagram 1**

Relation between LICs and the financial market




[4]/ Pension life annuities do not have the option of cashing out or changing contracts. At the same time, liabilities originating in insuree's investment accounts, which could be more volatile or liquid, still represent a small share of LICs' liabilities (3%).

[5]/ However, the interruption of service has a limited impact on other sectors. The type of insurance provided by LICs mainly affects natural persons that, in a large majority, are covered by the State guarantee (life annuities). If the problem affects just one company, insurances such as title or health insurance offer possibilities of substitution with other companies.

[6]/ See, for example, Das, Davies, and Podpiera (2003).

[7]/ Monks and Stringa (2005), using empirical evidence for the United Kingdom, do not find evidence of contagion from the insurance sector to the banking system, at either the individual or the industrial level. However, when they look specifically at banks that have an ownership relationship with insurance companies, they find evidence of the transmission of negative effects. The method used to measure these effects is based on the behavior of stock market prices in specific events that affect the insurance industry. In Chile, this methodology is not directly applicable, since LICs are closed corporations (which are not publicly traded on the stock exchange).

[8]/ Nevertheless, Trainar (2004) finds evidence of effects between sectors and concludes that the insurance sector is not likely to be a source of systemic risk, in the sense that the failure of one company is unlikely to provoke effects at the level of the economy.

[9]/ The link through financial debt can be another important channel for transmitting problems from LICs to the financial sector. In Chile, LICs' liabilities with the financial system reached US$150 million at the end of 2004 (6% of total equity). It is important to highlight that financial liabilities are subject to a maximum limit of one time equity (financial leverage).

The ownership link, through financial groups, relates LICs to banks, general insurance companies, AFPs, firms, and other market agents. These links can act as mechanisms for transmitting possible instabilities in the LICs to other agents and vice versa[10]/. Solvency problems in one of the members could affect the rest of the institutions pertaining to the economic group, either directly in the earnings of the financial conglomerate or through a reputation or contagion effect. This relation is of particular interest in the case of banks, since nine LICs, which together represent 18% of the industry's assets, belong to an economic group that is tied, linked in turn, to a banking institution[11]/.

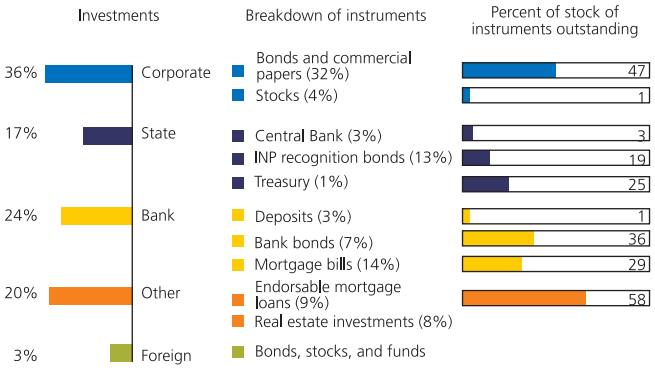
The second channel relating LICs to the market is generated by the phenomenon of "financial convergence," which has allowed LICs to expand into selling financial products that are not traditional to their area, such as savings, credit cards, mortgage financing, and mutual funds. In the opposite direction, other institutions, particularly banks, have acted as distributors of insurance products (*bancaseguros*); they have come to represent an important channel of distribution for life insurance, with a 28% share of nonpension insurance[12]/. This growing relationship facilitates a possible contagion of problems in the financial markets, directly in the earnings generated by the participants[13]/.

The relationship between LICs and the State is created through two types of guarantees provided in the law: the minimum pension guarantee and the life annuities guarantee. While the former can be significant, it does not depend on the financial health of LICs. Therefore, the focus here is on the State guarantee on annuities, whose direct commitment is from the LICs. Essentially, the State promises to pay 75% of the amount in excess of the minimum pension, with a ceiling of 45 UFs per contract, in the case of nonpayment by the company to its policyholders. Given the volume of life annuity commitments accrued through August 2005, this State guarantee covers debt equivalent to US$14 billion (SVS, 2005). The insolvency guarantee of a medium-sized company in the industry is approximately US$600 million[14]/. The tight link between the State and LICs has been growing and is potentially important for the State's performance, although it is improbable that the totality of annuity guarantees would be active at once.

Finally, one of the most direct and significant links between LICs and the Chilean financial market stems from the great demand for instruments they generate, which makes them an important source of financing for other market participants. Specifically, indexed fixed-income instruments allow the companies to match their liabilities through annuities and reduce their capital costs. As illustrated in figure 5, LICs currently possess an important share of the stock of instruments available in the market. The companies' portfolio decisions therefore have a bearing on the access conditions of households, Government, and firms.

**Figure 5**

Demand for instruments generated by LICs
(investment portfolio as of March 2005)




Sources:
SVS.
SBIF.
Central Bank of Chile.

The description of the links above provides a sense of the importance of LICs in the Chilean economy and highlights the relevance of monitoring their financial strength. Problems in the LICs could be transmitted to the rest of the system through these channels. Although the impact on financial stability could be limited in the short term, it is important to identify the risks and assess how prepared these institutions are to address different types of shocks.

## 4. Evolution of the credit risk and stress tests for LICs

An adequate framework that ensures the financial strength of LICs requires the identification of the main risks inherent in the insurance activity, their incorporation into the regulatory framework, the determination of a minimum capital level to ensure the solvency of the companies, and the design of early warning indicators to detect solvency problems.

[10]/ Trainar (2004) highlights the benefits of diversifying business for financial conglomerates and financial stability.

[11]/ These banks represent approximately 70% of the banking system's total assets.

[12]/ Lazen and Mastrángelo (2005) analyze the development of the *bancaseguros* and alternative distribution channels in Chile. Banks were authorized to establish affiliated insurance brokers in 1997. In 2004, these banking affiliates were also authorized to act as pension insurance brokers (60% of total insurance), potentially magnifying the relationship between banks and insurance companies.

[13]/ As of December 2004, the bank insurance brokers (affiliates) accounted for 4%, in total, of the profits of banks that have this type of affiliate.

[14]/ The company's residual assets must be discounted from the guaranteed amount to determine the effective payment that the State would ultimately assume when the resources were depleted.

Risks facing LICs can be grouped, generally, into investment risks (tied to assets), technical risks (tied mainly to liabilities), and other nontechnical risks of the LICs[15]/. Investment risks include diversification, counterparty (credit), and liquidity risks, as well as fluctuations in asset value through price movements to which the companies' investments are exposed (market risk). In the case of technical risks, LICs face the risks of technical reserve constitution (mortality, underpricing) and reinsurance. The long-term commitments that the companies make force them to adequately match their asset and liability flows over time, to avoid noncompliance or liabilities' arrears. One of LICs' main risks originates from the lower duration of their assets relative to their liabilities. In a scenario of diminishing interest rates, reinvestment could drive the profitability of their portfolio below that of their liabilities (reinvestment risk). Finally, the other nontechnical risks include operating, legal, administrative, and technological risks.

In this respect, international regulation has evolved considerably in the last decades, incorporating the main risks mentioned above into different approaches. One regulatory framework is the solvency approach used in Europe, which determines the capital levels that companies must maintain based on accounting fixed-ratios and capital-at-risk. Similarly, the risk-based capital (RBC) approach, used in countries such as the United States and Japan, sets the minimum capital requirement according to each risk.

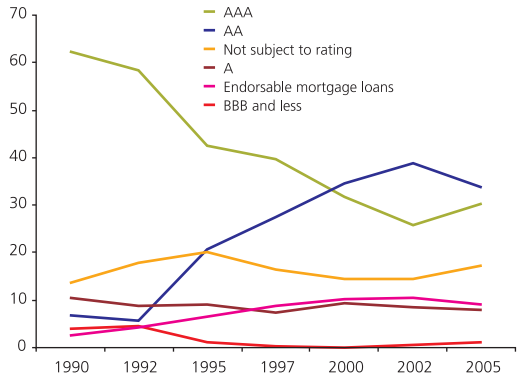
In Chile, the regulatory framework addresses these risks through different mechanisms designed under the general structure of the European-type solvency approach, that is, using an accounting ratio (the debt-to-equity ratio) to determine the minimum capital that each LIC must maintain[16]/. In the case of asset risks, it ensures diversification by setting limits on investment by instrument and issuer, and it addresses the risk of price fluctuations through a value-at-risk (VAR) standard[17]/. With regard to liabilities, reserves are constituted based on a standard mortality table; in the case of life annuities, these are adjusted by the asset-liability matching position[18]/. In particular, the risk of interest rate fluctuations, which affects the companies' reinvestment conditions, is incorporated in the matching rules drawn up by the regulator.

While the level of capital required of the companies is intended to cover all the mentioned risks, the requirement is not sensitive to the higher potential credit risk that the industry can assume. The Superintendency of Securities and Insurance (SVS) recently implemented the so-called asset sufficiency test, which aims at measuring each company's ability to meet its financial commitments in time. Under this regulation, the asset flow is written down according to its risk classification, which corrects potential credit worsening of the portfolio indirectly through the technical reserves of the annuities[19]/.

This is important because the LICs' portfolio has been migrating toward a larger share of corporate bonds and mortgage loans, which are mainly replacing State bonds (figure 6). The biggest change in credit composition is from AAA to AA, and investments in the higher risk categories are limited by current regulations. Nevertheless, there is an increase in risk at the margin that is not considered in the current determination of the required capital base. Moreover, the larger share of mortgage loans in LICs' portfolios exposes the companies to a greater degree of household credit risk, which presents a greater risk relative to the State.

**Figure 6**

Investment portfolio, by risk rating
(percent of investment portfolio)




(1) State instruments rated AAA.
(2) Does not include mutuals or reinsurance.
(3) The lowest available private rating was used.
(4) The instruments were associated to the long-term ratings of the issuer.
(5) Figures as of December of each year; 2005 measured in March.

Source: Authors' calculations, based on data from SVS.

[15]/ For a more detailed classification of LICs' risks, see KPMG (2002). The study distinguishes between risks present at the level of the entity, the industry, and the economy.

[16]/ The minimum capital corresponds to the maximum debt-to-equity ratio (16 times), a fixed amount of 90,000 UF, and the solvency margin. The solvency margin, in turn, incorporates capital at risk and the ratio of technical reserves to equity. The denomination of debt in this paper corresponds to current liabilities.

[17]/ Nearly 20% of investments is subject to the VAR calculation. The majority of LICs' investments in Chile are in fixed-rate instruments, which are valued at historical cost and which are treated under the assumption that they will be held until maturity, so additional capital is not required for them to reflect market price fluctuations.

[18]/ This year, the SVS updated the mortality tables used to constitute technical reserves, reflecting the increase in the life expectancy of annuitants in the last twenty years.

[19]/ The asset sufficiency test also considers prepayment risk adjustment factors, increasing its sensitivity to the companies' reinvestment risk. General Rule N° 188 (October 2005), which enters into force in June 2006.

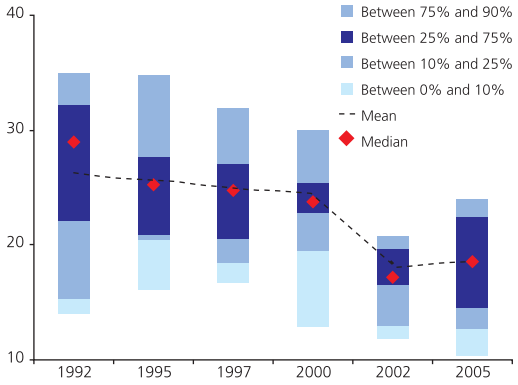
Although there are no direct requirements tied to asset credit risk, the focus of attention continues to be on the capital that the companies maintain and whether this is sufficient or proportional to the evolution of risk. It is therefore desirable to examine the portfolio, comparing credit risk with capital at each moment in time. To this purpose, a specific indicator is calculated, using the weights included in the calculation of the Basel capital adequacy indicator (CAI) developed for the banking sector. While the levels are in no case comparable for LICs and banks due to differences in their business horizons, the evolution of the resulting indicator and its distribution among companies gives us a concrete perspective on the ratio of capital to risk-weighted assets through time.

Figures 7 and 8 present the capital adequacy indicators, based on the weights used under Basel I and those recently proposed in Basel II, respectively. Using the Basel I weights, the companies' capitalization has fallen in recent years in comparison with the higher credit risk incorporated in the portfolios. Figure 7 reveals both a decreasing trend for the industry as a whole and a wider distribution for last year relative to 2002. Companies with the lowest CAI (that together account for 25% of the industry's assets) reduced their equity relative to risk-weighted assets, whereas the companies with the highest CAI (that together represent 25% of assets) raised their indicator in 2005. However, the trend appears much more stable when the Basel II weights are considered (figure 8). This indicator shows a negative evolution only for the company with the lowest CAI in the distribution, while the remaining companies, located at higher percentiles, improved their capital adequacy in 2005.

**Figure 7**

Basel I indicators

(Indicator weighted by size of assets) (1) (2)



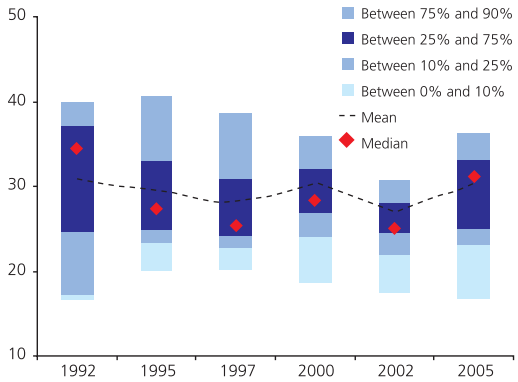

(1) CAI indicator ordered from high to low; the percentile indicates the amount of assets accrued.
(2) The range "between 90 and 100%" is omitted. In all years it exceeded the maximum range of the axis.

Source: Authors' calculations, based on data from SVS.

**Figure 8**

Basel II indicators

(Indicator weighted by size of assets) (1) (2)




(1) CAI indicator ordered from high to low; the percentile indicates the amount of assets accrued.
(2) The range "between 90 and 100%" is omitted. In all years it exceeded the maximum range of the axis.

Source: Authors' calculations, based on data from SVS.

The differences in the observed results when we use the indicator based on the Basel I versus the Basel II weights arise, mainly, because the Basel II weights for corporate bonds are lower for the lower credit risk ratings (AAA, AA, and A). These are precisely the ratings in which LICs have concentrated their investments in recent years.

An exercise to measure the credit risk exposure of LICs is to assume hypothetical stress scenarios and then observe what would happen with the companies' equity base. The first step is to choose five extreme hypothetical scenarios in which LICs' portfolio conditions worsen. Scenario 1 (S1) supposes a one-category downgrade in risk rating of all the instruments in the portfolio[20]/. S2 assumes default in the instruments issued by the main corporate group to which LICs are exposed in Chile[21]/. S3 represents the default of the second main economic group. Finally, S4 and S5 assume noncompliance of instruments related with the electric and retail sectors, respectively, to which the companies are largely exposed within the real sector[22]/.

Table 1 shows what would happen with the current debt-to-equity ratio (D/E) on facing these scenarios and directly posting the capital loss. Current regulations allow a maximum D/E of 16 times; if the ratio is higher, companies must contribute the necessary capital to reach this value. The benchmark D/E measure shows that in none of the cases would the industry remain over the maximum allowed, but an analysis of individual impacts suggests that a significant share of the companies

[20]/ In this exercise, the downgrade in risk rating corresponds to movements between categories, for example, from AA to A or from A to BBB. The loss associated with this event is estimated through the change in the expected loss (the change in the default probability) for the value of the assets.

[21]/ The classification of corporate groups is made by the SVS.

[22]/ It does not include exercises related to instruments that carry explicit or direct guarantees, such as mortgage loans (housing) and transport (Government).

would have to contribute capital. With the exception of the generalized downgrade in risk rating, all the reported scenarios significantly affect the equity of an important number of companies[23]/. For example, in the highest impact scenario (S2), the nonpayment of commitments by the most important economic group in the LIC portfolio would generate D/E ratios above 16 in nine companies, with a loss equivalent to 45% of total equity of the industry.

**Table 1**

Credit stress tests on LICs

(times; number of companies; percent of current equity)

| Scenarios | D/E (1) (2) | N° companies (3) | Loss /Equity |
|---|---|---|---|
| Base scenario | 8.0 | 0 | |
| E1 | 8.6 | 0 | 7.1 |
| E2 | 14.5 | 9 | 45.0 |
| E3 | 13.9 | 7 | 42.4 |
| E4 | 13.8 | 8 | 41.9 |
| E5 | 10.3 | 3 | 22.1 |

(1) Debt-to-equity ratio (maximum 16 times).
(2) Total debt (D) is equal to current liabilities.
(3) Number of companies with D/E over 16.

Source: Authors' calculations (March 2005 data).

## 5. Concluding remarks

Life insurance companies have become one of the most important institutional investor groups in the financial system. The sector's growing importance in the Chilean economy has been accompanied by a greater link between LICs and other agents, such as the State, banks, and households, through different channels (property, products, investments, and guarantees).This interaction has helped deepen the financial markets and make them more dynamic. The drawback, however, is the potential transmission of financial problems from one sector to another, which could ultimately have repercussions on the financial vulnerability of the system.

It is therefore crucial to systematically monitor the solvency of the distinct entities and the potential impact on related sectors. Part of this objective can be accomplished by strengthening consolidated supervision of financial groups. At the same time, identifying risks and establishing correction measures are part of the supervision work that has been going on in Chile.

LICs' capital requirements must cover the complete spectrum of risks that the life insurance industry faces. In the case of Chile, however, this is not directly sensitive to the higher credit risk observed in the industry in the last few years. This paper calculates an indicator that reviews the evolution of capitalization relative to the credit risk in LICs' portfolio, using the logic of the capital adequacy indicators incorporated in Basel I and II. The evidence is not conclusive on the level of system capitalization: using Basel I weights results in a falling ratio beginning in 2002, whereas based on Basel II weights, the industry exhibits stable capital vis-à-vis the relatively higher existing risk. However, given the limitations of these weights in the context of the life insurance industry, it is advisable to incorporate this issue explicitly in the capital requirements.

Finally, the stress tests performed on LICs' portfolios provide evidence on the exposure of the companies to credit risk. In general, the industry displays strengths for facing a generalized downgrade in the risk rating of debt instruments, though it shows significant effects on equity in each of the other scenarios selected. It is important to bear in mind, however, that in extreme situations, problems could be unleashed in more than one sector in the economy simultaneously.

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Trainar, Philippe, 2004, "Insurance and Financial Stability." *Financial Stability Review* (November). Banque de France.


[23]/ The total effect on equity could be greater considering that the nonpayment of instruments would affect the companies' matching position. The D/E ratio would thus rise even more when the required reserves were adjusted.

# Liquidity risk and funding in the Chilean banking system*

Authors: Alejandro Jara** and Nicole Winkler***

## 1. Introduction

Managing liquidity is one of the central concerns of every banking institution. One of the critical aspects of the banking business is precisely transforming short-term deposits into medium- and long-term loans. Adequate liquidity management represents an institution's capacity to continue to finance its loans and to meet the maturities of its funding obligations. This capacity is determined by the combination of the business carried out and the balance sheet structure.

To implement correct liquidity management, banking institutions must not only consider the funding necessary to finance the normal course of their activities, but also evaluate their funding capacity in the face of adverse scenarios. Such scenarios can derive from specific difficulties in a given institution's financing or from generalized problems in the banking industry.

This issue is also of interest for regulators and supervisors. The Basel Committee on Banking Supervision has proposed a set of recommendations aimed at improving the management of bank liquidity (BIS, 2000). These recommendations emphasize the importance of developing an adequate liquidity management policy on the part of banking institutions, which must always be complemented by the measuring and monitoring of funding and the ongoing evaluation of the institutions' capacity to access the financial market. In addition, the BIS has underscored the need for adequate supervision of liquidity management. In Chile, regulatory guidelines of the Central Bank[1]/ have been gradually incorporating these recommendations, leading to the creation of a "liquidity management policy" in accordance with the scale and risk of the operations of each banking institution[2]/.

This paper analyzes the main characteristics of bank funding in Chile and their implications for liquidity risk. Moreover, it highlights existing differences among banks with regard to their degree of exposure to liquidity risk. These differences reflect, in part, the distinct comparative advantages among banking institutions for attracting relatively more stable resources, as well as the degree of liquidity of their assets. We include a brief section that evaluates the differences among banks in the area of liquidity management in periods of financial stress, understood as significant falls in one of the main sources of bank funding. The paper thus underscores the significant share of relatively more volatile sources in the financing of bank deposits and the implications for liquidity management.

## 2. Liquidity and funding in the Chilean banking system

To analyze the structure of bank financing, we grouped the balance sheet into three large categories: (1) treasury funding (*Treas*), (2) time deposits (*TimeDep*), and (3) demand deposits, fixed-income instruments, capital and others (*Other*). Treasury funding, which corresponds to net financial activities (investments) that banks carry out in the monetary market[3]/, represent a source (use) of financing that is readily available and very sensitive to relative prices, and it constitutes the main variable in short-term liquidity management. Time deposits correspond to deposits by individuals, firms, and financial intermediaries. The deposits by individuals and firms respond more slowly to interest rate stimuli, whereas deposits by financial

* The opinions expressed in this document are the exclusive responsibility of the authors and do not necessarily represent the views of the Central Bank of Chile or its Board Members. We thank Luis Óscar Herrera and Alejandro Micco for their comments, and José Matus for efficient assistance.

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1/ See Chapter III.B.2 of the *Compendio de Normas Financieras*, which discusses term matching.

2/ In practice, financial institutions design and implement their own procedures and models for liquidity risk management and monitoring, which complement regulations in force.

3/ It is made up of the net use of interbank financing (*Interb*), net lines of external financing, (*Fext*), contracts and repos, from which cash and financial investments (*Invfin*) in secondary markets are deducted:

$Treas_{it} = Interb_{it} + Fext_{it} + Pactos_{it} + Repos_{it} - Cash_{it} - Invfin_{it}$.

intermediaries are similar to treasury funding sources. Finally, the remaining financing sources (*Other*) are considered exogenous and, therefore, more stable in the relevant periods for banks' liquidity management.

As can be seen in equation (1), the total sum of all financing sources (*Tf*) allows financing the sum of loans (*Loans*), fixed assets (*Afixed*), and other assets (*Aother*), which correspond to the less liquid items of total assets:

$$Tf_{it} = Treas_{it} + TimeDep_{it} + Other_{it} = Loans_{it} + Afixed_{it} + Aother_{it} \quad (1)$$

Table 1 presents the monthly average of the funding structure and the uses of the national banking system as a percentage of total assets (for the 2002–2005 period). The table shows that time deposits represent the system's main source of funding (43%), followed by financial investments (18%)[4]/, funding obtained through fixed-rate instruments (16%), and demand deposits (12%). Treasury funding, in turn, includes mainly financial investments in the secondary market and, to a lesser extent, external financing (4% of assets).

However, the Chilean banking industry is characterized by its heterogeneity. To capture this characteristic, we classified the 26 banks that currently make up the national banking system into three broad categories: large banks (namely, the four largest institutions in the system), medium-sized banks and treasury banks (table 1). Time deposits have a strong share in total funding sources for all the bank groups in Chile, although their share is relatively larger in the group of medium-sized banks (nearly 50%). The group of large banks is characterized as maintaining a high level of demand financing, related to their greater number of checking accounts. The group of medium-sized banks maintains a similar financing structure to that of the large banks, although demand deposits account for a smaller share of total funding. Treasury banks are characterized as maintaining a high share of liquid assets in the form of financial investments, as well as a low presence of demand deposits, which is partially compensated by a higher level of capital.

The share of foreign and domestic bank credit lines in aggregate funding is relatively low in comparison with other banking systems and with the past history of the domestic system[5]/. The largest banks are, on average, net suppliers of resources in the interbank market, while the rest of the system is a net user of this market, especially the group of treasury banks.

**Table 1**

Sources of bank funding

(average 2002–2005, percent of assets)

| | System | Large banks | Medium-sized banks | Treasury banks |
|---|---|---|---|---|
| Treasury | -13.5 | -13.4 | -10.3 | -39.5 |
| Interbank (net) | 0.0 | -0.4 | 0.6 | 1.1 |
| External financing (net) | 4.1 | 4.7 | 3.1 | 0.3 |
| Contracts (net) | 2.2 | 2.3 | 1.8 | 3.2 |
| Repos (net) | -0.8 | -0.7 | -0.9 | -1.3 |
| Cash | 1.1 | 1.3 | 0.8 | 0.1 |
| Financial investments | 17.8 | 18.0 | 14.1 | 42.6 |
| Time deposits | 42.7 | 39.7 | 49.2 | 40.5 |
| Other | 36.0 | 39.4 | 30.9 | 22.3 |
| Demand deposits | 12.2 | 14.6 | 8.6 | 2.9 |
| Fixed-income instruments | 15.8 | 18.1 | 13.1 | 0.0 |
| Capital | 7.9 | 6.6 | 9.2 | 19.4 |
| Other | 0.1 | 0.1 | 0.0 | 0.0 |
| Total sources (uses) | 65.2 | 65.7 | 69.8 | 23.3 |
| Loans | 63.8 | 64.1 | 68.2 | 27.5 |
| Derivatives (net) | 0.0 | -0.1 | 0.2 | -0.5 |
| Fixed assets | 2.6 | 2.6 | 2.6 | 0.8 |
| Other investments | 0.2 | 0.2 | 0.3 | 0.0 |
| Other assets | -1.4 | -1.2 | -1.5 | -4.5 |

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

Based on the classification of bank funding presented in table 1, it is possible to carry out a cross-sectional comparison of the financing structure of the Chilean banking system. This funding structure can be tied to idiosyncratic characteristics of each bank, in order to distinguish empirical regularities that are relevant to liquidity management. Following this methodology, and weighting each bank funding component by its relative size[6]/, the following empirical regularities can be found for the national banking system (figure 1):

- Funding from mutual funds is positively related to the relative importance of time deposits as a share of total financing for the relatively smaller banks (figure 1.a).
- The relatively larger banking institutions, which typically have more branches, maintain a high level of funding through demand deposits, on average (figure 1.b).
- There is a negative relation between the relative importance of the stable sources grouped in the category "Other" and the share of financial investments in total assets. Similarly, banks that maintain a high ratio of illiquid assets ("total sources") generally exhibit a larger share of stable funding (figures 1.c and 1.d).

[4]/ Part of these resources held as financial investments derive from the technical reserves, which, strictly speaking, do not represent an alternative for bank financing.

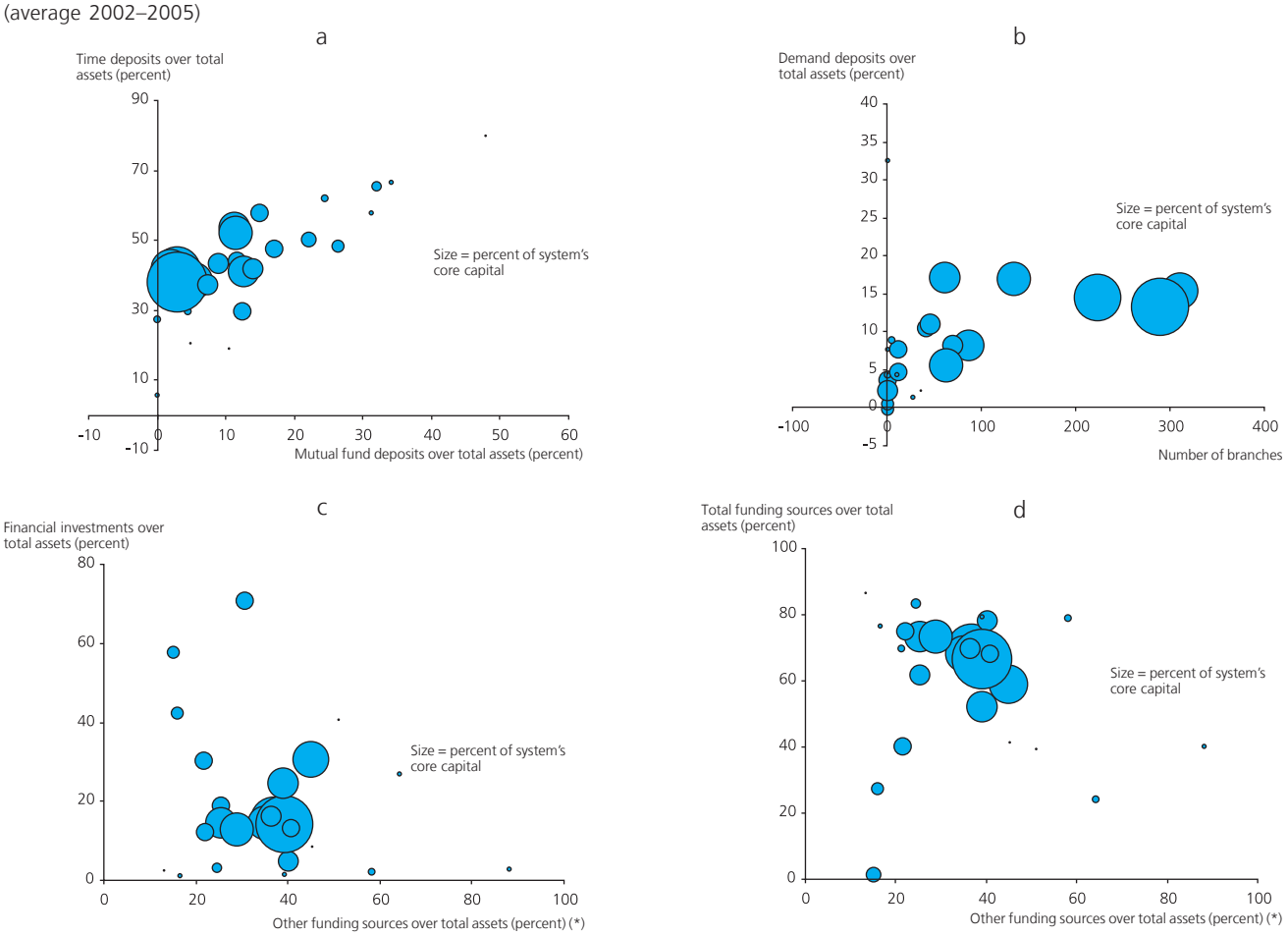
[5]/ See Held and Jiménez (1999).

[6]/ The relative size reflects the share of each bank in the total capital in the system.

**Figure 1**

Characteristics of bank funding

(average 2002–2005)




(*) Other sources include demand deposits, fixed-income instruments, and capital.

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

## Maturity transformation

From the perspective of liquidity risk, maturity transformation is a central aspect of the banking business, because banks attract liquid funds from the public and invest them, traditionally, in less liquid assets. The liquidity of an asset depends on the speed and cost at which it can be transformed into a means of payment. Resources available as cash, for example, and deposits maintained in other banking institutions are considered liquid under normal market conditions. Government instruments and Central Bank and Treasury bonds are relatively less liquid, although their liquidity is fairly high because they can be transformed into available resources at a low cost. In general, financial instruments that take an excessively long time to liquidate or whose sales price varies considerably are less appropriate for use in bank liquidity management.

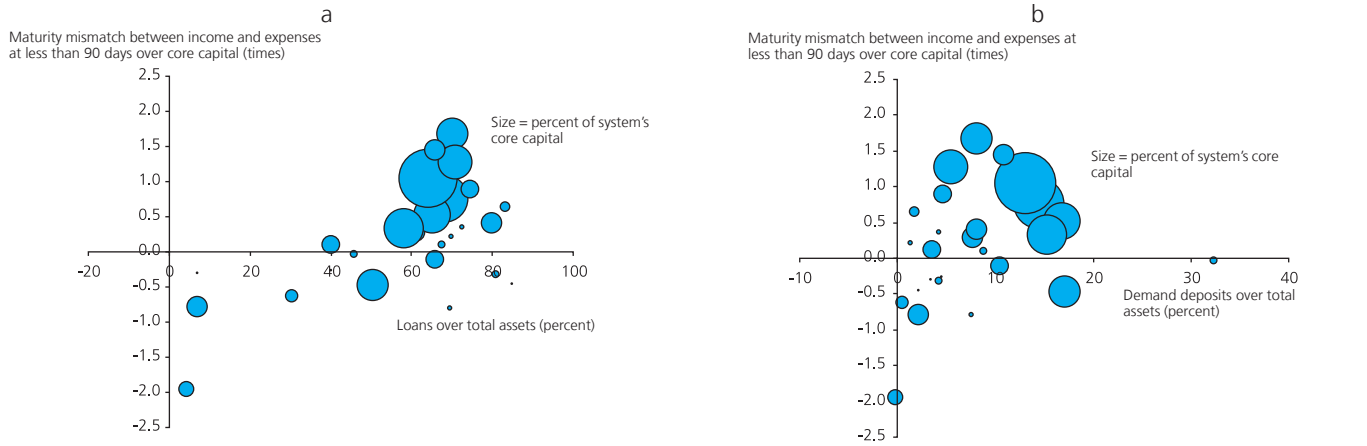
The maturity transformation carried out by banks generates a mismatch between assets and liabilities with different maturities. Measuring this mismatch at different maturities as a percentage of basic capital is a traditional measure of liquidity risk exposure. Figure 2 shows, as an example, the mismatch of 90-day maturities among banks in Chile (that is, the difference between expenses and income accrued at that maturity for each institution)[7]/, compared with the share of loans and demand deposits in total assets. The figure shows that the greatest mismatch at 90 days is found with the relatively larger banks, which also maintain a larger share of illiquid assets (loans). Similarly, these institutions maintain an important share of demand deposits, stemming from their greater number of checking accounts. This is reflected in a higher "contractual" mismatch, since these deposits, by definition, form part of the shortest maturity ranges.

[7]/ The Chilean regulatory framework establishes that 30- and 90-day mismatches must not exceed 100% and 200% of core capital, respectively.

**Figure 2**

Liquidity risk exposure

(average 2002–2005)




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

## Volatility of bank funding

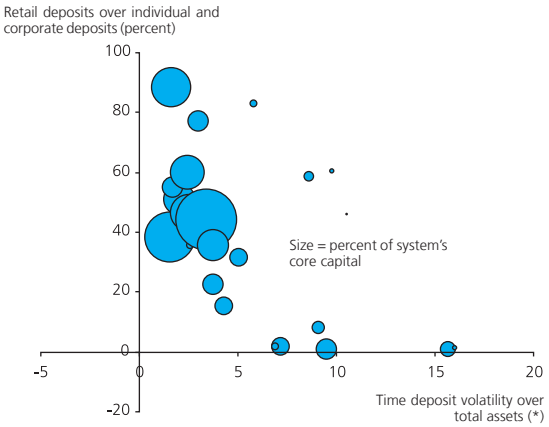
Net funding mismatches, however, also depend on the behavior of depositors[8]/. In particular, depositors or creditors whose behavior is more sensitive to changes in market conditions tend to increase the liquidity risk in bank funding. On the other hand, many depositors keep significant resources in demand accounts on a permanent, stable basis, thereby reducing bank liquidity risk despite the greater mismatch they provoke. In other words, the degree of volatility of the bank creditors or depositors is relevant for the analysis of liquidity risk. In general, the more volatile the funding, the higher the probability that these resources will be withdrawn (or not rolled over at maturity) in a banking institution, in response to changes in market perception.

This adds another dimension to liquidity management, in terms of exposure to this risk: namely, the degree of volatility of bank funding. According to Dziobek et al. (2000), the degree of volatility of bank funding depends on both institutional and economic factors, which can be grouped into three categories: (1) type of depositor, (2) extent of insurance coverage, and (3) the maturity of the deposits. Deposits from institutional investors, such as the pension funds, mutual funds, and insurance companies, tend to be more volatile because of the degree of sophistication of their investment decisions, their knowledge of the banks' financial position, and, in most cases, the presence of an explicit responsibility to safeguard their assets. At the other extreme, household deposits tend to be less volatile (figure 3), in response to the existence of deposit insurance, less information on which to base their decisions, and a lower perception of the risks involved[9]/. Corporate deposits, in turn, fall between these two extremes in terms of volatility.

**Figure 3**

Volatility of retail time deposits

(average 2002–2005)




(*) Measured through the standard deviation of the quarterly variation.

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

Table 2 presents the institutional composition of bank deposits, separated into deposits by individuals, firms and institutional investors. At the level of the bank groups, the table confirms some of the stylized facts presented at the beginning of this section, in that the larger banks have a greater share of retail banking in their total deposits[10]/.

[8]/ In practice, the SBIF can authorize the use of internal models that capture this behavior, in order to measure term mismatches taking maturity flows into account.

[9]/ In Chile, the guarantee on time deposits from natural persons is 90% (up to 120 UF), while for demand deposits it is 100%.

[10]/ Approximately in this case, through deposits from non-profit natural persons.

Treasury banks —which, on average, receive more funding from time deposits— attract nearly 60% of their resources from institutional sources. Finally, the medium-sized banks display a high share of volatile deposits (over 40%), although this is partially compensated by deposits from individuals.

**Table 2**

Institutional breakdown of deposits
(percent of total deposits)

| | 2002 | 2003 | 2004 | 2005 (3) |
|---|---|---|---|---|
| System | | | | |
| Individuals / (Individuals + Firms) (1) | 50.9 | 52.3 | 49.7 | 48.1 |
| Institutional (2) | 32.2 | 28.2 | 34.8 | 34.5 |
| Large banks | | | | |
| Individuals / (Individuals + Firms) (1) | 55.3 | 47.4 | 48.5 | 46.5 |
| Institutional (2) | 24.1 | 21.5 | 44.4 | 43.4 |
| Medium-sized banks | | | | |
| Individuals / (Individuals + Firms) (1) | 42.9 | 47.4 | 48.5 | 46.5 |
| Institutional (2) | 44.1 | 37.2 | 44.4 | 43.4 |
| Treasury banks | | | | |
| Individuals / (Individuals + Firms) (1) | 9.8 | 7.1 | 8.3 | 7.7 |
| Institutional (2)) | 60.8 | 55.6 | 60.9 | 57.6 |

(1) Share of deposits from natural persons for non-profit purposes in total deposits from natural persons and firms.
(2) Share of institutional deposits in total deposits from natural persons, firms, and institutions.
(3) As of February 2005 (latest available data).

Source: Authors' calculations, based on data from SBIF y SVS.

At the system level, we observe a slight fall in the relative importance of individuals in financing deposits over the last four years. In particular, in the case of the relatively larger banks, the "institutional" presence in deposits has increased to nearly 28% of total deposits.

Finally, to evaluate the degree of liquidity risk exposure associated with more volatile financing, it is necessary to contrast it with the liquid asset position maintained in the bank's balance sheet. Banks that maintain a financing structure that is more dependent on volatile financing are not necessarily more exposed to liquidity risk, to the extent that their assets are composed mainly of highly liquid financial instruments, as occurs with the treasury banks. An indicator that captures the essence of this argument is the funding volatility ratio, constructed on the basis of the quotient between volatile funding that is not hedged by liquid assets and iliquid assets, that is,

$$FVR = \left( \frac{VolL - LiqA}{TotA - LiqA} \right) \qquad (2)$$

where (F*VR*) corresponds to the funding volatility ratio, *VolL* to volatile liabilities, *LiqA* to liquid assets, and *TotA* to total assets.

Figures 4.a and 4.b show an estimate of the funding volatility ratio during the 2002–2005 period for the Chilean banking system. We considered as a potentially volatile liability the sum of deposits from institutional investors (pension funds, mutual funds and insurance companies) and deposits from corporations listed in the Securities Registry maintained by the Superintendency of Securities and Insurance (SVS). In addition, we considered as a volatile liability credit lines with other banks (interbank financing) and with foreign markets. The figures show that the funding volatility ratio can vary strongly among banks. In particular, the larger banks present a funding volatility ratio greater than zero, which means that there is a positive share of less liquid assets financed with potentially volatile liabilities[11]/.

Figure 4.a highlights the consistency between two of the indicators presented in this section that measure liquidity risk exposure: the 90-day mismatch and the funding volatility ratio. Figure 4.b, in turn, highlights that banks that have a high share of mutual funds in total deposits tend to have a higher funding volatility ratio. In contrast, some small banks manage to compensate for this high presence of funding volatility through a higher share of liquid assets, thus registering a negative funding volatility ratio. This point can be observed in figure 4.c, which illustrates how smaller banks compensate their greater dependency on financing from mutual funds: they maintain a high presence of liquid assets on their balance sheets, which in some cases is over 30% of total assets. Finally, the larger banks exhibit a lower share of volatile liabilities than the medium-sized banks, due to the greater presence of retail financing, as shown in figure 4.d.

## 3. Bank liquidity management in periods of stress

Liquidity management refers to the capacity of banking institutions to meet their obligations under normal working conditions. In Chile, the high share of potentially volatile sources in bank funding implies that liquidity management is an important aspect of bank management. It is relatively less important, however, in the case of banks whose funding comes largely from retail financing, which is less volatile[12]/.

An adequate liquidity management requires testing under stress scenarios, that is, when the usual sources of funding are suddenly and unexpectedly reduced[13]/. A concrete case of financial stress that is relevant to bank liquidity management policies in Chile originates in the volatility of mutual funds that invest in fixed-income securities. These funds represent

[11]/ In Thailand, Malaysia, and other more developed countries, the funding volatility ratio tends to be negative, reflecting a lower liquidity risk exposure. In developing countries, this indicator is positive, on average (see Dziobek et al., 2000).

[12]/ See Gatev et al. (2004).

[13]/ For a liquidity risk situation to translate into a higher probability of bank failure, the lack of financing must be accompanied by solvency problems or by a market perception of insolvency.

an important source of total deposits, and they vary as a result of the savings decisions of contributors and portfolio changes by the administrators, which are motivated by changes in market conditions. These fluctuations in mutual funds signify that the banking system needs either to look for alternative sources of financing or adjust the size of their assets.

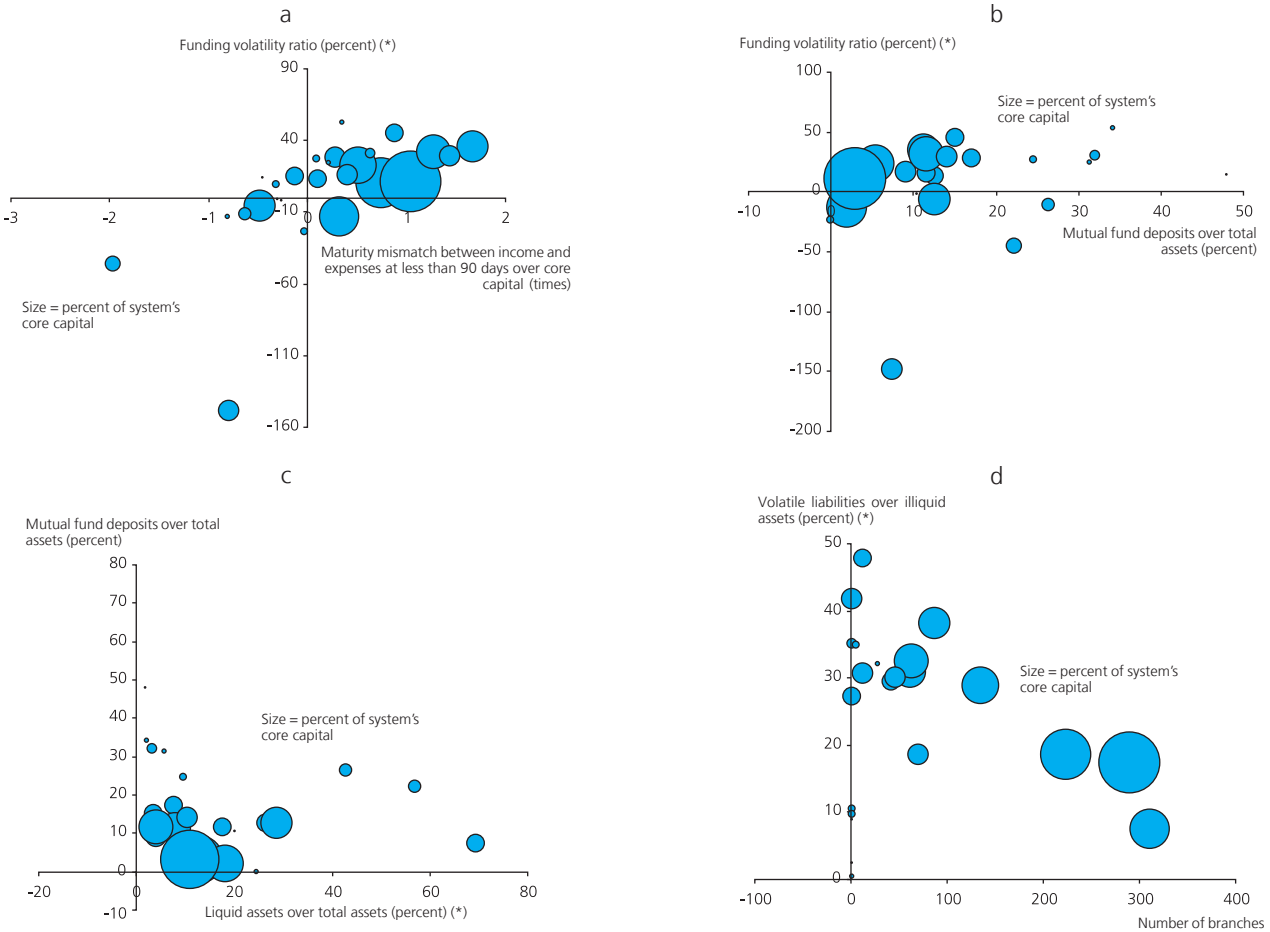
## Sudden drop in mutual funds and its impact on liquidity management

Figure 5 shows the evolution of quarterly changes in total short-, medium-, and long-term mutual funds, in real terms[14]/. The figure shows the higher volatility that these funds have displayed in the recent period, including three particularly significant falls: [15]/ September 1998, December 2002, and April 2003.

While the source of the fund variation was different in each of the three cases[16]/, it is interesting to evaluate their impact on bank liquidity management. To that end, we considered the historical monthly bank financing series from January 1990 to June 2005, following the classification presented in table 1. For each of these variables, we constructed a monthly indicator of the "intensity of the drop" ($I_{ti}$), as follows:

**Figure 4**

Volatility and bank liquidity
(average 2002–2005)




(*) Liquid assets include available funds (cash and deposits at the Central Bank, at other banks, and abroad) and instruments issued by the Central Bank with a secondary market. Volatile liabilities (institutional deposits and interbank and foreign credit lines) less liquid assets over total assets less liquid assets.

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

[14]/ The short-, medium-, and long-term mutual funds correspond to the 1, 2, and 3 funds, whose share of bank deposits is approximately 80%, 60%, and 50% of each fund, respectively.

[15]/ These drops exceed the fund's average fluctuation minus two standard deviations, based on the monthly series for the period 1990:1 to 2005:1.

[16]/ The drop experienced in September 1998 stemmed from the strong increase in interest rates during the period; the fall in December 2002 reflected the impact of the nominalization of monetary policy; and the May 2003 episode captures the Inverlink effect.

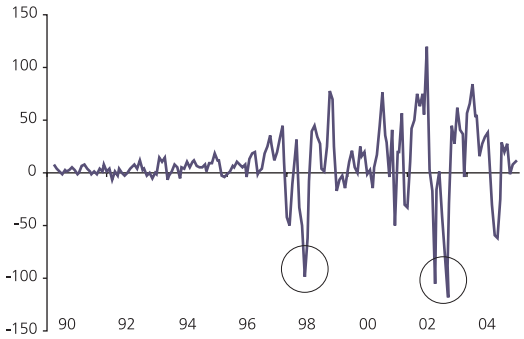
$$I_{ti} = \begin{cases} 3 & si \quad \Delta I \in \left[-\infty, \bar{x} - 2\sigma\right] \\ 1 & si \quad \Delta I \in \left(\bar{x} - 2\sigma, \bar{x} - \sigma\right] \\ 0.5 & si \quad \Delta I \in \left(\bar{x} - \sigma, 0\right] \\ 0 & si \quad \Delta I \in \left(0, \infty\right] \end{cases}$$

where $\Delta I$ corresponds to the quarterly change in each variable (*Treas, TimeDep, Other, Tf*) and $\sigma$ is the standard deviation of other changes in the indicated period. In other words, the larger the indicator, the bigger the fall in the funding source relative to its historical behavior.

**Figure 5**

Quarterly variation of mutual funds (*)

(millions of UF)




(*) Includes type 1, 2, and 3 mutual funds.

Source: AAFM.

Figure 6 shows the degree of intensity of the drop in financing sources for the mutual fund episode registered in April 2003[17]/. One point that stands out from the figure is that the banks that have a larger number of branches (that is, that maintain a larger base of retail financing) tend to use the treasury less in moments of stress, while their time deposits post a smaller drop in periods of higher mutual fund volatility. This suggests that the partial funding sources of banks with a larger base of retail financing tend to experience lower relative volatility[18]/. Consequently, the resources withdrawn by the mutual funds tend to return to the system, albeit heterogeneously. In particular, banks with a broader base of clients are relatively less adversely affected in terms of total deposits under this type of scenario.

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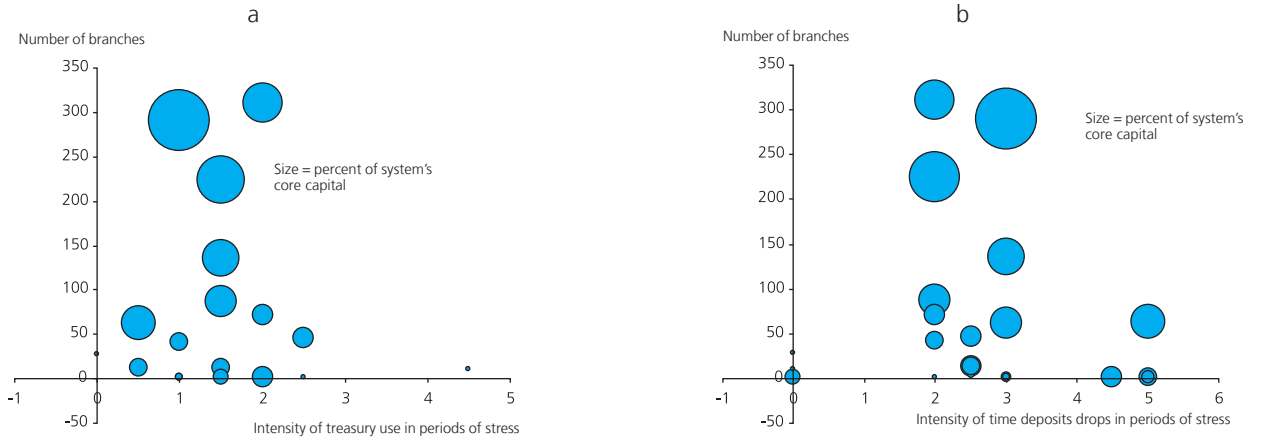
**Figure 6**

Impact on liquidity management in periods of stress (April 2003)




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

[17]/ Each observation on the intensity of use reflects the indicator's moving sum for a five-month centered window, in order to capture possible lags between the drop in the mutual funds and its impact on the bank balance sheet.

[18]/ To complement this partial analysis, we estimated a simple regression between the degree of intensity of the drop in time deposits in April 2003 (controlling for the number of branches, size, and other funding characteristics) and the degree of asset liquidity. The estimations (not reported here) confirm the presumption that the number of branches reduces the degree of intensity of the drop in time deposits in periods of stress, which in turn results from the sudden falls in the mutual funds' equity.

# External financing: The implications of interest rate swaps*

Authors: Sergio Godoy** and Jorge Selaive***

## 1. Introduction

In Chile, firms and banks regularly use interest rate swaps (IRS) to hedge interest rate risk underlying in their external liabilities. These instruments allow a domestic company or bank to obtain a fixed (floating) payment profile in the face of debt commitments in foreign currency originally contracted at a floating (fixed) rate. In this paper, we analyze a unique database of foreign interest rate swap contracts[1]/. Our goals are the following: (1) to characterize the use of these instruments by Chilean companies, (2) to evaluate quantitatively the impact of interest rate swaps on their real cost of foreign indebtedness and, finally, (3) to estimate the impact of IRS on the composition (fixed versus floating) of external debt in the period 1996 to 2004.

Establishing the real cost of financing allows us to evaluate the conditions under which Chilean firms access external credit markets. In addition, determining the effective fixed-rate share of external debt allows us to quantify more accurately the possible effects of international interest rate variations on debt service and, therefore, represents additional evidence for assessing Chile's macrofinancial stability.

We find that the cost of external financing for Chilean firms, measured using foreign IRS, has fallen steadily since 2001. It has fallen more rapidly than the Chilean sovereign spread, such that the two indicators reached very similar levels in 2004. In addition, when we take the IRS into account, the external debt that is actually subject to a floating rate fell from 49% of total external debt to 40% in 2004. In this context, the economy would be on better footing for enduring international rate hikes. Under a scenario of such rate hikes, the effects on the debt service are substantially lower than the effects estimated based on the debt originally contracted at a floating rate.

## 2. Interest rate swap contracts: operational features

A swap contract consists in an agreement between two parties to exchange cash flows at set dates in the future and at a preestablished price. The most popular of this type of contract is the fixed-rate IRS, where one party receives a cash flow calculated over the principal using a floating (fixed) interest rate and the counterparty receives a cash flow calculated by applying a floating (fixed) interest rate to a notional amount of principal and the counterparty receives a flow computed by applying a fixed (floating) interest rate to the same notional amount. This notional principal amount is not exchanged. Finally, the fixed interest rate in the contract is known as the swap interest rate[2]/ (diagram 1).

Diagram 1 presents a fixed-to-floating IRS contract. A firm contracts a loan with a creditor at the London interbank offer rate (LIBOR)[3]/ and then arranges a swap for all (or a portion) of it with a bank, at an interest rate of X%. Consequently, the IRS itself corresponds to the area surrounded by an intermittent line in diagram 1.

* The opinions expressed in this document are the exclusive responsibility of the authors and do not necessarily represent the views of the Central Bank of Chile or its Board Members. We thank Luis Óscar Herrera and two anonymous discussants for their comments. We also thank the Central Bank of Chile's Foreign Exchange Department for providing data.

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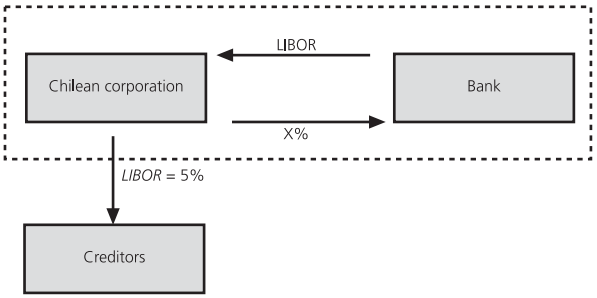
[1]/ Under Chapter IX of the Compendium of Foreign Exchange Regulations (*Compendio de Normas de Cambios Internacionales*) and the associated manual of procedures and formulas, local entities must report to the Central Bank all operations carried out with foreign counterparties involving foreign interest rate derivatives. The database contains the foreign interest rate derivative contracts and compensations.

[2]/ Interest rate swap contracts are traded over the counter, or outside the organized exchanges. These contracts do not normally include explicit commissions, although the fixed interest rate received can include them implicitly. Another implicit cost is the possible reduction of the credit line. However, both costs will probably be very low.

[3]/ The London interbank offer rate is the floating interest rate that AA-rated banks in London pay for funds loaned by other banks with the same rating. It is calculated by the British Bankers' Association (see *www.bba.org.uk*).

**Diagram 1**

Fixed-to-floating interest rate swap




At the start of the contract, the net value of this instrument is zero. As time passes, however, interest rates vary, and thus the value of the contract also varies. It is therefore normal for one of the parties to be *in the money*, or to have a long position in the contract, while the other party is *out of the money*, or has a short position for an equal amount. Consequently, each of the parties involved is exposed to the risk of nonpayment by the counterparty. However, in the international markets, there is no differentiation among firms for credit or nonpayment risk. This situation is explained by the following considerations:

i) The financial design of swap contracts does not include the exchange of the principal amount (that is, the notional value), so swaps have a lower credit risk than bonds or loans, since the exposed portion corresponds only to interests.

ii) There are market practices that reduce the credit risk involved in swap operations.

iii) Banks have a diversified client portfolio, which reduces the possibility that one party to the swap contract will be affected by the insolvency of the counterparty[4]/.

## 3. The swap market in Chile and the rest of the world

This section presents the evolution of IRS in Chile in the period 1996–2004, together with an international comparison for the years 2001 and 2004. In this period, more than 90% of IRS contracts were denominated in U.S. dollars and based on the dollar LIBOR.

### a. Chile

Table 1 shows a strong and sustained growth of IRS contracts. For banks, the highest growth occurred after 1999, whereas firms began to increase the use of these contracts in 1996. Some of the IRS contracted by banks could, perhaps, correspond to operations that in reality reflect the interests of domestic firms that do not have direct access to foreign intermediaries. The average weighted duration[5]/ of swap contracts is around four years, which is very close to the duration of external debt.

**Table 1**

Notional amount contracted in interest rate swaps (*)

(US$ million)

| Year | Banks | Firms | Total |
|---|---|---|---|
| 1996 | 99 | 846 | 945 |
| 1997 | 184 | 1,514 | 1,698 |
| 1998 | 326 | 1,660 | 1,986 |
| 1999 | 313 | 316 | 629 |
| 2000 | 1,149 | 757 | 1,906 |
| 2001 | 2,483 | 2,078 | 4,561 |
| 2002 | 3,054 | 1,870 | 4,924 |
| 2003 | 3,415 | 2,733 | 6,148 |
| 2004 | 2,786 | 1,375 | 4,161 |
| Average duration, in years | 3.7 | 4.0 | 3.9 |

(*) The figures correspond to contracts in U.S. dollars.

Source: Authors' calculations, based on data from the Central Bank of Chile.

Table 2 presents the percentage of total IRS contracts that were carried out to obtain a fixed payment profile, distinguishing between banks and firms. It also presents the number of banks and firms that arranged IRS contracts in the same period.

**Table 2**

Share of interest rate swaps that pay a fixed rate and number of banks and firms surveyed (*)

| | Percent of the total contracted amount that pay a fixed rate | | | Number of entities surveyed | | |
|---|---|---|---|---|---|---|
| Year | Banks | Firms | Total | Banks | Firms | Total |
| 1996 | 0 | 100 | 90 | 1 | 4 | 5 |
| 1997 | 19 | 100 | 91 | 2 | 8 | 10 |
| 1998 | 77 | 99 | 96 | 5 | 14 | 19 |
| 1999 | 83 | 65 | 74 | 5 | 5 | 10 |
| 2000 | 25 | 49 | 35 | 4 | 5 | 9 |
| 2001 | 71 | 75 | 73 | 8 | 14 | 22 |
| 2002 | 72 | 69 | 71 | 10 | 9 | 19 |
| 2003 | 73 | 59 | 67 | 9 | 10 | 19 |
| 2004 | 57 | 85 | 66 | 8 | 6 | 14 |

(*) The figures correspond to contracts in U.S. dollars.

Source: Authors' calculations, based on data from the Central Bank of Chile.

The majority of the contracts were taken on to obtain a fixed interest rate, as demonstrated in the column that groups banks and firms. This large share of IRS used to obtain a fixed rate could be explained by the greater facility for

[4]/ These three considerations do not imply that swap operations are credit risk-free, because there is consistently a positive spread between the swap interest rate and the U.S. Treasury rate for different maturities. Nevertheless, the credit risk of swap operations is lower than the U.S. corporate credit risk.

[5]/ Duration is a measure of the sensitivity of the price of the financial instrument to changes in interest rates.

obtaining floating-rate financing in the international markets and/or the higher cost of contracting directly a fixed interest rate in these markets.

The number of Chilean entities that have undertaken IRS contracts has increased, in line with the increase in the contracts. Nonetheless, domestic demand continues to be dominated by entities that are relatively knowledgeable on derivative financial instruments. These entities correspond mainly to banks and firms in the mining, telecommunications, and services sectors.

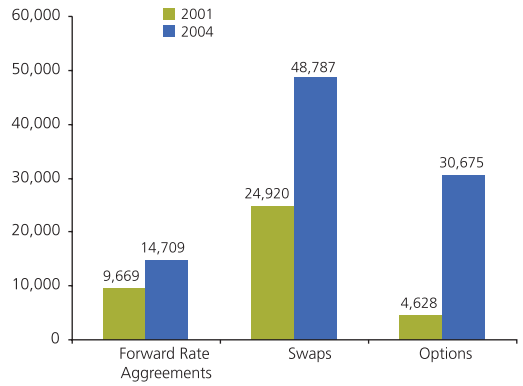
### b. International comparison

Figures 1 and 2 present the use of over-the-counter interest rate derivatives reported in the triennial surveys by the Bank for International Settlements (BIS, 2005). Swaps are the most commonly used instrument for hedging interest rate risk, growing around 100% between 2001 and 2004. This growth rate was only surpassed by that of interest rate options. In Chile, however, the share of interest rate options is rather low.

**Figure 1**

Interest rate derivative contracts, 2001 and 2004

(US$ million)




Source: Authors' calculations, based on data from BIS (2005).

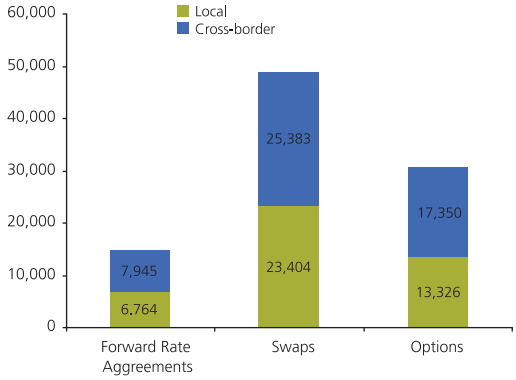
Cross-border operations (that is, operations carried out between residents and nonresidents) represent more than half of all contracts involving forward rate agreements[6]/, swaps, and options.

In Chile, IRS contracts represented 12% and 11% of total external debt in 2001 and 2004, respectively. In contrast, the average share for the full group of economies was 34% in 2004 (figure 3)[7]/.

**Figure 2**

Interest rate derivative contracts: local and cross-border, 2004

(US$ million)

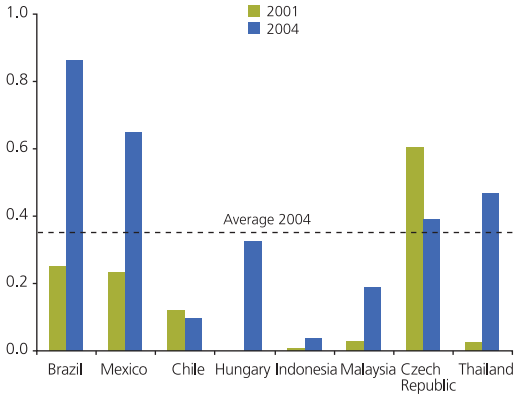



Source: Authors' calculations, based on data from BIS (2005).

**Figure 3**

IRS contracts / total foreign debt (*)

(percent)




(*) The BIS survey presents statistics for the month of April for each year, which are multiplied by the number of working days to obtain annual figures. In the case of Chile, however, we used real contract figures for each year.

Sources: Authors' calculations, based on data from the Central Bank of Chile, BIS (2005), and World Bank (2005).

Thus, compared with other emerging economies and without controlling for idiosyncratic factors that could be determining the use of interest rate swaps in each economy, Chile would appear to have room for increasing its IRS use.

## 4. Corporate credit risk

This section examines the yield curves for the swap rates of Chilean firms, exploring some of the reasons behind the movement of these curves over time.

[6]/ A forward rate agreement (FRA) is a contract between two parties to exchange, at a given future date, payments associated with an interest rate differential calculated over a theoretical notional value.

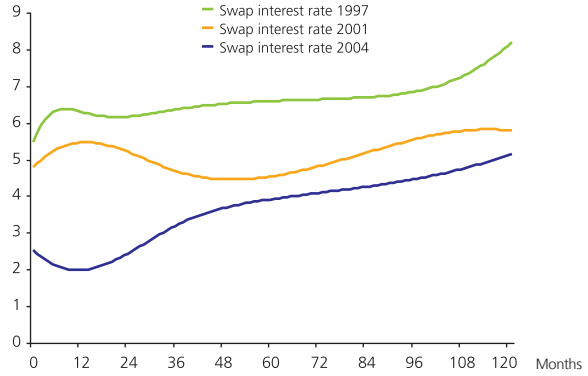
[7]/ The results do not change much when normalizing by long-term external debt.

### a. Swap rate yield curves

Figure 4 presents the evolution of swap rate yield curves for Chilean firms.

**Figure 4**

Average swap rate yield curves (*)
(percent)




(*) The swap interest rates were calculated on the basis of swap contracts carried out in the corresponding year. They were calculated for maturities of over one year. For operations of less than one year, we used the fixed interest rate on external debt for maturity *t*. The curves were interpolated using the mathematical spline method on the basis of more liquid points (see Hagan and West, 2004; Ron, 2000).

Source: Authors' calculations, based on data from the Central Bank of Chile.

Between 1997 and 2001, the curves fell more or less parallel. From 2001 to 2004, rates continued to fall for all maturities, but short-term rates fell the most.

This behavior largely reflects movements in the U.S. Treasury rate yield curve. Specifically, the reduction in swap rates for all maturities can be related to a parallel fall in the U.S. Treasury rate yield curve. The steeper drop in short-term rates relative to long-term rates between 2001 and 2004 is associated with the period in which the Federal Reserve began to relax its monetary policy and the yield curve had a sharper drop in the short ranges. This high degree of comovement between swap and U.S. Treasury rates reflects the high degree of integration in world financial markets of certain Chilean firms. As mentioned above, these firms correspond to large entities in the banking, mining, telecommunications, and services sectors, which possess a broad knowledge of derivative financial instruments and very low credit risk[8]/.

### b. Premiums based on swap rate yield curves

Figure 5 shows the evolution of the swap premiums (SP) that Chilean firms pay over U.S. Treasury bond interest rates. We propose the following equation for estimating these premiums at different maturities:

$$SP_t = SIR_t - TIR_t + PLIBOR_t , \quad (1)$$

where $SP_t$ corresponds to Chilean firms' premium based on swap interest rates; $SIR_t$ is the swap interest rate; $TIR_t$ is the U.S. Treasury interest rate; and $PLIBOR_t$ is the premium that firms pay over the LIBOR for loans contracted at a floating rate. All the variables correspond to maturity *t*.

We include *PLIBOR* in equation (1) because swap operations are largely contracted against the LIBOR. That is, in the swap contract, the bank or other intermediary pays the LIBOR to the resident entity, whereas the local firm continues to pay the spread over LIBOR.

Between 1997 and 2001, the *SP* of Chilean firms rose in both the shortest and longest ranges of the average yield curve. This is related to the series of financial crises that affected emerging markets in that period, among other factors.

The reduction of the *SP* between 2001 and 2004 in the up to three years ranges could initially be associated with the U.S. Federal Reserve's reduction in the short-term interest rate between those years. This would have led to a transitory increase in liquidity toward emerging markets, generating an effect primarily in the short ranges. Another explanation related to the same phenomenon is the reduction of the country risk between 2001 and 2004.

**Figure 5**

Corporate premium yield curves (*)
(based on swap interest rates, basis points)


(*) For operations of less than one year, we used the spreads calculated as the difference between the fixed interest rate on external debt for maturity *t* and the U.S. Treasury interest rate for maturity *t*. The curves were interpolated using the mathematical spline method on the basis of more liquid points (see Hagan and West, 2004; Ron, 2000).

Source: Authors' calculations, based on data from the Central Bank of Chile and U.S. Federal Reserve.

Figure 6 documents this last possibility. It presents the evolution of the Chilean sovereign spread, the swap premiums (*SP*), and the corporate premiums of Chilean firms in the 1999–2004 period. All the series have a similar average

8/ Moreover and not coincidentally, firms that undertake swaps also correspond, to a large degree, to the firms that hold the highest share of the economy's stock of external debt.

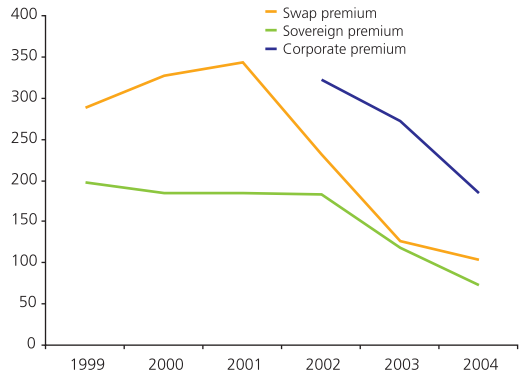
term. We find that all the spreads display a similar falling trend in the recent years. However, certain aspects stand out. First, the swap premium was, on average, only 80 basis points above the sovereign spread in the 1999–2004 period. Second, the swap premium has fallen faster than the economy's sovereign premium. Thus, in 2004, Chilean firms that carried out swap operations paid a spread that was not very different from the Chilean sovereign spread.

Swap operations and sovereign bonds have very similar spreads because the specific credit risk of the resident firms is very low when they undertake swap operations. This, in turn, is partly explained by the three considerations laid out in section 2 of this paper. Moreover, Chilean firms carry out their swap operations in a much more liquid market than the Chilean sovereign bond market.

Finally, in the 2002–2004 period, the swap premium was, on average, 106 basis points lower than the corporate premium of Chilean firms (figure 6). This corroborates the fact that swaps represent a lower credit risk than corporate bonds[9]/.

**Figure 6**

Swap, corporate and Chilean sovereign premiums (*)
(basis points)




(*)The curves were interpolated using the mathematical spline method on the basis of more liquid points (see Hagan and West, 2004; Ron, 2000).

Source: Authors' calculations, based on data from the Central Bank of Chile, Bloomberg and J.P. Morgan Chase.

## 5. Effects on Chilean foreign debt service

IRS have a direct effect on the sensitivity of external debt service requirements to fluctuations in international interest rates. In consequence, identifying the share of fixed- versus floating-rate external debt allows us to quantify more precisely the effect of changes in external debt service requirements in the face of variations in international interest rates.

The share of Chile's total debt that is contracted at a fixed rate has risen steadily since 2000. Between 2003 and 2004, the share of fixed-rate debt in total external debt rose slightly, from 49 to 51%.

To take outstanding IRS into account each year, we propose estimating the outstanding value of fixed- and floating-rate external debt, incorporating IRS that are contracted to pay fixed and floating rates during the year, as follows:

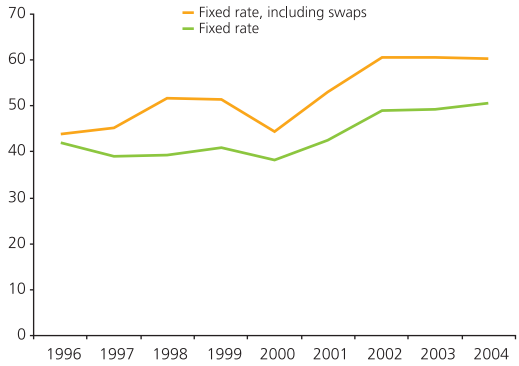
$$DEBTF_t^{STI} = DEBTF_t^{Original} + IRS_{t[Floating->Fixed]} - IRS_{t[Fixed->Floating]}, \quad (2)$$

where $DEBTF^{IRS}$ corresponds to the gross fixed-rate external debt incorporating *IRS*; $DEBTF^{Original}$ represents the gross external debt originally contracted at a fixed rate (official data); $IRS_{(Floating->Fixed)}$ corresponds to the outstanding amount on *IRS* that pay a fixed rate and receive variable payments; $IRS_{(Fixed->Floating)}$ is the outstanding amount on *IRS* that pay a floating rate and receive fixed payments.

Figure 7 presents the share of $DEBTF^{IRS}$ *and* $DEBTF^{Original}$ in gross external debt from 1996 to 2004.

**Figure 7**

Gross fixed-rate external debt
(percent over gross external debt)




Source: Authors' calculations, based on data from the Central Bank of Chile.

For every year we find that the percentage of fixed-rate external debt incorporating IRS exceeded the percentage of external debt originally contracted at a fixed rate. Moreover, the percentage differences between the shares of original fixed-rate debt and the debt including swaps are significant, reaching 10% in 2004[10]/. That year, the fixed-rate external debt including swaps represented 60% of total gross external debt.

[9]/ Corporate premiums also include an early redemption option on corporate bonds. This option could explain, to a lesser degree, the difference between these premiums and the swap premiums, which do not include this option. This does not affect the comparison between the swap premiums and the sovereign spread, however, because neither of these two cases offers the possibility of redemption.

[10]/ That same year, swap operations represented 6.3% of long-term external debt.

The above pattern could be attributed to more residents entering into swap contracts to obtain a fixed rate than to obtain a floating rate. This phenomenon could, in principal, be explained by the following two factors: a greater facility for obtaining floating-rate financing in international markets and a higher cost of directly contracting fixed rates in the same markets.

To verify the importance of external *IRS* for the economy's debt service requirements, we simulated a 500 basis point increase (5%) in the LIBOR. The exercise is counterfactual, in that it simulates a possible increase in the debt service both with and without interest rate swaps. Table 3 presents the simulation. Column A presents the effect of the possible rate increase on debt originally contracted at a floating rate, while column B reports the same rate increase for floating-rate debt corrected (reduced) by the outstanding amount of *IRS*.

Using 2004 as the base year, the simulation results indicate that if we evaluate the increase in the debt service in the face of a 500 basis point increase without incorporating the *IRS*, we would overestimate the increase in the debt service by US$210 million.

## 6. Final comments

Our analysis has presented evidence on the importance of the foreign interest rate swap market in Chile and its significant potential for greater growth. To specify more precisely the latter aspect, further analysis is needed to explore the idiosyncratic determinants of the foreign interest rate derivatives market.

Domestic economic agents that undertake swap operations have seen a steady drop in the real cost of the external financing to which they have access, and it is now very close to the Chilean sovereign spread. In this context, the fall in the sovereign spread does not reflect the full extent of the economy's improved external financing conditions.

The floating-rate external debt that is actually exposed to international rate variations fell from 49% to 40% of total foreign debt in 2004. As a result, the economy is on better footing to face international rate hikes, and debt service requirements would be significantly less affected by such hikes.

Finally, the use of derivatives by Chilean firms should continue to be monitored. In particular, future studies should explore the factors that determine how firms use derivatives and analyze other possible implications that these instruments may have for the financial stability of the economy.

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**Table 3**

Simulation of a 500 basis points increase in the LIBOR

(US$ million)

| Year | Increase in service on debt originally contracted at a floating rate | Increase in service on debt originally contracted at a floating rate, adjusted for swaps | Difference | Long-term debt service | Long-term debt service + increase in service on debt originally contracted at a floating rate, including swaps | Long-term debt service + increase in service on debt originally contracted at a floating rate | Share of increased debt service on total original service | Share of increased debt service on total service, including swaps |
|---|---|---|---|---|---|---|---|---|
| | (A) | (B) | (A) - (B) | (C) | (A) + (C) | (B) + (C) | (A)/ [(A) + (C)] | (B)/ [(A) + (C)] |
| 2004 | 1,066 | 856 | 210 | 1,282 | 2,348 | 2,138 | 45% | 40% |

Source: Authors' calculations, based on data from the Central Bank of Chile.

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