

**Preliminary**

# **An Evaluation of Monetary Regime Options for Latin America**

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## I. Introduction

Over the past decade, many middle-income developing countries have moved away from intermediate exchange rate regimes and toward either extreme of floating rates or hard pegs such as currency boards or dollarization. In the 1980s and early 1990s, intermediate regimes such as soft pegs, crawling pegs, and crawling bands were the norm. Now, these options are increasing falling out of favor, particularly for those emerging market countries that are highly integrated in international financial markets.

In this paper, we analyze the choice of exchange rate regime in Latin America. We start, in Section II, by taking stock of the evolution of exchange regimes in the region and exploring the reasons for that evolution. While the general trend in Latin America is not very different from that in other regions, it would appear that Latin American countries tend to move in large clusters from regime to regime. We note that empirical equations that try to explain regime choices do not fare particularly well for Latin American countries. In particular, the popularity of intermediate regimes seemed excessive ten years ago, but this has been neutralized with the generalized move to floating in the recent years

In Section III, we ask whether Latin American countries should form an independent common currency area. We apply a modern version of the theory of optimal currency areas (OCA). This approach is well suited to choosing between the two extremes of exchange rate regimes, because it focuses on the choice between a common currency and individually floating exchange rates. In this framework, a common currency is advantageous to the extent that it reduces transaction costs and thus encourages trade. It is costly insofar as it does not allow each country to conduct an independent monetary and exchange rate policy so as to buffer external shocks and respond to domestic conditions that may be dissimilar. We find that, under present circumstances, the costs of a common currency are likely to outweigh the benefits for the countries of Latin America. In fact, these countries do not trade much with each other, as has been noted elsewhere. Perhaps more surprisingly, they face diverse economic shocks and their business cycles are not coordinated. Finally, they are affected by common shocks to sentiment in international financial markets, but no more so than is the average pair of emerging markets.

In Section IV, we consider a different form of non-national monetary arrangement, namely unilateral dollarization. As with the choice to form a common currency, whether this option is a good one for a particular country depends on whether it is sufficiently similar and integrated with the United States, so that the monetary policy of the U.S. is acceptable. However, potential financial fragility and lack of credibility seem to be even more relevant considerations. With poor credibility of the monetary authorities and strong demand for dollar-denominated financial assets (“spontaneous” or “de facto” dollarization), it becomes extremely costly to run a national monetary regime. Countries are forced to live with high interest rates, highly volatile exchange rates and prices, and a high degree of vulnerability in the financial sector. Unilateral dollarization is perceived as an effective and immediate way of importing monetary credibility, even if it implies giving up the national central bank, thereby forgoing seigniorage and lender-of-last-resort facilities.

Finally, in Section V we review some of the evidence on whether emerging market floaters do in fact benefit from their monetary policy autonomy. We ask whether a credibility gap prevents emerging market countries from being “free floaters” by forcing them to intervene in foreign

exchange markets and to adjust interest rates in an attempt to moderate exchange rates fluctuations. But the key question is whether emerging market floaters get something valuable for eschewing the credibility and lower transaction costs of dollarization, that is, whether they retain sufficient flexibility to use monetary policy for domestic ends in response to important shocks. Specifically, we examine the response of monetary policy to domestic inflation, output gaps, and shocks to terms of trade and worldwide interest rates.

We conclude that some countries are indeed viable candidates for pursuing a floating exchange rate, while others are good candidates for dollarization. Some countries would appear to be reasonable candidates for either dollarization or a float; for them, the choice will be difficult. Other countries seem to be candidates for neither dollarization nor a float; for them, life will be difficult.

## II. Evolution of Exchange Rate Arrangements in Latin America. Choices and Reasons

By 2001, a majority of Latin American countries had either adopted the US dollar as legal tender currency or instituted a floating exchange rate regime—the latter often combined with an inflation target (Table 1).<sup>2</sup> Chile staged a gradual and orderly exit from an intermediate exchange rate system to a float. Other changes in exchange rate regime took place under crisis or near-crisis circumstances. Notably, Brazil and Mexico moved to floats under heavy losses of foreign exchange reserves, but have subsequently operated their new exchange rate regimes without excessive strain. Ecuador and El Salvador dollarized fully. In 2002, Argentina moved to a float under an intense financial crisis, after having maintained a currency board for eleven years. Also in 2002 Venezuela moved to a float from an intermediate regime under milder external pressure conditions. And so on.

In the rest of the world, there has also been a move to the “corners” (Figure 1). In Asia, Thailand moved from a *de facto* peg to an independent float, and Korea and Indonesia from a managed float to an independent float. The Philippines maintained a floating regime, while Malaysia, an outlier, has maintained a traditional fixed exchange rate since 1998. In contrast to Latin America, there have been no moves toward currency boards or currency unions.

The move to the corners has been primarily driven by heightened integration in international financial markets and the volatility of capital flows, which have led to the conclusion that intermediate regimes are more vulnerable to costly currency crises than are the “corner” regimes. A currency board gives stronger (if not foolproof) credibility and durability to a peg, and under

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<sup>2</sup> Calvo and Reinhart (2002) have emphasized the difference between *de jure* regimes and *de facto* regimes, that is, between what the authorities do and what they say they do with respect to exchange rate policy. In the above, we have used the IMF’s official classification, which—while beginning from the countries’ self-reported regime—now corrects it on the basis of the IMF staff’s views in those cases where the *de facto* regime clearly differs from the self-reported regime. We also checked that the alternative classification produced by Levy-Yeyati and Sturzenegger (1999) entirely on the basis of “deeds rather than words” is similar to the IMF’s official classification, at least for the countries in Latin America.

full dollarization, without an exchange rate there is no risk of sharp devaluations. At the other end, a floating rate may permit to absorb international financial shocks more gradually and less stressfully. Latin American countries are indeed fairly open to international capital movements. Table 2 shows that an index that measures directly the incidence of capital controls yields generally low levels of restrictions for countries in the region, while de facto international financial integration (proxied by gross financial inflows plus outflows, in absolute value, as a ratio to GDP) has increased significantly for most Latin American countries in the past decade.

The increasing popularity of floating exchange rate regimes is also related to the generalized decline in inflation. Previously, inflation stabilization objectives seemed to rule out the possibility of floating exchange rates, and to require pegs or quasi-pegs, at least temporarily. Indeed, the exchange rate was a central instrument in many inflation stabilization plans, and fixing the rate (often through currency boards) proved to be particularly effective in stopping hyperinflations. For countries wishing to preserve some exchange rate flexibility, intermediate regimes were intended to keep a lid on devaluation and inflation expectations through bands and pegs, and to prevent gradual losses of competitiveness by letting the rate “crawl.” With lower inflation, floating exchange rate regimes now seem to be a more appealing option.

### **III. A Common Currency for Latin America?**

In this section we review the considerations relating to a common currency for Latin America or groups of Latin American countries. We analyze both the case in which Latin American countries lock their bilateral rates but float jointly as an independent currency, and the case in which they simultaneously adopt the U.S. dollar. A traditional approach, going back at least to Mundell (1961), is to ask whether the common currency candidates are subject to coordinated business cycles so that monetary policy would need to react in the same way in each country. As much has been written on this approach, we provide a highly selective review. We extend this idea by examining if changes in external financial conditions are also correlated among the group of Latin American countries. To the extent that they are, one could posit that their exchange rate policies should also be similar, strengthening the case for a common currency.

#### **Real-based optimal currency area (OCA) considerations**

##### *Patterns of trade*

As is well known, at present Latin American countries are less open to international trade than are other countries at a similar level of economic development. Moreover, their direction of trade is highly diversified, with no dominant trading partner (Table 3).<sup>3</sup> In particular, the share of trade

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<sup>3</sup> Mussa et al. (2000) and Jadresic et al. (2001) report these facts for a large number of countries and potential common currency areas.

with the United States is often no larger than that with Europe or Japan for South American countries, and is only slightly larger for the typical Central American country. Mexico, with an 80 percent trade share with the United States, is an outlier. On this basis, Latin American countries do not seem to be especially suitable candidates for a common currency, nor is there a particularly strong case for them to dollarize. However, patterns of trade are to some extent endogenous, and the direction of trade could change substantially if a free trade zone in the Americas were to materialize.

### *Comovement of economic variables*

The comovement of output fluctuations among the various countries in the world has been extensively analyzed by Bayoumi and Eichengreen (1994). Correlations of economic growth across pairs of countries are typically lower in Latin America than they are in Western Europe, and somewhat higher than in East Asia. Interestingly, for each Latin American country, correlations with U.S. growth are positive and often significant. However, this is also the case for East Asian countries, and even more so for Western European countries. Bayoumi and Eichengreen (1994) also consider correlations of supply shocks as distinct from demand shocks, following the Blanchard and Quah (1989) methodology. To assess the desirability and feasibility of a common currency, supply shocks are clearly more relevant, as one might expect demand shocks—which to a large extent may be policy-driven—to become more correlated under a common currency. The correlation of supply shocks among the various Latin American countries is typically low and insignificant, and clearly lower than it is for the countries in the European Monetary Union. Moreover, the correlation of supply shocks with the United States is insignificant (and often negative) for all Latin American countries. On average, such shocks are larger in Latin America than in Western Europe or East Asia, and Latin America adjusts to them faster than Western Europe does, though more slowly than East Asia does. On the whole, these considerations do not support the case for a common currency in Latin America, or for widespread dollarization.

### **Financial-based OCA considerations**

While the comovement of fundamental macroeconomic variables among Latin American countries does not seem to be particularly high, there is a widespread view that financial markets tend to treat Latin American countries as one bloc. At present, there is no clear theory of how financial variable comovement relates to optimum currency areas. Nevertheless, if there were evidence that Latin American countries are routinely hit by large, common financial shocks (such as a sudden loss of appetite for Latin American financial assets, regardless of fundamentals), one might speculate that monetary and exchange rate policies should react in a similar way in each Latin American country. In that case, a common currency (whether an independent currency or the U.S. dollar) might be a reasonable way to go.

Therefore, it seems helpful to complement the information obtained from comovement of real variables with that on comovement of financial variables, even if this is highly tentative because only financial asset prices, rather than shocks, can be observed. Our overall finding is that the degree of comovement of financial variables is not higher among Latin American countries than among emerging markets more generally. In other words, market participants may view

emerging markets as one bloc, but they do not seem to view Latin American markets as a distinct group from the rest.<sup>4</sup>

Yields on government bonds issued by emerging markets in U.S. dollars are obvious candidates to consider. Specifically, we analyze the most closely-watched indicator by market participants, the EMBI+ spreads (vis-à-vis U.S. government bonds) computed by J.P.Morgan. On this basis, there seems to be very large comovement among the various Latin American emerging markets. However, the comovement among Latin American countries is not much higher than among other groups of countries. To abstract from the common component for all emerging market spreads, we first regress each individual country's spread series on the overall EMBI+ spread series, and save the residuals. We then report the correlation matrix among these country-specific components of the spread series (Table 4). We conduct this exercise for the full sample for which the EMBI+ data are available (1998-2001) and for a subsample that begins after the Russian crisis and that ends well before Argentinean spreads start to rise (1999-2000). For either sample period, the correlations between any two Latin American countries do not seem to be higher than the correlations between any two emerging markets.

In the same vein, we examined directly the observed comovement of exchange rates among the various Latin American countries. Of course, this is largely obfuscated by the presence of exchange rate pegs. To mitigate this problem, we turn to the comovement of forward exchange rates, using non-deliverable forwards to the extent that the data are available (Table 5). We again find that comovement is not particularly high among Latin American countries.

An alternative way of summarizing the comovement of both exchange rate expectations and international financial market conditions is to consider results from an "early warning system" model designed to predict exchange rate crises. The model defines a currency crisis as an extreme change in an indicator of exchange market pressure, which is calculated as a weighted average of changes in the exchange rate and international reserves. We compute a correlation matrix of the estimated probabilities of crisis obtained from the "DCSD" model developed at the IMF (Berg and Pattillo, 1999; Berg, Borensztein, Milesi-Ferretti, and Pattillo, 2000). A disadvantage of this approach is that it is designed to capture extreme events only; an advantage, however, is that it considers several macroeconomic and external variables with weights that reflect their relative ability to predict exchange rate movements. Although the model is based on fundamental variables, these would indirectly reflect changes in market sentiment as well. Using this approach, we find one more time that Latin American countries do not display greater comovement of probabilities than do other groups of countries (Table 6).

### **Political and Institutional Considerations**

The European experience highlights the need for political commitment to a common currency and the time it may take to develop common institutions buttressing that commitment.<sup>5</sup>

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<sup>4</sup> This is somewhat in contrast with the studies on regional contagion, such as Glick and Rose (1999).

Moreover, EMU countries have very similar levels of economic and financial development. Per capita GDP (PPP-adjusted, 2000 data) is in a relatively tight range, between 16,000 U.S. dollars a year in Greece and 27,400 U.S. dollars in Belgium. This has made it easier to set up a currency union without engendering pressures for massive fiscal transfers or migration on a scale that might prove socially unsustainable.<sup>6</sup> By contrast, in Latin America, GDP per capita (PPP-adjusted, 2000 data) ranges from 2,200 U.S. dollars a year in Honduras to 11,000 U.S. dollars in Argentina. Even within Mercosur, GDP per capita is 4,000 U.S. dollars in Paraguay and 6,800 U.S. dollars in Brazil, still well below that of Uruguay (10,000 U.S. dollars) or Argentina. This suggests that a move toward the creation of a common currency would be a complicated and slow process for the Latin American countries.

One advantage of a common currency compared with individual currencies is it might make it easier to attain political consensus for central bank independence, and may even serve as a catalyst for other desirable policies, including fiscal discipline. Indeed, it is hard to imagine a common currency without durable guarantees of central bank independence. In the European case, independence of the individual countries' central banks was a precondition for EMU membership, and the European Central Bank itself has strong institutional guarantees of independence. Similarly, many policy-makers have been attracted by the discipline imposed by the Maastricht preconditions in the areas of monetary and fiscal policy. In principle, both central bank independence and monetary and fiscal discipline can be obtained by individual countries, but a common currency may serve as a useful political catalyst.

On the whole, under current conditions, an independent common currency for Latin America does not seem to be especially appealing. As always, however, it is important to bear in mind that conditions that determine the desirability of a common currency are to a certain extent endogenous. As mentioned above, initiatives to increase trade integration among Latin American countries would increase the appeal of a common currency, in addition to fostering economic growth in the region.

At any rate, an independent common currency in Latin America is not likely to emerge, at least not in the next decade. The alternative choice for abandoning the national currency would be “unilateral dollarization.” Unilateral dollarization does not require a long process of building common institutions and reaching consensus, which took decades in Europe. Moreover, with unilateral dollarization, fiscal transfers to mitigate country-specific shocks are just not an option, and the dollarizing country ends up with no say in setting monetary policy. Thus, while the move toward a common currency engendered widespread resistance among some sections of the public in several European countries, Ecuador and El Salvador were able to dollarize speedily and with no political resistance on the part of the United States’ public or authorities.

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<sup>5</sup> Bayoumi et al. (2000) provide a recent application of economic and political considerations to the desirability and feasibility of a common currency for the countries in South-East Asia. Similar considerations apply to Latin America.

<sup>6</sup> Net transfers within the EU have been fairly limited as viewed from the richer countries—which are also relatively large—although they amount to a few percentage points of GDP for some of the recipient countries, such as Greece and Portugal, which are relatively small.

#### **IV. Unilateral Dollarization**

We have seen that there is no obvious case to be made for dollarization on the basis of optimum currency area considerations. Nevertheless, dollarization may be appealing to those countries lacking credibility and where de facto dollarization has already reached high levels.

Some Latin American countries have already taken the decision to unilaterally adopt the US dollar as the legal tender currency. The classic case is Panama, which has used the US dollar since its creation in 1904. More recently, Ecuador adopted the dollar in 1999 in the midst of a financial and currency crisis, and El Salvador started to make the transition to full dollarization in a gradual way at end-2000 under more tranquil conditions. The dollarization option has also been considered by other Central American nations, who seem to be watching developments in El Salvador intently, and was intensely debated in Argentina until recently. In this section, we review the main pros and cons of dollarization for the various types of economies in Latin America.

##### **Monetary Credibility**

For many countries, the main gain that could be obtained from dollarization is to neutralize the domestic monetary institutions' poor credibility, which may have been caused by past violations of exchange rate pegs or bands, a history of soft financing of the fiscal deficit or the banking system, and high inflation. Such poor credibility and the related expectations of devaluation and/or inflation bring about chronically high ex-post interest rates when monetary discipline is maintained, and a high demand for foreign financial assets, implying capital flight or dollarization of domestic financial assets. In cases of extremely poor credibility, it may seem impossible to implement an independent monetary arrangement. Pegs or intermediate regimes involving some form of exchange rate commitment result in high interest rates with serious consequences for fiscal sustainability and private investment; a floating regime leads to high volatility of the exchange rate and episodes of overshooting, unless the central bank engages in an active defense of the exchange rate, thus undermining the principles of the floating currency regime itself.

Latin American countries have made progress in establishing credibility by making their central banks more independent and improving monetary discipline over the past decades. Many Latin American countries enacted new central bank laws in the 1990s that conferred relatively high levels of independence and accountability to the central banks. A number of Latin American countries—especially those that enacted new central bank reforms in the mid- and late 1990s—now score quite high on indices quantifying the degree of legal independence and accountability of central banks (Table 7). These indices are imperfect, because sometimes central banks operate de facto much more (or less) independently than their charters suggest. Nevertheless, the indices seems to correlate well with inflation over the last few years in this limited sample of countries.

However, it may take years to establish credibility. In fact, interest rates remain high despite the sharp decline in actual inflation during the last decade. In classic illustration of the “peso problem,” nominal interest rates are still high, owing to expectations of inflation (or devaluation). Ex-post real interest rates are above 10 percent (per year) on bank deposits in several South American countries while the surge in prices does not take place. The lack of

credibility increases finance costs also for the private sector, with negative effects on investment and growth. In addition, poor monetary credibility may increase the volatility of expected inflation, which in turn may increase the risk premium attached to domestic-currency debt (Ize and Levy Yeyati, 1998). This second effect is probably less important.

Sovereign default risk also contributes to increasing finance costs for the private sector. This is because rating agencies have traditionally applied a “sovereign ceiling” in their foreign currency ratings, implying that no private borrower could be rated higher than the national government. The logic is that, in a debt crisis situation, the government would apply capital controls and use the scarce foreign reserves to service their debts first. Standard and Poor’s (1997) concluded that it was not necessary to apply the sovereign ceiling in fully dollarized economies, such as Panama. Interestingly, it reached the same conclusion for countries, such as Argentina, where the US dollar was widely used in parallel with the domestic currency, even if one could conceive of situations where controls could be imposed to protect the banking sector in those cases as well.

There do not appear to be easy fixes to avoid higher private finance costs resulting from poor monetary credibility. Indexation of financial contracts to the inflation rate would seem to be helpful and has been used extensively in Chile, and to some extent in Brazil. However, policy makers in other countries have stayed away from financial indexation, fearing that its very existence would lead to its application to other types of nominal arrangements, such as wages. More importantly perhaps, if the relevant alternative assets for investors are foreign-currency denominated securities, indexation would not completely eliminate the need for high domestic interest rates to compensate for devaluation risk.

Thus, even in cases when an independent monetary regime is workable, credibility problems may still cause high financial costs for the government and the private sector, affecting investment and growth, and making defaults and financial crises more likely.

### **Spontaneous Dollarization**

Another manifestation of the lack of monetary credibility is that citizens want to hold U.S. dollars, not domestic currency. One form of this is capital flight; another is spontaneous, or “de facto” dollarization, that is, the holding of a large fraction of domestic monetary assets (bank deposits and cash) in foreign currency. Capital flight is difficult to conceptualize, let alone estimate. A suggestive, if incomplete, indicator is the volume of deposits held by the non-bank private sector abroad with banks that are part of the BIS reporting system (Figure 2). These cross-border deposits rose steadily in the 1980s, but the trend reversed for many countries approximately at the time when they reduced their debts through Brady deals.<sup>7</sup> After the Mexican crisis, however, the increase in deposits held abroad resumed. At present, the volume of deposits abroad is substantial for most Latin American countries, typically ranging between 5 and 15 percent of GDP.

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<sup>7</sup> A possible explanation of this turning point is that the deposits abroad were needed as collateral for international trade finance during the debt crisis years.

Foreign-currency denominated deposits are very large in many Latin American countries, particularly Bolivia, Peru, and—before their recent “pesification”—Argentina (Table 8). Anecdotal evidence suggests cash holdings of U.S. dollars are widespread in several Latin American countries. While investors may hold foreign-currency denominated assets for “normal” portfolio diversification reasons, it is overwhelmingly plausible that the main motivation in Latin America is the lack of monetary credibility. Indeed, this is in contrast to the “home bias” observed in advanced economies.

Moreover, corporations also show a preference to borrow in foreign currency. The reasons for this may be manifold, including insufficient development of domestic financial markets, and companies trying to take advantage of implicit official guarantees. Jeanne (2002) raises the possibility that, when the risk premium attached to domestic debt is very high, companies may be forced to take foreign-currency denominated debt because they would risk bankruptcy if they held high interest, domestic currency debt.

One important implication of a high degree of spontaneous dollarization is that large changes in the exchange rate can bring about a financial sector crisis and large-scale corporate bankruptcies. Even if commercial banks were well matched in terms of the currency denomination of their assets and liabilities, a large devaluation would shift many dollar loans into nonperforming status. It has been argued that, absent an exchange rate peg and implicit or explicit government guarantees, and helped by appropriate prudential regulations, banks and corporations would hedge their foreign exchange positions (Goldstein, 2001). However, it is not clear that the exchange rate risk could be hedged for the country as a whole. In the aggregate, it would be necessary for foreigners with “deep pockets” to provide exchange rate insurance and bear all the risk. For reasons that perhaps are not well understood, foreign investors seem to be resistant to doing so, implying that emerging market countries by and large cannot borrow internationally in their own currency. Presumably, the difficulties are worse for small countries, with high information costs for international investors.

If hedging the foreign exchange risk with international markets is not possible, the central bank will be forced to limit fluctuations in the exchange rate. Although countries rarely pursue “pure” floats (nor should they), there are occasions when large changes in the exchange rate would be justified. With the risk of heavy losses in the banking sector, however, the central bank will have to be extremely cautious about allowing large exchange rate adjustments.

In conclusion, the appeal of complete dollarization is greater for countries already displaying high (and not reversible) spontaneous dollarization. For these countries, any floating exchange rate regime would fail to provide much real flexibility; the seigniorage loss of giving up the domestic currency would be relatively small; and dollarization would likely reduce uncertainties in the financial sector.

### **Advantages of Integration**

A key advantage that dollarization may bring about is to encourage greater economic integration with the United States. There is evidence that a common currency encourages bilateral trade. Engel and Rogers (1996) find that Canadian provinces tend to be more integrated among themselves than with U. S. states that are geographically closer: price differences for similar goods much higher for two cities located in different countries than for two equidistant cities in

the same country; similarly, Canadian provinces trade 20 times more among themselves than with nearby U. S. states. One of the factors explaining this is probably the use of a common currency. More significant, using a large panel of countries, Rose (2000) and Frankel and Rose (2002) find that a common currency may increase bilateral trade flows between countries by as much as four times. These estimates look extremely high, and indeed their robustness has been challenged. Klein (2002) finds that, while there is a large bilateral trade effect in Rose's equations in flows between developing countries, there is no significant effect on the bilateral trade between the United States and developing countries that use the dollar as currency.<sup>8</sup>

Dollarization may also be expected to increase economic relations more generally with the United States, including higher foreign direct investment and greater financial market integration. In fact, one of the most profound effects of Panama's dollarization is the close integration of its banking system with that of the United States and indeed with the rest of the world.

Finally, it is an open question whether dollarization, by ruling out potential recourse to the inflation tax, could foster financial discipline in government. In fact, the higher degree of credibility afforded by dollarization could be used to finance more expansionary fiscal policies and more risk-taking in the financial sector. While the cost of a crisis would be higher, the probability of falling into a crisis would be perceived to be smaller, and this could encourage governments to take higher risks. The net impact of dollarization is not clear in this respect.

### **How It All Adds Up**

The ideal candidate for dollarization would be a small economy, with close trade and economic links with the United States, a high degree of spontaneous dollarization, and poor credibility of the monetary authority. Not many countries fit the bill. Mexico and countries in Central America tend to be much more integrated with the United States, but typically they also have fewer credibility issues and less spontaneous dollarization. For these countries, the key will be to find out how large the benefits of dollarization may be in terms of higher integration with the United States, when firm conclusions can be drawn from the cases of Ecuador and El Salvador. Many countries in South America have credibility problems, but may also benefit substantially from exchange rate flexibility. For them, the test will be whether floating regimes with inflation targeting can build up the requisite credibility to run an independent monetary regime without creating an undue burden on the domestic economy.

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<sup>8</sup> Other authors show that methodological changes reduce the impact of a common currency on trade compared with Rose's (2000) estimates. Tenreyro (2001) endogenizes the choice to belong to a currency area. Persson (2001) takes into account that countries belonging to currency unions are massively smaller than countries not belonging to currency unions. On the other hand Parsley and Wei (2001) find supportive evidence for a strong effect of currency unions by looking from another direction. They find that the law of one price for traded goods holds significantly more closely across cities that have a common currency; the effect is much larger than that of reducing currency volatility per se.

## V. Floating Exchange Rates

Is a floating exchange rate regime a viable option for the countries of Latin America? In our view, a floating exchange rate regime precludes neither substantial intervention in foreign exchange markets, nor close attention to the exchange rate in conducting monetary policy, as long as the nominal exchange rate moves frequently and substantially in response to market forces, and the authorities do not set a particular level or path for the exchange rate. Our reading of the evidence is that, while there is much truth to the “fear of floating” claim that emerging markets do not float like the U.S. or Japan, in many cases they also float usefully and meaningfully to some extent, in that their exchange rates do indeed move around substantially and usefully in response to important shocks.<sup>9</sup>

Indeed, the key question we focus on is whether flexibility in exchange rate and monetary policy achieves meaningful domestic objectives. To address this question, we briefly review the experience of a few emerging markets over the latter half of the 1990s. We then look at the available systematic evidence. We review the literature on how a floating exchange rate should respond to various shocks, noting how various conditions specific to emerging markets, in particular lack of credibility and financial fragility, might modify this optimal response. We then examine available evidence on whether emerging market exchange rates and monetary policy appear to be useful tools of countercyclical and anti-inflationary policy.

Even if monetary policy flexibility is valuable, it may be too costly, in two respects. First, the lack of credibility associated with a floating exchange rate may imply higher real interest rates, perhaps due to a “peso problem” of a looming if never realized collapse. Second, unstable expectations or unruly markets may generate excessive exchange rate volatility in emerging market floats. We briefly look at some evidence on these questions at the end.

### Individual Country Anecdotes

We compare Argentina (a hard peg) with Mexico, Chile, and Peru (all floating, to varying degrees), and Hong Kong (a hard peg) with Singapore (a managed float), during the turmoil period of the late 1990s. For each of these countries, we show the inflation rate, the real effective exchange rate, and real GDP growth (year over year) in the top panel and the level of the nominal and real interest rate and the change (year over year) in the real effective exchange rate in the bottom panel, for 1996–2001.

In **Argentina** (Figure 3a) the price level and the real exchange rate remained unsurprisingly stable, and the still strong credibility of the currency board kept interest rates flat through the turmoil of the Russia, LTCM and Brazil crises of 1998/1999. Only real GDP growth was adversely affected, with consequences that persist to this date.

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<sup>9</sup> Roubini (2001), Edwards and Savastano (1999) and Eichengreen (2002) provide useful discussions of general exchange rate issues for emerging markets; the latter concentrates on the same issues of concern to us in this section.

**Mexico's** (Figure 3a) response in 1998/1999 is strikingly different. While interest rates did spike up, the exchange rate was also allowed to weaken substantially. Real GDP growth dipped but resumed in 1999, and the exchange rate appreciated rapidly back up.<sup>10</sup> Two other points emerge from the figures. First, real rates have been quite low since the turmoil of 1998/1999, falling below 5 percent in 2001 when Mexico followed the recession in the United States. Second, inflation in Mexico has come down well below 10 percent. On the whole, Mexico's monetary policy has been flexible enough to allow interest rates to respond to cyclical downturns, taking advantage of the prevalence of lower inflation.

**Peru** (Figure 3b) confirms some aspects of this story. Even this highly dollarized economy responded to the shocks of 1998/1999 through a combination of higher interest rates and a substantial, and in this case prolonged, depreciation in the real exchange rate. The outcome for growth was, however, not as cheerful as in Mexico, probably because of the weaker impulse from the strong U.S. economy. In contrast to Mexico, the authorities seem to have first attempted to raise interest rates without letting the exchange rate go, only subsequently allowing the weakening. In the event, inflation did not pick up much following the depreciation.

**Chile's** (Figure 3b) story is also similar, but the response of interest rates seems to have been higher relative to that of the exchange rate, and the recession is sharper. Chile went through two episodes of exchange rate pressure, in 1999 and 2000. In the first episode, interest rates increased sharply, in the context of a monetary framework with objectives on both inflation and the exchange rate (an explicit band). In September 2000 the authorities abandoned the band for freer floating. Thus in the second episode, the sharp depreciation was not accompanied by any interest rate increase. As with the other countries, inflation did not rise much in response to this depreciation, and the economy recovered from the recession. One can perhaps infer from this experience either that Chile accrued credibility in 1999, using it in 2000, or that Chile learned not to fear floating.

The comparison between Hong Kong and Singapore suggests a parallel with that between Mexico and Argentina. In **Hong Kong** (Figure 3c), the adjustment was, at least initially, in the form of higher interest rates and a large output drop. By contrast, **Singapore** (Figure 3c) displays a sharp nominal and, eventually, real effective depreciation, with moderate monetary tightening and no recession. Three differences with Mexico/Argentina are worth noting. First, Singapore allowed only a brief and fairly modest interest rate response. Second, one cannot attribute its strong growth performance to its location. Third, Hong Kong's flexibility and small economic size resulted in a large, though lagged, disinflation that ultimately led to a substantial real exchange rate adjustment.

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<sup>10</sup> On Mexico's experience during this period, see Carstens and Werner (1999). It is striking to note the strong trend appreciation in the real exchange rate through the period under examination. It might be noted that this follows the sharp real depreciation of 1995. Of course Mexico benefited from the strong growth in the United States during this period, but the deviation in the real exchange rate from the trend appreciation is perhaps all the more remarkable.

This anecdotal evidence suggests several tentative observations. (I) Floating countries do allow exchange rates to move in response to shocks, though sometimes interest rate responses are also sharp. (II) Exchange rate flexibility seems to have been helpful in cushioning output despite adverse shocks. (III) Peru's high degree of dollarization did not preclude some exchange rate response. (IV) At least for Mexico, real interest rates seem to have declined recently in response to the recession. (V) Pass-through seems to have been relatively low following exchange rate adjustments in floating countries. (VI) Hong Kong's price flexibility and small economic size clearly make it a more plausible candidate than Argentina is for a hard peg. (VII) Floating regimes seem to become gradually more effective over time, as evidenced by the case of Chile.

This perusal of cases can hardly be definitive, and others will no doubt look at these episodes differently.<sup>11</sup> We now turn to more systematic evidence regarding the effectiveness of floating exchange rates in emerging markets.

### The Taylor Rule as a Benchmark for Monetary Policy

Much of the discussion of design of optimal policy, especially for advanced economies, has focused on Taylor rules in recent years, following Taylor (1993). In this framework, monetary policy follows a rule of the form:

$$i_t^* = i^* + \beta(E\{\pi_{t,k}|\Omega_t\} - \pi^*) + \gamma E\{x_{t,k}|\Omega_t\}$$

where  $i_t^*$  is the target rate for the monetary policy instrument (for example, an overnight nominal interest rate),  $\pi_{t,k}$  is inflation between periods  $t$  and  $t+k$ ,  $\pi^*$  is the desired inflation rate,  $x_{t,k}$  is the output gap (that is, the gap between desired and actual output) between  $t$  and  $t+k$ .  $E$  is the expectations operator, with  $\Omega_t$  the information available to policy-makers as of time  $t$ .  $i^*$  is then the desired rate for the monetary policy instrument that would prevail when both inflation and output are at desired levels.<sup>12</sup>

This formulation is quite general: it says that the policy maker tries to move the monetary policy instrument so as to achieve some success at both keeping inflation on track and at reducing the output gap. The instrument usually is the interest rate, but it could be a monetary aggregate as well.<sup>13</sup> The values of the coefficients  $\beta$  and  $\gamma$  are useful summaries of policy. On the standard view that higher real interest rates contract both output and inflation, a coefficient of  $\beta$  above 1

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<sup>11</sup> For example, Hausmann et al. (1999).

<sup>12</sup> This discussion follows quite closely Clarida, Galí and Gertler (2000).

<sup>13</sup> Taylor (2000) notes that a monetary instrument may make more sense when uncertainty about money velocity is lower than uncertainty about real interest rates, or when real shocks (such as export demand shocks) are large, as is likely to be the case for emerging markets.

suggests that policy will be stabilizing for inflation. Similarly, a coefficient of  $\gamma$  above 0 would be stabilizing for output.<sup>14</sup> Strict inflation targeting would be a restricted form of equation (1), in which the weight on the output gap is zero. (The output gap would still be in  $\Omega$ , so it would still matter for policy, a point to which we return below.)

A policy of the general Taylor-rule sort can be derived for a central banker in a closed economy who has a quadratic loss function in deviations in inflation and output from their targets, in an economy with nominal price rigidities. More generally, the Taylor rule benchmark is buttressed by the observation that the rule has provided a reasonably accurate way of describing how advanced economy central banks behave, notably those of the United States, Germany and Japan.

This theoretical literature was developed with reference to closed economies. It seems, however, that much of the closed economy story remains in open economies with floating exchange rates. The most obvious complication is the effect of the exchange rate, which provides additional channels for monetary policy to operate. The main effect is that interest rate contractions now affect inflation more rapidly through the exchange rate appreciation they induce, while their contractionary effect on output is also enhanced by the appreciation. Thus, smaller changes in the interest rate are appropriate for a given deviation from equilibrium values of output and inflation.<sup>15</sup> Nevertheless, a strict Taylor rule formulation would include the exchange rate only to the extent that, as part of  $\Omega$ , it helps predict inflation or output gaps.

### The Taylor Rule in the Tropics

Can emerging markets float meaningfully and run their an independent monetary policy along the lines of a strict Taylor rule? Three factors may make it impractical for emerging markets to do so: lack of policy credibility, high inflation pass-through, and financial fragility with respect to exchange rate movements. First, lack of credibility of the central bank may lead markets to interpret any loosening as a permanent shift towards higher inflation, implying that there is no benefit to discretion. Second, high inflation pass-through may imply that exchange rate devaluations end up being predominantly inflationary, rather than expansionary. (High pass-through may itself result from lack of credibility, as wage and price setters interpret exchange rate depreciations as signaling a loosening of monetary policy, rather than a change in relative prices.) Third, exchange rate movements may have adverse real effects through the balance sheets of banks, firms, and the government.

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<sup>14</sup> It may help to note that the Taylor equation can be rewritten as:

$r_t^* = r^* + (\beta - 1)(E\{\pi_{t,k} | \Omega_t\} - \pi^*) + \gamma E\{x_{t,k} | \Omega_t\}$ , where  $r_t^*$  is the ex ante real interest rate and  $r^*$  is the long run equilibrium real rate of interest.

<sup>15</sup> Eichengreen (2002) shows this in a very simple model. Svensson (2000) reaches broadly similar conclusions based on simulations of a much more elaborate framework.

Thus, with poor credibility and high pass-through it is difficult for a central bank to float and operate an independent monetary policy for domestic objectives. The implications of balance sheet effects for monetary policy are more complicated, though the basic closed economy results are likely to endure. The most obvious implication, that devaluations are less strongly expansionary, does not undermine the closed economy logic of the Taylor rule. Two further complications may have the stronger implications. First, the output effects of devaluations may be highly nonlinear (with large devaluations having dramatically different effects); the optimal response during crises might thus be different. Second, the authorities may care about the financial state of the banking sector beyond its implications for output and inflation (say for fiscal reasons). In either case, the central bank might pay attention to the exchange rate even beyond the extent to which it helps predict inflation and the output gap.<sup>16</sup>

Do emerging market floaters follow a form of Taylor rule similar to that in the equation above? Table 9 reports the results obtained for Chile and Peru, from Corbo (2000) and Morón and Castro (2000), respectively. For comparison, (Table 9 lines 1 through 4) reports the baseline estimates for the G3 countries, drawn from Clarida, Galí and Gertler (1997).<sup>17</sup>

The evidence is not conclusive but is consistent with the view that these emerging markets made effective use of monetary policy. The coefficient  $\beta$  for Chile is above 1 and is roughly comparable to that of the G3. Thus, Chile seems to have been able to manipulate its real interest rate in response to expected inflation. Similar results apply to Peru with respect to the money supply. The coefficient  $\gamma$  is closer to zero for both Chile and Peru, so that there is little evidence that the authorities respond to the output gap directly, beyond its implications for price pressures.<sup>18</sup> Nevertheless, even with a zero coefficient on the output gap, a regime in which the authorities respond only to inflation is still more countercyclical than a hard peg or dollarization, where uncovered interest parity suggests that the real interest rate increases when inflation is low. At the same time, neither Chile nor Peru seems to target exclusively inflation and the output gap: in Chile, there is evidence that the central bank also targets the current account deficit (indeed, this is an announced objective of the central bank); in Peru, deviations of the real exchange rate from trend seem to be resisted by the authorities.

These results are inevitably tentative. Compared to the developed country examples, the time series are short and the monetary policy regimes are changing during the sample, as we noted in the section above specifically for Chile. For Peru, Morón and Castro (2000) argue that during the turmoil of 1998/1999 the authorities were especially careful to avoid depreciation, and they show

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<sup>16</sup> See Eichengreen (2002) and Céspedes, Chang and Velasco (2001) for further discussion.

<sup>17</sup> The results for the G3 confirm that central banks have since the 1980s raised (expected) real interest rates when inflation was high and lowered them when output was below equilibrium. The Fed seems to have given more emphasis to output after the initial disinflation period of 1979 through 1982 (line 4).

<sup>18</sup> It might be interesting to examine the first-stage regressions that underlie these results, i.e, the extent to which shocks such as foreign interest rates, the terms of trade, or the exchange rate itself affect expected output and inflation.

econometrically that the revealed aversion of the authorities to exchange rate weakness was especially strong during that period. Nonetheless, their results also show some counter-cyclical response. In addition, it is often more difficult to identify the instrument of monetary policy in emerging markets, most notably where the authorities attempt to control a monetary aggregate but do so only imperfectly at all horizons.<sup>19</sup>

## **Response to Important Shocks**

A complementary approach to looking at Taylor rules is to ask whether emerging market floaters respond appropriately to important shocks to exogenous variables, such as the terms of trade and foreign interest rates.

### *Terms-of-trade shocks*

Under floating rates, a negative shock to the terms of trade shocks should depreciate the exchange rate.<sup>20</sup> An appropriate response for the monetary authorities would be to “lean against the wind,” in an attempt to keep inflation in check. The increase in interest rates should be limited however, as the negative terms-of-trade shock would also increase the output gap (see the second term in the equation above). To the extent that emerging markets central bank lack credibility, face high pass-through, or view devaluations as contractionary, a sharper interest rate response and a more limited depreciation might be appropriate.

There is evidence that emerging market floating exchange rate countries do, in fact, usefully depreciate in response to negative terms of trade shocks. Broda (2000) looks at a sample of 73 developing countries since 1973 and examines whether the response of real GDP, the real exchange rate and inflation to terms of trade shocks differs systematically across exchange rate regimes. He finds that, in response to negative terms of trade shocks, fixed exchange rate regimes suffer large and significant losses in terms of real GDP growth and display real exchange rate depreciations only after two years. By contrast, floating exchange rate countries display immediate large nominal and real depreciations, some inflation, and much smaller output

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<sup>19</sup> Edwards and Savastano (1998) attempt to estimate a monetary policy reaction function for Mexico in 1996–97, using somewhat different techniques. Hausmann et al. (1999) regress real interest rates on the output gap for a few emerging markets, and typically find a negative coefficient, implying higher real rates during recessions. At the same time, they find similar results for the United States. However, numerous other studies using more complete, Taylor-type regressions for the U.S. find that monetary policy seems to be countercyclical, thus casting doubt on the simpler Hausmann et. al methodology.

<sup>20</sup> Chen and Rogoff (2001) point out that in many plausible models the nominal exchange rate should depreciate with negative terms of trade shocks. With sticky domestic prices, for example, a permanent increase in the terms of trade will call for an almost corresponding appreciation to keep the relative price of domestic goods in line. In the Dornbusch (1976) model, similarly, a permanent change in the terms of trade requires full adjustment of the nominal exchange rate, in order to reproduce the flexible price equilibrium.

losses.<sup>21</sup> Broda (2000) shows that emerging market floaters with a high degree of de facto dollarization (using data from Baliño et al., 1999) do not look different in this regard.

A complementary approach considers how the nominal exchange rate responds to long-run trends that affect the equilibrium real exchange rate. One potential advantage of floats, compared with pegs, might be that they would permit the real exchange rate to trend without demanding changes in the price level. Chen and Rogoff (2002) examine the long-run relationship between the real exchange rate and real commodity prices for three small open developed countries, Canada, Australia and New Zealand. They find that world real commodity prices have a strong and fairly stable relationship with the real exchange rate of New Zealand and Australia, while the result is less clear for Canada. A long depreciating trend in the Australian real exchange rate is related to a similar downward trend in the real commodity prices of Australia's main exports. In the absence of a floating exchange rate, Australia would have had to experience deflation to achieve a similar adjustment.

This type of result seems to hold for some emerging markets as well. In more recent work, Cashin and Sahay (forthcoming) show that the real (and nominal) depreciation of the South African rand over the two decades since 1979 is explained by a continued decline in the real price of South Africa's commodity exports. It will be interesting to see if these results extend to other emerging markets.

### *Foreign Interest Rate Shocks*

An increase in foreign interest rates will, like a negative terms of trade shock, tend to depreciate the exchange rate and hence cause inflation, prompting the monetary authorities again to raise interest rates. At the same time, since the domestic interest rate hike would itself tend to reduce output, the monetary authority should "lean against the wind" but should permit some depreciation.<sup>22</sup> Permanent shocks to foreign interest rates should be more fully offset, as inflation will not tend to come down over time in the absence of a reduction in output. More generally, uncovered interest parity implies that a permanent increase in the foreign interest rate requires, in the long run, a corresponding increase in the domestic interest rate to maintain a stable inflation rate and output gap, independent of the exchange rate regime.<sup>23</sup>

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<sup>21</sup> Negative terms of trade shocks above 3 percent of GDP lead to real output declines of 2 percent the first year and 7 percent cumulative over three years in countries with pegged regimes, compared to an average 1 percent decline the first year and 2 percent cumulative in countries with floats. The real effective exchange rate depreciates by only 2 percent in the fixed regime in the first year, and 4 percent overall, compared to a 7 percent depreciation on impact and 11 percent overall in countries with floats. Inflation is also somewhat higher in floats.

<sup>22</sup> These points are made by Eichengreen (2002) informally and by Parrado and Velasco (2001) in an optimizing model of a small open economy in the Obstfeld and Rogoff (1996) tradition.

<sup>23</sup> Eichengreen (2002) emphasizes these points.

Hausmann et al. (1999) find that the reaction of domestic rates to U.S. rates is not significantly different across exchange rate regimes, using monthly data from 1960 to 1998 for 11 emerging markets. Moreover, using daily data for 1998-99 for Mexico, Venezuela and Argentina, they find that the reaction of domestic interest rates to the international risk premium is highest in Mexico, the country with the most flexible exchange rate regime. In a more comprehensive study, Frankel, Schmukler and Servén (2000) regress quarterly and monthly domestic interest rates in several emerging market countries on the U.S. Federal Funds rate, along with several controls. They find mixed results: floats seem to have some insulating properties in their full sample, but not in a restricted sample consisting of the developing countries in the 1990s alone.

An alternative perspective is provided by Borensztein, Zettelmeyer and Philippon (2001), who examine the response of domestic interest rates and exchange rates to shocks to the U.S. Fed Fund rate and the risk premium on emerging market debt in a small sample of polar extreme regimes (Hong Kong, Singapore, Mexico and Argentina) as well as developed country floaters such as Australia, Canada and New Zealand for comparison. They attempt to identify the effects of surprises to the U.S. Fed Fund rate, rather than any movements in the rates that may reflect underlying factors affecting both emerging markets and the U.S. Moreover, they employ a dynamic specification to identify impact as well as long-run effects, a potentially important difference given that the optimal response to permanent and temporary shocks is likely vary, as we have seen. They find that interest rates in Hong Kong seem to react one-for-one to U.S. monetary policy shocks. By contrast, interest rates in Singapore increase by about 0.3 basis points to a 1 basis point increase in U.S. interest rates, and Singapore's exchange rate depreciates somewhat. In these respects, Singapore thus looks very much like advanced country floaters such as Australia, Canada and New Zealand. The estimates for Mexico are less precise, making it difficult to discern a significant difference compared with Argentina. Thus this study does not confirm the result by Hausmann et al. (1999) that shocks to U.S. interest rates cause interest rates in Mexico to rise more than they do in Argentina. At the same time, it remains clear that the Mexican exchange rate does depreciate in response to U.S. interest rate shocks, consistent with the results in Frankel, Schmukler and Servén (2000).

### **Inflation Pass-through**

Pass-through has been moderate in Mexico, Brazil, Russia, and other emerging markets that have recently undergone extremely large devaluations. This is confirmed by our country anecdotes reported above. More systematic analyses (Borensztein and De Gregorio, 1999; Goldfajn and Werlang, 2000) find that pass-through tends to be limited where output is below potential, the real exchange rate is initially misaligned, and the initial rate of inflation is low. This suggests that, in less extreme conditions, pass-through may be low where countries have established a track record of credibility with respect to their monetary policy in the context of a floating exchange rate

We present some simple evidence on this conjecture for Mexico. We estimate inflation pass-through by regressing (the log of) prices on past prices and current and past exchange rate levels in a two-variable VAR. Figure 4 shows how an innovation of one percent in the exchange rate passes through into changes in the price level over time. The upper curve is based upon estimates for 1995-98, while the lower curve is based upon estimates for 1999-2001. While these results

are tentative, they suggest that pass-through has become more moderate in Mexico as its float (introduced during the crisis of 1995) gained credibility over time.<sup>24</sup>

### **Do emerging markets pay a large price in terms of credibility or volatility?**

Using a variety of approaches, we have presented evidence suggesting that emerging market floaters are often able to loosen monetary and exchange rate policy when this seems appropriate (e.g., in response to adverse external shocks). Does this flexibility impose a price in terms of higher inflation, higher real interest rates, or higher exchange rate volatility?

First, floating regimes, which may themselves have become more popular in response to the decline in inflation, do not seem to have led to a resurgence of inflation.<sup>25</sup> Second, there is tentative evidence that emerging market floaters suffered from chronically higher real interest rates as a result of lower credibility. Hausmann et al. (1999) find that, even looking at lower inflation periods only, real interest rates were significantly higher in floating rate countries than in fixed rate countries in the 1990s (9 percent versus 5 percent). Ghosh et al. (1997), in a much broader sample, also find somewhat higher real interest rates in floats than in pegs, although they find no systematic difference in economic growth across regimes. At the same time, it is difficult to disentangle the cases of countries that attempt to peg but are unable to sustain the peg because of inconsistent policies from those of countries that float as a deliberate choice. For the latter cases, it would be interesting to explore whether floaters gain credibility over time.

Third, is exchange rate volatility excessive in emerging market floaters? For advanced economies, there is evidence that volatility is largely unrelated to fundamentals. For example, Flood and Rose (1995) find that the only economic variable whose behavior depends systematically on the exchange rate regime is the real exchange rate, which is much more volatile in floats. There is no sign that the exchange rate volatility associated with floats achieves lower volatility in some other dimension (such as interest rates).<sup>26</sup> For emerging markets, “fear of floating” considerations seem to lead most floaters to curb exchange rate volatility by increasing the volatility of interest rates and reserves. As a result, exchange rate volatility in Mexico has not been out of line with that observed in developed country floats, after the immediate post-crisis period of 1995 (Edwards and Savastano, 1998), despite presumably larger shocks in Mexico.

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<sup>24</sup> Carstens and Werner (1999) present further evidence to this effect.

<sup>25</sup> There is a debate on whether some monetary policy approaches (such as strict inflation targeting) in the context of floating are more effective than others. Corbo et al. (2001) discuss this issue with a special focus on emerging markets.

<sup>26</sup> Jeanne and Rose (2000) suggest in a model how “noise traders” could explain this result. Flood and Rose (1999) instead focus on how volatility in the exchange rate can be self-fulfilling in that it can generate high and volatile risk premia that, in turn, justify the exchange rate volatility. In this context, a *credible* peg could fix expectations around the stable equilibrium and reduce volatility in the exchange rate without increasing volatility elsewhere in the economy.

## **VI. Conclusions**

We have reviewed the relative merits of various monetary regime options for Latin American countries, along the spectrum ranging from the adoption of a common or foreign currency, to a floating exchange rate regime for individual countries.

From the optimal currency area literature, a high degree of integration promises large gains from trade and few costs to forgoing monetary policy independence to countries that share a common currency. An independent common currency for Latin American countries does not seem to be especially desirable on the basis of these considerations. Especially for countries that are highly integrated in global financial markets, the choice in the near term increasingly seems to be between dollarization and floating, with a big question mark on exactly how free that floating can be and ought to be.

There is no obvious case for dollarization on the basis of optimum currency area considerations. Nevertheless, dollarization may be appealing to those countries lacking credibility and where de facto dollarization has already reached high levels. Thus, the ideal candidate for dollarization would be a small economy, with close trade and economic links with the United States, with a high degree of spontaneous dollarization and poor credibility for the monetary authority. The most likely candidates tend to be in Central America. These countries will be keen to observe whether Ecuador and El Salvador draw large benefits from dollarization in terms of higher integration with the United States.

Many countries in South America have more credibility issues, but may also draw larger benefits from exchange rate flexibility. Countries such as Brazil, Chile and Colombia seem relatively well suited to float. There is much debate whether emerging markets can meaningfully and usefully float. In our view, this is clearly a possibility. A useful and meaningful float is not necessarily an absolutely pure float. Indeed, emerging markets seldom conduct pure floats: they often intervene in the foreign exchange market and regularly conduct monetary policy keeping a close eye on foreign exchange rate developments. But so do advanced country floaters, including strict inflation targeters—to the extent that the exchange rate determines inflation expectations. But what is important is that exchange rates and interest rates seem to move in useful ways. First, emerging markets with floating exchange rates seem on the whole to respond to terms of trade shocks with appropriate adjustments in the exchange rate and relative prices, adjustments that would be painful if they had to take place directly through changes in nominal prices instead. Similarly, there is tentative evidence that emerging market floaters allow interest rates to fall in response relatively low inflation and to cuts in foreign interest rates.

Some countries could fit in either extreme. Mexico's close trade relations with the United States may suggest the desirability of a move to a currency union, or even unilateral dollarization, at some stage in the future. However, the Canadian model of floating despite tight integration with the United States seems to have been successful. Other countries currently fit neither extreme. Argentina has neither the credibility that would make floating easy, nor the close integration with the US that would argue in favor of dollarization. While floating is probably Argentina's most viable option at this stage, the road ahead looks difficult either way.

We have painted a fairly static picture, but successfully maintaining a given regime may make it more and more viable as time goes by. If floating regimes continue to deliver low inflation, thus

gaining further credibility, one can hope that they will gradually become even more effective. Indeed, wage indexation may disappear and inflation expectations may cease to be backward-looking.<sup>27</sup> Firms may reduce their vulnerability to exchange rate fluctuations by altering their financial structure to minimize balance sheet effects.<sup>28</sup> As shown above, some hint of such improved credibility is evident for Chile and Mexico in recent years. At the other extreme, dollarization may promote additional trade liberalization and greater integration with the United States for countries such as Ecuador and El Salvador, thus further increasing the appeal of dollarization in the future.

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<sup>27</sup> Corbo et al. (2001) argue that this has been observed in Latin American inflation targeters in the 1990s.

<sup>28</sup> Eichengreen (2002) makes the point that, even if the economy on the whole cannot reduce its exposure to foreign-currency-denominated debt, firms can rearrange it so as to minimize risks. Martinez and Werner (2001) find that Mexican firms reduced foreign currency mismatches in their borrowing after Mexico moved to a float.

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Table 1. Exchange Rate Regimes and Monetary Targets: South America and Central America, 1985-2001.

	1985	1990	1995	2001	Target playing a role in 2001
South America					
Argentina	Intermediate	Float	Hard Peg	Hard Peg	--
Bolivia	Float	Intermediate	Intermediate	Intermediate	exchange rate
Brazil	Intermediate	Intermediate	Intermediate	Float	inflation rate
Chile	Intermediate	Intermediate	Intermediate	Float	inflation rate
Colombia	Intermediate	Intermediate	Intermediate	Float	inflation rate
Ecuador	Intermediate	Intermediate	Intermediate	Hard Peg	exchange rate
Paraguay	Intermediate	Float	Float	Float	--
Peru	Intermediate	Float	Float	Float	monetary aggregate
Uruguay	Float	Intermediate	Intermediate	Intermediate	--
Venezuela	Intermediate	Float	Intermediate	Intermediate	exchange rate
Central America					
Costa Rica	Intermediate	Intermediate	Intermediate	Intermediate	exchange rate
El Salvador	Intermediate	Intermediate	Intermediate	Hard Peg	exchange rate
Guatemala	Intermediate	Float	Float	Float	--
Honduras	Float	Intermediate	Intermediate	Intermediate	exchange rate
Mexico	Intermediate	Intermediate	Float	Float	monetary aggregate
Nicaragua	Intermediate	Intermediate	Intermediate	Intermediate	exchange rate
Panama	Hard Peg	Hard Peg	Hard Peg	Hard Peg	exchange rate

Source:

*Exchange Arrangements and Exchange Restrictions*, Annual Reports, International Monetary Fund, 1985-2001.

Notes:

The IMF classification is based on countries' self-reporting. Since 1998, the classification incorporates the IMF staff's views. The data prior to 2001 in this table has been corrected on the basis of the IMF staff's views. In early 2002, Argentina and Venezuela moved to floats. Hard pegs include currency unions and currency board arrangements. Intermediates include pegged horizontal bands, conventional fixed peg arrangements, crawling pegs and crawling bands. Floats include managed floats and independent floats.

Table 2. Integration in Global Financial Markets: Latin American Countries, 1980-1999.

	Emerging Market	Capital controls 1990-1999	De facto openness		Trade Openness	
			1980-1989	1990-1999	1980-1989	1990-1999
South American Countries						
Argentina	yes	1.0	4.0	11.6	7.8	9.5
Bolivia	no	1.7	10.4	9.0	25.9	22.4
Brazil	yes	4.0	4.4	6.4	9.1	9.0
Chile	yes	3.3	13.6	15.6	25.9	29.7
Colombia	yes	3.3	5.0	6.1	14.3	17.9
Ecuador	yes	2.0	10.4	7.0	23.2	28.7
Paraguay	no	1.0	5.4	3.8	23.2	46.6
Peru	yes	0.3	5.4	6.4	11.8	15.0
Uruguay	no	0.3	10.1	7.4	24.1	19.8
Venezuela	yes	1.0	5.2	17.1	22.5	25.7
Median		1.3	5.4	7.2	22.9	21.1
Weighted average		1.8	5.2	9.2	12.0	13.4
Central American Countries						
Costa Rica	no	0.3	8.6	6.4	35.9	41.4
El Salvador	no	0.7	3.4	4.1	24.5	27.2
Guatemala	no	1.0	4.4	5.1	18.9	21.6
Honduras	no	2.3	5.7	6.4	29.3	43.6
Mexico	yes	1.0	4.8	8.4	14.7	24.5
Nicaragua	no	0.3	8.4	29.7	26.4	45.9
Panama	no	0.0	203.2	49.6	34.9	38.1
Median		0.7	5.7	6.4	26.4	38.1
Weighted Average		1.0	8.0	8.8	16.1	25.4
Asian Emerging Markets						
Median		1.8	4.3	7.6	24.0	30.5
Weighted Average		2.5	3.5	6.9	17.7	24.4
European Emerging Markets						
Median		2.2	4.6	8.9	31.8	38.8
Weighted Average		2.2	2.7	8.6	26.9	30.0
African and Middle Eastern Emerging Markets						
Median		2.7	6.3	7.8	31.4	36.6
Weighted Average		1.9	6.1	6.5	37.8	32.5
All Emerging Markets						
Median		2.0	5.4	8.2	27.1	31.9
Weighted Average		2.2	4.5	8.4	19.9	24.1

## Sources:

International Financial Corporation; *Exchange Arrangements and Exchange Restrictions* and *International Financial Statistics*, International Monetary Fund.

## Notes:

The index of capital controls ranges from 0 to 4 and it is the sum of four dummy variables that take the value of one if the country has (a) multiple exchange rates, (b) current account restrictions, (c) capital account restrictions, (d) export proceeds surrender requirements, respectively.

De facto openness to capital flows is the absolute value of inward and outward flows of financial assets and liabilities (the sum of the absolute values, if available, of IFS lines 78bdd, 78bed, 78fd, 78bgd, 78bhd, and 78bid), as a ratio of GDP.

Table 3. Latin American Countries: Trade Shares, 2000.

	Trade Share with				Western Hemisphere
	Euro Area	Japan	United States		
South American countries					
Argentina	20.9	2.4	15.7		0.6
Bolivia	15.8	2.1	16.4		0.0
Brazil	25.9	4.9	23.5		0.5
Chile	21.3	9.3	18.4		0.0
Colombia	15.0	3.1	42.8		0.0
Ecuador	13.6	4.8	34.9		0.2
Paraguay	10.3	1.9	12.9		0.9
Peru	21.0	4.9	28.8		0.1
Uruguay	17.5	1.6	9.2		0.0
Venezuela	8.3	1.4	46.1		6.4
Median	16.6	2.7	20.9		0.2
Weighted Average	21.5	4.0	24.8		1.0
Central American countries					
Costa Rica	20.9	3.0	42.4		0.0
El Salvador	10.8	1.5	48.8		0.6
Guatemala	8.5	2.7	44.4		0.4
Honduras	6.0	2.4	62.7		4.2
Mexico	6.1	2.2	80.4		0.2
Nicaragua	9.0	3.5	35.8		0.2
Panama	11.2	4.8	35.5		9.6
Median	9.0	2.7	44.4		0.4
Weighted Average	6.7	2.3	76.7		0.4

Source:  
*Direction of Trade Statistics*, International Monetary Fund.

Table 4. Correlation Matrix of Spread Residuals.

A. Long Sample, 1/07/1998 to 11/28/2001.

	Argentina	Brazil	Ecuador	Mexico	Panama	Peru	Venezuela	Bulgaria	Morocco	Nigeria	Philippines	Poland	Russia
Argentina	1.00												
Brazil	0.40	1.00											
Ecuador	-0.23	-0.41	1.00										
Mexico	-0.46	-0.02	-0.26	1.00									
Panama	0.00	0.11	0.13	0.06	1.00								
Peru	-0.01	0.47	-0.30	0.06	0.64	1.00							
Venezuela	0.29	0.34	-0.14	0.21	0.35	0.37	1.00						
Bulgaria	-0.48	-0.06	-0.05	0.50	0.55	0.56	0.35	1.00					
Morocco	-0.06	0.20	-0.43	0.65	0.39	0.45	0.52	0.68	1.00				
Nigeria	0.07	0.22	0.42	-0.33	0.56	0.43	0.36	0.30	0.03	1.00			
Philippines	0.22	0.39	-0.22	-0.07	0.62	0.78	0.56	0.45	0.40	0.62	1.00		
Poland	-0.28	-0.08	0.33	0.35	0.51	0.16	0.29	0.53	0.40	0.54	0.38	1.00	
Russia	-0.52	-0.29	0.01	0.62	-0.35	-0.31	-0.08	0.08	0.12	-0.44	-0.52	0.09	1.00

B. Short Sample, 1/06/1999 1/03/2001.

	Argentina	Brazil	Ecuador	Mexico	Panama	Peru	Venezuela	Bulgaria	Korea	Morocco	Nigeria	Philippines	Poland	Russia
Argentina	1.00													
Brazil	0.61	1.00												
Ecuador	-0.39	-0.28	1.00											
Mexico	0.38	0.57	-0.26	1.00										
Panama	0.73	0.30	0.01	0.23	1.00									
Peru	0.83	0.61	-0.37	0.25	0.78	1.00								
Venezuela	0.37	0.61	0.11	-0.05	0.35	0.51	1.00							
Bulgaria	0.69	0.37	-0.26	0.21	0.64	0.70	0.35	1.00						
Korea	0.63	0.53	-0.09	0.03	0.65	0.76	0.78	0.71	1.00					
Morocco	0.74	0.60	-0.52	0.53	0.52	0.75	0.31	0.79	0.60	1.00				
Nigeria	0.47	0.42	0.33	0.02	0.53	0.49	0.75	0.57	0.80	0.39	1.00			
Philippines	0.72	0.42	-0.07	-0.03	0.77	0.83	0.69	0.72	0.93	0.58	0.74	1.00		
Poland	0.49	0.32	0.35	0.01	0.59	0.44	0.55	0.59	0.75	0.36	0.87	0.70	1.00	
Russia	-0.69	-0.20	-0.11	-0.21	-0.74	-0.50	-0.19	-0.59	-0.44	-0.42	-0.47	-0.60	-0.59	1.00

Source: morganmarkets.jp Morgan.com, JPMorgan.

Note:

Spread residuals are the residuals that result from a linear regression of the country's EMBI plus index on the global EMBI plus index.

Table 5. Correlation matrix of Forward premiums, 7/26/2000 to 2/06/2002.

	Argentina	Brazil	Chile	Mexico	Venezuela	India	Korea	Philippines	South Africa	Thailand	Turkey
Argentina	1.00										
Brazil	0.90	1.00									
Chile	0.57	0.63	1.00								
Mexico	-0.68	-0.58	-0.34	1.00							
Venezuela	0.79	0.61	0.58	-0.75	1.00						
India	-0.82	-0.73	-0.40	0.51	-0.68	1.00					
Korea	0.92	0.81	0.59	-0.63	0.79	-0.76	1.00				
Philippines	-0.08	-0.03	0.33	0.30	-0.18	0.33	-0.16	1.00			
South Africa	0.87	0.72	0.52	-0.48	0.75	-0.78	0.92	-0.07	1.00		
Thailand	0.83	0.76	0.34	-0.39	0.45	-0.67	0.85	-0.08	0.79	1.00	
Turkey	0.65	0.78	0.35	-0.40	0.24	-0.56	0.55	-0.01	0.42	0.67	1.00

Source:

Bloomberg

Note:

Forward premiums are defined as the log of the ratio of the 12 month forward rate or the 12 month non-deliverable forward rate to the spot rate.

Table 6. Correlation matrix of the estimated probabilities of an exchange rate crisis according to the DCSD model, 1985 -2001.

	Arge	Braz	Chil	Colo	Mexi	Peru	Urug	Vene	Cypr	Egypt	Indi	Indo	Isra	Kore	Mala	Paki	Phil	Safr	SriL	Thai	Zimb	
Argentina	1.00																					
Brazil	0.03	1.00																				
Chile	0.21	0.17	1.00																			
Colombia	0.14	0.19	0.65	1.00																		
Mexico	-0.22	-0.30	-0.44	-0.24	1.00																	
Peru	0.01	0.41	-0.10	-0.26	-0.30	1.00																
Uruguay	0.02	-0.15	-0.07	0.33	0.39	-0.35	1.00															
Venezuela	0.08	-0.21	0.26	0.14	-0.11	-0.13	-0.34	1.00														
Cyprus	0.17	-0.09	0.14	0.53	0.07	-0.15	0.58	-0.21	1.00													
Egypt	0.03	0.13	0.25	-0.04	-0.26	0.13	-0.68	0.68	-0.56	1.00												
India	-0.15	0.36	-0.28	-0.39	-0.20	0.64	-0.62	0.14	-0.49	0.43	1.00											
Indonesia	-0.11	0.12	-0.10	0.33	0.10	-0.08	0.54	-0.41	0.42	-0.44	-0.16	1.00										
Israel	-0.29	-0.08	-0.48	-0.28	0.15	0.43	-0.09	-0.03	-0.01	-0.01	0.52	0.25	1.00									
Korea	-0.25	0.12	-0.35	0.10	0.08	-0.05	0.57	-0.53	0.33	-0.53	-0.10	0.74	0.26	1.00								
Malaysia	-0.01	0.10	0.14	0.57	-0.15	-0.22	0.49	-0.23	0.44	-0.32	-0.34	0.81	0.04	0.66	1.00							
Pakistan	-0.21	0.13	0.03	0.28	-0.23	0.08	0.18	-0.19	0.25	-0.30	0.08	0.47	0.24	0.41	0.53	1.00						
Philippines	-0.25	0.11	-0.11	0.15	-0.19	0.18	-0.07	0.05	-0.19	0.15	0.43	0.28	0.35	0.30	0.39	0.34	1.00					
South Africa	0.00	-0.25	-0.37	-0.22	0.38	0.11	0.31	-0.26	0.13	-0.34	0.10	0.42	0.44	0.39	0.15	0.31	0.16	1.00				
Sri Lanka	0.06	-0.10	-0.03	-0.15	-0.18	-0.12	-0.54	0.49	-0.36	0.63	0.24	-0.29	-0.01	-0.35	-0.16	-0.15	0.05	-0.32	1.00			
Thailand	-0.14	-0.01	0.00	0.47	0.05	-0.25	0.62	-0.36	0.49	-0.49	-0.36	0.90	0.11	0.77	0.91	0.54	0.31	0.33	-0.28	1.00		
Zimbabwe	0.03	0.37	0.12	0.02	-0.23	0.18	-0.16	-0.25	0.04	-0.16	0.05	-0.15	-0.15	0.03	-0.01	-0.04	-0.04	-0.36	-0.18	-0.14	1.00	

Source:  
International Monetary Fund.

Note:

For the methodology used to compute the probabilities, see Berg and Pattillo (1999) and Berg, Borensztein, Milesi-Ferretti, and Pattillo (2000).

Table 7. Latin America: Legal Central Bank Independence and Inflation

Country	ICBI <sup>1/</sup>	Rate of Inflation		
		1985-95	1996-2000	2001
Argentina	18.5	193.6	-0.4	-1.5
Peru	17	299	6.1	-0.1
Chile	16.5	16.2	4.8	2.6
Mexico	16	41.3	15.7	4.4
Colombia	15	24.9	14.4	9
Bolivia	13.5	24.6	4.8	0.9
Honduras	13	14.4	14.7	8.8
Costa Rica	12.5	18	11.3	10.6
Uruguay	12.5	68.5	10.8	3.5
Brazil	12	700.9	6	7.6
Paraguay	10.5	22.6	8.2	8.4
Venezuela	9.5	40.6	35.4	12.3
Dominican Republic	7			
Guatemala	7	17.4	6.8	9.2

1/ Index of Central Bank Independence. Source: Jacome (2001). Maximum value (most independent) is 19.

Table 8. Latin America: Foreign Currency Deposits as a share of total deposits, 1992 - 2000.

	1992	1993	1994	1995	1996	1997	1998	1999	2000
South America									
Argentina	50.7	52.9	55.7	57.3	57.6	56.3	58.4	61.9	64.7
Bolivia				92.6	92.2	92.2	92.1	92.8	92.5
Chile		8.6 (92-95)			4.3	3.7	6.9	10.5	12.5
Ecuador	7.0	8.7	11.8	17.8	24.8	32.0	46.4	39.9	
Paraguay	42.3	49.5	46.1	40.1	44.6	51.0	59.4	63.7	
Peru						72.0	74.7	77.1	78.2
Uruguay		81.4	82.0	82.5	83.7	83.9	84.2		
Central America									
Costa Rica	41.8	38.3	40.9	41.6	43.2	44.5	45.7		
El Salvador		4.4	5.5	5.9	7.0	8.0	8.2		
Honduras			15.3	20.8	26.9	24.6	23.2		
Mexico		4.3	7.6	8.8	10.5	3.8	4.0	4.6	4.9
Nicaragua	50.1	59.1	59.7	65.4	69.1	68.4	71.7	70.3	72.8

Sources: *Staff Country Reports* and *Country Desk Data*, International Monetary Fund.

Notes: Brazil and Guatemala are not listed because foreign currency deposits are not allowed. Colombia and Venezuela are not listed because they have negligible foreign currency deposits. Panama is not listed because it is dollarized.

Table 9. Taylor Equations for Various Countries<sup>1</sup>

	B	Coefficient on additional
Germany <sup>2</sup>	1.31 (0.09)	0.25 (0.04)
Japan <sup>2</sup>	2.04 (0.19)	0.08 (0.03)
United States <sup>2</sup>	1.79 (0.18)	0.07 (0.06)
post 82:10	1.83 (0.45)	0.56 (0.16)
Chile <sup>3</sup>	1.24 (0.18)	0.36 (0.32)
including CA deficit deviation from 4% target <sup>4</sup>	1.68 (0.29)	-
Peru <sup>6</sup> ( Includes the deviation of the real exchange rate from trend. )	-0.0022 (0.0008)	-0.0007 (0.0001) -0.1106 (-0.048)

Notes:

1/ All these results derive from GMM (that is instrumented) regressions of the sort described by equation (1) in the text. Standard errors are in parentheses. The developed country results are from Clarida, Galí and Gertler (1997), Chile is Corbo (2000), while Peru is from Morón and Castro (2000).

2/ Monthly data from 1979 through 1994.

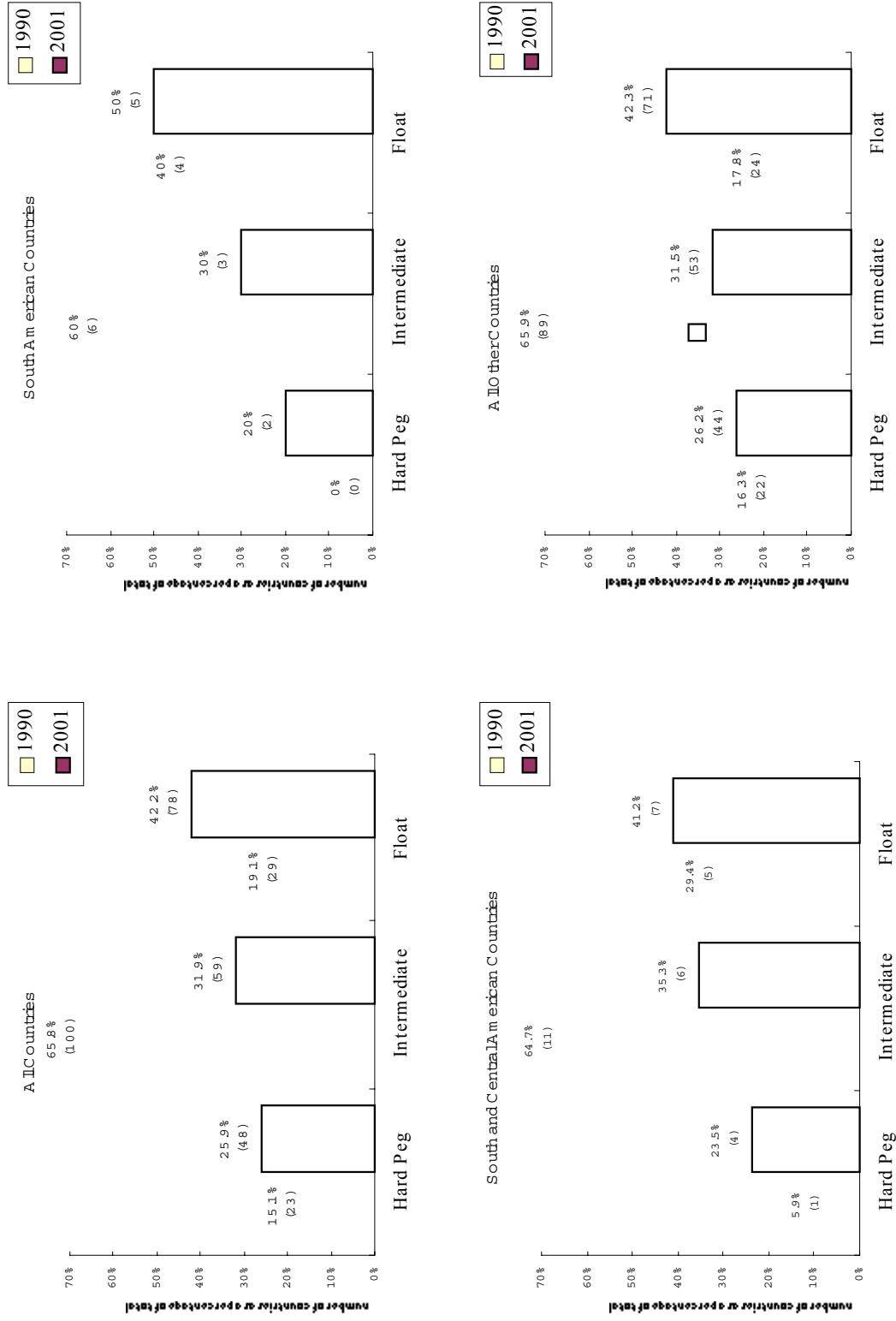
3/ Quarterly data from 1990:1 through 1999:4. The dependent variable in this regression is the real interest rate; for purposes of comparison we have added 1 to the reported coefficient of 0.236, to correspond to the dependent variable, which is the nominal interest rate in the other regressions. The standard error is not adjusted. Corbo (2000) emphasizes that 0.236 is not significantly different from 0.

4/ Chile has a declared objective of maintaining a current account deficit below 4% of GDP. The observed sign implies that an increase in the deficit led to a counter-cyclical increase in the real interest rate.

5/ For Colombia, Corbo (2000) used the deviation of the unemployment rate from trend rather than the output gap; here we present the opposite sign from that in Corbo (2000), for comparability. It may be that a difference in units explains the difference in magnitudes.

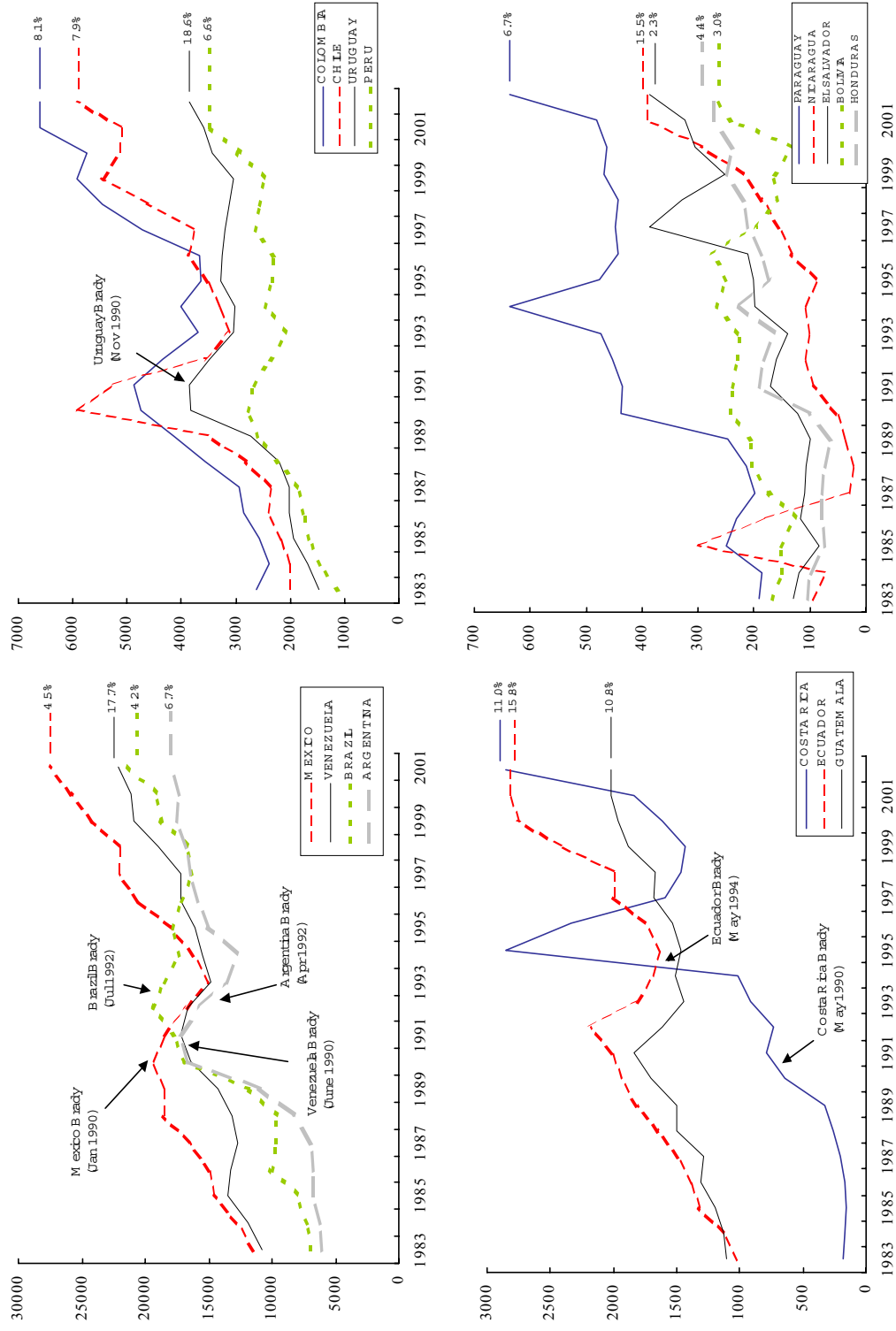
6/ From Morón and Castro (2000), estimated with the change in base money as the dependent variable from Jan 1992 to December 1999. The coefficients are not comparable because of the different dependent variable. The signs are as expected, in that low inflation, low output, and a depreciated exchange rate imply higher subsequent base money growth.

Figure 1. Exchange Rate Regimes, 1990 and 2001.



Source: Exchange Arrangements and Exchange Restrictions, Annual Reports, International Monetary Fund, 1990 and 2001.  
 Notes: The data refers to 12/31/1990 and 3/31/2001. The number of countries is in parentheses. For 1990, official classification has been corrected on the basis of IMF staff views. South American countries include Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela. Central American countries include Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama. There are 135 other countries in 1990 and 168 other countries in 2001. Hard pegs include currency unions and currency board arrangements. Intermediates include pegged horizontal bands, conventional fixed peg arrangements, crawling pegs and crawling bands. Floats include managed floats and independent floats.

Figure 2. Latin America: Private Deposits Abroad, 1983-2001.  
(in millions of US dollars)



Source: Bank of International Settlements database.

Notes: Total outstanding liabilities of BIS-reporting banks vis-a-vis non-bank residents of Latin American countries. The right hand side labels represent the 2001 liabilities of each country as a percent of GDP. Arrows indicate the times of the countries' respective Brady plans.

Figure 3a. Argentina and Mexico  
Inflation, Output and the Real Exchange rate

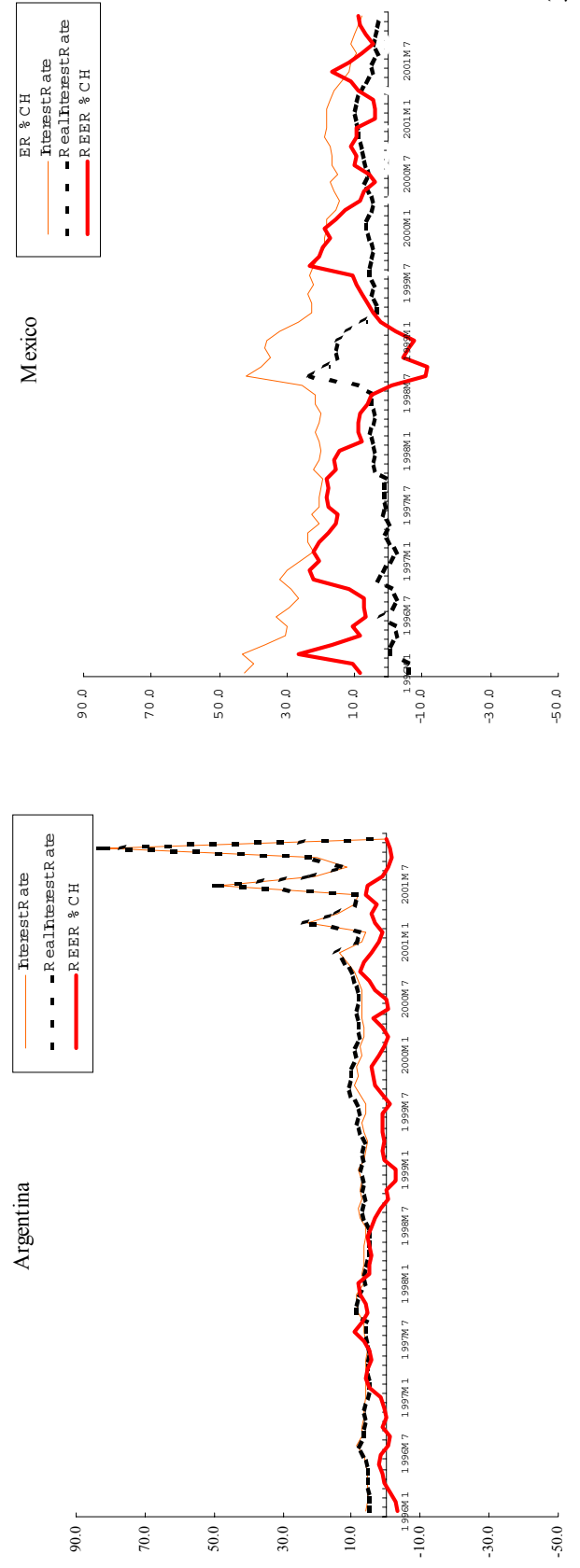
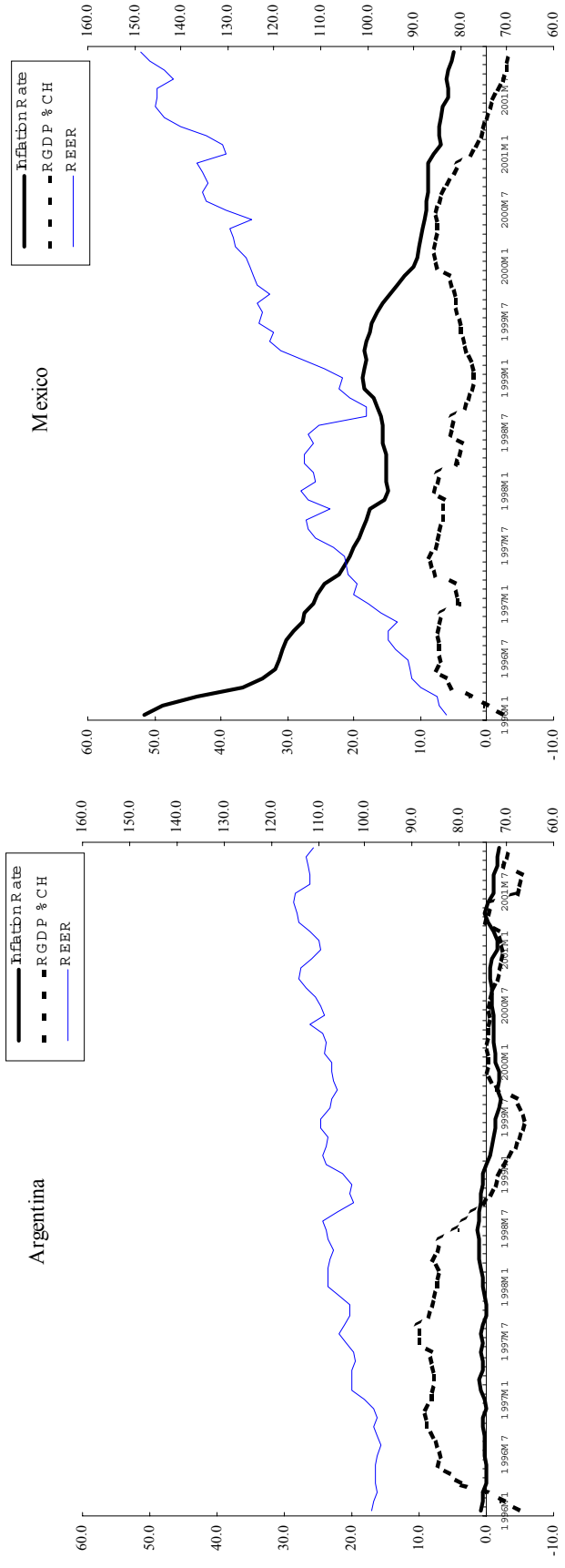


Figure 3b. Chile and Peru

Inflation, Output and the Real Exchange rate

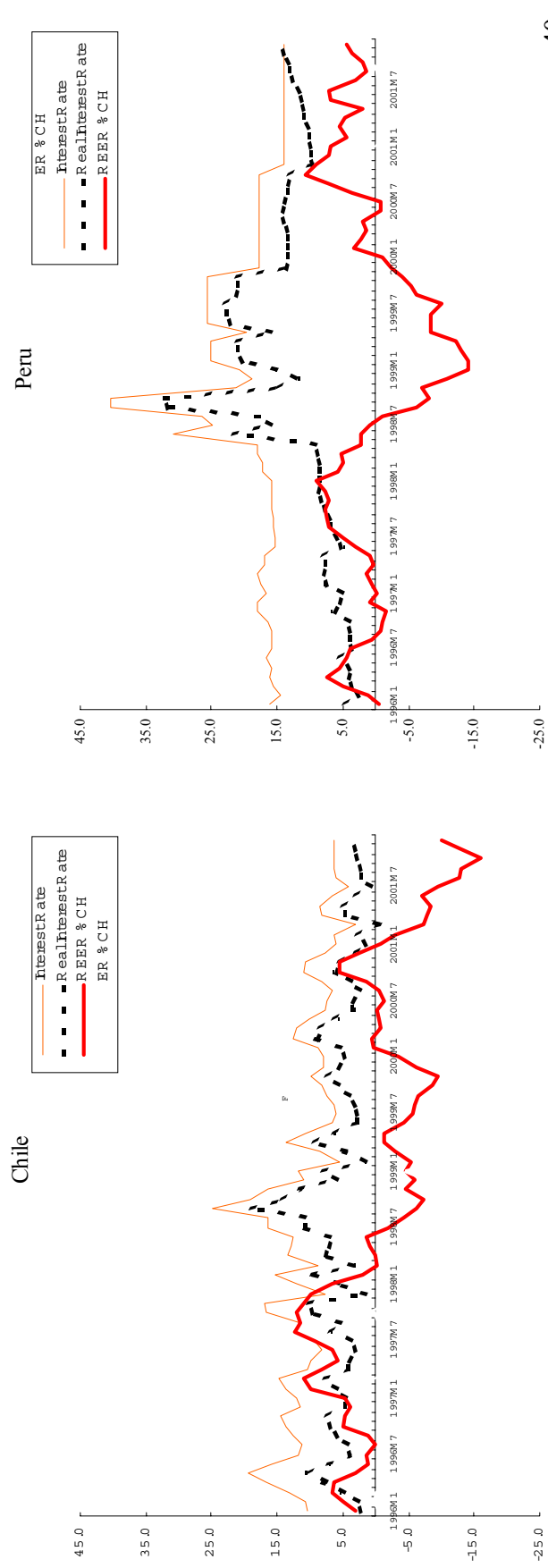
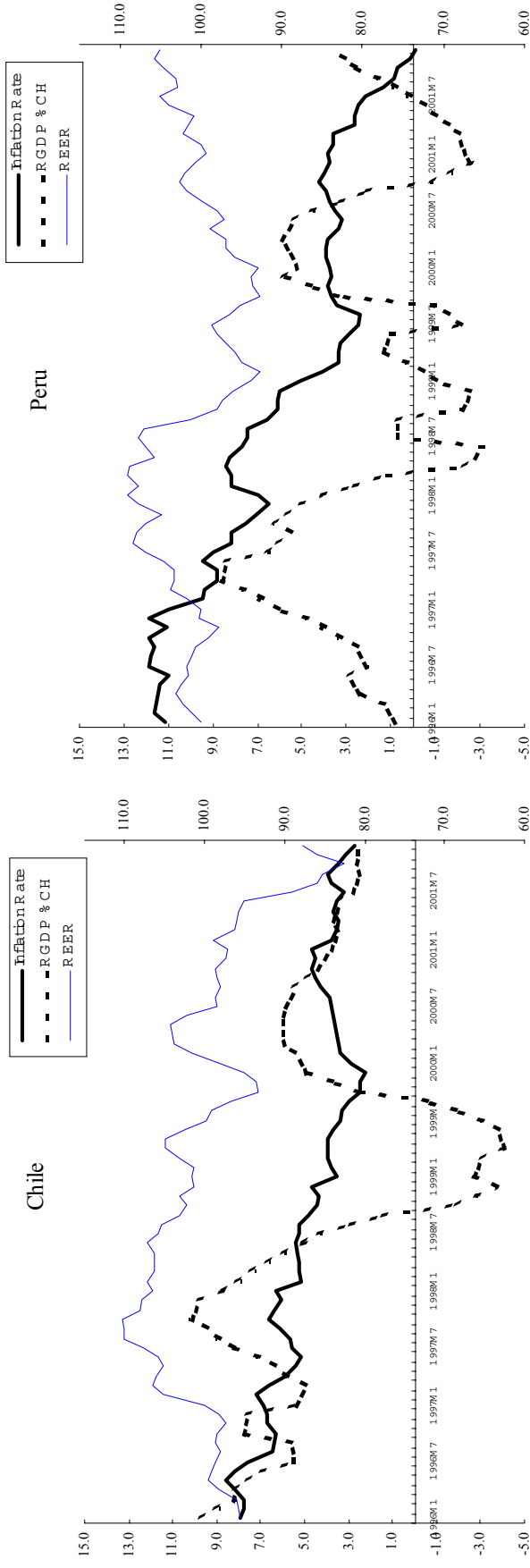


Figure 3c. Hong Kong and Singapore  
Inflation, Output and the Real Exchange rate

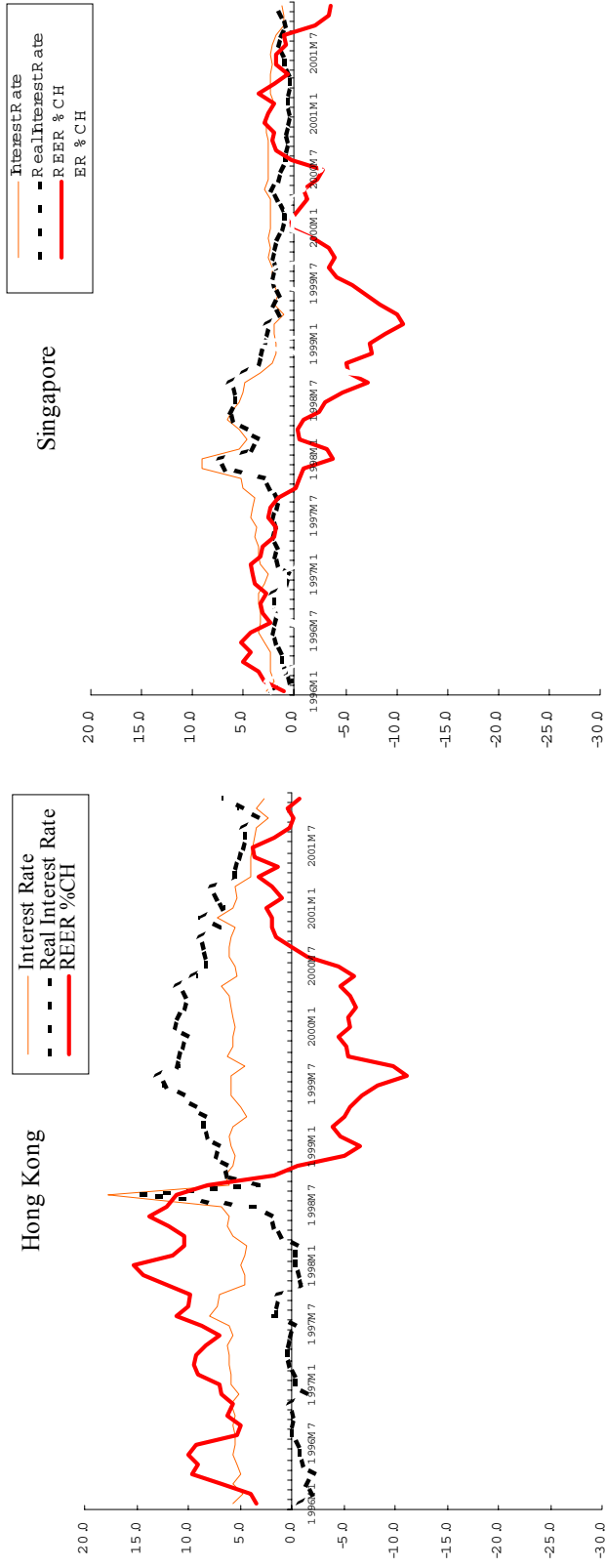
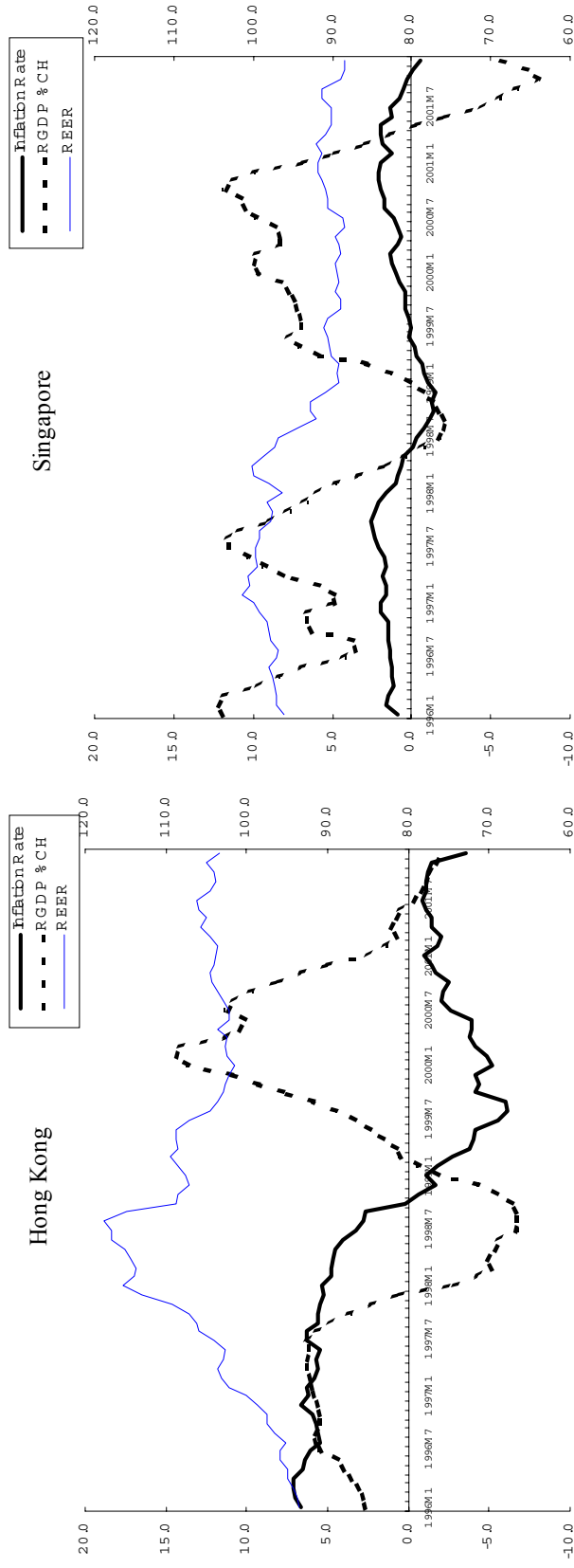


Figure 4. Inflation Pass-through in Mexico

