

Monetary policy and financial integration: the case of Chile¹

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I. Introduction

In Chile, monetary policy and financial openness have experienced important changes in the last 30 years. Starting in the mid-1970s, a first attempt to liberalise financial markets and the capital account ended in a major financial crisis in 1982, due to inadequate prudential regulation and supervision. This reflects the fact that financial integration can make a major contribution to economic development, but also entails risks. On the one hand, free mobility of capital across borders allows the financing of investment at a lower cost and thus has a positive effect on output. Capital flows also facilitate the transfer of new technologies, ease access to foreign export markets, increase competitiveness and develop domestic capital markets. They can also facilitate portfolio diversification and consumption smoothing. On the other hand, an open capital account can increase local vulnerability and exposure to external shocks, as Chile experienced in 1982. Other well-known examples of risks related to open capital accounts include those derived from overheating, asset price bubbles or excessive risk taking in the financial and corporate sectors. Since capital flows are highly volatile, the recipient country may also become more exposed to contagion and the herding behaviour of international investors.

To enjoy the advantages of financial integration, the Chilean economy completely opened the capital account in 2001. But before reaching this stage, the country built strong institutions to deal with the associated risks. Today the Chilean economy is much better prepared than in the past to deal with the challenges of financial openness. This has been thoroughly recognised by international financial markets, and demonstrated by its response to "real life" stress tests, such as the crises in other economies in the region, and the world economic slowdown of 2001-03.

The institutional cornerstones of Chile's current macroeconomic stability include a monetary regime based on inflation targeting, a fiscal policy based on a structural budget surplus rule, and a floating exchange rate regime. Financial stability is supported by credible institutions and effective regulations, which include technical supervisory bodies devoted to specific financial and capital-market segments.

This paper describes the policy frameworks and institutions adopted in Chile to reap the benefits of financial integration at minimum risk. In addition, it provides econometric and other quantitative evidence of the extent of such integration and some of its characteristics. Section II provides a historical perspective and reviews the key elements of Chile's macroeconomic policy framework: monetary policy based on central bank independence and inflation targeting, a floating exchange rate regime, and coordination of monetary policy with a rules-based fiscal policy. Section III explains the long-term process involved in the opening of the capital account and its relation with other policies and institutions. Section IV gives an empirical analysis of financial integration in Chile and assesses its extent and evolution over time. Section V provides concluding remarks.

¹ We are grateful to Leonardo Luna for excellent research assistance. Sections II and III draw extensively on work by a staff team at the Central Bank of Chile led by Esteban Jadresic (Central Bank of Chile (2004)).

II. Monetary policy framework and institutions

II.1 A historical perspective

Monetary policy and financial integration have experienced important changes over the course of the 20th century in Chile. Until 1931, the Chilean economy was fully integrated into the world economy, and monetary policy was subordinated to the balance of payments, as befitted the Gold Standard. After the 1930s, free trade was replaced by import substitution, capital movements were severely restricted, and access to international capital markets disappeared. Financial repression became the norm, and monetary policy was passively subordinated to fiscal policy. As a result, inflation became high and persistent, in a period when the developed world experienced very low inflation, as a by-product of the Bretton Woods arrangement.

Important reforms took place in the second half of the 1970s, as a new administration drastically reduced the fiscal deficit, liberalised capital markets, and opened the economy to foreign trade. Monetary policy was no longer subordinated to fiscal policy, but to the balance of payments, while the exchange rate followed a crawling peg. In that framework monetary policy lacked a nominal anchor. Therefore, in 1979, the Central Bank of Chile (CBCh) pegged the exchange rate to the US dollar, providing a nominal anchor for monetary policy. The fixed exchange rate regime was abandoned in June 1982 as a result of a major financial crisis which was triggered by a large shift in US monetary policy and inadequate prudential regulation and supervision at home. Subsequently (until the end of the decade), monetary policy was subordinated to the resolution of the financial crisis. In August 1984 the exchange rate was allowed to float within a narrow band, in an environment of tight capital controls. This allowed the CBCh some room to follow an active monetary policy in 1985. However, monetary policy could not operate as an effective counter-cyclical tool until the following decade, due to the significant external constraint created by the debt crisis. As a result, balance of payments considerations prevailed over other policy goals, such as inflation or output stabilisation.

In December 1989, in a landmark decision, new Central Bank legislation was enacted which established a significant degree of independence for monetary policy.

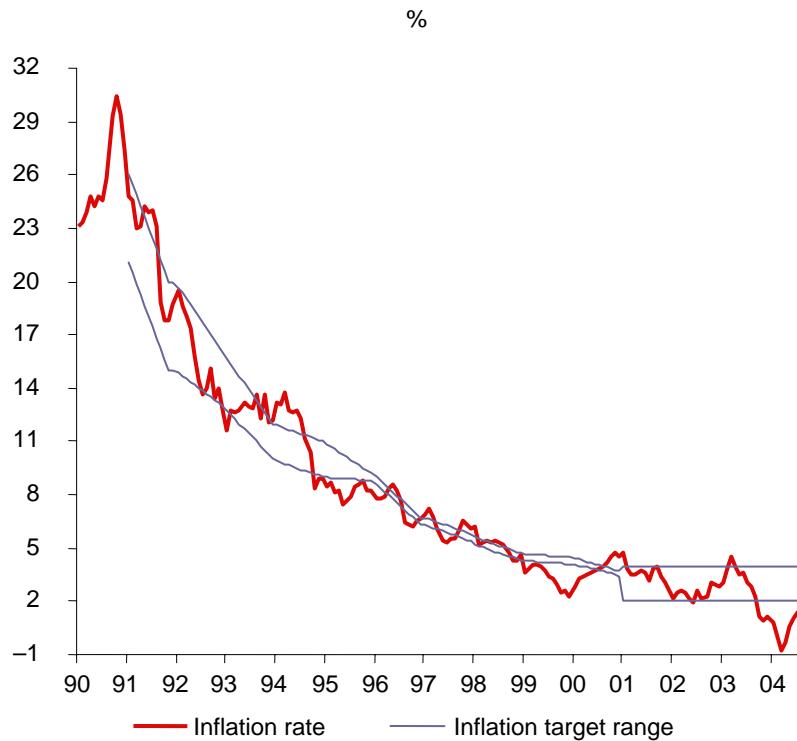
II.2 Monetary policy under inflation targeting

Of all the possible monetary regimes available at the time, the newly independent Central Bank opted in 1990 for inflation targeting (IT), becoming the second country to adopt such a framework after the Reserve Bank of New Zealand in 1989. The first annual target was established in September 1990 for the following year. Subsequently, Chile successfully reduced inflation down from a peak of 30% year-on-year in September 1990 to single digit rates in less than a decade (see Graph 1). The IT framework was fully implemented in 2000, when the CBCh formally adopted this approach to monetary policy, established procedures for regular monetary policy meetings, forecasting tools and models, and began publishing periodic inflation reports including explicit inflation forecasts. Previously, in September 1999, the CBCh had adopted a floating exchange rate regime, which strengthened its anchor and its own management of monetary policy.

Since 2001, Chile's inflation target has been defined as a 2% to 4% target range, centred around 3% annual inflation. The headline CPI is used as the inflation target measure over a 24-month policy horizon, based on an estimate of how long it takes for monetary policy changes to affect inflation. Monetary policy responds to deviations of the CBCh's inflation forecast (and the gap between actual and potential output) from the 3% inflation target over the 24-month policy horizon. While the ultimate goal is to achieve the inflation target, policy focuses on inflation forecasts. This regime is sometimes called "inflation-forecast" targeting.

The CBCh's operational target is the overnight interest rate on interbank loans. Monetary policy instruments include open-market operations (OMOs), standing facilities and legal bank reserves. OMOs are the main instrument for managing liquidity according to an operational target level determined by the Central Bank Board. They take the form of twice-weekly auctions of Central Bank securities, maturing in up to one year. Liquidity management is fine-tuned by complementary repurchase and reverse-repurchase operations. Standing facilities are credit lines that provide liquidity at higher interest rates, to discourage their use at normal times. Reserve requirements on bank deposits are not used as a monetary policy instrument and in fact have remained unchanged since 1980.

Graph 1
Inflation targets and inflation rates 1990-2005



The Central Bank believes that transparency and accountability should be central features of monetary policy and has acted accordingly. The monthly schedule of monetary policy meetings is announced in advance and a press release and minutes are published shortly after each meeting. The *Monetary Policy Report*, which is published every four months, is widely circulated by Board members and managers. The Bank's macroeconomic projections model, statistical data, and policy and research papers are published regularly on paper and also on the Bank's website. By law, the Central Bank is accountable to the Chilean Senate. After every *Report*'s release, the Central Bank Governor and Board present the analyses and projections therein to the Senate.

Monetary policy can contribute to output stabilisation, as long as this is consistent with its primary objective of meeting the inflation target. This occurs when demand shocks dominate supply shocks, ie when output (or the output gap) is positively correlated with inflation. Under such circumstances the Central Bank contributes actively to stabilising both inflation and output, applying a counter-cyclical monetary policy. Since 2002 the counter-cyclical stance of monetary policy has been reinforced, as reflected by an increasingly expansionary monetary policy in response to the combination of below-target actual inflation and lower than potential actual output.

Monetary policy does not deal with volatile capital flows directly. However, when changes in their level or volatility affect other macroeconomic variables, and ultimately economic activity and inflation, then monetary policy reacts, and can have an effect on capital flows. This procedure is consistent with the Central Bank's mandate and contributes to more effective monetary policy management in Chile.

II.3 The floating exchange rate regime

As discussed above, the Central Bank complemented its inflation targeting regime with a floating exchange rate regime. This was implemented in September 1999, at the same time that the IT framework was consolidated, and when the Board of the CBCh estimated that mechanisms for dealing with external shocks had been enhanced. This topic is discussed in Section III.

Considering Chile's floating exchange rate regime and rising creditworthiness in international capital markets, the need for holding large amounts of international reserves has been reduced. On the other hand, the declining risk premium on Chile's external liabilities has also lowered the Central Bank's cost

of carrying reserves. In this context, the CBCh is implementing a programme to redeem part of its dollar-linked debt with international reserves, which is expected to reduce its current level of reserves. Nevertheless, the Central Bank will continue to maintain a significant level of international reserves for two reasons: one, because reserves contribute to reducing the country risk premium and act as a buffer against possible liquidity shocks; and two, because reserves allow monetary authorities to intervene credibly in the exchange market under exceptional circumstances.

Like most other central banks, the CBCh can conduct sterilised foreign exchange interventions to counteract excessive volatility. The Bank acted decisively to avoid the negative consequences of the exchange rate overreacting to shocks. Acknowledging the difficulties involved in identifying "excessive" exchange rate shocks, the Central Bank's interventions are not so much aimed at maintaining a particular exchange rate level, but rather at avoiding major exchange rate volatility.

Since the flexible exchange rate regime was introduced in 1999, the Central Bank has considered on two occasions that exchange rate depreciations were large enough to warrant its intervention in the market. In both cases, the CBCh pre-announced the time horizon for its sterilised intervention (August-December 2001 and October 2002-February 2003), as well as the total amount of resources that would be used and the form of the intervention.² However, specific amounts and dates of each intervention were not provided in advance. An empirical evaluation of the specific interventions implemented during these periods suggests that their effects on the spot market were slight and in most cases negligible. However, the evidence also shows that the announcements themselves affected the spot exchange rate significantly; ie the impact of Central Bank actions at the level of the exchange rate arose mainly from the authorities' public announcement.³

The current exchange rate regime provides indirect mechanisms to deal with volatile capital flows. In the first place, since the exchange rate fluctuates according to market conditions, possible gains from betting against the authorities are not present, thereby eliminating a potential source of capital flow volatility (speculation against the currency and the currency regime). In this sense, a flexible exchange regime provides an effective buffer against this source of volatile capital flows. Second, the CBCh maintains significant international reserves. Hence the monetary authority has the means to act against any excessive (temporary) exchange rate depreciation and volatility, in the event of a large liquidity shock.

The floating exchange rate mechanism was complemented in 2000 by regulations on currency risk of banks and, indirectly, of corporations. The Central Bank and the Superintendency of Banks established rules that limit currency mismatches of banks and that require them to consider the exposure to currency risk of their clients when assessing their creditworthiness. Thus, currency mismatches in companies translate into higher capital requirements for those banks that lend to them. This policy has significantly increased the resilience of the banking and corporate sector to exchange rate shocks.

II.4 Monetary and fiscal policy coordination

The policy framework adopted by the Central Bank is complemented and supported by a responsible and sound fiscal stance. In fact, the Ministry of Finance has adopted a structural surplus rule. This rule - quite exceptional in the world - defines a resource envelope for fiscal policy, determined as an annual structural budget surplus⁴ equivalent to 1% of GDP. The difference between the structural and the actual budget surplus is determined by the deviation from trend levels of GDP and the price of copper, weighted by their impact on government revenue. Accordingly, the government recorded actual deficits during 2000-03 and is expected to record a budget surplus in 2004, thus satisfying the 1%-of-GDP structural surplus rule since its inception.

Fiscal policy therefore plays a significant counter-cyclical role, thus complementing the CBCh's counter-cyclical policy framework. Counter-cyclical or stabilising policies are only feasible when

² On both occasions the Central Bank announced that it would intervene both directly in the spot market and through swaps between domestic currency- and foreign currency-denominated bonds issued by the Bank.

³ See Tapia and Tokman (2004).

⁴ At the general-government level.

macroeconomic institutions are strong and policy rules are credible. Recent international evidence shows that countries with low risk premia on their sovereign liabilities are more likely to adopt counter-cyclical policies.⁵ Among these, Chile, with a country risk premium currently below 100 basis points, has applied some of the strongest counter-cyclical policies among emerging economies, contributing more effectively to stabilising output.

Institutionalisation of policy rules by both the Ministry of Finance and the Central Bank has simplified policy coordination. The Chilean experience illustrates that, in the presence of strong institutions and policy rules, policies can be coordinated by design, and there is less conflict over the best response to any given shock that affects the economy.

III. Capital account liberalisation and institution building

Historically, Chile has had capital account restrictions through most of the 20th century, starting in a context of high inflation and State intervention in the early 1930s. During the second half of the 1970s, the country started to open up its capital account, following a trade liberalisation programme initiated in 1974. The opening up of the capital account was implemented in the context of a fixed exchange rate regime, widespread indexation and a financial sector that lacked the required prudential regulation and supervision. Despite the official position, market agents tended to operate under the assumption that the government somehow backed the soundness and creditworthiness of local financial institutions and insured the deposit base. This set the stage for an explosion of moral hazard problems, which were facilitated by capital inflows. Due to inadequate regulation and supervision, levels of indebtedness, maturity gaps between assets and liabilities, related-lending, and foreign currency mismatches received less attention than they deserved.

Weak institutions and macro-fundamentals added up to a fragile economic policy framework, leaving the economy vulnerable. When the 1981 international recession hit with unexpected severity, it abruptly ended efforts to open up the capital account, given the sudden stop of capital flows to developing countries. The deep financial crisis that ensued led to a rapid drain on international reserves, and the fixed exchange rate regime was abandoned. The devaluation that followed provoked severe losses across all sectors of the economy.

In the aftermath of the debt crisis, in the mid-1980s, the authorities focused on economic recovery and reorganised the overall macro-financial framework. Drawing on the recession experience and the subsequent financial crisis, a new banking law was enacted in 1986 that addressed *moral hazard* and *systemic risk* issues, and regulations governing financial institutions were upgraded to strengthen the financial sector.

In the early 1990s several factors - including a successful transition to democracy - favoured the voluntary return of capital flows to Chile. Given the macroeconomic policy framework, the authorities faced a classical monetary policy dilemma, with more policy goals than independent instruments. The level of domestic interest rates necessary to control aggregate demand gave rise to incentives for interest-arbitrage capital inflows, within a broader context of a sharp increase in capital flows to most emerging economies. The choice was either to accept an appreciation of the real exchange rate inconsistent with external balance, or to reduce interest rates, in which case the risks of exchange rate appreciation would remain small, but inflationary risks would dominate the picture in a highly indexed economy.

The policy options available included allowing the exchange rate to appreciate, limiting appreciation through sterilised intervention accompanied by tight fiscal policy to offset the associated costs, or introducing controls on capital inflows, and at the same time liberalising capital outflows. Chile's strategy involved a combination of all these options.

In terms of capital outflows, the opening of the capital account went ahead relatively quickly. In 1991, the procedures for direct investment abroad were streamlined, and banks could invest abroad up to

⁵ Calderón and Schmidt-Hebbel (2003) and Calderón et al (2004) provide evidence that emerging economies with low (high) country risk premia (an inverse measure of policy credibility) exhibit counter- (pro-)cyclical fiscal and monetary policies.

40% of their foreign currency deposits. In 1992, the limit on banks' foreign exchange holdings doubled and export proceeds exempt from surrender requirements were increased. In 1994, restrictions on profit remittances were lifted, banks were allowed to invest up to 20% of their capital and reserves abroad, and the ceilings on institutional investors' investment abroad were raised. In 1995, the minimum holding period for foreign direct investment in Chile was reduced from three years to one. In 1998, the ceiling for banks' investment in assets denominated in foreign currency was raised to 70% of their capital and reserves, and the ceiling for mutual funds was eliminated. Ceilings on investment abroad were also increased for pension funds and life and general insurance companies. All these measures contributed to an increase in Chile's degree of international financial integration.

With regard to capital inflows, a more gradual approach was followed during the transition to price stability, as independence of monetary policy in a context of limited exchange variability depended on some degree of capital controls. Thus, an unremunerated reserve requirement (URR) was introduced in June 1991, in response to a surge in capital flows. Other important controls were a minimum holding period for portfolio investments and stringent requirements for issuing bonds and American depository receipts (ADRs) abroad.

From a macroeconomic point of view, the URR was expected to enhance the autonomy of monetary policy and simultaneously minimise the effects on the exchange rate of the tight monetary policy needed to control aggregate demand. From a macro-prudential point of view, the URR was expected to discourage short-term capital inflows without affecting long-term foreign investment, especially foreign direct investment. This was expected to reduce the volatility of international capital flows into the country and, subsequently, exchange rate volatility.

The URR remained in effect during most of the 1990s and in the aftermath of the Asian crisis. But in late June 1998, in light of strong pressure against the peso, the Central Bank cut the URR from 30% to 10%, and then to zero in September of that year, although it remained as part of the CBCh regulations.

Overall, several studies suggest that the URR had the following effects on the Chilean economy (Valdés and Soto (1998), Edwards (1998, 2000), De Gregorio et al (2000), Gallego et al (1999), Gallego and Hernández (2002)):

- (a) It created a wedge between domestic and external interest rates, allowing monetary policy more independence;
- (b) It modified the composition of capital flows, raising the share of medium- and long-term inflows;
- (c) It did not, however, affect the real exchange rate or the overall size of capital inflows;
- (d) It discriminated against small and medium-sized companies, as the cost of the URR weighed more heavily on small businesses, which faced stricter financial restrictions and higher financing costs;
- (e) Loopholes had to be constantly plugged, as private agents had a substantial incentive to elude the regulation;
- (f) It produced some distortions in capital versus labour costs, redistributing income in favour of the owners of capital, and distorting resource allocations somewhat.

At the regulatory level, the URR was finally removed in April 2001, as part of several measures applied to increase Chile's financial integration with the rest of the world.

Achieving the medium-term objective of completely opening up the capital account was possible once the authorities considered fundamentals and institutions to be strong enough to shield the economy from external shocks, and thus able to give Chile the full benefit of a higher degree of financial integration. These conditions included:

- (a) Adoption of a floating exchange rate regime within an inflation targeting framework;
- (b) Price stability;
- (c) Prudential regulation and supervision of the financial sector, including regulations on currency mismatches;
- (d) Development of markets for derivative instruments to provide better coverage of exchange risk;

- (e) A suitable level of international reserves;
- (f) A more diversified trade structure;
- (g) A solvent financial system; and
- (h) A solid and prudent fiscal position, characterised by a fiscal rule targeting a structural surplus of 1% of GDP.

Once these preconditions were met, Chile moved on to its current stance, and has had a fully open capital account regime since 2001. The only foreign exchange regulations that remain specify reporting requirements for statistical purposes.

IV. Financial market integration and domestic markets and institutions

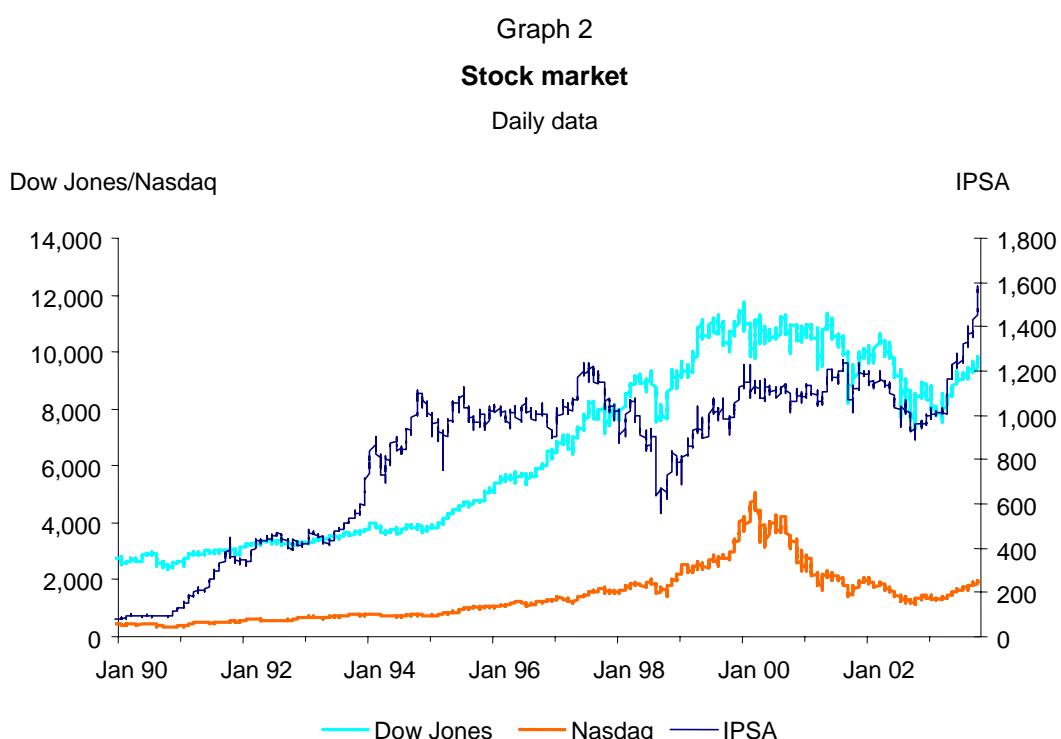
In this section we look at concrete measures of financial integration in the Chilean economy in order to assess its extent and evolution during the 1990s. We first analyse the case of stock and fixed income instruments, by correlating the returns in local and US markets. Then we analyse the access of local companies to external funding. In particular, we are interested in determining whether foreign control has increased local companies' access to international capital markets, thus facilitating financial integration.

IV.1 Financial integration and domestic markets

A similar framework is used for both stock and fixed income instruments, comparing daily returns (in US dollar terms) during the 1990s. In order to capture the evolution of financial integration over time, two-year moving windows were used in the estimation process.

IV.1.1 Stock markets

Daily returns of the local market index (IPSA) were compared with those from the Dow Jones and Nasdaq indexes between 1989 and 2003, using a two-year moving window (see Graph 2).



Since the data series are stationary, we can estimate the following equation on returns:

$$\text{dlog(IPSA/e)} = c + \alpha \cdot \text{dlog(DowJones)} + \beta \cdot \text{dlog((IPSA/e)(-1))} \quad (1)$$

where the log differences correspond to the returns of the series. The coefficient α measures the degree of correlation between the IPSA and Dow Jones returns. The coefficient β , in turn, captures the importance of returns in the previous period in explaining today's return. If there is a contemporaneous correlation between IPSA and Dow Jones, then the lag of only one of them suffices to capture serial correlation. Finally, e is the peso/dollar exchange rate. As mentioned, a two-year moving window was estimated for the period, meaning that we have about 500 estimates for each of the parameters. Table 1 shows the average of the estimates for both the Dow Jones and Nasdaq equations.

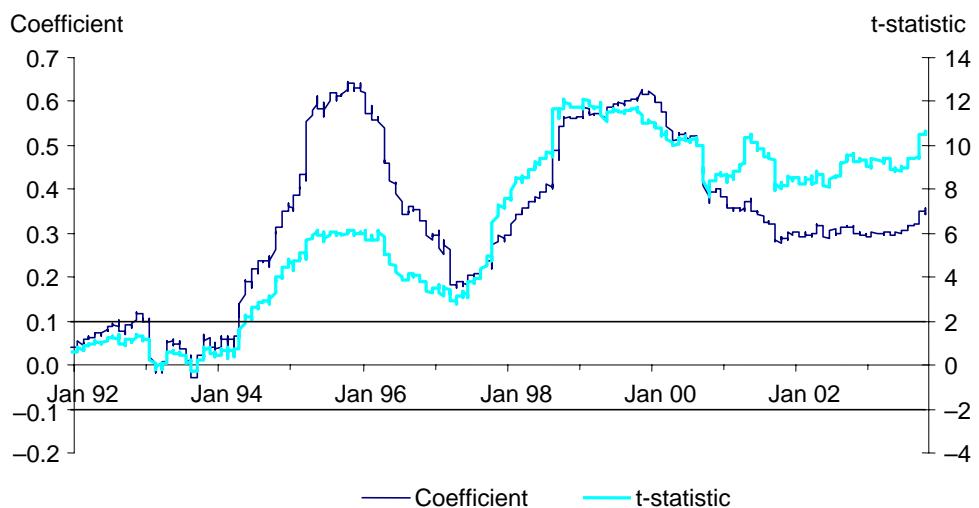
Table 1
**Average of the estimates of daily IPSA returns
in US dollars**

Explanatory variable	c	Return in the foreign market	IPSA $e(-1)$	R^2
Dow Jones	0.0	0.25	0.15	0.08
Nasdaq	0.0	0.20	0.16	0.08

The lagged variable is always significant. The explanatory power of the equations, as measured by their R^2 , is low as is usual with this type of estimation. The significance of the return in the foreign market varies over time. Graph 3 shows this evolution for the Dow Jones returns.

Graph 3 shows the value of the coefficient on the left-hand axis and the significance on the right-hand one. A band between the values -2 and 2 on the right-hand axis shows the area where the t-statistic indicates that the estimate is not significantly different from zero. The horizontal axis indicates the last date included in the window estimation period.

Graph 3
Correlation of daily returns between IPSA and Dow Jones

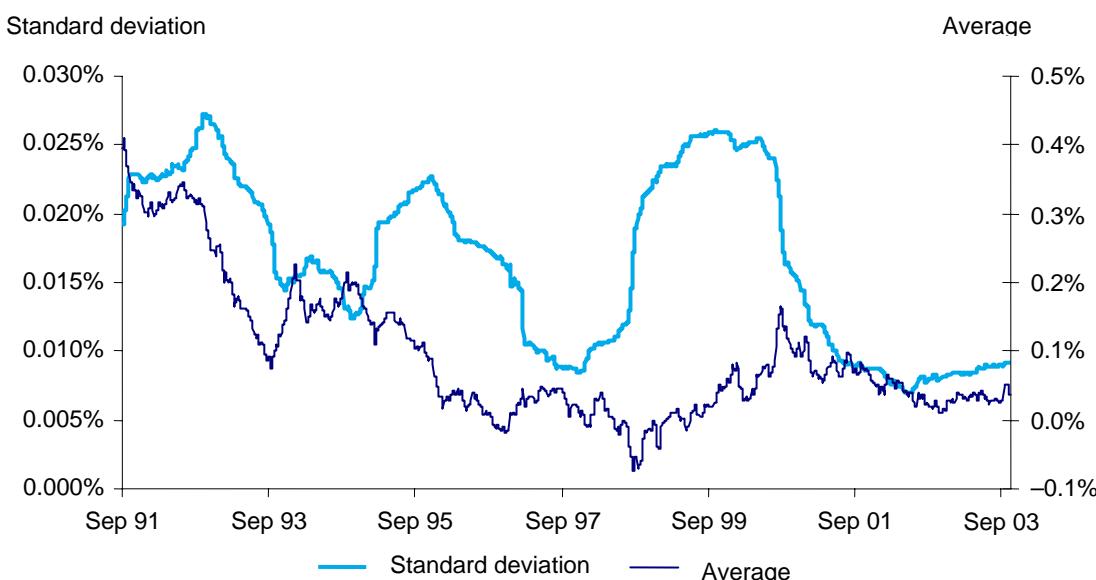


Correlation between the local and foreign stock market becomes significant by mid-1994, with significance becoming stronger as we move forward through the sample. This indicates that financial integration at the level of stock markets became a significant phenomenon by mid-1992. Significance shows a second increase at the end of 1997 (corresponding to data beginning at the end of 1995).

The value of the estimated parameter α fluctuates between 0.1 and 0.5 in the case of the Dow Jones and 0.05 and 0.4 in the case of the Nasdaq. Estimates of α show two peaks (during 1995 and from mid-1998 to mid-2000). These correspond to episodes of strong co-movements across markets that are captured by the moving window. The second peak, for example, corresponds to the sharp fall in foreign markets of October 1998, which was replicated in the local market.

The impact of increased integration on *market volatility* is ambiguous in theory. On the one hand, the larger investor base can help to reduce the effect of local shocks. On the other, external shocks are more easily transmitted to the local market. Graph 4 shows the standard deviation and average of a two-year window of daily returns, measured on the left- and right-hand side, respectively. In the early 1990s, where we found that integration was low, our measure of volatility is the highest of the whole sample. Volatility shows a general declining trend, except for the specific episodes already mentioned, where volatility rose temporarily.

Graph 4
Daily IPSA yield: mean and variance



Thus, we conclude that financial integration increased at the stock market level during the 1990s, while volatility seems to have declined with market integration.

IV.1.2 Interest rates

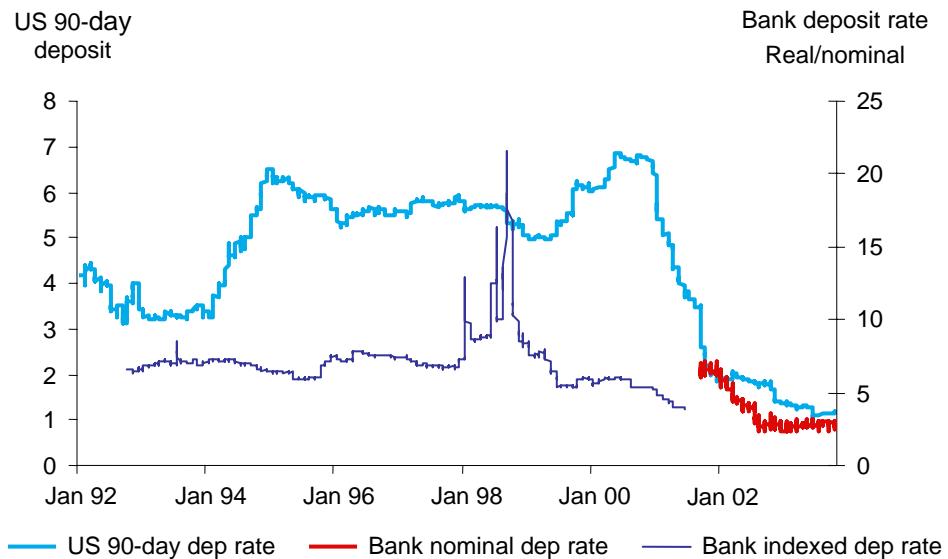
In the case of correlations in interest rates we looked at the evidence of money markets and the market for long-term bonds (see Graphs 5 and 6). The first is the market targeted by monetary policy and will be our test of monetary independence. The longer-term market will give us a better idea of financial integration, since it is less influenced by monetary policy.

Regarding the money market, we compared the US three-month deposit rate with the domestic 90-day indexed deposit rate, using two-year moving windows. After July 2001, when the CBCh started targeting nominal interest rates, we compared nominal rates over six-month moving windows.

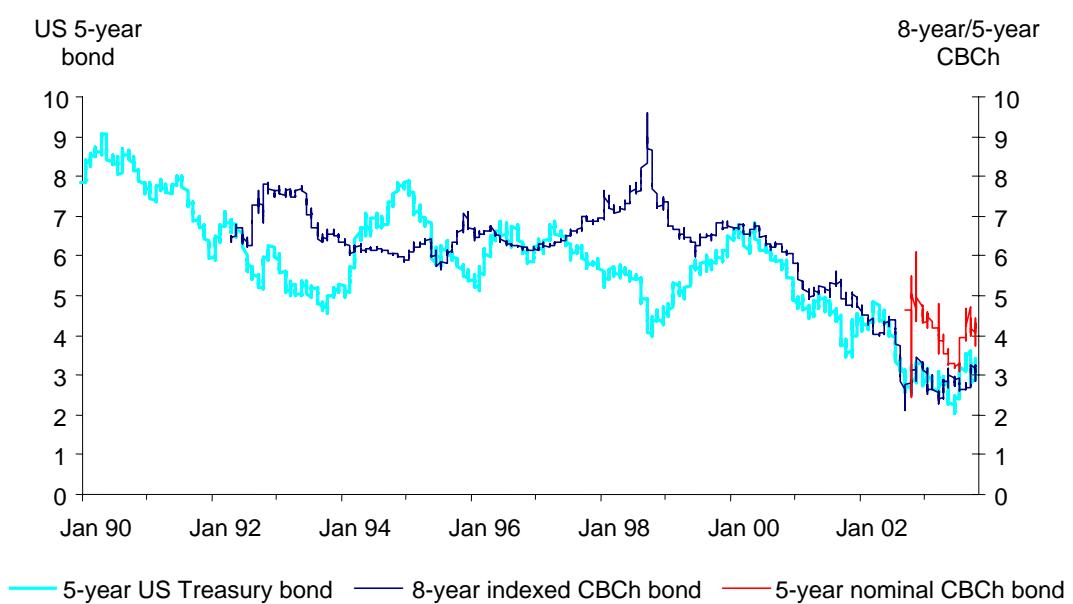
We find that the coefficient that captures the partial correlation between domestic and foreign rates is not significant in all specifications. This evidence points towards independence of monetary policy throughout the period.

In the case of the long-term market we compared the rates on a five-year US Treasury bond with those of an eight-year Central Bank indexed coupon bond (which has a similar duration).

Graph 5
Short-term internal and external interest rates
 Daily data



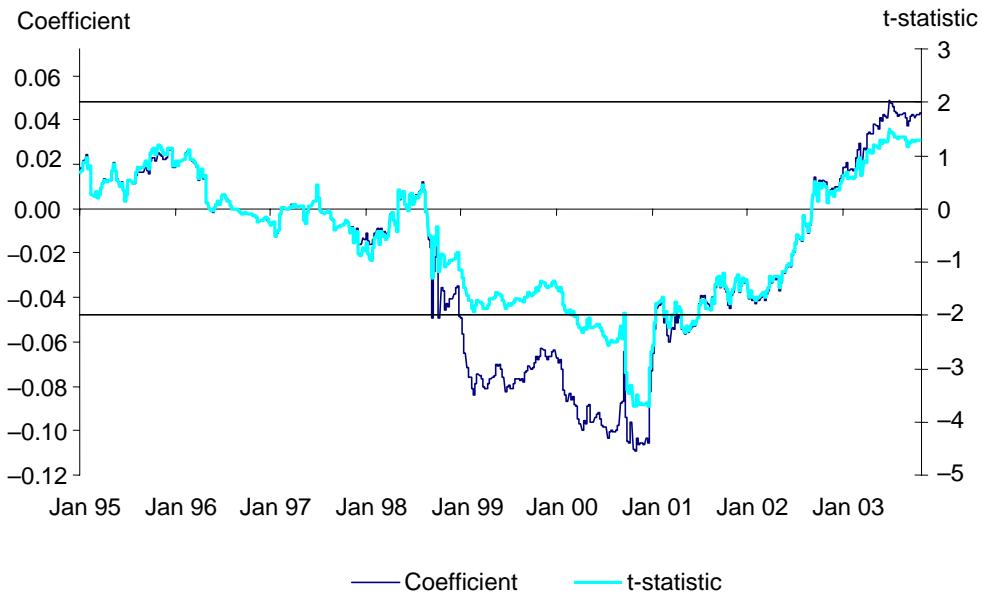
Graph 6
Long-term internal and external interest rates
 Daily data



We used daily data for domestic and foreign rates and six-month and two-year moving windows to evaluate the evidence. The estimated correlation coefficient is not significant for most of the sample (see Graph 7), except for the estimates that cover 1998. During that year, the monetary authorities reacted to pressure on the exchange rate by significantly increasing domestic interest rates. The CBCh moved to a free float regime in September 1999. Since that period, we observe a higher association between internal and external long-term rates, as Graph 6 shows. Correlation estimates take positive values, but are not significant. This may be an indication that the similarity in the

evolution of these interest rates may be the result of similar real shocks that affected both economies in this period, which generated similar market responses.

Graph 7
Correlation between domestic and foreign long-term rates



We also ran a separate estimation for the period after September 2002, using the new five-year Central Bank bullet bond. This instrument is more comparable to the five-year US Treasury bond, since they are nominal and have the same coupon structure. In this case we use a six-month window, since we have less data. Correlation in this case is significant for most of the sample, suggesting the existence of financial integration.

Given the conflicting evidence obtained above, we decided to conduct an alternative test of financial integration, using the interest rate parity equation. This relation states that the difference between internal and external interest rates is equal to the expected appreciation or depreciation of the local currency. However, empirical tests of uncovered interest rate parity usually fail. Given this fact, we focus on the correlation between the interest rate differential and the expected currency appreciation/depreciation.

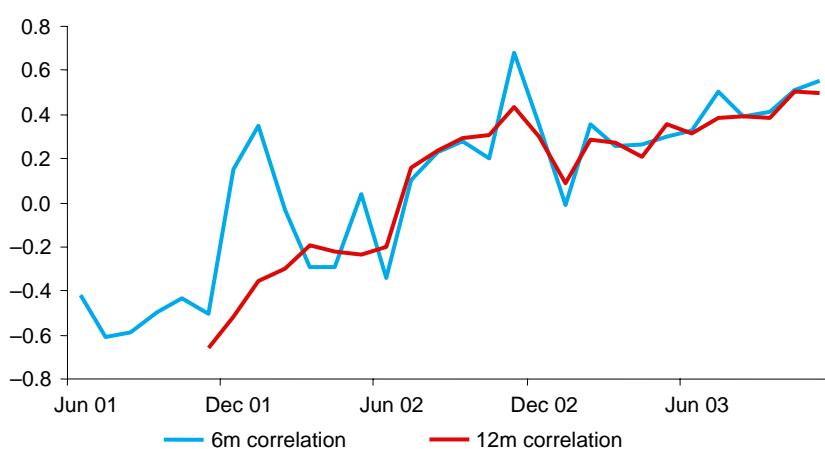
The interest rate parity equation is:

$$i_t - \text{spread}_t - i_t^* = E(e_{t+1} - e_t),$$

where E is the expectations operator. To generate the expected appreciation/depreciation series we use the monthly Survey of Expectations of the Central Bank of Chile. This survey has existed since December 2000. It asks for the future value of the US dollar, from which we calculate expected changes in the exchange rate over a 12-month horizon.

To compute the interest rate differential, we used a five-year US Treasury bond interest rate as the external rate. For the internal interest rate we used two alternatives. First, we used the real eight-year CBCh coupon bond (PRC-8) rate, adding an estimate for expected inflation. The latter was assumed to be 3% between December 2000 and September 2002. From this date onwards, we computed expected inflation as the difference between the nominal (BCP-5) and real (BCU-5) yields on five-year CBCh bonds. A second method was to make direct use of the BCP-5 nominal bond, which has existed only since September 2002. The two methods give very similar results. Graph 8 shows the evolution of the correlation of the interest rate differential with the expected change in the exchange rate.

Graph 8
Expected depreciation and interest rate differential
Six- and 12-month correlation coefficient



The correlation between the interest differential and expected depreciation was calculated using windows of six and 12 months of monthly data. Graph 8 suggests that this correlation has increased over time, growing towards one, especially after December 2001. A factor that may help explain this higher correlation is the issuance of new bonds by the CBCCh since September 2002. These bonds are closer in format to international standards and may facilitate comparison, and therefore arbitrage.

IV.2 Financial integration and institutions

In this section we study how financial integration affected the capacity of local firms to access foreign sources of capital. We centre the analysis on whether foreign control has an impact on the ability to tap foreign capital markets in the case of banks and firms.

IV.2.1 Banking sector

In the last 10 years foreign control of the banking system has more than doubled in terms of assets, increasing from 16% in the mid-1990s to 43% today. However, the increase in foreign ownership in a period of higher financial integration does not seem to make a difference in terms of access to foreign funding. The latter seems to be driven mainly by market conditions, and locally and foreign-controlled banks exhibit a similar pattern, as shown in Graph 9.

Graph 9
Foreign debt as a percentage of total assets, by nationality



IV.2.2 Firms

We analysed a sample of the largest 100 companies that report to the Superintendency of Securities and Insurance, which represent 84% of the assets of all reporting firms. Any firm that issues publicly traded instruments, either equity or bonds, has to report to this regulatory body. State-owned companies were not considered in the sample. Foreigners control 48% of assets, with the remainder in control of nationals. Our main findings are shown in Table 2.

Table 2
Debt as a percentage of assets

	Control		Total
	Foreign	Local	
Debt with foreign banks	12.9%	2.4%	7.4%
Bonds issued abroad	11.4%	2.0%	6.5%
Debt with local banks	3.2%	3.9%	3.6%
Bonds issued locally	10.5%	7.0%	8.7%
Total debt	38.0%	15.3%	26.0%

Source: Calculations based on SVS balance sheet data.

Table 2 shows two facts: (i) foreign-controlled firms use more debt than locally controlled firms to finance their assets, and (ii) foreign firms make more extensive use of foreign markets for funding. Even after controlling for higher debt use, foreign firms obtain 64% of their funding abroad, while foreign debt amounts to only 29% in the case of local firms. This might be a manifestation of the "home bias" described by Feldstein and Horioka (1980), who interpret their results as an indication of incomplete financial integration.

One argument against this finding is that foreign investment is concentrated in sectors that use debt more intensively. Inspection of the sectoral composition of the data renders this argument invalid. Excluding public infrastructure concessionaires, which include only foreign-controlled firms, we observe in Table 3 that the bias towards foreign funding of foreign-controlled firms actually increases from 64% to 70%. The extent of the use of debt by foreign firms diminishes, but still doubles that of local firms.

Table 3
**Debt as a percentage of assets
(excluding infrastructure)**

	Control		Total
	Foreign	Local	
Debt with foreign banks	12.9%	2.4%	7.2%
Bonds issued abroad	10.2%	2.0%	6.2%
Debt with local banks	2.1%	3.9%	3.2%
Bonds issued locally	7.7%	7.0%	7.8%
Total debt	33.0%	15.3%	24.4%

Source: Calculations based on SVS balance sheet data.

We next refined our analysis by excluding Spanish-controlled power generation and distribution companies, which represent 19% of total assets in our sample, as these companies make extensive use of debt and obtain a significant part of it abroad. Table 4 shows that the overall leverage of foreign-controlled firms decreases significantly, but is still 70% higher than that of local firms. External funding by foreign-controlled firms drops to 52% of assets, but is still much higher than the 29% figure observed in locally controlled firms.

Table 4
**Debt as a percentage of assets
(excluding Spanish-controlled firms)**

	Control		Total
	Foreign	Local	
Debt with foreign banks	8.9%	2.4%	4.7%
Bonds issued abroad	4.9%	2.0%	4.2%
Debt with local banks	3.1%	3.9%	4.4%
Bonds issued locally	9.5%	7.0%	10.1%
Total debt	26.5%	15.3%	23.3%

Source: Calculations based on SVS balance sheet data.

In sum, we conclude that foreign ownership does make a difference in the case of firms. Foreign-controlled firms exhibit significantly higher leverage than locally controlled firms. Moreover, foreign-controlled firms tend to use external sources of funding more intensively than locally controlled firms in all sectors of the economy. This result was robust to various adjustments to control for sector-specific characteristics.

V. Concluding remarks

Thirty years after its first capital account liberalisation, Chile is today fully integrated into world financial markets. But before reaching this stage, the country paid significant costs and learned important lessons. The most important is that financial integration has many benefits, but also entails risks. In order to deal with these risks, solid fundamentals and strong institutions are required. The institutional cornerstones of Chile's current macroeconomic stability include a monetary policy based on inflation targeting, a fiscal policy based on a structural budget surplus rule, and a floating exchange rate regime, all complemented by strong but evolving financial sector regulation and supervision.

This policy and institutional framework has reduced the potential costs derived from internal factors, such as policy inconsistencies, one-way bets, implicit insurance or moral hazard. At the same time, it cushions the effects of volatile capital flows, as adjustments are made to a larger extent through prices rather than quantities, with agents internalising inherent risks.

Today Chile is enjoying the benefits of international financial integration with reasonable assurances against the risks associated with free and volatile capital flows. To be sure, many challenges remain, among them ongoing fine-tuning of the monetary policy framework, consolidation of the fiscal policy framework, modernisation of the financial sector, and expansion of the benefits of financial integration.

Our empirical analysis suggests that the Chilean economy has been highly integrated at the level of stock markets since 1992, and that stock market volatility declined with financial integration. Financial integration is not present at the level of short-term fixed income instruments, which is a sign of monetary independence. But there are increasing signs of financial integration in the behaviour of long-term bond rates after 2001. We also found that foreign ownership does not seem to make a difference in terms of access to foreign funding in the Chilean banking sector. But foreign ownership does make a difference in the case of firms. Foreign-controlled firms exhibit higher leverage ratios and

use external sources of funds more intensively than locally controlled firms. This may be a sign of incomplete financial integration at the firm level.

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