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EXCHANGE CONTROLS, DEVALUATIONS  
AND REAL EXCHANGE RATES:  
THE LATIN AMERICAN EXPERIENCE

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Exchange Controls, Devaluations and Real Exchange Rates:  
The Latin American Experience

ABSTRACT

This paper deals with the anatomy of devaluation in Latin America. In an effort to understand the economics surrounding the causes and consequences of exchange rate crises, eighteen devaluation episodes that took place between 1962 and 1982 are investigated in detail. The paper focuses on: (1) the relation between (inconsistent) macroeconomics policies and exchange rate crises; (2) the role of real exchange rate overvaluation in the precipitation of balance of payment crises under pre-determined nominal exchange rates; (3) the role of exchange controls, multiple exchange rates and black markets in the period preceding devaluations; and (4) the effectiveness of nominal devaluations as a way to restore real exchange rate equilibrium. A distinction is made between stepwise devaluations and crawling peg regime. It was found that historically most stepwise devaluations have had difficulty in sustaining a real devaluation over the medium term. Countries that adopted a crawling peg have generally been able to maintain a higher real exchange rate. In many cases, however, this has been achieved at the cost of substantial inflation.

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## I. Introduction

This paper deals with the anatomy of devaluations in Latin America. In an effort to understand the economics surrounding the causes and consequences of exchange rate crises, eighteen devaluation episodes that took place between 1962 and 1982 are investigated in detail. The paper focuses on: (1) the relation between (inconsistent) macroeconomic policies and exchange rate crises; (2) the role of real exchange rate overvaluation in the precipitation of balance of payment crises under pre-determined nominal exchange rates; (3) the role of exchange controls, multiple exchange rates and black markets in the period preceding devaluations; and (4) the effectiveness of nominal devaluations as a way to restore real exchange rate equilibrium. Here a distinction is made between stepwise devaluations and devaluations that are followed by a crawling peg regime.

The empirical approach followed in this paper consists on analyzing in detail the evolution of a number of key variables during the three years preceding and the three years following the 18 devaluation episodes. In doing this, an effort is made to detect regularities across countries that will allow us to infer some general rules relating 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. In these comparisons non-parametric tests were used. Although this episodic strategy for empirical inquiry departs significantly 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, on Harberger and Edwards' (1982) study on balance of payments crises.<sup>1</sup> The episodic approach adopted in this paper 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, from time to time and in order to shed additional light into the problem at hand, the episodic approach is supplemented with a regression analysis.

The paper starts, in Section II, with a brief review of the analytical aspects related to the balance of payments crises and to devaluation. This analytical discussion sets the stage for the detailed empirical analysis of Sections III and IV.

## II. Macroeconomic Policy, Real Exchange Rates and Devaluations Under Alternative Nominal Exchange Rate Regimes

A fundamental principle of open economy macroeconomics is that in order to have a sustainable and stable macroeconomic equilibrium it is necessary for monetary and fiscal policies to be consistent with the chosen nominal exchange rate regime. This means that the selection of an exchange rate system imposes certain limitations on the extent of macropolicies. If this

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<sup>1</sup>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 (1985c) and Kamin (1985) have also used the episodic approach, as have some of the studies that have analyzed the effectiveness of IMF programs.

consistency is violated severe disequilibrium situations, which are usually reflected on the real exchange rate misalignment, and in an eventual balance of payments crises, will take place. In this section we briefly discuss the interaction between macroeconomic policies, real exchange rate behavior, exchange controls and balance of payment crisis. We also analyze the role of devaluations in the adjustment process. In the discussion we make a distinction between two alternative nominal exchange rate regimes: (1) predetermined nominal exchange rates, including fixed rates and its variants such as crawling peg and managed rates; and (2) nonunified exchange rate systems, including dual rates and the case where a significant parallel foreign exchange market coexists with the official rate.

#### II.1 Macroeconomic Policies and Real Exchange Rates Under Predetermined Nominal Exchange Rates

Perhaps the case of a "high" fiscal deficit is the most clear example of macro and exchange rate inconsistencies under fixed nominal rates. In most developing countries fiscal imbalances are partially or wholly financed by money creation. The inflation "required" to finance a fiscal deficit equal to a fraction  $\delta$  of GDP is given by:

$$\pi = \delta/\lambda \quad (1)$$

where  $\pi$  is the rate of inflation required to finance the government deficit, and  $\lambda$  is the ratio of high-powered money to GDP.<sup>2</sup> If, for example, a country has a fiscal deficit of 8% of GDP and its stock of base money represents 20% of GDP, the required rate of inflation will be 40% per annum. If the required rate of inflation is as high as in this example,

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<sup>2</sup>The increase in high power money required to finance a deficit equal to a fraction  $\delta$  of GDP can be written as:  $\Delta M/P = \delta G$ . In equilibrium  $\Delta M/M$  is equal to the rate of inflation, and thus equation (1) follows.

there will generally be an inconsistency between the fiscal deficit and the maintenance of a fixed nominal exchange rate. Since the domestic price of nontradables increases at a rate approximately equal to the rate of inflation, and the domestic price of tradables grows at approximately the rate of world inflation,<sup>3</sup> a real appreciation will take place every period.

Under predetermined nominal exchange rates, all increases in domestic credit that exceed the growth in the demand for domestic money will be inconsistent with the maintenance of the fixed nominal rate. These excesses of domestic credit creation above money demand growth will be translated into an excess demand for tradable goods, nontradable goods, and financial assets. While the excess demand of tradables will be reflected in a higher trade deficit (or lower surplus), in a loss of international reserves, and in an increase in (net) foreign borrowing above its long run sustainable level, the excess demand for nontradables will be translated into higher prices for those goods, and consequently into a real exchange rate appreciation. If there are no changes in the fundamental real determinants of the equilibrium real exchange rate this real appreciation induced by the expansive domestic credit policy will represent a departure of the actual RER from its equilibrium value, or real exchange rate misalignment (i.e., overvaluation).

If the inconsistent macropolicies are not reversed, the drainage of reserves and the real exchange rate appreciation will continue. Typically, the authorities will try to stop this process by imposing exchange controls,

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<sup>3</sup>The domestic price of tradables is equal to  $P_T = EP_T^* \tau$ , where  $P_T^*$  is the international price of tradables,  $E$  is the nominal exchange rate and  $\tau$  is one plus the tax on tradables. If the exchange rate is fixed and there are no changes in  $\tau$ ,  $P_T$  will increase at approximately the rate of world inflation.



hiking tariffs and imposing quantitative controls. A number of times this will result in the emergence of black markets on foreign exchange rate. In section II.2 below we discuss the functioning of this kind of system. These policies, however, will only be able to delay the crisis. Eventually, the country will "run out" of reserves and/or its real exchange rate will reach a lower bound, at which point a devaluation, and possibly other corrective policies will be implemented.<sup>4</sup>

The consistency between monetary and exchange rate policies is not only needed under fixed rates, but also under most types of predetermined and managed nominal exchange rates such as "active" crawling pegs, where the economic authorities preannounce the rate of devaluation for a given period into the future. Perhaps Argentina in the late 1970s is the most notorious recent case of an inconsistent fiscal and crawling nominal exchange rate policies. During that period the Argentinian government implemented the by-now famous preannounced rate of devaluation or "tablita" as a means to reduce inflation. However, the preannounced rate of crawl was clearly inconsistent with the inflation tax required to finance the fiscal deficit (Calvo 1986). This inconsistency not only generated a real appreciation but also substantial speculative activity, where the public basically bet on when the "tablita" would be abandoned.

In a "passive" crawling peg regime, the monetary authorities adjust the parity periodically, without following written or rigid rules. The extent of exchange rate devaluation in each period responds to pragmatic considerations, including inflation differentials, level of international reserves and the behavior of the terms of trade. In a way, under this type of crawling

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<sup>4</sup>There is a vast literature on the theoretical determinants of exchange rate crises. See, for example, Krugman (1979) and Calvo (1987).

peg the need for "consistency" is somewhat reduced, since the rate of crawl can always "accommodate" the monetary policy, in a way to avoid RER overvaluation and reserves losses. If this is done, however, other macroeconomic objectives, like reasonable price stability, would be seriously affected.

## II.2 Macroeconomic Policies and the RER with Dual Nominal Rates and in the Presence of Parallel Nominal Exchange Rate Markets

Nonunified (or multiple) nominal exchange rates have traditionally had some appeal for the developing countries. Under this type of system different international transactions are subject to differential nominal exchange rates, giving rise to the possibility of having more than one real exchange rate.<sup>5</sup>

Under this type of regime, the relation between macroeconomic policies and the rest of the economy will depend on the nature of the multiple rates system. If, for example, the multiple rates regime consists of two (or more) predetermined (i.e., fixed) nominal rates, the system will work almost in the same way as under unified predetermined nominal rates. This is because multiple fixed nominal exchange rates are equivalent to a unified rate system with taxes on certain external transactions.<sup>6</sup> In this case, as with unified predetermined rates, inconsistent macroeconomic policies will result in loss of international reserves, a rate of domestic inflation that will exceed world inflation, and in real exchange rate overvaluation. This situation, of course, will be unsustainable in the long run and the authorities will have to introduce corrective macropolicies.

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<sup>5</sup>There is a growing theoretical literature on the effects of macroeconomic policies under nonunified nominal rates. See Aizenman (1985), Dornbusch (1986a,b).

<sup>6</sup>See, for example, the discussion in Dornbusch (1986a).

A different kind of nonunified nominal exchange rates consists of a fixed official rate for current account transactions and an (official) freely fluctuating rate for capital account transactions. The main purpose of this system is to delink the real side of the economy from the effects of supposedly highly unstable capital movements. In this dual exchange rate system, portfolio decisions are highly influenced by the differential between the free and fixed rates or exchange rate premium. The private sector decisions on what proportion of wealth to hold in the form of foreign currency denominated assets is strongly affected by the expected rate of devaluation of the free rate. The free rate, in turn, will be highly responsive to expectations about future events.<sup>7</sup>

Under this type of dual exchange rate system, even if no current account transactions slip into the free rate, changes in the free nominal rate will still exercise an indirect effect on the relative price of tradables or real exchange rate.<sup>8</sup> Consider, for example, the case of a sustained increase of domestic credit exceeding the increase in the demand for domestic money. As before this will provoke an excess demand for goods and financial assets. As a result of this policy there will be a decline in the stock of international reserves, an increase in the price of nontradable goods, and consequently a real appreciation. In addition there will be an increase in the demand for foreign assets, which will result in a nominal devaluation of the free rate, and in changes in the domestic interest rate. In this case, if there are no capital controls and we assume risk

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<sup>7</sup>This type of regime has been recently discussed by Dornbusch (1986b).

<sup>8</sup>Notice that if no current account transactions are subject to the free rate the relevant RER -- that is the appropriate measure of competitiveness -- is the fixed rate RER. This is because this is the one at which all goods transactions can take place.

neutrality, the following relation will hold between domestic interest rates ( $i$ ) and foreign interest rates ( $i^*$ ).  $i = (e/f) i^* + (\dot{f}/f)$  where  $e$  is the fixed nominal exchanger rate,  $f$  is the free rate and  $(\dot{f}/f)$  is the expected change in  $f$ . The devaluation of the freely fluctuating rate will, in turn, have a secondary influence over the official real exchange rate via a wealth effect (Dornbusch, 1986b). The bottom line, however, is that in this case inconsistent macropolicies will eventually be also unsustainable, as international reserves are drained. By isolating the current from the capital account, all this type of dual rates system can hope to do is delay the eventual crisis.

The analysis is somewhat more complex if in addition to the financial side some current account transactions are subject to the free nominal exchange rate. In this case we will have two real exchange rates -- in addition to the traditional concept we will have a second RER defined as the price of tradables subject to the free nominal rate relative to nontradables. In this case macropolicies will affect both real rates.<sup>9</sup> For example, an increase in domestic credit that exceeds growth of the demand for domestic money will now result in lower reserves, higher prices on nontradables, a higher "free" market nominal exchange rate, and increased foreign indebtedness. The higher price of non-tradables will generate a decline (i.e., appreciation) in the real exchange rate applicable to those goods subject to the official foreign exchange market. What will happen to the RER relevant to those goods subject to the free nominal rate? This will depend on whether as a result of the higher rate of growth of domestic credit the nominal exchange rate determined in the free market will increase

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<sup>9</sup>Dornbusch (1986b) analyzes this case in some detail.

by more or less than the price of non-tradable goods. If the same type of behavior as under a freely floating rate is observed, we will likely encounter a nominal exchange rate overshooting in this market, with the free rate nominal exchange rate increasing -- at least on impact -- by more than the price of domestic goods. The real exchange rate applicable to this type of good will, at least in the short run, depreciate. It is perfectly possible, then, that under this dual exchange rate system an expansionary monetary policy results in a real appreciation for a subset of goods -- those subject to the official market --, and a real depreciation for a different subset of goods -- those subject to the free market for the nominal exchange rate.

Perhaps the most complex type of regime consists of an official pegged (or predetermined) nominal exchange rate that coexists with an illegal or quasi-illegal parallel market for foreign exchange. Although when there are exchange controls some kind of black market for foreign exchange always exist, there are times when this parallel market becomes very significant, and even dominant.<sup>10</sup> Although in some respects the combination of a fixed official rate with a parallel market works in a way similar to the dual rates regime discussed above, there are some important differences. First, to the extent that the black market is illegal, the expectations and costs of detection play an important role in determining the premium or difference between the official and freely determined nominal exchange rates. Second, expectations regarding political events are fundamentally important, since they reflect possible future changes in the extent of exchange controls, and

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<sup>10</sup>The extent and importance of the black market is basically determined by whether authorities allow some changes in international reserves. Under complete rationing the authorities have no reserves, and legal export proceeds are the only source of foreign exchange.

other important policies. Third, in this case exporters have to decide in each period what proportion of their foreign exchange earnings to surrender legally and what proportion to bring into the country via the parallel market.<sup>11</sup> This decision, of course, will partially depend on the level of the premium itself.<sup>12</sup>

In the extreme case of a generalized parallel market with complete rationing at the official rate, an increase in the rate of domestic credit creation will result in higher domestic prices and in an increase in the black market premium. Since the Central Bank has already lost all its international reserves, the increase in domestic credit will not be translated, as before, in losses of the official stock of foreign exchange. This expansive monetary policy will result in an appreciation of the official real exchange rate as well as in a decline of the relative price of exports surrendered via the official market relative to those that use the parallel market.<sup>13</sup> As a result, a relatively smaller proportion of export proceeds will be surrendered at the official rate, making the crisis even worse. Eventually, the inconsistent macropolicies will become unsustain-

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<sup>11</sup>In a way exporters also face this decision under an official dual system. In that case it will still pay to convert export proceedings at the higher free rate.

<sup>12</sup>An important question in the case of generalized black markets relates to determining what is the marginal exchange rate. Under these circumstances the black market rate will generally be the marginal rate for the import and import competing sectors. In the case of exports, the marginal rate will depend on the institutional arrangement and on whether exporters "have" to surrender a certain proportion or a certain foreign exchange amount of their export proceeds, via the official market. If a certain proportion of these proceeds has to be surrendered, the marginal rate for exporters is a weighted average between the official and the black market rate. If on the contrary exporters have to surrender a given number of dollars, the black market rate is the marginal one.

<sup>13</sup>Depending on expectations the nominal exchange rate determined in the parallel market can increase by more or by less than domestic prices.

able, and corrective policies will have to be implemented. At this point the issue of nominal exchange rate unification may become important, since the authorities will try to devalue the nominal rate, and eliminate the (legal or de facto) multiple rates system.

### II.3. Nominal Devaluations and Adjustment

Unavoidably, the maintenance of inconsistent macro-policies will eventually result in a devaluation and an attempt to generate a macroeconomic adjustment. Nominal devaluations usually have a dual objective: (a) they seek to generate a real devaluation or improvement in the degree of international competitiveness of the country; and (b) via that RER devaluation they seek to provoke an improvement in the external position (i.e., level of international reserves, and/or current account) of the country. Whether a devaluation will actually be successful will depend on a number of factors, the most important being the initial conditions and the accompanying macroeconomic policies.<sup>14</sup> Obviously, since  $RER = EP_T^*/P_N$  (where RER is the real exchange rate, E is the nominal exchange rate,  $P_T^*$  is "the" world price index and  $P_N$  is the domestic price index) a nominal devaluation that increases E will only be effective in moving the RER towards its higher equilibrium value if  $P_N$  does not go up in the same proportion as E.

In theory, and under the most common conditions, nominal devaluations will affect an economy via three main channels.<sup>15</sup> First, a devaluation will

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<sup>14</sup>The initial conditions include whether there are distortions stemming from the existence of parallel markets for foreign exchange. See Appendix VIII for a brief review of alternative theories of devaluation.

<sup>15</sup>In some cases, however, if there are extensive quantitative import controls and parallel markets some of these effects will be different. See the discussion below.

have an expenditure reducing effect. To the extent that as a result of the devaluation the domestic price level goes up, there will be a negative wealth effect that will induce the real value of domestic currency denominated nominal assets, including domestic money. However, if there are assets denominated in foreign currency, there may also be a positive wealth effect. If the negative wealth effect dominates, there will be a reduction in expenditure on all goods including tradables, and there will be a reduction in the trade deficit. Second, a nominal devaluation will tend to have an expenditure switching effect.<sup>16</sup> If the nominal devaluation succeeds in altering the relative price of tradables to nontradables, or real exchange rate, there will be a substitution in expenditure away from tradables, and a substitution in production towards tradables. The combination of these two effects will result in an improved external situation for the country. While the expenditure switching effect results in an increased demand for nontradables, the expenditure reducing effect generates a decline in demand for those goods. Depending on which of these effects dominate there will be an increase or a decline for the demand for domestic home goods. Third, a devaluation will result in an increase in the domestic currency price of imported intermediate inputs. This will result in an upward shift of the supply schedules for the final goods including nontradables.<sup>17</sup>

An important characteristic of nominal devaluation is that, under unified nominal exchange rates and with no quantitative restrictions, it is not discriminatory, and increases the domestic (nominal) price of all

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<sup>16</sup>We say it will "tend to have" because this assumes that the nominal devaluation is translated into a real devaluation.

<sup>17</sup>The combination of these effects may very well result in a decline of aggregate output as a consequence of the devaluation. See Edwards, 1986.



tradable goods, services, and assets. This, however, will not be the case if, as it usually happens in the developing countries, there is a parallel (or dual) market, and the devaluation refers to the official rate only. In this case, only those transactions affected by the official rate will be directly affected by the change in the official exchange rate. Of course, since the parallel (or free) market will be indirectly affected by the official devaluation, transactions conducted in that market will be subject to an indirect effect. Notice, however, that in general it is not possible to know a priori whether an official rate devaluation will increase or reduce the parallel market premium. Naturally, with parallel markets there will be additional relative price changes, with the price of transactions subject to the official rate changing relative to those subject to the parallel rate.<sup>18</sup>

When there are quantitative restrictions (QRs) on imports, devaluations will also fail to generate a uniform increase in the price of tradables. In fact, in this case nominal devaluations may have quite a different effect than in those circumstances where tariffs are used to restrict imports.<sup>19</sup> In the case of QRs the domestic price of the importable will be endogenous, in the sense that it will take whatever level is required for that market to clear. In this case a nominal devaluation will tend to have no direct (first round) effect on the domestic price of those importables subject to

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<sup>18</sup>Of course, the devaluation itself will affect the parallel rate. Theoretically speaking an official devaluation can generate either an increase or decline in the black market premium. The empirical evidence indicates that following the nominal devaluation there is usually a drop in the parallel market premium. An important question when there are parallel markets refers to exchange rate unification. Lizondo (1986) has shown that the equilibrium nominal rate can be either above or below the black market.

<sup>19</sup>See Krueger (1981).

QR rationing. However, since the price of exportables continues to be tied, via the exchange rate, to its world price, the devaluation will increase their price relative to rationed importables. Nonrationed importables will also be affected by the devaluation and their relative price relative both to rationed importables and nontradables will tend to change.

Whether a nominal devaluation will be successful will depend on: (a) accompanying policies implemented alongside with the devaluation, and (b) on the initial conditions prevailing prior to the devaluation.

Let us first focus on the initial conditions. If the country implements a devaluation at a time when the real exchange rate is greatly misaligned (i.e., overvalued) the nominal devaluation will generally be helpful to restore equilibrium in the external sector. Under these initial conditions, a nominal devaluation, if accompanied by the appropriate macro-policies, will generally have a medium to long run positive effect on the real exchange rate. In practice what the nominal devaluation will do is help the country follow a smoother transition path toward reestablishing equilibrium in the external sector (see Edwards 1987). If the initial condition of real exchange rate misalignment has been generated by unsustainable macroeconomic policies, a discrete once-and-for-all devaluation will only have a lasting effect on the real rate if at the same time of the devaluation the unsustainable policies are corrected. If, however, the initial condition is one of equilibrium a nominal devaluation will have no medium or long run effect.

The second set of factors that determine the effectiveness of a real devaluation is the accompanying policies. In order for the nominal devaluation to achieve a real depreciation it is critical that the nominal devaluation is not accompanied by expansive credit (or monetary) policies,

expensive fiscal policies, and wage indexation policies.

It should be noted, however, that even if the accompanying macro-policies are restrictive, nominal devaluations will never result in equiproportional real devaluations in the medium to longer run. The reason is that there are a number of forces that work towards generating (at least) a partial offsetting increase in the price level  $P$ . The most obvious of these forces is related to the role of imported intermediate inputs. The nominal devaluation will result in higher domestic prices of imported inputs, and consequently of the cost of producing domestic goods. This effect, that partially offsets the effect of the nominal devaluation will be more important as time passes. That is, it will generally be expected that the effect of the nominal devaluation on the real exchange rate will be partially eroded through time. On impact of the nominal devaluation will result in a high (and almost equiproportional) increase in the real exchange rate. As time passes, the prices of imported goods, and in some cases wages react to the nominal devaluation, the effect on the real exchange rate will be partially eroded.

### III. Balance of Payments Crises, Exchange Controls and Devaluations in Latin America

In this and the following section we analyze in detail 18 episodes of balance of payments and devaluation crises in Latin America between 1962 and 1982. This investigation focuses on three important issues: (a) the role of "inconsistent" macroeconomic policies in the precipitation of the devaluation crises; (b) the role of exchange controls before and after each of these crises; and (c) the effectiveness of nominal devaluations as a means to restore equilibrium and competitiveness (this is the subject of Section IV). Table 1 contains data on the 18 devaluation episodes. All of these

TABLE 1

## Devaluation Crises in Selected Latin American Countries

<u>Country</u>	<u>Year</u>	<u>Rate of Devaluation (Percentage)</u>			
		<u>Year of Deval.</u>	<u>One Year After Dev.</u>	<u>Two Years After Dev.</u>	<u>Three Years After Dev.</u>
<b>A. <u>Stepwise Devaluations</u></b>					
Argentina	1970	25.000	0.000	0.00	0.000
Bolivia	1972	66.667	0.000	0.00	0.000
Bolivia	1979	25.000	0.000	0.00	684.000
Colombia	1962	34.328	0.000	0.00	50.000
Colombia	1965	50.000	0.000	16.74	7.107
Costa Rica	1974	28.872	0.000	0.00	0.000
Ecuador	1961	20.000	0.000	0.00	0.000
Ecuador	1970	38.889	0.000	0.00	0.000
Nicaragua	1979	43.034	0.000	0.00	0.000
Peru	1967	44.403	0.000	0.00	0.000
Venezuela	1964	38.199	0.000	0.00	0.000
<b>B. <u>Devaluations Followed by Crawling Peg</u></b>					
Bolivia	1982	684.000	155.102	1700.00	
Chile	1982	88.282	19.202	46.51	43.372
Colombia	1967	16.741	7.107	5.75	6.947
Ecuador	1982	32.600	63.198	24.17	42.538
Mexico	1976	59.600	13.965	-0.05	0.343
Mexico	1982	267.837	49.181	33.79	93.031
Peru	1975	16.279	54.222	87.90	50.460

Source: See text.

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. Eleven of them implemented a stepwise devaluation, where after the exchange rate adjustment they attempted to once again fix the nominal parity. Many of them did not succeed and experienced recurrent devaluations. Seven of the countries adopted a crawling exchange rate after devaluing.

### III.1 Macroeconomic Policies and Balance of Payments Crises

As was pointed out in Section II.1, under fixed nominal exchange rates macroeconomic policies determine whether the exchange rate chosen by the authorities can be sustained in the longer run. Under most circumstances, if macroeconomic policies become "inconsistent", international reserves will be eroded, the real exchange rate will experience an appreciation (i.e., overvaluation) and an exchange rate crises -- that is 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 this issue by comparing the evolution of macroeconomic policy in the devaluing countries with that of the control group of fixed rate countries.<sup>20</sup>

Table 2 summarizes the behavior of four indicators of domestic credit and fiscal policies for the devaluing countries and for the control group:<sup>21</sup>

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<sup>20</sup>This, of course, assumes that the policies followed by the fixers are consistent and sustainable. This is not a very farfetched assumption.

<sup>21</sup>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,

(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 public sector as proportion of total domestic credit (Panel C); and (4) fiscal deficit as proportion of GDP (Panel D). All the indicators have been constructed using data from various issues of the International Financial Statistics as well as several IFS types. For the devaluing countries these indicators are reported for 3 years, 2 years, 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. These panels provide three 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, there is a clear shift to the right of all four distributions in the three years prior to the crisis. 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 countries, on the other hand, was only slightly more than 10 percent. Formal  $\chi^2$  tests indicate that with a fairly high degree of probability, these policy indicators for the devaluing nations come from a different population than for the control group. The value of these  $\chi^2$  was 2.79 for the rate of growth of domestic credit, 2.90 for the rate of growth of domestic credit to

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averages are used. In our case, the Bolivian devaluation of 1982 is a major outlier.

TABLE 2

## Indicators of Macroeconomic Policy in Latin American Devaluing

Countries: During the Year of Devaluation and Three Years

Preceding the Devaluation

	<u>3 Years</u> <u>Prior to</u> <u>Devaluation</u>	<u>2 Years</u> <u>Prior to</u> <u>Devaluation</u>	<u>1 Year</u> <u>Prior to</u> <u>Devaluation</u>	<u>Year of</u> <u>Devaluation</u>	<u>Control</u> <u>Group</u>
<b>A. <u>Annual Rate of Growth of Domestic Credit (Percentage)</u></b>					
First Quartile	5.7	16.6	15.6	19.1	14.4
Median	25.5	28.2	22.2	27.5	17.4
Third Quartile	35.4	36.5	30.3	45.3	29.9
<b>B. <u>Annual Rate of Growth of Domestic Credit to Public Sector (Percentage)</u></b>					
First Quartile	3.8	12.1	7.7	23.7	<0
Median	33.2	32.1	29.3	45.7	22.7
Third Quartile	58.4	62.6	53.2	113.9	33.2
<b>C. <u>Ratio of Domestic Credit to Public Sector to Total Domestic Credit</u></b>					
First Quartile	0.039	0.049	0.047	0.077	<0
Median	0.235	0.204	0.232	0.255	0.114
Third Quartile	0.327	0.345	0.343	0.456	0.279
<b>D. <u>Fiscal Deficit as Percentage of GDP<sup>a</sup></u></b>					
First Quartile	0.2	0.5	0.2	0.6	0.7
Median	1.2	1.1	3.3	4.1	1.6
Third Quartile	3.6	4.6	4.6	6.6	2.7

<sup>a</sup>Only 11 countries had data.Source: See text.

the public sector, and 6.49 for the fraction of total credit that goes to the public sector. Although, due to the low number of observations, these  $\chi^2$  tests should be considered with some degree of skepticism, they do 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.

Even though when taken as a group the devaluing countries behaved in a distinctively different way than the control group, the policies of some individual devaluing countries -- in particular Venezuela in 1964 -- were somewhat similar to those of the control group. Regarding the rate of growth of domestic credit, in Ecuador in 1961, and Peru in 1967 their behavior was not too different than that of the control group.

Expansive macroeconomic policies will generally have an impact on the level of reserves and on inflation, and thus on the real exchange rate. Table 3 contains data on the evolution of: (1) the index of the (bilateral) real exchange rate; (2) ratio of net foreign assets of the monetary system to money; and (3) the current account ratio during the three years preceding the crisis. The main differences between Tables 2 and 3 is that in the former we have summarized the behavior of four key exogenous policy variables while Table 3 deals with endogenous variables whose behavior responds to the policy and other shocks.

The data in Table 3 very vividly capture the deterioration of the external sector of these countries. In 14 out of the 16 countries with relevant data the real exchange rate experienced a real appreciation in the three years prior to the devaluation. Excluding the 1967 Colombian devaluation, the average real appreciation during the 3 years preceding the devaluation crisis was almost 9 percent. Naturally, this real appreciation



TABLE 3

Evolution of Real Exchange Rate, Net Foreign Assets,  
And Current Account Prior to Devaluation

Country	Year	Index of RER <sup>a</sup>		Ratio of Net Foreign Assets <sup>b</sup>		(Current Account/GDP) <sup>c</sup>	
		-3 Yrs.	-1 Yr.	-3 Yrs.	-1 Yr.	-3 Yrs.	-1 Yr.
Argentina	1970	103.1	100	7.3	6.3	0.6	-1.0
Bolivia	1972	98.3	100	12.0	8.7	-5.6	-4.8
Bolivia	1979	103.0	100	26.0	2.9	-3.9	-10.0
Colombia	1962	108.9	100	1.2	-1.8	1.6	-3.0
Colombia	1965	155.7	100	-10.7	-11.7	-2.3	-3.0
Costa Rica	1974	101.6	100	12.8	16.7	-11.9	-9.2
Ecuador	1961	n.a.	n.a.	18.9	16.4	-0.9	-2.5
Ecuador	1970	104.3	100	19.1	11.2	-5.8	-7.9
Nicaragua	1979	102.0	100	16.8	-36.0	-2.8	-1.0
Peru	1967	119.5	100	23.9	18.0	0.3	-3.7
Venezuela	1964	100.6	100	28.4	34.0	6.8	9.1
Bolivia	1982	129.9	100	-10.5	-23.3	-10.2	-10.4
Chile	1982	129.8	100	24.2	16.4	-6.2	-15.5
Colombia	1967	78.7 <sup>e</sup>	100	-11.9	-8.8	-3.0	-4.7
Ecuador	1982	105.7	100	26.6	-17.1	-3.9	-4.5
Mexico	1976	109.2	100	14.4	9.5	-2.5	-4.4
Mexico	1982	112.9	100	7.5	6.9	-3.8	-5.2
Peru	1975	95.4	100	18.1	18.9	-0.1	-6.2
Average Change Between 3 and 1 Year Prior to Crisis: <sup>f</sup>			-8.7% (-2.98)		-40.8% (-2.27)		-1.9 (-2.41)

<sup>a</sup>This is a bilateral index relative to the U.S. constructed as  $(E \cdot WPI^{US})/CPI$ . The index has been set equal to 100 the year prior to the devaluation.

<sup>b</sup>Ratio of net foreign assets to the sum of net foreign assets plus domestic credit. (Lines 31N over the sum of lines 31N and 32 of the IFS.)

<sup>c</sup>Ratio of current account to GDP x 100.

<sup>d</sup>This is the index two years prior to devaluation.

<sup>e</sup>Colombia devalued in 1965. This explains the evolution of RER.

<sup>f</sup>Excludes Colombia 1967. The number in parentheses are t-statistics for null hypothesis that mean equals zero.

was the result of domestic rates of inflation that increasingly exceeded the world rate of inflation. A  $\chi^2$  test, in fact, indicates that as the crisis date became closer the rate of CPI inflation in the devaluing countries became more distinct, in a statistical sense, from that of the fixed rate control group. While the  $\chi^2(2)$  was 4.1 three years prior to the crisis (level of probability 0.13), it was 13.7 one year before the crisis, reflecting a probability of less than 0.001 percent of the null hypothesis being accepted. It is interesting to notice that while, on average, these countries experienced almost a 9% real appreciation in the two years prior to the crisis, there is quite a difference in the individual countries' experiences. While some of them, such as Colombia in 1965, went through a major deterioration in competitiveness, others (i.e., Venezuela 1964) only experienced an insignificant change in the real exchange rate index. This recorded average real appreciation of 9% is, in many ways, an under-estimation of the magnitude of the disequilibrium. In many cases, in the period leading to the crisis 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, also presented in Table 3, clearly captures the effect of the inconsistent macropolicies on the external accounts. In 14 out of the 18 countries the ratio of net foreign assets to money, experienced a decline during this two year period, confirming the view that devaluation crises are usually preceded by an important rundown of international reserves. On average, for these 18 countries, the net foreign assets ratio declined in more than 40% during the two years prior to the devaluation. The year before the crisis the median of this indicator was 0.091, significantly below the median for the control group 0.201. Also, in 14 of the 18 countries the current

account ratio experienced a decline in the two years before the crisis, with the average deterioration amounting to almost 2 percentage points of GDP. The year prior to the crisis 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.

In addition to the deterioration of the current account, capital flight is a crucial force underlying the weakening position of these countries' external sector. Data not reported here clearly show that in spite of existing, and increasing, control on capital mobility, as the devaluation drew nearer and as a result of the heightened expectations of devaluation, substantially larger amounts of funds flew these countries.

The data in Table 3 clearly highlights the fact that although one can identify a dominating pattern among these devaluations, there are nontrivial differences across countries. In the majority of them the devaluation clearly responded to the simultaneous depletion of international reserves and loss in competitiveness (i.e., real exchange appreciation). In others, however, it is not possible to detect any of these symptoms in the years prior to the crisis. In these cases the authorities anticipated that there was a likely crisis down the road, and decided to tackle the problem before things got out of hand. In the case of the 1964 Venezuelan devaluation, 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.

The lack of data on external terms of trade didn't allow us to analyze for every country whether devaluations responded, at least partially, to an exogenous deterioration of the external sector. However, it is clear that at least in the Colombian devaluations of 1965 and 1967 the drastic

deterioration in the country's terms of trade, stemming from drops in the price of coffee in the preceding or devaluation years had much to do with the decision to devalue.

Quite clearly, simple mechanical rules that relate the decision to alter the exchange rate to some unique indicator such as international reserves, cannot explain the authorities' decisions to devalue. Devaluations are a complex phenomenon, that responds to a combination of factors, including, in some cases, the perceptions of future events, and the authorities' desire to avoid the most painful aspects of balance of payments crises.

### III.2 Exchange Controls, Trade Restrictions, Parallel Markets and Balance of Payments Crisis

In Table 4 we present a summary for those countries that have data of the evolution of exchange controls and trade restrictions during the two years preceding the crisis. Table 5, on the other hand, presents data on multiple (official) exchange rates and on parallel (black) market premia in the period immediately preceding the crisis.

The data presented in Table 4 on exchange controls have been classified according to the IMF practice, distinguishes between:<sup>22</sup> (a) payments restrictions on current transactions, such as licenses, prior 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

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<sup>22</sup>See IMF's Yearbook of Exchange Controls Payments Restrictions. The information summarized in Table 2 was obtained from various issues of this Yearbook.

TABLE 4

## Evolution of Exchange Controls and Trade Restrictions

## In The Two Years Preceding Devaluation

<u>Episode</u>	<u>Payments Restrictions on Current Transactions</u>	<u>Tariffs, Duties and Cost Related Measures</u>	<u>Restrictions on Capital Transactions</u>
Argentina (1970)	<ul style="list-style-type: none"> <li>•Increasing restrictions on capital goods.</li> <li>•Public sector payments monitored.</li> <li>•All foreign exchange transactions suspended for 10 days prior to devaluation.</li> </ul>	<ul style="list-style-type: none"> <li>•Advanced deposits of 40% for 180 days.</li> <li>•Taxes on traditional exports.</li> <li>•Special regimes and exceptions abolished.</li> </ul>	<ul style="list-style-type: none"> <li>•No restrictions, and no changes prior to devaluation.</li> </ul>
Bolivia (1972)	<ul style="list-style-type: none"> <li>•Public sector payments highly controlled.</li> <li>•QRs on foodstuffs, cattle, cotton.</li> <li>•Between May and Aug. a number of imports are prohibited (1972).</li> </ul>	<ul style="list-style-type: none"> <li>•Custom charge of 15% is in place in 1970.</li> <li>•20% tax on exports imposed.</li> </ul>	<ul style="list-style-type: none"> <li>•Restrictive initial conditions. No changes.</li> </ul>
Bolivia (1979)	<ul style="list-style-type: none"> <li>•Payments restrictions are increased for a number of items in year prior.</li> <li>•Exchange transactions suspended for 8 days prior to devaluation.</li> </ul>	<ul style="list-style-type: none"> <li>•In 1977 most imports subject to 5-25% advanced deposit.</li> <li>•Exceptions for duty payments eliminated for essentials (Feb.)</li> <li>•500% advanced deposit imposed on 600 items.</li> </ul>	<ul style="list-style-type: none"> <li>•All capital movements requires authorization.</li> <li>•Ceiling set on new foreign borrowing.</li> </ul>
Bolivia (1982)	<ul style="list-style-type: none"> <li>•Imports of industrial goods produced locally are prohibited.</li> <li>•All sales of foreign exchange subject to authorization.</li> </ul>	<ul style="list-style-type: none"> <li>•In 1980 advanced deposits of 5% to 25%.</li> <li>•1981: advanced deposits reduced; import duties reduced.</li> </ul>	<ul style="list-style-type: none"> <li>•July 1982, payments restrictions tightened.</li> </ul>

Table 4 (cont.)

<u>Episode</u>	<u>Payments Restrictions on Current Transactions</u>	<u>Tariffs, Duties and Cost Related Measures</u>	<u>Restrictions on Capital Transactions</u>
Chile (1982)	<ul style="list-style-type: none"> <li>• Payments highly liberalized. No restrictions imposed.</li> </ul>	<ul style="list-style-type: none"> <li>• Flat import tariff of 10% not altered prior to devaluation.</li> </ul>	<ul style="list-style-type: none"> <li>• Some restrictions on capital movements are in place preceding devaluation. No changes prior to abandonment of peg.</li> </ul>
Colombia (1962)	<ul style="list-style-type: none"> <li>• Initial conditions highly restrictive</li> <li>• Large number of goods moved into prior license list during 1961.</li> <li>• All but 11 items in free list move to prior license (Aug.)</li> <li>• Many items moved to prohibited list (Nov. 1962).</li> </ul>	<ul style="list-style-type: none"> <li>• 1960: Advanced deposits ranging from 1%-130%.</li> <li>• 1961: Many advanced deposits reduced during first half of year.</li> <li>• 1962 (Apr.): Advanced deposits raised.</li> </ul>	<ul style="list-style-type: none"> <li>• Dual exchange rates plus active parallel market. No changes prior to crisis.</li> </ul>
Colombia (1965)	<ul style="list-style-type: none"> <li>• Dec. 1964: Import free list suspended. 95% advanced deposit imposed.</li> <li>• 1965: Many goods passed to prior licensing.</li> <li>• Dual rates imposed (Sept.).</li> </ul>	<ul style="list-style-type: none"> <li>• Sept. 1964: 5% advanced deposit imposed.</li> <li>• Dec. 1964: 95% advanced deposit imposed on selected items.</li> <li>• 1965 more goods subject to deposit.</li> </ul>	<ul style="list-style-type: none"> <li>• Oct. 1964: Banco de la Republica ceases operations in free market.</li> <li>• Slight increase in tightness.</li> </ul>
Colombia (1967)	<ul style="list-style-type: none"> <li>• Highly restrictive payments.</li> </ul>	<ul style="list-style-type: none"> <li>• Jan. 1967: All advanced deposits increased by 50%.</li> <li>• Feb. advanced deposits further increased.</li> </ul>	<ul style="list-style-type: none"> <li>• Starting from controls, slight increase in degree of restrictions.</li> </ul>
Costa Rica (1974)	<ul style="list-style-type: none"> <li>• Dual rates (1972).</li> <li>• Most imports passed to higher rate during 1973.</li> <li>• Process continues in 1974 prior to dev.</li> </ul>	<ul style="list-style-type: none"> <li>• Mild restrictions on trade, not increased.</li> </ul>	<ul style="list-style-type: none"> <li>• Some restrictions in place (10%-15% tax on remittances to rest of world).</li> </ul>

Table 4 (cont.)

<u>Episode</u>	<u>Payments Restrictions on Current Transactions</u>	<u>Tariffs, Duties and Cost Related Measures</u>	<u>Restrictions on Capital Transactions</u>
Ecuador (1961)	<ul style="list-style-type: none"> <li>•1959: Multiple rates; all imports subject to licenses.</li> <li>•1960: Proceeds from nontraditional exports moved to free rate.</li> <li>•Prior to devaluation tightening of controls. Many items passed to restrictive list.</li> </ul>	<ul style="list-style-type: none"> <li>•Highly restrictive system, becomes tighter year prior to devaluation.</li> <li>•Aug. 1962: Advanced deposits increased to 100% for list 2 imports.</li> </ul>	<ul style="list-style-type: none"> <li>•Capital movements should be registered.</li> </ul>
Ecuador (1970)	<ul style="list-style-type: none"> <li>•Two types of import lists with different degrees of restrictions.</li> <li>•Jan.-July 1970: Increased restrictions including \$400 quota on travelers.</li> </ul>	<ul style="list-style-type: none"> <li>•1968: List 1 subject to 15% duties; List 2 subject to 70% duty.</li> <li>•1969: Increased surcharges hiked.</li> <li>•Jan. 1970: Duties raised to 40% for List 1 and 80% for List 2.</li> <li>•May: Further increases in surcharges.</li> </ul>	<ul style="list-style-type: none"> <li>•June 1970: Increased restrictions. Banks and nonbanks required to sell all foreign exchange holdings to central bank at</li> </ul>
Ecuador (1982)	<ul style="list-style-type: none"> <li>•Same List 1/List 2 structure. Multiple rates.</li> <li>•1981: Increased restrictions.</li> </ul>	<ul style="list-style-type: none"> <li>•Feb. 1981 increase in coverage and rates of advanced deposits.</li> <li>•June: Import tariffs raised in 500 items.</li> </ul>	<ul style="list-style-type: none"> <li>•Slight increase in restrictions.</li> </ul>
Mexico (1982)	<ul style="list-style-type: none"> <li>•Initial conditions: Import licensing and import quotas.</li> <li>•1981: Import licensing greatly increased.</li> </ul>	<ul style="list-style-type: none"> <li>•May 1981: Duties increased in 374 items.</li> <li>•July: Further increases in duties levels.</li> <li>•Nov.: Duties hiked for 120 items.</li> </ul>	<ul style="list-style-type: none"> <li>•No change in capital controls in period preceding devaluation.</li> </ul>
Nicaragua (1979)	<ul style="list-style-type: none"> <li>•2 groups of imports.</li> <li>•Sales of foreign exchange at official rate restricted.</li> <li>•Licenses hiked in 1978/79.</li> <li>•Multiple rates imposed (Apr. 1979).</li> </ul>	<ul style="list-style-type: none"> <li>•Nov. 1979: Weekly foreign exchange allocation for imports imposed.</li> </ul>	<ul style="list-style-type: none"> <li>•Increased restrictions.</li> </ul>

Table 4 (cont.)

<u>Episode</u>	<u>Payments Restrictions on Current Transactions</u>	<u>Tariffs, Duties and Cost Related Measures</u>	<u>Restrictions on Capital Transactions</u>
Peru (1967)	<ul style="list-style-type: none"> <li>•Initial conditions (1965): No licenses required (except for 12 items).</li> <li>•In 1967 a number of restrictions were imposed. Exports required licenses (Oct.). Exports proceeds surrendered for certificates.</li> </ul>	<ul style="list-style-type: none"> <li>•Aug. 1966: Most imports subject to surcharge.</li> <li>•June 1967: Generalized hike in import duties.</li> </ul>	<ul style="list-style-type: none"> <li>•Very open initial conditions.</li> <li>•Sept. 1967: A moratorium on payments of foreign debt is declared. Lifted after 16 days.</li> <li>•Slight increase in degree of restrictions.</li> </ul>
Peru (1975)	<ul style="list-style-type: none"> <li>•Initial conditions (1973): Severe restrictions. Multiple exchange rates. Licenses or prior approval required for almost every item.</li> <li>•No major changes during year prior to devaluation.</li> </ul>	<ul style="list-style-type: none"> <li>•Restrictive initial conditions. During 1974 degree of restrictiveness is increased.</li> <li>•Jan. 1975: 12% surcharge on all imports.</li> </ul>	<ul style="list-style-type: none"> <li>•Very restrictive initial conditions.</li> <li>•No changes during year prior to devaluation.</li> </ul>
Venezuela (1964)	<ul style="list-style-type: none"> <li>•Multiple rates.</li> <li>•Some restrictions initially, with licenses required on some items.</li> <li>•No changes in year prior to devaluation.</li> </ul>	<ul style="list-style-type: none"> <li>•No changes in year prior to devaluation.</li> </ul>	<ul style="list-style-type: none"> <li>•Almost complete capital mobility which is maintained throughout episode.</li> </ul>

Source: See text.



to the abandonment of the fixed peg. The table reveals that in the great majority of the cases the devaluation was preceded by an important piling up of exchange controls and restrictions. In some 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 become even tighter as the erosion of reserves became severe and/or real exchange rate appreciation became more massive. 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.<sup>23</sup>

Table 5 shows that in the majority of these episodes the period preceding the devaluation was characterized by the existence of multiple exchange rates. In fact, only 6 out of the 18 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 Nicaragua in 1979 and in Colombia in 1967 there was an increase in the number of rates during the three years period preceding the crisis.

The data on parallel market premia in Table 5 are particularly interesting.<sup>24</sup> In 14 out of the 18 devaluation episodes there was a significant increase in the black market premium during the 9 months preceding

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<sup>23</sup>This is rather deceiving in the case of Venezuela, since a multiple rate system was in effect.

<sup>24</sup>Depending on the country, these figures refer either to the black market for foreign exchange or to the fluctuating rate in the "free segment".

TABLE 5

## Multiple Exchange Rates and Parallel Market Premium

In Period Prior to Devaluation

<u>Country</u>	<u>Year</u>	<u>Number of Official Exchange Rates</u>		<u>Black Market Premium (Percent)</u>		
		<u>-3 Yrs.</u>	<u>-1 Yr.</u>	<u>-9 Mths.</u>	<u>-3 Mths.</u>	<u>-1 Mth.</u>
Argentina	1970	1	1	0.3	0.0	0.0
Bolivia	1972	2	2	64.0	67.1	60.0
Bolivia	1979	1	1	10.0	17.5	17.5
Colombia	1962	3	3	33.4	34.7	58.0
Colombia	1965	3	3	42.8	110.6	114.4
Costa Rica	1974	8	5	42.2	34.7	30.2
Ecuador	1961	2	2	21.9	23.3	66.7
Ecuador	1970	2	2	22.5	23.9	55.6
Nicaragua	1979	1	2	27.1	78.6	92.9
Peru	1967	1	1	2.2	2.2	43.6
Venezuela	1964	3	3	35.5	35.5	35.5
Bolivia	1982	2	2	25.0	502.3	434.1
Chile	1982	1	1	10.3	12.8	17.9
Colombia	1967	3	4	19.2	46.3	48.1
Ecuador	1982	3	3	25.0	45.0	74.4
Mexico	1976	1	1	0.0	0.0	0.0
Mexico	1982	1	1	5.4	11.7	12.5
Peru	1975	4	4	52.5	56.3	75.7

Source: Various issues of Picks Currency Yearbook and World Currency Yearbook.

the crisis. This evolution of the parallel market premium reflects three interrelated forces. First, in the presence of a freely determined black 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 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 and will result in an eventual devaluation.

As the data on net foreign assets and on the current account in Table 3 clearly 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 crisis, unleashed by the inconsistent macroeconomic policies.

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 economy. Data on the evolution of real growth of GDP shows that already one year prior to the devaluation crisis countries were performing significantly poorer than the control group; a  $\chi^2(2) = 8.7$  indicated that the null hypothesis that the devaluing and the control groups come from the same population is rejected.<sup>25</sup> This finding has important consequences for the "contractionary devaluation" controversy, since it suggests

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<sup>25</sup> Interestingly enough, three years prior to the crisis it is not possible to reject the hypothesis that both groups come from the same population ( $\chi^2(2) = 0.555$ ).

that the observed decline in growth in periods surrounding devaluations may in fact not respond to the crisis, but rather to the effects of the massive imposition of restrictions.

#### IV. The "Effectiveness" of Nominal Devaluations in Latin America

It is difficult to assess empirically whether a nominal devaluation has indeed been successful. There are various possible criteria one can use to evaluate the "effectiveness" of a devaluation, including its effect on the real exchange rate, its impact on the current account, on the level of international reserves, or in any of the other accounts of the balance of payments. Moreover, since devaluations are many times, if not always, undertaken under quantity rationing their effects will tend to differ from the more traditional textbook cases. An additional difficulty stems from the fact that devaluations are almost always one of many components of stabilization packages aimed at improving the external position of a country. It is difficult to separate the effect of the devaluation itself from that of the accompanying macroeconomic policies and from the trade liberalization reforms many times implemented alongside the devaluation. This difficulty is further complicated by the fact that large and abrupt nominal devaluations are usually fairly isolated events that occur only sporadically.<sup>26</sup> In that regard devaluations are not easily subject to time series regression analysis. In fact, in any developing nation one encounters at most 5 large devaluations since World War II; certainly not enough for meaningful regression estimation.<sup>27,28</sup>

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<sup>26</sup>By "abrupt" we don't necessarily mean unexpected.

<sup>27</sup>It is possible, however, to pool a number of episodes and estimate a limited dependent variable model to analyze the determinants of devaluation. See Edwards (forthcoming).

Given these conceptual difficulties and the existing data limitations, empirical analyses of devaluation have, by necessity, to be somewhat descriptive in nature. The data should be approached in a humble way, trying to extract as much information as possible from them, but being aware that in some instances it is not possible to obtain very sharp conclusions. In this section we follow the 18 devaluation episodes of Table 1, for three years after the nominal exchange rate adjustments.

#### IV.1 Nominal Devaluations and Real Devaluations

The 18 devaluation episodes included in this study are different in a number of respects (see Table 1 for the list of countries and for the characteristics of the nominal exchange rate change). In some cases the devaluation took place after more than a decade of fixed nominal exchange rates (i.e., Mexico, 1976). In others, such as Colombia 1967, the devaluation was implemented after only two years of attempting to maintain a fixed parity. As can be seen in Table 1, in 11 of the episodes the devaluations were a stepwise event, preceded and followed by a fixed nominal (official) exchange rate. In the other 7 episodes the devaluation was preceded by a fixed nominal exchange rate, but was followed by a crawling peg. All the episodes, however, have three characteristics in common:<sup>29</sup> (a) in all cases the devaluation was preceded by two or more years of exchange rate fixity; (b) the initial nominal exchange rate adjustment was at least 15%; and (c) in all cases the initial conditions reflected (varying) degrees of

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<sup>28</sup>This statement, of course, excludes those countries with an ongoing crawling peg. Although under a crawling pet the nominal exchange rate is effectively "devalued" every period, the economics involved are different from those of straight large devaluations.

<sup>29</sup>These, in fact, were the requirements we used for an exchange rate adjustment to qualify as a "devaluation episode", and, thus, for being included in this study.

disequilibrium.

Tables 6 and 7 deal with real exchange rates behavior during three years after the devaluation. In Table 6 the index of the bilateral (with respect to the U.S. dollar) real exchange rate one year before the devaluation, the year of the devaluation, and one, two and three years after the devaluation is presented. Table 7, on the other hand, presents data on the ratio of the cumulative ex-post elasticity of the real exchange rate with respect to the nominal exchange rate for the year of the devaluation, one, two and three years after the devaluation.<sup>30</sup> This cumulative "effectiveness" index is computed in the following form:

$$\text{Effectiveness Index}_k = \frac{\hat{RER}_k}{\hat{E}_k}$$

where  $k$  refers to the year of the devaluation, 1, 2 and 3 years after the devaluation.  $\hat{RER}_k$  is the percentage change in the real exchange rate between the year prior to the devaluation and  $k$  years after the devaluation ( $k = 0, 1, 2, 3$ ).  $\hat{E}_k$  is the percentage change in the nominal exchange rate during the same period. This elasticity, then, provides an index of the degree of erosion experienced by the real exchange rate during the three years after the devaluation. A value of one means that the nominal exchange rate adjustment has been fully transferred into a one-to-one a real devaluation. A negative value of the index, on the other hand, indicates that more than 100% of the nominal devaluation has been eroded and that, at that particular point, the real exchange rate is below its value one year before the crisis.

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<sup>30</sup> Both of these indexes were constructed using data on official nominal rates. See below for indexes constructed with parallel markets dated.

TABLE 6

## Evolution of RER Index After Devaluation

<u>Country</u>	<u>Year</u>	<u>Year Prior to Dev.</u>	<u>Year of Dev.</u>	<u>1 Year After</u>	<u>2 Years After</u>	<u>3 Years After</u>
Argentina	1970	100	113.2	87.5	57.7	40.5
Bolivia	1972	100	108.3	-	90.5	90.3
Bolivia	1979	100	96.6	90.2	74.3	86.1
Colombia	1962	100	131.4	99.2	84.4	(125.0*)
Colombia	1965	100	148.2	127.1	(138.0*)	(142.6*)
Costa Rica	1974	100	117.6	110.2	110.6	112.8
Ecuador	1961	100	114.9	112.0	105.7	101.6
Ecuador	1970	100	136.9	130.7	126.7	126.6
Nicaragua	1979	100	108.7	71.7	80.8	66.0
Peru	1967	100	131.7	113.5	111.4	109.0
Venezuela	1964	100	135.1	135.9	137.3	138.1
Bolivia	1982	100	115.8	131.9	-	-
Chile	1982	100	174.7	165.7	-	226.0
Colombia	1967	100	108.5	112.2	112.3	116.4
Ecuador	1982	100	116.4	129.4	129.6	139.3
Mexico	1976	100	143.4	134.6	123.3	118.0
Mexico	1982	100	236.1	176.7	-	181.8
Peru	1975	100	103.2	124.4	179.6	184.6

\* Indicates that a new devaluation took place that year.

Source: See text.

TABLE 7

## Nominal and Real Devaluations in Latin American Ex-Post

## RER Elasticity of Official Nominal Devaluation

<u>Country</u>	<u>Year</u>	<u>Year of Devaluation</u>	<u>1 Yr. After Devaluation</u>	<u>3 Yrs. After Devaluation</u>	<u>Ratio of RER 3 Yrs. After to 3 Yrs. Prior</u>
Argentina	1970	0.57	< 0	< 0	0.39
Bolivia	1972	0.12	0.52	< 0	0.92
Bolivia	1979	< 0	< 0	< 0	0.83
Colombia	1962	0.92	< 0	n.a.	0.78*
Colombia	1965	0.96	0.54	< 0	n.a.
Costa Rica	1974	0.61	0.35	0.44	1.11
Ecuador	1961	0.75	0.60	.008	1.00
Ecuador	1970	0.95	0.79	.68	1.21
Nicaragua	1979	0.20	< 0	< 0	0.65
Peru	1967	0.73	0.42	.22	0.91
Venezuela	1964	0.92	0.94	.99	1.37
Bolivia	1982	0.02	0.02	n.a.	
Chile	1982	0.85	0.53	0.34	1.74
Colombia	1967	0.51	0.49	0.40	1.48
Ecuador	1982	0.50	0.25	0.14	1.32
Mexico	1976	0.73	0.42	0.22	1.08
Mexico	1982	0.51	0.17	0.06	1.61
Peru	1975	0.20	0.31	0.21	1.94

\*Refers to ratio of 2 years prior to 2 years after.



The actual value of this ex-post elasticity index, then, measures in a very broad sense what percentage of the devaluation has been effective. The reasons why this is only a broad and somewhat inaccurate measure of "effectiveness" are: (1) it is based on a "before" and "after" analysis, without maintaining other relevant variables constant, and (2) it doesn't take into account the inflation consequences of the devaluations. As is argued below this becomes important when evaluating the effectiveness of the crawling peg devaluations. In subsection IV.4 below, however, we make an explicit effort to control for other variables such as domestic credit policy, fiscal policy and foreign shocks. The last column in Table 7 includes the ratio of the real exchange rate index three years after the devaluation to three years prior to the devaluation.

These tables are very revealing, and provide a useful start for our analysis. Let's first focus on the 11 cases of stepwise devaluation. These data show that in only five of the 11 episodes -- Costa Rica 1974, Ecuador 1961 and 1970, Peru 1967 and Venezuela 1964 -- three years after the devaluation the real exchange rate index was higher than its value just before the crisis. In only three episodes, however, after three years the RER was above its value three years before the devaluation. These data also show that in some cases the erosion was very rapid. For example, in the cases of Argentina, Bolivia 1972 and 1979; Colombia 1962 and Nicaragua 1979, it took less than a year for the effect of the nominal devaluation to be completely wiped out. Table 7 shows that only in Costa Rica 1974, Ecuador 1970 and Venezuela 1964, the index of effectiveness equal or greater to 1/3 after 3 years.

The data on the crawling peg countries present a very different picture. In the six cases for which there are data, three years after the

devaluation the RER index was significantly higher than the year before. Naturally, this was achieved by "fighting off" the real exchange rate erosion with additional devaluations in the following years. Typically, under this type of regime the authorities further devalue the currency in magnitudes approximately equal to the domestic rate of inflation. Of course, a potential problem with this policy is that it can lead to an explosive (nonconvergent) process, where the devaluation generates inflation, which partially erodes the effect of the devaluation; this leads to a higher devaluation and even higher inflation and so on, ad-infinitum. An alternative scenario, is one where the process is stabilized at some mild rate of inflation, as in Chile in the recent period and in Colombia since 1967. Table 8 presents data on the evolution of inflation in our 18 episodes. As can be seen, of the crawling peg countries, only in Chile and Colombia (1967) the rate of inflation 3 years after the crisis was below its level 3 years before the devaluation. Also, these data indicate that among the crawlers in Bolivia, Peru and Mexico (1982) the higher real exchange rate was sustained at the cost of substantial permanent increase in the rate of inflation.

The real exchange rate data in Table 6 were constructed using indexes on official nominal rates. However, as noted above, in these countries black markets of varying degrees of importance have traditionally existed. In Table 9 we present, for those countries that have data, indexes of real exchange rate constructed with data on parallel market nominal exchange rates. Table 10 contains additional information on parallel markets and on multiple exchange rate practices during the period following the devaluations. As can be seen, in most cases the parallel market premium declined rapidly during the months immediately following the crisis (i.e., 3 months

TABLE 8

Inflation Rates in Latin American Devaluing Countries  
Before and After The Crisis (Percent)

<u>Country</u>	<u>Year</u>	<u>3 Years Before Dev.</u>	<u>1 Year Before Dev.</u>	<u>1 Year After Dev.</u>	<u>3 Years After Dev.</u>
Argentina	1970	29.4	7.7	34.8	61.2
Bolivia	1972	2.2	3.7	31.5	7.9
Bolivia	1979	4.5	10.4	47.2	133.3
Colombia	1962	7.2	8.7	32.0	3.5
Colombia	1965	2.5	17.7	19.9	5.8
Costa Rica	1974	3.0	15.2	3.5	4.2
Ecuador	1961	1.3	1.7	2.9	4.0
Ecuador	1970	3.8	6.3	8.7	13.0
Nicaragua	1979	2.8	4.6	35.3	24.8
Peru	1967	9.9	9.0	19.0	5.0
Venezuela	1964	-2.4	1.2	1.7	0.0
Bolivia	1982	19.7	28.6	269.1	-
Chile	1982	33.4	19.7	27.3	30.7
Colombia	1967	17.7	19.9	5.8	6.8
Ecuador	1982	10.3	16.4	48.4	27.9
Mexico	1976	12.0	15.2	29.0	18.2
Mexico	1982	18.2	27.9	101.8	57.8
Peru	1975	7.2	16.9	33.5	57.8

Source: IFS.

after the crisis). In a number of episodes, however, this decline was short-lived, and after 9 months the premium had once again increased. This evolution of the premia provides some (limited) information on the way dual markets, with a legal and an illegal segment, react to devaluations of the official rate. In most instances, a large nominal devaluation of the official rate will, on impact, tend to reduce the gap between the freely determined parallel rate and the predetermined (i.e., fixed) official rate. As time passes, however, and other forces are unleashed, the freely determined black market rate starts responding to these forces and to expectations. The nine months premium data in Table 10 confirm the general ambiguities of the theoretical analyses on the subject.

Table 10 shows that only a handful of these official devaluations were coupled with an exchange rate unification at a single higher official rate -- Bolivia 1972, Ecuador 1970, Bolivia 1982; in the case of Ecuador, however, this unification was very short-lived. In a few other episodes the number of multiple rates was reduced -- Costa Rica 1974, Venezuela 1964, Colombia 1967 -- but multiple rate practices were not eliminated. Interestingly enough, and contrary to popular belief, instead of leading to unification, many of these devaluations were actually followed by a more generalized use of multiple rates, either the year of the devaluation or in the subsequent two years.

#### IV.2 Devaluations, Exchange Controls and Payment Restrictions

As shown in the preceding section, the vast majority of our devaluation episodes were preceded by a massive piling-up of exchange controls and trade restrictions. As these efforts to slow down, or halt, the erosion of international reserves failed, the economic authorities were eventually "forced" to devalue and implement some sort of a stabilization program. As

TABLE 9

Parallel Markets Real Exchange Rate Indexes In  
Devaluing Latin American Countries

<u>Country</u>	<u>Year</u>	<u>3 Years Before Dev.</u>	<u>1 Year Before Dev.</u>	<u>Year Of Dev.</u>	<u>1 Year After Dev.</u>	<u>2 Years After Dev.</u>	<u>3 Years After Dev.</u>
Bolivia	1972	79.3	100.0	108.2	86.3	69.6	66.3
Bolivia	1979	103.0	100.0	103.2	100.3	96.4	218.5
Colombia	1962	63.6	100.0	88.6	60.0	71.0	98.9
Colombia	1965	124.9	100.0	139.4	122.6	113.5	109.1
Ecuador	1961	88.2	100.0	99.8	115.6	92.5	91.4
Ecuador	1970	92.4	100.0	122.3	116.0	117.4	104.8
Peru	1967	122.8	100.0	125.9	130.2	130.0	171.8
Colombia	1967	81.6	100.0	92.6	89.0	90.2	108.8
Mexico	1976	113.8	100.0	172.6	135.4	128.9	124.9
Peru	1975	114.8	100.0	99.2	95.8	103.1	110.9

Source: Constructed from data obtained from various issues of Pick Currency Yearbook.

TABLE 10

Exchange Rate Unification and  
Parallel Market Premium After Devaluation

<u>Country</u>	<u>Year</u>	<u>Number of Official Rates</u>				<u>Black Market Premium</u>		
		<u>Year Prior</u>	<u>Yr. of Dev.</u>	<u>+1 Yr.</u>	<u>3 Yrs.</u>	<u>Month Prior</u>	<u>3 Mths. After</u>	<u>9 Mths. After</u>
Argentina	1970	1	1	5	5	0	0.5	9.0
Bolivia	1972	2	1	1	1	60.0	32.5	5.0
Bolivia	1979	1	2	2	1	17.5	15.0	20.0
Colombia	1962	3	3	3	4	57.8	11.0	14.4
Colombia	1965	3	4	4	2	114.4	35.9	19.3
Costa Rica	1974	5	3	3	3	30.2	3.5	15.2
Ecuador	1961	2	2	2	2	66.7	30.8	57.3
Ecuador	1970	2	1	2	3	55.6	16.0	9.2
Nicaragua	1979	2	5	3	6	92.9	97.0	47.8
Peru	1967	1	2	3	4	43.6	1.6	13.7
Venezuela	1964	3	2	2	2	35.2	0	0
Bolivia	1982	2	1	1	-	434.0	180.0	300.0
Chile	1982	1	2	3	-	17.9	2.4	10.6
Colombia	1967	4	3	2	2	48.1	30.7	15.4
Ecuador	1982	3	4	4	-	74.4	76.4	118.7
Mexico	1976	1	1	?	?	-	-	-
Mexico	1982	1	2	2	-	40.9	23.5	33.3
Peru	1975	4	5	5	4	75.7	55.6	77.8

Source: Various issues of Pick's Currency Yearbook and World Currency Yearbook.

can be seen in Table 11, in a large number of cases this protective tendency was reversed almost immediately after the devaluation. After devaluing, and (somewhat) reestablishing the degree of international competitiveness of the country, the authorities usually felt that the controls imposed in the few years preceding the crisis were not needed any more. The combination of these trade liberalization programs with the devaluations make the evaluation of the impact of the latter on the trade account somewhat difficult. First, this reduction in the degree of trade restrictions will result in a change -- usually an increase -- of the equilibrium real exchange rate, making the "required" real exchange rate devaluation higher than with the controls. Second, given this policy mix -- devaluation with trade liberalization -- it is not surprising to find that in a large number of countries real imports grew at very fast rates during the three years following the crisis.

In a number of instances -- Argentina 1970, Colombia 1965, Costa Rica 1964 -- the liberalization of trade was short-lived, being reversed after few months. Not too surprisingly, these are some of the countries for which the effect of the devaluation on the real exchange rate eroded fairly rapidly (recall Table 7). Moreover, in other cases -- Peru 1967, Nicaragua 1979 -- the devaluation was accompanied by a sharp increase in trade and/or capital movements restrictions. This reflects the fact that both of these devaluations were in fact implemented under an environment where the authorities saw the devaluations as partial remedies, without having a real intention to implement demand management policies alongside them. Given that the ultimate sources of the exchange rate and balance of payments disequilibrium -- the inconsistent macroeconomic policies -- were not tackled there was little hope in lifting the controls.

TABLE 11

Summary of Evolution of Exchange Controls and  
Trade Restrictions After Devaluation

<u>Country</u>	<u>Year</u>	<u>Payments Restrictions on Current Transactions</u>	<u>Tariffs, Duties and Cost- Related Measures</u>	<u>Restrictions on Capital Transactions</u>
Argentina	1970	•Decreasing restrictions for one year. Then highly restrictive.	•Short run liberalization; abrupt increase in tariffs 6 mths. after dev.	•Increased restrictiveness.
Bolivia	1972	•No significant changes.	•No change for 1 yr. Rapid increase in tariffs 1 yr. after.	•No change.
Bolivia	1979	•No significant changes.	•Mild liberalization.	•Slight liberalization of capital movement ceilings.
Colombia	1962	•Decreasing.	•Liberalization of advanced deposits.	•No change.
Colombia	1965	•Short-lived liberalization.	•Short-lived liberalization of advanced deposits.	•After 14 mths. restrictions greatly hiked.
Costa Rica	1974	•Very short run liberalization.	•Short run liberalization tariffs were later raised.	•Restrictions on capital flows introduced.
Ecuador	1961	•No clear pattern.	•No change in tariffs; increase in advanced deposits rates.	•No change.
Ecuador	1970	•Slight liberalization.	•Mild reduction in tariffs; important liberalization of advanced deposits.	•Mild liberalization of capital movement restrictions.
Nicaragua	1979	•Very slight liberalization.	•No changes.	•Very sharp increase in degree of restrictions.



Table 11 (cont)

<u>Country</u>	<u>Year</u>	<u>Payments Restrictions on Current Transactions</u>	<u>Tariffs, Duties and Cost- Related Measures</u>	<u>Restrictions on Capital Transactions</u>
Peru	1967	•Increased restrict- iveness.	•Tariffs raised.	•Sharp increase in restrictions.
Venezuela	1964	•Slight increase in restrictiveness.	•No change.	•No change.
Chile	1982	•No changes for 2 years.	•Slight increase in tariffs; no advanced deposits.	•Slight reduction and then increase in restrictions.
Colombia	1967	•Slow liberaliza- tion.	•Slow liberaliza- tion.	•Mild liberal- ization.
Peru	1975	•No significant change.	•Increase in tariffs levels.	•Slight liberalization.

Source: Constructed from information obtained from various issues of the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions and from various issues of Pick's Yearbook and World Currencies Yearbook.

#### IV.3. International Reserves, the Current Account, and Devaluation

Table 12 contains data on the evolution of gross real international reserve (measured in US\$ of constant value), the ratio of the current account balance to GDP, and the ratio of foreign assets to money after the devaluation. These indicators compare the levels of these variables one and three years after the crisis with their levels one year before the devaluation. While the data on reserves refers to percentage changes, those on the current account ratio, and on the ratio of net foreign assets refers to absolute changes.

This table provides a broad summary on how the external sector of these economies evolved during the years following the abandonment of the peg. A first revealing fact refers to the difference in behavior in the short run (i.e., one year) and medium run (i.e., 3 years).<sup>31</sup> While in a number of countries there was a deterioration in most of these indicators of the in the short run, the situation changed through time, and after three years there had been a substantial improvement. In fact, it is quite striking that after three years the real level of gross international reserves had increased significantly in 15 out of the 18 countries. Naturally, this "before" and "after" analysis does not allow us to establish rigorously whether the accumulation in the level of reserves over this period of three years responds to the devaluation or to other factors.

In some countries there was a simultaneous deterioration of the current account and an improvement in the accumulation of gross reserves. This apparently puzzling phenomenon is nothing but a reflection of the fact that

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<sup>31</sup>Cooper (1971) focused on one year after the devaluations only. However, the changing behavior through time detected in this table suggests that by concentrating in the very short run some substantial part of the action can be missed.

TABLE 12

## Behavior of External Sector Variables 1 and 3 Years

## After Devaluation

<u>Country</u>	<u>Year</u>	<u>Percentage Change in International Reserves<sup>a</sup></u>		<u>Change Current Account Ratio<sup>b</sup></u>		<u>Change In Ratio Net Foreign Assets</u>	
		<u>1 Yr. After</u>	<u>3 Yrs. After</u>	<u>1 Yr. After</u>	<u>3 Yrs. After</u>	<u>1 Yr. After</u>	<u>3 Yrs. After</u>
Argentina	1970	-0.55	1.25	-0.024	0.029	-0.03	-0.05
Bolivia	1972	0.07	1.28	0.029	-0.028	-0.04	0.14
Bolivia	1979	-0.51	-0.36	-0.010	0.014	-0.14	-0.94
Colombia	1962	-0.52	0.14	-0.047	0.026	-0.11	-0.04
Colombia	1965	0.07	1.85	-0.025	-0.005	0.03	0.06
Costa Rica	1974	-0.23	1.73	-0.001	0.011	-0.13	-0.00
Ecuador	1961	0.16	0.95	-0.010	-0.005	0.000	0.04
Ecuador	1970	-0.19	2.87	-0.062	0.053	-0.06	0.21
Nicaragua	1979	-0.01	1.35	-0.205	-0.156	-0.02	0.13
Peru	1967	-0.01	1.96	-0.012	0.064	-0.04	0.09
Venezuela	1964	0.18	0.29	-0.064	-0.073	0.01	0.01
Bolivia	1982	0.55	0.89	-	-	-0.13	-
Chile	1982	-0.44	-0.28	-0.002	0.021	-0.06	-
Colombia	1967	-0.01	2.27	-0.005	0.124	0.03	0.04
Ecuador	1982	-0.01	0.09	0.001	-	-0.09	-
Mexico	1976	-0.17	0.12	0.003	0.006	-0.03	-0.02
Mexico	1982	-0.80	0.15	0.079	-	0.02	0.000
Peru	1975	-0.58	-0.68	-0.073	0.053	-0.02	-0.77

<sup>a</sup>Percentage change in non-gold real reserves (in U.S. \$) with respect to year prior to crisis.

<sup>b</sup>Change of ratio of current account to GDP with respect to 1 year before devaluation.

Source: See text.

capital inflow, and or reversed capital flows, have played an important role in most stabilization programs. In a number of these episodes the devaluation was, in fact, part of an IMF-supported adjustment program which allowed the country in question to obtain substantial short and medium term resources; both from the international private banks and from the IMF, itself.

A limitation of using the real level of gross international reserves as an indicator of the external sector's behavior is that there is a strong and generalized tendency for the level of reserves holdings to increase through time, as countries grow and expand their level of foreign trade. In fact at times recorded growth of reserves can be quite misleading since they have been acquired via higher indebtedness and only to satisfy the growing demand of the Central Bank for international liquidity.<sup>32</sup>

This problem can be solved by concentrating on some relative measure of international liquidity, such as the ratio of net foreign assets to money reported in Table 12. An alternative indicator that is sometimes useful is the number of months worth of imports that the Central Bank holds in the form of reserves. Looking at Table 12 we can see that the ratio of net foreign assets provides a somewhat different story than the level of reserves, indicating that in a nontrivial number of countries the external situation in fact deteriorated after the devaluation, over and above the already precarious initial conditions of one year before the crisis. Interestingly enough, and not too surprising, many of those countries whose external position measured by the ratio of foreign assets, experienced a deterioration, are among those for which the effect of the devaluations on

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<sup>32</sup>On the determinants of the demand for reserves by the developing countries see Edwards (1983). On the relation between foreign borrowing and the demand for the international reserves see Eaton and Gersowitz (1980).

the RER eroded fully before three years -- Argentina 1970, Bolivia 1972, Colombia 1962, Bolivia 1979.

The Peruvian episode of 1975 provides a fascinating contrast. As was reported in Table 7, in this episode the authorities were able to maintain, via successive devaluations, a substantially high real exchange rate during the three years following the crisis. However, as Table 12 shows, this was of no avail, and that the external sector continued to deteriorate, to the point that in 1979 the Peruvian government was forced to reschedule its massive foreign debt. This was largely the result of generalized expectations that the policies undertaken by the authorities were not consistent with a return to stability.

#### IV.4. Macroeconomic Policies

Theoretically, whether nominal devaluations succeed or not in helping a country regain international competitiveness will largely depend on the accompanying macroeconomic policies. If the economic authorities don't put a check on the ultimate cause of the crisis that triggered the devaluation -- that is, the inconsistent macroeconomic policies -- the effects of the exchange rate adjustment will indeed be very short-lived.

Table 13 contains data on three of the indicators of domestic credit and fiscal policies considered in Section III (Table 2): (a) rate of growth of domestic credit; (b) rate of growth of domestic credit to the public sector; and (c) proportion of total domestic credit received by the public sector. It is very educational to compare the evolution of these data with the behavior of these indicators for the control group of 24 fixed exchange rate countries. In fact, if we consider the control group policies as a broad characterization of those policies "consistent" with maintaining a fixed rate, this comparison can shed additional light on successful and

TABLE 13

## Macroeconomic Policies in Period Following Devaluation

<u>Country</u>	<u>Year</u>	<u>Rate of Growth of Domestic Credit</u>		<u>Rate of Growth of Domestic Credit To Public Sector</u>		<u>Fraction Of Total Credit To Public Sector</u>	
		<u>+1 Yr.</u>	<u>+3 Yrs.</u>	<u>+1 Yr.</u>	<u>+3 Yrs.</u>	<u>+1 Yr.</u>	<u>+3 Yrs.</u>
Argentina	1970	41.9	94.7	14.3*	133.3	2.1*	4.8*
Bolivia	1972	31.2	38.5	4.1*	186.0	45.8	23.3
Bolivia	1979	38.1	343.2	62.3	411.8	44.8	53.1
Colombia	1962	16.7*	23.0	12.3*	45.7	24.1	31.3
Colombia	1965	17.9	16.4*	< 0*	< 0*	24.9	21.5
Costa Rica	1974	45.2	31.0	161.5	126.5	14.1	21.4
Ecuador	1961	1.9*	10.8*	2.2*	< 0*	10.9*	4.8*
Ecuador	1970	13.0*	7.8*	18.7*	< 0*	27.8	16.0
Nicaragua	1979	n.a.	31.5	n.a.	54.9	3.43	34.7
Peru	1967	12.0*	13.2*	18.5*	< 0*	36.3	25.0
Venezuela	1964	10.7*	8.9*	< 0*	< 0*	< 0*	< 0*
Bolivia	1982	171.3	5126.3	217.2	-	62.0	-
Chile	1982	10.9*	-	36.7	-	9.4*	-
Colombia	1967	16.4*	17.2*	< 0*	< 0*	21.5	14.2
Ecuador	1982	59.2	-	-	-	-	-
Mexico	1976	142.1	34.9	94.7	33.0	50.5	46.2
Mexico	1982	49.4	67.9	47.4	87.1	57.4	55.1
Peru	1975	54.3	54.1	114.0	55.4	33.5	35.3
First Quartile		12.5	14.0	12.5	14.0	10.6	7.2
Median		31.2	31.2	31.2	31.2	26.4	27.0
Third Quartile		12.5	14.0	51.8	64.5	45.1	35.2

\* Means that the value is less or equal to the median of the same variable for the control group of fixers.

Source: See text.

unsuccessful devaluations. In only 5 of the 18 devaluation episodes the rate of growth of domestic credit was lower than the median for the control group (17.4%) both one and three years after the devaluation -- Ecuador 1961, Ecuador 1970, Peru 1967, Venezuela 1964, Colombia 1967. When the other two indicators of macroeconomic policy are considered, the situation is very similar. In only a handful of countries the demand management policies immediately following the crisis can be considered to be tight.

In order to investigate in a more rigorous way the form in which macroeconomic policies and devaluations interacted during these episodes, and the way in which they affected the behavior of the real exchange rate, a number of cross section regressions were estimated. These equations took each devaluation episode as the observation unit, and considered the rate of change of the real exchange rate as the dependent variable. The independent variable included the nominal devaluation, the rate of growth of domestic credit, the change in the rate of growth of domestic credit to the public sector, and the change in the ratio of the fiscal deficit to GDP. The equations estimated were the following:

$$\hat{RER}_k = \alpha_1 + \alpha_2 \hat{E}_k + \alpha_3 \hat{C}_k + \alpha_4 \hat{FIS}_k + u$$

where  $\hat{RER}_k$  is the percentage change in the real exchange rate between the year prior to the devaluation and  $k$  years after the devaluation (for  $k = 1, 2, 3$  years), for country (episode)  $n$ .  $\hat{E}_k$  is the percentage change of the nominal exchange rate during the same period, for country  $n$ . Given the nature of the data set used, in most step-wise devaluation cases  $\hat{E}_1 = \hat{E}_2 = \hat{E}_3 = \hat{E}$  = initial devaluation.  $\hat{C}_k$  is the rate of growth of domestic credit between year  $k$  and the year prior to the devaluation.  $\hat{FIS}_k$  is the change in the particular index of fiscal policy used. The

results from this equation allow us to have an idea on the average effects of the nominal devaluations on the RER maintaining (most) other things constant. The results obtained from the estimation of this equation are presented in Table 14. Given the very small numbers of observations, these results should be interpreted cautiously; in spite of this the results are quite revealing. In all but one case the coefficients had the expected signs, confirming that expansive macroeconomic policies will generally result in an erosion of the real exchange rate. Moreover, these results clearly show that nominal devaluations coupled with rapid rates of growth of domestic credit or of the fiscal deficit will be self-defeating. Additionally, these results provide some idea on the "effectiveness" of nominal devaluations with other things constant. To the extent that governments are able to control their fiscal and monetary policies they will be able to significantly enhance the short to medium run effects of nominal devaluations on the real exchange rate.

#### V. Concluding Remarks

In this paper we have investigated in some detail the anatomy of devaluations in Latin American. The analysis proceeded from the causes and close determinants of devaluations, to their consequences. Data on 18 major devaluation episodes were followed for a seven year period that spanned from 3 years prior to the crisis up to three years after the crisis. The methodology used was to a large extent descriptive, and made extensive use of non-parametric tests in comparing the behavior of the devaluing countries to that of a control group of 24 developing nations that maintained a fixed exchange rate for at least 10 years.



TABLE 14

## Nominal Devaluations and Real Devaluations In Latin America:

## Cross Section Regressions (OLS)

	$\hat{E}_k$	$\hat{C}_k$	$C\hat{P}S_k$	$\Delta DEF$	$R^2$
<u>Panel A:</u> k = 1 year					
	0.556 (4.079)	-0.181 (-2.380)	-	-0.007 (-0.581)	0.756
	0.213 (3.737)	-0.015 (-0.165)	-	-	0.707
	0.212 (3.674)	-0.025 (-0.315)	-0.022 (-0.773)	-	0.717
<u>Panel B:</u> k = 2 Years					
	0.747 (3.914)	-0.228 (-3.475)	-	-0.005 (-0.331)	0.770
	0.467 (4.746)	-0.138 (-2.616)	-	-	0.666
	0.464 (5.011)	-0.031 (-0.372)	-0.075 (-1.608)	-	
<u>Panel C:</u> k = 3 Years					
	0.091 (0.851)	-0.091 (-1.012)	-	-0.009 (-0.366)	0.214
	0.122 (1.781)	-0.079 (-1.537)	-	-	0.245
	0.147 (2.394)	-0.064 (0.783)	-0.082 (-2.117)	-	0.438

Notes: Numbers in parentheses are t-statistics.

The empirical analysis forcefully indicates that historically the immediate causes of devaluations have been a rapid depletion of the stock of international reserves and a substantial real appreciation (i.e., over-valuation) of the real exchange rate. The ultimate causes of the balance of payments crises, however, were expansive domestic credit and fiscal policies that became inconsistent with maintaining a fixed peg. The analysis also shows that in the period leading to a devaluation countries have generally piled up exchange controls and trade restrictions in an effort to stop the imminent crisis. Black market premia goes up, but the drainage of reserves is not stopped; at most it is somewhat slowed.

The impact of a devaluation will depend on a number of factors, including the specific institutional environment and exchange rate system. In particular, in the realistic case of quantity rationing, multiple rates and parallel markets, devaluations will have different consequences than what the textbook model suggests.

What makes a "successful" devaluation? This is not an easy question to answer. Not only are there many ways to assess success, but devaluations are only one component of larger macroeconomic packages. In spite of the intrinsic difficulties related to evaluating this issue, the empirical analysis in this paper provides a number of important clues and leads. In particular, it is possible to classify our episodes into three broad groups of: successful devaluations, unsuccessful devaluations, and those devaluations for which it is not possible to provide a categorical verdict. Looking at the definite cases of success and failure provides important lessons.

Let's look at the record, on the effect of the devaluations on the behavior of the RER. The data in Tables 6 and 7 indicate that in only 3 of

the 11 stepwise devaluations we can talk of "success" -- Ecuador 1970, Venezuela 1964 and Costa Rica. On the other hand, one can easily detect six (out of eleven) clear failures where after only one or two years the real exchange rate was already way below its already overvalued level of one year prior to the crisis.<sup>33</sup>

The picture is very different when one looks at the crawlers. In all six cases for which there are data, after three years the real exchange rate index was way above its predevaluation level. One should be careful, however, to jump to the easy and naive conclusion that all crawling pegs are successful! Indeed, in many ways the definition of a crawling peg is a system geared at avoiding RER overvaluation. In order to assess the real degree of success of the crawlers it is necessary to ask ourselves at what cost the higher RER was maintained. From Table 8 it is clear that, in many episodes, the main cost is related to a rapid increase in inflation. The severe cost related to high (i.e., over 50% per annum) rates of inflation are too well known to be repeated here. What is clear, however, is that it is not possible to refer to a "successful devaluation" when a 30% real devaluation is accomplished by provoking a 150% rate of inflation.

As in the case of step-wise devaluers, successful crawlers require to implement consistent demand management policies along side the devaluation. The scrutiny of the data presented in this paper allows us to indicate one clear successful crawler: Colombia in 1967. The Chilean devaluation in 1982 comes in an honorable second place.

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<sup>33</sup> Argentina, both Bolivian devaluations, Colombia 1962 and 1965, and Nicaragua. The data in Table 13 is quite categorical. In successful countries devaluations have been only one component of broader programs aimed at demand management; failure countries maintained the inconsistent macroeconomic policies.

## APPENDIX

Control Countries

<u>Country</u>	<u>IFS Country Code</u>	<u>Year of Study</u>
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

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