

FINANCIAL LIBERALIZATION,
INTEREST RATES, AND
THE REAL EXCHANGE RATE
IN CHILE*

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CHAPTER 3

Financial Liberalization, Interest Rates, and the Real Exchange Rate

During the 1960s and early 1970s Chile's financial market was underdeveloped and highly distorted; it was in fact a textbook case of "financial repression". The degree of financial intermediation was low, real interest rates were negative, reserves requirements were extremely high, and credit was rationed and allocated using arbitrary inefficient criteria. By late 1973, and as a result of the Unidad Popular's nationalization process, the government either owned or controlled most banks.¹

The liberalization of the domestic financial sector and the creation of a dynamic capital market was an early priority of the military government. The fundamental goals of this reform were to free domestic interest rates, allow the market to allocate credit, and to encourage the creation of new banks and financial institutions. Along the lines of the financial liberalization literature -- pioneered by Edward Shaw and Ronald McKinnon from Stanford University -- it was expected that as a result of these reforms the volume of financial intermediation would increase, credit would be efficiently allocated, the volume of domestic savings would rise and, consequently, growth perspectives would improve. The crucial role assigned by the authorities to the financial reform was aptly summarized by Minister Cauas in his 1974 report (Mendez 1979, p. 92):

The development of the capital market has special importance in increasing the rate of savings...This is achieved through financial intermediaries....The necessity to increase substantially the rate of internal savings and to guarantee the best use of investment resources are indispensable requirements for the acceleration of economic growth. For this reason, special emphasis has been placed on the development of the capital market.

In this chapter some of the most important aspects of the financial liberalization reforms are analyzed. In Section 3.1 the most salient institutional characteristics of the reforms of the domestic capital market, and the evolution of financial intermediation are discussed. Section 3.2 looks at the behavior of interest rates during the period. In Section 3.3 the itinerary and effects of the liberalization of the capital account of the balance of payments are analyzed, and its effects on the accumulation of a gigantic foreign debt are described. In that section special emphasis is placed on the effects of the opening of the capital account on the real exchange rate. Finally, in in Section 3.4 some of the most important aspects of the financial crisis of 1981-1982 are discussed.

3.1 The Reform of the Domestic Financial Market

The liberalization of the financial market started in early 1974 when reserves requirements were lowered, and new non-bank financial institutions -- the so-called financieras -- were permitted to operate. In May of that year the Central Bank allowed financieras to freely determine interest rates in short-term financial operations, and more than a year later, in October of 1975, interest rates charged and paid by commercial banks were also freed. The freeing of interest rates represented a major change in a country where for more than 20 years financial operations had been tightly controlled, and it meant a move from negative to positive (and very high) real interest rates.

In April of 1975 the government began a process of privatization of banks nationalized during the Allende period. A number of these banks were bought by private conglomerates (i.e., the grupos), both old and newly formed, that saw the generalized privatization process pushed by the government as an excellent opportunity to rapidly expand. In particular, the fact that the government required only small down payments for selling banks and firms, was

seen as a very attractive feature of the privatization process.² Besides encouraging the creation of new financial institutions and freeing interest rates, the government also implemented a process that greatly reduced banks' reserves requirements from more than 100% in 1973 to 42% in 1979, and to a final level of 10% in late 1980.

During the 1973-1981 period the liberalization of the domestic financial market moved much faster than the liberalization of controls on capital movements in and out of the country. In fact, as is explained in detail in Section 3.3 below, until June of 1979 international capital movements were severely controlled.

An important result of these reforms was that both the number of financial institutions and the volume of intermediation greatly increased. For example, in 1981 there were 26 national banks, 19 foreign banks and 15 "financieras", a number significantly higher than the -- national banks, (with no foreign banks) in operation in September of 1973. On the other hand between 1973 and 1981 the real volume of total credit to the private sector increased by more than 1100%!

In Table 3-1 some indicators of the evolution of the financial sector are presented. As can be seen, the volume of financial intermediation -- as measured by credit to the private sector in real terms, the ratio of money to GDP, and the ratio of reserve money to total money -- experienced a spectacular increase during the first ten years of the military government. In fact by 1982 Chile had one of the most highly monetized economies among the developing countries.

In spite of the rapid growth and increased sophistication of the domestic capital market, most financial operations had very short maturities, with 30 days being most common. In 1982, for example, only 22 percent of total time

TABLE 3-1

The Behavior of the Financial Sector:Selected Indicators 1970-1983

<u>Year</u>	(A) Credit to the Private Sector in Real Terms <u>(1975=100)</u>	(B) <u>M2/GDP</u> (%)	(C) <u>Ratio of Monetary Base to M2</u> (%)
1970	63.2	8.8%	55.7%
1971	91.2	13.1%	63.2%
1972	93.2	13.6%	71.9%
1973	77.2	10.7%	69.9%
1974	88.2	5.4%	58.4%
1975	100.0	5.6%	49.7%
1976	136.8	5.9%	64.8%
1977	270.0	8.3%	66.2%
1978	444.3	10.4%	55.7%
1979	585.0	12.0%	46.4%
1980	817.2	13.2%	41.1%
1981	983.7	21.2%	28.9%
1982		25.6%	18.6%
1983		16.5%	

Sources: Columns (A) from Ramos (1984); column (B) from Banco Central de Chile. Column (C) from International Monetary Fund.

deposits in domestic currency has a maturity that exceeded than one year. On the loans side, maturities were slightly higher; in 1982 55 percent of total credit had maturities below one year.

During the 1976-1980 period not only the volume of real credit increased, but the level of transactions in the stock market also grew substantially, with stock prices experiencing a steep increase (see Table 3-2). Much of the activity in the stock market consisted of transactions conducted by newly formed mutual funds, which became increasingly active during the period. However, in spite of its rapid growth in the early 1980s the stock market was still small in relative terms, with its monthly average transactions volume representing less than 2 percent of the stock of total domestic credit.

There is no doubt that, at least in terms of increasing the degree of financial intermediation, the liberalization reform was a success. However, from the beginning it was apparent that the capital market liberalization reform was facing three major problems. First, and as discussed in detail in Section 3.2 below, interest rates were very high. Second, in spite of the very significant growth in the degree of financial intermediation, domestic savings did not increase, as the proponents of the reforms had expected. In fact, as was pointed out in Chapter 1, domestic savings were at one of their lowest historical levels. Third, and perhaps more important, the rapid growth of the financial sector took place in an environment with no supervision on behalf of the monetary authorities. As a result many banks accumulated an unprecedented volume of bad loans, which eventually led to the deep financial crisis of 1982.

Savings and Financial Reform

Several factors explain the apparently contradictory behavior of the level of financial intermediation and domestic savings, which as can be seen

TABLE 3-2

Real Stock Prices and Volume of Transactions: 1976-1983

	Index of Real Value of Transactions in Stock Exchange <u>(1976=100)</u>	Real Index of Stock Prices <u>(1976=100)</u>
1976	100.0	100.0
1977	202.1	184.4
1978	310.8	364.8
1979	713.9	421.6
1980	1300.7	780.8
1981	1623.9	625.7
1982	3964.4	475.9
1983	2385.6	305.3

Source: Nominal values were taken from information provided by Bolsa de Comercio de Santiago. The real figures reported in the table were constructed deflating the values by a corrected consumer price index.

in Table 3-3 during most of the period were below 15% of GDP. The first factor is related to the behavior of asset prices. In the late 1970s asset prices experienced a very sharp increase generating an important hike in perceived wealth and, consequently, in consumption.³ The increased asset prices and perceived wealth stemmed from the growing optimism on the future perspectives of the economy which accompanied the "boom" years of 1978-80. The extent of this asset appreciation is clearly illustrated by the evolution of the real value of the index of stock price presented in Table 3-3. To a large extent, the appreciation represented a "bubble" which eventually burst generating major costs. However, in the early "boom" years few observers of the Chilean economic scene -- and certainly not the government authorities -- recognized the "bubble" nature of the phenomenon.⁴

The low level of domestic savings was also related to the privatization policy pursued by the government. As noted, and as is reported in detail in Chapter 4, in 1974 and as a form to reduce the importance of the public sector, a process of privatization of government-owned firms was implemented, with firms being auctioned to private (domestic and foreign) bidders. In general, the government used the proceeds from these sales to finance current expenditures. From a practical point of view, the private savings used to acquire these firms were matched by negative government savings. Finally, two other important factors affected the degree of intermediation and savings. First the increase in foreign indebtedness, reported in detail below, also contributed to the increase in financial intermediation without a corresponding increase in domestic savings. Second, after 1975 the government channeled increasing fractions of its savings through the financial sector, increasing the degree of intermediation without having any effect on aggregate savings.

TABLE 3-3

Investment and Savings In Chile: 1970-1983

<u>Year</u>	<u>(Gross Domestic Investment/ GDP)</u> %	<u>Gross Capital Formation on Fixed Capital/GDP</u> %	<u>Depreciation/ GDP</u> %	<u>(Net Domestic Savings/ GDP)</u> %	<u>(Gross Domestic Savings/ GDP)</u> %	<u>Foreign Savings/ GDP)</u> %
1970	23.4	20.4	11.0	10.6	21.6	1.7
1971	20.8	18.3	11.9	6.0	17.8	2.9
1972	15.2	14.8	10.4	-0.1	10.4	4.8
1973	14.3	14.7	19.2	-9.7	9.5	4.8
1974	25.8	17.4	11.8	13.5	25.3	0.5
1975	14.0	15.4	15.7	-7.2	8.5	5.6
1976	13.6	12.7	14.1	1.4	15.4	-1.9
1977	14.4	13.3	11.7	-1.0	10.7	3.7
1978	16.5	14.5	10.5	1.1	11.6	4.8
1979	19.6	15.6	11.0	2.7	13.7	5.9
1980	23.9	17.6	11.4	4.1	15.5	8.5
1981	27.6	19.5	8.7	-1.2	7.5	14.5
1982	11.1	15.0	n.a.	-8.6	n.a.	9.2
1983	9.3	12.9	n.a.	-6.8	n.a.	5.4

Source: Banco Central de Chile.

Financial Sector Regulation

Undoubtedly, the most serious institutional problem related to the reform of the domestic capital market was the lack of effective supervision and regulation. For example, as early as 1974 it was well known by everyone involved -- including, of course, the "regulators" -- that the grupos were finding ways not to comply with the rules directed towards avoiding excessive ownership concentration in the financial sector. The laxitude of the supervision system was first reflected in 1974 and early 1975 when a number of informal financial institutions started to operate with the implicit approval of the government, and with absolutely no control. Also, many grupo-owned banks concentrated large fractions of their loan portfolios on "related firms", which were either owned or controlled by that particular conglomerate. The basic scheme used by many of these grupos was to use the financial resources obtained through the newly acquired banks to grow fast, mainly through the acquisition of firms that were being privatized; later some of these funds were also used to expand the level of operations of these and other firms. At the same time banks embarked on a frantic race where they tried to grow as fast as possible. As explained below, many of the loans to related firms did not represent, from a purely financial point of view, sound banking practices.

In late 1976 and early 1977 as a serious financial crisis erupted, it became painfully clear that the supervision and regulation schemes for the financial sector were inadequate. A number of minor informal and formal "financieras" went bankrupt. More seriously, however, and mainly due to the large number of "bad loans" made to grupo-owned firms, a major bank -- the Banco Osorno, owned by the Fluxa grupo -- ran into serious trouble and had to be intervened by the government.⁵

As a result of this crisis some measures that were supposed to strengthen the financial sector's structure were taken. First, informal institutions were closed. Second, the required minimum equity of formal financieras was increased to 75% of that of banks. Third, the government established a compulsory deposit insurance scheme that, in theory, covered up to the equivalent of US\$3,000 for each depositor; in practice, however, and given the government behavior during the Banco Osorno crisis when all depositors were paid off, the public expected that this insurance would cover any amount. In fact, this generalized implicit guarantee for deposits generated a classic case of moral hazard, where depositors -- both large and small -- had no incentives to distinguish between those banks that had been weakened by their bad loans from those few institutions that had a solid financial base. However, after the Banco Osorno crisis nothing serious was done to reduce the degree of interrelation between the banks and the grupos. In fact, after this date the percentage of loans directed by each bank to the grupos' firms grew significantly. As it turned out, and not surprisingly perhaps, this lack of regulation played a critical role in the financial crisis of 1981-82, and in the overall collapse of the Chilean experiment.

3.2 Interest Rates, the "Boom" and Expected Devaluation

Interest rate behavior constitutes one of the most fascinating features of the recent Chilean experience. During most of the experiment both nominal and real interest rates were very high.⁶ Table 3-4 contains quarterly data on borrowing nominal interest rates, inflation, international interest rates (LIBOR) and on the rate of devaluation for 1977 through 1983. As can be seen from these data, even after the capital account was significantly opened and the exchange rate was pegged against the dollar in June of 1979, there was still a very substantial differential between the domestic borrowing rates and

TABLE 3-4

Interest Rates, Rate of Devaluation and InflationQuarterly Data 1977-1983

	<u>Annualized Nominal Borrowing Interest Rate (%)</u>	<u>Annualized Rate of Devaluation (%)</u>	<u>LIBOR Interest Rate (%)</u>	<u>Annualized Rate of Inflation (%)</u>
1977 Q1	124.6	71.4	6.3	103.2
Q2	83.6	23.4	6.8	100.0
Q3	70.8	71.9	7.0	61.2
Q4	99.8	85.5	7.8	57.4
1978 Q1	70.7	57.4	8.0	37.9
Q2	55.6	33.1	8.5	41.2
Q3	55.5	19.7	9.3	43.0
Q4	70.0	11.2	11.5	28.1
1979 Q1	47.3	14.3	11.8	24.9
Q2	44.1	18.7	11.8	32.9
Q3	42.7	33.8	12.3	48.8
Q4	46.1	0	15.5	39.2
1980 Q1	52.0	0	16.3	28.5
Q2	32.7	0	14.0	32.0
Q3	31.8	0	11.5	27.0
Q4	34.2	0	17.8	33.0
1981 Q1	45.0	0	19.0	18.0
Q2	40.9	0	20.5	11.6
Q3	38.8	0	20.5	8.5
Q4	38.5	0	16.0	7.4
1982 Q1	38.9	0	15.6	7.0
Q2	32.4	14.3	16.2	4.2
Q3	37.8	245.1	12.1	26.1
Q4	73.2	152.0	9.5	55.8
1983 Q1	33.1	36.9	9.5	18.7
Q2	28.9	1.3	9.7	25.4
Q3	25.0	26.2	10.5	26.8
Q4	24.9	30.8	9.9	26.5

Sources: Constructed from data obtained from Banco Central de Chile, International Financial Statistics and Cortazar and Marshall (1981). The annualized rate of devaluation was computed relative to the U.S. dollar as $(1 + \text{actual devaluation})^4$.

the foreign (LIBOR) rate. Only a small fraction of this differential can be explained by the premium over LIBOR charged by the international financial community to Chilean borrowers. The premiums averaged 1.55 percentage points in 1978; 0.99 percentage points in 1979; 0.99 percentage points in 1980; 0.89 percentage points in 1981; and 0.97 percentage points in 1982.⁷

The data on nominal interest rates presented in Table 3-5 refer to average borrowing rates from the banking system. Throughout the period lending rates were substantially higher. The spread between nominal lending and borrowing rates averaged 22.7 percentage points in 1978, 22.4 percentage points in 1979, 9.4 percentage points in 1980, 11.1 percentage points in 1981 and 18.2 in 1982, and partially reflected the inefficiency of the Chilean banking system, which had much higher operation costs per unit of deposits than banks of comparable size in the U.S. and other industrialized countries.⁸ In Table 3-5 data on spreads between lending and borrowing rates between 1974 and 1983 are presented.

Until mid-1979, when the process of opening the capital account was accelerated, ex-post real interest rates were also high. As can be seen from Table 3-6 the real borrowing interest rate averaged 8.8 percent per annum in 1977, 18.9 percent per annum in 1978 and 13.2 percent per annum during the first half of 1979. The (partial) opening of the capital account and the resulting large inflows of foreign capital quickly impacted real interest rates; between the third quarter of 1979 and the fourth quarter of 1980 borrowing real rates declined significantly, averaging only 4.1 percent per annum. Toward the end of 1980 the situation drastically changed. In December of that year the real borrowing rate climbed to 15 percent per annum, while the real lending rate exceeded 20 percent per annum. Things became even worse in 1981 when in spite of the fact that capital inflows reached a record high,

TABLE 3-5

Annualized Spreads Between Borrowing and Lending Interest Rates:19179-1983

(percent)

	<u>Q1</u>	<u>Q2</u>	<u>Q3</u>	<u>Q4</u>
1979	20.0	16.4	39.3	14.0
1980	9.8	10.9	9.2	7.8
1981	7.2	9.7	12.1	15.4
1982	16.2	15.3	26.3	15.0
1983	17.0	15.2	14.2	12.8

Source: Calculated from data presented in Banco Central de Chile.

TABLE 3-6

Ex-Post Real Annualized Interest Rates: 1977-1983

(real borrowing rates; percent per annum)

	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>	<u>Average</u>
1977	10.5	-8.2	6.0	26.9	8.8
1978	23.8	10.2	8.7	32.7	18.9
1979	17.9	8.4	-4.1	5.0	6.8
1980	18.3	0.5	3.8	1.0	5.9
1981	22.8	26.3	27.9	29.0	26.5
1982	29.8	27.6	9.3	11.2	19.5
1983	12.1	8.6	-1.4	-1.2	4.5

Source: Constructed by the authors from raw data obtained from Banco Central de Chile and Cortazar and Marshall (1981). The ex-post real rates were constructed as $r = (1+i)/(1+\pi) - 1$ where r is the ex-post real rate, i is the annualized nominal rate and π is the actual annualized rate of inflation.

averaging US \$1.1 billion per quarter, the real ex-post borrowing rate increased to an annual average of 27 percent, and the real ex-post lending interest rate averaged 37 percent. In the first half of 1982, immediately preceding the devaluation of the peso, the real borrowing rate averaged 37 percent, while the real lending rate reached the remarkable figure of 43 percent.

The bizarre behavior of interest rates during the military rule in Chile responded to a number of complex and interrelated factors. However, two major elements can be singled out as being the most important determinants of interest rates dynamics. The first is the ever expanding demand for credit which, in turn, responded to a number of factors, including the behavior of the grupos, and the substantially higher levels of expenditure originated by the optimistic views on the future of the economy. The second element relates to the expectations of devaluation which increased steadily after the first quarter of 1980. Whereas the continuous increases in the demand for credit mainly explain the behavior of the real interest rate, the expectations of devaluation affected both the nominal interest rate and the ex-post real rate. Other factors that also played a role in interest rates behavior were the existence of transaction costs and, especially in 1981, the passive monetary policy pursued by the central bank.

Very early during the liberalization attempt the demand for credit experienced important increases. Initially this higher demand stemmed, mainly, from the grupos which, after acquiring some of the newly privatized banks started using funds obtained through them to finance the purchase, modernization and expansion of other firms that were being privatized.⁹ At this early point there was also a strong credit demand, by all sorts of firms, to finance working capital. One of the consequences of the Unidad Popular

government was that most firms were highly decapitalized, and in great need of fresh working capital, to finance the accumulation of inventories. Also, a nontrivial fraction of the demand for credit during this period had its origin on efforts made by different firms to avoid bankruptcy as a result of the 1975 recession.¹⁰

Harberger (1985) has pointed out that this initial demand for credit by the grupos, soon became an evergrowing "false demand", consisting on the rolling-over of bad loans. Many of the firms acquired by the grupos did not turn out to be profitable, and increasingly resorted to additional borrowing from the banking sector in order to stay afloat. Instead of recognizing the "bad" nature of the loans, banks continued to roll them over, compounding the problem until in late 1981 the situation was completely out of control. The reluctance of banks to put an end to this scheme, and make effective the collaterals obtained from the borrowing firms was partially based on the fact that by late 1981 and 1982 the book value of collaterals greatly exceeded their market value, implying that banks would in fact have to write off a fraction of these loans. Everywhere, of course, banks are very reluctant to write off bad loans since it invariantly implies that total credit has have to be reduced by a very high multiple of the amount written off.¹¹ The actual importance of the grupos in the generation of an upward pressure on the demand for credit is reflected by the fact that up to December 1982 the six largest conglomerates had received, only through the banks each of them directly controlled, almost 15% of total credit.¹² Of course, the rolling over of these bad loans for a considerably long period of time was only possible due to the lax attitude the authorities had regarding banking regulation.

Starting in mid-1979 a fairly generalized feeling of prosperity and of very bright future economic perspectives began to invade the Chilean

population. Based on the rapid rates of growth of the previous two years and on the abundance of foreign financing, and fueled by an implacable government propaganda and by the adulation of foreign bankers and pundits, the Chilean public started to form very optimistic expectations of the future growth path of the economy. In fact, the years 1980 and early 1981 were characterized by an euphoria a la Kindleberger (1978).¹³

This optimism resulted in a perception of substantially higher wealth -- which, as noted, was reflected in dramatic rises of asset prices, including stocks and real estate -- was followed by major spending sprees, compared only to Imelda Marcos', by people belonging to most strata of society. The rise in expenditure (consumption and to a lesser extent investment) was largely financed through higher credit -- denominated both in domestic and foreign currency -- obtained from the banking sector. This higher demand for credit to finance higher expenditure had three major consequences. First, it exercised additional pressures on domestic interest rates, over and above those generated by the grupo-related false demand for credit; second, and as is documented below, it resulted in very drastic increases in foreign indebtedness; and third it helped create a dangerously fragile financial structure, where a high proportion of the banking sector loans were granted using highly inflated collateral prices.

Towards mid- to late-1980 the expectations of devaluation began to play an increasingly important role. Although the actual nominal exchange rate had been fixed at 39 pesos per dollar since June of 1979, the expectations of devaluations increased steadily as it became apparent that the real overvaluation was imposing a severe toll on the economy, and was not sustainable. For example, Le Fort (1985) has determined using Bayesian methods, that in May of 1982 the public's perceived probability that the authorities would abandon the

fixed rate system exceeded 90 percent. According to his computations, the expected rate of devaluation rose steadily from approximately 2% in July of 1979 -- one month after the parity was fixed -- to more than 26% in May of 1982, just prior to the devaluation of that year, according to his computations. (See Table 3-7).

In spite of the fact that during 1980, 1981 and the early months of 1982 there were still some controls on capital movements, as the expected rate of devaluation rose, so did the domestic nominal interest rate. As the expected devaluation became higher and higher, large numbers of firms and private individuals began substituting foreign credit for domestic credit, exercising additional pressures on domestic interest rates. In a recent article Edwards (1986) showed that, in addition to other factors, international interest rates plus expected devaluation play an important role in explaining nominal interest rate behavior in Chile. Based on the semi-open economy model of interest rate behavior in developing countries of Edwards and Khan (1985) the following result was obtained from the estimation of a reduced form equation for nominal interest rate, using OLS corrected by serial correlation on quarterly data for 1977 through 1982 (the numbers in parentheses are t-statistics):

$$\begin{aligned}
 i_t = & 0.039 + 0.239 (i_t^* + D_t^e) - 0.442 \log m_{t-1} \\
 & (0.418) \quad (1.965) \quad (-2.030) \\
 & -0.153 \log y_t - 0.378 \pi_t + 0.090 \text{ dummy} \\
 & (-0.175) \quad (-1.130) \quad (0.905) \quad (3.1) \\
 R^2 = & 0.905 \\
 DW = & 1.932 \\
 N = & 18 \\
 RHO = & -0.389
 \end{aligned}$$

where i_t is the domestic nominal interest rate; $(i_t^* + D_t^e)$ is the sum of the international (LIBOR) nominal rate plus the expected rate of devaluation;

TABLE 3-7

Expected Devaluation: 1979-1982*

(percent)

	<u>March</u>	<u>May</u>	<u>September</u>	<u>December</u>
1979	-	-	1.3	1.1
1980	1.0	1.2	1.7	9.8
1981	17.1	17.6	30.5	30.6
1982	32.7	26.3	-	-

*These figures are computed as the perceived probability of abandoning the fixed rate times the conditional expected devaluation.

Source: LeFort (1984).

m_{t-1} is a measure of real money in period $t-1$, which proxies the availability of real liquidity in the economy; y_t is a measure of permanent real income; π_t is actual inflation, which is used as a proxy for expected inflation; and π/t dummy is a dummy variable that took a value of zero from 1977 to mid-1979 and a value of one then onwards to allow for a distinction between the fixed and nonfixed exchange rates subperiods.¹⁴

These results are quite interesting. The fact that the coefficient of $(i_t^* + D_t^e)$ and of $\log m_{t-1}$ are significant at conventional levels and have the expected signs, provides support to the hypothesis that during this period the behavior of the nominal interest rate in Chile was influenced both by open economy factors and internal real liquidity conditions. Particularly important is the finding of a significantly positive coefficient for the $(i_t^* + D_t^e)$ term. This means that higher expected rates of devaluation will be promptly passed on to higher nominal domestic rates of interest. For example, if the expected rate of devaluation increases from 2% in a given month to 26% in another month -- as Le Fort's computations suggest -- the monthly nominal rate of interest would increase in almost 8 percentage points. Another important element in the explanation of the behavior of i_t pointed out by this equation are international foreign interest rate, which during 1980 and 1982 world interest rates increased quite substantially.

The coefficients of the constant and of the dummy variable confirm the hypothesis that domestic and foreign assets were not perfect substitutes during the period. Also, the significantly negative coefficient of the real liquidity variable (m_{t-1}) clearly points out that throughout the period nominal interest rates were not only affected by foreign factors, but also responded to the behavior of the domestic money market. The other coefficients in (3.1) are not estimated in a very precise fashion. All in all,

however, the results reported in equation (3.1) point out towards three basic factors in the explanation of nominal interest rates behavior in Chile:

(1) nominal world interest rates; (2) expected devaluation; and (3) real liquidity.¹⁵

The steady increase in the expected rate of devaluation between late 1980 and mid-1982 are especially important for understanding the dramatic increase in the ex-post real interest rates during this period. A key aspect of this problem, of course, is the difference between expected and actual rates of devaluation. While in a semi-open economy the nominal interest rate depends critically on the expected rate of devaluation, the actual rate of inflation -- which is used to measure ex-post real interest rates, as those presented in Table 3-6 -- depends mainly on the actual rate of devaluation. Since in spite of the growing expectations of devaluation the authorities maintained the fixed rate until June of 1982, the actual rate of inflation was well below the expected rate of devaluation, and computed ex-post real interest rates turned out to be very high starting in late 1980.¹⁶

Summing up, there are clear indications that the high nominal rates during most of the period responded mainly to a continuous increase in the demand for credit -- which responded to a number of different factors -- and, starting in late 1980, also responded to very important increases in the expected rate of devaluation. Other factors, of course, also had some role in the behavior of interest rates, including the existence of transaction costs which impeded banks to take positions on foreign currency (Sjaastad, 1983); the increase in world interest rates, the increase in the country risk premium attached to Chile by the international financial community starting in late 1980 (Edwards 1985a, Arellano, 1985); and, the "automatic adjustment" macro-economic strategy followed by the economic authorities in 1980 and 1981.

Although the formal modeling of Chile's interest rates has proven to be difficult and elusive, and sometimes even embarrassing, in the Appendix to this Chapter we present a model of interest rate determination in a semi-open economy that captures all the more important highlights of the Chilean case. In that model we combine the demand for credit and expected devaluation factors with other elements to provide an explanation of the behavior of interest rates during this period.

3.3 The Liberalization of the Capital Account, Foreign Indebtedness and the Real Exchange Rate

During the first years of the military rule the capital account was tightly controlled. Although the degree of controls became less stringent through time, until 1982 financial capital could not flow freely in or out of the country. During the early period, restrictions on banks intermediation of external funds were particularly severe.

Very early on, the authorities began to worry about the control of capital movements into the country. This preoccupation stemmed from the fact that starting in 1976 increases in international reserves, generated mainly by capital inflows, became an important source of base money creation, hampering the anti-inflationary effort.

Capital movements were controlled through an array of mechanisms. First, all capital moving into the country had to be registered with the Central Bank. Foreign lenders who wanted to have an assurance that they would have access to foreign exchange in the future faced, according to Article 14 of the Exchange Law, additional restrictions in the form of minimum maturities and maximum interest rates. For example, until quite late into the experiment loans with maturities below 24 months were forbidden, and those with maturities lower than 66 months were subject to non-interest yielding reserves

requirements ranging from 10% to 25% of the value of the loan. Given the steepness of these deposits, until 1982 the overwhelming majority of loans and maturities exceeded 66 months.¹⁷ Unlike Argentina and Uruguay, Chile forbade short-run capital movements until the desperate days of the 1982 crisis.¹⁸

Restrictions on banks intermediation of foreign funds constituted the second major tool for controlling the level of capital inflows. These restrictions operated in two ways. First, there was a limit on banks the level of foreign liabilities; second, and more important, there was a maximum amount by which banks could increase their foreign liabilities each month. Until December of 1978 foreign currency (gross) liabilities could not exceed 1.6 times the bank's equity. At that time this limit was increased to 1.8 times the bank's equity.

In June of 1979 a major step towards liberalizing the capital account was taken when the restriction on the maximum ratio of foreign liabilities to equity was eliminated, and the level of foreign liabilities became only subject to the overall maximum debt-equity ratio of 20 applicable to banks. The elimination of this restriction in mid-1979 had a major impact on capital inflows, with Article 14 loans increasing by almost 100% during that year. However, banks were still subject to a severe restriction on the maximum increase in the level of foreign liabilities permitted per month. In late 1979 the maximum monthly increase in bank's (gross) foreign liabilities was "the largest of 5% of equity or U.S. \$2 million". At this time this restriction on the maximum monthly increase in foreign liabilities became binding, as banks could obtain from abroad large sums which could only be brought slowly into the country. In April of 1980 this flow restriction was eliminated, and banks could increase their foreign liabilities as fast as they wanted. This measure generated an astonishing increase in banks foreign liabilities. For

example, banks' foreign credits imported via Article 14 jumped in 1980 by more than three times!

The combination of reduced capital controls and of a renewed eagerness to lend money to Chile on behalf of the international financial community resulted in a staggering increase in Chile's foreign debt. In Table 3-8 the evolution of Chile's foreign indebtedness is presented. Three things stand out from this table. First, the remarkably rapid increase in total foreign indebtedness which almost tripled between 1978 and 1982. Second, the change in the relative importance of public and private debt. Whereas in 1973 private debt constituted less than 12% of total external debt, in 1981 it represented almost 65%. Between 1973 and 1981 private (nominal) foreign debt increased by more than 23 times. When expressed in constant dollars the increase is still more than 11 times, representing an average annual rate of real growth of almost 40%. And, third, the figures in Table 3-8 highlight the rapid growth in the level of foreign indebtedness of the private banking system.

Of course, the increased role of private foreign indebtedness was not an accident. Quite on the contrary, it represented a deliberate government policy aimed at curbing public sector involvement in international financial transactions, and at encouraging the private sector participation in the international financial sector. Consistent with the view that the government should not get actively involved in financial or productive deals, the vast majority of the private loans were obtained without government guarantee. In fact, it was thought at the time by the economic authorities and other observers that since most of the debt had been contracted by the private sector without any government guarantee, the very rapid increase in foreign debt did not represent a threat for the country as a whole: if a domestic private borrower could not pay its foreign obligations, that was a private problem,

TABLE 3-8

Chile's Foreign Debt 1973-1982

(Millions of U.S.\$, End of Period)

	<u>Total Debt</u>	<u>Public Sector Debt</u>	<u>Private Sector Debt</u>		
			<u>Banking System</u>	<u>Rest</u>	<u>Total Private</u>
1973	3,667	3,244	N.A.	N.A.	423
1974	4,435	3,966	N.A.	N.A.	469
1975	4,854	4,068	154	632	786
1976	4,720	3,762	168	790	958
1977	5,201	3,917	309	975	1,284
1978	6,664	4,709	660	1,295	1,955
1979	8,484	5,063	1,968	1,453	3,421
1980	11,084	5,063	3,497	2,524	6,021
1981	15,542	5,542	6,516	3,561	10,077
1982	17,153	6,660	6,613	3,880	10,493

Source: Banco Central de Chile

N.A. = Not available.

between him and the foreign creditor, which would be solved through a regular bankruptcy procedure.

The view that increases -- even major increases -- in private foreign indebtedness should not be looked at with concern is perhaps best reflected by the following quote from a paper delivered by Walter Robischek, then Director of the IMF's Western Hemisphere Department, at a conference organized by the Chilean Central Bank (1981, p. 171):

In the case of the private sector, I would argue that the difference between domestic and foreign debt is not significant... if it exists at all....More generally, private firms can be expected to be careful in assessing the net return to be derived from borrowed funds, as compared with the net cost since their survival as enterprises is at stake.

In his 1981 Report of the Nation's Economic Conditions, Minister de Castro even argued that private indebtedness from abroad should be actively encouraged since it represented higher foreign savings. He argued (1981, p. 23) "[T]here is no doubt that the current account deficits...are highly beneficial for the country, and that we should make an effort to maintain them at the highest possible level and for the larger possible period of time."

As events showed later, the distinction between public and private debt was highly artificial, as in 1983 the Chilean government ended up nationalizing a very substantial proportion of the private non-guaranteed debt, independently of the fact that the original private borrower had gone bankrupt.

Although domestic banks greatly increased their degree of intermediation in foreign funds, they were not allowed to take the exchange risk, and all their loans financed with external funds had to be documented in foreign currency with the final borrower taking all the exchange rate risk. These regulations generated a highly segmented credit market, where only some agents had access to the "relatively cheap" credit denominated in foreign exchange. In fact, Zahler (1980) and Tybout (1985) have argued that these regulations

initially resulted in large rents that were captured by those that access to the foreign funds (i.e., the grupos).

The sudden and substantial increase in the level of capital inflows after capital controls were relaxed in June of 1979 and April of 1980 responded to two basic factors. First, as more and more market oriented policies were adopted and the economy entered into the successful years of the "boom", the perceived profitability of domestic investment -- as seen from abroad -- increased dramatically (see McKinnon 1985). This, in turn, provoked a portfolio disequilibrium in the international financial markets, where investors now wanted to hold a significantly higher fraction of Chile's capital stock as part of their portfolios. In the case of Chile this disequilibrium was quite evident since at least mid-1978, when foreign banks were very eager to increase their exposure in Chile, but could not because of the capital controls. Immediately following the liberalization, international investors tried to solve their portfolio composition disequilibrium, increasing dramatically their acquisition of domestic (i.e., Chilean) securities. As a consequence capital inflows into the country jumped in the way illustrated above. A very important characteristic of this mechanism, which is discussed in greater detail in Chapter 7, is that after the relaxation of capital inflows there will in fact be an overshooting in the level of capital inflows; immediately following the liberalization there will be a jump on capital inflows which will then slowly decline to its new equilibrium level.

The second factor that explains the increase in capital inflows is the differential between domestic interest rates and international rates adjusted by expected devaluation, that existed throughout most of the period. Unfortunately, since there are no reliable data on long-run expected rates of devaluation, it is difficult to fully assess the importance of this factor.

This data problem is particularly difficult since we need to have a good idea of the public's expected rate of devaluation for a period of five years or so into the future. The reason for this, of course, is that in order to decide whether to borrow in pesos or in dollars the domestic firm or bank will compare the total cost of obtaining a loan of the same maturity in pesos or in dollars. Since between 1979 and 1981 the minimum required maturity to freely import capital was 66 months, the expected devaluation that should be taken into account is one that relates to this period.²⁰ There is little doubt that even as early as 1980 the expectations of devaluation for the next 66 months were significantly greater than zero. Once this maturity element is introduced, it becomes clear that the ex-ante long term (i.e., 66 months) cost of foreign credit greatly exceeded the calculations based on the short term ex-post actual rate of devaluation.

Some researchers have attempted to evaluate empirically the importance of the differential between domestic and foreign rates of interest in explaining the massive increase of capital inflows starting in 1979. Surprisingly perhaps, the existing evidence suggests that for the 1979-81 period, capital inflows were not particularly sensitive to changes in interest rate differentials. Sjaastad (1983), for example, reports that between August of 1979 and December of 1980 there was a weak response of the rate of capital inflows to spread between domestic and foreign interest rates spread. Between January 1981 and March 1982 this relationship, however, basically disappeared. Also Corbo (1985a), in what is possibly the most ambitious attempt to econometrically explain the behavior of capital flows in Chile, failed to find a significant role for interest rates differentials. In an application of the Kouri and Porter (1974) model Corbo consistently found that the coefficient of the international interest rate plus rate of devaluation was negative and

highly insignificant.²¹

The Liberalization of the Capital Account and the Real Exchange Rate

The increase in the availability of foreign funds that followed the opening of the capital account became a major source, together with the backward wage indexation and the pegging of the exchange rate, of the persistent real overvaluation of the peso that took place since mid-1979. In fact, the increase in the level of capital flows into the country required a real appreciation of the peso. From an analytical perspective the reason for this is that, to the extent that a fraction of the net inflowing capital is spent on nontradable goods, an incipient excess demand for this type of goods will emerge; in order to restore equilibrium, nontradable goods' relative prices will have to increase, and a real appreciation will result.²² This was indeed the case in Chile, where a large proportion of the newly imported foreign capital was used to finance a dramatic boom in the construction sector.

In Table 3-9 quarterly data on the behavior of the effective real exchange rate -- constructed with respect to a basket of currencies -- between 1977 and 1984 are presented. An increase in this index reflects a real depreciation, whereas a decline shows a real appreciation. A salient characteristic of these data is that during the first phase of the tablita period, (i.e., until June of 1979) there was not a significant real appreciation of the peso. Only in 1979, after the tablita scheme entered its second phase and the capital account was opened did the real overvaluation accelerate. Between the second quarter of 1979 and the second quarter of 1982 the real appreciation amounted to 25%.²³

The way in which the rapid increase in capital inflows after June 1979 conspired with the exchange rate and wage rate policies to generate the real overvaluation can be easily illustrated using the inflation model of Chapter

TABLE 3-9

Index of Real Effective Exchange Rate in Chile: 1977-1984

(1978 = 100)

	<u>1st Quarter</u>	<u>2nd Quarter</u>	<u>3rd Quarter</u>	<u>4th Quarter</u>	<u>Average</u>
1977	84.4	77.0	81.4	91.7	83.6
1978	99.2	98.8	100.5	101.5	100.0
1979	101.7	96.6	91.0	86.0	93.8
1980	85.6	81.5	78.7	74.7	80.1
1981	72.8	69.1	67.3	71.5	70.2
1982	70.7	72.6	78.6	83.0	76.7
1983	89.5	81.9	77.9	80.1	82.3
1984	83.1	81.9	n.a.	n.a.	n.a.

Notes: This index has been constructed as the ratio of a weighted average of Wholesale Price Indexes (WPI) of Chile's ten major trading partners, expressed in pesos, to Chile's Consumer Price Index (CPI). For Chile the CPI as corrected by R. Cortazar and J. Marshall, "Indice de Precios al Consumidor en Chile," (Santiago: Cieplan, 1981) was used. It should be noted that alternative measures of the real exchange rate yield very similar results. For more details on the index see Edwards (1987).

2. Assume now that due to the increasing greater availability of foreign funds, real expenditure increases through time (i.e., $\hat{Z}_t > 0$). Then, the inflation equation (2.7) becomes:

$$\hat{P}_t = \left(\frac{\alpha\epsilon + \eta}{\eta + \epsilon}\right) \hat{P}_{Tt}^* + \frac{(1-\alpha)\epsilon}{\eta + \epsilon} \hat{P}_{t-1} - \left(\frac{(1-\alpha)\delta}{\eta + \epsilon}\right) \hat{Z}_t, \quad (3.2)$$

and the equation for real exchange rate dynamics becomes:

$$\hat{e}_t = \left(\frac{\epsilon(1-\alpha)}{\eta + \epsilon}\right) (\hat{P}_{Tt}^* - \hat{P}_{t-1}) + \left(\frac{(1-\alpha)\delta}{\eta + \epsilon}\right) \hat{Z}_t. \quad (3.3)$$

It is easy to see from these equations that as long as there is an increase in real expenditure, $\hat{Z}_t > 0$, the convergence of domestic to world inflation will be slower, and the degree of real overvaluation will greatly increase.²⁴ This is illustrated in Table 3-10 where the paths of \hat{P}_t and \hat{e}_t are compared for two hypothetical cases. In Case A there are no capital inflows that generate real expenditure pressures (i.e., $\hat{Z}_t = 0$), while in Case B we assume that in each period, and thanks to inflows of foreign funds, real expenditure increases by 10% (i.e., $\hat{Z}_t = 10.0$). In both cases it is assumed that the initial domestic rate of inflation is equal to 30% and that international inflation is constant and equal to 8%. The assumptions regarding the different elasticities appear at the bottom of the table. The results obtained from this exercise are very revealing. First, they show that in the presence of capital inflows domestic inflation moves significantly slower towards international inflation than in the case of no capital inflows. Second, and more important, under capital inflows (Case B) the degree of real overvaluation of the exchange rate can become very significant. In our hypothetical case with capital inflows, illustrated in Table 3-10, after 3 years the accumulated real overvaluation exceeds twenty percent.

In order to better assess empirically the extent of this relationship between capital inflows and the real exchange rate, a regression analysis was

TABLE 3-10

The Effect of Capital Inflows on Inflation and the Real Exchange Rate

(An Example)

Year	Case A:		Case B:	
	<u>No Capital Inflows</u>		<u>Positive Capital Inflows</u>	
	\hat{P}_t	\hat{e}_t	\hat{P}_t	\hat{e}_t
0	30.0%	-	30.0	-
1	12.6%	-4.6%	16.1%	-11.2%
2	9.0%	-1.0%	13.2%	-6.3%
3	8.2%	-0.2%	12.6%	-5.3%

Notes: A negative value of \hat{e} means real appreciation. Case (A) assumes $\hat{Z}_1 = \hat{Z}_2 = \hat{Z}_3 = 0$. Case B, on the other hand, assumes $\hat{Z}_1 = \hat{Z}_2 = \hat{Z}_3 = 10\%$. Both cases assume $\alpha = 0.5$, $\eta = -1.0$, $\delta = 1.2$, $\epsilon = -0.7$, $\hat{P}_{Tt}^* = 8\%$. The simulations use equations (3.2) and (3.3)

performed. Reduced form regressions using quarterly data for the period comprised between the first quarter of 1977 and the fourth quarter of 1982 were run. In addition to the (lagged) rate of net capital flows, other possible determinants of the real exchange rate like the terms of trade and real growth were also included in the regressions. (Of course, by using lagged values of net capital inflows we avoid any simultaneity problem that could arise because of the endogeneity of this variable.) The following results were obtained where REER is the indexing of the real effective exchange rate and the numbers in parentheses are t-statistics:²⁵

$$\begin{aligned} \log \text{REER}_t = & 0.014 - 0.078 \log[\text{net capital flows}]_{t-1} + 0.798 \log \text{REER}_{t-1} \\ & (3.458) \quad (-3.801) \qquad\qquad\qquad (10.376) \\ & R^2 = 0.897 \\ & \text{D.W.} = 1.887 \qquad\qquad\qquad (3.4) \end{aligned}$$

$$\begin{aligned} \log \text{REER}_t = & 0.016 - 0.076 \log[\text{net capital flows}]_{t-1} \\ & (3.973) \quad (-3.521) \\ & -0.218 \log[\text{terms of trade}]_{t-1} + 0.271 [\text{growth}]_{t-1} \\ & (-1.935) \qquad\qquad\qquad (1.250) \\ & + 0.005 [\text{devaluation dummy}]_t + 0.964 \log \text{RER}_{t-1} \qquad\qquad\qquad (3.5) \\ & (0.194) \qquad\qquad\qquad (7.889) \\ & R^2 = 0.946 \\ & \text{D.W.} = 1.753 \end{aligned}$$

As may be seen, under both specifications, the coefficient of the lagged value of net capital inflows is significantly negative as expected. However, the value of the coefficient is not very large, suggesting that it would take a significant change in the rate of capital flows -- as in Chile -- to generate a large variation in the real exchange rate. It can also be seen from the results reported in equation (3.5) that the coefficient of the terms of trade variable is negative as expected. The coefficient for real growth, however, turned out to be positive and insignificant, suggesting that the Ricardo-

Balassa effect did not play an important role in determining the behavior of the real exchange rate in Chile during this period. Finally the coefficient of the lagged dependent variable was fairly high under both specifications, indicating that after a shock the real exchange rate moved only slowly towards its new equilibrium. This is, in some sense, not surprising given that these regressions were run using quarterly data. In sum, the results presented here provide support to the hypothesis that the real exchange rate has been negatively affected by the rate of capital inflows in Chile.

3.4 The Miracle Turns Sour: The Financial Crisis of 1981-1982

In late 1981 the "bubble" originated with the euphoria of the "boom" years burst and a major financial crisis erupted. Already in late 1980 and early 1981 fairly large segments of the population began to question whether the pace at which the economy, and in particular expenditure, had been growing was sustainable. The crisis atmosphere greatly increased in mid-1981 when a medium size conglomerate, the CRAV grupo, couldn't pay its debts and went bankrupt. In spite of the optimistic government propaganda the public now seriously began questioning the strength of the financial sector. Undoubtedly, the failure of the CRAV grupo represented the turning point which marked the end of the euphoria.

In mid-1981, as interest rates continued climbing, asset prices began to fall and some non-grupo firms went bankrupt as they couldn't any longer face foreign competition or pay the interest bill. The bankruptcies problem reached crisis proportion in 1982 when 810 failed, more than double the average of the previous 5 years.²⁶ The government, in the meantime, argued that there was no reason to worry, since the high interest rates were the reflection that the "automatic adjustment" process was operating as predicted. Moreover, Minister de Castro forcefully pointed out that given the

circumstances bankruptcies were very healthy for the Chilean economy, since they would facilitate the process of adjustment. In his own words (1981, p. 23): "[I]t is important not to forget that bankruptcies are the appropriate channel through which an economy gets rid of inefficient investments. If the government interferes in this process...the period of inefficiencies is lengthened...."

As the financial situation of most firms became dangerously weak, and asset prices plummeted, bankers and grupo officials refused to realize their capital losses and began lobbying for a government solution. The government refused to intervene, citing, once again, the advantages of the "automatic adjustment". In an attempt to bring interest rates down grupo executives began desperately shuttling between Santiago and New York trying to obtain additional foreign funds. In the second half of 1981 international banks, taking an attitude which still puzzles most observers, agreed to pour vast amounts of resources into the sinking Chilean economy; in the second half of that year capital inflows from abroad reached a record height.

In 1982 the situation changed drastically as foreign banks suddenly decided that Chile was not a good risk any more. In the first half of that year net capital flows fell by almost 65%. Commercial banks were hit particularly hard, with their total importation of Article 14 loans dropping by 75% in that year. Of course, this decline in the level of capital inflows meant that total expenditure had to fall. Now, in order to maintain equilibrium, a real depreciation was required. The mechanism operating in this case is fully symmetric to the real appreciation effect of the increase in capital inflows discussed above. A serious problem at this point, however, was that the wage indexation scheme made the adjustment in relative prices (i.e., the real depreciation) particularly difficult. As a way to get over this problem, some

observers started calling for an abandonment of the fixed exchange rate policy.

It seemed however, that regarding the exchange rate policy, the grupos were in a non-win situation. On one hand, the real overvaluation of the peso was greatly hurting the profitability of their firms which were largely oriented towards the export sector. In order to improve this profitability a necessary -- but certainly not sufficient -- condition was to engineer a real devaluation through the abandonment of the fixed rate policy. On the other hand, the grupos had incurred an extremely high foreign debt, and a devaluation -- especially a large one -- would have resulted in a significant increase in the peso value of that debt, and in some cases would have meant insolvency. The two largest grupos decided to face this situation in opposite ways. One (the Cruzat grupo) tried to substitute foreign for domestic liabilities and lobbied extensively for a devaluation; another (the Vial grupo) gambled on the maintenance of the fixed rate, and lobbied for an adjustment through a government imposed reduction in nominal wages.

The June 1982 devaluation came too late and did not provide any help to the struggling banks and firms. On the contrary, many debtors could not service their debts at the new exchange rate. As a result, and in opposition to the government's previous announced policy of not favoring particular groups through economic legislation, a preferential lower exchange rate was established for those debtors with foreign liabilities. Interest rates continued to be high, in spite of some efforts made by the government, including the relaxation of the prohibition for short term capital inflows. Banks continued to accumulate bad loans and the financial structure of the major grupos steadily worsened. A major collapse of the financial system was only avoided by the continuous massive injection of funds to banks by the Central Bank.

In January of 1983 the government stepped up its degree of intervention and liquidated two banks, and nationalized others. The two major grupos were also intervened with the officials of one of them including a former Minister of Finance, being charged with alleged fraud. At that time it was discovered, to the astonishment of some, that the proportion of loans banks had made to grupo-owned firms is extraordinary. For example almost 50% of the largest private bank (the Banco de Chile) loans had been granted to firms owned by that particular grupo. Perhaps the most controversial measure taken at this time was the nationalization of the liquidated banks foreign debt, which had been obtained without government guarantee. Responding to pressures by the international banks the Chilean government decided to take over this debt guaranteeing now its payment.

Paradoxically, at the end of 1983, the financial sector was in some way, at the same juncture as ten years before. It had been nationalized and was tightly controlled by the state. Moreover, General Pinochet had managed to accomplish nationalizing the Banco de Chile, something Allende was not able to do during his government.

Footnotes to Chapter 3

¹On financial repression see, for example, the classical book by McKinnon (1971). By 1973 the degree of monetization of the Chilean economy was very low by international standards.

²Initially the government tried to implement regulations to avoid excessive concentration of bank ownership. The private sector rapidly evaded these rules by setting innumerable interconnected holding companies, with each of them owning a small fraction of the bank's equity (see Arellano 1985). The role and behavior of these grupos is analyzed in more detail in Chapter 4.

³See Harberger (1982), Barandiaran et al. (1982), Edwards (1985) and Arellano (1985).

⁴The appreciation of asset prices plays a crucial role in Barandiaran's (1983) perceptive analysis of Chile's financial crisis.

⁵Harberger (1985) in his interpretation of the Chilean experiment points out that the failure of Banco Osorno was one of the most important negative events in the period.

⁶See Harberger (1985), Corbo (1985), Dornbosch (1985) and Edwards (1985, 1986).

⁷These figures refer to loans received by the banking sector; see Boletín Mensual del Banco Central de Chile. See Edwards (1984) for an empirical analysis of the determinants of the spread over LIBOR for a group of developing countries in the period 1976-80. Of course, since by no means domestic and foreign securities were perfect substitutes, there is no reason to expect strict equality between both rates.

⁸Arellano (1985) also makes this point.

⁹An interesting debate that took place in Chile in 1977 is whether it was a mistake having privatized the banks before privatizing the manufacturing firms. See, for example, the interview to Minister Sergio de Castro in Que Pasa 312 (14 April, 1977).

¹⁰In Chile the writing-off of bad loans would have resulted in a reduction of the stock of credit equal to approximately 40 times the value of the bad loans.

¹¹Sjaastad and Cortez (1978) have argued that during the early period the high rates could be partially explained by the financial costs resulting from the existence of high reserve requirements under conditions of very high inflation. This, however, is the only possible explanation for the early period since subsequently reserves requirements were drastically reduced to a final level of 10%, whereas interest rates remained, by and large, quite high.

¹²This figure, which was computed from data provided by the Superintendencia de Bancos, refers only to loans each grupo received from its own banks. There was, of course, a significant amount of cross loans, where banks controlled by grupo A lend money to firms owned by grupo B. It is not possible to quantify the importance of those loans.

¹³Barandiaran (1983) was perhaps the first to point out that Chile was following the pattern of a somewhat typical financial crisis as described by Kindleberger. The role of increased perceived wealth in the explanation of the low level of savings and of the high interest rates has also been emphasized by Harberger (1983), Edwards (1985a,b) and Arellano (1985).

¹⁴This equation is derived from combining a closed economy expression for interest rate determination with an open economy equation. In this model the degree of financial openness of the economy is not imposed exogenously, but can be obtained from the actual data. In the current case it is the nominal

borrowing rate; i^* is LIBOR; D^e is a proxy for the expected rate of devaluation constructed as the tablita rate between January 1978 and June 1979 and as the degree of accumulated real overvaluation after June 1979. y is quarterly GNP as constructed by the Universidad de Chile; m is the M1 definition of money, and π is the actual rate of inflation, which under rational expectations is the appropriate proxy for the expected rate of devaluation. See Edwards and Khan (1985) and Edwards (1985c) for discussions on the model, and Edwards (1986a) for a description of the data.

¹⁵Hansen and de Melo (1985) reached a similar conclusion in their analysis of the case of Uruguay.

¹⁶Of course, to the extent that the public expected a real devaluation the ex-ante real interest rate also increased.

¹⁷The average maturity for Article 14 loans was 54 months in 1979, 64 months in 1980 and 60 months in 1981.

¹⁸An exception, of course, was trade financing. In 1982, and as a way to speed up the "automatic adjustment" process the maturity restriction was lifted. At the time, however, the international financial community had very little interest in lending to Chile.

¹⁹For a more detailed discussion of the mechanisms of this overshooting see Edwards (1985, 1986b). See also Chapter 7 of this book.

²⁰Rigorously, a risk neutral firm or bank, in order to decide whether to borrow in pesos or in dollars will compare $(1+i_k)$ with $(1+i_k^*)E(S_k)/S$; where i_k is the interest rate charged on a peso denominated loan that matures in k periods from now (that is a loan of maturity k); i_k^* is the interest rate on a dollar denominated loan also of maturity k ; S is the nominal exchange rate -- measured as pesos per dollar -- in the current period; and $E(S_k)$ is the value of the exchange rate that is expected to prevail

k periods from now. If $(1+i_k)$ exceeds $(1+i_k^*) E(S_k)/S$, then the firm will prefer to borrow in dollars. While it is true that in late 1979 people expected the exchange rate to remain fixed for a short period, there is no doubt that the expectations of devaluation during the relevant 66 month period were significantly greater than zero. See LeFort (1984).

²¹In Corbo's (1985) regressions the t -statistics for this coefficient was never greater (in absolute value) than 0.7. Our own attempts to explain econometrically the behavior of the net rate of capital flows in Chile during 1977-81 did not produce significant results. The regressions indicate that the rate of capital was not sensible during the period to uncovered interest rate differentials.

²²This follows from the traditional "transfer problem" in international economics. See Dornbusch (1985), Harberger (1982), and Edwards (1984, 1985b). Condon, Corbo and de Melo (1983) use a simulation model to conclude that capital inflows (treated like transfers) played an important role in the process of real exchange rate appreciation. See also Obstfeld (1986).

²³The fact that the real exchange rate did not experience a (significant) real appreciation during the first 18 months of the tablita is very robust to the methodology used to calculate the real exchange rate. For example, using 6 alternative proxies for the real exchange rate (or relative price of tradable to nontradable goods) Corbo (1982) found that between the fourth quarter of 1977 and the second quarter of 1979 there had been no significant change in this variable. Moreover, whereas according to 3 of these indexes there had been a real depreciation of approximately 4 percent during this period, the other 3 indexes indicated a real appreciation of 2 percent. Also, according to an elaborate index computed by CIEPLAN, between 1977 and 1979 Chile did not experience an important real appreciation.

²⁴Of course, if \hat{z}_t is sufficiently high, convergence of \hat{p} to \hat{p}_T^* can even fail.

²⁵D.W. is the Durbin-Watson statistic; R^2 is the coefficient of determination. These regressions were run correcting for the existence of first order autocorrelation. Note that since lagged right-hand side variables are used, no simultaneity problems arise from the estimation reported here. The devaluation dummy in equation (3.5) takes a value of one in June of 1979 and March of 1982, and zero otherwise. On the relationship between real exchange rates and its real determinants see Edwards (1987).

²⁶The number of bankruptcies per year were the following: 1975, --- firms; 1976 --- firms; 1977 --- firms; 1978 --- firms; 1979 --- firms; 1980 --- firms; 1981 --- firms. These data were obtained from the Sindicatura Nacional de Quiebras.

Appendix to Chapter 3

A Model for Analyzing Real Interest Rate Behavior in a Semi-Open Economy

The purpose of this Appendix is to present a simple model of interest rate determination in a small semi-open economy. The model is developed with the Chilean case in mind. It is assumed that in this economy that there are no trade restrictions, but that there are some restrictions to international capital movements. In particular, it is assumed that, as in the case of Chile until 1982, long-run capital movements are allowed, while short-run capital flows are forbidden. It is in this sense that the model focuses on a semi-open economy. The model has three main building blocks:

(a) Determination of the Short-Run Real Interest Rate:

It is assumed that the short-run real interest rate clears the credit market. The demand for credit has the usual characteristics. The supply of credit, however, is composed of two sources: domestic credit and foreign credit. It is assumed that since net international capital flows (increases in international credit) are only allowed for long-run maturities, they will depend on the long-run interest differential adjusted by expectations of devaluation in a country risk premium. Given their different characteristics it is assumed that domestic and foreign credit are not perfect substitutes.

(b) Long-Term Interest Rate Differentials:

It is assumed that due to institutional restrictions only long-term capital movements are allowed. As mentioned, these flows depend on, among other variables, an adjusted long-term interest rate differential, where the adjustment is due to long-term expectations of devaluation, a country risk premium and transaction costs. If the long-term domestic

interest rate exceeds the long-term foreign rate, plus expectations of devaluation, plus the country risk premium, plus a risk premium, a positive (net) capital flow will occur, having a positive effect on the total supply of credit. The domestic long-term interest rate is related to the domestic short-term interest rate through the term structure of interest rates. The existence of these risk premia reflect the non-perfect substitutability assumption. It is also assumed that there is a maximum ratio of foreign debt to GNP, after which a foreign borrowing "ceiling" is reached. This "ceiling" is an endogenous variable.

(c) Term Structure of Interest Rate:

The long-term interest rate depends on the present short-term rate, the expected future short-term rates, and on a liquidity premium. Then, an increase in the short-term rate (with future expected short-term rates constant) will generate an increase in the long-term rate, producing a positive long-term interest rate differential. This, in turn, will induce a capital inflow from abroad.

A.1 Notation

r :	Short-term real interest rate
C^d :	Real quantity of credit demanded
C^s :	Real quantity of credit supplied
π^e :	Expected inflation
y^p :	Real permanent income
y :	Real income
F :	Real foreign capital inflows
d :	"Adjusted" interest rate differential
i :	Short-term nominal interest rate
π^* :	Foreign inflation

- δ : Discount factor
- $E_t()$ = Expectation formed on all available information
- D^e : Long-term expectations of devaluation. This expectation refers to the minimum maturities at which capital can be imported.
- i_L : Long-term nominal interest rate
- R^e : Country risk premium
- T: Transaction costs
- CA: Current account
- I: Ratio of investment to GNP
- i_L^* : Foreign long-term interest rate
- k: Increase in domestic credit
- S: Exchange rate
- IR: Stock of international reserves
- P: Risk premium

A.2 The Model

In this section the model is presented. The way the model works is illustrated using a diagrammatical analysis. The model is given by equations (A.1) through (A.10), where the signs in parentheses are the assumed signs of the respective partial derivatives:

Demand for real credit:

$$C_t^d = f(r_t, y_t^p, \pi^e, r_{t+1}^e) \quad (\text{A.1})$$

(-)

Real supply of credit:

$$C_t^S = C_{t-1} + F_t + k_t \quad (\text{A.2})$$

Net foreign capital flows:

$$F_t = F(d_{t-1}, \dots) \quad (\text{A.3})$$

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Short-term nominal rate:

$$i_t = r_t + \pi_t^e \quad (\text{A.4})$$

Expected inflation:

$$\pi^e = E_t(\pi_{t+k}) \quad (\text{A.5})$$

Long-term nominal interest rate:

$$i_L = i_t + \sum_{j=1}^{\infty} \gamma^j i_{t+j}^e \quad (\text{A.6})$$

Adjusted long-term interest rate differential:

$$d_t = i_L - [i_L^* + D^e + R^e + T + P_t] \quad (\text{A.7})$$

Foreign debt:

$$L_t = \sum_{i=0}^t F_i (1+\delta)^{t-1} \quad (\text{A.8})$$

Expectations of Devaluation:

$$D_t^e = f(L_t/y_t, (\pi^e - \pi^{*e}), CA_t, I_t^e, \dots) \quad (\text{A.9})$$

(+) (+) (+) (-)

Country Risk Premium:

$$R^e = g(L_t/Y_t, CA, I_t, IR_t, \dots) \quad (\text{A.10})$$

(+) (+) (-) (-)

The short-term real interest rate (r) is determined by the credit market clearing conditions [equation (A.1) equals equation (a.2)]. In order to simplify the diagrammatic exposition we have assumed that the supply for credit does not depend on the real interest rate. However, relaxing this assumption does not affect in any substantial way the discussion presented here. For a given π^e , equation (A.4) determines the short-term nominal interest rate i_t . Given i_t and the expected future short-run nominal rates, equation (A.6) determines the long-term domestic nominal rate i_L .

According to equation (A.7) this long-term rate i_L , together with i_L^* , D^e , R^e , P and T , determine the adjusted long-term interest rate differential which, under full equilibrium, is assumed to be zero.

The initial equilibrium in this model is summarized in Diagram A.1. In quadrant I the demand and supply of credit determine the short-term real rate r . For a given inflationary expectation π^e , the nominal rate i is determined in quadrant II. Schedule DD in quadrant III relates to short-term nominal interest rate (i) with the adjusted interest rate differential d , for given values of i_L^* , i_{t+j}^e , D^e , R^e , P and T . The slope of this schedule indicates that a higher i will result, with given i_L^* , i_{t+j}^e , D^e , R^e and T , in a larger interest rate differential. On the other hand, higher values of i_L^* , D^e or R^e will result in a downward shift of the DD schedule.

Finally, in quadrant IV schedule FF relates the interest rate differential d and the supply of credit for given values of C_{t-1} and k . The slope of this schedule indicates that, for given k , a higher interest rate differential will result in a higher supply of real credit. The reason for this is that a higher d will induce a larger foreign capital inflow.

A.3 The Functioning of the Model

This section illustrates how this model works. Two cases are investigated: (A) an increase in the demand for real credit stemming from increased consumption due to higher perceived real wealth; and (B) an increase in expected devaluation. In order to maintain the analysis at a simple level these disturbances are analyzed one at a time, as if they were the only shock to the economy.

Case A: Increase in the Demand for Credit

Assume that in period t there is an exogenous increase in the demand for real credit, and that in that period the supply of domestic credit remains

Figure A.1

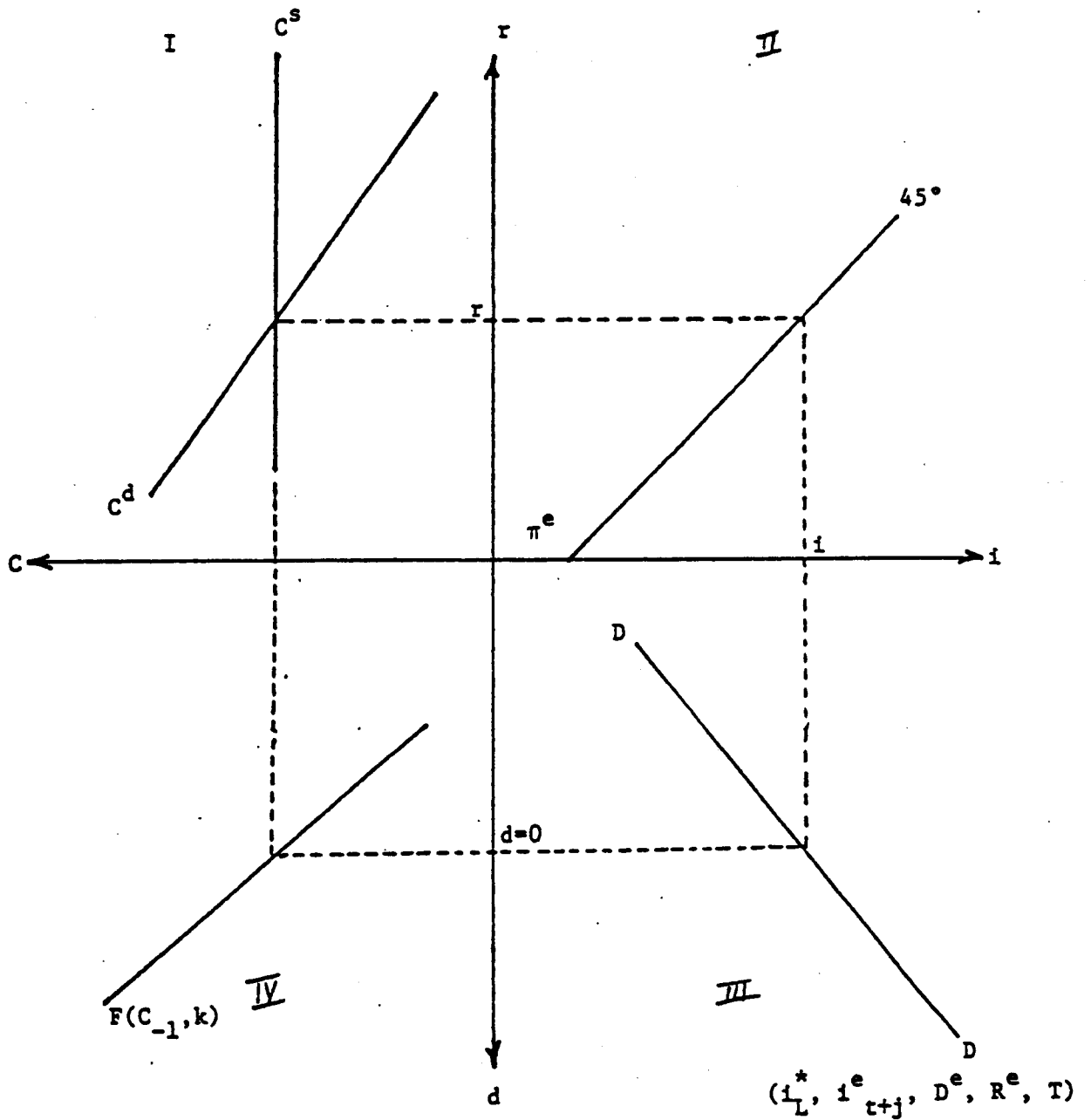


Figure 1

constant (i.e., $k = 0$). This case can be illustrated using diagram A.2: the demand for credit schedule shifts up to C_1^d , generating an initial increase in the short-term real rate to r_1 in quadrant I. If inflationary expectations remain constant, the short-term nominal interest rate rises to i_1 in quadrant II.

This increase in i generates, for given i_L^*, i_{t+j}^e , D^e and R , a positive long-term interest differential $d_1 > 0$, which will induce an inflow of capital, which will increase the liquidity in the economy. However, since the capital inflows will result in a higher level of foreign debt, the country risk premium and maybe the expectations of devaluation will increase, generating a shift in the DD curve in quadrant III to D_1D_1 . In this case the new equilibrium long-term interest rate differential will be associated with a smaller inflow of foreign capital, and the new short-term real interest rate will be higher. This indeed seems to have been the case in Chile towards the second part of 1981.

Case B: An Increase in the Expectations of Devaluation

Assume now that the expectations of devaluation D^e increase. This will generate, through equation (A.7), an initial negative long-term interest rate differential, which will be reflected by a downward shift of schedule DD in Figure A.3 to D_1D_1 . As a consequence of this reduction in d , the net capital inflow from abroad will decline, generating a decrease in the supply of real credit to C_1 in Figure A.3. This, in turn, will result in a higher r , and for a given π_1^e in a higher short-term nominal interest rate i_1 . In the second run of effects, this higher i induces through a positive d , additional capital inflows, which increase liquidity but not enough as to re-establish old r . New equilibrium real rate will be r_2 . Notice that this analysis will hold only if the expectation of devaluation is not associated

Figure A.2

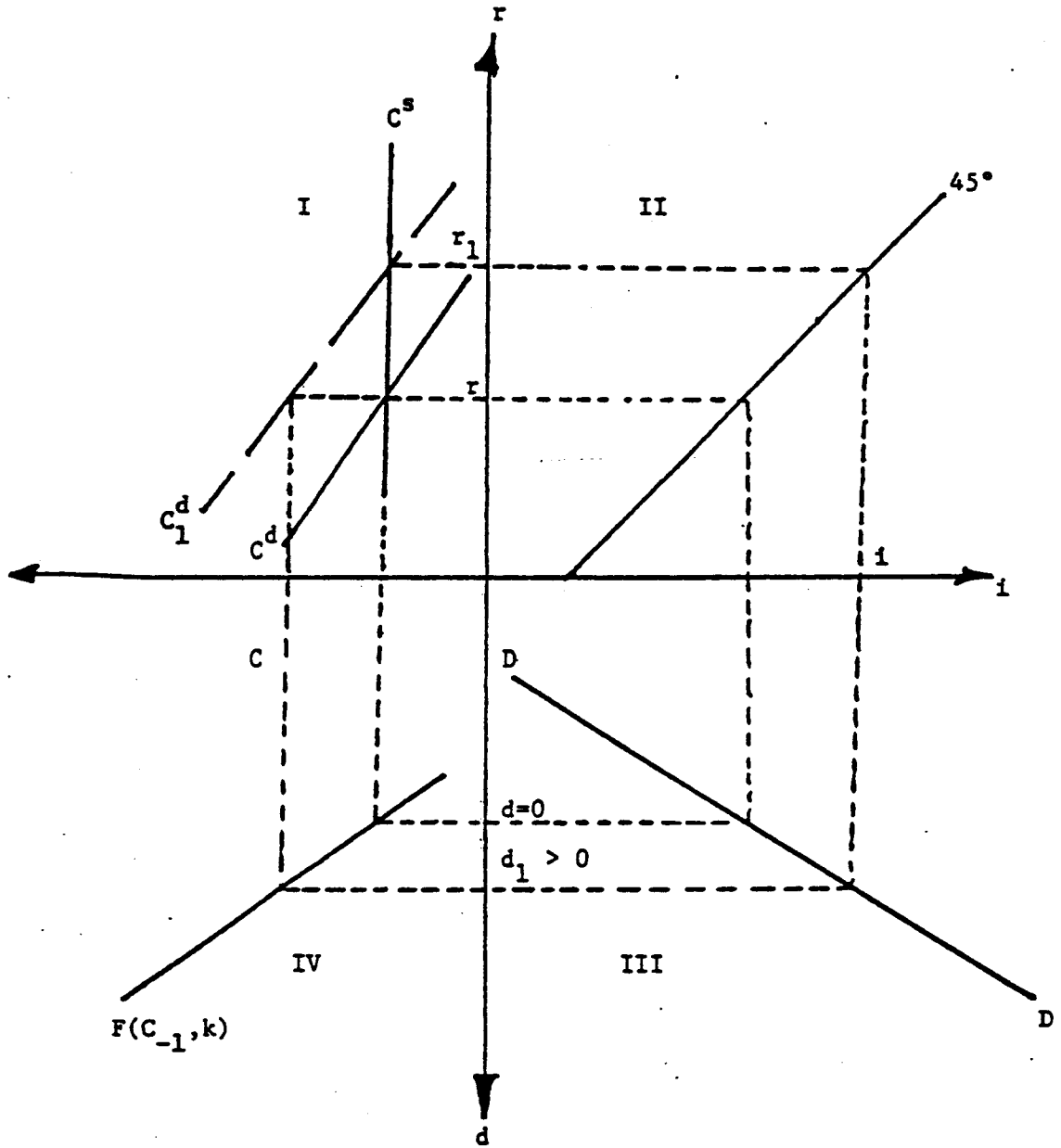


Figure 2

Figure A.3

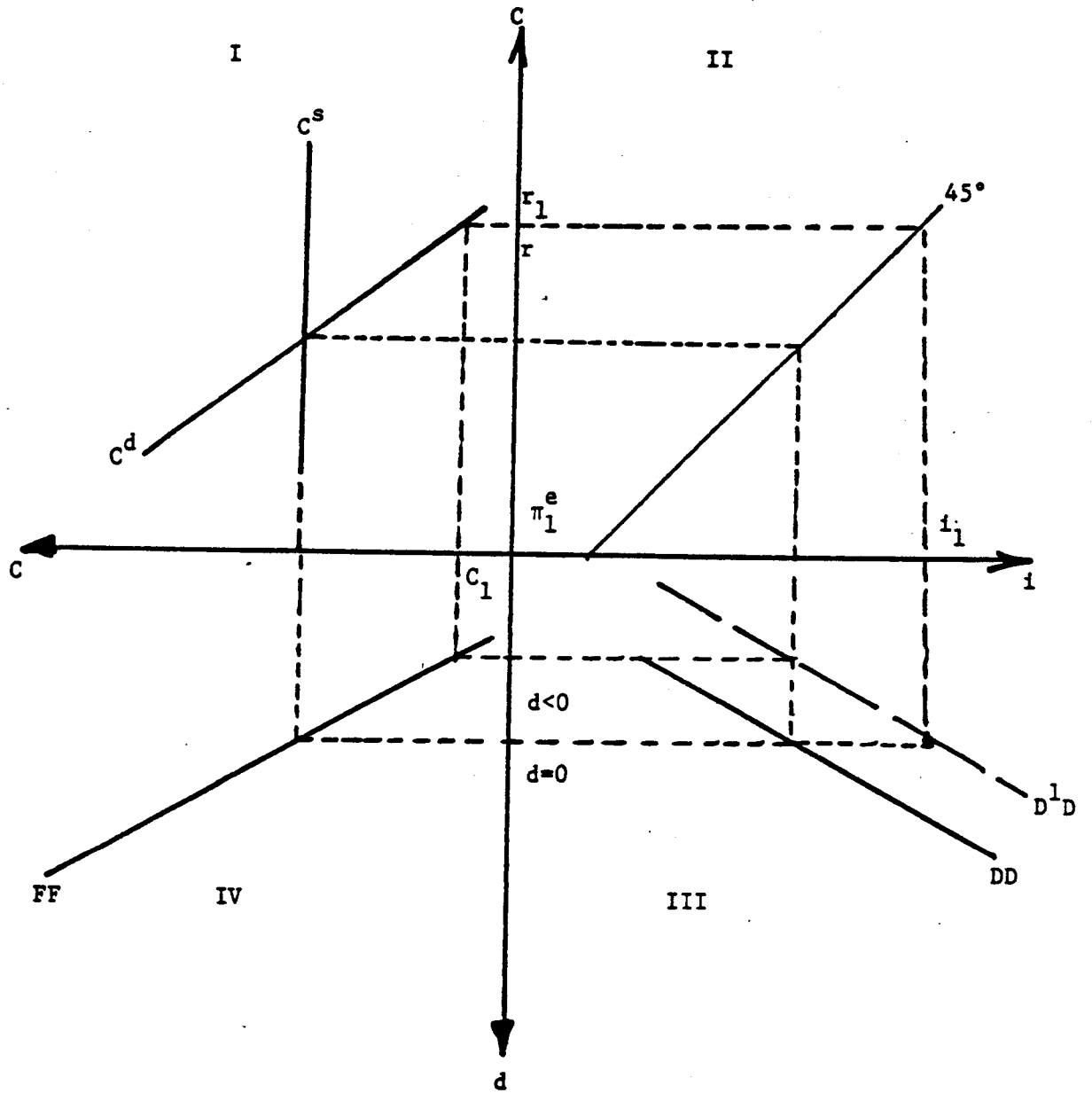


Figure 3

with higher expected inflation. If, however, a higher D^e is related to a higher π^e the final result will depend on the relative magnitudes of these two effects.

It is important to note that increases in i_L^* , or R , and decreases in i_{t+j}^e , will have the same effects on the real short-run interest rate as higher devaluation expectations.

Despite its simplicity, this model is able to capture the main characteristics of the Chilean experience during 1979-83. For example, according to the model, the combination of (a) an increase in the demand for real credit; (b) higher expectations of devaluations; (c) higher-risk premium assigned to the country by the international financial community; (d) a reduction in the expectations of domestic inflation; and (e) a higher world interest rate, will result in a large increase in the equilibrium domestic short-term real interest rate.