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The Costs and Benefits of Fixed Dollar Exchange Rates in Latin America

The major Latin American countries have embarked on broad-based economic reform programs to raise economic efficiency, promote investment, and accelerate output growth.[1] To achieve these goals, these countries are attempting to foster economic stability, and in some cases, the tool they are using is an exchange rate fixed to the U.S. dollar.

When establishing economic stability is an important goal, the purposes fixed exchange rates can serve go beyond what is immediately obvious. Not only do fixed exchange rates stabilize the domestic prices at which exporters can sell and importers can import, a fixed exchange rate regime also has important implications for domestic monetary and price stability.

Implications for domestic monetary and price stability involve international differences in inflation rates. For a country's exchange rate to remain fixed, a country's inflation rate and the inflation rates of its trading partners must be the same. If the country's inflation rate persistently exceeds those of its trading partners, the country's citizens will buy foreign products. After all, prices of domestic products in a country with a fixed exchange rate will eventually rise above prices of foreign imports. The same price phenomenon will hurt the country's exports. Money growth is a primary cause of inflation; therefore, a country that fixes the price of its currency relative to some other country's currency implicitly must follow that country's monetary policy.

As a result, a fixed exchange rate can signal to investors a government's intent to follow a stable monetary policy. If the government prints money to cover budget deficits or to postpone unpleasant adjustments to adverse external shocks, investors will notice quickly. The policy will be obvious as the country's inflation outstrips that of its trading partners, the demand for foreign (domestic) currencies rises (falls), and the country's foreign exchange reserves disappear.

Thus, a persistently fixed exchange rate lends credibility to a government's commitment to a stable monetary policy. Such credibility is important. Even if a government is firmly committed to a stable monetary policy, private-sector behavior can nullify the expected benefits of such a policy if the private sector does not believe the policy will last.

But there is a problem with using a fixed exchange rate to signal such credibility. A government's commitment to fixing the exchange rate may, itself, be incredible. Almost any government faces temptations to renege on both exchange rate and monetary policy targets. If the returns from unexpectedly devaluing are high, a fixed exchange rate is not very credible. For a government to make a fixed exchange rate credible, it must demonstrate or create circumstances that make the cost of devaluation high.

This article assays the policy and economic characteristics that could make fixed exchange rate regimes credible and, therefore, make credible a government's commitment to monetary stability.

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[1] *Examples include Argentina, Bolivia, Chile, Colombia, Mexico, Venezuela, and to a lesser extent, Brazil.*

The factors that result in such credibility—or in a lack of credibility—are complicated because the benefits of reneging are not always what one might expect. The obvious gain that would make reneging likely—that a devaluation could result in economic growth—is not the only benefit. Even when a devaluation clearly will not result in rising income and growing government revenues, some countries still devalue, and we outline what governments get when they do. Some governments, for example, are simply trying to accumulate foreign exchange so that they can defend their currencies in the future.

In the next section of this article, we use a simple game to examine the dilemma Latin American governments face when choosing whether to fix their exchange rate. We then consider the importance of the effects of devaluation on output growth and discuss key economic relationships that determine the effects of changes in exchange rates.

The credibility of exchange rate and anti-inflation policy

Although we know that official promises to follow a monetary or exchange rate rule are not credible if reneging is not costly, identifying costliness is not always easy.[2] Attempts to address related issues in the area of domestic monetary policy appear in the "rules versus discretion" literature, which considers alternative economic scenarios and the likelihood of various government reactions to them.

Although the issue of rules versus discretion was developed without a focus on exchange rates (Kydland and Prescott 1977 and Barro and Gordon 1983a and 1983b), numerous authors have recently applied this framework to questions about appropriate exchange rate regimes.[3] In many such applications, surprise devaluations are assumed to increase inflation, a result countries generally do not want, and to increase output, a result countries almost universally want. Overall, when these are the likely outcomes of devaluation, a fixed exchange rate is not very credible unless authorities despise inflation so much that they will avoid devaluation at any cost.

The story became more complicated, however, when Edwards (1989) and Faini and de Melo (1990) showed that developing countries often suffer a fall in output growth from surprise devaluations, a scenario first outlined for Latin America by Diaz–Alejandro (1963).[4] Thus, while the earlier literature tells us something about when fixed exchange rates may be incredible, Edwards (1989) and Faini and de Melo (1990) offer information about when fixed exchange rates may prove credible.

Contractionary devaluations result from a variety of sources.[5] One involves the economic structure generated in Latin America by its post-World War II protectionist policies. Protected domestic industries relied heavily on imported inputs, especially capital goods. In addition, protection of industry rendered investment in agriculture and other exporting sectors unprofitable. Therefore, exporting sectors had a tendency to stagnate. In these circumstances, devaluation can have perverse effects on output. Devaluation increases the price of investment goods, which leads to a collapse of investment. Because Latin American countries generally did not have capital

[2] *This article tries to treat credibility as endogenous, that is, the credibility of a fixed exchange rate is dependent on the costs of devaluing to society. We ignore the political process. Credibility will also depend upon how effectively the political process punishes policymakers and governments for bad economic outcomes.*

[3] *These include Kamin (1988), Giovannini (1990 and 1992), Agénor (1991), Devarajan and Rodrik (1991), and Dornbusch and Fischer (1991).*

[4] *See Diaz–Alejandro (1963) and Cooper (1971) for early analyses of contractionary devaluation. More recent studies include Krugman and Taylor (1978), Lizondo and Montiel (1986), Edwards (1989), Faini and de Melo (1990), and Cooper (1992).*

[5] *At best, devaluations tend to be neutral in Edwards' analysis (Edwards 1989, chapter 8). Output tends to fall before the devaluation, usually as a result of a deterioration in the terms of trade. When devaluation finally occurs, output tends to improve but not necessarily to a level greater than or equal to output before the terms of trade shock. Kamin (1988) also comes to similar conclusions. McLeod and Welch (1992) find a nonlinear relationship, where small (surprise) real devaluations increase output growth and large devaluations decrease it in Argentina, Brazil, Colombia, and Venezuela, while any devaluation decreases output in Chile and Mexico.*

goods-producing sectors, and import substitution policies left exporting sectors weak and inflexible, the devaluation would not generate an expansion of domestic capital goods production nor an offsetting increase in export revenue to buy imported capital goods. Economic stagnation would result, if only temporarily.

These peculiar circumstances mean that, unlike some countries in other parts of the world, Latin American nations have avoided using exchange rate policies to improve output growth. If anything, Latin American governments have resisted devaluation, even in the face of severe overvaluation. (See the Appendix, "Inflation and Exchange Rates in Latin America," for a description of exchange rate policies in Latin America). Indeed, in addition to the economic costs of higher inflation and, in some cases, lower output growth, Latin American devaluations often entail political costs.[6]

Despite the negative economic and political effects, Latin American countries have devalued. Even in cases when fixed exchange rates have been an explicit objective of policy, such credible fixed exchange rates have not been part of Latin America's experience over the past thirty years.[7]

These difficulties not only raise questions about the process of devaluation and exchange rate manipulation, but also about the process of credibility formation. Where devaluations are known to weaken output growth and increase inflation, special care must be taken in considering the nature of policy trade-offs. Why, after all, would governments want what many of their citizens would regard as prejudicial?

One explanation that Kydland and Prescott (1977), Barro and Gordon (1983a and 1983b), and Dornbusch and Fischer (1991) suggest is that a government might want to increase inflation tax revenue through surprise inflation. In the case of Latin America, this argument is not credible. Dornbusch and Fischer find that the pure public-finance motive for inflation explains little in the context of Latin American countries experiencing moderate inflation, such as Brazil in the 1960s and Chile, Colombia, and Mexico. Dornbusch, Sturzenegger, and Wolf (1990) show that the public-finance motive only marginally explains the acceleration of inflation in the high-inflation Latin American countries—Argentina, Bolivia and Brazil in the 1980s, and Peru.

Another argument, however, is credible. Latin American countries have had to use nominal exchange rate surprises to generate substantial balance of payments (trade) surpluses to service their foreign debts.[8] Other factors suggest that the generation of foreign exchange reserves is an important consideration when a policymaker contemplates the consequences of devaluation in the context of debt-servicing difficulties. Eaton and Gersovitz (1980) point out that foreign exchange reserves take on special importance in providing liquidity services for export and import transactions, especially if the country faces credit limits in international markets.[9] Similarly, van Wijnbergen (1990) emphasizes the insurance value of foreign exchange reserves when trade-contingent debt instruments do not exist in international capital markets for these countries. For these reasons, we introduce reserve growth as an objective of policy.

A model of the exchange rate credibility problem in Latin America

We present a game to simulate the special exchange rate credibility problems that a Latin American policymaker might face. We then address some of the issues the game raises for Latin America.

[6] *See Edwards (1989) and Edwards and Montiel (1989).*

[7] *The most noteworthy cases are those of the Southern Cone countries of Argentina, Chile, and Uruguay in the late 1970s and early 1980s. These countries combined trade and capital account liberalization with exchange rate pegging to bring down inflation. All the programs had collapsed by 1982, due to severe terms of trade shocks, interest rate shocks, and the fact that the fixed exchange rate did not necessarily force the adoption of fiscal, monetary, and financial policies consistent with fixed exchange rates.*

[8] *See Faini and de Melo (1990) for a discussion of the central role of real exchange rate depreciation in the stabilization policies in the debt crisis of the 1980s.*

[9] *To support this claim, Eaton and Gersovitz (1980) provide evidence that debt and foreign reserves were asset substitutes for less-developed countries in the 1970s. As these countries borrowed internationally, reserve holdings fell. Once voluntary lending dried up in the early 1980s, the demand for reserves increased accordingly.*

Consistent with our discussion in the previous section, the model introduces a balance of payments surplus target, the growth in foreign exchange reserves, in the objective function so that the trade-off in policy objectives is between inflation and the growth in foreign reserves (a balance of payments surplus).[10]

To present exchange rate credibility problems as simply as possible, we assume that unanticipated depreciations of the currency improve the balance of payments or, equivalently, increase foreign exchange reserve growth. Equation 1 characterizes the forces that may affect growth or the decline in reserves as[11]

$$\dot{R} = \alpha\left[e - E(e)\right] + \omega, \tag{1}$$

where R is the level of foreign reserves held by the central bank, a $\dot{}$ signifies a rate of change over time, e is the rate of depreciations of the nominal exchange rate, E is the expectations operator, and ω is an external shock that is equal, on average, to zero. This shock could represent unexpected changes in the terms of trade, defined as the (foreign) price of exports over the (foreign) price of imports, or changes in foreign interest rates over some expected value. All variables are expressed in natural logarithms. α measures the (temporary) increase in reserve growth due to a surprise devaluation per unit of (infinitesimal) time; exchange rate depreciation can only increase reserve growth if it is a surprise. The short-term nature of the analysis assumes that the *quantum* of exports and imports does not quickly adjust to terms of trade or interest rate shocks and, therefore, any such shock translates completely into reserve changes. The expected external shock is equal to zero.

All goods in this simple model are traded. Inflation is determined purely by expectations of inflation. We can assume that goods price arbitrage (purchasing power parity) holds and that individuals have rational expectations. The private sector, however, sets its inflation expectations before the government decides where to set changes in the exchange rate and, thus, inflation.[12] Individuals in the private sector lose mainly through incorrect predictions of the exchange rate, although, on average, individuals correctly predict inflation. Thus, we assume that individuals in the private sector maximize the following utility function:

$$U_p = -\frac{1}{2}\left[\pi - E(\pi)\right]^2. \tag{2}$$

Accordingly, they try to forecast the inflation rate as accurately as possible to minimize their losses from miscalculation. Hence, individuals will act so that

$$\pi = E(\pi) = E(e) + E(\pi^*) = E(e), \tag{3}$$

where π is domestic inflation and π^* is the foreign inflation rate, set equal to zero for simplicity. In the long run, expected values of all variables will equal their actual values. But we assume the government can react to shocks to the system more quickly than the public because prices (and wages) are set before the shock is revealed. Therefore, the government can temporarily cause departures from purchasing power parity by unexpectedly changing the nominal exchange rate.

The government minimizes a quadratic loss function, which penalizes any inflation rate (positive or negative) not equal to zero and deviations from a target growth rate of foreign reserves, $\dot{R}$,

$$max\ U = -\left[\frac{\pi^2}{2} + \frac{\beta}{2}(\dot{R} - \dot{R}^*)^2\right], \tag{4}$$

where $-\beta(\dot{R} - \dot{R}^*)$ measures the marginal utility of a deviation of an increase in reserves. If reserve

[10] *Sachs (1985) analyzes the U.S. trade deficit in a similar way. The relationship could also include the capital account. We exclude the capital account for ease of exposition.*

[11] *In a more complete model, the country produces nontraded goods as well as traded goods, and the direct effects of exchange rate changes are concentrated on the traded-goods sector.*

[12] *This timing could be generated by the overlapping contracts framework of Gray (1976) and Fischer (1977), or it could be due to the government having an informational advantage, as in Canzoneri (1985). It is unlikely, however, that the government will observe terms of trade shocks before the private sector. The inertia in prices due to contracting gives the government room to use surprise devaluation to increase reserve growth, as discussed below.*

Table 1
Payoff Matrix for the Government and Private Sectors Under Fixed and Flexible Exchange Rates*

		Private sector expects	
		$e = 0$ (fixed)	$e > 0$ (flexible)
Government chooses	$e = 0$ (fixed)	$-\frac{\beta}{2}\left[\dot{R}^{*2} + \sigma_\omega^2\right], 0$	$-\frac{1}{2}\left[[\beta^2\alpha^2 + \beta(1+\alpha^2\beta)^2]\dot{R}^{*2} + \beta\sigma_\omega^2\right], -\frac{\beta^2\alpha^2}{2}\dot{R}^{*2}$
	$e > 0$ (flexible)	$0, -\frac{\beta^2\alpha^2}{2}\dot{R}^{*2}$	$-\frac{\beta}{2}\left[(1+\beta\alpha^2)\dot{R}^{*2} + \left(\frac{1+\beta\alpha^4}{(1+\beta\alpha^2)^2}\right)\sigma_\omega^2\right], 0,$

where e = rate of devaluation, E = expectations operator, $\sigma_\omega^2 = E(\omega^2)$ is the variance of external shocks.
*The first value in the ordered pair represents the government's payoff and the second the private sector's payoff.

growth is below its target rate, the marginal utility is positive, and if reserve growth is above its target rate, the marginal utility is negative.

The game proceeds in two simple stages. The private sector sets its devaluation and, thus, inflation expectations, and enters into contracts based on these price expectations. The government then sets its rate of devaluation. Table 1 presents the payoff matrix for the government and private sectors, and Table 2 presents the analytical solutions to the game under two conditions: credible precommitment, in which the government irrevocably fixes the exchange rate, and flexible exchange rates, which are equivalent to a noncredible fixed exchange rate.[13]

If the government cannot be forced to honor a commitment to a fixed exchange rate, the dominant strategy for the government is a flexible rate.[14] Knowing this, the private sector will always expect exchange rates to be flexible. Accordingly, the equilibrium will correspond to the lower right quadrant of Table 1. On the other hand, suppose the government precommits to a fixed exchange rate and, through legislation or membership in a currency bloc, the commitment is credible. Then one possible equilibrium of the game could correspond to the upper left quadrant of Table 1. The other equilibrium is still the flexible exchange rate equilibrium in the lower right quadrant of the table.

If "commitment technologies" exist that can force the government to establish an irrevocably fixed exchange rate, which regime will the government pick? This game does not yield an unambiguous choice.[15] Both regimes have different implications for inflation and reserve growth. We now investigate these different outcomes.

[13] *We assume that the targeted growth rate of reserves $\dot{R}^*$ and shocks ω are independent. In Table 2, the subscript* r *denotes rule, while the subscript* d *denotes discretion.*

[14] *To see this, compare the total payoff to the government when* e *= 0 and when* e *> 0. The payoff when* e *> 0 is unambiguously larger than when* e *= 0.*

[15] *If we subtract the expression for $E(U)_d$ from $E(U)_r$ in Table 2, we find*

$$E(U)_r - E(U)_d = \frac{\beta}{2}\left[\beta\alpha^2\dot{R}^{*2} - \left(\frac{\beta\alpha^2[(2+\alpha^2(\beta-1)]}{(1+\beta\alpha^2)^2}\right)\sigma_\omega^2\right].$$

The sign of this expression depends on the government's marginal rate of substitution between inflation and international reserves, ß (> 0), and the effects of devaluation on reserve growth as well as the target level of reserve growth and the variance of external shocks. The partial derivatives of are

$$\frac{\partial[E(U)_r - E(U)_d]}{\partial\dot{R}^*} > 0, \frac{\partial[E(U)_r - E(U)_d]}{\partial\sigma_\omega^2} < 0, \text{ and}$$

$$\frac{\partial[E(U)_r - E(U)_d]}{\partial\beta} \gtrless 0, \frac{\partial[E(U)_r - R - E(U)_d]}{\partial\alpha} \gtrless 0.$$

Table 2
Equilibrium Inflation, Reserve Growth, and Expected Government Utility
Under Fixed and Flexible Exchange Rates

Credible precommitment to a fixed exchange rate	Flexible exchange rate (No credible commitment)
$\pi_r = R(e_r) = e_r = 0$	$e_d = \beta\alpha\dot{R}^* - \frac{\beta\alpha^2}{1+\beta\alpha^2}\omega$
	$\pi_d = E(e) = \beta\alpha\dot{R}^*$
$\dot{R}_r = \omega$	$\dot{R}_d = \frac{1}{1+\beta\alpha^2}\omega$
$E(U)_r = -\frac{\beta}{2}\left[\dot{R}^{*2} + \sigma_\omega^2\right]$	$E(U)_d = -\frac{\beta}{2}\left[(1+\beta\alpha^2)\dot{R}^{*2} + \left(\frac{1+\beta\alpha^4}{(1+\beta\alpha^2)^2}\right)\sigma_\omega^2\right],$

where π = inflation rate, e = rate of devaluation, τ = terms of trade, E = expectations operator, U = government's utility, $\sigma_\omega^2 = E(\omega^2)$ is the variance of external shocks.

Inflation and reserve growth with a credibly fixed exchange rate

Suppose the government can credibly commit to the exchange rate rule that sets e_r=0. From Table 2, the equilibrium exchange rate depreciation and inflation, $_r$, will be zero, and expected reserve growth will be zero, while actual reserve fluctuations will completely accommodate unexpected terms of trade or foreign interest rate fluctuations.

Notice that the larger the government's desired reserve accumulation, the more government welfare falls. A government that credibly commits (forever) to a fixed exchange rate will be continuously frustrated in increasing its stock of reserves if this divergence persists. A higher variance of the shock term also decreases welfare.

Such a policy, however, is not *time consistent*. The government can improve on this outcome temporarily by announcing a fixed exchange rate and then devaluing.[16] Rational individuals will recognize the government's incentive to renege on its exchange rate stance and will set expectations

[16] *A government that convinces the public it will keep exchange rates fixed can improve welfare by cheating in the current period. For an explanation, note that expected inflation in the current period will be zero. Maximizing equation 3 with respect to* e *yields*

$$e = \frac{1}{\alpha}\left[\dot{R}^* - \omega\right].$$

Expected and actual reserve accumulation under cheating will be

$$\dot{R}_C = \dot{R}^*.$$

Expected utility will be equal to zero, which is clearly an improvement over credibly fixed exchange rates and, as we shall see, flexible exchange rates since both generate negative expected utility. Such a situation, however, is not consistent. The public would recognize the government's large incentive to cheat, and the equilibrium outcome reverts to the discretionary flexible exchange rate case above. Also, once the public realizes that the government has cheated, cheating can never be used again. Addressing sustainable equilibria over time and the relationship between credibility and reputation are beyond the scope of this article. For discussion and analysis, see Barro and Gordon (1983a and 1983b), Rogoff (1985 and 1987), Canzoneri (1985), Cukierman (1986), Agénor (1991), Obstfeld (1991), and Fischer (1990).

and prices so that the marginal cost of devaluing will equal the marginal benefit to the government.

Inflation and reserve growth under flexible exchange rates

Assuming that optimal reserve growth is positive, a government that can gain foreign exchange reserves by devaluing will face the well-known inflationary bias of policies that lack credibility. The private sector, knowing that the government has an incentive to devalue to raise reserve growth, expects a devaluation. The private sector will set prices accordingly, generating positive inflation regardless of the government's policy stance. Even if the government does not devalue when the private sector expects a devaluation, the economy will suffer from high inflation. The positive rate of inflation, combined with the fixed exchange rate, will cause a surge in imports and a fall in exports, culminating in a loss in foreign reserves. Following a no-devaluation policy without credibility is doubly costly to the government: both inflation and a balance of payments crisis will result. The government will devalue, one way or another.

Formally, one can see this result by taking expectations on the equilibrium solution for devaluation and inflation under flexible exchange rates and noting that the ex ante expected shock is zero. Then from Table 2, expected inflation and devaluation is

$$E(e_d) = E(\pi_d) = \beta\alpha\dot{R}^*. \tag{5}$$

It should be noted that the adjustment programs undertaken in Latin America included devaluation for the explicit purpose of increasing foreign exchange reserves. The analysis suggests that this policy will be inherently inflationary. On the other hand, governments may intend to fix exchange rates forever but cannot resist the temptation to devalue to increase reserves. Economic agents, recognizing this, act to protect themselves from the devaluation by increasing the rate of price increases.

Because the coefficient on the shock term in the solution for reserves under flexible exchange rates in Table 2 is less than the corresponding coefficient under fixed exchange rates, the flexible rate regime can smooth fluctuations in foreign exchange reserves due to unexpected changes in the terms of trade or foreign interest rates. Again, as in the credible fixed exchange rate case, the government cannot affect the expected (average) rate of foreign reserve accumulation in the long run.

To fix or not to fix? The importance of output effects of real devaluation

A comparison of the game's outcomes under the two regimes suggests that a credible commitment to a fixed exchange rate regime eliminates the inflationary bias of the flexible rate regime. Unfortunately, however, this policy increases the economy's susceptibility to external shocks. The choice of regime, therefore, depends on the relative importance a particular government places on each of these two objectives and on how sensitive the balance of payments is to exchange rate surprises. Whether a country fixes its exchange rate depends on how heavily the policymaker values reserves relative to inflation (β), how sensitive reserve growth is to devaluation (α), the variance of external shocks σ^2_ω, and the target reserve growth $\dot{R}^*$.

Before the early 1980s, Latin American countries grew significantly. The terms of trade and international interest rates remained fairly steady. Most Latin American countries maintained fixed exchange rates throughout this period, despite the breakdown of the Bretton Woods system of fixed exchange rates in the early 1970s. The external trauma of the late 1970s and early 1980s brought increases in world interest rates and a major decline in the terms of trade to most of Latin America. The model predicts that an increase in the variance of foreign shocks will increase the desirability of a more flexible rate, and, in fact, many Latin American countries moved toward a more flexible rate.

In the early 1990s, adjustment to these shocks is nearly complete for most Latin American countries, and interest rates and terms of trade are stable. The theory presented above suggests that Latin American countries will tend toward fixed exchange rates in the near future, barring any major disruption of international trade and capital flows.

Costs and benefits of fixed and flexible exchange rate regimes

Most Latin American countries had to devalue their exchange rates dramatically in the 1980s in the face of the balance of payments problems brought about by the debt crisis and adverse terms of trade movements. The adjustment under more flexible exchange rates imposed high economic costs. Most Latin American countries suffered large declines in gross domestic product (GDP) per capita in the first half of the decade. From 1981 to 1985, the cumulative fall in per capita GDP was 12.6 percent in Argentina, 14.9 percent in Chile, 8.7 percent in Mexico, and 14.5 percent in Venezuela.[17] Brazil and Colombia managed to increase GDP per capita by 4.1 percent and 1.9 percent, respectively, after suffering initial contractions between 1981 and 1984. Inflation, as discussed in the Appendix, also accelerated in all six of these countries in the first half of the 1980s. The costs of balance of payments crises were high, especially in those countries where output fell as a consequence of real devaluation.

Latin American terms of trade movements settled down in the 1980s, and international interest rates have declined significantly in recent years. Given these results, we are not surprised to see countries such as Argentina and Mexico returning to fixed exchange rates after more than a decade of adjustment to the debt crisis. Enhanced credibility should greatly improve these countries' macroeconomic performances, barring any new balance of payments crisis. The costs of renewed real devaluation emanating from large government deficits and excessive money growth in the form of high inflation and losses of foreign reserves should temper any moves back to macroeconomic mismanagement. Terms of trade shocks, however, can still undo these fixed exchange rates and, thus, keep the exchange rate regimes from being completely credible. Consequently, some flexibility in the exchange rates in Latin America may be desirable.

Ultimately, however, the credibility of government policy will depend on its prolonged effort to maintain monetary and fiscal discipline for low inflation and, more generally, to keep the reform process on track. Latin American countries seem, at least for the moment, to be headed in this direction.

[17] *Inter-American Development Bank (1991).*

Appendix

Inflation and Exchange Rates in Latin America

Figure 1
Trends in Argentina

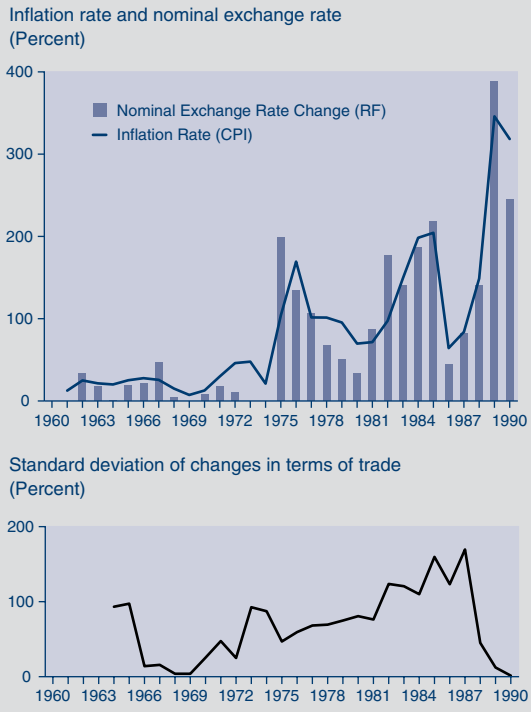
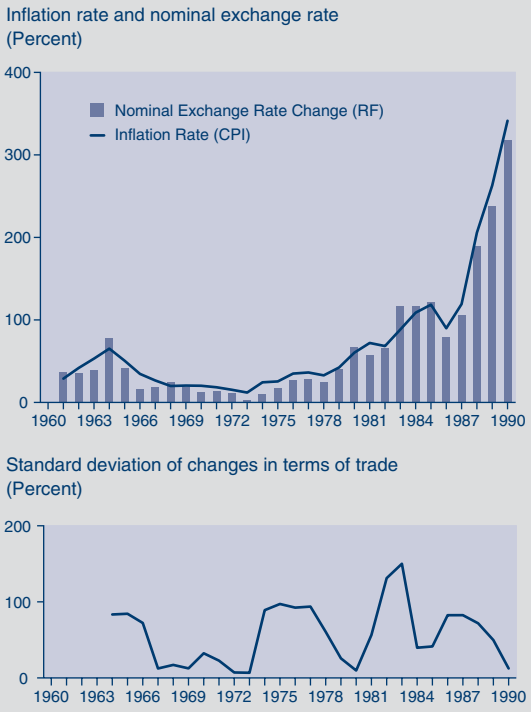


Figure 2
Trends in Brazil



For most of the period since World War II, Latin American countries have generally maintained fixed exchange rates with the U.S. dollar. These fixed exchange rate regimes usually collapsed, but Latin American central banks most often returned to a fixed exchange rate following devaluation.

Argentina, Brazil, Chile, Colombia, Mexico, and Venezuela tried to maintain parities fixed to the dollar until the late 1960s. Colombia, Mexico, and Venezuela were more successful than Argentina, Brazil, and Chile, even in the face of high inflation and overvaluation. The ultimate devaluations, however, were followed by a return, if only temporarily, to pegged exchange rates.

Figures 1 through 6 show trends for these six countries.[1,2] The figures also show

[1] Descriptions of exchange rate policies in each of these countries can be found in Cavallo and Cottani (1991) for Argentina, Coes (1991) for Brazil, Edwards and Edwards (1987) and de la Cuadra and Hachette (1991) for Chile, Edwards (1986) and Garcia Garcia (1991) for Colombia, Ortiz (1991), and McLeod and Welch (1991) for Mexico.

[2] Inflation (upper charts in Figures 1 through 6) is measured as the logarithmic percentage change in the consumer price index (CPI), with data from the International Monetary Fund (IMF). Nominal exchange rates are taken from the IMF's RF series. The lower charts in Figures 1 through 6 show (three-year moving average) standard deviations of logarithmic changes in the terms of trade, with data from the World Bank (1991).

(Continued on the next page)

Inflation and Exchange Rates in Latin America—*Continued*

Figure 3
Trends in Chile

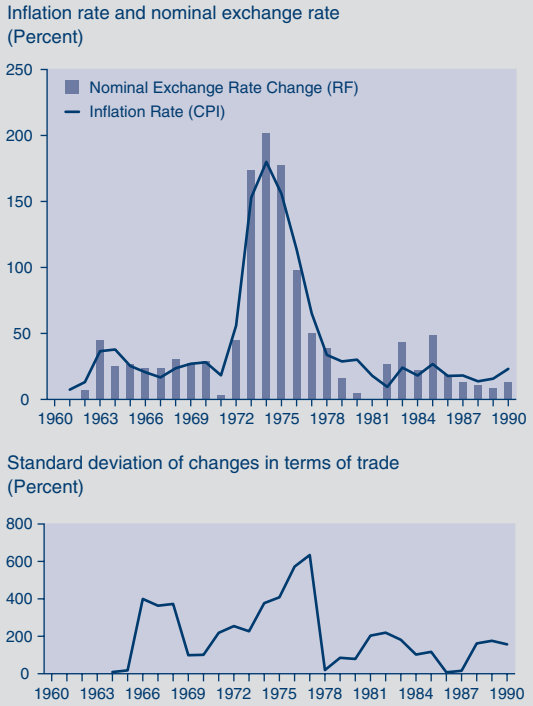
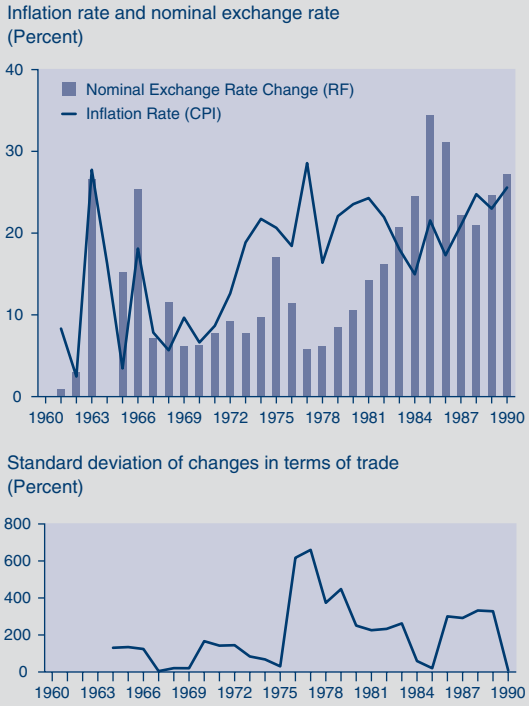


Figure 4
Trends in Colombia



that inflation rates and changes in exchange rates tend to be highest when the variability of the terms of trade is high for most of these countries.

The figures reflect Brazil's and Colombia's moves to crawling pegs in the late 1960s. Argentina briefly used a crawling peg from 1964 to 1966 and during 1971. Argentina, however, reverted to imposing fixed exchange rate regimes throughout the postwar period. Chile, on the other hand, seems to have implicitly used a crawling peg arrangement until fixing in 1971, although officially the country had fixed rates.

Economic disturbances in the early 1970s, especially OPEC's 1973 oil embargo, caused a new set of devaluations in Argentina, Chile, Mexico, and Venezuela, while Brazil and Colombia had to accelerate their exchange rates' devaluation rate. After these large devaluations, Argentina and Chile followed crawling pegs until 1978. In 1979, Argentina and Chile, along with Uruguay, tried to use their exchange rates to lower inflation by slowly decreasing the rate of crawl to zero.

Rising international interest rates in the late 1970s and severe terms of trade shocks in the early 1980s caused all six countries to abandon fixed rate regimes and adopt more flexible exchange rates. They continuously devalued their currencies. Each of these countries had to increase its exports and decrease

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Inflation and Exchange Rates in Latin America—*Concluded*

Figure 5
Trends in Mexico

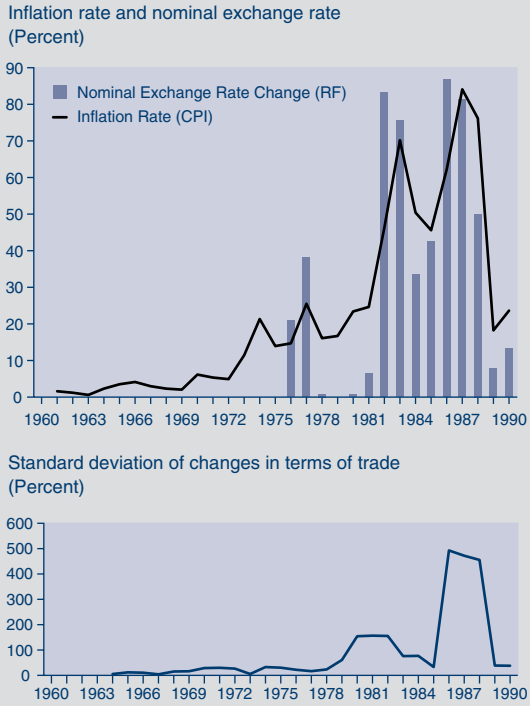
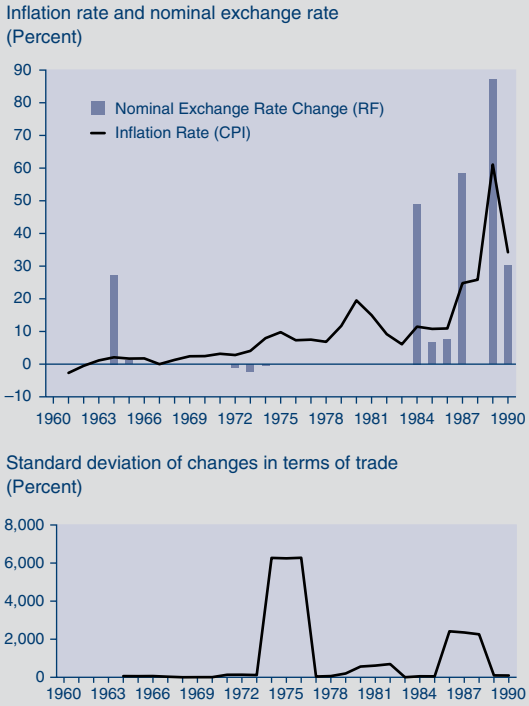


Figure 6
Trends in Venezuela



its imports to service the large foreign debts it had accumulated in the 1970s. During this period of flexible exchange rates in the mid-1980s, inflation accelerated to unprecedented levels in all Latin America, with the exception of Chile.

Flexible exchange rate regimes lasted until the late 1980s, except for brief periods of fixed exchange rates in Argentina (1985–87) and Brazil (1986–87) during their failed so-called "heterodox" inflation stabilization plans, which used wage and price controls. In 1988, Mexico initiated a successful anti-inflation program designed to keep exchange rate depreciation slower than the inflation rate. (By late 1991, the Mexican peso's exchange rate was virtually fixed.) Argentina followed Mexico in early 1991 by fixing the Argentine exchange rate to the U.S. dollar and promising full convertibility of Argentine australs (now pesos) into dollars.

These most recent fixed exchange rate policies represent governments' use of exchange rates to signal the governments' intentions concerning future inflation and to increase the credibility of anti-inflation programs. Such exchange rate pegs are never fully credible because governments have an incentive to devalue and inflate once the public formulates inflation expectations. Some countries, especially Chile and Argentina, have enacted constraints to eliminate the governments' ability to renege on announced policy rules.

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