HOW EFFECTIVE ARE CONTROLS ON CAPITAL INFLOWS? AN EVALUATION OF CHILE'S EXPERIENCE*

By

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June 1999

* I have benefited from discussions with Ed Leamer and Jose de Gregorio. I am indebted to Rajesh Chakrabarti, Kyongchul Kim and Alejandro Jara for assistance.

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I. Introduction

A number of authors have recently argued that globalization has gone too far, and that free capital mobility has created a highly unstable international financial system. Krugman (1999), for instance, has maintained that "sooner or later we will have to turn the clock at least part of the way back: to *limit capital flows* for countries that are unsuitable for either currency unions or free floating (p. 74, emphasis added)."

Discussions on the new international financial architecture have focused on two type of controls on cross border capital movements: controls on capital inflows, similar to those implemented in Chile between 1991 and 1998; and, controls on capital outflows, of the type Malaysia imposed in mid 1998. While most economists continue to be skeptical about the latter, the idea restricting capital inflows has rapidly grown in popularity. Joe Stiglitz, the World Bank's Chief Economist, has been quoted by the New York Times (Sunday February 1, 1998) as saying: "You want to look for policies that discourage hot money but facilitate the flow of long-term loans, and there is evidence that the Chilean approach or some version of it, does this." This view has recently been endorsed by Ito and Portes (1998) and Eichengreen (1999), among others.

In this paper I review Chile's recent (1991-98) experience with restrictions on capital inflows, and I investigate whether this policy has been effective. More specifically, I focus on four issues: First, is there evidence that capital controls have affected the composition of capital flows? Second, has this policy affected the dynamic behavior of the real exchange? Third, is there evidence that the impositions of these restrictions increased Chile's ability to undertake independent monetary policy. And fourth, I discuss whether these controls helped Chile reduce the degree of

macroeconomic instability. The paper is divided in six sections. In Section II I provide an overview of Chile's controls system. Section III deals with the composition of capital flows. In Section IV I concentrate on the relationship between capital controls, real exchange rates and domestic interest rates. In Section V I deal with capital controls and financial vulnerability. And finally, Section VI contains some concluding remarks.

II. Controls to Capital Inflows in Chile: An Overview

Chile has relied on controls on capital inflows on two occasions during the last twenty years: in 1978-82 and, more recently, during 1991-98. In both episode foreigners wishing to move funds into Chile were required to make non-interest bearing deposits at the Central Bank. The goals of the policy were, in both occasions, to protect the economy from the effects of hot money, to help avoid "excessive" real exchange rate appreciation, and to increase the Central Bank's control over domestic monetary policy (Massad 1998a).

During the 1978-82 period the controls were particularly stringent: inflows with maturities below 24 months were forbidden, and those with maturities from twenty four to sixty six months were subject to non-interest earning reserve requirements ranging from 10 percent to 25 percent of the value of the inflows. Largely as a result of this policy, between 1979 and 1981 the average maturity of inflows was 59 months. In spite of these draconian restrictions on capital inflows, during 1981-82 Chile went through a traumatic currency crisis: the peso was devalued by almost 90 percent and a large number of banks had to be bailed out by the government. The main cause behind this crisis was a poorly regulated banking sector, which used international loans to speculate in real estate, and that extended large volumes of credit to banks' owners. A massive banking reform

implemented in 1986, established strict guidelines on banks' exposure and activities, and instituted a broad system of on-site inspections. This reform helped create a sturdy banking system and has helped Chile withstand the global financial travails of the second half of the 1990s.[1]

Chile reintroduced restrictions on capital inflows in June 1991. Originally, all portfolio inflows were subject to a 20% reserve deposit that earned no interest. For maturities of less than a year, the deposit applied for the duration of the inflow, while for longer maturities, the reserve requirement was for one year. In July 1992 the rate of the reserve requirement was raised to 30%, and its holding period was set at one year, independently of the length of stay of the flow. Also, at that time its coverage was extended to trade credit and to loans related to foreign direct investment. New changes were introduced in 1995, when the reserve requirement coverage was extended to Chilean stocks traded in the New York Stock Exchange (ADRs), to "financial" foreign direct investment (FDI), and bond issues. In June of 1998, and under pressure from the East Asian crisis, the rate of the reserve requirement was lowered to 10%, and in September of that year the deposit rate was reduced to zero. Throughout this period Chile also regulated foreign direct investment: Until 1992, FDI was subject to a three years minimum stay in the country; at that time the minimum stay was reduced to one year. There are no restrictions on the repatriation of profits from FDI.[2]

In 1991, when the controls policy was reintroduceded, the authorities had three goals in mind: first, to slow down the volume of capital flowing into the country, and to tilt its composition towards longer maturities. Second, to reduce (or at least delay) the real exchange rate appreciation that stemmed from these inflows. And third, it was

expected that the existence of these controls would allow the Central Bank to maintain a high differential between domestic and international interest rates. This, in turn, was expected to help the government's effort to reduce inflation to the lower single-digit level. It was further expected that the controls would reduce the country's vulnerability to international financial instability (Cowan and De Gregorio 1998, Massad 1998a, and Valdes-Prieto and Soto 1996).

Chile's system of unremunerated reserve requirements is equivalent to a tax on capital inflows. The rate of the tax depends both on the period of time during which the funds stay in the country, as well as on the opportunity cost of these funds. As shown by Valdés-Prieto and Soto (1996) and De Gregorio, Edwards and Valdes (1998), the tax equivalent for funds that stay in Chile for k months, is given by the following expression:

$$(1) \qquad \tau(k) = [\, r^* \lambda / (1 - \lambda)\,]\,(\rho / k),$$

where r* is an international interest rate that captures the opportunity cost of the reserve requirement, λ is the proportion of the funds that has to be deposited at the Central Bank, and ρ is the period of time (measured in months) that the deposit has to be kept in the Central Bank.

Figure 1 contains estimates of this tax equivalent for three values of k: six months, one year and three years. Three aspects of this figure are particularly interesting: first, the rate of the tax is inversely related to the length of stay of the funds in the country. This, of course, was exactly the intent of the policy, as the authorities wanted to discourage short-term inflows. Second, the rate of the tax is quite high even for three a

year period. During 1997, for example, the average tax for 3 year-funds was 80 basis points. And third, the tax equivalent has varied through time, both because the rate of the required deposit was altered and because the opportunity cost has changed.

III. The Composition of Capital Inflows in Chile

In Table 1 I present data, from the Central Bank of Chile, on the composition of capital inflows into Chile between 1988 and 1998. As may be seen, during this period shorter term flows (that is, flows with less than a year maturity) declined steeply relative to longer term capital. The fact that this change in composition happened immediately after the implementation of the policy, provides some support for the view that the by restricting capital mobility, the authorities indeed affected the composition of inflows. These data also show that, with the exception of a brief decline in 1993, the total volume of capital inflows into the country continued to increase until 1998. De Gregorio et al (1998) used the Central Bank of Chile data reported in table 1 to calculate the maturity structure of Chile's total foreign debt. According to their results, and in line with the figures in table 1, Chile's short term debt as a proportion of total debt declined from 19% in 1990 to less than 5% in 1997.

In constructing the figures in Table 1, the central bank of Chile, classified inflows as "short term" or "long term" on the basis of contracted maturity. It is possible to argue, however, that when measuring a country's degree of vulnerability to financial turmoil what really matters is "residual" maturity, measured by the value of the county's liabilities in hands of foreigners that mature within a year. Table 2 presents data, from the *Bank of International Settlements,* on residual maturity for loans extended by G-10 banks to Chile and a group of selected of Latin American and East Asian countries. The results are quite revealing. First, once residual maturity is used, the percentage of short-term debt does not look as low as when contracting maturities are considered. Second, the figures in table 2 indicate that in late 1996 Chile had a lower percentage of short term

debt to G-10 banks than any of the East Asian countries, with the exception of Malaysia. Third, although by end 1996 Chile had a relatively low percentage of short term residual debt, it was not significantly lower than that of Argentina, a country with no capital restrictions, and it was higher than that of Mexico another Latin American country without controls. And fourth, Chile experienced a significant reduction in its residual short term debt between 1996 and 1998.

A number of authors have used regression analysis to investigate the determinants of capital flows in Chile. Soto (1997) and De Gregorio et al (1998), for example, have used vector autoregression analysis on monthly data to analyze the way in which capital controls have affected the composition of capital inflows. Their results confirm the picture emerging from tables 1 and 2, and suggest that the tax on capital movements discouraged short term inflows. These analyses suggest, however, that the reduction in shorter term flows was fully compensated by increases in longer term capital inflows and that, consequently, aggregate capital moving into Chile was not altered by this policy. Moreover, Valdés-Prieto and Soto (1998) have argued that the controls only became effective in discouraging short-term flows after 1995, when its actual rate increased significantly.

A traditional shortcoming of capital controls (either on outflows or inflows) is that it is relatively easy for investors to avoid them. Valdés-Prieto and Soto (1998), for example, have argued that in spite of the authorities' efforts to close loopholes, Chile's controls have been subject to considerable evasion. Cowan and De Gregorio (1997) acknowledged this fact, and constructed a subjective index of the "power" of the controls. This index takes a value of one if there is no (or very little) evasion, and takes a value of

zero if there is complete evasion. According to them this index reached its lowest value during the second quarter of 1995; by late 1997 and early 1998 this index had reached a value of 0.8.

IV. Capital Controls, Real Exchange Rates, Domestic Interest Rates and the Independence of Monetary Policy

Since the mid 1970s Chile's economic strategy has relied strongly on a rapid growth of exports. In order to achieve this goal the authorities have made serious efforts to maintain a "competitive" real exchange rate. To this end, in 1984 Chile adopted a crawling peg nominal exchange rate regime, where the peso-dollar rate was allowed to fluctuate within an upward-moving band. This exchange rate policy has been complemented by an anti inflationary policy based on interest rate targeting. The authorities argued that by maintaining domestic (peso) denominated interest rates above international rates, inflation would decline gradually (Massad 1998b). This policy mix worked relatively well until the late 1980s, when Chile regained access to international financial markets, and capital began to flow into the country putting pressure both on the real exchange rate and domestic interest rates.

In December 1989, and after 17 years of a military regime, a new government was democratically elected in Chile. From early on the newly elected authorities thought that in order to gain credibility among international and domestic investors, it was essential to take a firm stance against inflation. They also decided that it was important to obtain the support of exporters, a group that from the beginning had been behind the market oriented reforms program (Labán and Larraín, 1997). By early 1990 exporters had, in fact, began to complain that the rapid strengthening of the peso in real terms was reducing their degree of competitiveness and profitability. (See figure 2 for an evolution

of the real exchange rate in Chile during 1983 and 1998; a higher value of the index represents a more real exchange rate depreciation). According to Cowan and De Gregorio (1997, p. 3 "growing concerns [in 1991] about inflation and the exchange rate pressure of capital inflows … led policymakers to introduce specific capital controls."

In this section I use monthly data for the period June 1991-September 1998 to analyze the macroeconomics effectiveness of Chile's capital controls. In order to do this I estimated a number of VAR equations, and I analyzed the way in which changes in the tax on capital inflows affected the real exchange rate and domestic interest rates. The following endogenous variables were included in the VARs: (1) The tax equivalent of the controls, under the assumption that the funds stay in Chile for 180 days. (2) The change in the log of the bilateral real exchange rate (RER) with respect to the US. (3) The rate of devaluation of the nominal exchange rate. And (4), domestic interest rates. Three alternative interest rates were used: indexed rates for one year banking sector loans, indexed rates on one year bank deposits, and nominal interest rates for one month deposits. In addition, the interest rate on US 3-month certificates of deposits was included as an exogenous variable.[3] All the VARs were estimated using two lags.

Real Exchange Rates

Figure 3 contains the impulse response functions obtained from this exercise.[4] As may be seen from panel (a), a temporary hike in the tax on capital inflows has not had a significant effect on the real exchange rate. This result coincides with those obtained by other authors using different methodologies and shorter time periods. Valdés-Prieto and Soto (1996), for example, used an error correction model to analyze the relationship between capital controls and the real exchange rate and concluded that the "reserve

requirement does not affect in any way the long run level of the real exchange rate…[I]n addition…these reserve requirements have an insignificant effect on the real exchange rate in the short run (p. 99)." Using a longer time period, Edwards (1998) reached similar results, as did De Gregorio et al (1998). Some authors, however, have found a small transitory effect of the controls on RERs. Soto (1997), for instance, estimated VARs for a shorter time period, and found out that changes in the tax had a very small effect on the RER. De Gregorio et al (1998) estimated a dynamic RER misalignement equation and found out that the tax on inflows had a small short term effect over the real exchange rate.

Domestic Interest Rates

Panels (b) and (c) in Figure 3 present impulse reaction functions for lending and borrowing indexed interest rates.[5] These figures indicate that a temporary innovation to the tax on capital inflows will have a temporary positive effect on indexed interest rates. The effect, however, is very small, reaching at its peak no more than 10 basis points (in real terms). A variance decomposition analysis confirms the idea that capital restrictions have played a rather minor role in interest rate behavior in Chile: after 24 months, the tax variable explains only 9.5 percent of the forecast error of indexed interest rates.

Interestingly enough, and in contrast with panels (b) and (c), the impulse response function presented in panel (d) suggests that the tax had no effect on nominal deposit interest rates. A possible explanation for this result is that, throughout the period under consideration the (equivalent) tax on 30 days transactions was very high – during 1993-98 its *minimum* exceeded 1,500 basis points. As a result of this, the short end of the term structure was, for all practical purposes, closed to the rest of the world. In general, one

would expect that changes in a redundant tax will have no effect on the domestic clearing interest rates.

The results reported in Figure 3 largely coincide with those obtained by other authors. Using a different VAR specification, De Gregorio et al (1998) and Soto (1997) also found that an innovation to the tax had a positive, and very small, short term effect on indexed interest rates. In Edwards (1998a), I argued that if the controls on inflows are effective, once they are imposed we would observe higher differentials between dollar and peso interest rates (properly adjusted by expected devaluation). I tested this proposition by using rolling regressions to estimate the parameters of an AR(1) process for the interest rate differential. I found out that, although the steady state interest rate differential had actually declined after the imposition of the controls in 1991, it had become more sluggish. That is, after the imposition of the controls – and in particular after their tightening in 1993 --, it took a longer period of time for interest rate differentials to decline until they reached their steady state equilibrium.

To sum up, the evidence reviewed in this section suggests that Chile's controls on capital inflows had no effect on the real exchange rate. In fact, there is generalized evidence indicating that, contrary to the goals of the policy architects, the controls could not avoid, even in the short run, the appreciation of the real exchange rate. At the same time, there is some evidence that the controls were able to affect, at least temporarily, domestic interest rates. The magnitude of this effect was very small, however, casting doubts on the extent to which it helped the central bank to truly pursue an independent monetary policy.

V. Do Controls on Capital Inflows Reduce Financial Instability?

One of the goals of the capital controls policy in Chile has been to reduce the country's degree of financial instability. Surprisingly, to date there have been no attempts to evaluate formally whether this objective has been achieved. In this section I use weekly data to provide a preliminary analysis on the subject. I address two specific questions: First, have the controls on inflows reduced interest rate and stock market volatility in Chile? And second, has Chile been immune from financial "contagion" during the the period during which the controls have been in effect (1991-98) ?

In order to analyze the effect of the tax on inflows on financial instability I considered the following extended GARCH(1,1) model of interest rates and stock returns (see Campbell, Lo and MacKinlay 1997 for this type of models in finance):

$$(2) \qquad \Delta r_t = \theta + \Sigma \phi_j x_{t-j} + \eta_t$$

$$(2) \qquad \sigma^2_t = \varphi + \alpha \eta^2_{t-1} + \beta \sigma^2_{t-1} + \gamma \, \text{Tax}.$$

Where *r* stands for either the domestic interest rate or the log of the stock market index; the xs are variables that affect changes in these financial market variables, and may include lagged values of Δr, as well as other domestic or international variables; η are innovations with zero mean and conditional variance σ^2_t; and Tax is the tax equivalent of the capital controls. If the controls on capital inflows have indeed succeeded in reducing financial volatility we would expect γ to be significantly negative.[6] In the estimation of equations (2) and (3), I used weekly data on: (a) short term central bank nominal *repo* rates; and (b), the stock market index. These were obtained from *Datastream*, and cover the longest period for which they are available. In order to

simplify the analysis, only lagged values Δr were included in the means equation (2). The means equations are not reported due to space considerations. The variable *Tax* corresponds to the tax-equivalent under the assumption that the funds stay in the country for 180 days. LM test is Engle's test for the existence of residual conditional heteroskedasticity.

The results obtained from the GARCH model are reported in Table 3, and are quite interesting: First, the GARCH(1,1) representation works adequately for both stock market returns and nominal interest rates. Second, for the case of stock market returns it is not possible to reject the hypothesis of an integrated (1,1) GARCH. And third, while in both equations the coefficient of *Tax* is negative, it is only significantly so in the stock market regression. Overall, these results suggest that the capital controls policy helped Chile reduce stock market instability. These results say nothing, however, on whether as a results of the capital controls Chile was insulated from contagion stemming form shocks that originated in other emerging markets. A particularly interesting issue is whether Chile was (partially) isolated from the financial turmoil that erupted in east Asian in mid 1997. In order to address this issue I used weekly data to estimate a number of equations on short term interest rate behavior in Chile. More specifically, I asked whether changes in short term rates in Chile were affected by changes in short term interest rates in Hong Kong.[7] The following equation was estimated using weekly data and polynomial distributed lags:

$$(4) \qquad \Delta r_t = \theta + \Sigma \alpha_j \Delta r_{t-1-j} + \Sigma \beta_j \Delta r^{US}_{t-1-j} + \Sigma \lambda_j \Delta r^{HK}_{t-1-j} + \Sigma \varphi_j \Delta dev_{t-1-j} + \eta_t$$

where Δr is the change in the short term *repo* nominal interest rate in Chile; Δr^{US} is the change in the one month US certificate of deposit rate; Δr^{HK} is the change in Hong Kong's one month deposit rate; and dev is the rate of devaluation of the Chilean peso. The estimated coefficients of $(\Sigma \Delta r^{HK}{}_{t-1-j})$ capture the extent to which Chile has been subject to "contagion" from East Asia during this period. If changes in Hong Kong's financial conditions have no effect o Chile's interest rates, we would expect that the coefficients of $(\Sigma \Delta r^{HK}{}_{t-1-j})$ would be insignificant in equation (4). A preliminary analysis of the data suggested that, approximately in May 1997, there was a break point in the series. For this reason equation (4) was estimated for two subperiods: October 1994-May 1997 and May 1997-January 1999. The results obtained using four lags, and second order polynomials with far-end constraints are reported in Table 4. As may be seen, during the early period, changes in Chile's interest rates were not affected by changes in interest rates in Hong Kong. The estimated sum of the coefficients of Δr^{HK} was very small and highly insignificant. Things changed, however, during the second (1997-1999) period, when according to these estimates changes in short term interest rates in Hong Kong had a positive effect in Chile's short term rate. The fact that this transmission took place in spite of the presence of capital controls, suggests that these were not effective in preventing "contagion" stemming from *very large* external shocks. Determining the point at which the controls become to lose effectiveness is beyond the scope of this paper, but it is an interesting topic for future research..

VI. Concluding Remarks

In the wake of the recent financial crises a number of authors have argued that the emerging economies should restrict capital mobility by imposing controls on capital inflows. Many of these authors have pointed out that emerging economies should look closely at Chile's experience with controls on inflows. It has been argued that, among other things, this policy helps reduce instability, real exchange rate overvaluation. But, does it really? In t this paper I have used four criteria to analyze the effectiveness of Chile's controls on capital inflows: (a) The policy's effect on the composition and volume of capital inflows; (b) its effect on real exchange rate behavior; (c) its impact on domestic interest rate and, thus, on the country's ability to undertake independent monetary policy; and (d) its effect on financial instability and vulnerability.

The main conclusion of this paper is that the effectiveness of Chile's controls on capital inflows has been exaggerated. This conclusion is supported both by the evidence amassed by other authors, as well as by the empirical results reported in this paper. The results obtained in this paper can be summarized as follows:

- After the controls were imposed, the maturity of foreign debt contracted by Chile increased significantly. The evidence suggests, however, that even in 1996 more than 40 percent of Chile's debt to G-10 banks had a residual maturity of less than one year. Most studies reviewed in this paper have concluded that although the policy affected the composition of capital inflows, it did not reduce the total volume of aggregate flows moving into Chile during the 1990s.

- The controls on inflows had no significant effect on Chile's real exchange rate. In spite of the authorities' efforts the real exchange rate appreciated by approximately 30% during the 1990s.
- The controls had a short term effect on domestic interest rates. The magnitude of the effect was very small, however, raising the question of whether the central bank's ability to undertake independent monetary policy really enhanced by the controls on capital inflows.
- The capital controls policy helped reduce stock market instability, but did not affect interest rate instability. There is some evidence suggesting that the controls were unable to isolate Chile from the very large financial shocks stemming from East Asia in 1997-1999.

Moreover, Chile's capital controls have also had some costs. The most important one is that they have increased significantly the cost of capital. Since large firms have access to international finance and can find ways to circumvent the controls, this high cost of capital is not only distortionary but also discriminates against small and medium size firms. During 1996, for example, the cost of funds for smaller firms was as high as 24 percent, in pesos: this translated into a cost in dollars in excess of 21 percent per year. During 1997 the cost funds to small firms exceeded 19 percent in dollar terms. Of course, when making a final decision on whether the adoption of Chile-style controls is worthwhile in another country, these costs have to be compared to the benefits identified above. Although that exercise is beyond the scope of this paper, I suspect that the result

will depend on the country in question, including its degree of development and the strength of its banking prudential regulations.

Economists have long recognized that dealing with cross border capital movements is a difficult policy issue. In the absence of strong financial supervision in both lending and borrowing countries, unregulated capital flows may indeed be misallocated, generating major disruptions in the receiving nations. Many authors, myself included, have argued that the relaxation of controls on international capital movements should take place towards the end of a market-oriented reform, and only after a sound supervisory system for the domestic financial market is in place. Controls on capital movements should be lifted carefully and gradually, but – and this is the important point -- they should be lifted. Moreover, in discussing the future of globalization it is important to understand what capital controls can and cannot do. The historical record shows convincingly that, in spite of some commentators' enthusiasm, controls on capital inflows are not a very effective solution. The true solution is for countries' to pursue sound macroeconomic policies, to avoid overly rigid exchange rates, and to implement banking supervisory systems that reduce moral hazard and corruption.

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Table 1 : Capital Inflows (gross) to Chile: Millions of US$

Year	Short term flows	Percentage of total	Long term flows	Percentage of total	Total	Deposits*
1988	916,564	96.3	34,838	3.7	951,402	--
1989	1,452,595	95.0	77,122	5.0	1,529,717	--
1990	1,683,149	90.3	181,419	9.7	1,864,568	--
1991	521,198	72.7	196,115	27.3	717,313	587
1992	225,197	28.9	554,072	71.1	779,269	11,424
1993	159,462	23.6	515,147	76.4	674,609	41,280
1994	161,575	16.5	819,699	83.5	981,274	87,039
1995	69,675	6.2	1,051,829	93.8	1,121,504	38,752
1996	67,254	3.2	2,042,456	96.8	2,109,710	172,320
1997	81,131	2.8	2,805,882	97.2	2,887,013	331,572

* Deposits in the Banco Chile due to reserve requirements; short term flows have a stay of less than one year.

Table 2: Ratio of Short-term Bank Loans to Total Bank Loans

(Percentage)

	Mid-1996	**End-1996**	**Mid-1997**	**End-1997**	**Mid-1998**
Argentina	53.4	56.3	54.2	57.7	57.4
Brazil	57.7	63.0	62.6	64.3	62.6
Chile	***57.7***	***51.2***	***43.3***	***50.4***	***45.9***
Colombia	45.9	39.3	39.4	40.0	39.6
Mexico	47.8	44.7	45.5	43.7	44.9
Peru	78.3	79.2	67.0	69.3	75.7
Indonesia	60.0	61.7	59.0	60.6	55.0
Korea	70.8	67.5	68.0	62.8	45.8
Malaysia	49.7	50.3	56.4	52.7	48.6
Taiwan	86.4	84.4	87.3	81.6	80.1
Thailand	68.9	65.2	65.7	65.8	59.3

Source: The Bank for International Settlements.

Table 3: Financial Market Volatility and Controls on Capital Inflows*
(GARCH Estimates: Weekly Data)

Dependent variable:	Change in repo interest Rate	Change in log of stock market index
C	3.387 (2.539)	0.0005 (3.855)
ε_{t-1}^2	0.864 (7.669)	0.619 (6.377)
σ_{t-1}^2	0.407 (7.669)	0.507 (15.909)
Tax	0.008 (0.847)	-0.010 (-2.695)
Period	1994/9-1999.1	1991.9-1999.1
N	229	385
LM Test	4.41	13.865

* The figures in parentheses are the t-values. See text for details.

Table 4: Changes in Domestic Interest Rates and World Interest Rates: Is there Contagion? (Weekly Data, 1994-1999)

	October 1994-May 1997	May 1997-January 1999
C	0.0732 (0.309)	-0.092 (-0.312)
$\Sigma \Delta r_{t-j}$	-0.597 (-1.432)	-0.649 (-2.730)
$\Sigma \Delta dev_{t-j}$	2.302 (1.006)	4.871 (2.930)
$\Sigma \Delta r^{US}_{t-j}$	-6.541 (-0.406)	-2.441 (-1.491)
$\Sigma \Delta r^{HK}_{t-j}$	-4.498 (-0.733)	2.684 (5.129)
N	139	89
R^2	0.081	0.281
Durbin-Watson	2.143	2.376

* The figures in parentheses are the t-values. See text for details.

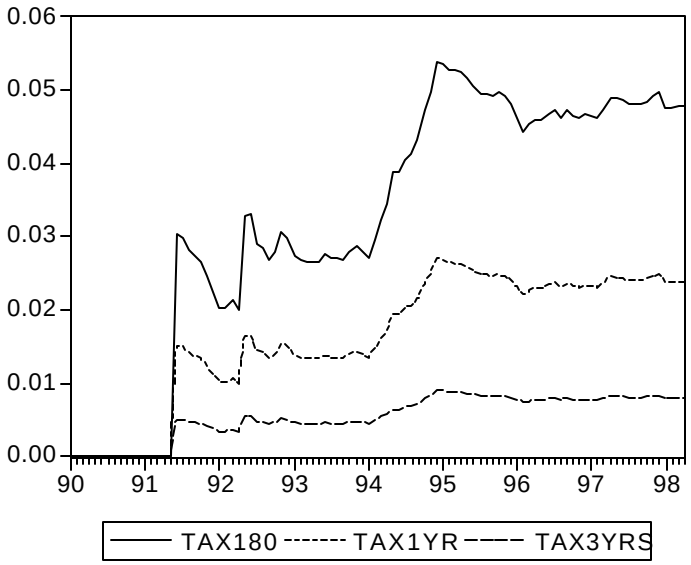

Figure 1: Tax Equivalent of Capital Controls: Stay of 180 days, 1 year and 3 years

Figure 2: Real Exchange Rate Index in Chile: Monthly Data, 1983-1998 (1990 = 100)

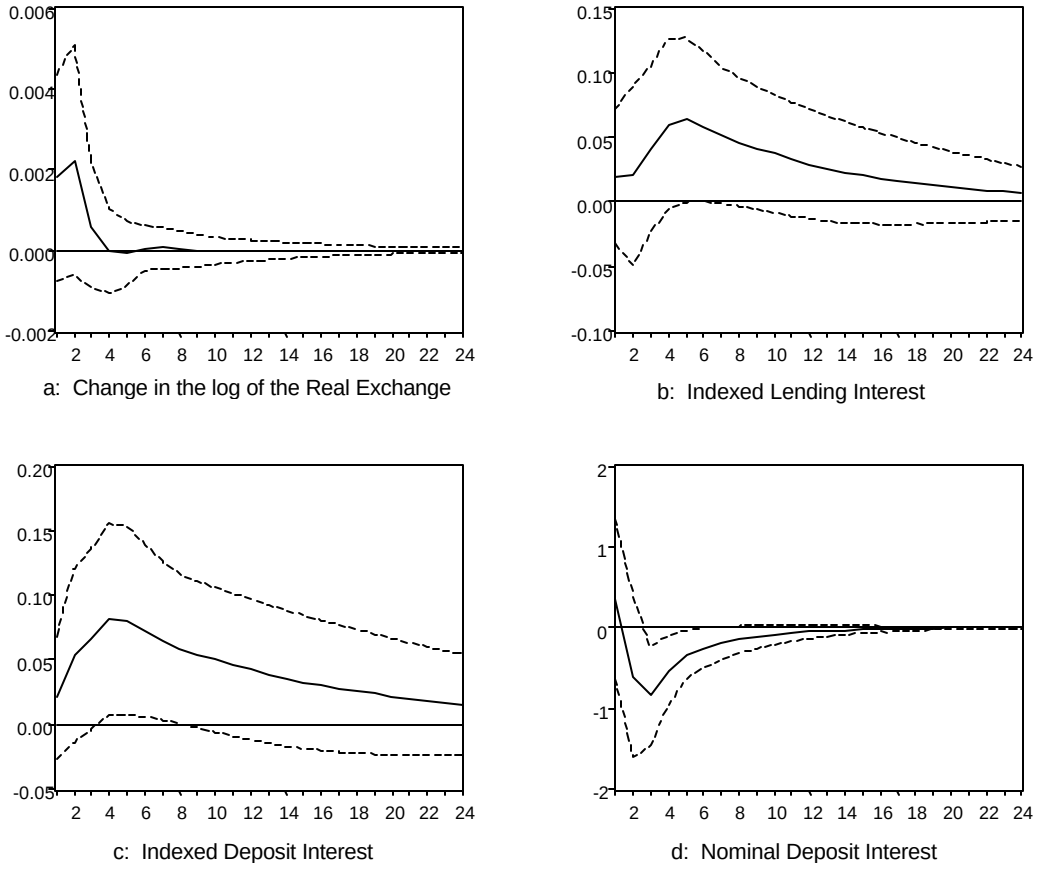

Figure 3: Impulse Response Function to a Standard Deviation Innovation of Tax on Capital

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ENDNOTES

[1] On the Chilean reforms see Edwards and Edwards (1991) and Bosworth, Dornbusch and Laban (1994).

[2] For further details see Massad (1998a, b), De Gregorio, Edwards and Valdes (1998), and Budnevich and Lefort (1997)

[3] These data were obtained from the Intenational Financial Statistics and from the Central Bank of Chile and are available on request.

[4] These results correspond to three different VAR estimations. A different interest rate variable was used in each of them. The impulse response function for the (difference of the) log of the RER corresponds to the VAR with the indexed lending rate. The results are very similar for the other VARs.

[5] Traditionally most financial transactions in Chile have been based on indexed interest rates. See Fontaine (1996).

[6] A likelihood ratio test suggests that the residuals of both the interest rates and stock market equations are subject to heteroskedasticity

[7] The use of Honk Kong's interest rates as an index of financial instability in East Asia is, of course, arbitrary. When alternative indicators are used the results are similar, however. The data were obtained from datastream.