Nº 158
Agosto 1993

Documento de Trabajo
ISSN (edición impresa) **0716-7334**
ISSN (edición electrónica) **0717-7593**

Lessons from the Chilean Stabilization and Recovery.

Vittorio Corbo
Stanley Fischer

www.economia.puc.cl

ISSN:0716-7334

PONTIFICIA UNIVERSIDAD CATOLICA DE CHILE
INSTITUTO DE ECONOMIA
Oficina de Publicaciones
Casilla 274 - V, Correo 21, Santiago

LESSONS FROM THE CHILEAN STABILIZATION AND RECOVERY

Vittorio Corbo and Stanley Fischer*

Documento de Trabajo Nº 158

Agosto, 1993

Paper prepared for the Brookings Institution Volume on "The Chilean Economy: Policy Lessons and Challenges".

* Professors of Economics at Catholic University of Chile and MIT respectively. We thank J. Cauas, J.A. Fontaine, A.O. Krueger and P. Meller for their comments and M. Alier, and J. Davidovich for very efficient research assistance.

INDICE

1. Introduction

The purpose of this paper is to evaluate Chile's stabilization experience in the last twenty years. During this period Chile had to struggle with the stabilization of very high inflation in 1973, with persistent but declining double digit inflation between 1976 and 1982, and then with continued moderate inflation in the decade after 1982 (see Figure 1). Stabilization also had an external dimension, the reduction of high current account deficits. The restoration of the external balance to managable levels was a major goal of policy at the beginning of the military government in 1973, following the sharp drop in the terms of trade in early 1975, and again following the external debt crisis of 1982-1983.

Seven issues of particular interest need to be studied to understand the recent Chilean stabilization experience. First, why did inflation explode after price controls were lifted in the last quarter of 1973? The issues here are twofold: the extent of the money overhang and alternative ways to deal with it; and the choice between shock treatment and a gradual stabilization program. Given the political will to carry out a sharp reduction in the public sector deficit, the choice should depend on the government's capacity to coordinate the evolution of the key nominal prices. A second and related issue is the extent to which there was a monetary crunch and therefore shock treatment rather than a gradual approach to stabilization in the 1974-1976 period. The third question is what were the sources of Chile's inflationary inertia. Two possible sources need to be analyzed: slowly adjusting inflation expectations; and inertia resulting from exchange rate and wage adjustment behavior.

Fourth, we address the reasons for the failure of the exchange rate based stabilization program of 1978-1982.

Here it is important to investigate the role of exchange rate policy in the stabilization effort as well as in the crisis of 1982. A fifth issue -- one that is surely of the widest interest -- is how Chile was able to pull out of the 1982-1983 crisis and then initiate a phase of export-led growth. A key factor in the turnaround was the real devaluation that provided a radical change in price incentives in favor of tradable activities. The question here is how Chile was able to achieve a 113.1% real devaluation between 1981 and 1990 while maintaining a moderate rate of inflation.

In 1990 a coalition of parties from the center and the left came to power. As the economic team of the new government included many critics of the previous government's economic policies, there was naturally some uncertainty about the policies of the new government. In particular, there was concern that the new government would implement populist policies. To maintain the macroeconomic achievements of the previous government, the new government had to convince the private sector that these were its intentions. In addition, the Central Bank that had just become independent in December 1989, wanted to demonstrate its independence in practice. Accordingly, the new government in its first year implemented a stabilization program aimed at reducing the accelerating rate of inflation it had inherited. Restrictive monetary policy was the main instrument utilized. The sixth issue that has to be studied is if this was the correct way to reduce inflation in early 1990.

In recent years, several countries that have reduced inflation to the 10 to 15 percent per annum range, have been attempting to reduce their inflation further, to single digit and even international levels. In the last two years, Chile has announced and pursued a goal of gradually reducing inflation towards international levels. The issues and problems associated with the pursuit of this objective are different from the reduction of three-digit annual inflation. We therefore analyse this problem in a separate section.

The rest of the paper is divided into six main sections. Section 2 presents a short review of the economic situation at the beginning of the military government. In Section 3 we review economic performance during the Pinochet government. Section 4 describes the main stabilization episodes. In Section 5 we take up the stabilization issues described in this introduction. The question of how to reduce inflation from the current moderate range is addressed in Section 6. The main conclusions are presented in Section 7.

2. The Economic Situation at the Beginning of the Military Government

As a consequence of the trade and industrial policies of the preceding 40 years, by the end of 1973 the Chilean economy was practically isolated from the world economy[1]. The average nominal import tariff was 105%, with tariffs ranging from nil for some inputs and "essential" consumer goods to 750% for goods considered as luxuries. There were also many non-tariff barriers, including the requirement for a 90-day non-interest bearing deposit amounting to 10 times the import value, import and export quotas, prior approval for all types of imports, and so on. Not surprisingly, the few imports that resulted were concentrated on intermediate goods, followed by capital goods, and a few "essential" consumer goods. Exports consisted mostly of copper, making export earnings almost entirely dependent on copper prices.

During the Allende administration (November 1970-September 1973), international trade was taken over almost entirely by the government. By 1973, there were six widely different exchange rates, with the ratio between the highest and the

[1]For economic policies in Chile up to 1973 see Universidad de Chile (1963), Corbo (1974), and Ffrench Davis (1973) For economic policies during the Allende regime see Cauas and Corbo (1972), Bitar (1986) and Larraín and Meller (1991).

lowest being 52 to 1. As a direct result of the system of protection, export activities were heavily taxed. Private capital inflows were almost nonexistent.

During the socialist administration of Allende, the government also directly or indirectly took control of a substantial part of productive activities. The agrarian reform, initiated in the Alessandri administration (1958-1964) and intensified during the Frei administration (1964-1970), was drastically accelerated during the Allende government, with the final result being the dismemberment of practically all large estates. The banking system was nationalized[2].

In other sectors of the economy private businesses were taken over by workers' councils, or alternatively company shares were bought by the government to extend what was then called the area of social property. Multinationals were expropriated, in some cases, as with copper enterprises, without compensation. This brought the government into conflict with various foreign governments, especially with the US.

On the macroeconomic front, the Allende government pursued populist policies. In 1971, current government spending grew by 12.4 per cent in real terms, and the fiscal deficit reached 10.7 per cent of GDP. Fueled by this aggressive demand expansion, GDP grew 9 per cent in real terms in 1971 (Table 1). In the same year, the money supply grew by 66 per cent in real terms -- a result of the large growth in high powered money to finance the rising public sector deficit, and the inertia of prices.

Measured inflation in 1971 was relatively low, but price controls and commodity and factor market rationing became widespread. During the following two

[2]As the government could not pass the required expropriation law to take over the property of the banks from the previous shareholders, it offered attractive prices to buy the shares in the open market. This process took place mostly in 1971. By 1972 almost all the banking system was in public hands.

years, the government continued its expansionary policies and price controls were intensified. Consequently, the fiscal deficit rose from 2.7 per cent of GDP in 1970 to almost 25 per cent of GDP in 1973. As this deficit was financed mostly by borrowing from the central bank and imports were controlled, pressures on domestic prices rose. The government tried to contain inflation by means of still tighter price controls, which resulted in active black markets where consumer goods were available at prices many times the official price. At the same time, enterprises faced a chronic shortage of basic inputs at official prices. As a result, black markets also emerged for inputs.

The Allende government's expansionary policies resulted in a progressive deterioration of the current account deficit, which reached 3.9 percent of GDP in 1972 (see Table 1). The large foreign reserves inherited from the Frei administration were used to finance the current account deficits of 1971 and 1972, and by August 1973 the reserves were exhausted. Since the populist policies pursued at the time made it difficult to obtain foreign financing, the stage was set for a major balance of payments crisis.

The government that took power in September 1973 inherited an economy closed to international trade, dominated by the public sector, and with severe macroeconomic imbalances in the form of accelerating inflation and a massive current account deficit. Relative prices were severely distorted and the production and distribution of goods were determined mainly by bureaucratic rules. The labor market was dominated by a few organizations which were fighting for political rather than workers' objectives. The country had practically no foreign exchange reserves and the nonfinancial public sector had a deficit of close to 25% of GDP (Table 1).

3. Macroeconomic Developments in the Last Twenty Years: An Overview[3]

[3]For economic policies and performance during this period see Corbo (1985a), Edwards and Edwards (1987), Harberger (1985), Fontaine (1989), Meller (1990 and 1992), and Rosende (1987).

The Chilean economy grew modestly in the year after the coup, but then experienced a deep recession in 1975. Thereafter the economy recovered and grew rapidly until 1981 when a new crisis developed. After a costly adjustment effort, growth resumed again in 1984. The average growth rate between 1984 and 1992 was 6.9%, with 1992 growth at 10.4%. (Figure 2).

Inflation was at three-digit annual levels up to 1976, averaging 296% for the period 1974-1976. From 1977 to 1980 the average annual inflation rate was 46.5% (Figure 1). Inflation temporarily reached 9.5% in 1981, and then hovered around 20% per year for the period 1982-1992 (Figure 1). The lowest levels of inflation during these years were reached in both 1988 and 1992 (see Table 1).

The new government undertook a massive fiscal adjustment in 1974, cutting subsidies and introducing a value added tax. The fiscal deficit declined from nearly 25% of GDP in 1973 to only 3% in 1974. Despite this massive adjustment, the economy grew, mainly because of the removal of widespread controls and the rebound from the virtual collapse of production at the end of the Allende regime.

The recession of 1975 had three major causes. The first was the large drop in the terms of trade, with copper prices falling by about 45 per cent in real terms (Table 1), and the price of oil rising by a factor of three. The cumulative effect was a close to 40% drop in the terms of trade. A second factor was the severe adjustment program (over and above that of 1974), in the form of restrictive fiscal and monetary policy, which was introduced in April 1975. The program had three goals: to stop inflation; to make it possible to service the external debt; and to reduce an emerging current account deficit that could not be externally financed given Chile's limited access to external financing at that time. A third cause was the large jump in the price level that had followed the lifting of price controls. Prices in Chile had been controlled since 1952, and their removal without any attempt at coordinating the private sector response produced a price

increase that turned fiscal and monetary policy more restrictive than expected (Ramos, 1986)[4].

In 1976, the economy was still experiencing high inflation (198.3 per cent per year) and high unemployment (15%); and had only US$ 107.9 millions in international reserves, equivalent to less than one month of imports. Nonetheless, as the reforms progressed, and their credibility was enhanced, the economy started to grow. GDP growth was 3.5 per cent in 1976, 9.9 per cent in 1977 and 8.2 per cent in 1978 (see Table 1).

With the resumption of growth, the reduction of inflation became the main priority of the economic team. The slow progress in reducing inflation, despite a budget that was already in surplus of 2.3 per cent of GDP (Table 1), persuaded the policymakers that it would take more than further fiscal tightening to reduce inflation. In February 1978 a crawling peg exchange rate regime was introduced with the goal of reducing inflation by slowing the rate of nominal devaluation. This policy culminated in June 1979 with the fixing of the exchange rate, even though domestic inflation was still running at an annual rate of 37 percent.

The natural result of the conflict between the use of the nominal exchange rate as an anchor for the price level while nominal wages and most financial contracts were fully indexed to past inflation, and the objective of achieving a stable real exchange rate consistent with the macroeconomic fundamentals, was a rapid real appreciation of the exchange rate. The exchange rate policy, in conjunction with a very poorly regulated and supervised deregulated financial system, had severe repercussions on the macroeconomic front: it was one of the main causes of the boom that developed in the following years, as well as of the deep recession in 1982-83. The boom resulted from the

[4]Short term costs as a consequence of the restructuring called for by the trade liberalization policies were not important in 1975, as the reduction in import barriers was more than compensated by a sharp real devaluation (Corbo, 1985a; De la Cuadra and Hachette, 1992).

drastic reduction in the cost of foreign borrowing implied by the real appreciation of the exchange rate. The bust came when, following the drastic decline in the availability of foreign loans, a sharp depreciation of the currency was called for.

With the introduction in February 1978 of the crawling peg formula for the nominal peso/dollar exchange rate, the cost of foreign borrowing decreased from 22.6 per cent per year in the fourth quarter of 1977 to 10.2 per cent per year in the first quarter of 1978, and became negative from then until the last quarter of 1980 (Corbo, 1985a). This reduction in borrowing costs unleashed a large increase in capital inflows, which caused domestic real interest rates to fall. Inappropriate regulation and supervision of the banking system exacerbated the traditional moral hazard problems associated with deposit insurance and facilitated the increase in foreign borrowing.

The drop in real peso and dollar interest rates, and the large increase in real credit, fueled a rapid increase in real domestic expenditure, which rose by 10.5 per cent in 1979, 9.3 per cent in 1980, and 10.9 per cent in 1981. Meanwhile, GDP growth reached 8.3 per cent in 1979, 7.8 per cent in 1980, and 5.5 per cent in 1981 (see Table 1 and Figure 2).

TABLE 1
ANNUAL MACROECONOMIC INDICATORS
1960-1992

	GDP Growth (%) (1)	Domestic Expenditure Growth (real, %) (2)	Trade Deficit (% of GDP[a]) (3)	Current Account Deficit (% of GDP[a]) (4)	Public Sector Deficit[b] (% of GDP) (5)	Price of Copper (US$/pound) (6)	Inflation (% change in CPI, Dec-Dec) (7)	Unemployment rate (% of Labor Force) (8)	Real Exchange rate[c] 1977=100 (9)	Real Interest Rate (10)
1960	N.A.	N.A.	2.9	3.8	4.6	30.8	5.5	7.1	78.6	
1961	4,8	6.1	4.3	5.5	4.5	28.7	9.6	8.0	72.6	
1962	4.7	2.5	1.4	3.0	5.8	29.3	27.7	7.9	69.7	
1963	6.3	5.8	2.5	4.3	4.9	29.3	45.4	7.5	79.4	
1964	2.2	2.9	0.9	2.7	3.9	44.1	38.4	7.0	71.3	
1965	0.8	0.4	-0.8	1.3	4.1	58.7	25.8	6.4	74.9	
1966	11.2	16.5	-1.1	1.4	2.5	69.5	17.0	6.1	78.4	
1967	3.2	0.6	-1.4	1.6	1.3	51.1	21.9	4.7	82.5	
1968	3.6	4.8	-0.8	2.0	1.5	56.1	27.9	4.9	88.9	
1969	3.7	5.8	-2.3	0.6	0.4	66.6	29.3	5.5	93.5	
1970	2.1	1.8	-0.7	1.2	2.7	64.2	36.1	5.7	93.4	
1971	9.0	9.7	1.0	2.1	10.7	49.3	28.2	3.9	85.6	
1972	-1.2	1.0	3.5	3.9	13.0	48.6	255.4	3.3	64.7	
1973	-5.6	-6.2	1.9	2.7	24.7	80.8	608.7	5.0	74.4	
1974	1.0	-2.4	-0.7	0.4	3.5	93.3	369.2	9.5	122.7	
1975	-12.9	-20.8	2.0	5.2	0.9	55.9	343.3	14.8	147.1	
1976	3.5	0.2	-4.3	-1.7	-0.6	63.6	198.0	12.7	124.1	
1977	9.9	14.2	1.8	3.7	-0.1	59.3	84.2	11.8	100.0	16.3
1978	8.2	9.7	3.3	5.2	-1.5	61.9	37.2	14.2	111.4	18.9
1979	8.3	10.5	2.8	5.4	-3.3	89.8	38.9	13.6	112.2	15.6
1980	7.8	9.3	4.2	7.1	-4.5	99.2	31.2	10.4	97.2	10.1
1981	5.5	11.6	10.3	14.5	-0.8	78.9	9.5	11.3	84.5	14.7

Column Sources:
(1), (2), (3), (4), (5), (8) and (10), Central Bank of Chile, Indicadores Económicos y Sociales. Up to 1988 and Monthly Bulletin for the recent years.
(4) For the Non Financial Public sector. Up to 1973, Central Bank of Chile, Indicadores Económicos y Sociales; from 1974 on T. Flores, "Sector Público No Financiero", mimeo PIMA, Instituto de Economía, U. Católica de Chile.
(5) It coresponds to the Non Financial Public sector. Up to 1973, Central Bank of Chile, Indicadores Económicos y Sociales, from 1974 on T. Flores, "Sector Público No Financiero", mimeo PIMA, Instituto de Economía, U. Católica de Chile.
(7) Corrected CPI, CIEPLAN.
(9) Central Bank of Chile Real Exchange Rate corrected by CIEPLAN CPI.
(10) Indexed Interest rates on 1 to 3 years loans. For the period 1977-1980 correspond to the indexed interest rate on 90 to 365 days loans.
[a]Computed with national account information at current prices.
[b]The figures in parentheses include an estimate of the quasi-fiscal subsidies channeled through the Central Bank (Larrañaga, 1989).
[c]Up indicates a real depreciation of the domestic currency.

TABLE 1 (Cont.)
ANNUAL MACROECONOMIC INDICATORS
1960-1992

	GDP Growth (%)	Domestic Expenditure Growth (real, %)	Trade Deficit (% of GDP[a])	Current Account Deficit (% of GDP[a])	Public Sector Deficit[b] (% of GDP)	Price of Copper (US$/pound)	Inflation (% change in CPI, Dec-Dec)	Unemployment rate (% of Labor Force)	Real Exchange rate[c] 1977=100	Real Interest Rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1982	-14.1	-24.1	1.9	9.2	3.5(8.8)	67.1	20.7	19.6	94.2	15.6
1983	-0.7	-4.6	-2.7	5.4	3.2(7.5)	72.2	23.1	14.6	113.1	11.2
1984	6.3	8.5	1.1	10.7	4.3(9.1)	62.4	23.0	13.9	118.2	9.2
1985	2.4	-1.9	-2.8	8.3	2.5(9.8)	64.3	26.4	12.0	145.2	9.1
1986	5.7	5.3	-3.8	6.9	2.1(5.0)	62.3	17.4	8.8	159.7	9.1
1987	5.7	7.3	-4.1	4.3	0.2(1.5)	81.1	21.5	7.9	166.6	7.6
1988	7.4	8.9	-7.2	0.7	-0.1	117.9	12.7	6.3	177.6	7.4
1989	10.0	12.2	-3.6	3.1	-1.2	129.1	21.4	5.3	173.5	8.9
1990	2.1	0.1	-2.9	2.8	0.7	120.9	27.3	5.7	180.1	12.7
1991	6.0	4.5	-4.9	-0.2	-1.0	106.1	18.7	5.5	169.9	8.5
1992	10.4	13.2	-2.1	1.7	-0.5	103.6	12.7	4.5	156.7	8.3

The widening gap between the rate of growth of real domestic expenditure and real GDP, which was reflected in the larger trade deficit and financed by an increase in foreign borrowing, built up demand pressures in the market for non-tradable goods. The trade balance deficit rose from 2.8 percent of GDP in 1979 to 4.2 percent in 1980, and 10.3 percent in 1981. Whilst increased expenditures on tradable goods caused imports to rise and exports to fall, the rise in expenditures on non-tradable goods resulted in a rise in their prices. Consequently the real exchange rate appreciated by 24.1% between 1978 and 1981 (Table 1).

With the emergence of a large trade deficit and unfavorable external shocks in 1981 (a decline in the terms of trade and a sharp increase in international interest rates), doubts arose about the sustainability of the current policies, and in particular the continuation of the fixed exchange rate policy. As shown in Table 2, there was a positive external shock of 1.2 percentage points of GDP in 1980, a negative shock equivalent to 0.5 percentage points of GDP in 1981, and a large negative shock equivalent to 3.8 percentage points of GDP in 1982 external shock with respect to change. Private capital flows turned around in the face of these shocks, and a period of capital flight began late in 1981.

As a result, the Chilean policy makers were faced with the need to adjust the current account deficit even before the international debt crisis broke in August 1982. The adjustment was made through a deep cut in total domestic expenditures, brought about by a sharp increase in real interest rates and a credit crunch. As the nominal exchange rate was fixed and wages were indexed by law to past inflation, the relative price of nontradables -- the reciprocal of the real exchange rate -- was very inflexible. Accordingly, the cut in domestic expenditures reduced the output but not the price of nontradables.

TABLE 2
EXTERNAL SHOCKS

	Total External Effect TXE	Terms of Trade Effect TTE	Real Interest Rate Effect RIRE	Price of Exports PX	Price of Imports PM	Average Real Interest Rate of Foreign Debt RIR	Foreign Debt to GDP Ratio FD/GDP	Exports to GDP Ratio X/GDP	Imports to GDP Ratio M/GDP
1977-79	0.00%	0.00%	0.00%	1.0000	1.0000	-0.0018	0.4104	0.2149	0.2415
190	1.20%	1.04%	0.16%	1.1049	1.0501	-0.0056	0.4020	0.2282	0.2698
1981	-0.52%	-0.55%	0.03%	0.9424	0.9715	-0.0026	0.4761	0.1642	0.2675
1982	-3.80%	-1.87%	-1.92%	0.7437	0.8495	0.0451	0.7047	0.1936	0.2125
1983	-3.37%	-0.88%	-2.49%	0.7175	0.7849	0.0590	0.8816	0.2404	0.2132

Note: The indicators TXE, TTE and RIRE were calculated with the following formulas:

$TXE = TTE + RIRE$

$TTE = (PX_t/PX_0 - 1) * (X/GDP)_0 - (PM_t/PM_0 - 1) *(M/GDP)_0$

$RIRE = - (RIR_t - RIR_0)*(FD/GDP)_0$

where the period 0 is the average 1977 - 1979.

TABLE 3
QUARTERLY INFLATION RATE

Country	Period	Average (AVπ)	Standard Deviation (SDπ)	¡Error!
Canadá	84-91	1.07%	0.47%	1.07%
France	84-91	0.92%	0.42%	0.92%
Germany	84-91	0.48%	0.50%	0.48%
Italy	84-91	1.64%	0.71%	1.63%
Japan	84-91	0.46%	0.71%	0.45%
U.S.	84-91	0.97%	0.42%	0.96%
U.K.	84-91	1.41%	0.97%	1.40%
Chile	84-91	4.88%	2.08%	4.78%
Colombia	84-91	5.70%	2.36%	5.57%
Israel	86-91	4.28%	1.58%	4.21%
Korea	74-81	4.67%	2.61%	4.55%
México	88-91	7.54%	8.70%	6.93%

Eventually, in June 1982, in the midst of a severe recession -- a 14.1% drop in GDP in 1982, and a more than 10 percentage point increase in the unemployment rate -- the fixed exchange rate policy had to be abandoned, compulsory wage indexation eliminated, and a series of nominal devaluations took place[5].

At the trough of the 1982-1983 depression, the liberalization policies of the previous eigth years were under attack on every front: entrepreneurs' associations were asking for protection for import competing sectors; unions were asking for employment policies to decrease unemployment; highly indebted families and firms were asking for debt relief; and banks were asking for a bailout to solve their problem of mounting non-performing loans. Popular discontent was growing with monthly days of protest that began to claim many lives. There were dissenting views within the government about the causes of the recession and the way out of it. Not surprisingly, at the end of 1983,

[5]For a short period the exchange rate was allowed to float.

the Pinochet government was searching for a policy to pull the economy out of recession.

Although it made concessions, the government maintained the main thrust of its policies. The pressures for protection were accommodated by raising the maximum tariff to 20% in March 1983 and to 35% in September 1984, but the request for a differentiated tariff structure was turned down. Free access to foreign exchange was maintained for dividends and capital remittances associated with direct foreign investment and the service of foreign debt. From the beginning the government developed a strategy of renegotiating the foreign debt, but with the declared goal of servicing it in full and, eventually, reestablishing full access to international capital markets. On this point, Chile took a very different route to that taken by many other heavily indebted countries.

Much had to be done to renegotiate domestic debt and to rescue the banking system. During the period of the sharp recession, and to avoid widespread bankruptcies, the government introduced a comprehensive program to rescue financially distressed institutions. It bought their non-performing loans, paying with central bank bonds. Commercial banks were supposed to buy back their loans with their profits; they were not allowed to distribute dividends to the previous shareholders until their loans had been redeemed. Similarly, the Central Bank in this period acquired the external debt of the rescued commercial banks. These rescue programs were financed by a large increase in domestic debt, and also, in later years, through external borrowing as the international financial institutions resumed lending to Chile.

The public sector deficit as a percentage of GDP also increased in these years, as social programs were introduced to assist the unemployed, and tax revenues suffered from the recession. As shown in Table 1, the public sector deficit reached 4.3% of GDP

in 1984, while the unemployment rate peaked at 19.6% of the labor force in 1982[6] and remained in the double digits well into 1985.

The size of the non-financial public sector deficit does not tell the whole story of the public finances, as the Central Bank was also experiencing heavy losses from its programs to rescue financially distressed financial institutions and private sector borrowers. In 1985 alone, these Central Bank losses were estimated to be as high as 7.8% of GDP (Larrañaga, 1989).

The increase in the current account deficit in 1984 to 11 percent of GDP forced further contraction of fiscal policy in 1985, and a tightening of credit. These policy changes were introduced early in 1985 by the new Minister of Finance, Hernán Büchi, who had been a junior member of the liberal economic team of the 1974-81 period. Büchi presided over the second restructuring of the Chilean economy from 1985 onward. The government's comprehensive adjustment program aimed at restoring both macroeconomic balance and economic growth, in a situation of restricted access to foreign borrowing. The tradable sector (exportable and efficient import competing sectors) was expected to be the engine of growth. Incentives were expected to come from a reduction in tariff levels and a sharp real devaluation, assisted by an active role of the government in promoting Chilean exports in international markets[7].

As a result of the large nominal devaluations, the reduction in the averge tariff to 30% in March 1985, to 20% in June 1985 and to 15% in January 1988, and the supportive macroeconomic policies of the time, the real exchange rate more than doubled between 1981 and 1990 (Table 1 and Figure 4). This new policy changed incentives drastically in favor of export oriented activities, initiating a period of export-led growth. As the export-led process gained momentum, large increases in efficiency

[6]Including workers engaged in emergency public works programs, the unemployment rate in 1983 was close to 30% of the labor force.

[7]A clear statement of the main thrust of the Economic Recovery Program appears in Büchi (1985).

began to be achieved in the export oriented sectors through improvements in quality control, better marketing and the adaptation and creation of new technologies.

Following the implementation of this adjustment program, Chile entered a period of export led growth that lasted well into the 1990s. GDP growth reached 6.3 percent in 1984, declined to 2.4 percent in 1985, and then increased to 5.7 percent in 1986. In the same years inflation reached 23.0% in 1984, 26.4% in 1985, and 17.4% in 1986 (Table 1 and Figure 1). In the meantime, the unemployment rate, which had reached close to 20% in 1982 (counting those in emergency public works programs as employed), was reduced to 8.8% by 1986.

Vigorous growth continued after 1986, partly because, as the debt crisis was increasingly left behind, the positive results of the policy reforms of the previous 12 years started to emerge. With the economy by now delivering growth above 5% per year, and with the unemployment rate coming down rapidly, public support for the economic policies began to increase. When the new coalition government came to power in March 1990, it wisely decided to maintain the market-oriented, open-economy, policies of the past administration. Its main departure from the policies of the previous government has been its concern for improving access to education and health for the poorest groups in the population. To accomplish this objective, it early on negotiated a temporary tax reform with the opposition which raised government revenues by around 2.8% of GDP to finance a similar increase in social sector expenditures.

4. Stabilization attempts

Chile has a long history of inflation. In the 1960s, inflation averaged 21.1% per annum. In the early 1970s, under the populist policies of the Allende government, inflation accelerated, reaching an annual rate of approximately 463% in August 1973, the month before Allende's fall (Figure 1). Foreign reserves were running down, and the current account deficit reached 2.7% of GDP. Underlying the acceleration of inflation and the balance of payments crisis of that period was a consolidated non-financial public sector deficit of close to 25% of GDP.

Among the main objectives of the military government that took power in September 1973 were the elimination of the severe and pressing macroeconomic disequilibria that it had inherited, and the reestablishment of a market economy[8]. To achieve these goals, public sector responsibilities would have to be revised, and the size of the public sector and its participation in economic activities heavily curtailed.

These reforms were preceded by a liberalization of markets in an effort to allow the price system to come back into operation. The monetary expansion and the price controls of the Allende years had resulted in a money overhang (see Section 5 below). The first decision that had to be taken by the military government was how to deal with the money overhang. Two possibilities were open, the first to introduce a capital levy,

[8]Towards this end, reforms were introduced in eighth main areas: (1) an initial stabilization program to reduce an inflation rate that was reaching 1000% per year; (2) profound public sector reforms aimed at reaching a permanent elimination of the public sector deficit and to reduce government distortions; (3) trade reforms to provide appropriate incentives to export oriented and import competing activities; (4) a social security reform to change from a bankrupt pay-as-you go pension system into one based on individual capitalization; (5) financial sector reform to improve the efficiency of financial intermediation; (6) labor market reform to facilitate industrial restructuring and the drastic reallocation of labor that had to take place from the highly protected import competing sectors towards the export oriented activities; (7) a comprehensive privatization program to get the state out of the activities that the private sector could undertake and to expand activities where the public sector has a central role to play, as in the provision of basic health, education and nutrition for the poorest groups in the population; and (8) social sectors reforms to improve the incentive system in the production and provision of social services and to target the provision of social programs to the poorest groups in the population (Corbo, 1993).

and the second, to allow a jump in the price level. The authorities chose the second option. As a result of the price liberalization, the inflation rate temporarily increased to an annual rate of 2,600 per cent between the third and fourth quarters of 1973.

From the beginning, the new economic authorities thought that the high fiscal deficit and the associated increase in money supply were at the root of the high inflation. However, they also believed that due to inflation inertia, inflation should be reduced only gradually. Despite a drastic fiscal adjustment, which cut the budget deficit by 21 percentage points of GDP in just one year, inflation in 1974 was still at a rate of 369%. Monetary policy in this period was supposed to be geared to provide enough liquidity to support the price increases resulting from higher costs[9].

Early in 1975, two developments prompted a change of the stabilization strategy in favor of a less gradual approach. First, a drastic worsening of the terms of trade (a reduction in the copper price of almost 50% and the persistence of the oil price increase of the previous year) suggested that the resultant current account deficit would be difficult to finance. Second, the government was unhappy with the pace of inflation reduction. Indeed, monthly inflation even started to accelerate in early 1975, reaching 17% in February and March as a result of the acceleration of devaluation to deal with the worsening of the current account.

The acceleration of the inflation rate (inflation for January-April amounted to 90%) prompted the preparation of a more radical fiscal adjustment. The new program, announced in April 1975, included a further fiscal adjustment in the form of: a 10% temporary hike in income taxes; a 10% additional consumption tax on luxury items; a reduction of between 15 and 25% in budgeted expenditures on goods and services by

[9]It should be mentioned that the then existing fiscal accounts showed a public sector deficit of 10.5% of GDP for 1974. Therefore the fiscal adjustment of 1974 was done in that context.

public entities and public enterprises; and the elimination of all exemptions to the value added tax. Money growth was expected to decelerate along with the reduction in the non-financial public sector deficit.

To support the new export-led growth strategy, and as a response to the sharp fall in the terms of trade, the fiscal and monetary corrections were accompanied by an aggressive crawling peg policy geared to achieving and sustaining a higher real exchange rate. Also, starting in October 1974, public sector wages were indexed to provide full compensation for the previous period's inflation. At the same time the government also mandated for the private sector wage adjustment based upon past inflation[10]. These exchange rate and wage adjustment mechanisms built inflationary intertia into the economy (see Section 5 below).

The government announcement of the new measures also included an explicit statement providing for full deposit insurance, thus setting the stage for undue risktaking by financial intermediaries:

"...all financial operations of the banking system as well as of the Savings and Loan Associations are guaranteed by the Central Bank, which has been financing the Savings and Loans deficits and shall continue to do so whenever this should be required." Cauas (1975, p. 161)[11].

As a result, of the substantial fiscal correction, the non-financial public sector deficit was reduced by a further 2.6 percentage points of GDP in 1975, in spite of the sharp recession (Table 1). The size of the fiscal correction and the accompanying

[10]At the beginning to avoid large increases in real wages while inflation was being sharply reduced, the size of the adjustment did not compensate fully for past inflation.

[11]This latter announcement, introduced at a time of a major crisis and when bank regulation and supervision was extremely weak, exacerbated moral hazard problems in the financial system. Moral hazard related problems were one of the important causes of the financial crisis of the early 1980s.

monetary squeeze in the presence of inflation inertia magnified the effects of the drop in the terms of trade[12]. The current account deficit for 1975, which in early 1975 had been expected to be 2 billion dollars for the year, turned out to be only 492 million dollars at year's end. However, inflation for the year was 343.3%, only marginally below the 369.2% of 1974. The costs of reducing inflation and the external deficit proved very high in terms of the drop in GDP and the resulting increase in unemployment.

Unhappy with the progress in reducing inflation, and observing in 1976 a surplus of 148 million dollars in the current account of the balance of payments, the Central Bank undertook revaluations of 10% each in June 1976 and March 1977. Inflation declined fast, but was still 198% in 1976 and 84.2% in 1977. The unemployment rate came down to 12.7% in 1976 and to 11.8% in 1977.

Late in 1977, a debate began to emerge in government circles on the dynamics of inflation and the slow pace of inflation reduction. At the center of the debate was the role of the exchange rate policy in the perpetuation of inflation. In an influential paper, Barandiarán (1977) questioned the exchange rate policy that was being followed. He recommended the introduction of a passive crawling peg in the form of a forward looking, preannounced devaluation schedule at a decreasing rate as a vehicle to shape inflation expectations and to provide a nominal anchor for the evolution of the price level. Another group was in favor of moving towards a flexible exchange rate, with aggregate monetary targets[13].

[12]With the old public sector deficit figures the fiscal correction was even more severe with a reduction in the deficit from 10.5% of GDP in 1974 to 2.6% of GDP in 1975. (Ministerio de Hacienda, 1982).

[13]McKinnon (1988) describes the options for slowing down inflation that were considered at the time.

An important shift in stabilization policy in the Barandiaran direction occurred in February 1978 when the government instituted a system of preannounced rates of devaluation of the peso. This policy culminated in June 1979 in a fixed exchange rate of 39 pesos per dollar, a rate that was maintained until June 1982. The government believed that the crawling peg, and a fortiori the fixed exchange rate, would reduce inflation both by shaping inflation expectations and through the direct influence of tradable goods (import competing and exportable goods) prices on all domestic prices.

However, the indexation system for wages and financial contracts was not changed at the time of the change in exchange rate policy. Since October 1974, wages had been indexed to past inflation with full compensation for increases in the CPI. The new labor code of 1979 also ensured that, for workers subject to collective bargaining, the lowest wage offered would be equal to the previous wage augmented by the CPI change since the last wage contract. Full indexation to the CPI applied also, on a voluntary base, to financial contracts and house rentals, and to many other private contracts. This extensive indexing, in the context of declining inflation with a fixed exchange rate, was bound to result in a slow pace of inflation reduction and an appreciation of the real exchange rate (see Figure 4 and Section 5).

Another problem of the post 1975 period was the high real interest rates that followed the deregulation of the domestic financial system. In response to these high real rates, pressure started to build for the liberalization of capital inflows, to allow domestic firms to borrow at lower foreign rates. Following the introduction of the forward looking devaluation schedule, the initial spread between the domestic interest rate and the foreign interest rate --adjusting for the expected rate of devaluation -- increased the incentives to bring capital into Chile. Weak financial regulations and institutions, in the presence of full deposit insurance, resulted in undue risk taking by the financial system. The final result was -- as elsewhere in Latin America -- large capital inflows, an expenditure boom, and a sharp real appreciation. Lax lending practices by

the private financial system financed an expenditure boom that resulted in a trade balance deficit of 10.3% of GDP in 1981.

This was also a year in which the public sector had a surplus of 0.8% of GDP, down from a surplus of 4.5% of GDP in 1980. The decline in the public sector surplus was due mostly to the transitory cost of a change in the social security system.

After three years with a fixed exchange rate, inflation declined to a one digit annual level in 1981. But this achievement, which brought with it a 25 percent real appreciation, did not last long. When in 1982 external financing was drastically reduced, the economic authorities decided to use a hands-off policy to allow the textbook automatic adjustment mechanism to accommodate domestic expenditures to a much reduced level of foreign financing.

The reduction in expenditures required a large real depreciation to avoid unemployment in the nontradable sector. With the nominal exchange rate fixed, this adjustment could be made only through differentially lower inflation in Chile than abroad. But the indexed wage adjustment mechanism implied substantial rigidity in the adjustment of the real exchange rate. The method selected to stabilize the external account thus became very costly. GDP dropped 14.1% in 1982[14] and the unemployment rate increased 8.3 percentage points between 1981 and 1982.

The sharp recession proved to be too much for the poorly regulated financial system. As a major financial crisis unfolded early in 1983, the government had to intervene to rescue the financial system, to support financially distressed firms and households, and to support the unemployed. As a result, there was a large increase in the public sector deficit inclusive of the quasi-fiscal deficit of the Central Bank.

[14]Of course, we are not claiming that the entire decline in output was due to the overvaluation of the exchange rate.

The Central Bank played an essential role in the rescue of the financial system and in distributing substantial subsidies to the private sector during the crisis. The Central Bank was able to utilize its access to domestic and foreign financial markets to finance its rescue operations. As a result, the expenses associated with the rescue of troubled financial institutions, stemming from the financial crisis of 1983, was not financed by printing money but instead by issuing domestic and foreign interest-bearing liabilities of the Central Bank. Even when the public sector deficit (including the quasi-fiscal deficit of the Central Bank) was running close to 10 percent of GDP in 1985, non monetary financing was obtained by the Central Bank tapping domestic and external financial markets by issuing its own debt. As the initial debt of the public sector was very small and the risk of lending to a bankrupt private sector very high, domestic real interest rates did not increase much[15]. From then on, Chile initiated a second fiscal adjustment, as drastic as that undertaken in the period 1974-1976.

Once the financial crisis was under control, Chile faced the problem of achieving a turnaround in its trade balance while creating the conditions for sustainable growth. By 1984 the non-financial public sector deficit had reached 4.3% of GDP while Central Bank losses incurred to support the financial system and private borrowers have been estimated at another 4.8% of GDP (Larrañaga, 1989).

The stabilization program put in place in 1985 was part of a broader structural adjustment program aimed at restoring the trade balance to a sustainable level and maintaining the microeconomic and institutional reforms introduced in the previous ten years. The program included a sharp fiscal adjustment assisted by an exchange rate policy that facilitated the increase in the real exchange rate towards its higher equilibrium level. The exchange rate policy introduced was again a crawling peg, but now was passive and ex post, adjusting the exchange rate for the differential between

[15]In this period Chile also initiated a monetary policy based on real interest rate targeting instead of monetary targeting (Fontaine, 1989).

domestic and foreign inflation. This system is similar to the one that existed up to February 1978; however, some additional flexibility was built in with the introduction of an exchange rate band around the target exchange rate.

The last stabilization episode of interest is the current struggle to reduce inflation to industrial country levels. In the last three years, inflation has come down from 27.3% in 1990 to 18.7% in 1991, and 12.7% in 1992. The non financial public sector has a surplus and the authorities have announced their decision to reduce the inflation rate gradually towards international levels. As the economic system currently lacks an explicit nominal anchor for the price level, the discussion has centered on how best to achieve the desired inflation reduction. The issue of how to reduce a 10-25% per annum inflation rate to industrial country levels is an important question that is being asked by policy makers in many other countries (Dornbusch and Fischer, 1993). We take it up in Section 6.

5. Stabilization Issues

In this section we turn to several of the questions raised in the introduction.

Was there a money overhang in 1973?

To answer this question we estimated a money demand equation for the period 1960.1 to 1970.4. The money demand equation is standard for a country with interest rate controls[16]. The equation, estimated for the period 1960.1 to 1970.4 is a semi-logarithmic function given by:

[16]By now there exists a long literature on demand for money equations for Chile. See in particular Corbo (1982), Matte and Rojas (1989), and Herrera and Vergara (1992).

$$\ln m_t = a_0 + a_1 \ln y^{P;t} + a_2 R_t + a_3 \ln m_{t-1}$$

where:

m	is the stock of real balances, measured as M1 divided by the CPI;
$y^{p;t}$	is permanent income, computed as the predicted value of y_t in a fourth period autoregressive model of GDP;
R_t	is the cost of holding money, measured as the contemporaneous inflation rate.

The estimated equation, with standard errors in parentheses, is

$$\ln m_t = \underset{(1.211)}{-3.288} + \underset{(0.145)}{0.397 \ln y^{p;t}} - \underset{(0.206)}{0.508 R_t} + \underset{(0.078)}{0.808 \ln m_{t-1}}$$

$R^2 = 0.973$ D-W = 1.98 Period: 1960.1 - 1970.4

Using the above equation, plus the observed values of income, inflation, and the observed evolution of the price level we obtained dynamic simulations of the quantity of money demanded for the period 1971.1 to 1973.2.

The estimated values indicate a money overhang of 44% of the existing level of the money supply in 1971, of 63% of the money supply in 1972, and of 96% of the money supply in the first half of 1973. It is possible that the money demand equation estimated on the basis of data from the relatively low inflation 1960s could give a misleading impression about the extent of the money overhang at the end of three years

of high inflation. To deal with this possibility, we also computed the size of the money overhang implied by a money demand equation estimated over the high inflation period 1975.1 to 1982.1[17]. The estimated values of the money overhang from this equation are 109% for 1971, 145% for 1972, and 156% for the first half of 1973.

Both estimates -- 96% and 156% -- indicate the presence of a substantial money overhang when the military government took power. Two aspects of stabilization have to be considered in such circumstances: first, the elimination of the money overhang (a stock problem); and second, elimination of the public sector deficit that is the cause of the money buildup (a flow problem).

Elimination of the money overhang can in principle be achieved through a once-for-all increase in the price level or through monetary reform. Coming out of World War II, most European countries used the route of a monetary reform (Dornbusch and Wolf, 1990). The option of allowing a jump in the price level runs the risk of starting a chain reaction in the form of increases in other prices, initiating a lengthy inflation process. The risk is higher for countries with a long inflation history.

The Chilean authorities decided to allow the price level to jump. When price controls were lifted in late 1973, the price level jumped by a factor of 2.3 between the third and fourth quarters of 1973. Since price controls were taken off before a clear fiscal program had been announced or put in place, a high inflation process did get under way. With no active fiscal policy, and with an exchange rate policy that, after an initial

[17]The estimated demand for money equation is given by:

$$\ln m_t = -4.149 + 0.623 \ln y_t^p - 0.651 R_t + 0.482 \ln m_{t-1}$$
$$(2.772) \quad (0.306) \quad (0.151) \quad (0.146)$$

$R^2 = 0.965$ D.W. = 1.91

devaluation, was geared to keeping the newly achieved real exchange rate stable through nominal devaluations, high inflation was bound to continue.

Shock Treatment versus Gradualism

For countries suffering from hyperinflation and an unsustainable balance-of-payments situation, as in Chile in late 1973, gradual stabilization was not a real option. The balance-of-payments crisis had to be addressed from the beginning and therefore a comprehensive and immediate stabilization package was the only realistic and credible stabilization option (Bruno et al, 1988 and 1991; Dornbusch and Fischer, 1986; Dornbusch, Sturzenegger and Wolf, 1990; Sargent, 1982)

Although Chile was an inflationary country, annual inflation had usually hovered in the range of 20% to 30%. The inflation levels of 1972-1973 were without parallel in Chilean history. However, because of its chronic inflation, Chile had developed indexation mechanisms to deal with the uncertainty associated with unpredictable levels of inflation. These indexation mechanisms had built in enough inertia in inflation dynamics to make any shock treatment in the form of a monetary crunch difficult to sustain due to the excessive unemployment they would bring.

As we saw in the previous section, the stabilization program that Chile introduced included a sharp fiscal adjustment, a cut in the budget deficit of a 21.2 percentage points of GDP in just one year, and some elements of a monetary crunch. Sjaastad and Cortés (1978), Lagos and Galetovic (1990), and Corbo and Solimano (1991) have found that there was a monetary crunch in 1974-1975 and especially so following the acceleration of inflation in the second quarters of 1975 and 1976. However, the PPP exchange rate rule and the indexation of wages introduced in October 1974 reinforced the indexation mechanisms already in existence in the Chilean

economy, and ensured that the pace of inflation reduction was bound to be slow. The unemployment cost was correspondingly high.

With the benefits of the experience of the last twenty years, it is clear that the adjustment would have been less costly if the massive fiscal adjustment and associated monetary crunch had been accompanied by incomes policies to break the inflationary inertia (Kiguel and Liviatan, 1988). Part of this coordinated adjustment would have involved using the exchange rate as a nominal anchor. Income policies to accompany the fiscal adjustment would have provided some breathing space for the fiscal adjustment to take effect. The use of a heterodox policy would most likely have speeded up the pace of inflation reduction and reduced the cost in terms of unemployment.

It could be claimed that the use of incomes policies was not an option in 1973 as the country had already overused and abused price controls in the previous two years without much result. Furthermore, there was no track record that would have brought credibility about the seriousness of the proposed fiscal adjustment. We doubt that the approach used in 1973 produced better results than would have been attained with a more coordinated approach. But in any case, the argument that there was no track record for fiscal policy was no longer valid in early 1975, when the stabilization program was revised to increase the size of the fiscal correction. At that time a coordinated heterodox stabilization -- which paid attention to wages as well as the exchange rate -- would very likely have helped bring down inflation more rapidly.

The Sources of Inertia.

It is generally accepted today that there was much inertia in inflation in the Chilean economy after 1974. By inertia we mean, of course, that inflation was slow to

respond to contractionary policy.[18] Corbo (1985b) built a model of Chilean inflation to study inflation dynamics. From a model estimated for the period 1974.1 to 1983.2, he found that Chilean inflation, for that period, had considerable inertia. Up to early 1978, inertia came from both the exchange rate rule and the indexation of wages. Starting in February 1978, when the exchange rate based stabilization program was introduced, the first source of inertia was eliminated but wage indexation remained as an important cause of inertia.

Corbo and Solimano (1991) investigated the dynamics of Chilean inflation in this period using a small structural model. For this purpose they estimated, for the period 1976.1 to 1989.1, a three equation quarterly model of the type used by Bruno and Fischer (1986) and Fischer (1988). The model includes a price equation, an output growth equation, and a wage equation. Corbo and Solimano found that the slow pace of disinflation in the 1975-1978 program was due in large part to the exchange rate and wage rules in place. From a counterfactual simulation they concluded --as should have been expected-- that the aggressive nominal devaluations of 1975, introduced to produce a real devaluation in response to the severe external shocks of that year, slowed down the pace of disinflation. Using the same model they found that the forward looking exchange rate policy introduced in February 1978, had a major share --in conjunction with the indexed wages-- in producing the real appreciation of 1978-1981.

Edwards (1992) examines the question of inertia in the context of the use of the exchange rate as a nominal anchor. He uses a reduced form of an Australian model (Dornbusch, 1980). In the reduced form, inflation is a function of lagged inflation (which comes from the wage and exchange rate equations of his structural model), foreign inflation, and the rate of change in domestic credit. He also introduced a dummy variable, that takes the value of one during the fixed exchange rate period. The dummy

[18]We do not here go into the question of whether inflation responded asymmetrically to increases and decreases in demand.

variable interacts with the coefficient of the lagged inflation variable to allow for a reduction of inertia following the fixing of the exchange rate. The estimation results lead Edwards to conclude that the Chilean economy displayed considerable inertia during this period. He also finds that the coefficient of lagged inflation did not decrease following the fixing of the exchange rate.

We pursue here the key question of the causes of the inertia by estimating a small structural model like that used in Bruno (1978), Corbo (1985b) and Corbo and Nam(1992).

The model is given by the following set of equations:

(1) $$\hat{P}_t = \alpha_0 + \alpha_1 \hat{PE}\, XT_t + \alpha_2 \hat{PE}\, XT_{t-1} + \alpha_3 \hat{E}_t + \alpha_4 \hat{W}_t + \alpha_5 \hat{M}_{t-1}$$

(2) $$\hat{E}_t = \beta_0 + \beta_1 \hat{P}_{t-1} + \beta_2 \hat{PE}\, XT_{t-1} + \beta_3 D1_t$$

(3) $$\hat{W}_t = \gamma_0 + \gamma_1 \hat{P}_{t-1} + \gamma_2 \frac{1}{U_t}$$

(4) $$\hat{M}_t = \hat{P}_t + \hat{L}\,(y_t, R_t, M_{t-1}/P_{t-1})$$

where

(^) = Quarterly rate of change

P = Consumer price index

PEXT = External Prices in Dollars

E = Exchange Rate, in Pesos per dollar

W = Average Wage Rate

M = Money Supply M1

L = Real Money Demand

y = Real Income

R = Nominal Interest Rate.

U = Unemployment Rate.

D1 = Dummy variable that takes a value of one in a quarter following a large nominal appreciation . It takes the value of one in 1976.3 and 1977.2 and zero otherwise.

Equation (1) is the price equation, equation (2) describes the PPP exchange rate rule. Equation (3) describes the wage indexation rule and equation (4) is a demand for money equation.

The model was estimated with quarterly data for the period 1974.2 to 1982.1. The results of the estimation appear in Table 4.

TABLE 4
QUARTERLY INFLATION MODEL: 1974.2 - 1982.1

α_0	-0.004 (0.016)	β_0	-0.043 (0.032)	γ_0	-0.015 (0.085)
α_1	-0.147 (0.291)	β_1	1.055 (0.104)	γ_1	0.953 (0.089)
α_2	0.052 (0.289)	β_2	0.085 (0.661)	γ_2	0.439 (1.027)
α_3	0.441 (0.068)	β_3	-0.209 (0.076)		
α_4	0.283 (0.070)				
α_5	0.263 (0.073)				
R^2	0.948	R^2	0.790	R^2	0.800
D-W	2.60	D-W	1.65	D-W	2.83

Note: The values in parenthesis are the estimated standard errors.

The estimated exchange rate and wage equations indicate a strong response of the nominal exchange rate and wages to lagged inflation[19]. Substituting equations (2), (3), and (4) into (1) we obtain the following expression for the coefficient of lagged inflation: $\alpha_3\beta_1 + \alpha_4\gamma_1 + \alpha_5$. Replacing the estimated values from the structural model one obtains an estimated value for this expression of 0.998.

[19]Some aspects of the estimated equations stand out. We are surprised that foreign prices in dollars (PEXT) have so little apparent effect on both domestic inflation and the exchange rate; perhaps the relative stability of the foreign price series makes it difficult to estimate the coefficient reliably. The statistical insignficance of the unemployment rate in the wage equation is also surprising.

From these results we conclude that inflation indeed shows strong inertia. Further, given its weight in the price equation, most of the inertia comes from the coefficient of lagged inflation in the exchange rate equation. However, the contribution of the coefficient of lagged inflation in the wage equation to the inertia in overall inflation is not small.

These results confirm the view that the PPP exchange rate rule was a major source of inertia. However, a review of the empirical work on this topic, along with the new evidence presented here, shows that the wage indexation rule also played an important part in producing inflationary inertia.

The Exchange Rate Based Stabilization Program of 1978-1982.

Unhappy with the slow pace of inflation reduction, the government authorities initiated an exchange rate based stabilization program in February 1978. This program lasted 4 years. The role of the exchange rate based stabilization program of 1978-1982 in the Chilean crisis of 1982 has been the subject of heated debate (Corbo, 1985b; Corbo and De Melo, 1987; Edwards and Edwards, 1987; Morandé, 1988; Valdés, 1992). The question is essentially whether the program was bound to fail, or whether it succumbed to minor design flaws along with major external shocks.

There is no question that a forward-looking exchange rate adjustment at a decreasing rate could and did slow the rate of inflation. The real dispute is over the roles of wage indexation, and poor financial regulation. Even with β_1 equal to zero, the limit of the crawling peg policy when the exchange rate is fixed, the coefficient of lagged inflation in the reduced form inflation equation derived from the model presented in Table 4, is equal to 0.53. That means that inertia remains, and that without a change in

the wage rule, the decreasing-crawl crawling peg exchange rate-based stabilization was bound to result in a real appreciation.

Our results confirm that it was the inconsistency between the forward-looking indexing of the nominal exchange rate at a decreasing rate, and the backward-looking indexing of nominal wages, that contributed much to the real appreciation and the ultimate crisis that built up during this period.

At the same time, the opening of the capital account without appropriate regulation and supervision of the financial system, in a system with full deposit insurance, exacerbated moral hazard problems and led the banks to pursue risky lending financed by a foreign borrowing boom. This borrowing was also encouraged by the change in the exchange rate rule as it increased the spread between domestic interest rates and the expected devaluation-augmented foreign interest rate. The large increase in foreign borrowing fueled a private expenditure boom and a real appreciation.

With the trade balance deficit reaching 10.3% of GDP in 1981, the obvious unsustainability of the expenditure boom set in motion a sharp drop in the availability of external financing. This led to a large increase in domestic real interest rates and a drop in the rates of growth of expenditures and GDP -- and ultimately to the abandonment of the exchange rate policy on June 14 1982, almost 2 months before Mexico's crisis.

Thus we conclude that the inconsistency between the exchange rate and wage adjustment rules, and the weak regulation and supervision of the financial system, bear most of the blame for the macroeconomic difficulties of the period[20].

[20]We are struck also by the difficult dynamics confronted by policymakers then and now who have embarked on a stabilization program whose success depends completely on not changing the nominal exchange rate. The more they demonstrate their commitment to their policy, the greater the costs if they fail, for the further out of line the real exchange rate is becoming. Thus a policy of this sort is likely to end in a crisis -- with a bang rather than a whimper.

The Recovery and Real Devaluation of 1983-1989

The Chilean success story is the story of the last decade, in which the economy appears to have achieved sustained growth. How was the turnaround and the accompanying real devaluation achieved and maintained?

In an open economy, the definition of the real exchange rate most relevant for resource allocation is the relative price between tradables and nontradables. This relative price is obtained from the market clearing condition in the market for non tradable goods. Starting with the Australian model developed by Salter (1959) and extended by Dornbusch (1980), one can obtain the following expression for the equilibrium real exchange rate (Rodriguez, 1991):

$$\ln RR_t = \alpha_o + \alpha_1 TS_t + \alpha_2 \ln (PX/PM)_t + \alpha_3 (GOV/GDP)_t$$

where RER is the real exchange rate, TS is the trade surplus as a share of GDP (i.e. TS = (Q-E)/Q, where Q is nominal GDP and E is nominal domestic expenditures) and PX/PM are the terms of trade between exportables and importables and GOV/GDP is the share of government expenditures in GDP. If we assume that the composition of government expenditure is more intensive in nontradables than is the composition of private expenditures, then the share of government expenditures in total expenditures is another determinant of the equilibrium real exchange rate. In this model the expected signs are a_1 positive, a_2 ambiguous, and a_3, the coefficient of the share of government expenditures in GDP, negative.

In this model, an increase in the equilibrium real exchange rate has to accompany an increase in the size of the trade surplus to avoid excess supply in the market for non-tradable goods. Structural measures are the fundamental determinants of the equilibrium real exchange rate through their effects on the trade surplus. For example, a liberalization of the labor market which facilitates resource reallocation

across sectors, results in a higher value of output, if expenditures do not increase as much as output it results also in a higher TS. To eliminate the excess supply of non-tradable goods, a higher value of the equilibrium real exchange rate is required, that is, a real depreciation.

A fiscal adjustment that results in an increase in the public sector surplus increases the difference between nominal output and nominal domestic absorption and therefore requires a real depreciation.

We estimate the equation using annual data for the period 1974-1990. The result, with estimated t-coefficients in parenthesis, is:

$$\ln RER_t = \underset{(1.93)}{1.88} + \underset{(2.70)}{2.05} TS_t + \underset{(0.005)}{0.001} \bullet \ln(PX/PM)_t + \underset{(0.26)}{0.55} (GOVS/GDP)_t + \underset{(3.80)}{0.59} \ln RER_{t-1}$$

$R^2 = 0.84$; D-W = 1.88 ; Years = 1974 - 1990

The coefficients of the share of the trade surplus in GDP and of the lagged value of the real exchange rate are highly significant. The coefficient implies that a one percentage point of GDP increase in the trade surplus requires a two percent real depreciation the same year and an accumulated real depreciation of five percent. We conclude from this empirical result that the evolution of the trade surplus is the most important factor accounting for the evolution of the real exchange rate.

Of course, the trade surplus itself is another endogenous variable, determined at the macroeconomic level by the difference between the value of output and the value of domestic expenditures. Therefore, to complete the model one has to explain the evolution of the ratio of the trade surplus to GDP. This ratio is explained by aggregate demand variables. The type of variables to include here are the primary deficit relative to GDP, the domestic interest rate, and the level of capital inflows relative to GDP.

Now we use this framework to discuss how Chile was able to achieve a large real depreciation in the period 1981-1989. As we saw in section 4 above, following the large increase in fiscal and quasi-fiscal expenditures at the time of the financial crisis in 1982, a radical fiscal adjustment took place. As shown in Table 1, the public sector deficit including the losses of the Central Bank reached a peak in 1985 and then began to drop off sharply. The increase in the overall deficit at that time was due mostly to the losses of the Central Bank. Central Bank losses resulting from its role in supporting the financial system and other debtors have been estimated at 5.3% of GDP in 1982, 4.3% of GDP in 1983, 4.8% of GDP in 1984, 7.3% of GDP in 1985, 2.9% of GDP in 1986, and 1.3% of GDP in 1988 (Larrañaga, 1989).

The reduction in government expenditures and quasi-fiscal subsidies contributed to a drastic cut in the public sector deficit (including the quasi-fiscal deficit of the Central Bank). This deficit reached only 1.2 percent of GDP in 1988. The large fiscal adjustment resulted in a rapid turnaround of the trade deficit, by eight percentage points of GDP between 1984 and 1988. In accordance with the model presented above, this improvement in the trade balance could account for a real depreciation of 17.0 percent in the short run and of 42 percent in the long run.

The observed real depreciation between 1984 and 1988 was 50.3 percent. In recent years, the maintenance of a surplus has been facilitated by the creation of a copper stabilization fund. The main purpose of this fund is to avoid spending temporary terms of trade improvements resulting from temporary increases in copper prices. The flow

contribution to the copper stabilization fund, as a share of GDP, was 0.1% in 1987, 3.4% in 1988, 4.1% in 1989, and 2.5% in 1990. These are substantial additions to public sector savings.

If we compare 1981 with 1989, we find that the turnaround of the trade balance was 13.9 percentage points of GDP while the real devaluation was 58.5 percent (Tables 1 and 3). For this period, the expenditures and GDP developments that contributed to the observed improvement in the trade surplus account for a real devaluation of 28.4 percent in the short run and of 69.5 percent in the long run.

One could also ask what made it possible to obtain a large real devaluation without an acceleration of inflation. The factors here were the combination of the large fiscal adjustment, the elimination of wage indexation in 1982, and the persistence of considerable unemployment, at least until 1987. In fact, unlike some other Latin America countries, in Chile the authorities did not have to use inflationary acceleration to erode real wages in order to make them consistent with a higher real exchange rate[21].

The credibility of the government's anti-inflationary stance is another factor that could have contributed to the low inflation that accompanied the real devaluation. This credibility would have derived from the overall consistency of macroeconomic policies, as well as the government's persistence with its basic market-oriented policies. As a result, inflationary expectations may have been low[22]. In other words, the government's reluctance to use the inflation tax (and proven willingness and political ability to cut

[21]As indexation had been suspended and unemployment was high, nominal wages did not adjust fully to the large initial nominal devaluation in 1982.

[22]The comparison of one year nominal interest rates with CPI indexed interest rates indicates a drop in expected annual inflation from 30.2% in the first half of 1985 to 29.2% in the second half of 1985 and only 14.3% in 1986.

current public spending) was believed by the public, giving rise to an anti-inflationary bias in the system.

The sustained real depreciation was one of the key factors behind the recovery and growth record of the post 1984 period. Non-copper exports and efficient import competing activities responded rapidly to the higher real exchange rate and the modest increase in tariffs that took place after 1983 (Figure 6). It is also worth noting that the policy of preventing the very high real interest rates that have been seen in other stabilizations (Table 1) was another important element behind the recovery of private investment and the resumption of growth after 1984.

Others factors that contributed to the recovery and growth of the Chilean economy after 1984 are: (i) the increased microeconomic efficiency of the economy as a result of the institutional and microeconomic reforms of the previous decade; (ii) the existence of a core of innovative entrepreneurs; (iii) the existence of a non-distorted labor market, with a large pool of unemployed labor and some unused capacity until 1987; (iv) the relative absence of distortions in commodity markets; (v) the access to external financing from international financial institutions in the early stages of the adjustment; (vi) the favorable copper prices in 1988-89, which provided a cushion for the external sector and improved public finances; and (vii) the support provided by an increase in the share of public investment in GDP and a recovery in private investment starting forcefully from 1987 (on this last point see Solimano,1989); (viii) the existence of an efficient network to cush on the impact of the adjustment on the poorest group in the population, which helped make the tough adjustments more acceptable.

As a final observation concerning the strong real performance of the Chilean economy after the crisis of 1982-83, it should be mentioned that as Chile had by 1983 eliminated most of the major trade and factor market distortions, the correction of the misalignment in the key relative prices, the real exchange rate and the real interest rate, was likely to result in a large export and output response. The Chilean experience

supports the view that restoring macroeconomic balance, reducing major distortions, and access to appropriate external financing are key ingredients for restoring sustainable growth. (Corbo and Fischer, 1992).

The Stabilization Program of 1990.

The democratic government that came to power in March 1990 inherited an accelerating rate of inflation (Figure 1), which had reached 27.3% in 1989, the highest level since 1980. The new government, which was expected to increase attention to social issues, was faced with the immediate task of slowing down inflation and conveying the message that maintenance of macroeconomic balance would be one of its main objectives.

The newly independent board of the Central Bank implemented from the beginning an aggressive stabilization program based on a sharp increase in real -- CPI indexed --interest rates on Central Bank paper. Real interest rates on 10 year Central Bank paper were raised 230 basis points, from 6.9 to 9.2 percent per year.

The resultant slowdown in real expenditures contributed to a reduction of GDP growth, to an increase in the trade balance surplus, and to lower inflation. However, in a world of increasingly integrated capital markets, a high real interest rate policy pulls in foreign capital that tends to offset the desired contractionary effects of the interest rate increase. Not surprisingly, in 1990 the Central Bank ended up accumulating 2.4 billion dollars in reserves. The issuing of Central Bank debt to finance the reserve accumulation increased Central Bank losses, as the Central Bank in effect borrowed at high domestic interest rates to invest abroad at lower rates adjusted for exchange rate changes.

This episode, as well as Chilean macroeconomic management in 1991 and 1992 (see Section 6 below), illustrates that monetary policy alone has a limited effectiveness in pursuing simultaneous inflation and exchange rate objectives. We believe that fiscal policy should have been used more actively during this period of anti-inflationary policy.

6. Single Digit Inflation

The Chilean government has declared the reduction of inflation to the levels of leading industrial countries as a long term goal of policy. So far, though, the inflation rate has continued in the moderate 12-30 percent per year range (Dornbusch and Fischer, 1993). At the end of 1992, as the real exchange rate appreciated, it seemed that the inflation rate might decline to less than 10 percent. However the recent worsening of the current account has made that prospect more remote.

Given Chile's remarkable real economic performance, the question arises of whether and why the government should even attempt to reduce the inflation rate below the range to which it has been confined for the last decade[23], and if so how.

The general arguments in favor of low inflation are well known (Fischer and Modigliani, 1978). They start from the welfare costs of inflation, computed as the area under the demand for money curve. The currency to GDP ratio in Chile is low by international standards, for 1992 about 2.6 percent; the ratio of total non-interest bearing monetary assets held by the public to GDP is about 4.6 percent. Using a demand for money equation (M1) of the form reported above, but estimated for the period 1983.4 to 1992.2, this cost of inflation --which includes the shoe-leather costs -- amounts in the

[23]Annual inflation has been in the range 14.7-30.7 percent since 1982, when it was 9.9 percent.

Chilean case to less than one percent of GDP[24]. This is very small by international standards.

The cost of distortions associated with the failure to adapt domestic institutions, including taxation, to inflation have to be added. These costs, which include menu costs, result from institutional non-adaptation, would be relatively low in the highly indexed Chilean system.

In addition, there are costs associated with the greater relative price variability and greater uncertainty about future price levels that are associated with higher inflation rates. While we are unaware of formal evidence on the relationship between relative price variability and inflation in the Chilean case, we would be surprised if this relationship does not hold for Chile too.

Turning to price level uncertainty, the inflation rate in Chile has been quite variable over the past decade, implying considerable uncertainty about future price levels. Examination of Figure 1 shows three high-inflation episodes within the last decade, and very sizable swings in the quarterly inflation rate. In fact, the variability of quarterly inflation in Chile in the last decade has been exceptionally high by international standards. A comparison of the variability of inflation in Chile and other countries shows that the variability of inflation in Chile is one of the highest (Table 3). The economic costs of this uncertainty are mitigated by widespread indexation, but some costs remain.

---

[24]This statement is based on an estimate of the relevant area under the demand curve for non-interest bearing money (M1), for a decline in the nominal interest rate from 5.5 percent per quarter to 2 percent per quarter. The estimated demand for money equation is given by:

$$\ln m_t = \underset{(0.958)}{-2.36} + \underset{(0.120)}{0.357 \ln y_t^P} - \underset{(0.005)}{0.026 R_t} + \underset{(0.111)}{0.712 \ln m_{t-1}}$$

$R^2 = 0.894$ DW = 2.17

The arguments for seeking to reduce the inflation rate are conceptually clear, even if they cannot all be quantified; they are the traditional shoe-leather and menu costs of inflation, plus costs associated with unnecessary relative price variability and uncertainty about future price levels that are greater at higher inflation rates.

These benefits of lower inflation have to be set against the loss in seigniorage that the government would experience at lower inflation rates. In recent years, the Chilean government has collected 7/10 of one percent of GDP in seignorage revenue. This seigorage arises from the inflation tax and income growth. With income growing at, say, 7 percent per annum, and an estimated long-run income elasticity of money demand of 1.25, about 0.5 percent of GDP in seigniorage derives from growth. Therefore, the government would lose very little seigniorage revenue from stabilizing inflation. Further, the flow loss of seignorage has to be set against the stock gain as the public increases its real holdings of non-interest bearing government liabilities as inflation comes down.

The crucial cost of reducing inflation is the likely recessionary consequences of any stabilization attempt. Two basic strategies can be envisaged. The first would be fully orthodox, attempting to reduce inflation through the tightening of monetary and fiscal policy, and relying on reductions in aggregate demand. The second would be heterodox, using in addition to the orthodox tools, the nominal anchor of the exchange rate and agreements with the labor unions and industry, to attempt to reduce the inflation rate at lower cost[25]. In either case, the stabilization attempt would probably slow growth, more so in the first case. It is quite likely in an exchange rate based stabilization that there would, for a period, be a real appreciation.

[25]In correspondence, John Williamson -- a student of Fritz Machlup--has pointed out that "heterodox" is the wrong word for the concept to which it has been applied over the past decade. "Hetero" means "other", which gives heterodox the connotation of "other than orthodox", rather than the intended "orthodox plus". The right word, suggested to us by Enrico Perotti, would appear to be "polidox", where "poli" means "many".

Given what appear to be relatively small benefits of reducing current levels of inflation, and the possible transitional costs, we do not believe the balance of the argument favors a resolute attack on inflation no matter what the condition of the economy. Chile's economic successes in the past decade owe much to the absolute commitment to maintaining a real exchange rate favorable to exports, and that commitment should not be abandoned just to accelerate the rate of disinflation.

Before turning to our recommended anti-inflationary policies, we digress briefly to examine current Chilean monetary policy. It is a remarkable fact that Chilean monetary policy has operated for the past decade without an explicit nominal anchor. Monetary policy targets both the real exchange rate and the inflation rate. The main instrument of monetary policy has been the 90-day real interest rate on Central Bank liabilities. The real interest rate is adjusted when inflation rises and when the real exchange rate moves away from its target level. Sometimes the two objectives come into conflict, and the Central Bank implicitly trade off between them. Recently, for instance, the real exchange rate has been allowed to appreciate as capital flowed in at the set level of the real interest rate[26].

When changes in the real interest rate are infrequent, as is the case at the present, there is nothing to tie down the inflation rate in such a system, except the stickiness of prices in responding to changes in aggregate demand. As we show in a simple model in the appendix, under plausible conditions the price level becomes a random walk in such a system, while the inflation rate is determinate. However, changes in expectations by price-setters, or any arbitrary change in their price-setting behavior, would change the inflation rate. Thus, in a fundamental sense, the stated current

[26]There was much less possibility of conflict between the two objectives in the 1980s when Chile had its access to international capital markets severely curtailed. Then, the link between domestic and international interest rates was broken and the Central Bank could set real interest rates without affecting the level of capital inflows.

operating rules of the Chilean monetary authority do not place constraints on the inflation rate.

In practice, it appears that the Central Bank has given more weight to the inflation target than to the real exchange rate target operated with a target range for the inflation rate, as well as the exchange rate. When the inflation rate has moved above an acceptable range, the Central Bank has reacted by increasing the real interest rate or undertaking a revaluation. This ensures that the inflation rate will return to its target range, if necessary through a slowdown of economic activity. With the recent emergence of current account deficits, the Central Bank has also stated as one of its objectives the maintainence of the current account deficit below 4 percent of GDP.

The Chilean Central Bank is implicitly operating with target ranges (or upper limits) for the inflation rate, for the real exchange rate, and for the current account deficit as a share of GDP. Indeed, sometimes the inflation target becomes quite explicit. Thus, in its annual reports to Congress the Central Bank announces inflation targets and also publicizes the progress made in achieving this target.

Of course, monetary policy alone cannot achieve so many objectives (i.e. the inflation rate, the real exchange rate, and the size of the current account deficit). But that does not necessarily mean the Central Bank should confine itself to a single objective: in the first place, the objectives are linked, for instance the Bank has a real exchange rate target in part because it aims to control the current account to avoid an excessive build up of foreign debt; and second, it is fully capable of trading off among these objectives in deciding on the setting of monetary policy.

Nonetheless, macroeconomic policy in Chile would in the last few years have been more effective if the work of monetary policy had been shared with a more active fiscal policy. In particular, through its effects on aggregate expenditures, fiscal policy could provide an additional instrument with which to pursue the three targets of

macroeconomic policy. Furthermore, when monetary policy rather than fiscal policy is used to reduce aggregate demand, any reduction in demand has to come from the crowding out of private expenditures, in particular, the most interest-elastic component, which is private investment. The crowding out of private investment affects long term growth prospects.

Turning now to anti-inflationary policy, we argue that the costs of inflation in Chile do justify an attempt to bring the inflation rate down. But in the still heavily indexed Chilean economy, the policy should be a gradual one. Chile should attempt to move gradually to a lower inflation rate, by making use of favorable shocks when they occur, and locking in the resultant gains[27].

In particular, we recommend that Chile adopt an active crawling peg exchange rate, with the central reference rate crawling at a gradually declining rate, and with a wide band on either side of the target rate. This crawling band system would be similar to the Israeli diagonal band system adopted at the end of 1991. The rate of crawl would be adjusted approximately annually, and the central parity could, if necessary, be adjusted as well. Such adjustments are the equivalent of devaluations and revaluations within an adjustable peg system; although they reduce the commitment benefit of the exchange rate peg, recent European experience suggests that it would be expensive to rule them out.

This proposal raises at least two issues. First, why is the exchange rate commitment so weak? Surely, if Chile is to be serious about reducing inflation, it should make a much firmer commitment. The commitment is weak because we do not believe that Chile should trade in its commitment to a pro-export exchange rate policy

[27]To have a clear committment to slowdown inflation also provides the signal that real problems have to be solved with real solutions. The inflation rate is a poor instrument to achieve real solution.

for an anti-inflationary policy. The Chilean economy has lived moderately well with inflation, the patient is not really sick from inflation, and there is no case for drastic treatment. However, since inflation is mildly debilitating, a concerted effort to take every opportunity to reduce it, with the goal of bringing inflation down to international levels over a period of years, is certainly warranted -- and the crawling band system gives that opportunity.

Second, is any nominal targeting possible in an economy that is so heavily indexed? It is necessary to distinguish here between financial indexation and wage indexation. We strongly recommend against any attempts to ban indexation in the long-term financial markets. Indexation has been instrumental in promoting the development of a long term capital market even while there has been uncertainty about long-term inflation prospects, and it should be permitted to continue to serve that function until private agents are sufficiently confident to do without it. Currently indexation is forbidden in financial contracts of less than 90 days. If the inflation rate comes down and becomes more stable, we would recommend the extension of this ban to 6 months and then a year, but not to longer-term loans. We recommend using a ban rather than relying purely on markets to make the switch away from indexation because it is quite likely there are dual equilibria in which either everyone operates with indexed contracts or with nominal contracts, and markets may have difficulty switching from one equilibrium to the other.

Wage indexation is not an insuperable obstacle to stabilization provided that the reduction in inflation is gradual, and that productivity growth continues at a reasonable rate, making room for real wage increases. To the extent that government decisions affect nominal wages, for instance in the setting of the minimum wage, and in reaching wage agreements with government employees, these contracts should be based on the nominal inflation that is implicit in the rate of crawl of the exchange rate. If a decision is ever made to try to move inflation down by 5-6 percent within a year, then it will be

necessary to reach an agreement with labor that prevents the familiar real wage increase that follows from ex post backward indexation in a context of declining inflation.

Circumstances in 1992 were exceptionally favorable to the adoption of a crawling band system. If the system had been put in place during the year, we believe it would by now have been operating well. However, the 8.9% real appreciation during that year, the recent worsening of the terms of trade, the deterioration of the trade account, and the proximity of elections, suggest this is not the best time to move to a new system.

Nonetheless, given the flexibility that can be built into the system by starting with wide bands, and by if necessary adjusting the reference rate occasionally, we do recommend the introduction of a crawling band with an exogenous and decreasing rate of crawl for the reference rate.

To be specific, given the expected inflation rate of 12% in Chile, and about 3% among its trading partners, we recommend a crawl of the central peg at 9% per annum, starting from the current nominal rate[28]. Given the uncertainty about the behavior of the current account, a band of plus/minus 8% on either side of the peg would be warranted. Both the central rate and the width of the band would be reassessed at the end of this year. Any adjustments that would be made in either should attempt to avoid discrete changes in the exchange rate. The intention would be to reduce both the crawl, to perhaps 7%, and the bands, to say 6% in either direction, for 1994.

The introduction of a crawling band exchange rate mechanism in a system with free capital flows puts limits on the movement of domestic nominal interest rates. In the absence of risk premia, and with no uncertainty about exchange rate movements relative

[28]The relevant nominal rate is the observed rate rather than the central point of the present exchange rate band.

to the reference rate, the domestic nominal interest rate would be exactly equal to the foreign rate plus the rate of crawl. In practice, the domestic nominal interest rate would have some room to move, derived from both risk premia and expected exchange rate movements within the band.

With the nominal interest rate given, and expected inflation closely related to the rate of crawl, the real interest rate is also constrained. The question then is how the Central Bank would conduct monetary policy in the new system. The answer is twofold: first, that when there is a nominal exchange rate target, the quantity of money has to adapt to demand; and second, that the existence of the bands still leaves room for movements in interest rates. To adapt the quantity of money to demand, the Central Bank will have to conduct open market purchases and sales that will keep nominal interest rates at the level implied by the exchange rate policy. On the second point, the bands exist precisely because the exchange rate may have to move relative to the reference rate; this flexibility needs to be exploited by the monetary authority, by adjusting nominal interest rates.

Ultimately the rate of crawl would decline to zero, but we would recommend the maintenance of the bands at 5% in each direction, to give some room for the exchange rate to respond to movements in the terms of trade and capital flows. Maintenance of such an exchange rate commitment would require a more active use of fiscal policy than has been seen in the last three years.

7. Conclusions

Two decades after the start of the economic reform process in 1973, Chile stands now as the major success story of orthodox adjustment policies. Starting in 1973, Chile undertook a big bang fiscal policy, and liberalized prices, then in 1974 it started a gradual trade liberalization program that by 1979 had resulted in a uniform 10% tariff. Later on it pursued an aggressive deregulation of markets, and large scale privatization.

As a result of external shocks, the flawed exchange-rate based stabilization strategy of 1978, and an ill-fated financial liberalization, it had again to undertake a drastic fiscal stabilization from 1982 to 1986.

The Chilean experience provides many lessons to countries pursuing comprehensives reforms. It supports the view that maintaining the basic macroeconomic balances is a necessary condition to promote a supply response. The far-reaching microeconomic reforms of the 1970s, which began the creation of an outward-oriented market economy, were almost destroyed in the macroeconomic crisis of 1982-1983. Once the macroeconomic situation was brought under control, the conditions were created for the resumption of growth.

The recent Chilean experience is also very rich on how to carry out a financial liberalization and its coordination with stabilization. Chile began to deregulate the financial markets quite early in the reform process, while inflation was at the three-digit annual level, and while radical reforms were resulting in major changes in relative prices. This deregulation, coupled with weak regulation and supervision of financial institutions and full deposit insurance, led to high real interest rates and the eventual collapse of the financial system.

Two lessons emerge here. First, extensive financial market liberalization should not take place until there has been signficant progress in stabilization and in the adjustment of relative prices. Second, deregulation in the presence of implicit or explicit deposit insurance and the absence of adequate regulation and supervision of financial intermediaries is a recipe for disaster. Thus any major deregulation should wait for the development of adequate regulation and supervision capabilities.

One lesson of the Chilean adjustment program that should be mentioned is that targeted anti-poverty programs work (Castañeda, 1992). Such programs are fully justified on their

own terms. In addition, by cushioning the poorest groups in the population from some of the short term costs of adjustment, they can provide much needed breathing space to give the reforms time to bear fruit.

The growth payoff to the Chilean reforms took many years, and its success was not assured. Indeed, as late as the mid-1980s, the Chilean reform program was seen by many as a failure. It was only with the string of high growth years in the second half of the 1980s, the return in 1989 of a democratic government that confirmed the main thrust of the market oriented policy reforms implemented in the previous 15 years, the crucially important stabilization of 1990, and subsequent stellar growth performance, that the success of the economic reforms could be regarded as having become deep-seated.

Thus, one crucial but politically unpalatable lesson from the Chilean experience, is that the returns to structural reforms take a long time to materialize[29]. However, the maturity period can be shortened by learning from the mistakes of others, including those of Chile. Judging from the Chilean case, the reforms more than justify the initial investment once they do materialize. We do not in this paper address the question of whether democracies are capable of sustaining such long-maturity adjustment programs. We believe that the answer is yes.

[29]This is a sober and dissapointing lesson for many countries in Eastern Europe and the former Soviet Union that are trying to make a transition to a market economy.

APPENDIX
NOTE ON CHILEAN MONETARY POLICY

In this Appendix, we explore the issue of the determinacy of the price level when monetary policy attempts to fix the real interest rate. For simplicity, the analysis is conducted for a closed economy. At the end we comment briefly on how the analysis would change for an open economy.

Assume the demand for money function is[30]:

(1) $m_t - p_t = y_t - \alpha i_t + \varepsilon_t$

where m, p and y are logarithms, and where we assume

(2) $i_t = r^* + p_{t-1} - p_{t-2}$

Equation (2) is the real interest rate rule, with r* the target real rate, and $(p_{t-1} - p_{t-2})$ is the most recently observed inflation rate.

For convenience we can assume that y_t is constant and equal to $y^* = r^* = 0$. Then

(1)' $m_t - p_t = - \alpha (p_{t-1} - p_{t-2}) + \varepsilon_t$

[30]For tractability, I simplify here by assuming that money demand adjusts completely, within one period, to changes on the right hand side of (1). Partial adjustment would be handled by included a term λm_{t-1} on the right hand side of (1). While the simplification helps keep the dynamics manageable, the lagged adjustment term should be included in general, especially for understanding why the money stock has been so variable in Chile.

As it stands, equation (1)' cannot determine the price level. It is simply an equation for the real money supply, and m_t and p_t could take any values as long as their difference is determined by (1)'.

There are two ways out of this indeterminacy. At the formal level, the authorities could fix either m_t or p_t as a nominal target, and the price level would then be determinate. But (1)' is implausible, because it is hard to believe that the price level reacts one-for-one to the money stock in the current period. Suppose alternatively that the price level is predetermined, through the goods market. Specifically assume that prices are set on the basis of the excess demand for goods in the previous period, and that demand is determined by wealth (in this case real balances). We can write:

$$(3) \qquad p_t = p_{t-1} + \theta (y^d_{t-1} - y^*) + u_{t-1}$$

$$= p_{t-1} + \beta (m_{t-1} - p_{t-1}) + u_{t-1}$$

where y^d_t is aggregate demand, given by

$$y^d_{t-1} = (\beta/\theta) (m_t - p_t) + y^*$$

Since the price level is predetermined, and for tractability, we replace the interest rate rule (2) by

$$(2)' \qquad i_t = r^* + p_t - p_{t-1} = p_t - p_{t-1}$$

Now putting the pieces together (equation (2)' in (1), and then substituting (1) lagged into (3)) we have the equation for the price level:

$$(4) \qquad p_t - p_{t-1} = -\alpha\beta(p_{t-1} - p_{t-2}) + \beta\varepsilon_{t-1} + u_{t-1}$$

This implies that the price level is a random walk, but the inflation rate is not. Writing Π for the inflation write, we have

(5) $\Pi_t = -\alpha\beta\ \Pi_{t-1} + \beta\varepsilon_{t-1} + u_{t-1}$

Assuming that $\alpha\beta$ is less than one in absolute value, this is a stable equation for the inflation rate.

(6) $0 < \alpha\beta < 1$

Equation (5) implies that the inflation rate tends to oscillate in response to a shock. The mechanism is that a demand shock today increases the price level and thus the inflation rate. This in turn leads the monetary authority to reduce real balances, which tends to reduce aggregate demand, pushing the price level down next period, and setting up a stable oscillation.

The conclusion in this extremely simplified example, in which the price level is predetermined, is that the real interest rate rule does make the price level indeterminate, but does not make the inflation rate indeterminate or unstable. Note that the determinacy of the inflation rate comes from the stickiness of the price adjustment process(3).

To apply sucgh an analysis to an open economy, like that of Chile, it would be necessary to include the exchange rate. We suspect that so long as the exchange rate was being set by a rule similar to (2), intended to keep the real exchange rate constant, a very similar analysis would apply.

REFERENCES

Barandiarán, E. 1977. "Una Nota sobre Política Cambiaria". Documento # 50 Santiago, Chile: Departamento de Estudios Empresas B.H.C .

Bitar, S. 1986. Chile: Experiments in Democracy. Philadelphia: Institute for the Study of Human Issues.

Bruno, M. 1978. " Exchange Rates , Import Costs, and Wage-Price Dynamics," Journal of Political Economy 86 (June) pp. 379-403.

Bruno, M., 1991. "High Inflation and the Nominal Anchors of an Open Economy" Princeton Essays in International Finance 183. International Finance Section, Princeton, N.J.: Princeton University. Processed.

Bruno, M. and S. Fischer, 1986. " The Inflationary Process: Shocks and Accommodations." In Y. Ben-Porath, (ed.). The Israeli Economy: Maturing Through Crises. Cambridge,Mass.: Harvard University Press.

Bruno, M., G. Di Tella , R. Dornbursch ., and S. Fischer , eds. 1988. Stopping High Inflation. Cambridge, Mass.: MIT Press.

Bruno, M. , S. Fischer, E. Helpman, and N. Liviatan, with L. Meridor . 1991 (eds.), Lessons of Economic Stabilization and Its Aftermath. Cambridge, Mass.: The MIT Press.

Büchi, H. 1985. "Chile's Economic Strategy". Remarks to the Banks'Advisory Committee. New York, March, mimeo.

Castañeda, T. (1992). Combating Poverty. Innovative Social Reforms in Chile during the 1980s, San Francisco, CA: ICS Press.

Cauas, J. 1975. " The Government Economic Recovery Program".Text of the Address to the Nation by the Minister of Finance. April 24 . In Méndez, op. cit., p.p.157-163.

Cauas, J. and V. Corbo, 1972. "La Economía Chilena en 1971 y Perspectivas para 1972". Series Informes de Coyuntura #1. Instituto de Economía. Santiago, Chile: Universidad Católica de Chile.

Corbo, V. 1974. Inflation in Developing Countries. Amsterdam: North Holland Publishing Co.

Corbo,V. 1982." Monetary Policy with an Overrestricted Demand for Money Equation". Journal of Development Economics, February. pp. 119-131.

Corbo, V., 1985a."Reforms and Macroeconomic Adjustment in Chile during 1974-84". World Development, Vol. 13, Nº8, Oxford, U.K.: Pergamon Press Ltd. pp. 893-916.

Corbo, V., 1985b. "International Prices, Wages and Inflation in Open Economy" Review of Economics and Statistics 67 (November): pp. 564-73.

Corbo, V., 1990. "Public Finance, Trade, and Development: The Chilean Experience". In V. Tanzi (ed.), Fiscal Policy in Open Developing Economies, Washington, D.C.: International Monetary Fund

Corbo, V., 1993. "Economic Reforms in Chile: An Overview" Paper presented at the Eastern Economic Association Meetings, Washington, D.C., March.

Corbo, V. and J. de Melo. 1987. " Lessons from the Southern Cone Policy Reforms." World Bank Research Observer. Vol. 2, # 2. pp. 111-142.

Corbo, V. and J. de Melo (1989). "External Shocks and Policy Reforms in the Southern Cone: A Reassesment". In G. Calvo, et.al. (eds.) Debt Stabilization and Development. Oxford and N. York: Blackwell.

Corbo, V. and A. Solimano, 1991. "Chile's Experience with Stabilization Revisited". In M. Bruno et al. (eds.), Lessons of Economic Stabilization and Its Aftermath. , Cambridge, Mass.: The MIT Press

Corbo, V. and S. Fischer, 1992. Adjustment Programs and Bank Support: Rationale and Main Results. In V. Corbo, S. Fischer, and S. Webb. Adjustment Lending Revisited. Washington D.C.: The World Bank.

Corbo, V. and S. Nam 1992. "Recent Experience in Controlling Inflation" In V. Corbo and S. Suh, (eds.), Structural Adjustment in a Newly Industrialized Country: The Korean Experience. Baltimore: Johns Hopkins University Press.

De la Cuadra, S. and D. Hachette, 1992. "The Chilean Trade Liberalization Experience". Santiago, Chile: Editorial de Economía y Administración. Universidad de Chile.

Dornbusch, R. 1980. Open Economy Macroeconomics. New York: Basic Books.

Dornbursch, R. and S. Fischer 1986. "Stopping Hyperinflations: Past and Present". Weltwirtschaftliches Archiv 122 (1, April), pp. 1-14.

Dornbusch R., F. Sturzenegger and H. Wolf. 1990. "Extreme Inflation: Dynamics and Stabilization". Brookings Papers on Economic Activity 2: pp. 2-84.

Dornbusch, R. and S. Fischer, 1993. " Moderate Inflation ". World Bank Economic Review. Vol. 7, #1. (January), pp. 1-44.

Edwards, S. and A. Edwards, 1987. Monetarism and Liberalization: The Chilean Experiment. Cambridge, Mass.: Ballinger.

Edwards, S. 1992. "Exchange Rates and Nominal Anchors", Cambridge, Mass.: NBER, Working Paper # 4246 (December).

Ffrench-Davis, R., 1973. Políticas Económicas en Chile 1952-1970. Santiago, Chile: Editorial Nueva Universidad.

Fischer, S. 1986. "Contracts, Credibility, and Disinflation". In S. Fischer, Indexing, Inflation, and Economic Policy. Cambridge, Mass.: The MIT Press.

Fischer, S. 1988. "Real Balances, the Exchange Rate, and Indexation: Real Variables in Disinflation". Quarterly Journal of Economics 103 (1): pp. 27-50.

Fischer, S. and F. Modigliani. 1978. " Towards and Understanding of the Costs of Inflation'.Weltwirtschaftliches Archiv Band #114. pp.810-832.

Fontaine, J.A., 1989. "The Chilean Economy in the 1980s: Adjustment and Recovery". In S. Edwards and F. Larraín (eds.), Debt Adjustment and Recovery. Oxford and New York: Blackwell.

Harberger, A.C., 1985. "Observations on the Chilean Economy, 1973-1983". Economic Development and Cultural Change, 33 April. pp. 451-462.

Herrera, L.H. and R. Vergara. 1992. " Estabilidad de la Demanda de Dinero, cointegración y política monetaria. Cuadernos de Economía Nº 86. Abril. pp. 35-54.

Kiguel, M. and N. Liviatan. 1988. "Inflationary Rigidities and Orthodox Stabilization Policies: Lessons form Latin America". The World Bank Economic Review September. pp. 273-298.

Lagos, L.F. and A. Galetovic. 1990. "Los Efectos de la Indización Cambiaria y Salarial en el Control de la Inflación: El caso de Chile 1975-1981". Cuadernos de Economía, Nº82. pp. 357-379.

Larraín, F. and P. Meller, 1991. "The Socialist-Populist Chilean Experience: 1970-1973". In R. Dornbursch and S. Edwards (eds.), The Macroeconomics of Populism in Latin America. Chicago: The Chicago University Press.

Larrañaga, O., 1989. El Déficit del Sector Público y la Política Fiscal en Chile, 1978-1987. Santiago, Chile: ECLA.

Marshall, J. and K. Schmidt-Hebbel, 1991. " Macroeconomics of Public Sector Deficits : The Case of Chile", WPS 696, Washington D.C.: The World Bank.

McKinnon, R., 1988. "Financial Liberalization and Economic Development", Ocassional Papers #6. San Francisco, California: International Center for Economic Growth (ICEG)

Matte, R. and P. Rojas. 1989. " Evolución Reciente del Mercado Monetario y una Estimación de la Demanda por Dinero en Chile. Cuadernos de Economía Nº 78 Agosto. pp. 195-216.

Meller, P., 1990. "Chile". In J. Williamson (ed.) Latin American Adjustment, Washington D.C.: Institute for International Economics

Meller, P., 1992." Adjustment and Equity in Chile", Paris: OECD Development Center.

Méndez, J.C. , 1979. Chilean Economic Policy. Santiago, Chile: Ministery of Finance

Ministerio de Hacienda, 1982. Exposición Sobre el Estado de la Hacienda Pública. Santiago, Chile: Dirección de Presupuestos.

Morandé, F. 1988. " Domestic Currency Appreciation and Foregn Capital Inflows. What Comes First? (Chile, 1977-1982)". Journal of International Money and Finance. pp. 447-466.

Ramos, J. 1986. Neo-conservative Economics in the Southern Cone of Latin America, 1973-83. Baltimore: Johns Hopkins University Press.

Rodriguez,C. (1991). " The Macroeconomics of Public Sector Deficits: The Case of Argentina". WPS # 696. Washington D.C.: The World Bank.

Rosende, F. 1987. "Ajuste con Crecimiento: El Caso Chileno". Documento de Investigación # 32, Santiago: Banco Central de Chile.

Salter, W.E.G. (1959). " Internal and External Balance: The Role of Price and Expenditure Effects", The Economic Record, 35 (August). pp. 226-238.

Sargent, T. (1982). "The End of Four Big Inflations", en R. Hall (ed.), Inflation: Its Causes and Effects, Chicago, The University of Chicago Press.

Sjaastad, L. y H. Cortés. (1978), "The Monetary Approach to the Balance of Payments and Interest Rates in Chile", Estudios de Economía..# 11. I Semester. pp.3-58.

Solimano, A. 1989." How Private Investment Reacts to Changing Macroeconomics Conditions. The Case of Chile. WPS # 212. Washington D.C.: The World Bank.

Universidad de Chile. 1963. La Economía Chilena en el Período 1950-1963. Santiago, Chile: Instituto de Economía.

Valdés, S. 1992. " Financial Liberalization and The Capital Account: Chile, 1974-84". mimeo.

World Bank, 1991. Adjustment Lending Policies for Sustainable Growth. Policy and Research Series Nº14. Washington, D.C.: The World Bank.

FIGURE 1A:
QUARTERLY INFLATION AT AN ANNUAL RATE
1960 - 1972
(percent)

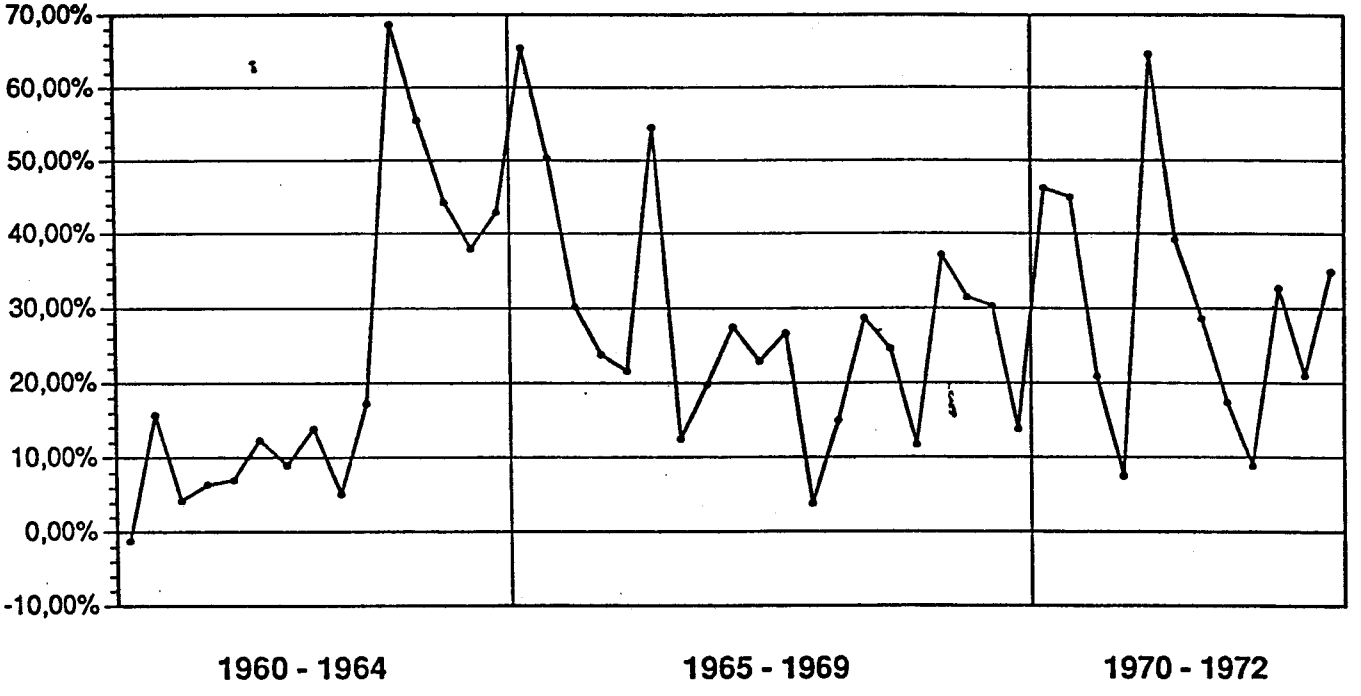


FIGURE 1B:
QUARTERLY INFLATION AT AN ANNUAL RATE
1973 - 1977
(percent)

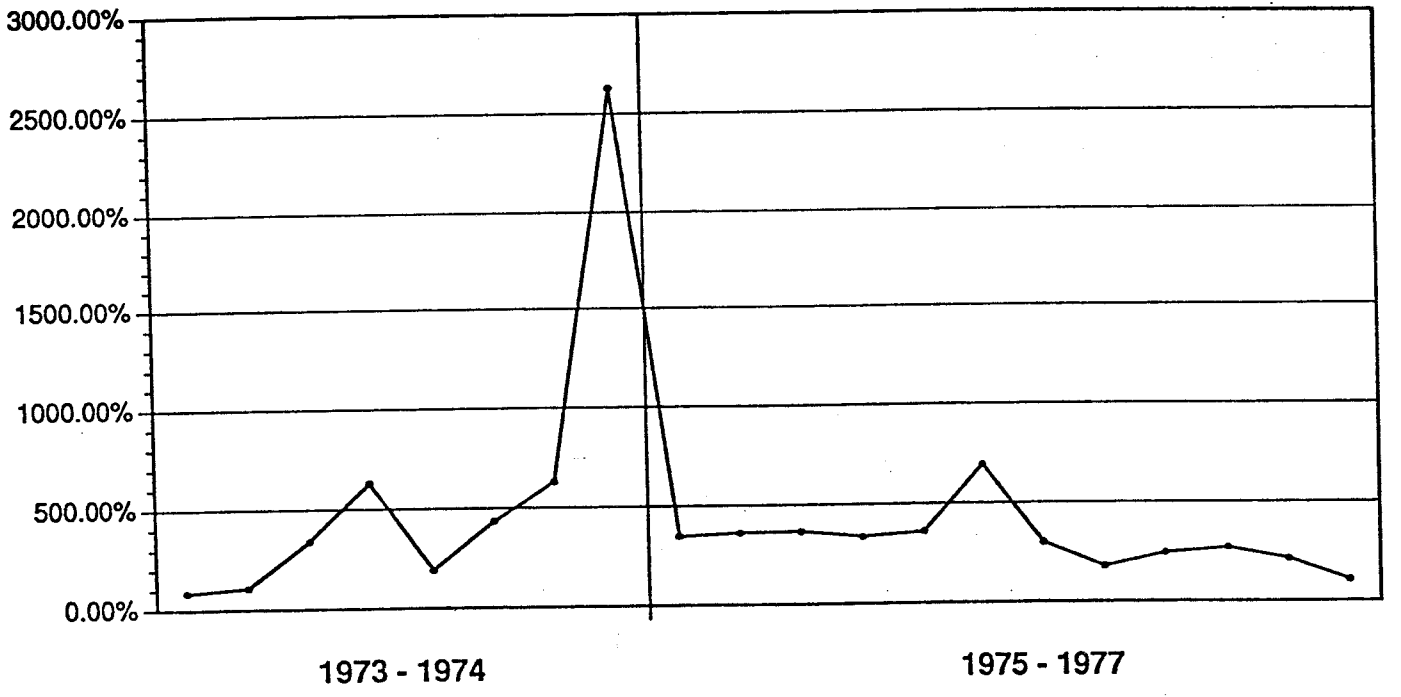


FIGURE 1C:
QUARTERLY INFLATION AT AN ANNUAL RATE
1978 - 1992
(percent)

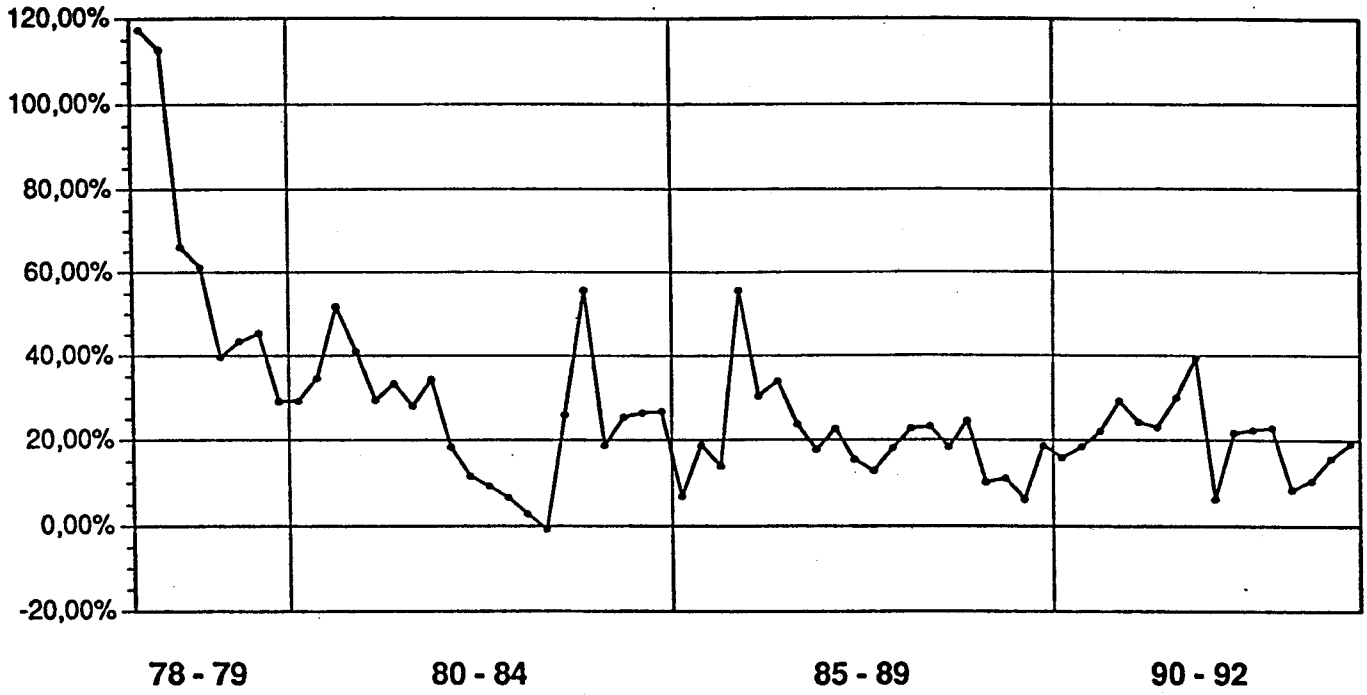


FIGURE 2: ANNUAL GROWTH OF REAL GDP
1970 - 1992
(percent per annum)

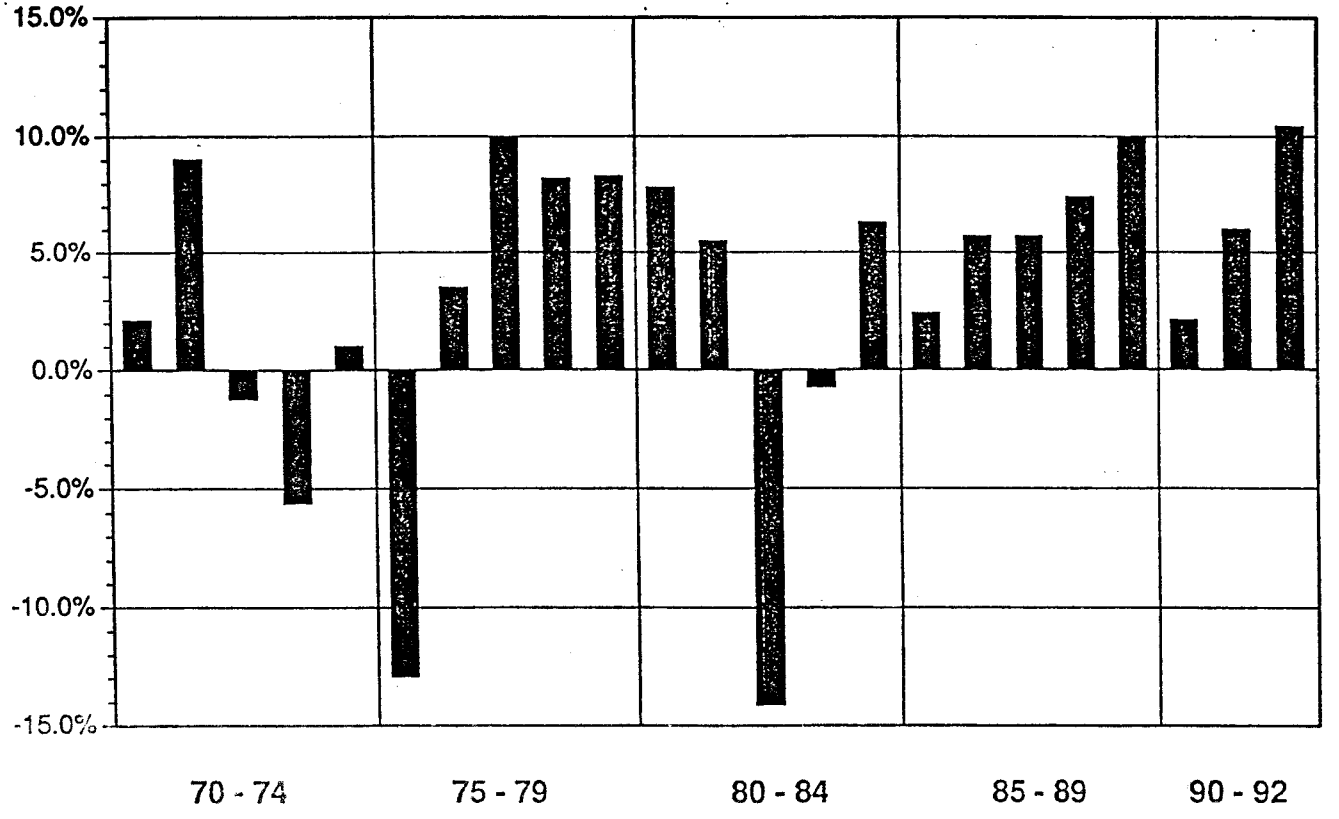
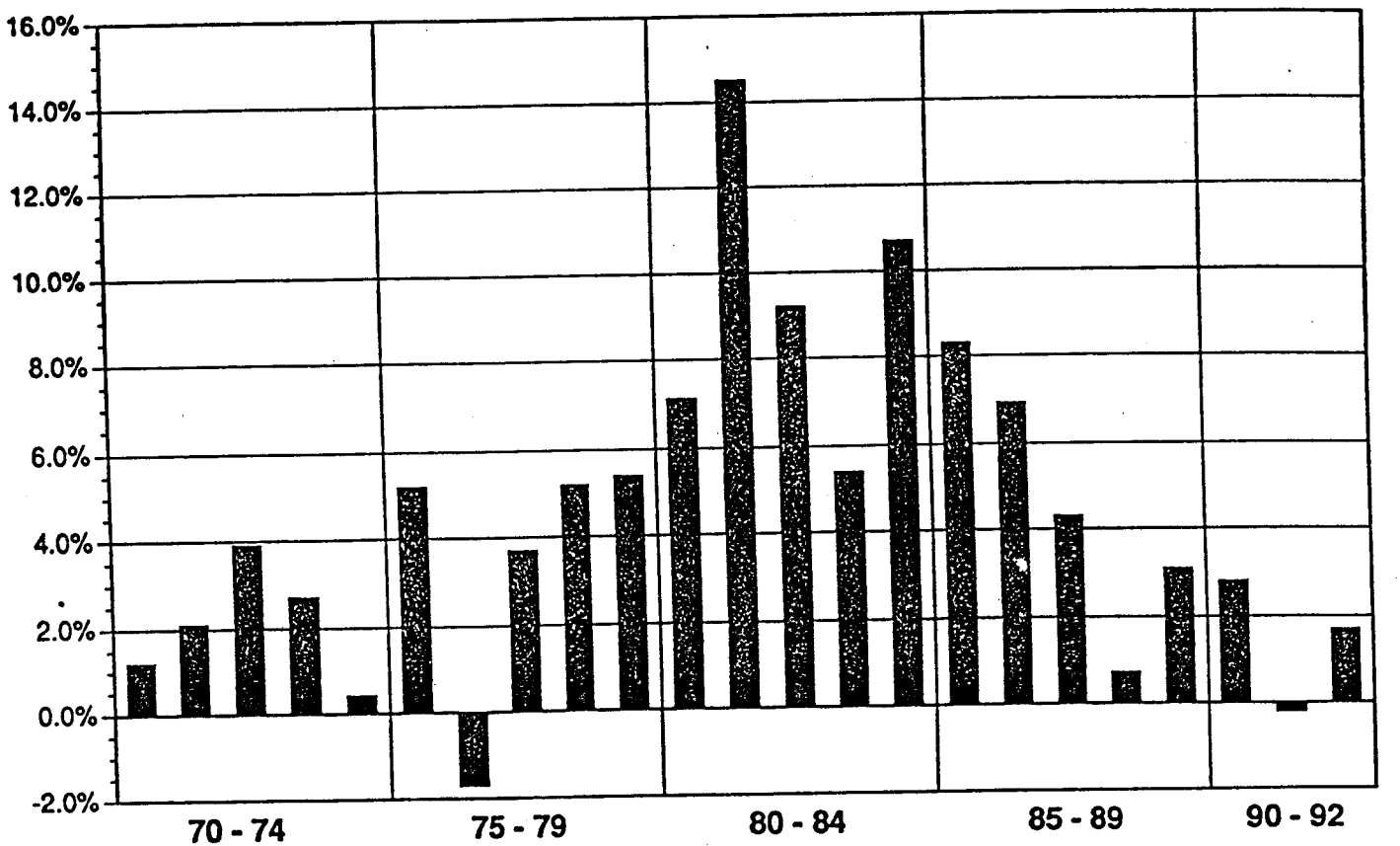


FIGURE 3: CURRENT ACCOUNT DEFICIT
1970 - 1992
(as percentage of GDP)



Note: Computed with National Accounts information at current prices.

FIGURE 4: REAL EXCHANGE RATE
1970 - 1992
(1977 = 100)

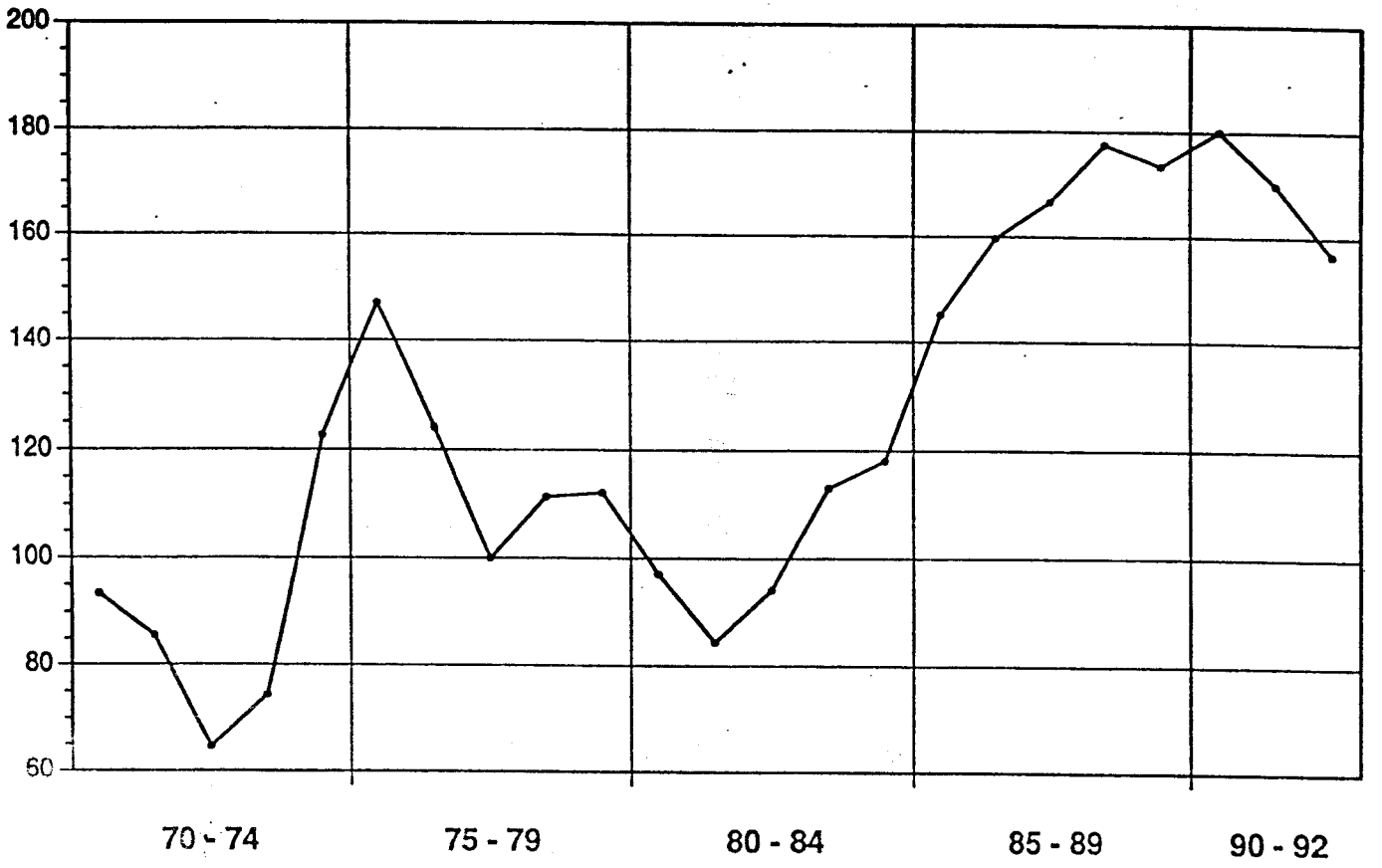


FIGURE 5: PUBLIC SECTOR DEFICIT
1970 - 1992
(as percentage of GDP)