REAL EXCHANGE RATES, EXCHANGE CONTROLS

AND DEVALUATION CRISES[*]

by

Sebastian Edwards

University of California at Los Angeles

and

National Bureau of Economic Research

UCLA Working Paper Number 512
September 1988

CHAPTER 6

REAL EXCHANGE RATES, EXCHANGE CONTROLS

AND DEVALUATION CRISES

by

Sebastian Edwards

University of California, Los Angeles

and

National Bureau of Economic Research

This is a draft of Chapter 6 of S. Edwards' <u>Real Exchange Rates, Devaluation and Adjustment</u>.

ABSTRACT

This paper corresponds to Chapter 6 of the forthcoming book <u>Real Exchange Rates, Devaluation and Adjustment: Exchange Rate Policy in Developing Countries</u>. This work investigates several aspects related to exchange rates in developing nations. Theoretical models of equilibrium and disequilibrium exchange rates are developed; the behavior of real exchange rates is investigated for a large cross section of countries; and the effectiveness of devaluation is assessed for a group of 39 developing nations.

CHAPTER 6

Real Exchange Rates, Exchange Controls and Devaluation Crises

In this and the following two chapters we analyze empirically the effectiveness of nominal devaluations as policy measures, and in particular their ability to affect real exchange rates. In an effort to understand the economics surrounding the causes and consequences of devaluations, thirty-nine devaluation episodes that took place between 1962 and 1982 are investigated in detail. The discussion also focuses on: (1) the relation between (inconsistent) macroeconomic policies and exchange rate crises; (2) the relation between the devaluation episodes and the external environment as summarized by terms of trade behavior; (3) the role of real exchange rate "overvaluation" in the precipitation of balance of payment crises under pre-determined nominal exchange rates; (4) the role of exchange controls, multiple exchange rates and black markets in the period preceding devaluations; (5) the balance of payments and output effects of devaluations. This chapter deals with points (1) through (4), which refer mainly to the causes of devaluation crises; Chapter 7 analyzes the period immediately following the balance of payments crises, emphasizing the real exchange rate effects of the devaluation; and Chapter 8 concentrates on the real output and income distribution ramifications of devaluations.

The approach followed in these three chapters is predominantly empirical and it is rooted in the theoretical framework provided in Part I of this book and captured by the macroeconomic model of Chapter 3. We have followed an empirical approach that combines nonparametric tests with more traditional regression analysis. An important aspect of this study consists on analyzing in detail the evolution of a number of key variables during the

three years preceding and the three years following the 39 devaluation episodes. In doing this, an effort is made to detect regularities across countries that allow us to infer some general rules related to the causes and effects of devaluations. At the same time care is taken to point out peculiarities that help better understand the exchange rate history of a particular country. A control group consisting of 24 developing nations that maintained a fixed nominal exchange rate for at least ten years was constructed and its behavior compared to that of the devaluing countries, using a battery of nonparametric tests.[1]

Although the episodic strategy for empirical inquiry used in this part of the book departs from the current practice of using almost exclusively different regression techniques, it has modern precedents in Cooper's (1971) well-known article on devaluation and, more recently, in Harberger and Edwards' (1982) study on balance of payments crises.[2] The episodic approach adopted in this part of the book has both advantages and drawbacks. On the positive side it allows us to look at each individual case, detecting peculiarities and regularities. It also permits us to deal with issues that are very difficult to accurately quantify and, thus, include in any type of regression analysis, such as the evolution of exchange controls and quantitative restrictions. On the other hand, a well known drawback of this empirical strategy is that by focusing on "before" and "after", it is not always easy to detect causality among variables. For this reason, and in order to shed additional light into the problem at hand, the episodic approach is supplemented with some more traditional statistical procedures, including regressions.

6.1 Macroeconomic Policies and Devaluation

Table 6.1 contains the list of the 39 devaluation episodes considered in this part of the study. All of these countries devalued their currencies in at least 15 percent after having maintained a fixed (official) exchange rate with respect to the U.S. dollar for two or more years. Twenty-nine of them implemented a stepwise devaluation, where after the nominal exchange rate adjustment they attempted to once again fix the parity (Panel A of Table 6.1).[3] Many of them did not succeed and experienced recurrent devaluations. Ten of the countries adopted a crawling exchange rate after devaluing (Panel B). This table also contains data on the amount of each nominal devaluation measured as the percentage change of the official exchange rate with respect to the U.S. dollar. Later in the chapter, however, we look in detail at the behavior of the parallel market exchange rate and at the multilateral real exchange rate. A number of these devaluations were taken in conjunction with adjustment programs sponsored by the IMF. In Appendix A to this chapter a list of IMF programs in these countries is provided.

Under fixed nominal exchange rates, macroeconomic policies determine whether the exchange rate chosen by the authorities can be sustained in the longer run. As the model of Chapter 3 indicates and the results in Chapter 5 showed, under most circumstances if macroeconomic policies become "inconsistent" international reserves will be eroded, the real exchange rate will experience an appreciation (i.e., it will become overvalued) and an exchange rate crises, including a devaluation, will eventually occur. From an empirical point of view it is not trivial to determine whether, for a particular country at a particular moment in time, macroeconomic policies have indeed become inconsistent with the fixed peg. In this section we tackle

TABLE 6.1

Devaluation Crises in Selected Developing Countries:

Rate of Devaluation (percentage)[a]

		Percentage of Devaluation			
Country	Year of Devaluation Crisis	Year of Devaluation	One Year After Devaluation	Two Years After	Three Years After
A. Stepwise Devaluations					
Argentina	1970	25.0	0.0	0.0	0.0
Bolivia	1972	66.6	0.0	0.0	0.0
Bolivia	1979	25.0	0.0	0.0	684.0
Colombia	1962	34.3	0.0	0.0	50.0
Colombia	1965	50.0	0.0	16.7	7.1
Costa Rica	1974	28.8	0.0	0.0	0.0
Cyprus	1967	16.6	0.0	0.0	0.0
Ecuador	1961	20.0	0.0	0.0	0.0
Ecuador	1970	38.8	0.0	0.0	0.0
Egypt	1962	23.9	0.0	0.0	0.0
Egypt	1979	78.8	0.0	0.0	0.0
Guyana	1967	15.9	0.9	0.6	0.2
India	1966	58.6	-0.3	1.0	-0.9
Indonesia	1978	50.6	0.3	-0.0	2.7
Israel	1962	66.6	0.0	0.0	0.0
Israel	1967	16.6	0.0	0.0	0.0
Israel	1971	20.0	0.0	0.0	7.1
Jamaica	1967	15.9	0.9	-0.6	0.2
Jamaica	1978	86.4	5.1	0.0	0.0
Malta	1967	16.6	0.0	0.0	0.0
Nicaragua	1979	43.0	0.0	0.0	0.0
Pakistan	1972	130.1	-10.2	0.0	0.0
Peru	1967	44.4	0.0	0.0	0.0
Philippines	1962	94.0	0.2	0.0	0.0
Philippines	1970	63.7	0.0	5.3	-0.7

Table 6.1 (cont.)

Country	Year of Devaluation Crisis	Percentage of Devaluation			
		Year of Devaluation	One Year After Devaluation	Two Years After	Three Years After
Sri Lanka	1967	24.1	0.0	0.5	0.0
Trinidad	1967	15.9	0.9	-0.6	0.2
Venezuela	1964	38.1	0.0	0.0	0.0
Yugoslavia	1965	66.6	0.0	0.0	0.0
B. Devaluations Followed by Crawling Peg					
Bolivia	1982	684.0	155.1	1700.0	.
Chile	1982	88.2	19.2	46.5	43.3
Colombia	1967	16.7	7.1	5.7	6.9
Ecuador	1982	32.6	63.1	24.1	42.5
Kenya	1981	35.9	23.7	8.4	14.3
Korea	1980	36.3	6.1	6.9	6.2
Mexico	1976	59.6	13.9	-0.0	0.3
Mexico	1982	267.8	49.1	33.7	93.0
Pakistan	1982	29.6	5.1	13.7	4.0
Peru	1975	16.2	54.2	87.9	50.4

[a]Devaluation of the official rate with respect to the U.S. dollar. In the case of multiple rates the IFS reports the "most common" of them. Table 6.10 contains data on the evolution of the number of official rates as well as on the parallel market premia.

Source: International Financial Statistics

this issue by comparing the evolution of macroeconomic policy in the devaluing countries with that of the control group of fixed rate countries.[4]

Table 6.2 summarizes the behavior of five indicators of domestic credit and fiscal policies for the devaluing countries and for the control group: (1) rate of growth of domestic credit (Panel A): (2) rate of growth of domestic credit to the public sector (Panel B); (3) percentage of credit received by the public sector as proportion of total domestic credit (Panel C); (4) fiscal deficit as proportion of GDP (Panel D); and (5) growth of domestic credit to the public sector as a proportion of GNP. All these indicators have been constructed using data from various issues of the International Financial Statistics as well as several IFS tapes.[5] For the devaluing countries these indicators are reported for 3 years, 2 years, and 1 year prior to the devaluation as well as for the year of the devaluation. While Panel A deals with monetary (or domestic credit) policy, the rest of the panels take us beyond the monetary realm and into the fiscal side of the economy. Indeed, these panels provide four different ways of looking at fiscal pressures.

A number of revealing facts emerge from this table. First, macro-economic policies became increasingly expansive in the devaluing countries as the year of the devaluation drew nearer. Indeed, when we compare three years before the crises with one year prior to them we can detect some shift to the right of all five distributions, with the extent of these shifts varying across indicators. Second, the devaluing countries as a group behaved quite differently than the control group. This is particularly clear for the fiscal policy indicators. For example, the year prior to the crisis half of the devaluing countries allocated one quarter or more of total domestic credit to the public sector; the median for the control group

TABLE 6.2

Indicators of Macroeconomic Policy In Devaluing Countries During

Year of Devaluation and 3 Years Preceding Devaluation:

Comparison to Control Group of Fixers

	Three Years Prior to Devaluation	Two Years Prior to Devaluation	1 Year Prior to Devaluation	Year of Devaluation	Control Group
A. Annual Rate of Growth of Domestic Credit (Percentage)					
First Quartile	10.7	11.6	11.9	13.1	14.4
Median	20.3	17.5	17.7	21.9	17.4
Third Quartile	34.9	31.9	29.7	38.3	29.9
Mean	21.7	21.3	20.5	26.8	19.3
B. Annual Rate of Growth of Domestic Credit to Public Sector (Percentage)					
First Quartile	4.8	<0	0	10.9	<0
Median	19.9	16.5	18.5	29.7	22.7
Third Quartile	57.9	51.0	48.9	63.3	33.2
Mean	38.0	25.4	29.3	53.2	5.7
C. Ratio of Domestic Credit to Public Sector to Total Domestic Credit (Ratio × 100)					
First Quartile	9.7	10.7	8.8	7.7	<0
Median	25.4	21.1	24.5	24.9	11.4
Third Quartile	39.8	44.1	45.9	48.2	27.9
Mean	25.4	24.8	24.8	25.3	14.0
D. Fiscal Deficit as Percentage of GDP (Percentage)					
First Quartile	0.44	0.26	0.01	0.01	0.7
Median	2.01	1.53	2.40	4.14	1.6
Third Quartile	5.57	5.35	5.01	6.45	2.7
Mean	2.8	3.1	2.8	4.4	1.9
E. Growth of Credit to Public Sector as Proportion of GDP (Percentage)					
First Quartile	0.17	-0.22	-0.51	0.02	0.03
Median	0.95	0.78	0.73	1.6	0.76
Third Quartile	1.9	2.2	2.4	3.4	1.6
Mean	1.8	1.2	1.9	2.6	.75

Source: See text.

countries, on the other hand, was only slightly over 10 percent. Formal χ^2 tests indicate that the probability of these policy indicators for the devaluing countries coming from the same population than for the control group is very low. For two years prior to the devaluation the value of these $\chi^2(2)$ were 7.0 (level of probability 0.02) for the rate of growth of domestic credit, $\chi^2(2)$ 1.3 (level of probability 0.5) for the rate of growth of domestic credit to the public sector, $\chi^2(2)$ 6.9 (level of probaiblity 0.04) for the fraction of total credit that goes to the public sector, and $\chi^2(2)$ 5.4 for the ratio of the fiscal deficit to GDP (level of probability 0.05). Moreover, these χ^2 tests suggest quite clearly that as the crisis date approached the devaluing countries' macropolicies tended to become more and more inconsistent with the goal of maintaining a fixed exchange rate. For instance the year of the devaluation the $\chi^2(2)$ statistic was 13.5 for the growth of domestic credit (level of probability 0.001); 4.8 for the rate of growth of domestic credit to the public sector (level of probability 0.1); 8.4 for the ratio of public sector credit to total credit (level of probability 0.015); and 16.9 for the fiscal deficit ratio (level of probability 0.001). Table 6.3 contains a summary of the χ^2 statistics used to test the null hypothesis that devaluers and the control group come from the same population.

Although not all devaluing countries behaved differently from the control group -- Venezuela, Israel 1962, and the Commonwealth nations being the main exceptions -- the nonparametric tests reported here provide broad and strong support to the hypothesis that in the period preceding the crisis the devaluing countries macroeconomic policies were significantly more expansive than those of the control group of countries that successfully maintained a pegged nominal exchange rate for a long period of time.

TABLE 6.3

χ^2 Tests Comparing Devaluing Countries

To Control Group of Fixers[a]

	3 Years Before Devaluation	Year of Devaluation
Growth of Domestic Credit	9.0 (0.011)	13.5 (0.001)
Growth of Domestic Credit to Public Sector	4.6 (0.100)	4.8 (0.09)
Ratio of Domestic Credit to Public Sector to Total Domestic Credit	8.4 (0.015)	8.4 (0.015)
Ratio of Fiscal Deficit to GNP	1.3 (0.533)	16.9 (0.000)
Growth of Credit to Public Sector as Proportion of GDP	7.3 (0.026)	13.8 (0.001)

[a]This test is distributed χ^2 with 2 degrees of freedom. The numbers in parentheses are the level of probability. These χ^2 statistics are computed as $\Sigma(0-E)^2/E$, where 0 is the observed count and E is the expected count. These χ^2 were estimated using the Proc. Freq. procedure in SAS.

An important question is whether these devaluation episodes and related balance of payments crises have been, at least partially, caused by exogenous deteriorations of the external environment. Table 6.4 contains information on the evolution of the external terms of trade for those countries that have data. Although this table shows a variety of individual country experiences, it indicates that for the stepwise devaluers as a group (Panel A) there was no significant worsening of the terms of trade in the period immediately preceding the crisis. However, the situation is very different for the second group of crawling countries. As can be seen these countries as a group were subject to massive negative terms of trade shocks; in some cases the deterioration of the terms of trade exceeded 30 percent in three years. It is interesting to note that the cases of large negative terms of trade shocks correspond predominantly to more recent devaluations. Even though the information in this table clearly suggests that terms of trade deterioration have not been the overwhelming cause of these crises, in a number of cases the crisis may have had its origins in exogenous deterioration of the external environment. It should be noticed that in some episodes, in addition to these negative shocks, and sometimes even in response to them, these countries pursued inconsistent macroeconomic policies.[6]

6.2 Real Exchange Rates, The External Sector and Devaluations

According to the model in Chapter 3 inconsistent macroeconomic policies will result in: (a) real exchange rate appreciations (i.e., overvaluations); (b) current account deficits, and (c) losses of international reserves. Table 6.5 contains data for the 39 episodes on the evolution of: (1) the index of the bilateral real exchange rate with respect to the U.S.;

TABLE 6.4

Terms of Trade in Period Preceding Devaluation Crises

Country	Year of Devaluation Crisis	3 Years Prior	1 Year Prior	Year of Crisis
A. Stepwise Devaluation				
Colombia	1962	100.0	100.9	94.8
Colombia	1965	100.0	109.3	111.4
India	1966	100.0	99.6	103.2
Indonesia	1978	100.0	117.6	119.1
Israel	1962	100.0	100.9	103.0
Israel	1967	100.0	106.1	104.0
Israel	1971	100.0	97.2	99.2
Malta	1967	100.0[a]	100.1	90.6
Nicaragua	1979	100.0	104.9	100.7
Pakistan	1972	100.0[a]	86.9	95.9
Philippines	1962	100.0	87.3	86.8
Philippines	1970	100.0	95.9	93.9
Sri Lanka	1967	100.0	102.3	95.5
Trinidad	1967	100.0[a]	100.1	103.9
Yugoslavia	1965	100.0	100.9	100.7
Average		100.0	100.7	100.2
B. Devaluation Followed by Crawling Peg				
Chile	1982	100.0	77.4	69.8
Colombia	1967	100.0	80.9	95.2
Kenya	1981	100.0	84.5	72.4
Korea	1980	100.0	102.6	88.9
Pakistan	1982	100.0	77.3	75.0
Average		100.0	84.5	80.3

[a]This number refers to two, rather than three, years prior to the devaluation.

Source: International Financial Statistics.

and (2) the index of multilateral real exchange rates. Table 6.6, on the other hand, contains data on the ratio of net foreign assets of the monetary system to money; and the ratio of the current account over GDP during the three years preceding the crises. The main differences between Table 6.2 and Tables 6.5 and 6.6 is that in the former we have summarized the behavior of five key exogenous policy variables while Tables 6.5 and 6.6 deal with endogenous variables whose behavior respond to policy measures and other shocks.

Table 6.5 shows that in 29 out of the 38 countries with relevant data the bilateral real exchange rate experienced a real appreciation in the three years prior to the devaluation; in 24 out of the 38 cases there also was a real appreciation of the multilateral RER during the period immediately preceding the crisis. For those countries experiencing an appreciation, the average decline in the real bilateral exchange rate during the 3 years preceding the devaluation crisis was almost 9.1 percent, while the real multilateral appreciation was 11.1%. Notice that the extent of real exchange rate appreciation before the crisis not only varied across countries, but also was more marked in recent years. This has been particularly the case for the countries that after the devaluation became crawlers; starting with the mid-1970s devaluing countries experienced real appreciations of almost 17%.[7]

Naturally, these real appreciations were the result of domestic rates of inflation that increasingly exceeded the world rate of inflation. A set of χ^2 tests, in fact, indicate that as the crisis date became closer, the rate of CPI inflation in the devaluing countries became more distinct from that of the fixed rate control group. While the $\chi^2(2)$ was 3.1 three years prior to the crisis (level of probability 0.21), it was 15.2 one year before

TABLE 6.5

Evolution of Real Exchange Rate Indexes During Three Years

Prior to Devaluation

(Index = 100 in Year Prior to Devaluation)

Country	Year	Bilateral Real Exchange Rate		Multilateral Real Exchange Rate	
		-3 Years	-1 Year	-3 Years.	-1 Year
Argentina	1970	102.8	100	100.4	100
Bolivia	1972	97.8	100	98.7	100
Bolivia	1979	103.2	100	100.1	100
Colombia	1962	108.1	100	105.7	100
Colombia	1965	155.7	100	123.8	100
Costa Rica	1974	101.6	100	93.9	100
Cyprus	1967	95.8	100	97.2	100
Ecuador	1961	101.5	100	102.7	100
Ecuador	1970	104.3	100	103.9	100
Egypt	1962	101.3	100	98.1	100
Egypt	1979	109.4	100	96.4	100
Guyana	1967	99.7	100	100.1	100
India	1966	121.2	100	119.7	100
Indonesia	1978	120.5	100	105.9	100
Israel	1962	105.9	100	108.4	100
Israel	1967	107.0	100	112.0	100
Israel	1971	102.5	100	104.8	100
Jamaica	1967	99.7	100	100.0	100
Jamaica	1978	110.6	100	107.4	100
Malta	1967	97.2	100	99.6	100
Nicaragua	1979	101.9	100	95.3	100
Pakistan	1972	105.1	100	97.9	100
Peru	1967	119.5	100	115.7	100
Philippines	1962	106.6	100	103.6	100
Philippines	1970	97.9	100	98.2	100
Sri Lanka	1967	95.2	100	92.2	100

Table 6.5 (continued)

Country	Year	Bilateral Real Exchange Rate		Multilateral Real Exchange Rate	
		-3 Years	-1 Year	-3 Years.	-1 Year
Trinidad	1967	100.7	100	100.8	100
Venezuela	1964	100.5	100	98.0	100
Yugoslavia	1965	117.7	100	120.5	100
Bolivia	1982	129.9	100	144.8	100
Chile	1982	129.9	100	140.6	100
Colombia[a]	1967	(78.7)	100	(83.1)	100
Ecuador	1982	105.6	100	115.3	100
Kenya	1981	93.5	100	93.1	100
Korea	1980	111.6	100	112.9	100
Mexico	1976	109.2	100	108.6	100
Mexico	1982	112.9	100	128.2	100
Pakistan	1982	100.6	100	115.2	100
Peru	1975	95.3	100	91.5	100

[a] Colombia devalued in 1965. This explains the evolution of RER index before 1967.

Source: Real exchange rates indexes constructed as described in Chapter 4.

TABLE 6.6

Evolution of Net Foreign Assets and Current Account

In Period Preceding Devaluation

Country	Year	Ratio of Net[a] Foreign Assets		(Current Account/ GDP)	
		-3 Years	-1 Year	-3 Years	-1 Year
Argentina	1970	7.3	6.3	0.006	-0.010
Bolivia	1972	12.0	8.6	-0.056	-0.044
Bolivia	1979	26.0	2.9	-0.039	-0.099
Colombia	1962	1.2	-1.8	0.016	-0.030
Colombia	1965	-10.7	-11.6	-0.022	-0.030
Costa Rica	1974	12.8	16.7	-0.119	-0.091
Cyprus	1967	49.8	55.0	-0.134	-0.072
Ecuador	1961	18.9	16.4	-0.009	-0.025
Ecuador	1970	19.1	11.2	-0.057	-0.079
Egypt	1962	12.0	4.1	-0.000	-0.011
Egypt	1979	-27.5	-36.6	-0.092	-0.044
Guyana	1967	62.6	33.0	-0.063	-0.142
India	1966	2.3	1.2	-0.025	-0.029
Indonesia	1978	-13.6	12.1	-0.039	-0.001
Israel	1962	20.7	30.6	-0.180	-0.179
Israel	1967	42.3	34.3	-0.236	-0.145
Israel	1971	29.4	3.5	-0.195	-0.259
Jamaica	1967	16.8	25.5	-0.100	-0.147
Jamaica	1978	-1.1	-22.3	-0.095	-0.049
Malta	1967	83.3	83.0	-0.247	-0.182
Nicaragua	1979	16.8	-35.5	-0.028	-0.009
Pakistan	1972	7.5	3.9	-0.028	-0.029
Peru	1967	23.9	17.9	0.003	-0.036
Philippines	1962	9.5	4.7	-0.006	-0.022
Philippines	1970	1.0	-5.9	-0.028	-0.043
Sri Lanka	1967	5.2	-0.5	-0.025	-0.039
Trinidad	1967	31.4	21.3	-0.084	-0.061

Table 6.6 (continued)

Country	Year	Ratio of Net[a] Foreign Assets		(Current Account/ GDP)	
		-3 Years	-1 Year	-3 Years	-1 Year
Venezuela	1964	28.4	33.9	0.068	0.091
Yugoslavia	1965	2.3	-0.9	-0.017	-0.031
Bolivia	1982	-10.5	-23.3	-0.101	-0.104
Chile	1982	24.2	16.4	-0.062	-0.155
Colombia	1967	-11.6	-8.8	-0.030	-0.047
Ecuador	1982	26.6	17.0	-0.038	-0.044
Kenya	1981	13.4	10.2	-0.156	-0.246
Korea	1980	13.2	1.8	-0.019	-0.072
Mexico	1976	14.3	9.5	-0.025	-0.044
Mexico	1982	7.5	6.8	-0.038	-0.052
Pakistan	1982	4.3	2.1	-0.030	-0.012
Peru	1975	18.0	18.9	-0.000	-0.062
Average % Change			-38.4%		-15%

[a]Ratio of Net Foreign assets to the sum of net foreign assets plus domestic credit × 100. (Lines 31N over the sum of Lines 31N + 32 of IFS).

Source: Constructed from data by the IFS.

the crisis, reflecting a probability of less than 0.001 percent of the null hypothesis being accepted.

The behavior of RERs shows some important differences across countries. While some of them, such as Colombia in 1965, Peru 1967, Mexico 1982, Chile 1982 and Yugoslavia 1965, went through major deteriorations in competitiveness, others (i.e., Venezuela 1964) only experienced an insignificant change in the real exchange rate index, while still others, as Cyprus and Sri Lanka experienced a real depreciation in the period preceding the devaluation. In many cases, however, the recorded average real appreciation during the period leading to the crisis provides an underestimation of the magnitude of the disequilibrium. This is because in many countries in the period prior to the devaluation price controls became quite pervasive, rendering official CPIs somewhat inadequate to construct RER indexes.

The evolution of net foreign assets and of the current account balance, presented in Table 6.6, clearly captures the effect of the inconsistent macropolicies on the external accounts. In 32 out of the 39 countries the ratio of net foreign assets, experienced a decline during this two year period, confirming the view that devaluation crises are usually preceded by an important rundown of international reserves (recall the model in Chapter 3). On average, for these 39 countries, the net foreign assets ratio declined in more than 38% during the two years prior to the devaluation. The year before the crisis the median of this indicator was 6.9%, significantly below the median for the control group 20.1%. Also, in 26 of the 39 countries the current account ratio experienced a decline in the two years before the crisis, with the average deterioration amounting to 15 percent. The year before the devaluation the median of current account deficit was 4.5% of GDP, about a full percentage point higher than the 3.6% for the

control group. Moreover, in some of these episodes the current account to GDP ratio reached remarkable levels. In Kenya and Israel 1971 the current account <u>deficit</u> was approximately equal to one-fourth of GDP!

In addition to the deterioration of the current account, capital flight is a crucial force underlying the weakening position of countries with payment difficulties. Naturally, since by their own nature these capital movements are semi-illegal, there are no official data on capital "flight". Table 6.7, however, contains estimates of capital flight for 38 of the devaluation episodes. For those countries that had the appropriate data capital "flight" was proxied by the sum of "net errors and omissions" and "other short term capital" from the <u>International Financial Statistics</u> balance of payments summary. For those countries that lacked data on "other short term capital movements", "errors and omissions" only were used. Although due to the lack of comparable data these proxies are somewhat rough, they do provide a very revealing picture on the behavior of volatile capital movements.[8] In 21 out of 38 episodes there was an increase in the extent of capital "flight" in the period preceding the crisis. Of these the most notable is Mexico 1982, where the year prior to the devaluation capital flight reached almost U.S. $9 billion. As expected, in those episodes where the devaluation was not associated with major macroeconomic disequilibria -- Venezuela and Indonesia, for example -- there was no increase in capital "flight" in the period prior to the devaluation itself.

The data in these tables clearly highlight the fact that although one can identify a dominating pattern among these devaluation episodes, there are nontrivial differences across countries. In the majority of them the devaluation responded to the simultaneous depletion of international reserves and loss in competitiveness (i.e., real exchange appreciation). In

TABLE 6.7

Estimates of Capital "Flight" in Devaluing Countries

In period Prior to Crisis[*]

(Millions of U.S. $)

Country	Year	-3 Yrs.	-1 Yr.
Argentina[a]	1970	-315	-28
Bolivia[a]	1972	6	68
Bolivia[a]	1979	106	33
Colombia[b]	1962	4	8
Colombia[b]	1965	-33	132
Costa Rica[a]	1974	-63	-46
Ecuador[b]	1961	-7	2
Ecuador[a]	1970	-18	-23
Egypt[b]	1962	-13	31
Egypt[a]	1979	303	564
Guyana[b]	1967	-1	6
India[b]	1966	81	-102
Indonesia[a]	1978	1986	445
Israel[a]	1962	-17	21
Israel[a]	1967	-125[c]	72
Israel[a]	1971	121	114
Jamaica[a]	1967	-8[c]	30
Jamaica[a]	1978	-2	71
Malta[a]	1967	4[c]	2
Nicaragua[a]	1979	9	184
Pakistan[a]	1972	28	35
Peru[b]	1967	29	-12
Philippines	1962	57	39
Philippines[a]	1970	20	-19
Sri Lanka[b]	1967	2	-2
Trinidad[b]	1967	0	4

<u>Table 6.7 (continued)</u>

<u>Country</u>	<u>Year</u>	<u>-3 Yrs.</u>	<u>-1 Yr.</u>
Venezuela[b]	1964	76	-33
Yugoslavia[b]	1965	-21	16
Bolivia[a]	1982	-9	-384
Chile[a]	1982	-455	-1220
Colombia[a]	1967	40	-140
Ecuador[a]	1982	39	442
Kenya[a]	1981	-26	-136
Korea[a]	1980	42	-1954
Mexico[a]	1976	246	421
Mexico[a]	1982	-596	8976
Pakistan[a]	1982	-325	-160
Peru[a]	1975	-79	-409

[a] Capital "flight" proxied by the sum of the IFS balance of payments items "net errors and omissions" (line 77ED) and "other short term capital" (line 77DD).

[b] When the proxy [a] was not available, capital "flight" was proxied by "net errors and omission" only.

[c] Two years prior to devaluation.

<u>Source</u>: Only those countries with data are listed here. A positive sign means that there was capital flight from the country. Constructed from raw data obtained from the <u>International Financial Statistics</u>.

a small number of cases, however, it is not possible to detect any of these symptoms in the years prior to the crisis, while in still other episodes only one of the symptoms related to the crisis was present. This is the case, for example, of the Indonesian devaluation of 1978, which basically responded to the decision of the Indonesian authorities to attack early on what they saw as the negative effects of a Dutch-Disease type situation (Woo and Nesutian, 1987). In other cases -- of which the 1964 Venezuelan devaluation is the primer example -- the exchange rate adjustment amounted to an important corrective measure, with the devaluation really being an elimination of the lowest of three official exchange rates. Finally, as already pointed out, for many of the Commonwealth countries the devaluation of 1967 reflects the adjustment of the Pound Sterling in that year. However, some of these countries, such as Guyana, were independently suffering some of the symptoms of a substantial disequilibrium of the external sector.

Devaluation Crisis and Real Exchange Rate Overvaluation

Table 6.5 clearly shows a generalized pattern towards real appreciation of the (official) real exchange rate in the period preceding the crisis. This, however, is not by and of itself an indication of real exchange rate misalignment. As has been pointed out in the previous chapters, in order to determine whether or not misalignment has taken place it is first necessary to analyze the behavior -- as well as expected behavior -- of the real exchange rate fundamental determinants, and of the equilibrium real exchange rate. A partial analysis -- limited by data availability -- provides evidence suggesting that these RER movements were indeed a disequilibrium phenomenon. For example, the data on terms of trade behavior in Table 6.4 indicate that in a number of countries -- Colombia 1962; Malta, 1967; Pakistan 1972; Sri Lanka 1967; Philippines 1962; Philippines 1970; Pakistan

1982; Chile 1982; Colombia 1967; Korea 1980 and Kenya 1981 -- there was a strong terms of trade deterioration, and thus a movement towards a higher (depreciated) equilibrium RER, in the years preceding the devaluation. Also, capital inflows tended to drop in most of these countries prior to the crisis, suggesting again that, if anything, the equilibrium real exchange rate should have moved towards an equilibrium real depreciation, rather than appreciation. By and large, then, this (impressionistic) evidence suggests that the real exchange rate appreciation observed in many of these countries prior to the crisis, did not respond to an equilibrium change, but can be rather characterized as overvaluation situations.

For a few episodes it is possible to use the series on estimated equilibrium real exchange rates reported in Chapter 5 to analyze the directions in which ERERs moved in the period immediately preceding the crisis. Table 6.8 contains data for Colombia, Israel, the Philippines and Sri Lanka. As can be seen in three of these cases the period preceding the devaluations were characterized by equilibrium real depreciations, which in the case of Sri Lanka was quite significant -- 8.4%. This means that while the _actual_ real exchange rate was declining prior to the devaluation, the _equilibrium_ real exchange rate was increasing. These results underscore, at least for these countries, the notion that these devaluations indeed took place under conditions of growing real exchange rate disequilibrium.

6.3 Exchange Controls and Devaluations

Table 6.9 contains data on the evolution of exchange controls and trade impediments in the period leading to these 39 devaluations. These data have been classified according to the IMF practice and distinguish between:[9]

(a) payments restrictions on current transactions, such as licenses, prior

TABLE 6.8

Evolution of Estimated Equilibrium Real Exchange Rates

In Period Preceding Devaluation: Selected Countries[*]

		% Change in Equilibrium RER Three Yrs. Prior To Crisis
Colombia	1967[a]	3.9%
Israel	1971	1.8%
Philippines	1970	-2.4%
Sri Lanka	1967	8.4%

[*]Computed from the estimated equilibrium real exchange rates series reported in Chapter 5 (Section 5.3). In each case the percentage change was computed comparing the estimated ERER the year of the devaluation with its value three years prior to the crisis. A positive number indicates an equilibrium real depreciation, whereas a negative number denotes an equilibrium real appreciation.

[a]Refers to two years before crisis.

TABLE 6.9

Evolution of Exchange Controls and Trade Restrictions

In The Two Years Preceding Devaluation

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
Argentina (1970)	• Increasing restrictions on capital goods. • Public sector payments monitored. • All foreign exchange transactions suspended for 10 days prior to devaluation.	• Advanced deposits of 40% for 180 days. • Taxes on traditional exports. • Special regimes and exceptions abolished.	• No restrictions, and no changes prior to devaluation.
Bolivia (1972)	• Public sector payments highly controlled. • QRs on foodstuffs, cattle, cotton. • Between May and Aug. a number of imports are prohibited (1972).	• Custom charge of 15% is in place in 1970. • 20% tax on exports imposed.	• Restrictive initial conditions. No changes.
Bolivia (1979)	• Payments restrictions were increased for a number of items in year prior. • Exchange transactions suspended for 8 days prior to devaluation.	• In 1977 most imports subject to 5-25% advanced deposit. • Exceptions for duty payments eliminated for essentials (Feb.) • 500% advanced deposit imposed on 600 items.	• All capital movements required authorization. • Ceiling set on new foreign borrowing.
Bolivia (1982)	• Imports of industrial goods produced locally are prohibited. • All sales of foreign exchange subject to authorization.	• In 1980 advanced deposits of 5% to 25% were introduced. • 1981: advanced deposits reduced; import duties reduced.	• July 1982, payments restrictions tightened.

Table 6.9 (cont.)

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
Chile (1982)	•Payments highly liberalized. No restrictions imposed.	•Flat import tariff of 10% not altered prior to devaluation.	•Some restrictions on capital movements were in place preceding devaluation. No changes prior to abandonment of peg.
Colombia (1962)	•Initial conditions highly restrictive •Large number of goods moved into prior license list during 1961. •All but 11 items in free list moved to prior license (Aug.) •Many items moved to prohibited list (Nov. 1962).	•1960: Advanced deposits ranging from 1%-130%. •1961: Many advanced deposits reduced during first half of year. •1962 (Apr.): Advanced deposits raised.	•Dual exchange rates plus active parallel market. No changes prior to crisis.
Colombia (1965)	•Dec. 1964: Import free list suspended. 95% advanced deposit imposed. •1965: Many goods passed to prior licensing. •Dual rates imposed (Sept.).	•Sept. 1964: 5% advanced deposit imposed. •Dec. 1964: 95% advanced deposit imposed on selected items. •1965 more goods subject to deposit.	•Oct. 1964: Banco de la Republica ceased operations in free market. •Slight increase in tightness.
Colombia (1967)	•Highly restrictive payments structure.	•Jan. 1967: All advanced deposits increased by 50%. •Feb. advanced deposits further increased.	•Starting from controls, slight increase in degree of restrictions.
Costa Rica (1974)	•Dual exchange rates (1972). •Most imports channeled at higher rate during 1973. •Process continued in 1974 prior to dev.	•Mild restrictions on trade, not increased.	•Some restrictions in place (10%-15% tax on remittances to rest of world).

Table 6.9 (cont.)

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
Cyprus (1967)	•System of open general licenses for imports and exports, except some 50 items that required individual licenses to be imported. •No major changes prior to devaluation.	•No changes in year prior to devaluation	•Transactions in foreign securities required prior approval •Restrictions to foreign investment •No major changes prior to devaluation.
Ecuador (1961)	•1959: Multiple rates; all imports subject to licenses. •1960: Proceeds from nontraditional exports moved to free rate. •Prior to devaluation tightening of controls. Many items passed to restrictive list.	•Highly restrictive system, became tighter year prior to devaluation. •Aug. 1962: Advanced deposits increased to 100% for list 2 imports.	•Capital movements should be registered.
Ecuador (1970)	•Two types of import lists with different degrees of restrictions. •Jan.-July 1970: Increased restrictions including $400 quota on travelers.	•1968: List 1 subject to 15% duties; List 2 subject to 70% duty. •1969: Import surcharges hiked. •Jan. 1970: Duties raised to 40% for List 1 and 80% for List 2. •May: Further increases in surcharges.	•June 1970: Increased restrictions. Banks and nonbanks required to sell all foreign exchange holdings to central bank at the free market exchange rate.
Ecuador (1982)	•Same List 1/List 2 structure. Multiple rates. •1981: Increased restrictions.	•Feb. 1981 increase in coverage and rates of advanced deposits. •June: Import tariffs raised in 500 items.	•Slight increase in restrictions.

Table 6.9 (cont.)

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
Egypt (1962)	•Dual exchange rates •Several imports were prohibited and all the others required individual licenses. •QR's on invisible payments. •The import trade was almost monopolized by the government the year prior to devaluation.	•Some imports subject to a 20% premium and some exports to a 20% tax. •Most previously premium-exempted imports were imposed a 10% premium in the year prior to devaluation.	•Severe restrictions on capital flows •Royalties and dividends were subject to QR's. •No major changes prior to devaluation.
Egypt (1979)	•Dual exchange rates •Official foreign exchange allocated to "essential" imports on a yearly basis. •Some "essential" imports and most invisible transactions were shifted to the parallel market 6 months before the devaluation.	•No changes in year prior to devaluation.	•Outward capital transfers were restricted with specific limits on each type of transaction. •Foreign-currency accounts were available only for some residents. •Supervision of the Central Bank on all public foreign debt was required the year prior to devaluation.
Guyana (1967)	•Individual licenses on imports of domestically produced goods and prohibitions on some other imports. •QR's on invisible payments. •In the 15 mths. preceding the devaluation a number of items were added to the list of goods subject to specific license.	•An advanced deposit requirement on import's letters of credit was introduced one year before the devaluation.	•Flows of capital to or from outside the Sterling Area were not normally permitted. •No major change prior to devaluation.

Table 6.9 (cont.)

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
India (1966)	•Highly restrictive system; most imports required individual licenses which were usually denied to nonessential imports. •Payments for invisibles required approval on an individual basis. •No major change the year prior to devaluation.	•Feb. 1965: custom surcharge of 10% ad-valorem was introduced on all imports. •July 1965: all private imports required a 25% advanced deposit. •Aug. 1965: the custom surcharge and the prior deposit requirements were abolished.	•Almost complete capital mobility except for foreign investment, which required prior approval.
Indonesia (1978)	•Prohibition on imports of vehicles and durable consumer goods. •Imports of foodstuffs and industrial inputs could only be made by the public sector. •No major change the year prior to devaluation.	•Sales taxes of 5%, 10% and 20% were levied on most imports. •Jan. 1977: a system of 100% advanced deposits, 100% financial guarantee and 100% advanced payments of duties was introduced on some imports. •Exemptions on import duties and sales taxes were granted for some items during the 8 mths preceding devaluation. •Sept. 1978: tariff reductions were announced on 138 items imported from ASEAN countries.	•Stringent regulation on foreign borrowing and foreign investment. •No restrictions on flows of foreign currency and securities. •No change in the year prior to devaluation.
Israel (1962)	•Most imports and invisible payments required individual licenses. •No major change prior to devaluation.	•No changes in year prior to devaluation.	•Specific regulations on repayment and amortization of foreign debt and other remittances. •Foreign currency time deposits were allowed. •No change in year prior to devaluation.

Table 6.9 (cont.)

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
Israel (1967)	•50% of all imports were subject to individual licenses, the other half was free of all restrictions. •A process of relaxation of import restrictions began to take place 18 mths. before the devaluation.	•No changes in the year prior to devaluation.	•Same regulations in force than those of the previous episode.
Israel (1971)	•Two types of import lists with different degree of restrictiveness. •In the 18 mths. preceding devaluation a number of import items were transferred to the less restrictive list.	•Jan. 1970: A 5-yr. program seeking to reduce the maximum tariff to 35% was announced. •An import deposit scheme of 50% of the CIF value was introduced. •Aug. 1970: An import surcharge of 20% of cif value was introduced. •Jan. 1971: Some reductions in tariffs and a 10% reduction in the advance deposit rate.	•Stringent regulation on foreign investment. •Foreign currency deposits were allowed but transfers of capital abroad was restricted. •The banking system suspended foreign exchange dealings 1 wk. before the the devaluation.
Jamaica (1967)	•Open general license system for all imports except 150 items that required individual licenses. •Since Jan. 1966 a great number of imports were required to have specific licenses. •Stringent controls on all other payments.	•Consumption tax on imports of 2.5%. •Sept. 1967: the consumption tax on imports was raised to 5%.	•Restrictions on foreign investment and foreign debt. •Oct. 1967: Banks were prohibited to sell foreign exchange for personal transfers.

Table 6.9 (cont.)

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
Jamaica (1978)	•Highly restrictive structure: most imports required specific licenses, payments for invisible subject to QRs. •Dec. 1976: the foreign exchange market was closed and reopened on a limited basis on Jan. 1977. •Feb. 1977: 128 items were included in the list of prohibited imports. •Apr. 1977: Dual exchange market was created.	•No change took place in period prior to devaluation.	•Stringent capital controls. •Apr. 1977: with the creation of dual markets all capital transactions were made at a depreciated rate. Some payments were temporarily suspended.
Kenya (1981)	•Multiple exchange rates •Imports classified into 4 lists for the provision of licenses. •June 1980: prohibition on certain imports was lifted.	•Some imports subject to a 3-mth. advance deposit ranging from 10% to 100% of the cif value of imports. •June 1980: surcharge of 10% in all imports and custom duties for consumer goods were increased by 100%. •June 1981: Tariffs were further raised.	•Stringent capital controls. •Mar. 1981: repatriation of assets held abroad was required to be completed by Dec.
Korea (1980)	•All imports required licenses but 30% of the universe of imports were prohibited items. •QRs on invisible payments. •18 mths. before devaluation a process of relaxation of licensing requirements began to take place.	•Advanced deposit scheme on all imports with rates ranging from 10% to 20% of cif value.	•Mild regulations on capital flows which were progressively relaxed.

Table 6.9 (cont.)

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
Mexico (1976)	•Import licenses required for almost all imports. •Public imports severely restricted.	•Non-essential imports subject to a 10% ad-valorem surcharge. •The 10% surcharge was eliminated in Jan. 1975 but in Aug. of that year the average import duty was increased from 15% to 20%.	•Foreign investment severely restricted. •Borrowing abroad of public and private sector was subject to approval from Ministry. •Foreign currency time deposits were permitted.
Mexico (1982)	•Initial conditions: Import licensing and import quotas. •1981: Import licensing requirements greatly increased.	•May 1981: Duties increased in 374 items. •July: Further increases in duties levels. •Nov.: Duties hiked for 120 items.	•No change in capital controls in period preceding devaluation.
Nicaragua (1979)	•2 groups of imports. •Sales of foreign exchange at official rate restricted. •Licenses hiked in 1978/79. •Multiple rates imposed (Apr. 1979).	•Nov. 1979: Weekly foreign exchange allocation for imports imposed.	•Increased restrictions.
Pakistan (1972)	•Multiple rates. •4 lists of permitted imports with different degree of restrictiveness regarding the issuance of licenses. •Payments for invisibles subject to QRs. •1971: licenses hiked and prohibitions increased.	•Imports from 2 of the 4 lists were subject to advanced deposits.	•Transfers of capital and purchase of foreign securities were rarely allowed. •Jan. 1972: All citizens were required to repatriate assets held abroad. •May 1972: A partial moratorium on external debt service was declared.

Table 6.9 (cont.)

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
Pakistan (1982)	•2 lists of permitted imports, both of them required licenses. •Payments for invisibles and some exports were subject to QRs. •Aug. 1981: some export goods were exempted from quota restrictions.	•1981: Increase in import duties of several items throughout the year.	•Transfers of capital and purchase of foreign securities were rarely permitted. •No changes in year prior to devaluation.
Peru (1967)	•Initial conditions (1965): No licenses required (except for 12 items). •In 1967 a number of restrictions were imposed. Exports required licenses (Oct.). Exports proceeds surrendered for certificates.	•Aug. 1966: Most imports were made subject to surcharge. •June 1967: Generalized hike in import duties.	•Mild initial restrictions. •Sept. 1967: A moratorium on payments of foreign debt is declared. Lifted after 16 days. •Slight increase in degree of restrictions.
Peru (1975)	•Initial conditions (1973): Severe restrictions. Multiple exchange rates. Licenses or prior approval required for almost every item. •No major changes during year prior to devaluation.	•Restrictive intial conditions. During 1974 degree of restrictiveness is increased. •Jan. 1975: 12% surcharge on all imports.	•Very restrictive initial conditions. •No changes during year prior to devaluation.
Philippines (1962)	•Dual exchange rates. •"Decontrol" program aimed at withdrawing all restrictions on foreign exchange payments (accomplished by Jan. 1962).	•Advanced deposit scheme with rates ranging from 50% to 150% of cif value. •Requirement was not removed despite the "decontrol" program.	•Mild restrictions on capital movements, which were completely withdrawn by Jan. 1962.

Table 6.9 (cont.)

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
Philippines (1970)	•Import prohibitions were in force and most imports required individual licenses •Payments for invisibles subject to QRs. •Increased restrictions prior to devaluation.	•Advanced deposit scheme with rates ranging from 25% to 175%. •1969: Import duties on many commodities were raised.	•Stringent regulations on foreign securities purchases, foreign debt and capital transfers. •Aug. 1969: Profit remittances from foreign firms were requested to be reduced. •Nov. 1969: Contracting in foreign currency was prohibited.
Sri Lanka (1967)	•All private imports required individual licenses and were divided into 3 groups, 2 of them subject to QRs, the others highly restricted. •QRs on payments for invisibles. •Nov. 1966: payments restrictions increased.	•Most imports subject to a 10% custom duty surcharge. •July 1966: The average and dispersion of the tariff structure was reduced, setting the maximum tariff on 150%. •The fees payable on import licenses and on surcharges increased steadily until the devaluation.	•Capital remittances of residents were limited. •The moratorium on transfers of dividends, profits and interest established in 1964 was relaxed on July 1966. •No change took place until the devaluation.
Trinidad-Tobago (1967)	•Regulations included prohibitions, individual import licensing and state trading. •In 1966-1967 an increasing number of imports became subject to individual licenses.	•No change took place prior to devaluation.	•Restrictions placed on all imports and exports of securities. •Sept. 1966: A 30% tax was imposed on dividends.

Table 6.9 (cont.)

Episode	Payments Restrictions on Current Transactions	Tariffs, Duties and Cost Related Measures	Restrictions on Capital Transactions
Venezuela (1964)	•Multiple rates. •Some restrictions initially, with licenses required on some items. •No changes in year prior to devaluation.	•No changes in year prior to devaluation.	•Almost complete capital mobility which is maintained throughout the episode.
Yugoslavia (1965)	•75% of imports were free of quantitative restrictions but subject to licenses; 25% of imports were subject to QRs. •Feb. 1964: Relaxation of import controls.	•No change took place prior to devaluation.	•Stringent capital controls and low degree of capital mobility. •No change before devaluation.

Source: See text.

approvals, multiple rates, prohibitions and so on; (b) tariffs, duties and price related measures; and (c) restrictions on capital movements in the form of either licenses or taxes. In this table we have tried to convey information on the conditions prevailing two years prior to the devaluation and on any changes implemented in the degree of controls in the year immediately prior to the abandonment of the fixed peg. Given the nature of the information available it is very difficult to quantitatively have an exact idea on how the extent of impediments has evolved. For this reason in this study we have decided to qualitatively analyze the evolution of exchange controls without making an attempt to construct a subjective <u>index</u> of trade restrictions. Indexes of trade controls have a number of problems and limitations. First, although they are purely subjective, by attaching numbers they sometimes give the false impression of a more or less precise measure. Second, these indexes cannot be compared across countries. Appendix C to this chapter contains a much more detailed discussion of the evolution of these exchange and trade controls both before and after the devaluations. Table 6.9 reveals that in the great majority of the cases the devaluation was preceded by an important piling up of exchange controls and restrictions. In a small number of episodes, such as Colombia in 1962 and 1967, Ecuador 1961, and Peru in 1975, the initial conditions (two years prior to the crisis) were already extremely restrictive, and became even tighter as the erosion of reserves became severe and/or real exchange rate appreciation increased. In other cases, however, -- Venezuela 1964 and Chile 1982, for example -- the period preceding the devaluation was characterized by a fairly free environment, with little restrictions and no attempts by the authorities to impose any additional controls.[10] Furthermore, in the case of Indonesia 1978, Israel 1967, 1971, and Korea 1980, the

period leading to the devaluation was accompanied by a liberalization of commodity trade.

Table 6.9 is supplemented by Table 6.10 that shows that in the majority of these episodes the period preceding the devaluation was characterized by the existence of multiple official exchange rates. In fact, only 13 out of 34 cases had a unified official exchange rate one year prior to the crisis. Interestingly enough, however, in most instances the multiple rates were in place at least three years before the crisis, and in most countries there was no increase in the number of official rates as the devaluation date approached. Only in Jamaica 1978, Nicaragua in 1979, Pakistan 1972, Colombia 1967, and the Philippines in 1962, there was an increase in the number of official nominal exchange rates during the three years period preceding the crisis.

The data on parallel market premia in Table 6.10 are particularly revealing.[11] In 28 out of the 33 devaluation episodes that have data there was a significant increase in the black market premium during the 3 years preceding the crisis. Moreover, the parallel market spread increased very quickly as the crisis approached, reaching in many countries very significant levels just one month prior to the crisis. This behavior of the spread traces closely the predictions of the model of Chapter 3, and is reflecting three interrelated forces. First, in the presence of a freely fluctuating parallel market rate, expansive domestic credit policies will usually be reflected in a depreciation of the free rate, at the same time as the domestic rate of inflation increases and international reserves are eroded. Second, this hike in the premium is capturing the public's reaction to the movement towards greater exchange controls. And third, it also reflects the generalized expectations that the situation is increasingly unsustainable

TABLE 6.10

Multiple Exchange Rates and Parallel Market Premium

In Period Prior to Devaluations

Country	Year	Number of Official Exchange Rates		Parallel Market Premium (percentage)			
		-3 Yrs.	-1 Yr.	-3 Yrs.	-9 Mths.	-3 Mths.	-1 Month
Argentina	1970	1	1	0	0.3	0.0	0.0
Bolivia	1972	2	2	31.2	64.0	67.1	60.0
Bolivia	1979	1	1	6.6	10.0	17.5	17.5
Colombia	1962	3	3	11.1	33.4	34.7	58.0
Colombia	1965	3	3	37.5	42.8	110.6	114.4
Costa Rica	1974	8	5	0.5	42.2	34.7	30.2
Ecuador	1961	2	2	37.6	21.9	23.3	66.7
Ecuador	1970	2	2	11.1	22.5	23.9	55.6
Egypt	1962	2	2	3.3	91.4	125.7	128.6
Egypt	1979	3	3	94.4	87.2	84.6	92.3
India	1966	1	1	51.9	77.5	131.1	134.2
Indonesia	1978	4	4	0.0	2.7	0.5	1.2
Israel	1962	1	1	-0.6	36.3	46.9	50.8
Israel	1967	1	1	7.8	5.6	13.9	9.9
Israel	1971	1	1	-5.0	26.9	7.7	6.9
Jamaica	1978	1	2	n.a.	n.a.	n.a.	n.a.
Nicaragua	1979	1	2	0.2	27.1	78.6	92.9
Pakistan	1972	1	2	112.2	152.1	157.3	134.2
Peru	1967	1	1	5.2	2.2	2.2	43.6
Philippines	1962	1	2	43.2	85.0	106.0	126.0
Philippines	1970	1	1	8.9	15.4	44.9	59.0
Sri Lanka	1967	1	1	163.2	180.3	173.1	152.1
Venezuela	1964	3	3	0	35.5	35.5	35.5
Yugoslavia	1965	2	2	n.a.	39.5	41.9	54.7

Table 6.10 (continued)

Country	Year	Number of Official Exchange Rates		Parallel Market Premium (percentage)			
		-3 Yrs.	-1 Yr.	-3 Yrs.	-9 Mths.	-3 Mths.	-1 Month
Bolivia	1982	2	2	n.a.	25.0	502.3	434.1
Chile	1982	1	1	n.a.	10.3	12.8	17.9
Colombia	1967	3	4	35.9	19.2	46.3	48.1
Ecuador	1982	3	3	n.a.	25.0	45.0	74.1
Kenya	1981	3	3	n.a.	0.7	10.7	19.8
Korea	1980	2	2	4.4	14.0	19.2	42.3
Mexico	1976	1	1	0.0	0.0	0.0	0.0
Mexico	1982	1	1	0.0	5.4	11.7	12.5
Pakistan	1982	1	1	n.a.	33.8	48.5	40.9
Peru	1975	4	4	77.8	52.5	56.3	75.7

Source: Picks Currency Yearbook, World's Currency Yearbook and IFS; various issues.

and will result in an eventual devaluation.

As the data on net foreign assets and on the current account in Table 6.6 show, the imposition of these exchange controls and payments restrictions did not succeed in putting an end to the erosion of foreign exchange, nor did they succeed in halting the deteriorating situation in the country's degree of international competitiveness. At most one can argue that these heightened impediments to trade managed to slow down the unavoidable balance of payments crisis, unleashed by the inconsistent macroeconomic policies.[12] An important side effect of these trade restrictions and exchange controls is that they introduced serious distortions that impacted on the economic performance of the country. Data on the evolution of real growth of GDP show that already one year prior to the devaluation crisis countries were performing significantly worse than the control group. χ^2 tests indicated that the null hypothesis that the devaluing and the control groups come from the same population is strongly rejected. This finding which has important consequences for the "<u>contractionary devaluation</u>" controversy, is discussed in great detail in Chapter 8.

6.4 <u>International Liquidity, Real Exchange Rates and the Probability of Devaluation: Econometric Estimates</u>

The empirical analysis of the preceding sections has provided a comprehensive picture of the circumstances surrounding the 39 devaluation episodes. The methodological approach was based on the inspection of key variables in the period preceding the devaluation, and on the use of non-parametric tests to compare their behavior to that of a control group. In this section we use a probit regression analysis to investigate the effects of changes in the levels of international liquidity, real exchange rates, fiscal policy and parallel market premia on the probability of occurrence of

a devaluation.

According to the model of Chapter 3 devaluations will be preceded by: (a) severe depletions of foreign assets held by the Central Bank and the monetary system; (b) real exchange rate appreciation (i.e., overvaluation); and (c) increases in the parallel market premia. While the loss of foreign assets and the real exchange rate overvaluation are the proximate factors triggering most devaluations, the ultimate causes of these exchange rate crises are related to inconsistent macro and especially fiscal policies.

The probit analysis reported here inquired on the role of both the proximate and ultimate causes of devaluation. Pooled quarterly data were used, and every regression was estimated with country specific dummy variables. Since not every country had long enough quarterly time series the number of countries included in the analysis had to be greatly reduced. Those regressions that did not include the parallel market premium as an explanatory variable covered 17 countries, while those that included it dealt with 7 countries only.[13] The reason why these regressions were run on pooled data is that there are very few (discrete) devaluations for any one country, and country-by-country regressions would then have very few (one or two) "ones" and many "zeroes".

The results obtained from these Probit regressions are reported in Table 6.11, where the dependent variable took a value of one when there was a devaluation and zero otherwise. The following notation has been used:

FARE: Ratio of foreign assets of the Central Bank to reserve money. This is a measure of international liquidity.

NFAM: Ratio of net foreign assets of the monetary sector to the quantity of money (M1). This is an alternative measure of international

TABLE 6.11

Probit Estimates of Devaluation Equations[*]

	(Eq.1)	(Eq.2)	(Eq.3)	(Eq.4)	(Eq.4)	(Eq.5)
$FARE_{-1}$	-	-0.944 (-2.917)	-0.800 (-2.304)	-	-	-
$NFAM_{-1}$	-	-	-	-0.259 (-0.404)	-0.784 (-1.571)	-0.230 (-2.384)
$PSCRE_{-1}$	1.456 (2.206)	-	0.597 (0.760)	1.257 (1.530)	-	-
RER_{-1}	-0.142 (-4.610)	-0.126 (-4.636)	-0.189 (-2.304)	-0.135 (-4.446)	-0.132 (-4.804)	-0.030 (-0.772)
$BMPR_{-1}$	-	-	-	-	-	1.110 (2.824)
N	758	794	751	758	708	435
log likelihood	32.4	41.8	46.9	32.0	33.6	33.6

[*]The numbers in parentheses are t-statistics, and N refers to the number of observations. All right hand side variables were lagged one period.

liquidity.

PSCRE: Ratio of domestic credit to the public sector to total domestic credit.

RER: Real (bilateral) exchange rate index.

BMPR: Parallel market premium.

Broadly speaking these estimates confirm the implications of the model developed in Chapter 3 and provide further support to the nonparametric tests reported in Section 6.2. The main results in Table 6.11 can be summarized as follows: (1) real exchange rate appreciations significantly increases the probability of devaluation; (2) A worsening in the foreign assets position of either the Central Bank or the monetary system as a whole increases the probability of devaluation; (3) More expansive fiscal policies -- characterized here by increases in the ratio of public sector credit -- increase the probability of devaluation; (4) Higher parallel market premia also reflect a significant increase in this probability.[14] Although in light of the exhaustive data analysis of the previous sections these results are not too surprising, they clearly reflect the robustness of our findings. Not only do our results hold from a qualitative point of view (an aspect captured by the nonparametric tests) but they are confirmed when more strict parametric tests are used.

6.5 Summary

In this chapter we have analyzed in detail the anatomy of devaluation crisis in the developing countries. This was done by scrutinizing thirty-nine major devaluation episodes that took place between 1962 and 1982. The analysis was carried out using two different methodologies: First, non-parametric tests were used to compare the behavior of the devaluers with that

of a control group of fixers. Second, limited dependent variable econometric techniques were used to analyze how different variables -- such as the real exchange rate -- have been connected to exchange rate crises and devaluations.

Throughout the empirical investigation the macroeconomic model of Chapter 3 provided the analytical framework. As suggested by that model most of the devaluation episodes were the result of inconsistent macroeconomic and in particular fiscal policies. As a consequence of these policies, in the vast majority of the cases current account balances deteriorated, the stock of international reserves was depleted, the parallel market spread shot up, and the real exchange rate experienced a massive appreciation, becoming over-valued. In fact the probit analysis indicates that the evolution of reserves, the real exchange rate and a fiscal policy indicator trace closely the probability of devaluation.

It was also found that in the majority of cases, the authorities imposed a number of payments and trade controls in an effort to stop the drainage of reserves. These measures, however, were to a large extent ineffective, being unable to stop the deterioration of the external accounts. In fact the data on capital "flight" show quite clearly that as the devaluation date approached these countries' nationals were able to "smuggle" increasing amounts of funds out of the country. These data provide a very consistent picture on the ineffectiveness of capital controls. If the ultimate sources of the disequilibria -- the inconsistent domestic credit and fiscal policies -- are not altered, capital controls are unable to stop an unavoidable collapse of the external sector. Under most circumstances, and as suggested by our model in Chapter 3, this collapse comes in the form of a large devaluation and a stabilization package, many times administered by the IMF. The purpose of the next chapter is to investigate in detail, for the same 39 devaluation

episodes, the effectiveness of devaluations as a policy tool to restore RER equilibrium.

Footnotes

[1] A word of caution should be said regarding the use of the control group methodology for cross country comparisons. In order for the nonparametric tests performed (x^2 tests) to be unbiased, the selection of the control group should not be affected by the definition of the "treatment" group (i.e., the devaluers). The clearest case where this requirement is violated refers to selectivity bias. Goldstein and Montiel (1986) have persuasively argued that a number of recent studies -- and in particular those comparing the performance of countries with IMF programs with those without Fund programs -- do not meet this criterion. The current study, however, is not subject to this selectivity bias problem. This is because we are basically comparing the behavior of policy instruments for a number of years prior to the crisis. A more subtle potential problem with this analysis based on a control group refers to possible cross country policy interdependence. If, for example, domestic credit policy in a control group country depends on credit policy in a devaluing country -- via some policy reaction function -- the nonparametric test will be biased. Although it is not possible to know exactly the extent of policy interdependence across these small countries, the great variety of nations and years involved in the analysis strongly suggests that this is not a serious problem.

[2] Cooper (1971), however, didn't deal with the period preceding the devaluations. Moreover, contrary to this study, and to Harberger and Edwards (1982), Cooper didn't use a control group for comparison. Recently, Edwards (1985a) and Kamin (1985) have also used the episodic approach, as have some of the studies that have analyzed the effectiveness of IMF

programs.

[3]Notice that five of the episodes -- Guyana 1967, Cyprus 1967, Jamaica 1967, Malta 1967, and Trinidad 1967 -- correspond to Commonwealth nations that pegged their exchange rates to the Pound Sterling. When the Pound was devalued in 1967 so were these countries' currencies. A question that this analysis will address, then, is whether these episodes are significantly different from the rest of the devaluations investigated here.

[4]This, of course, assumes that the policies followed by the fixers are consistent and sustainable. This is not a very farfetched assumption. See Appendix B to this chapter for a list of the control group.

[5]In order to avoid the influence of extreme outliers in the analysis we have summarized the data by means of the first, second (median) and third quartile. Outliers can indeed distort the analysis if, for example, averages are used. In our case, the Bolivian devaluation of 1982, for example, is a major outlier. For the sake of completeness the means are also reported for each variable.

[6]It may be argued, however, that if the countries fail to adapt their macro policy to the new international environment, the ultimate cause of the crisis is still an inconsistent macro policy.

[7]The amount of real appreciation in the years preceding devaluation is relatively small on average. This can be partially explained by measurement error. In most countries as the crisis unravels, price controls are imposed, distorting the official CPI.

[8] As a consequence of the 1982 debt crisis the definition and measurement of capital "flight" has become a much discussed subject. See, for example, Cumby and Levich (1987). The measures used in this chapter are among the simplest and thus easiest to calculate of those suggested in this literature. Notice that given the indirect way of computing it, for some countries capital "flight" is positive. What we care about, however, is the change in our proxy as the crisis date approaches.

[9] See IMF's Yearbook of Exchange Controls Payments Restrictions. The information summarized in Table 6.8 was obtained from various issues of this Yearbook. More detailed information on the imposition of these controls is reported in Appendix C of this chapter.

[10] In the case of Venezuela, however, the existence of a multiple exchange rate system introduced some restrictions.

[11] Depending on the country, these figures refer either to the black market for foreign exchange or to the fluctuating rate in the "free segment".

[12] On the ineffectiveness of capital controls see Edwards (1985b).

[13] The 17 countries are: Bolivia, Colombia, Costa Rica, Ecuador, Indonesia, Egypt, Guyana, Yugoslavia, India, Israel, Jamaica, Nicaragua, Pakistan, Peru, Philippines, Sri Lanka, Trinidad. The 7 countries included in the regressions with parallel market premium data are: Colombia, Ecuador, Sri Lanka, India, Pakistan, Philippines and Yugoslavia.

[14] Regressions were also estimated using the right hand side variables in logs. A problem with those estimates is that since some observations had negative values, we lost a number of data points. The results, obtained with

these reduced samples, however, confirmed our findings:

$$DEV_t = -0.820 \log FARE_{t-1} - -0.411 \log RER_{t-1} + 0.879 \log PSCRE_{t-1}$$

$$(-2.421) \qquad\qquad (-3.727) \qquad\qquad (0.795)$$

$$N = 481.$$

APPENDIX 6.A

IMF Programs In Countries In Devaluation Sample

Country	Year of Devaluation Crisis	Stand-by Agreement Date*	Amount	External Fund Facility Date*	Amount
			(Millions of SDRs or Dollars $)		
Argentina	1970	1968(4/15)	$125.00	-	-
Bolivia	1972	1973(1/17)	27.30	-	-
Bolivia	1979	1981(2/1)	66.38	-	-
Bolivia	1982	-	-	-	-
Chile	1982	1983(1/10)	500.00	-	-
Colombia	1962	1962(1/1) 1963(1/14)	$10.00 $52.50	- -	- -
Colombia	1965	1964(2/14) 1967(4/15)	$10.00 $60.00	- -	- -
Colombia	1967	1967(4/15) 1968(4/19)	$46.00 $60.00	- -	- -
Costa Rica	1974	-	-	-	-
Cyprus	1967	-	-	-	-
Ecuador	1961	1963(7/1)	$6.00	-	-
Ecuador	1970	1970(9/14)	22.00	-	-
Ecuador	1982	1983(7/25)	157.50	-	-
Egypt	1962	-	-	-	-
Egypt	1979	-	-	1978(7/28)	600.00
Guyana	1967	1967(2/15) 1968(2/15)	$7.50 $4.00	- -	- -
India	1966	1965(3/22)	$100.00	-	-
Indonesia	1978	-	-	-	-
Israel	1962	-	-	-	-
Israel	1967	-	-	-	-
Israel	1971	-	-	-	-
Jamaica	1967	-	-	-	-
Jamaica	1978	-	-	-	-
Kenya	1981	1979(8/20) 1980(10/15)	122.48 241.50	- -	- -

Appendix 6.A (cont.)

Country	Year of Devaluation Crisis	Stand-by Agreement Date*	Amount (Millions of SDRs or Dollars $)	External Fund Facility Date*	Amount
Kenya	1980	1980(3/3)	640.00	-	-
		1981(2/13)	576.00	-	-
Malta	1967	-	-	-	-
Mexico	1976	-	-	1977(1/1)	518.00
Mexico	1982	-	-	1983(1/1)	3410.63
Nicaragua	1979	1979(5/14)	34.00	-	-
Pakistan	1972	1972(5/18)	9.00	-	-
Peru	1967	1967(8/18)	$42.50	-	-
Peru	1975	-	-	-	-
Philippines	1962	1964(4/12)	$40.40	-	-
Philippines	1970	1970(2/20)	27.50	-	-
		1971(3/16)	45.00		
		1972(5/11)	45.00		
Sri Lanka	1967	-	-	-	-
Trinidad	1967	-	-	-	-
Venezuela	1964	-	-	-	-
Yugoslavia	1965	1967(1/1)	$45.00	-	-

*Numbers in parentheses refer to the month and date in which the agreement was signed.

Source: International Monetary Fund.

APPENDIX 6.B

Control Countries

Country	IFS Country Code	Year of Study
Cote d'Ivoire	662	1965-1977
Dominican Republic	243	1960-1980
Ecuador	248	1971-1980
Egypt	469	1960-1971
El Salvador	253	1960-1980
Ethiopia	644	1960-1970
Greece	174	1960-1973
Guatemala	258	1960-1980
Honduras	268	1960-1980
Iran	429	1960-1971
Iraq	433	1960-1971
Jordan	439	1960-1971
Malaysia	548	1960-1970
Mexico	273	1960-1974
Nicaragua	278	1960-1977
Nigeria	694	1960-1970
Panama	283	1960-1980
Paraguay	288	1960-1982
Singapore	576	1960-1970
Sudan	732	1960-1976
Thailand	578	1960-1971
Tunisia	744	1960-1970
Venezuela	299	1965-1971
Zambia	754	1960-1971