EXCHANGE RATE POLICY IN CHILE SINCE 1960:
POLITICAL ECONOMY AND THE CHOICE OF REGIME*

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Abstract

This paper analyzes exchange rate policies in Chile since the 1960s. A brief overview on main policies is presented. Particular attention is put into the two episodes of fixed-exchange rate as well as the reasons why policy makers may have arrived to those decisions. The paper also examines the long tradition of Chile on the use of crawling peg to preserve competitiveness and as a quick exit during times of crisis. More specifically, this paper attempts to uncover political economy factors that may have influenced the decisions on exchange rate policy. Empirical evidence on the economic environment during different episodes of exchange rate management as well as the political economy factors that may have underlay the options is presented.

1. Introduction

Since 1960 Chile has experienced not only with several exchange rate regimes, but also with several approaches to economic policy. From an import substitution strategy in the sixties, to full-fledged populism in the early seventies, Chile has adopted, since mid seventies, an open free market economy with conservative macroeconomic management. During the whole period the implementation of macroeconomic policies has changed according to the external environment as well as internal developments. The importance of inflation, macroeconomic stability, outward orientation, competitiveness, structural reforms, and other objectives have played different roles in the choice of the exchange rate regime and stabilization policies. At the same time, economic policy has not been implemented in isolation from pressures from interest groups and political economy considerations. Indeed, many decisions are made taking into account pressures as well as the need to build support for policies, and hence some compensation mechanism arise.

Economic performance has also been very varied during this period. The economy has gone from moderate growth in the sixties, to extreme inflation, stabilization with recession-recovery in the seventies, and finally to a big recession-recovery cycle and then high growth since the eighties.

The varied experiences and the varied performance make Chile one interesting case in exchange rate policy during the last 30 to 40 years. It is interesting to note that at least during the latest fifteen years exchange rate policy has been one of the main areas of public attention and discussion regarding economic policy. As a consequence of the crisis of 1982 and the good record since the mid eighties, a high priority has been given to the objective of keeping competitiveness, not only at a government level but also within the private sector.

The purpose of this paper is to study the determinants of the choice of exchange rate regime, with special emphasis on political economy factors. For this purpose the Chilean experience since 1960 is analyzed. The next section describes the evolution of exchange rate policies in Chile. Section 3 discusses the political economy of exchange rates, analyzing the role of exchange rate policy in the context of other objectives and as part of a whole package of macroeconomic policy. Section 4 describes the data and performs some preliminary analysis on measures of misalignment and the relationship between exchange rate regime, trade policy, and other characteristics of the economy. In section 5 I present multinomial logit analysis to examine the determinants of the exchange rate choice. Finally, section 6 concludes.

2. Evolution of Exchange Rates and Policies

The real exchange rate has displayed large fluctuations since the 1960s (Figure 1). Changes in fundamentals, such as terms of trade, productivity, openness, etc., explain this evolution. But also, changes in nominal exchange rate policies have had persistent effects on the behavior of the real exchange rate. The use of the real exchange rate to achieve competitiveness or to reduce inflation has had important real effects.[1] Another important characteristic of Chile's exchange rate policies is the existence of strong restrictions on foreign exchange transactions for most of the time from 1960 to 1990, with the exception of the late 1970s and early 1980s. Almost complete liberalization of foreign exchange markets has taken place in the 1990s.

2.1 Classification of Exchange Rate Regimes

In order to classify exchange rates regimes, this work distinguishes four different exchange rate regimes and they will be defined by a discrete variable (1 to 4). They are:

1. *Fixed exchange rate regime*: this is usually implemented to achieve low inflation, and it is also characterized by a liberalization of most foreign exchange transactions, and consequently, unification of exchange rate market. During these periods there was been also liberalization (partial) of capital flows. The two experiences in Chile only differ that in the first Chile was a relatively closed economy following an import substitution strategy, while during the second one the economy was fairly open. However, both experiences bear the in common the sign of the reforms. In both cases there was a tendency toward more openness.

2. *Crisis management*: these are usually periods where the authorities adopted some form of floating and the introduction of segmentation in foreign exchange markets. These periods follow exchange rate crisis. At this stage there is no clear exchange rate regime, but just attempts to control the loss of reserves, rising inflation, and financial distress.

3. *Crawling peg cum exchange rate controls*: This basically consists of a policy of small devaluations of the exchange rate according to some rule oriented to keep some level for the real exchange rate. The exchange rate can be fixed at the level of the crawling peg or it can be allowed to float within a narrow band. Most of the crawling peg episodes have been characterized by segmentation in the foreign exchange market.

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[1] For descriptions of exchange rates policies see Ffrench-Davis (1973, 1979), De Gregorio (1986), Edwards and Cox-Edwards (1987), Dornbusch and Edwards (1994), Meller (1990), Williamson (1996) and Cowan and De Gregorio (1998).

4.	*Wide band*: this is a system of a wide exchange rate band around some central parity, and with few controls on foreign exchange rate market. The central parity can be chosen in a manner similar to that of the crawling peg, but the exchange rate is allowed to float in a wide range. This is the closest that the Chilean economy has been to a floating regime.

Table 1 presents the classification of the exchange rate regime according to this categories. The reasons for this classification, and the description of exchange rate policies, are discussed in what follows.

2.2 Exchange Rate Policies: 1960-1996

The sixties started with a fixed-exchange rate regime. In order to achieve price stability, in January 1959, and after a 18% devaluation in late 1958 and 25% in January 1959, the exchange rate was fixed at 1.05 Escudos per US dollar. The foreign exchange market was unified, and free access to it was established. Between 1960 and 1962 there was a 12% real appreciation, a decline in inflation and a sharp increase in the deficit in the current account. With the external situation deteriorating and after completing the liberalization of foreign exchange, 1962 started with a reversal of liberalization, and the reintroduction of foreign trade restrictions. The exchange rate system was abandoned in October 1962, and in the next couple of years exchange rate policy and capital account management were oriented to close the external gap. Restrictions in the foreign exchange market were reintroduced and intensified during 1963-64.

The crawling peg system was initiated in April 1965, with a couple of small devaluations a month. The policy remained essentially the same until 1970, with varying degree of restrictions on foreign exchange and foreign trade, depending to a large extent on short-term balance of payments conditions. For these reasons, for example, in 1967 and after a deteriorating external situation, restrictions were tightened. By the late sixties there were three official exchange rates: one rate for most trade transactions, the "corredores" rate, the second one that applied to the banking system and it was mainly used for financial obligations, and the last one for copper exports. The exchange rate for copper exports was in practice a tax, although small. In the period 1963-65 this dual system was used more intensely as the economy entered into a balance of payments crisis. The gap between the general exchange rate for exports and the one for copper was in average 11% during this period, while the maximum was in 1964, when it reached 18%.

In late 1970, right after the beginning of Allende's government, there was a new attempt to fix the exchange rate, but the rapid rise in inflation caused a substantial real appreciation. The policy response was to devalue and to increase segmentation in the foreign exchange market. By 1973 there were at least six official exchange rates with a ratio of 1:52 between the maximum and the minimum. By that time there was also massive intervention in foreign trade. The average tariff was around 100%.

It is worth to note that according to figure 1 the real exchange rate during the sixties was substantially lower than the real exchange rate post-1974. As mentioned above, multiple exchange rates with a number of restrictions and trade protection may have allowed the economy to have such an appreciated real exchange rate without wide current account deficit.

After the militaries took power in 1973 the first measure in the exchange rate front was a 300% devaluation, for the most important exchange rates, to restore competitiveness, and the multiple exchange rate regime was collapsed to just three rates. A crawling peg with four devaluations a month was implemented, but with different adjustments for the different rates with the purpose of achieving exchange rate unification. In August 1974 the exchange rate for copper exports was unified, remaining only two exchange rates. The final unification occurred one year later. Macroeconomic discipline was achieved, but inflation was still high, despite the large decline in activity. By 1974 the real exchange rate reached the maximum depreciation since the 1960s.

By 1976 and 1977 inflation was still high. In 1976 inflation was still three-digit and in 1977 declined to 64%. During these years the crawling peg system was based on daily devaluations pre announced, and indexed to domestic inflation. But, in June 1976 and March 1977 two 10% revaluations were implemented, officially justified by the fact that the real exchange rate was too depreciated and the external conditions would allow for an appreciation.

In February 1978 the system of daily indexed devaluations was abandoned by a "tablita", that set the rate of crawl according to inflationary targets. The "tablita" was announced to start with a 2.5% monthly devaluation starting February to end in 0.75% in the last quarter of 1978. Inflation still remained high and stabilized at around 30%, despite the reduction in the rate of nominal devaluation. In late 1978 a "tablita" for the whole 1979, with a 15% devaluation, was announced. Despite the attempt to reduce inflation through the reduction in the rate for devaluation, inflation was still high. The year 1978 closed with 30% inflation, the same rate prevailing in June 1979.

With disappointing progress on inflation, the exchange rate was fixed in June 1979. The value of the dollar was set at $ 39, which was 6% higher than the prevailing tablita. The rest of the story is well-known. After deteriorating internal and external conditions, the fixed exchange rate regime collapsed in June 1982.

The devaluation of 1982 was followed by a period of instability, with discrete devaluations, a short period of floating, segmentation of the foreign exchange rate market and so on. In August 1982 the exchange rate was again set according to a crawling peg based on a PPP-rule. Although the rules have changed, the basic mechanism of daily mini-devaluations, initiated in the sixties, has been kept until today. During the crisis of the early eighties and in order to help firms under financial distress because of high leverage in dollars, several programs to help debtors were implemented, and they are discussed below.

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In late September 1982 the exchange rate was allowed to move within a narrow band, ±2%, which has been widening since then. The central parity has been determined according to daily devaluations based on the differentials between domestic and foreign inflation. There have been changes in the rate of crawl as well as the basket of currencies used to set the central parity.

After stability returned to exchange rate policy, several devaluations were implemented during the 1980s, in addition to the daily mini devaluations. The first one was 23.7% in September 1984, 9% in February 1985, and 5% in June 1985.

The crawling rate has been set following a PPP rule. Devaluations have been done on a daily basis as the difference between domestic inflation and foreign inflation, which in terms of US dollars was estimated at annual rates of 1% when the system was reintroduced. Then in March 1983 the discount was set to zero to induce a depreciation. Then, in 1985 a 0.6% as foreign inflation was discounted, and later rates of 3.6%, 0%, 1.2% were used to finally reach a 2.4%, since July 1992.

In late 1995 a downward drift (appreciation) of 2% was added to the PPP rule. That is, the discount allowed for an "equilibrium" 2% real appreciation in the central parity, that is a PPP-2% rule. The central parity has been set according to a basket of currencies, but the weights have been changed in different occasions.

Regarding the width of the band, when first was implemented, in September 1982, a ±2% width around the central parity was set. In mid 1989 the band was widened to ±5%, further to ±10% in January of 1992 and to ±12.5% in January 1997. As in the 1980s the central parity has been changed on several occasions during the 1990s, but revaluations instead of devaluations. There have been four revaluations: in June 1991 the central parity was revalued by 2%, then revalued 5% in January 1992, 10% in December 1994, and finally in January 1997 it was revalued by 5%.

The period going from the debt crisis up to 1990 was a period in which the continuous devaluations of the nominal exchange rate were able to achieve a continuous real depreciation. Devaluation without inflation was achieved because the devaluations contributed mainly to correct a large misalignment occurred in the early 1980s.[2] Between 1981 and 1988, the period of persistent depreciation, the average devaluation was 30% per year, whilst average inflation was only 20% per year. It is interesting to note that the real depreciation continued even in the second part of the 1980s, where there was no need to devalue discretely. The depreciation of the dollar in the second half of the 1980s, after the sharp appreciation of the first half

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[2] For details on real exchange rates determinants see De Gregorio (1996) and Céspedes and De Gregorio (1999).

of the 1980s, allowed to have a depreciating rate with respect to the dollar, an even lower inflation rate and a depreciation of the real exchange rate.

Beginning in 1990, the situation has reverted, and exchange rates started appreciating. The economy had reached full employment by 1988, external accounts appear to be sound and productivity growth has been important. Chile has also returned to voluntary capital markets. In this context, tensions in the exchange rate market appeared and the period of "high" (depreciated) real exchange rate ended. During 1990-96 the real exchange rate appreciated at an average annual rate of 4.6%.

An important policy implemented during the 1990s, with controversial degree of success, has been an unremunerated reserve requirement on most capital inflows, that currently amounts to an entry fee of about 3%. This has been used as a complement to macroeconomic policy, with the objective to allow tight monetary policy with a "weak" currency.

3. The Political Economy of Exchange Rate Regimes

Decisions on exchange rate policy, and in particular the objective of the policy in terms of achieving certain level for the real exchange rate and its interaction with other objectives such as promoting specific sectors or controlling inflation, are not taken in isolation. The choices are not necessarily the technically "optimal" ones, since they are many times subordinated to other objectives and the result of interactions among different interest groups. In this section I explore some political economy factors that have underlay the exchange rate regimes in Chile. In this respect it is important to show how the system evolved from an import substitution strategy to trade liberalization, and the exchange rate played an important role as a compensation mechanism. Another important feature in Chile was the evolution of the exchange rate system from one competitiveness-oriented toward an anti inflation-oriented. In all of these cases there were political economy factors, ideas, and institutions that were determinant in the specific choices.

4.1 From import substitution to liberalization

During the 1960s until 1974 Chile was a leading example of inward-looking development based on import substitution. Therefore, the exchange rate had to accommodate to this strategy. Although the crawling peg was introduced in the 1960s to preserve competitiveness and stability, figure 1 shows that the real exchange rate was very appreciated when compared to the post 1974 levels. This was sustained, to avoid excessive imports and an unsustainable external imbalance, by high tariffs and other trade restrictions.

A clear description of the interactions between the exchange rate regime and the trade regime is in the speech given in 1976 by Sergio de Castro, one of the leading figures of Chile's trade liberalization. He was

explaining the problems Chile had with the Andean Pact in order to liberalize its trade regime. On imports substitution and appreciation he said:

> "Obviously that policy [appreciated exchange rate] allowed for the import of capital goods and raw materials at relatively low prices which were needed for industrialization which was being encouraged. As a result, ... it also motivated the importation of all sort of goods. If the policy had been maintained, it would obviously have created a large deficit in the balance of payments. In order to avoid this, a tariff policy was applied which consisted in prohibiting or in applying extremely high duties to those products which it was thought could be produced domestically" (de Castro, 1976).

And regarding exchange rate and trade regime he went on arguing that:

> "It should be emphasized that the exchange rate policy and the tariff policy are indissolubly bound together in an inverse relation… In this way the lack of protection which may affect a particular sector when the tariffs are lowered is compensated for in part by the additional protection afforded by what should be an automatic rise in the rate of exchange rate in real terms."

Therefore, the exchange rate regime prevailing until 1978 was clearly oriented to compensate the industrial sector, and other protected ones, for the loss of protection.3 It was also oriented to promote exports. Of course, as basic open macro theory would suggest a depreciation of the real exchange rate is the natural outcome of trade liberalization, and hence the objectives of the authorities were consistent with expected outcomes. The objective of achieving competitiveness was already evident in "El Ladrillo," the name given to the document prepared by the Chicago boys during Allende's government and is considered to be the economic program of the military regime.[4] According to this document:

> "The maintenance of the exchange rate in real terms is an indispensable requisite to move significant amount of resources to the exports industry. In consequence, *and while stability of prices is still not achieved* [italicized by author], it is indispensable that the Central Bank continue devaluing periodically and with necessary frequency to avoid large devaluations or predictable ones that could induce speculation… It is fundamental that the exchange rate policy do not change… If, for example, it is expected that the exchange rate

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[3] It is disputable when authorities changed from the compensation objective to the anti-inflation objewctive, since already in February 1978 the tablita was implemented, anchoring the rate of crawl to future expected inflation. However, the regime in 1978 is classified as a crawling peg, although it moved to a fixed-exchange rate regime.

[4] The document was called "Economic Program for Development" and given to important figures in the military government in September 1973.

will increase less than domestic prices [real appreciation], there will be a devastating [funesto] effect in the allocation of resources since the risk of investing in the export sector will be increased..."

It was clear the intention of opening up the economy and compensating the reduced protection, as well as promoting exports, with the exchange rate. However, the exchange rate was not the only compensation given to entrepreneurs in order to have support for the reforms, in particular the opening up of the economy. Reforms were deep and widespread and several other mechanisms had to be used. Edwards and Lederman (1998) provide an insightful discussion on the political economy of Chile's trade reform. In a relatively short period of time, from 1974 to 1979, tariffs were drastically reduced--from an average 100% and many selective controls to a flat 10% and no other controls--, and it was possible because existed the necessary support to undertake the reform. Some of the components of the reform program provided compensations to the private sector. This is the case of a large scale privatization, some of which were at a bargain (Hachette and Luders, 1992), and financial liberalization, which allowed existing and emerging conglomerates to participate in financial activities, heavily intervened pre-1974. On the other hand, more direct compensation mechanisms were the repression of labor unions and the appointment of leaders of the entrepreneurial associations to the cabinet. The first important case was the appointment of the leader of the organization of farmers as Minister of Agriculture. This mechanism was regularly used to build support for the reforms among the private sector (Campero, 1991).

Finally, it is important to bear in mind that reforms were also favored by the fact that the country was in one of its deepest economic and political crisis of the century in 1973, and therefore there was ample room and popular support to introduce drastic reforms.

Summarizing, one can argue that the from 1974 to 1979 the exchange rate regime was consistent with the compensation needed to implement a deep trade reform and the drastic switch from import substitution to outward-oriented development.

3.2 Inflation and fixed exchange rate

As described in section 2, since 1978 the exchange rate policy started shifting toward an anti-inflation objective, which culminated with the fixed-exchange rate from June 1979 to June 1982. From a political economy point of view two are the main issues that arise in this period. The first one is why after a strong position favoring competitiveness there was the change of emphasis to use the exchange rate as the anchor to fight inflation. The second issue is which were the compensation mechanism used to keep support for the economic program after several years of pro-competitiveness discourse. Now I examine them in turn.

Regarding the change of emphasis in the role of exchange rate policy it is difficult to find a strong answer and there are least three important aspects that may help to explain this change:

- The role of ideas. Actually the economic team was mostly educated at Chicago University. As clear from "El Ladrillo" (see italicized in quotation above) the crawling peg, or mini-devaluations, was thought as a good tool before achieving price stability. In a more stable situation there was the believe that inflation would quickly converge to international levels. According to a high official, Julio Dittborn deputy director of the planning office (ODEPLAN) by that time, "in the light of existing information...fixing the exchange rate would lead us quickly to domestic inflation similar to international inflation" (cited by Arellano and Cortazar, 1982). Thus the issue of real appreciation was not considered to be important. Moreover, the real exchange rate was at record levels (depreciated), and hence, there was room for some appreciation.

- Inflationary disappointment and temptation. After a shock treatment to reduce inflation in 1974, with a money-based stabilization, progress in inflation was moderate. By the end of 1976 inflation was 174%, and in 1977 declined to 64%. Thus, moving to an exchange rate-based stabilization, under the view that the law of one price should hold, could help to bring progress faster. Indeed in 1978 inflation decreased to 30%. It is important, however, to note that the decision to fix the exchange rate was taken before achieving price stability, since by June 1979 yearly inflation was still 30%.

- The external environment was suitable. As large amounts of funds in the world were available for developing countries and at the same time Chile's financial markets were open to the rest of the world. Financing a widening current account was not seen as a problem.

The 1979-82 experience has some similarities with the fixed exchange rate of the late fifties in terms of "inflationary disappointment." From 1955 to 1958 in Chile was the "Mision Klein-Sacks." This was an economic program designed by an American consulting firm, previously working in Peru. They proposed a broad reform program, that showed partial success (Ffrench-Davies, 1973). After reducing inflation from levels around 70-80% in 1954-55 to 17% in 1957, inflation jumped again to around 30% in 1958. A notable inflationary success was achieved in 1960-61, when the exchange rate was fixed, with inflation declining to 5.5% and 9.5%, figures not seen in Chile in the post-war and not seen again until the 1990s.[5]

In the context of an appreciating exchange rate and a pro-openness objective one may wonder how it was possible to sustain the fixed-exchange rate regime of the late seventies-early eighties. First of all, the

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[5] A difference in the two cases is that the crisis of 1962 was clearly caused by a fiscal imbalance, with a fiscal deficit about 5% of GDP, while the crisis in 1982 was with fiscal surplus, but with a financial crisis, closest to Asian-crisis of today.

main "compensation" was a boom of economic activity. This boom was associated with the stabilization program and it is a typical consequence of exchange rate-based disinflations (see Calvo and Vegh, 1998). The average rate of growth during 1977-81 was 7.9%. Growth was particularly important toward the early 1980s since at the beginning it was the recovery from the 1974 recession. This compares strikingly with a -3.2% average decline in output in the previous 5 years.[6] Low tariffs and an appreciating exchange rate also allowed for cheap imports, for consumer goods as well as inputs for the industrial sector. All of this economic scenario, with strong growth of output, and even stronger for consumption, generated ample support for the stabilization strategy.[7]

There were additional reasons why there was still support for the fixed exchange rate. Edwards and Lederman (1998) stress the fact that the opening of the capital account and the liberalization of financial markets allowed the big "grupos" to obtain financing abroad at very convenient conditions, when domestic interest rate (lending) where very high. Therefore, while having troubles in their tradable activities, corporate conglomerates were able to obtain financing, to make profits in their nontradable businesses, and to enjoy large spreads in interest rates domestically. The appointment of entrepreneurs to the cabinet continued, making them to be involved in policy making and being partners in the main decisions.

As the crisis was arriving by late 1981, support started declining. It is interesting, for example, that Jorge Alessandri--president of Chile during from 1958 to 1964 and one of the main figures among entrepreneurs--criticized the economic situation in the eve of the devaluation of 1982 (El Mercurio, 17 of April). Although he did not ask directly for a devaluation, he suggested that tariffs could be increased. The official line was of course just to argue that a devaluation would be chaos, only inflation, and hence, not a valid option.

3.3 Crisis and compensations again. An example: Subsidies to debtors in the crisis of 1982

After the devaluation of 1982, the government needed to rebuild support to undertake an adjustment and to avoid that the social discontent would threaten the military regime. Indeed, 1983 was perhaps the year where the military government was under the biggest threat. One solution was to go back to partial populism and appointing ministers "more pragmatic," in opposition to the Chicago boys. They raised tariffs and introduce several measures to alleviate the situation of particular groups. But, they did not have the strength, and perhaps neither the intention, to change the basis of the economic model.

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[6] Similarly, in the early sixties, an expansion of output gave support to the fixed exchange rate regime, since output grew 4.4% in the period 1959-62, compared to 1.8% in the previous four years. However, the currency crisis of 1962 did not end up in a large recession, since output kept growing strong in subsequent years.

[7] In 1980 there was a plebiscite to approve a new Constitution, and the results, despite the legitimacy of the election, showed that the government large popular support, and certainly the economic situation was key for this.

In the aftermath of the crisis, several measures were announced to compensate losses and the costs arisen from the break of the commitment with the exchange rate.[8] Although the crisis was widespread and deep, and far from being beneficial to somebody, some early announcements may also have helped to defend the model among entrepreneurs. Just a couple of days after the devaluation, the finance Minister announced the privatization of public enterprises, such as an electric company (Chilectra), the telephone company, and a maritime shipping firm.

Although many instruments were used to obtain support for the adjustment and privatization, particular schemes were implemented to alleviate debtors and manage the crisis, to avoid a major collapse. After allowing the exchange rate to float in August 1982, the authorities decided to implement a "preferential exchange rate system" for all debts in foreign exchange (or denominated in foreign exchange) contracted before August 1982 with financial institutions operating in Chile or directly with foreign banks. The preferential exchange rate could be used to pay interest and principal, and no pre payment was allowed. The "preferential exchange rate" was determined as the exchange rate that would have prevailed in August 6th of 1982 if the policy of mini devaluations would have been maintained, expressed in UF,[9] with a 5% surcharge.

Since the minidevaluations rule were applied with a discount for foreign inflation, the preferential and the official exchange rate would have converged. however, the existence of the preferential exchange rate, pegged in UF's, imposed constraints on the ability of the Central Bank to conduct exchange rate policy since each time it would decide to devalue it would widen the gap between both exchange rates. This was what actually happened. The gap (official exchange rate/preferential exchange rate), that started at about 26% and declined systematically to 17% in mid 1984, increase sharply after the devaluations of September 1984, February and June 1985, reaching a maximum of 63% in July 1985.

The forms of payment, from cash to bonds, and the eligibility for the preferential exchange rate were changed during its application. The most important changed was the exclusion of exporters in early 1984, since they were benefiting from the depreciations of the exchange rate. In June 1985 it was announced the gradual elimination of the preferential exchange rate, by reducing linearly the gap to disappear in December 1986.

Although the preferential exchange rate was the main subsidy to debtors, in September 1984 a "dedollarization" of debts was allowed. Debtors could refinance their debts at an exchange rate of 93

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[8] To many, one of the main difficulties faced in the early 1980s was the inability of wages to adjust, since labor legislation imposed 100% indexation as a floor for new negotiations. Therefore, one of the first measures implemented after the devaluation was the elimination of the automatic wage adjustments.

[9] "Unidad de Fomento" is a unit of account indexed daily to the variation of the CPI in the previous month.

$/US$, instead of the post-devaluation rate of 115 $/US$. There was a maximum allowed for these operations and special treatment for debts under the preferential exchange rate system.

The amount of these subsidies was sizable. Between 1982 and 1985 the subsidy for the preferential exchange rate was 2.9 billions of dollars and the dedollarization of 1984 cost was 232 millions of dollars. The average costs of these two mechanisms was in average 3.5% of GDP per year between 1982 and 1986.

The appreciation during the period June 1979 to June 1982 was popular. Initially enjoyed popular support as cheap imports, and financing for them, were available. The devaluation came at a moment were it was broadly seen as inevitable. However, it ewas a huge change in the rules of the game. These arrangements, for the highly indebted in foreign exchange, are an example of how the losers, in particular the sizable ones, are compensated to keep support to existing policies.

3.4 Back to competitiveness

Since 1982 and after a period of instability, exchange rate policy returned to a crawling peg system. During the second half of the eighties the economy recovered strongly after the 1982-83 recession, with strong growth of exports and with a very depreciated real exchange rate (fig. 1), which according to the official measure that includes all main trading partners reached its historical heights by 1990. This set the stage for the economic program of Aylwin's administration, the first elected president after the military regime. Regarding exchange rate policy the program was very clear:

> "It must be kept a stable real exchange rate that stimulates efficiently exports and efficient import substitution."

The commitment with a depreciated exchange rate was strong, although unsuccessful, as the real exchange rate appreciated. As shown below, this was the result of an undervalued currency in 1990. The lack of capital flows in the eighties allowed an artificially depreciated real exchange rate. But, as capital inflows resumed with force in the early nineties, and the economy kept growing, the real exchange rate appreciated. There has been a trend appreciation between 4 and 5% during the nineties, and it has not been possible for the authorities to stop it.

Even the Frei administration that began in 1994 was strong in its desire to avoid appreciation. The finance Minister announced, in his first important speech, in the meeting called "Entrepreneurs of the World" that the government would seek a stable real exchange rate. But, the real appreciation continued. Flexibilization of the exchange rate band, that had a center crawling with PPP, has been introduced in order to permit the exchange rate to appreciate.

There have been two main instruments to avoid and slow down the real appreciation. First, there has been a massive accumulation of reserves. And second, capital controls in 1991 were introduced in 1991, and revised definitely in 1992, to slow down inflows. An unremunerated reserve requirement of 30% for one year for capital inflows, with some exceptions and loopholes, was introduced. As time went on and loopholes were discovered, the mechanism has been perfected, mainly through the increase of its scope. By 1998, the reserve requirement covered most inflows, with the exception of foreign direct investment and the issue of new stocks sold as ADRs abroad. In June 1998 the reserve requirement was reduced to 10%.

Regarding compensations, two aspects need to be mentioned:

- The average rate of annual growth of the economy in the last ten years has been about 8%. Therefore the claims for compensation are rather weak. Even at the agriculture sector, perhaps the one with greatest difficulties, has faced problems asking for compensation since its productivity and production have grown strongly. Therefore, as in the late seventies and early eighties with the appreciation during the fixed exchange rate period, strong growth was reduced the strength of complaints. Moreover, the official position has been usually that the appreciation is not a serious problem since the economy, and the tradable goods sector, has been growing at healthy rates.

- From the point of view of big conglomerates and the leadership of entrepreneurs organizations, there are also some similarities with the appreciation of the early eighties. Despite capital controls, large firms with access to international financial markets could get long term financing at international rates with a small fee from the unremunerated reserve requirement, which is declining with the length of the borrowing. Adding an appreciating exchange rate, the cost of financing has been very low.

4. The Choice of Exchange Rate Regimes: Preliminaries

Before proceeding with the determinants of the choice of exchange rate regime in the next section, this section presents the data, some basic correlations between exchange rate policies and trade policies, and measures of misalignment that will be used later.

4.1 The Data

In general exchange rate policies are designed in conjunction with other policies. In particular, as evident from the Chilean experience discussed in the previous sections, the degree of openness, foreign exchange controls, and controls on capital flows very related to exchange rate policies. The first set of variables account for policies related directly to the exchange rate regime. They are:

1. Black market premium: indicates the tightness of foreign exchange and capital controls. It has also been used as an indicator of overall distortions of economic policy.

2. Tariffs. I use the average level of tariffs.

3. Quantitative restrictions indices: in addition to tariffs several quantitative restrictions have been used to regulate trade flows in Chile. There is one index for imports and the other for exports. The later was only used for 1960-62. The indices are updated from Ffrench-Davis (1973) and de la Cuadra and Hachette (1990), and take values between 0 and 20, where 20 indicates the absence of quantitative controls.

4. Trade liberalization index: updated from de la Cuadra and Hachette (1990) and summarizes all the previous indicators to measure the degree of trade openness and distortions on foreign exchange markets.

The second set of variables can be interpreted as variables related to economic *fundamentals*. Figures 2 to 7 show the evolution of the main variables. The variables are:

5. Terms of trade, based on Central Bank and World Bank data.

6. Fiscal variables: overall fiscal surplus and the ratio of government consumption to GDP.

7. Current account deficit as percentage of GDP.

8. Inflation: CPI inflation.

9. Unemployment rate: unemployment rate of the Great Santiago is used, instead of national figures, because this is the only series for which data since 1960 are available.

10. GDP growth and GDP per worker.

11. Reserves as a percentage of M1 and M2 in order to have a measure of external vulnerability.

12. Net foreign assets: this is net foreign assets of 1960 plus accumulated current account deficit, taken from Bronner, Loayza and Lopez, (1997).

13. External environment: measures of international inflation (US CPI), copper prices, and percentage of countries with fixed-exchange rate regime (from Goldfajn and Valdes, 1998), were used as external indicators. In particular, the latter variable was used to indicate world trends on macroeconomic management.

Some of the previous variables could be given also a *political economy* interpretation. For example, inflation may be related to "fundamentals" because it may reflect weakness of fiscal policy, while it could be interpreted as a political economy variable related to the weight the economy places on inflation vis-a-vis unemployment. Fiscal policy variables, unemployment and net foreign assets (external indebtedness) could also be related to political economy factors. Political economy factors are also related to characteristics of the economic structure and some institutional factors. Several variables were constructed, and the ones that were used in the empirical investigation are:

14. Structure of the economy: data on composition of output and employment by main sectors of economic activity were constructed. Both variables present a similar evolution over time, and hence, the share of output of manufacturing and the share of exports on GDP were used to measure the relative importance of the import substitution and the export sector, respectively.[10] The reason for this classification is that in Chile exports have been traditionally associated to mining and agriculture, while manufacturing has been traditionally a sector producing imports substitutes. All of these data were based on national accounts. In addition, line 22d of IFS as a share of GDP, was used to measure financial development. More precisely, development of the banking system. This variable corresponds to the claims of the banking system (excluding the central bank) on non banking private sector as a fraction of GDP.

15. Data on the importance of labor unions are scarce and unreliable. A series on unionization (percent of the labor force belonging to unions) was constructed based on data of the Ministry of Labor. However, because of inconsistencies in the series, the data for 1974-79 were assumed to be constant and equal to the value of 1980, which is 13%, while in 1973 was 24%. So it was assumed that from 1974 to 1980 unionization was constant at 13%, a substantial drop considering that unionization was increasing since 1960. Some scattered data on number of strikes as well as number of unions were obtained, but not with enough observations or reliability to use them in the empirical section.

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[10] It is possible that during large recessions the increase in the share of a particular sector may be the result of a decline in GDP rather than a trend increase in the production of that sector. For this reason I used alternatively shares of sectors constructed with respect to a HP filtered measure of the GDP. However, the results did not change significantly.

4.2. Exchange and trade policies

As it was discussed previously, the exchange rate regime is classified in four categories: 1 for fixed exchange rate, 2 for management after a crisis, 3 crawling peg with exchange rate controls and 4 for a wide exchange rate band, which is the closest to a floating regime. Tables 2, 3, and 4 are contingency tables for the exchange rate regime and other indicators of economic policy. Each entry represents the number of years (37 in total) where a given regime coincides with a given range for the other variables. At the bottom of each table are the average for each variable across regimes and its standard deviation (s.d.).

Table 2 shows the relationship with the average level of tariffs, where the level of tariffs is divided in ranges from 0 to 20%, from 20 to 70% and 70 to 110%. As can be seen from the table, crisis happened also with high tariffs. Whether high tariffs were a response to the crisis or part of a more overall policy stance regarding foreign trade is not clear. Indeed the three observations for very high tariffs coincide with the years 1971-73, where the economy become more closed to foreign trade and macroeconomic management was out of control. However, it is natural to think that during currency crisis a usual response to control the depreciation of the currency is to increase tariffs. This happened in Chile in the 1980s after the debt crisis. Crawling peg systems is a system oriented to keep some competitiveness, and it has been used in periods of tariffs in the low and middle range. During the 1990s tariffs have been low and the exchange rate regime has been of a wide band.

Similarly, for the trade liberalization index (table 3) similar patterns are observed. Recall that the higher the value of the index the more open is the economy. Regarding crisis we observe that, in addition to the early 70s, there is a reaction toward reducing the degree of openness, since out of the 6 cases, 5 of them happened with the index between 1 and 8. The periods of fixed exchange rate regime occurred with both, relatively open (early 1980s) and relatively closed (early 1960s) economies. However, and as I discussed in the review of the experiences, in both experiences there was a tendency was toward liberalization.

Finally, in table 4 I compare the exchange rate regime with the black market premium. Unification of foreign exchange rate market was a characteristics of the two periods with fixed exchange rates. As the table shows they were also periods with a low black market premium, except in the eve of the crisis of the early 60s were the premium started increasing before the abandonment of the regime, and foreign exchange controls were used to defend the currency. As expected, crises have a high BMP, in most of the cases above 50%. Crawling peg periods have low, moderate and high exchange rate premia. Finally the experience of the 1990s show small black market premium.

Overall, the results, although with few data, show some interesting relations. There is a tendency to have a more closed economy and high black market premium in times of crisis. There is an attempt toward increased liberalization in periods of fixed exchange rates. Crawling peg has been used during periods of

middle range and low tariff, and the wide band has been used in a period of significant openness. Overall, one could preliminary conclude that more flexible exchange rate regime have prevailed when the economy is more open, and the political economy interpretation would suggest that this is done in order to keep competitiveness. Below a more complete analysis is presented on the relationship between exchange rate regime, other economic and political economy variables.

4.3. Measuring Real Exchange Rate Misalignment

A key variable needed to analyze the choice of the exchange rate regime is the degree of misalignment of the exchange rate. To construct a measure of misalignment, we need to define some equilibrium real exchange rate (q^*) and compare it with the actual real exchange rate (q). More precisely we define the misalignment, M, as $q-q^*$, where the real exchange rate is measured as the units of domestic goods per unit of foreign goods (ep^*/p). Therefore, a negative value for M implies an overvalued currency (the real exchange rate is "too low" or appreciated), while a positive one represents an undervalued exchange rate.

The first thing it was done to estimate equilibrium real exchange rate was to estimate a structural equation for the real exchange rate (log). Then, the predicted value was smoothed using a HP filter, and that value was considered to be the equilibrium real exchange rate. Assuming a smooth real exchange rate allows having persistent real exchange rate misalignments, something that has characterized the Chilean economy in the period of this study. The regressions were performed for the entire sample: 1960-96. In order to have reasonable estimates a dummy variable for the constant and for the fiscal variable for the post-1974 period was introduced. During the sixties and early seventies there were multiple exchange rates, low degree of openness and pervasive capital controls which make difficult to think there was a stable relationship for the real exchange rate.[11]

The explanatory variables in the real exchange rate equations are:

(1) GDP per worker, as a measure of productivity and to capture the Balassa-Samuelson effect by which higher levels of productivity (in the tradable goods sector compared to the non-tradable goods sector and across countries) imply a more appreciated real exchange rate. Rigorously one should compare domestic productivity against productivity in the rest of the world. This was found to work better for the entire sample from 1960 to 1996.

(2) Government consumption over GDP, as a measure of pressures on the relative price of non tradables as long as the government spends a larger fraction of GDP in non tradables. This variable may

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[11] In a previous version, regressions for the period 1974-96 were estimated and used in the analysis of the next section. For the period 1960-74 the variable misalignment was not used. In this version the entire sample is used for the rest of the papers, and the results do not change significantly when a restricted sample is used.

also capture the intertemporal effects of increases in government expenditure. This variable is measured based on IFS data for government final consumption, which is in average about 12% in the estimation period. The fiscal surplus was also used to proxy for the effects of fiscal policy.

(3) Net foreign assets (log). The need to generate current account surpluses of an economy depends on its net assets position with the rest of the world. If net assets are positive and large the economy will have an appreciated real exchange rate since it will need less surpluses to pay back debts, and hence we expect a negative sign. This series is constructed as the accumulated current account surplus, starting with an estimate in 1960.

(4) Terms of trade (log). Depending on the strength of income and substitution effects the sign may be either positive or negative, but in general one would expect the sign to be negative, that is an improvement in the terms of trade cause an appreciation (De Gregorio and Wolf, 1994).

(5) Finally, an indicator of openness was used to capture the fact that more open economies should have a more depreciated real exchange rate. As economies are more open, they need more resources to be devoted to the tradable goods sector in order to keep full employment, and hence, the real exchange rate must appreciate. However, this variable is also amenable to political economy factors. In an open economy, more sensitivity with tradable goods sector will tend to favor a weak currency. In addition, import substitution sectors, the most affected by the reduction of tariffs, , can be implicitly compensated with a weak currency.

The results from the estimations of equilibrium real exchange rates are presented in table 5. We use the multilateral real exchange rate published by the Central Bank. In general the results are in line with the theoretical predictions and with other estimations for the Chilean economy, although neither the terms of trade nor government expenditure were statistically significant. As said before, the fiscal surplus was only significant post-1974. The rest of the coefficients have the expected sign. An increase in labor productivity (measured in logarithmic form) in Chile produces a real appreciation, while an increase in foreign productivity produces a real depreciation, both results consistent with the Balassa-Samuelson effect. Moreover, when entered the difference in labor productivity, in regression (3), the coefficient is about -1, that is an increase in relative productivity in 1% produces an appreciation in the order of 1%. An increase in net foreign liabilities induces a depreciation. A 10% increase in foreign liabilities leads to a depreciation of 1.5%. The only fiscal variable significant was the budget surplus post-1974, which indicates that an increase in the surplus by 1% of GDP leads to a 1% real depreciation. Finally, openness, measured by the index of liberalization plays also a significant role in the real exchange rate. A larger degree of openness is associated with a more depreciated real exchange rate. As was explained above, the trade liberalization of the seventies was accompanied with a deliberate effort to keep a depreciated real exchange rate. Of course, there are theoretical reasons that explain why this attempt was successfully, since a reduction of tariffs is

associated with a depreciated real exchange rate. As argued above, it was also consistent with the need to compensate import substitution industries from the loss of competitiveness stemming from the reduction of protection.

In order to measure the misalignment I use regression (3), although the results are not very different when computed with other regressions. The misalignment series is plotted in figure 8. The stabilization of the mid 1970s resulted in a very depreciated real exchange rate, which started appreciating significantly with the tablita, and then, after the debt crisis depreciated also substantially, to start appreciating again in the early 1990s but with a more flexible exchange rate regime. The Chilean experience is one where misalignments tend to be very persistent (see also Bronner, Loayza and Lopez, 1997).

4.4. A first look at the data

With the basic data for the analysis, I first have a look at the behavior of the variables across the different exchange rate regimes. This is done in table 6. Inflation has been lower in the band period, which corresponds to the 1990s. It is interesting to note, that the periods of crawling peg are characterized by higher inflation and lower growth than the periods of fixed exchange rate. But, both periods of fixed exchange rate ended up in a crisis, which is an indication of the boom-bust cycle of exchange rate-based stabilizations (Calvo and Vegh, 1998) and that were commented before in its role as a "compensation mechanism." In addition these periods have also a wide current account deficit. It is interesting to note that terms of trade were not exceptionally low during crisis, so they are not purely a result of bad external environment.

The data show that the relationship between the exchange rate regime and the misalignment is consistent with the discussion in the previous section. The real exchange rate is relatively undervalued during periods of crawling peg. Therefore, crawling pegs have a bias toward competitiveness, while fixed exchange rate regimes have a bias toward controlling inflation. Crises are associated with misalignments since they present the highest overvaluation.

Fiscal figures show that during the fixed and band exchange rate regimes, fiscal accounts were in surplus o a slight deficit, and hence the collapse of the fixed regimes cannot be attributed to a fiscal problem, except for the crisis of 1962. Moreover, during the period with a band, the nineties, the fiscal position has been the strongest and the level of government expenditure is the lowest.

Sectoral composition of output, exports and employment do not show clear patterns across exchange rate regimes, and they are relatively stable. Only in the latest period there is some increase in the share of exports of manufactures, although production of manufactures declines slightly compared to other periods. These figures show the big change that has taken place within industry, which has become intensive in

exports, while in the sixties and seventies it was essentially producing imports substitutes. Similar change has taken place in agriculture, forestry and fishing. In all of these sectors the share of exports has increased during the nineties, although the share of labor (and output) has declined significantly in this same period, reflecting the change toward activities oriented to exports and intensive in capital, from traditional products produced for domestic markets. The level of the real exchange rate and the exchange rate regime are important in the explanation of these changes.

Clearly, the nineties (the period of the exchange rate band), financial development has been the highest, measured by the relative size of M2 or credit from the banking system. During crisis financial development declines substantially and M1/GDP increases.

Finally, unemployment appears to be somewhat larger during crawling peg regimes, but this is a consequence of the recovery from the (currency) crisis of 1983-83 that resulted in high unemployment for the next several years. Unionization has also tended to increase during crisis, which is to a large extent the fact that the first to become unemployed are workers not affiliated to unions.

5. The Choice of Exchange Rate Regimes: Multinomial Analysis

In this section I analyze the determinants of the exchange rate regime. First, I present a brief methodological description, and then the results. The results are divided in three parts, in the first part I present some partial correlations (univariate regressions) between the main economic and political variables and the prevailing exchange rate regime. In the second part I present more general results. And in the third part I simplify the analysis by separating the exchange rate regime in crawling peg and rest, and hence I can use standard logit technique.

5.1 Methodology

Given that the possible choices are j=1,2,3 and 4, for the exchange rate regime, we can estimate the following multinomial logit model:[12]

$$\Pr(Y_i = j) = \frac{e^{b_j' x X_i}}{\sum_{k=1}^{4} e^{b_{k'} x X_i}} \tag{1}$$

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[12] For further details see Greene (1993), chapter 21.

However, if we replace β_j by β_j+z in the previous expression, the term $\exp(z'X_i)$ cancels out and hence the probability is exactly the same. To solve this indeterminacy one needs to normalize one of the β's to zero. I choose the crawling peg ($j=3$) as normalization since is the regime in most of the observations. Although the coefficients depend on the normalization, the marginal effects are independent of it. Therefore, equation (1) becomes:

$$\Pr(Y_i = j) = \frac{e^{b_{j'}XX_i}}{1 + \sum_{k=1,k\neq3}^{4} e^{b_{k'}XX_i}}$$

for $j=1,2,4$, and:

$$\Pr(Y_i = 3) = \frac{1}{1 + \sum_{k=1,k=!3}^{4} e^{b_{k'}XX_i}}$$

The parameters of these equations are not easy to interpret, specially since the effects of a given variable on the probability of a given regime is rather complicated. Therefore, in order to assess the impact of a given variable, it is possible to calculate the marginal effects of a change in a given variable on the probability of a given regime. The expression for the "marginal" effect of the vector X on the probability of a given regime (the gradient) is:

$$\frac{\partial \Pr(Y_i = j)}{\partial X} = P_j[\boldsymbol{b}_j - \sum_k P_k \boldsymbol{b}_k]$$

where P_j is the probability of a given regime. Those probabilities are evaluated at the mean of the independent variables. In the presentation of the results, to have an indicator closer to elasticities I normalize by 10% changes around the mean.

It is important to make to clarifications before going into the results . First of all, the sample is relatively small, with only 37 data points and not enough variability since 20 observations correspond to crawling peg, 5 to wide band, 5 to fixed exchange rate, and 6 to crisis. Therefore, it will be difficult to obtain strong results for experiences that have just five or six observations. For this reason the last part of this section looks at the choice of crawling against the rest. And second, the definition of crisis is also disputable since it is not properly a choice: it is the only alternative and not necessarily a choice. Hence, the regression results may not only be measuring the choice of regime, but also the likelihood of currency crisis.

5.2 Results from univariate multinomial logit

As a first pass on the data tables 7 and 8 present univariate regressions for the main variables. Each entry corresponds to the effect on the probability of choosing a given regime when the independent variable

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increases ten percent around its mean. The mean of each variable in the sample is in the last row of each table. Table 7 examines the contemporaneous correlation, and table 8 at lagged independent variables to avoid potential problems of simultaneity.

The results for inflation are weak and small in magnitude, but they show that fixed exchange rate regime is more likely to be chosen when past inflation is low. There is also a negative contemporaneous correlation between fixed exchange rate regime and inflation. In contrast when inflation is high it is more likely the choice of a crawling peg. The results say, for example, that an increase in past inflation by 6.4 percentage points increases the probability of choosing a crawling peg by 1.3% and reduces the probability of a fixed exchange rate by 1.2%. This results confirms statistically the discussion of previous sections since low inflation may create the temptation to accelerate progress using the exchange rate as an anchor. In contrast, crawling pegs, by targeting the real exchange rate, may have the cost of allowing higher inflation in order to restore competitiveness.

The results for the terms of trade are puzzling, because they are contrary to what should be expected at first. According to the results, fixed exchange rates are less likely when terms of trade improve. Since fixed exchange rates cause a real appreciation and external sustainability is their Achilles heel, one would expect that the choice of fixing may be more likely when terms of trade are relatively good. One possible reason for these results may be that what matters is not level of the terms of trade rather than their movements. However, the residuals from an AR(1) process for the terms of trade were also used and the results did not change. Nevertheless, other explanation, also based on the results of the previous section on the determinants of the real exchange rate. A deterioration in the terms of trade leads to an exchange rate depreciation, and hence, to offset its inflationary effects an inflation-adverse policy maker may choose to fix the exchange rate, rather than accommodate with more inflation. This could be the dominant effect in the sample. The results indicate also that crisis occur also with bad terms of trade shocks, which is expected.

The BMP shows a strong contemporary correlation with exchange rate regimes, but not when lagged variables are used in the regressions. This confirms the idea discussed before that fixed exchange rate regimes coincide with liberalization of the capital account and of foreign exchange transactions. When unemployment is high and growth in the previous year is low it is more likely a crawling peg regime. In contrast, growth is higher with fixed exchange rate regimes, consistent with the initial boom of exchange rate-based stabilizations.

The results for misalignment are basically the same for contemporaneous and lagged variables, and similar to the results of table 6. Undervaluation is more likely to happen with crawling peg regimes, while the others have a tendency to overvaluation. This reinforces the idea that the main objective of crawling peg is linked to competitiveness.

Regarding composition of economic activity the share of manufactures increases in crisis. This result, however, may be more of reverse causality since in episodes of currency crisis the most affected sectors are non tradables. A large exports sector makes more likely a crawling peg or a more flexible regime such as the band, while it makes less likely fixed regimes. This is consistent with the preliminary finding that openness is linked to an exchange rate regime that allows for a weak currency to build support for the economic strategy. However, there could be a reverse causality problem, since a large exportable sector is the result of a real depreciation.

The effects of financial intermediation on the choice of regime is weak and the signs are the same as those of the share of exports. This result, although weak, is also puzzling since one would expect opposite, rather than the same, signs for the size of intermediation and the share of exports, since they would indicate relative strength of very different interest groups. However, as corporate conglomerates grow in importance, and they have ties with he non tradable sectors, perhaps financial sector, the dividing line among interest groups in terms of productive sector is rather blurry.

Unionization has a relevant coefficient only in the case of fixed exchange rate and in crisis. In the first case the results show that in periods of fixed exchange rate unionization is smaller, which is the case of the early 1960s and the early 1980s. In turn, during crisis unionization increases, but this is mainly influenced by the experience in the early 1970s. Regarding lagged variables, high unionization is less likely to be followed by a crisis and more likely to be followed by a crawling peg.

5.3 Multinomial logit results

Multiple regressions with different coefficient across regimes are bounded in the number of regressors since some regimes have at most 5 observations. For this reason only combinations of two variables were used in the multiple regressors case. The more variables were introduce the more changed the results for the sign and significance of the different variables.

Tables 9, 10 and 11, show some regressions using pair of variables. Coefficients of crawling peg are normalized to zero. The first panel in each table shows the results, the second the forecasting ability of the regression, and the third one the impact of a change in a variable on the probability of a given regime.

In table 9, lagged values of BMP and inflation, the results are in line with those of the univariate correlations, except the negative sign for the variable inflation in periods of crisis. The forecasting ability of this regression is relatively good since it predicts correctly in 28 out of the 36 years in the sample, and tends to overpredict periods of crawling peg and underpredict periods of crisis. Table 10 replaces lagged BMP by current ratio of exports to GDP, and the results are similar, confirming that the share of exports increases with crawling peg and band, and declines in crisis and fixed exchange rate years.

Finally, table 11 shows regressions with misalignment and share of exports. These two variables are important to be considered together since the competitiveness bias of some regimes are not necessarily to look for an undervaluation, but to boost exports. This can explain why the relative importance of the coefficients change. Indeed, the results show that undervaluation are associated with crawling peg, something observed also in univariate regressions, and overvaluation in periods of fixed exchange rate. For crisis and band the coefficient is negative, but smaller. On the other hand, crawling peg is associated with a large exports share, while the contrary occurs for fixed exchange rate. Therefore, the results show that crawling peg regimes are essentially oriented toward competitiveness and export promotion, while fixed exchange rate regimes are related to misalignments and low inflation.

5.4 Binomial logit

A final set of results is presented in table 12. Since there are few observations for fixed exchange rate, band and crisis, while there are 20 observations with crawling peg. For this reason I analyze the choice between of crawling peg and band or fixed exchange rate. Management of exchange rate in a currency crisis is not considered, since it is not really a choice. In addition, and as discussed before, crawling peg have been in general associated to some form of capital or exchange controls, while fixed exchange rate periods and the nineties with the band have been much more liberal. Therefore, one could also interpret the results as related to the choice of capital controls.

There are 31 observations, 20 of which are years of crawling peg, and the remaining 11 are band or fixed exchange rate. The results confirm most of the findings presented above. Crawling peg is more likely with high inflation and high share of exports. It is also more likely when terms of trade are high. Significant part of crawling peg experiences were in the 1960s, during the Breton Woods era, and therefore they are more likely when the trend around the world was fixed exchange rate. Black market premium is also higher with crawling peg indicating the presence of capital controls. Finally, crawling pegs have been in place more often with low growth and high unemployment.

6. Conclusions

This paper has discussed and analyzed empirically the determinants of exchange rate regime in the Chilean economy since 1960. Many indicators have been used to proxy for different relevant factors that should influence the choice of regime. Despite the few observations,--a 37-year period--which makes difficult to obtain strong results, there is some evidence for the factors underlying the choice of the exchange rate regime.

Of course the results must be interpreted with caution. First, causality is not clear. For example, crawling pegs are more likely when growth is low, but this is in part that crawling pegs have been used after currency crisis to restore competitiveness. And second, the empirical results are basic descriptions of the relationships among the data. It is not possible to derive straightforward policy implications from those results, since they are not based in a model that connects all of the variables.

For example, the fact that fixed exchange rates are associated with a boom in economic activity does not imply that this is a policy to get out of a recession.

The results indicate that low inflation and unification of exchange rate markets (measured through a reduction of the black market premium) are associated with fixed exchange rate periods. Moreover, low inflation precedes the choice of the fixed exchange rate regime, which suggests that such policy is used mostly by inflation-adverse policy makers seeking to use the exchange rate as an anchor. Indeed, I argue that there is a temptation with using the exchange rate to consolidate low inflation, since fixing the exchange rate when progress has been made, but not enough to declare victory. This is what was observed in the late fifties and in the late eighties.

Overvaluation is also another characteristic of periods of fixed exchange rate regime. There is, of course the issue of compensation and political sustainability for large changes in relative prices. Periods of fixed exchange rate are associated also with a strong expansion of economic activity, and hence, this reduces the pressures stemming from interest groups that loose relatively, since most of the sectors are benefited by the boom. The two experiences with fixed exchange rate regime in Chile have ended in a currency crisis, a period of instability and the introduction of capital controls and foreign exchange restrictions.

Political economy factors, as measured by the relative size of different groups, do not appear to play a direct important role in the determination of the regime. However, this does not imply that political economy plays no role in the choice of exchange rate regime. It is likely that important entrepreneurial groups are linked to several sectors, especially in both, tradables and non tradables.

There are, however, indications that political economy factors have underlie some decisions regarding the exchange rate regime, as well as other related policies, such as trade regime, and subsidies given after currecy crisis. Inflation and unemployment play a role in the choice of regime. During most of the period from 1960 to 1997 exchange rate policy has followed a crawling peg, with some form of capital controls. This situation changed since 1990 when a widening exchange rate band has been implemented. This paper shows that crawling peg has been used, at the cost of inflation, to have a depreciated real exchange rate. Periods of crawling peg usually follow period of high growth and low inflation.

Exchange rate policy is certainly determined jointly with other set of policies that respond to the objectives of the authorities and the interactions among interest groups. This is the case of the sharp undervaluation of the second half of the seventies, which was clearly intended to compensate for the deep trade liberalization that exposed most of the economy to external competition, something unknown given the tradition of Chile with import substitution. More direct compensation mechanism has been used regarding exchange rate policy, as the case of subsidies to debtors in foreign exchange after the devaluation of 1982 discussed above.

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Figure 1. Real exchange Rate.
(Index 1986=100)
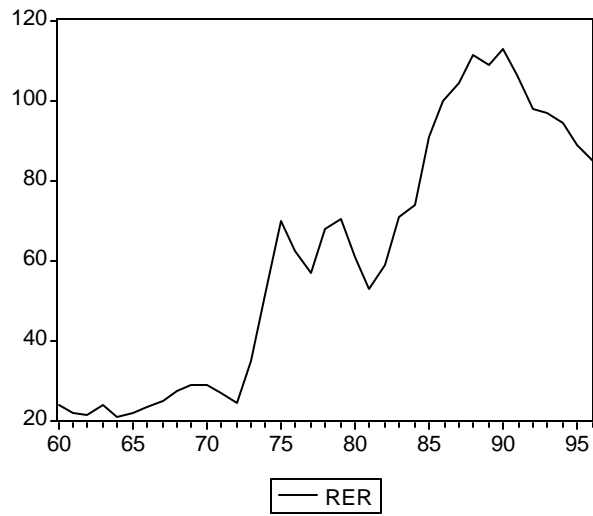
Figure 2. Black Market Premium.
(Ratio Black Market and official rate)
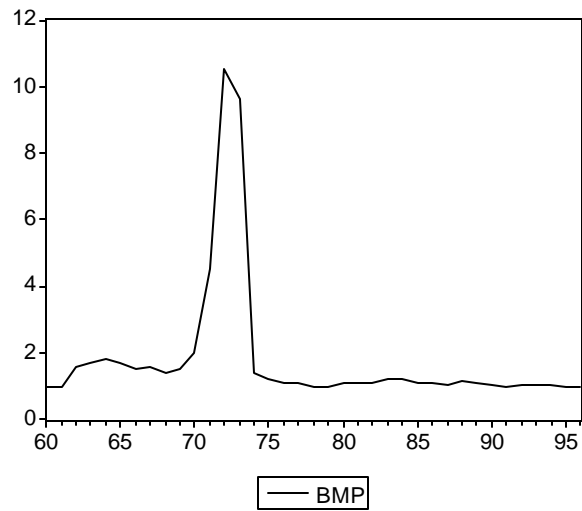
Figure 3. Trade Regimes.
Liberalization Index and Tariffs.
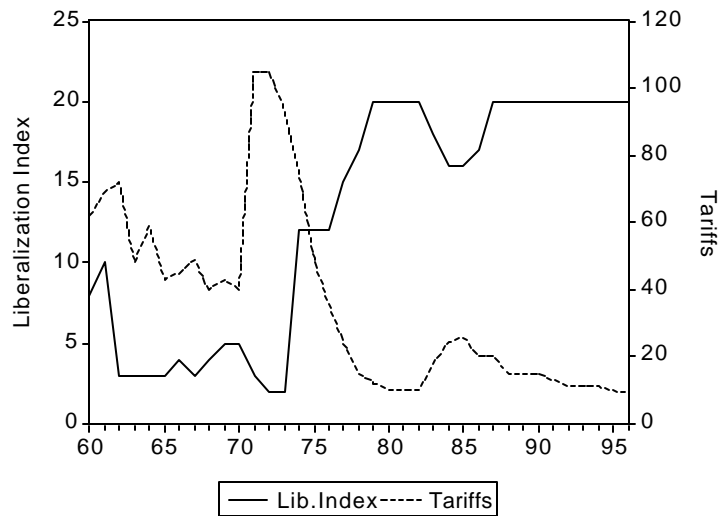
Figure 4. Current Account and Terms of Trade.
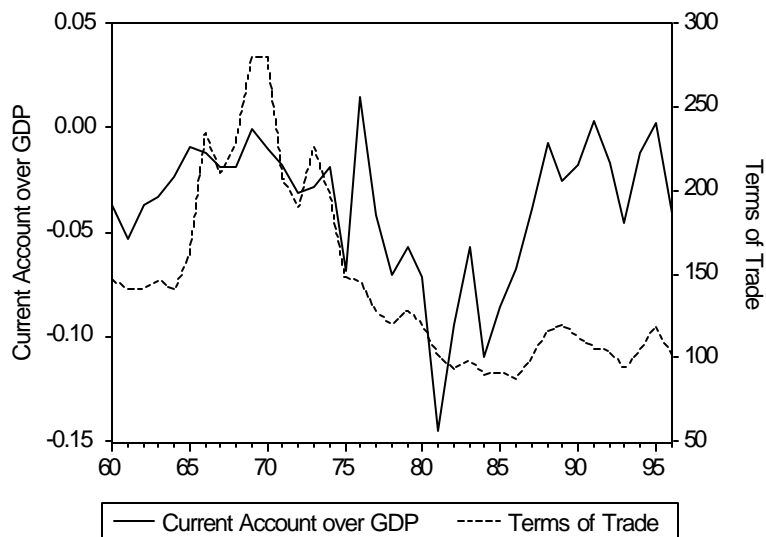
Figure 5. Annual Inflation Rate.
(log scale)
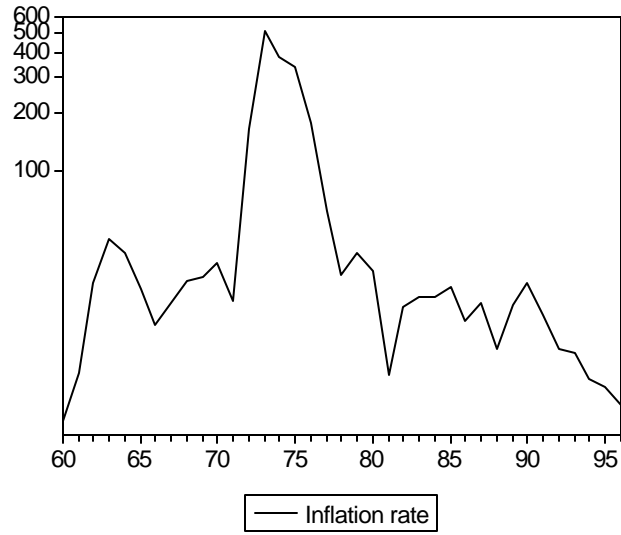
Figure 6. Unemployment Rate.
(percent)
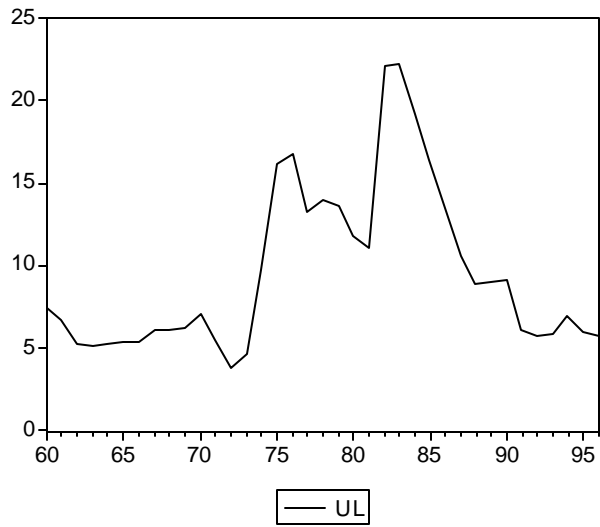
Figure 7. GDP Growth Rate.
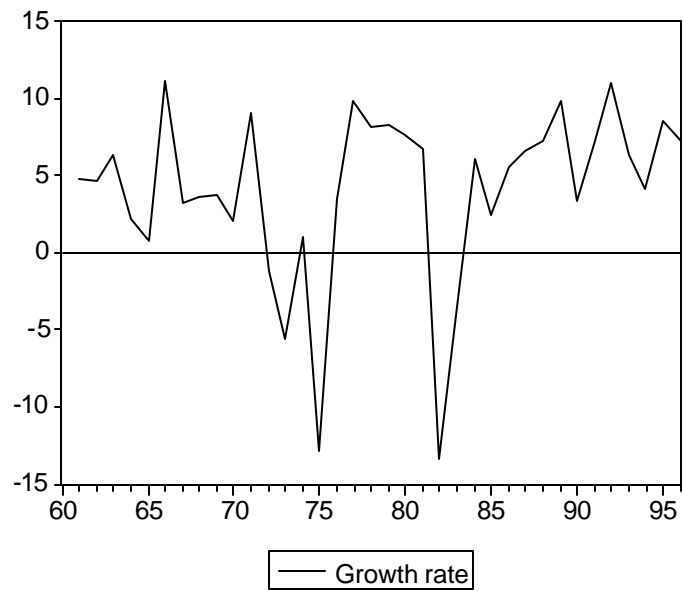
Figure 8. Real Exchange Rate Missaligment .*
1960-1996
(percent)
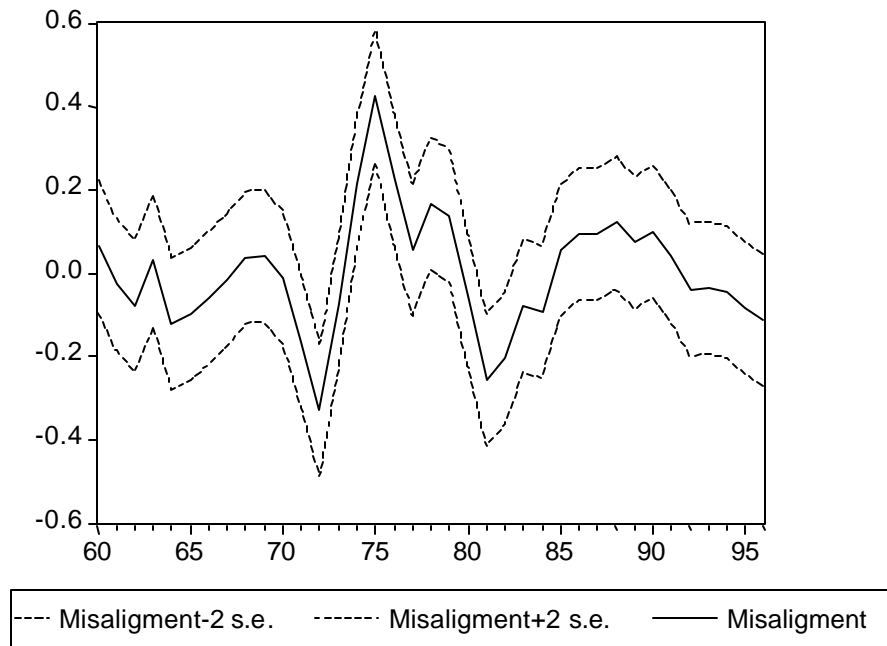
* The measure of misalignment is based on Equation (3), Table5.

Table 1.Exchange Rate Regimes.

	Exchange Rate Regime		Exchange Rate Regime		Exchange Rate Regime
1960	1	1973	2	1986	3
1961	1	1974	3	1987	3
1962	1	1975	3	1988	3
1963	2	1976	3	1989	3
1964	2	1977	3	1990	3
1965	3	1978	3	1991	3
1966	3	1979	1	1992	4
1967	3	1980	1	1993	4
1968	3	1981	1	1994	4
1969	3	1982	2	1995	4
1970	3	1983	3	1996	4
1971	2	1984	3		
1972	2	1985	3		

Table 2. Exchange Rate Regimes – Tariffs.

	Fixed	Crisis	Crawling Peg	Band	All the Sample
0 - 20	3	1	7	5	16
20 - 70	2	2	12	0	16
70 - 110	1	3	1	0	5
Average Tariffs	**39.2**	**52.8**	**31.3**	**10.5**	**32.1**
Standard Deviation	**31.3**	**34.6**	**16.5**	**0.9**	**23**

Table 3. Exchange Rate Regimes – Index of Trade Liberalization.

	Fixed	Crisis	Crawling Peg	Band	All the Sample
1 - 8	2	5	6	0	13
8 - 16	1	0	6	0	7
16 - 20	3	1	8	5	17
Average ITL	**13.5**	**5.5**	**13**	**20**	**12.8**
Standard Deviation	**7.5**	**7.1**	**6.6**	**0**	**7.3**

Table 4. Exchange Rate Regimes-Black Market Premium.

	Fixed	Crisis	Crawling Peg	Band	All the Sample
0% - 5%	3	0	4	5	12
5% - 10%	2	1	4	0	7
10% - 50%	0	0	9	0	9
50% - and up%	1	5	3	0	9
Average BMP	**13.3**	**386.7**	**27.1**	**0.6**	**79.6**
Standard Deviation	**23.4**	**419.3**	**27.1**	**0.5**	**209.1**

Table 5. Real Exchange Rate .

	(1)	(2)	(3)
Chilean Productivity of Labor	-1.004	-1.496	
	(-3.68)	(-7.49)	
U.S. Productivity of Labor	1.415	2.052	
	(3.97)	(7.81)	
Relative Productivity of Labor			-1.009
			(-3.58)
Net Foreign Assets (log)	-0.154	-0.168	-0.187
	(-4.84)	(-5.00)	(-7.09)
Fiscal Surplus	0.009	0.013	0.011
	(1.44)	(1.98)	(1.79)
Openness			1.197
			(2.91)
Sample	1960-1996	1960-1996	1960-1996
R^2	0.99	0.98	0.98
Adjusted R^2	0.98	0.98	0.98
Durbin Watson.	1.84	1.89	1.54
Observations	37	37	37

Note: t-statistics in parenthesis.

Equations (1), (2), (3) include a dummy for the period 1974-1996, for fiscal surplus and the constant.

Table 6. 1 Variables Statistics by Exchange Rate Regime.

Rate Regime		Inflation (%)	GDP Growth (%)	Current Account (% of GDP)	Terms of Trade Index	Cooper Price (cUS$/pound)	One month US$ libor	BMP[1]
Fixed	Mean	20.4	6.6	-6.7	129.8	59,4	8.9	113.3
	S.d.	13.9	1.5	4.1	17.2	33,3	6.0	23.4
Crisis	Mean	133.0	-0.4	-3.8	167.3	53.2	7.0	486.7
	S.d.	191.4	8.2	2.8	49.6	18.1	3.5	419.3
Crawling Peg	Mean	66.7	4.0	-3.3	152.8	75.8	7.5	127.1
	S.d.	105.7	5.3	3.3	63.3	24.0	1.8	27.1
Band	Mean	9.7	7.4	-2.3	104.6	106.4	4.5	100.6
	S.d.	2.6	2.5	2.0	8.9	16.7	1.2	0.5
All the Sample	Mean	62.2	4.1	-3.8	145.0	73.6	7.2	179.6
	S.d.	112.0	5.6	3.4	53.7	28.1	3.2	209.1

Exchange Rate Regime		Reserves (% of GDP)	Long and Medium Term Foreign Debt (% of GDP)	Real Exchange Rate	Misalignment Sample 60-96[2]	Fiscal Surplus (%GDP)	Government. Expenditure (% of GDP)	Government Consumption (% of GDP)
Fixed	Mean	6.6	26.9	30.9	-3.7%	-0.1	24.2	12.0
	S.d.	6.6	10.4	16.2	13.5%	5.3	5.1	1.6
Crisis	Mean	2.3	30.8	23.4	-14.3%	-7.8	28.8	13.2
	S.d.	4.2	13.0	10.5	12.2%	4.4	9.7	2.9
Crawling Peg	Mean	6.5	51.6	49.6	7.0%	-1.0	26.1	12.6
	S.d.	6.0	26.2	24.5	12.5%	2.6	5.8	1.9
Band	Mean	22.4	31.6	68.3	-6.3%	2.1	20.2	9.3
	S.d.	2.0	3.6	4.0	3.4%	0.3	0.7	0.3
All the Sample	Mean	8.0	41.5	44.8	0.0%	-1.5	25.6	12.1
	S.d.	8.0	22.9	23.9	14.1%	4.4	6.4	2.2

[1] BMP: Observed dollar exchange rate over official rate.
[2] Estimation based on equation (3), Table 5.

Table 6.2 Variables Statistics by Exchange Rate Regime.

Exchange Rate Regime		M1/GDP (% of GDP)	M2/GDP (% of GDP)	Claims on Private Sector (% of GDP)	Mining (% of GDP)	Manufactures Industry (% of GDP)	Construction, Transports, and Telecommunications (% of GDP)	Trade and Services (% of GDP)
Fixed	Mean	9.1	12.3	31.5	10.0	20.7	11.6	48.4
	S.d.	0.5	6.3	16.7	0.5	1.2	1.0	3.2
Crisis	Mean	14.4	10.6	22.1	9.6	22.7	12.0	47.3
	S.d.	6.4	9.6	29.7	1.1	3.1	1.6	3.1
Crawling Peg	Mean	8.7	18.3	34.6	10.0	20.7	11.6	47.4
	S.d.	0.8	13.2	26.7	0.6	2.3	1.1	2.1
Band	Mean	8.8	29.6	49.9	8.9	18.5	14.4	46.6
	S.d.	0.2	1.4	3.5	0.2	0.4	0.6	0.1
All the Sample	Mean	9.7	17.7	34.2	9.8	20.7	12.0	47.4
	S.d.	3.3	12.1	24.6	0.7	2.4	1.4	2.3

Exchange Rate Regime		Mining Exports (% on Total Exports)	Agriculture Exports (% on Total Exports)	Industry Exports (% on Total Exports)	Total Exports on GDP (%)	Share of Labor on Agric. Forestry and Fishing (%)	Unemployment (%)	Unionization (%)
Fixed	Mean	71.1	6.7	21.7	13.2	23.3	9.3	11.7
	S.d.	16.4	1.6	14.6	3.6	6.9	3.3	1.3
Crisis	Mean	80.4	4.7	14.3	10.8	21.5	7.7	17.8
	S.d.	11.8	2.9	8.4	2.8	5.5	7.1	7.3
Crawling Peg	Mean	66.8	8.1	24.7	19.8	20.3	11.1	13.5
	S.d.	14.9	5.1	10.2	5.9	3.3	5.1	3.0
Band	Mean	46.3	11.3	42.4	22.2	16.5	6.0	13.5
	S.d.	2.2	1.3	1.7	1.5	1.2	0.5	1.1
All the Sample	Mean	66.9	7.8	24.9	17.6	20.5	9.6	13.9
	S.d.	16.4	4.3	12.5	6.2	4.5	5.1	4.0

Table 7. Effect on Regimes Probabilities of 10% change (around mean)
in independent variable.
Univariate regression and Contemporaneous Independent Variable.

	Inflation	Terms of Trade	BMP	Unemployment	Exports on GDP	Manufactures on GDP	GDP Growth	Credit to the Priv.Sec.	Misal[1]	Unionization
Fixed	-0.86%	-1.84%	-2.34%	-0.03%	-6.15%	-0.71%	8.84%	-0.31%	-9.3%	-5.26%
Crisis	0.54%	1.90%	11.39%	-1.55%	-2.22%	10.14%	-0.90%	-1.31%	-11.9%	4.26%
Crawling Peg	0.32%	2.78%	-9.05%	3.80%	5.27%	-2.48%	-0.92%	0.18%	32.3%	0.85%
Band	0.00%	-2.84%	0.00%	-2.22%	3.10%	-6.95%	0.93%	1.43%	-10.9%	0.14%
Mean of variable (whole sample)	62.22	144.95	1.80	9.56	0.18	0.21	4.15	0.30	0	0.13912

Table 8. Effect on Regimes Probabilities of 10% change (around mean)
in independent variable.
Univariate regression and Lagged Independent Variable.

	Inflation	Terms of Trade	BMP	Unemployment	Exports on GDP	Manufactures on GDP	GDP Growth	Credit to the Priv.Sec.	Misal	Unionization
Fixed	-1.22%	-1.52%	0.00%	0.89%	-4.38%	-1.62%	0.98%	-0.47%	-11.2%	0.04%
Crisis	-0.08%	2.54%	0.79%	-3.20%	-0.61%	11.11%	0.04%	-1.63%	-12.7%	-4.19%
Crawling Peg	1.30%	1.98%	-0.79%	48.76%	1.86%	-0.38%	-2.02%	0.68%	35.0%	4.20%
Band	0.00%	-3.00%	0.00%	-2.56%	3.13%	-9.10%	1.00%	1.43%	-11.8%	-0.06%
Mean of variable (relevant sample)	63.76	146.15	1.82	9.67	0.17	0.21	4.06	0.29	0	0.13912

[1]The measure of misalignment employed on Table 7 and 8, was estimated with the equation (3) on Table 5, and the estimated effect corresponds to ten points change in the mean of misalignment.

Table 9.1 Multinomial Logit Model.
Lagged Inflation and Lagged Black Market Premium.

	Fixed	**Crisis**	**Band**
Constant	39.7	-5.42	63.8
	(2.178)	(-1.800)	(1.598)
BMP(lagged)	-38.0	4.20	-59.9
	(-2.157)	(1.507)	(-1.520)
Inflation(lagged)	-0.01	-0.08	-0.12
	(-0.273)	(-1.545)	(-1.396)
Log-Likelihood	-20.3		
Restricted (Slopes=0) Log-L.	-42.2		
Chi-Squared (3)	43.8		

Note: t-statistics in parenthesis. No results reported for Crawling Peg since it is used as normalization vector.

Table 9.2 Frequencies of actual & predicted outcomes
Predicted outcome has maximum probability.

	PREDICTED				
ACTUAL	**Fixed**	**Crisis**	**Crawling Peg**	**Band**	**TOTAL**
Fixed	2	0	1	2	5
Crisis	0	3	3	0	6
Crawling Peg	1	0	19	0	20
Band	1	0	0	4	5
Total	4	3	23	6	36

Table 9.3 Effect on Regimes Probabilities of 10% change (around mean)
in independent variable.

	BMP lagged	**Inflation Lagged**
Fixed	0.00%	0.00%
Crisis	4.84%	-3.06%
Crawling Peg	-4.84%	3.06%
Band	0.00%	0.00%
Mean of variable (relevant Sample)	1.82	63.76

Table 10.1 Multinomial Logit Model.
Share of Exports on GDP and Lagged Inflation.

	Fixed	Crisis	Band.
Constant	4.3	8.39	1.32
	(1.775)	(2.289)	(0.481)
Exports on GDP	-26.7	-72.5	11.9
	(-1.992)	(-2.252)	(0.839)
Inflation(lagged)	-0.04	0.006	-0.30
	(-0.920)	(0.699)	(-2.096)
Log-Likelihood	-24.8		
Restricted (Slopes=0) Log-L.	-42.2		
Chi-Squared (3)	34.7		

Note: t-statistics in parenthesis. No results reported for Crawling Peg since it is used as normalization vector.

Table 10.2 Frequencies of actual & predicted outcomes
Predicted outcome has maximum probability.

	PREDICTED				
ACTUAL	Fixed	Crisis	Crawling Peg	Band	TOTAL
Fixed	2	1	2	0	5
Crisis	0	5	0	1	6
Crawling Peg	1	1	17	1	20
Band	0	0	2	3	5
Total	3	7	21	5	36

Table 10.3 Effect on Regimes Probabilities of 10% change (around mean)
in independent variable.

	Exports on GDP	Lagged Inflation
Fixed	-1.74%	1.05%
Crisis	-2.00%	0.079%
Crawling Peg	3.73%	0.97%
Band	0.00%	0.00%
Mean of variable (relevant sample)	0.18	63.76

Table 11.1 Multinomial Logit Model.
Real Exchange Rate Misalignment[1] and Share of Exports on GDP.

	Fixed	Crisis	Band.
Constant	2.81	4.35	-15.2
	(1.289)	(1.258)	(-1.600)
RER Misalignment	-6.03	-14.8	-35.6
	(-0.95)	(-1.85)	(-1.92)
Exports on GDP	-24.8	-43.9	60.1
	(-1.70)	(-1.65)	(1.53)
Log-Likelihood	-25.8		
Restricted (Slopes=0) Log-L.	-44.1		
Chi-Squared (3)	36.5		

Note: t-statistics in parenthesis. No results reported for Crawling Peg since it is used as normalization vector.

Table 11.2 Frequencies of actual & predicted outcomes
Predicted outcome has maximum probability.

	PREDICTED				
ACTUAL	**Fixed**	**Crisis**	**Crawling Peg**	**Band**	**TOTAL**
Fixed	1	2	3	0	6
Crisis	2	3	0	1	6
Crawling Peg	1	1	18	0	20
Band	0	0	2	3	5
Total	4	6	23	4	37

Table 11.3 Effect on Regimes Probabilities of 10% change (around mean*)
in independent variable.

	Misalignment[2]	Exports on GDP
Fixed	-7.34%	-5.92%
Crisis	-3.61%	-1.89%
Crawling Peg	13.60%	6.91%
Band	-2.65%	0.89%
Mean of variable (relevant sample)	0	0.18

[1] Equation (3) on table 5.
[2] The estimated effect corresponds to ten points change in the mean of misalignment.

Table 12. Binomial Logit Estimations: The choice of crawling peg.

	(1)	(2)	(3)	(4)	(5)
Growth			-0.281		-0.281
Test t			(-1.792)		(-1.773)
10% Effect			-2.5%		-2.5%
Terms of Trade (log)	20.407				
Test t	(1.969)				
10% Effect	2.2%				
Inflation	0.116	0.143			
Test t	(1.554)	(1.864)			
10% Effect	0.1%	0.1%			
Reserves/ M2	-15.417				
Test t	(-2.130)				
10% Effect	-0.1%				
Industries Share on GDP[1]	-69.540				
Test t	(-2.018)				
10% Effect	-0.1%				
Exports Share on GDP[2]		55.06		65.945	
Test t		(2.064)		(1.837)	
10% Effect		1.1%		11.2%	
Bmp		12.67		20.187	
Test t		(2.289)		(2.169)	
10% Effect		1.6%		22%	
Unionization					20.768
Test t					(0.868)
10% Effect					4.8%
Gov. Exp. before elections			2.435		
Test t			0,4		
10% Effect			0.4%		
Unemployment				0.729	
Test t				(1.978)	
10% Effect				6.6%	
RER Misalignment[3]			17.374		13.681
Test t			(2.233)		(2.272)
10 points Effect			31%		24%
Log-Likelihood	-8.9	-9.1	-13.4	-7.5	-13.7
Restricted (Coef=0)	-20.2	-20.2	-20.2	-19.1	-20.2
Chi-Squared	22.6	22.1	13.6	23.1	12.9
Predicted/ Observations	29/31	28/31	25/31	26/31	26/31

[1] Sampled for the period 1974-1996.
[2] In equation (1), this variable was sampled for the period 1974-1996.
[3] In equation (3), this variable was sampled for the period 1974-1996.