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## An Evaluation of Monetary Regime Options for Latin America

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**IMF Working Paper**

Research Department

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**Abstract**

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

We assess monetary regime options for Latin American countries. The costs of a common currency are likely to outweigh its benefits, as those countries face diverse economic shocks, do not trade much with each other, and are affected by common international financial shocks only to the same extent as the average pair of emerging markets. Unilateral dollarization would be desirable only for those countries where there are strong links to the U.S. economy, the credibility of the monetary authorities is irreversibly lost, and there is keen demand for dollar-denominated financial assets. Finally, some countries in the region seem to be good candidates for meaningful and useful floating.

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## I. ROADMAP AND SUMMARY

In this paper, we analyze the choice of exchange rate regime for the countries of Latin America. We begin by taking stock of the evolution of exchange rate regimes in the region and exploring the reasons for that evolution (Section II). 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 increasingly falling out of favor, particularly for those emerging market countries that are highly integrated into international financial markets. 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. Intermediate regimes seemed unusually popular in Latin America a decade ago, but this has been neutralized with the generalized move to floating and hard pegs in the 1990s.

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) and find that, under present circumstances, the costs of a common currency are likely to outweigh the benefits for the countries of Latin America. As has been noted elsewhere, these countries do not trade much with each other. However, they face diverse economic shocks and their business cycles are not coordinated. Perhaps more surprisingly, they are affected by international financial shocks only to the same extent as any pair of emerging markets more generally.

In Section IV, we consider unilateral dollarization. As with a common currency, whether this option is workable depends on whether the country is sufficiently similar to and integrated with the United States; this determines whether the monetary policy stance of the United States would be appropriate for the country's needs. 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 rate 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, whereas others are good candidates for dollarization (Section VI). 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

By 2001, a majority of Latin American countries had either adopted the U.S. 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, and have operated under floating regimes since then. 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.

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 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.

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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.

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

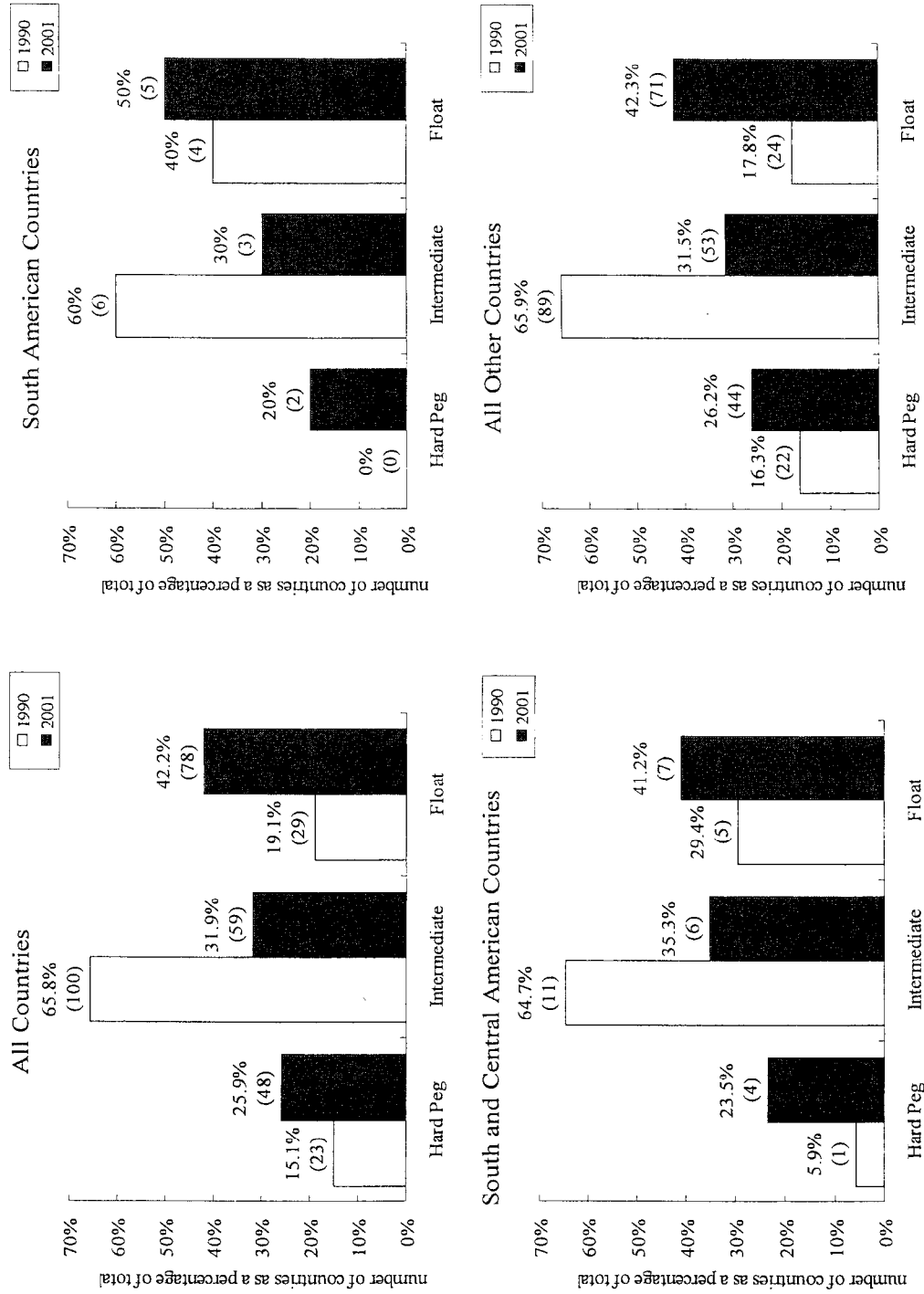
	1985	1990	1995	2001	Target Playing a Role in 2001
<b>South America</b>					
Argentina	Intermediate	Float	Hard Peg	Hard Peg	--
Bolivia	Float	Intermediate	Intermediate	Intermediate	Exchange Rate
Brazil	Intermediate	Intermediate	Intermediate	Float	Inflation Rate
Chile	Intermediate	Intermediate	Intermediate	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
<b>Central America</b>					
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: International Monetary Fund, *Annual Report on Exchange Arrangements and Exchange Restrictions*, 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.



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.

### **III. 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.

#### **A. Real Aspects of Optimal Currency Areas**

##### **Patterns of Trade**

As is well known, Latin American countries are at present less open to international trade than are other countries at a similar level of economic development. Moreover, their trade patterns are highly diversified, with no dominant trading partner (Table 2).<sup>3</sup> Thus, the share of trade with the United States is often no larger or only slightly larger than that with Europe or Japan. Mexico, with an 80 percent trade share with the United States, is a notable exception. On this basis, therefore, 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.

##### **Comovement of Real Variables**

Comovement of output fluctuations has been analyzed by Bayoumi and Eichengreen (1994). Correlations of economic growth across pairs of countries are typically lower in Latin America than in Western Europe, and somewhat higher than in East Asia. For Latin American countries, correlations with U.S. growth are generally positive and often significant. However, this is also true 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. In assessing the desirability of a common currency, supply shocks tend to be more important, since demand shocks are largely policy-driven and would tend to become more correlated under a common currency. Correlation of supply shocks among Latin American countries is typically low, insignificant, and lower than in the European Monetary Union.

Moreover, correlation of supply shocks with the United States is insignificant for Latin America. 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, though more slowly than East Asia. On the whole, these considerations do not support the case for a common currency in Latin America, or for widespread dollarization.

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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.

Table 2. Latin American Countries: Trade Shares, 2000

	Trade Share With			
	Euro Area	Japan	United States	Western Hemisphere
South American Countries				
Argentina	20.9	2.4	15.7	41.8
Bolivia	15.8	2.1	16.4	59.9
Brazil	25.9	4.9	23.5	23.2
Chile	21.3	9.3	18.4	28.5
Colombia	15.0	3.1	42.8	28.5
Ecuador	13.6	4.8	34.9	30.0
Paraguay	10.3	1.9	12.9	63.3
Peru	21.0	4.9	28.8	26.2
Uruguay	17.5	1.6	9.2	52.7
Venezuela	8.3	1.4	46.1	30.5
Median	16.6	2.7	20.9	30.2
Weighted Average	21.5	4.0	24.8	29.9
Central American Countries				
Costa Rica	20.9	3.0	42.4	18.4
El Salvador	10.8	1.5	48.8	29.1
Guatemala	8.5	2.7	44.4	30.0
Honduras	6.0	2.4	62.7	16.7
Mexico	6.1	2.2	80.4	3.3
Nicaragua	9.0	3.5	35.8	33.5
Panama	11.2	4.8	35.5	40.9
Median	9.0	2.7	44.4	29.1
Weighted Average	6.7	2.3	76.7	5.8

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

## **B. Financial Considerations**

While 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 comovements of financial variables would relate 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) or, at least, greater monetary cooperation within the region might be appropriate.

Therefore, it seems helpful to complement the information obtained from comovements of real variables with that on comovements 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 it is 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 distinct 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, namely, the EMBI+ spreads (vis-à-vis U.S. government bonds) computed by J.P.Morgan. While comovement is high among Latin American markets, it 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 3). We conduct this exercise using EMBI+ data for 1998–2001 and for a subsample that begins after the Russian crisis and that ends well before Argentina's spreads start to rise (1999–2000). In general, the correlations between any two Latin American countries do not seem to be higher than the correlations between any two emerging markets.

We also examine observed comovements of exchange rates among Latin American countries. In order to reduce the problems created by the presence of exchange rate pegs, we use comovements of forward exchange rates in terms of nondeliverable forwards (Table 4). Once again, comovements among Latin American countries are not out of line.

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

Table 3. 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	<b>0.40</b>	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	<b>0.47</b>	-0.30	0.06	<b>0.64</b>	1.00							
Venezuela	<b>0.29</b>	<b>0.34</b>	-0.14	<b>0.21</b>	<b>0.35</b>	<b>0.37</b>	1.00						
Bulgaria	-0.48	-0.06	-0.05	<b>0.50</b>	<b>0.55</b>	<b>0.56</b>	<b>0.35</b>	1.00					
Morocco	-0.06	<b>0.20</b>	-0.43	<b>0.65</b>	<b>0.39</b>	<b>0.45</b>	<b>0.52</b>	<b>0.68</b>	1.00				
Nigeria	0.07	<b>0.22</b>	<b>0.42</b>	-0.33	<b>0.56</b>	<b>0.43</b>	<b>0.36</b>	<b>0.30</b>	0.03	1.00			
Philippines	<b>0.22</b>	<b>0.39</b>	-0.22	-0.07	<b>0.62</b>	<b>0.78</b>	<b>0.56</b>	<b>0.45</b>	<b>0.40</b>	<b>0.62</b>	1.00		
Poland	-0.28	-0.08	<b>0.33</b>	<b>0.35</b>	<b>0.51</b>	<b>0.16</b>	<b>0.29</b>	<b>0.53</b>	<b>0.40</b>	<b>0.54</b>	<b>0.38</b>	1.00	
Russia	-0.52	-0.29	0.01	<b>0.62</b>	-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
Argentina	1.00												
Brazil	<b>0.61</b>	1.00											
Ecuador	-0.39	-0.28	1.00										
Mexico	<b>0.38</b>	<b>0.57</b>	-0.26	1.00									
Panama	<b>0.73</b>	<b>0.30</b>	0.01	<b>0.23</b>	1.00								
Peru	<b>0.83</b>	<b>0.61</b>	-0.37	<b>0.25</b>	<b>0.78</b>	1.00							
Venezuela	<b>0.37</b>	<b>0.61</b>	0.11	-0.05	<b>0.35</b>	<b>0.51</b>	1.00						
Bulgaria	<b>0.69</b>	<b>0.37</b>	-0.26	<b>0.21</b>	<b>0.64</b>	<b>0.70</b>	<b>0.35</b>	1.00					
Korea	<b>0.63</b>	<b>0.53</b>	-0.09	0.03	<b>0.65</b>	<b>0.76</b>	<b>0.78</b>	<b>0.71</b>	1.00				
Morocco	<b>0.74</b>	<b>0.60</b>	-0.52	<b>0.53</b>	<b>0.52</b>	<b>0.75</b>	<b>0.31</b>	<b>0.79</b>	<b>0.60</b>	1.00			
Nigeria	<b>0.47</b>	<b>0.42</b>	<b>0.33</b>	0.02	<b>0.53</b>	<b>0.49</b>	<b>0.75</b>	<b>0.57</b>	<b>0.80</b>	<b>0.39</b>	1.00		
Philippines	<b>0.72</b>	<b>0.42</b>	-0.07	-0.03	<b>0.77</b>	<b>0.83</b>	<b>0.69</b>	<b>0.72</b>	<b>0.93</b>	<b>0.58</b>	<b>0.74</b>	1.00	
Poland	<b>0.49</b>	<b>0.32</b>	<b>0.35</b>	0.01	<b>0.59</b>	<b>0.44</b>	<b>0.55</b>	<b>0.59</b>	<b>0.75</b>	<b>0.36</b>	<b>0.87</b>	<b>0.70</b>	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

Source: JPMorgan, morgannmarkets.jpmmorgan.com.

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

An alternative way of summarizing covariation of exchange rate expectations and of financial conditions is to utilize 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, calculated as a weighted average of changes in the exchange rate and international reserves.

We compute correlations of the estimated crisis probabilities 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 once again that Latin American countries do not display greater covariation of probabilities than do other groups of countries (Table 5).

### **C. Political and Institutional Considerations**

The European experience highlights the need for commitment to a common currency and the time it may take to develop common institutions buttressing such commitment.<sup>5</sup> 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 US\$16,000 in Greece and US\$27,400 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 US\$2,200 a year in Honduras to US\$11,000 in Argentina. Even within Mercosur, GDP per capita is US\$4,000 in Paraguay and US\$6,800 in Brazil, still well below that of Uruguay (US\$10,000) 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 that 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

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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.

Table 5. 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	Egyp	Indi	Indo	Isra	Kore	Mala	Paki	Phil	Safr	SriL	Thai	Zimb
Argentina	1.00																				
Brazil	0.03	1.00																			
Chile	<b>0.21</b>	<b>0.17</b>	1.00																		
Colombia	0.14	<b>0.19</b>	<b>0.65</b>	1.00																	
Mexico	-0.22	-0.30	-0.44	-0.24	1.00																
Peru	0.01	<b>0.41</b>	-0.10	-0.26	-0.30	1.00															
Uruguay	0.02	-0.15	-0.07	<b>0.33</b>	<b>0.39</b>	-0.35	1.00														
Venezuela	0.08	-0.21	<b>0.26</b>	0.14	-0.11	-0.13	-0.34	1.00													
Cyprus	<b>0.17</b>	-0.09	0.14	<b>0.53</b>	0.07	-0.15	<b>0.58</b>	-0.21	1.00												
Egypt	0.03	0.13	<b>0.25</b>	-0.04	-0.26	0.13	-0.68	<b>0.68</b>	-0.56	1.00											
India	-0.15	<b>0.36</b>	-0.28	-0.39	-0.20	<b>0.64</b>	-0.62	0.14	-0.49	<b>0.43</b>	1.00										
Indonesia	-0.11	0.12	-0.10	<b>0.33</b>	0.10	-0.08	<b>0.54</b>	-0.41	<b>0.42</b>	-0.44	-0.16	1.00									
Israel	-0.29	-0.08	-0.48	-0.28	<b>0.15</b>	<b>0.43</b>	-0.09	-0.03	-0.01	-0.01	<b>0.52</b>	<b>0.25</b>	1.00								
Korea	-0.25	0.12	-0.35	0.10	0.08	-0.05	<b>0.57</b>	-0.53	<b>0.33</b>	-0.53	-0.10	<b>0.74</b>	<b>0.26</b>	1.00							
Malaysia	-0.01	0.10	0.14	<b>0.57</b>	-0.15	-0.22	<b>0.49</b>	-0.23	<b>0.44</b>	-0.32	-0.34	<b>0.81</b>	0.04	<b>0.66</b>	1.00						
Pakistan	-0.21	0.13	0.03	<b>0.28</b>	-0.23	0.08	<b>0.18</b>	-0.19	<b>0.25</b>	-0.30	0.08	<b>0.47</b>	<b>0.24</b>	<b>0.41</b>	<b>0.53</b>	1.00					
Philippines	-0.25	0.11	-0.11	0.15	-0.19	<b>0.18</b>	-0.07	0.05	-0.19	<b>0.15</b>	<b>0.43</b>	<b>0.28</b>	<b>0.35</b>	<b>0.30</b>	<b>0.39</b>	<b>0.34</b>	1.00				
South Africa	0.00	-0.25	-0.37	-0.22	<b>0.38</b>	0.11	<b>0.31</b>	-0.26	0.13	-0.34	0.10	<b>0.42</b>	<b>0.44</b>	<b>0.39</b>	<b>0.15</b>	<b>0.31</b>	<b>0.16</b>	1.00			
Sri Lanka	0.06	-0.10	-0.03	-0.15	-0.18	-0.12	-0.54	<b>0.49</b>	-0.36	<b>0.63</b>	<b>0.24</b>	-0.29	-0.01	-0.35	-0.16	-0.15	0.05	-0.32	1.00		
Thailand	-0.14	-0.01	0.00	<b>0.47</b>	0.05	-0.25	<b>0.62</b>	-0.36	<b>0.49</b>	-0.49	-0.36	<b>0.90</b>	0.11	<b>0.77</b>	<b>0.91</b>	<b>0.54</b>	<b>0.31</b>	<b>0.33</b>	-0.28	1.00	
Zimbabwe	0.03	<b>0.37</b>	0.12	0.02	-0.23	<b>0.18</b>	-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).



independence. In the European case, independence of individual countries' central banks was a precondition for EMU membership, and the European Central Bank itself has strong institutional guarantees of independence. Similarly, many policymakers 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 towards 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 and authorities.

#### **IV. UNILATERAL DOLLARIZATION**

##### **A. Achieving Monetary Credibility**

For many countries, the main gain 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. Low credibility and related expectations of devaluation and inflation bring about chronically high ex post interest rates when monetary discipline is maintained, and high demand for foreign financial assets, implying capital flight or dollarization of domestic financial assets. 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; floating rates suffer from high volatility 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. 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 6).

However, it often takes years to establish credibility. Interest rates remain high despite sharp declines in inflation. In classic illustration of the “peso problem,” nominal interest rates are still high, owing to expectations of inflation (or devaluation). While the surge in prices does not take place, ex post real interest rates and finance costs remain high, with negative effects on investment and growth. Low monetary credibility may also increase the volatility of expected inflation, which raises the risk premium attached to domestic-currency debt (Ize and Levy Yeyati, 1998).

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, policymakers 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 wage contracts. 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 where 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.

## **B. Spontaneous Dollarization**

A 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 in which a large fraction of domestic monetary assets (bank deposits and cash) is held in foreign currency. A suggestive, if incomplete, indicator of capital flight is the volume of deposits held abroad by the nonbank private sector with banks that are part of the BIS reporting system (Figure 2). These cross-border deposits rose steadily in the 1980s, fell for many countries at the time of the Brady deals,<sup>7</sup> and rose again after the Mexican crisis. At present, the volume of external deposits is substantial for most Latin American countries, typically ranging between 5 and 15 percent of GDP.

Foreign-currency denominated domestic deposits are very large in many Latin American countries, particularly in Bolivia, Peru, and—before the recent “pesification”—Argentina (Table 7). Anecdotal evidence suggests that cash holdings of U.S. dollars are widespread in several Latin American countries. While investors may hold foreign-currency

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

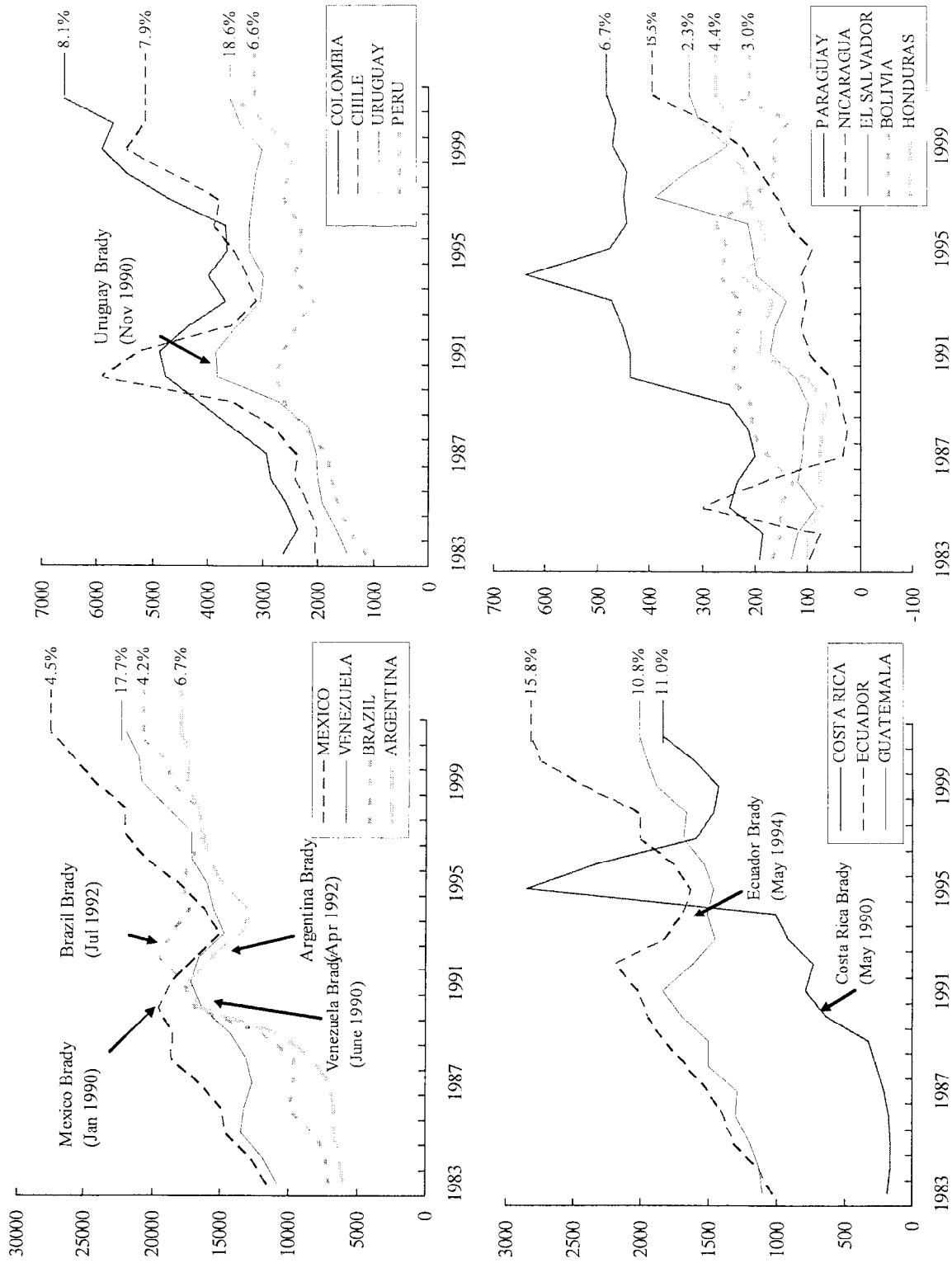
Table 6. Latin America: Legal Central Bank Independence and Inflation

Country	ICBI <sup>1/</sup>	IALCBI <sup>2/</sup> 1980-1989	Rate of Inflation		
			1985-95	1996-2000	2001
Argentina	18.50	0.40	193.60	-0.40	-1.50
Peru	17.00	0.43	299.00	6.10	-0.10
Chile	16.50	0.46	16.20	4.80	2.60
Mexico	16.00	0.34	41.30	15.70	4.40
Colombia	15.00	0.27	24.90	14.40	9.00
Bolivia	13.50	0.30	24.60	4.80	0.90
Honduras	13.00	0.43	14.40	14.70	8.80
Costa Rica	12.50	0.47	18.00	11.30	10.60
Uruguay	12.50	0.24	68.50	10.80	3.50
Brazil	12.00	0.21	700.90	6.00	7.60
Paraguay	10.50	...	22.60	8.20	8.40
Venezuela	9.50	0.43	40.60	35.40	12.30
Guatemala	7.00	...	17.40	6.80	9.20

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

2/ Index of Aggregate Legal Central Bank Independence. Source: Cukierman et al. (1992). The index ranges from 0 (lowest level of independence) to 1 (highest level of independence).

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.

Table 7. 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	50.65	52.91	55.70	57.25	57.60	56.29	58.43	61.89	64.75
Bolivia	...	...	...	92.56	92.16	92.25	92.12	92.80	92.52
Chile	8.60	8.60	8.60	8.60	4.30	3.70	6.90	10.50	12.50
Ecuador	6.97	8.70	11.77	17.78	24.81	31.98	46.35	39.93	...
Paraguay	42.26	49.55	46.10	40.10	44.57	51.01	59.39	63.67	...
Peru	...	...	...	...	...	72.00	74.70	77.10	78.20
Uruguay	...	81.39	82.04	82.54	83.70	83.87	84.20	...	...
Central America									
Costa Rica	41.80	38.25	40.94	41.63	43.19	44.51	45.72	...	...
El Salvador	...	4.35	5.47	5.89	6.99	7.95	8.23	...	...
Honduras	...	...	15.26	20.83	26.90	24.61	23.21	...	...
Mexico	...	4.34	7.63	8.84	10.46	3.84	3.99	4.57	4.94
Nicaragua	50.05	59.08	59.72	65.36	69.08	68.44	71.70	70.30	72.84

Sources: IMF *Staff Country Reports* and IMF staff estimates.

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.

denominated assets for “normal” portfolio diversification reasons, the main motivation in Latin America may be concern over monetary credibility.

One important implication of extensive spontaneous dollarization is that large changes in the exchange rate can bring about financial crisis and large-scale bankruptcies among corporations with foreign exposure. 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 risk can be hedged for the country as a whole: foreigners seem to be reluctant to provide exchange rate insurance and bear all the risk, as emerging market countries by and large cannot borrow internationally in their own currency. Thus, the risk of heavy losses in the banking and financial sectors forces central banks to limit fluctuations in the exchange rate, thereby weakening the adjustment properties of flexible rates.

In conclusion, complete dollarization appeals more to countries with high and irreversible spontaneous dollarization. For them, a floating exchange rate regime would fail to provide much real flexibility. By contrast, dollarization would likely reduce uncertainties in the financial sector and the seigniorage loss of giving up the domestic currency would be relatively small.

### **C. Trade Integration as an Advantage**

A key consequence of dollarization may be greater trade integration with the United States. Indeed, there is evidence that common currencies encourage 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 are much higher for two cities located in different countries than for two equidistant cities in the same country. 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 have been challenged by Klein (2002), who finds that the large bilateral trade effect in Rose’s work holds for trade between developing countries, but not for the bilateral trade between the United States and dollarized developing countries.<sup>8</sup>

Dollarization may also have other advantages. It may increase economic relations more generally with the United States, including higher foreign direct investment and greater financial market integration. Moreover, it is widely believed that dollarization promotes financial discipline in government by eliminating recourse to the inflation tax. On the other hand, the increase in credibility afforded by dollarization could be used to finance more

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<sup>8</sup> Other authors show that methodological changes reduce Rose’s estimates. Other relevant studies include Tenreyro (2001), Persson (2001), and Parsley and Wei (2001).

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 greater risks.

Hence, the ideal candidate for dollarization is a small economy, with close trade and economic links to the United States, extensive spontaneous dollarization, and low monetary policy credibility. Few countries in Latin America fit the bill. Mexico and several other countries in Central America tend to be highly integrated with the United States, but face few credibility problems and have little spontaneous dollarization. Many other countries in the region have credibility problems but may benefit substantially from exchange rate flexibility. Here, the test will be whether floating with inflation targeting can build up the requisite credibility to run an independent monetary regime without creating an undue burden on the domestic economy.

## V. FLOATING EXCHANGE RATES

Are floating rates viable options for Latin America? Can flexibility in exchange rates and independent monetary policy achieve meaningful domestic objectives?

### A. Some Anecdotes

We set the stage for a more systematic analysis by reviewing the experience of several emerging economies during the turmoil period of the late 1990s. We compare Argentina (a hard peg) with Mexico, Chile, and Peru (all floating, to varying degrees); and Hong Kong SAR (a hard peg) with Singapore (a managed float). 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.

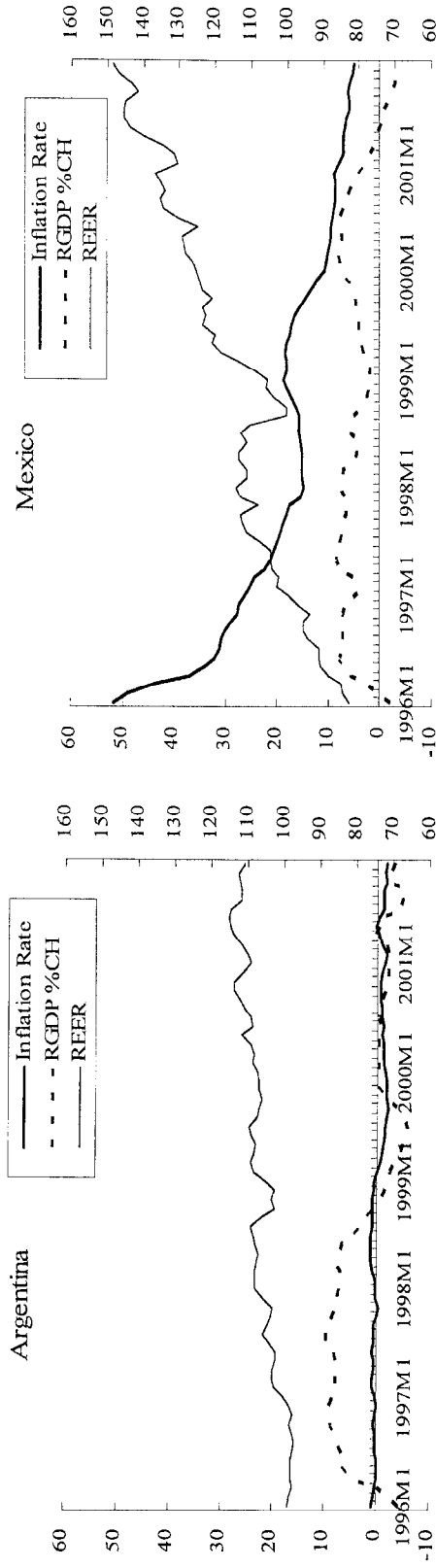
In **Argentina** (Figure 3a) the price level and the real exchange rate remained unsurprisingly stable, and the still strong credibility of the currency board kept interest rates flat through the turmoil of the Russia, LTCM and Brazil crises of 1998/1999. Only real GDP growth was adversely affected,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

**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>9</sup>

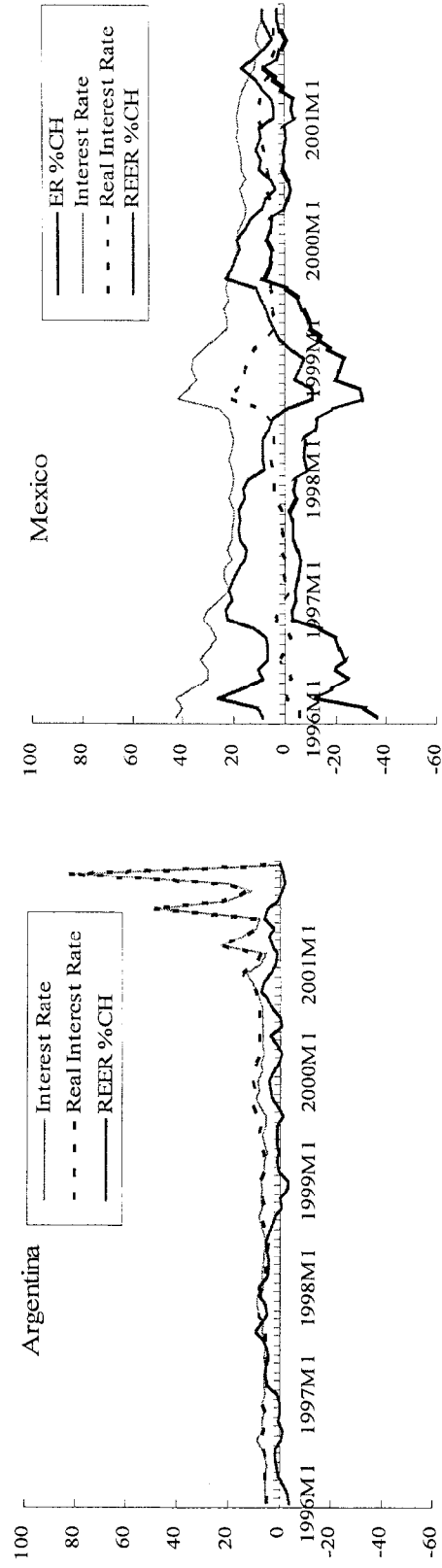
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<sup>9</sup> On Mexico's experience during this period, see Carstens and Werner (1999) and Edwards and Savastano (1998). The trend appreciation in the real exchange rate through the period under examination is remarkable. It may be partially accounted for by the reversal of the large real depreciation of 1995, and the benefits of strong growth in the United States.

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



Interest Rates and Exchange Rate Changes



Source: IMF



Two other points are noteworthy regarding Mexico. 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.

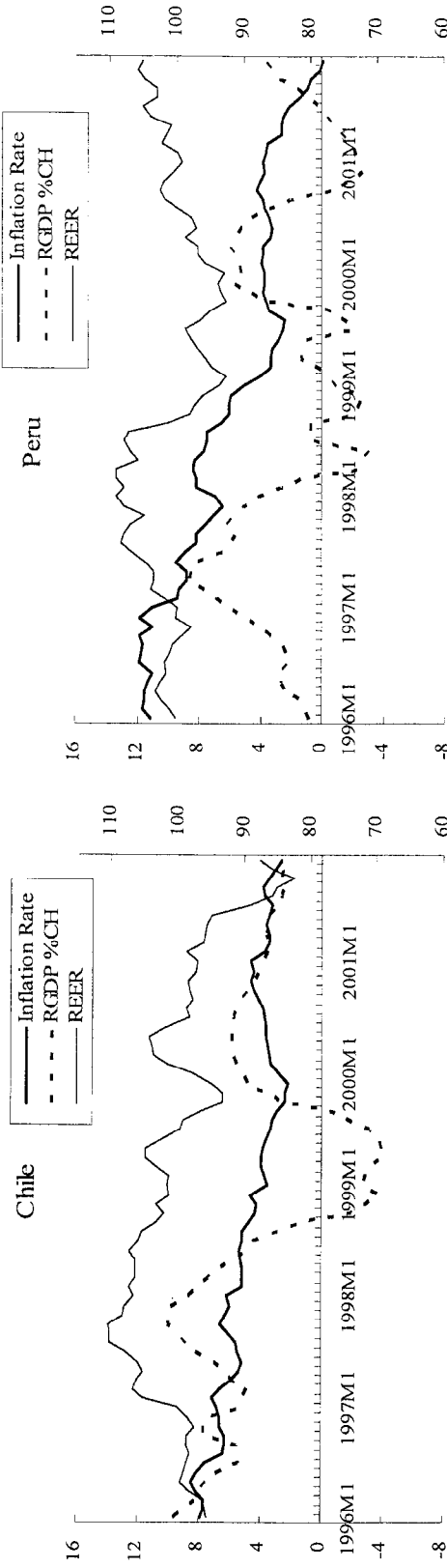
**Peru** (Figure 3b) confirms some aspects of this story. Even this highly dollarized economy responded to the shocks of 1998/1999 through a combination of higher interest rates and a substantial, and in this case prolonged, real depreciation. The outcome for growth was, however, not as cheerful as in 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 late 1998 and late 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 1998, using it in 2000, or that Chile learned not to fear floating.

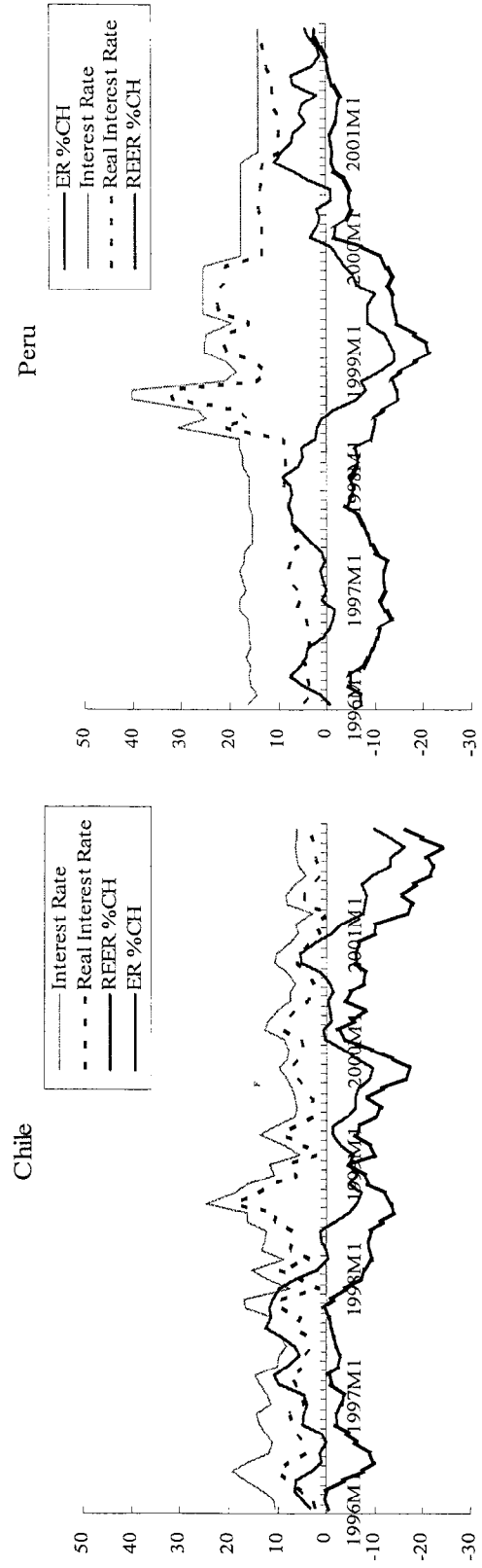
The comparison between Hong Kong SAR and Singapore suggests a parallel with that between Mexico and Argentina. In **Hong Kong SAR** (Figure 3c), the adjustment was, at least initially, in the form of higher interest rates and a large output drop. By contrast, **Singapore** (Figure 3c) displays a sharp 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 modest interest rate response. Second, one cannot attribute its strong growth performance to its location. Third, Hong Kong SAR's flexibility and small economic size resulted in a large, though lagged, disinflation that ultimately led to a substantial real exchange rate adjustment.

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 SAR's price flexibility and small economic size clearly make it a more plausible candidate

Figure 3b. Chile and Peru  
Inflation, Output and the Real Exchange Rate

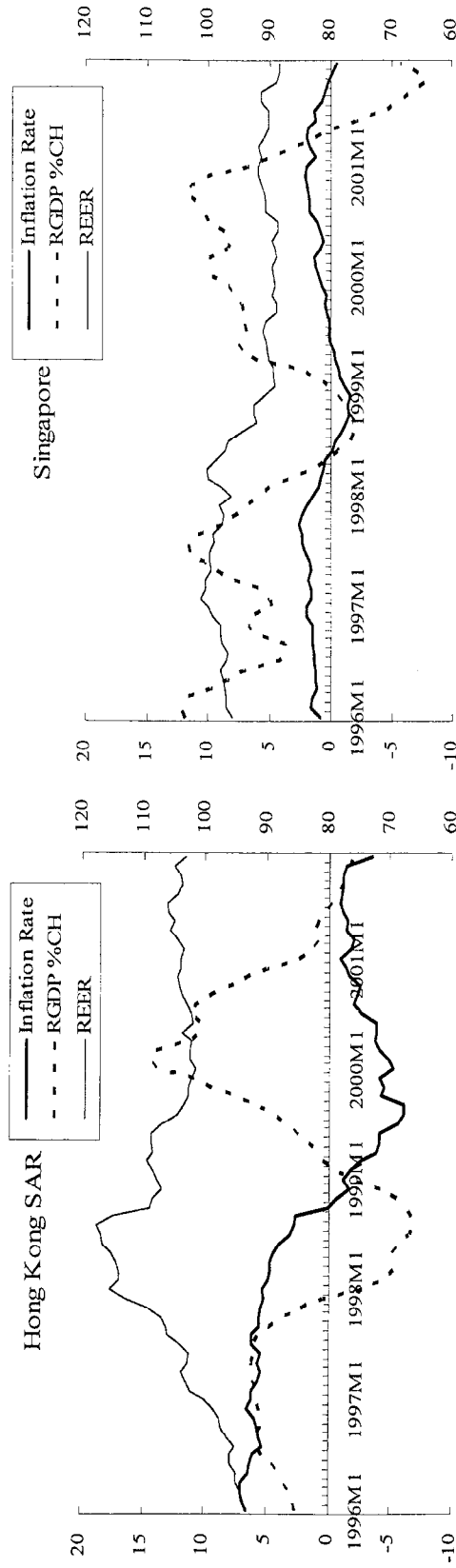


Interest Rates and Exchange Rate Changes

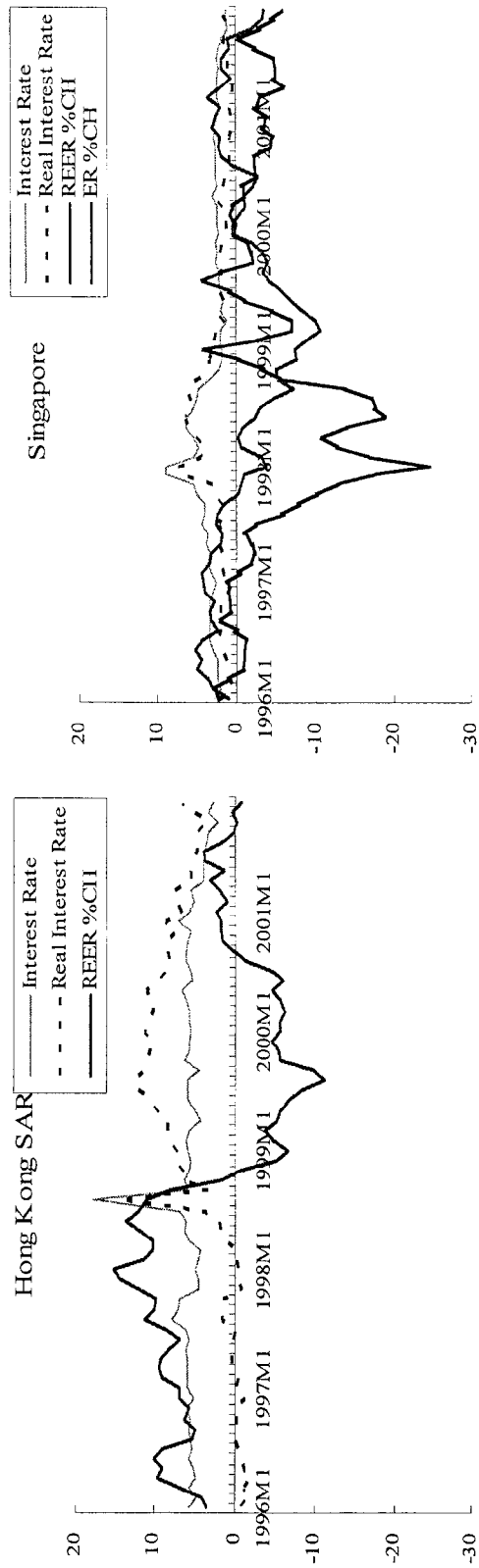


Source: IMF

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



Interest Rates and Exchange Rate Changes



Source: IMF

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>10</sup> We now turn to more systematic evidence regarding the effectiveness of floating exchange rates in emerging markets.

### **B. The Taylor Rule as a Benchmark for Monetary Policy**

Much of the recent discussion of optimal monetary policy, especially for advanced economies, has used the Taylor rule as a benchmark. In this framework, monetary policy follows a rule of the form:

$$i_t^* = i^* + \beta(E\{\pi_{t,k}|\Omega_t\} - \pi^*) + \gamma E\{x_{t,k}|\Omega_t\} \quad (1)$$

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 policymakers at 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>11</sup>

This formulation states that the policymaker seeks to maintain inflation on track and to keep the output gap as small as possible. The typical instrument is the interest rate, but it could be a monetary aggregate as well.<sup>12</sup> On the standard view that higher real interest rates reduce both output and inflation, a coefficient of  $\beta$  above 1 suggests that policy will be stabilizing for inflation. Similarly, a coefficient of  $\gamma$  above 0 would be stabilizing for output. Strict inflation targeting would be a restricted form of equation (1), in which the weight on the output gap is zero. (The output gap is still in  $\Omega$  and thus matters for policy, a point to which we return below.) A policy rule of this type can be derived for a closed economy with nominal price rigidities, using a quadratic loss function in deviations of inflation and output from their targets. The rule has provided a reasonably accurate way of describing central bank behavior in advanced economies like the United States, Germany, and Japan.

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<sup>10</sup> For example, Hausmann et al. (1999).

<sup>11</sup> This discussion closely follows Clarida, Galí and Gertler (2000).

<sup>12</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.

In open economies, the most obvious complication concerns the role of the exchange rate, which provides additional channels for monetary policy. The main effect is that interest rate contractions now affect inflation more rapidly through exchange rate appreciation, while their effect on output is also enhanced by the appreciation. Thus, smaller changes in the interest rate are needed for given deviations of output and inflation.<sup>13</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.

### C. The Taylor Rule in the Tropics

Can emerging markets float meaningfully and run independent monetary policies? The three conditions that matter are policy credibility, inflation pass-through, and financial fragility with respect to exchange rate movements. Lack of central bank credibility may lead markets to interpret any loosening as a permanent shift towards higher inflation, implying that there is no benefit to discretion. High inflation pass-through means that exchange rate devaluations tend to be more inflationary than expansionary. (High pass-through may result from lack of credibility, as wage and price setters interpret exchange rate depreciations as a loosening of monetary policy, rather than a change in relative prices.) In conditions of financial fragility, exchange rate movements may have adverse real effects through the balance sheets of banks, firms, and the government.

Thus, poor credibility and high pass-through make it difficult for a central bank to float and operate an independent monetary policy that might be represented by a Taylor-rule approach. The implications of balance sheet effects are more complicated, but the basic closed-economy results are likely to endure. Even the likelihood that devaluations will be less expansionary does not undermine the closed-economy logic of the Taylor rule.

Two further complications arise in the shift to the open economy. First, the output effects of devaluations may be highly nonlinear, with large devaluations having dramatically stronger effects. This, in turn, affects the optimal response during crises. 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 both cases, the central bank might therefore pay attention to the exchange rate beyond its role in predicting inflation and the output gap.<sup>14</sup>

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<sup>13</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.

<sup>14</sup> See Eichengreen (2002) and Céspedes, Chang and Velasco (2001) for further discussion.

Do emerging market floaters follow Taylor rules? Table 8 reports results for Chile from Corbo (2000) and Restrepo (1998) and Peru from Morón and Castro (2000), along with the baseline estimates for the G3 countries from Clarida, Galí and Gertler (1997).<sup>15</sup>

While the evidence is not conclusive, it is consistent with the view that these emerging markets made effective use of monetary policy. The coefficient  $\beta$  for Chile is above 1 and 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. Analogous results hold for Peru with respect to money supply. The coefficient  $\gamma$  is closer to zero for both Chile and Peru, consistent with the hypothesis that the authorities may not respond to the output gap beyond its implications for price pressures.<sup>16</sup>

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, taking the results at face value, both Chile and Peru would seem to have paid attention to variables other than inflation and the output gap, possibly in the earlier part of the period considered by the authors.

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. It is also more difficult to identify the monetary policy instrument in emerging markets, especially where the authorities attempt to control a monetary aggregate but do so only imperfectly.<sup>17</sup>

#### **D. 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.

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<sup>15</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>16</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.

<sup>17</sup> For relevant empirical research, see Edwards and Savastano (1998) and Hausmann et al. (1999).

Table 8. Taylor Equations for Various Countries<sup>1</sup>

	$\beta$	$\gamma$	Coefficient on Additional Variables
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)		0.61 (0.24)
Chile <sup>5</sup>	1.60 (0.12)	-0.03 (0.19)	
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)

<sup>1/</sup> 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, Gali and Gertler (1997), Chile is from Corbo (2000) and Restrepo (1998), and Peru is from Morón and Castro (2000).

<sup>2/</sup> Monthly data from 1979 through 1994.

<sup>3/</sup> From Corbo (2000). 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 0.24.

<sup>4/</sup> From Corbo (2000). In the past, Chile used to have 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.

<sup>5/</sup> From Restrepo (1998).

<sup>6/</sup> 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.

## Terms-of-Trade Shocks

Under floating rates, a negative shock to the terms of trade should depreciate the exchange rate.<sup>18</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. To the extent that emerging markets’ central banks 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. Drawing on a sample of developing countries over the past three decades, Broda (2002) examines whether the responses of real GDP, the real exchange rate, and inflation to negative terms of trade shocks differ systematically across exchange rate regimes. He finds that countries with fixed exchange rates suffer large and significant losses in terms of real GDP growth, and display real exchange rate depreciations only after two years. By contrast, countries with floating rates display immediate large nominal and real depreciations, some inflation, and much smaller output losses. Emerging market floaters with a high degree of de facto dollarization do not look different in this regard.

Another 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. Rogoff and Chen (2001) 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 many emerging and developing countries as well. Cashin et al. (2002) show that for many countries that depend on commodity exports,

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<sup>18</sup> Rogoff and Chen (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.



real exchange rate movements are highly correlated with commodity prices, and the real exchange rate is cointegrated with (trending) commodity prices.

### **Foreign Interest Rate Shocks**

An increase in foreign interest rates will 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 permit some depreciation.<sup>19</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.

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 et al. (2002) 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 et al. (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 SAR, 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 surprise changes in the U.S. Fed Funds rate. They employ a dynamic specification to estimate impact as well as long-run effects, a potentially important difference given that the optimal response to permanent and temporary shocks is likely to vary, as we have seen. They find that interest rates in Hong Kong SAR 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 in response 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

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<sup>19</sup> These points are made by Eichengreen (2002) informally and by Parrado and Velasco (2002) in an optimizing model of a small open economy in the Obstfeld and Rogoff (1996) tradition.

less precise, making it difficult to discern a significant difference compared with Argentina. Therefore 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).

### **E. Inflation Pass-Through**

In this section we ask whether exchange rate pass through is so high in some emerging markets that floating exchange rates are not a viable option. High pass-through from inflation to prices might be suggestive of low monetary policy credibility, in that innovations to the exchange rate are in this case interpreted not as relative price shifts but as signs of an inflation burst to come. Moreover, where recent history is highly inflationary, a foreign currency may serve as the unit of account, further enhancing inflation pass-through and impairing the role of the exchange rate.

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 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 1 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>20</sup>

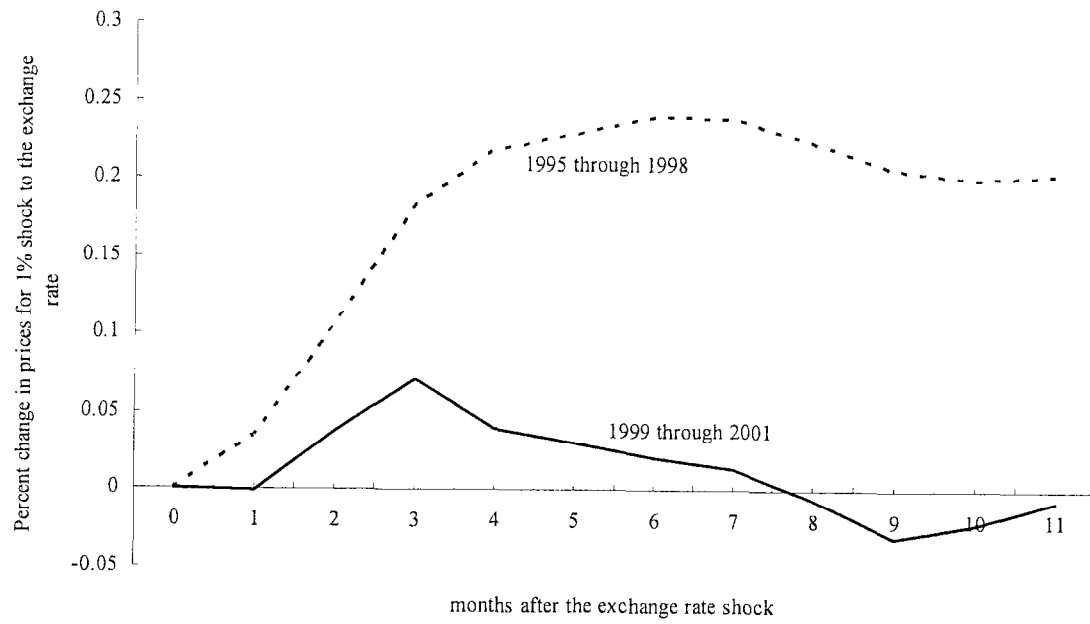
## **VI. CONCLUSIONS**

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

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<sup>20</sup> Carstens and Werner (1999) present further evidence to this effect.

Figure 4. Inflation Pass-through in Mexico



An independent common currency does not seem warranted for Latin American countries, because the necessary degree of economic integration is absent. Especially for countries that are closely linked to global financial markets, the choice in the near term increasingly seems to be between dollarization and floating, with a large question mark on exactly how free that floating can 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 countries lacking credibility and facing high de facto dollarization. The ideal candidate for dollarization is a small economy, with close trade and economic links to the United States, a high degree of spontaneous dollarization, and low central bank credibility. The most likely candidates tend to be in Central America.

Many countries in South America have greater credibility problems, but may also benefit more from exchange rate flexibility. Brazil, Chile, and Colombia seem relatively well suited for floating. There is, however, much debate on whether emerging markets can meaningfully and successfully float. A working float is not necessarily a pure float. Indeed, emerging markets, as well as advanced countries, often intervene in the foreign exchange market and regularly conduct monetary policy with a close eye on the exchange rate.

Emerging markets with floating exchange rates seem on the whole to respond to terms of trade shocks with appropriate adjustments in exchange rates and relative prices, adjustments that would be painful if they had to take place through changes in nominal prices instead. There is tentative evidence that emerging market floaters allow interest rates to fall in response to relatively low inflation and to lower foreign interest rates. On the whole, several countries in the region seem to be good candidates for floating meaningfully and usefully, without paying large costs in terms of lost credibility or increased volatility.<sup>21</sup>

Mexico's close trade relations with the United States suggest the desirability of currency union, or unilateral dollarization, at some stage in the future. Other countries currently fit neither extreme. Argentina has neither the credibility that would make floating easy, nor the close integration with the United States that would favor dollarization. While floating is probably Argentina's most viable option at this stage, the road ahead looks difficult either way.

Success with a given regime may make it more and more viable as time goes by. If floating regimes deliver low inflation, and thereby strengthen credibility, one can hope that they will gradually become even more effective. Eventually, wage indexation may become unnecessary and inflation expectations may cease to be backward-looking.<sup>22</sup> Firms may

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<sup>21</sup> Systematic cross-country studies typically do not find significant differences in economic performance across different types of exchange rate regimes (see, e.g., Ghosh et al., 1997).

<sup>22</sup> Corbo et al. (2001) argue that this has been observed in Latin American inflation targeters in the 1990s.

reduce their vulnerability to exchange rate fluctuations by altering their financial structure to minimize balance sheet effects.<sup>23</sup> Some hint of improved credibility is evident for Chile and Mexico in recent years. For its part, 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>23</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.

## REFERENCES

- Ball, L., 1998, "Policy Rules for Open Economies" NBER Working Paper 6760 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Bayoumi, Tamim, and Barry Eichengreen, 1994, "One Money or Many? Analyzing the Prospects for Monetary Unification in Various Parts of the World," *Princeton Studies in International Finance*, No. 76.
- \_\_\_\_\_, Barry Eichengreen, and Paolo Mauro, 2000, "On Regional Monetary Arrangements for ASEAN," *Journal of the Japanese and International Economies*, Vol. 14, No. 2, pp. 121–148.
- Berg, Andrew, and Eduardo Borensztein, 2000a, "The Choice of Exchange Rate Regime and Monetary Target in Highly Dollarized Economies," *Journal of Applied Economics*, Vol. 3, No. 2, pp. 285–324.
- \_\_\_\_\_, 2000b, "The Pros and Cons of Full Dollarization," IMF Working Paper 00/50 (Washington: International Monetary Fund).
- Berg, Andrew and Catherine Pattillo, 1999, "Are Currency Crises Predictable? A Test," *Staff Papers*, International Monetary Fund, Vol. 46, (June), pp.107–38.
- Berg, Andrew, Eduardo Borensztein, Gian Maria Milesi-Ferretti, and Catherine Pattillo, 2000, "Anticipating Balance of Payments Crises—The Role of Early Warning Systems," IMF Occasional Paper No. 186 (Washington: International Monetary Fund).
- Blanchard, O., and D. Quah, 1989, "The Dynamic Effects of Aggregate Demand and Supply Disturbances," *American Economic Review*, Vol. 79, pp. 655–73.
- Borensztein, Eduardo, Jeromin Zettelmeyer, and T. Philippon, 2001, "Monetary Independence in Emerging Markets: Does the Exchange Rate Regime Make a Difference?" IMF Working Paper 01/1 (Washington: International Monetary Fund).
- Broda, C., 2000, Terms of Trade and Exchange Rate Regimes in Developing Countries (unpublished).
- Caballero, R. J., and Arvind Krishnamurthy, 2001, "A 'Vertical' Analysis of Crises and Intervention: Fear of Floating and Ex-Ante Problems," NBER Working Paper No. 8428 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Calvo, Guillermo, and Carmen Reinhart, 2002, "Fear of Floating," *Quarterly Journal of Economics*, Vol. 117, No. 2, May.

- Cecchetti, S. G., and M. Ehrmann, 1999, "Does Inflation Targeting Increase Output Volatility? An International Comparison of Policymakers," Preferences and Outcomes, NBER Working Paper No. 7426, (Cambridge, Massachusetts: National Bureau of Economic Research).
- Céspedes, L. F., R. Chang, and A. Velasco, 2001, "Balance Sheets and Exchange Rate Policy," (unpublished).
- Clarida, R. H., 2001, "The Empirics of Monetary Policy Rules in Open Economies," NBER Working Paper No. 8603 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Clarida, R., J. Gali, and M. Gertler, 1997, "Monetary Policy Rules in Practice: Some International Evidence," NBER Working Paper 6254 (Cambridge, Massachusetts: National Bureau of Economic Research).
- \_\_\_\_\_, J. Gali, and M. Gertler, 2000, "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory," *Quarterly Journal of Economics*, February.
- Collins, S. M., 1996, "On Becoming More Flexible: Exchange Rate Regimes in Latin America and the Caribbean," *Journal of Development Economics*, Vol. 51, pp.117–138.
- Corbo, V. 2000, "Monetary Policy in Latin America in the 90s," Central Bank of Chile Working Papers No. 78.
- \_\_\_\_\_, O. Landerretche, and K. Schmidt-Hebbel, 2001, "Assessing Inflation Targeting After a Decade of World Experience," Oesterreichische Nationalbank Working Paper No. 51.
- Edwards, S., and Miguel Savastano, 1998, "The Morning After: The Mexican Peso in the Aftermath of the 1994 Currency Crisis," NBER Working Paper No. 6516 (Cambridge, Massachusetts: National Bureau of Economic Research).
- \_\_\_\_\_, 1999, "The Choice of Exchange Rate Regime in Developing and Middle Income Countries," in *Changes in Exchange Rates in Rapidly Developing Countries: Theory, Practice, and Policy Issues*, NBER-East Asia Seminar on Economics, Vol. 7, ed. by T. Ito and Anne O. Krueger (Chicago and London: University of Chicago Press).
- Eichengreen, Barry, 1998, "The Only Game in Town," *The World Today* (December).
- \_\_\_\_\_, 2002, "Can Emerging Markets Float? Should They Inflation Target?" Banco Central Do Brasil Working Paper Series 36, February.

- \_\_\_\_\_, and R. Hausmann, 1999, "Exchange Rates and Financial Fragility" NBER Working Paper No. 7418 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Engel, C., and J. H. Rogers, 1996, "How Wide is the Border?," *American Economic Review*, Vol. 86, pp. 1112–25.
- Fischer, Stanley, 2001, "Exchange Rate Regimes: Is the Bipolar View Correct?," *Journal of Economic Perspectives*, Vol. 15, No. 2, pp. 3–24.
- Flood, Robert P., and A. K. Rose, 1999, "Understanding Exchange Rate Volatility Without the Contrivance of Macroeconomics," (unpublished).
- Frankel, Jeffrey A., and A. K. Rose, 1998, "The Endogeneity of the Optimum Currency Area Criteria," *Economic Journal*, Vol. 108, pp.1009–25.
- \_\_\_\_\_, 2002, "An Estimate of the Effect of Common Currencies on Trade and Income," *Quarterly Journal of Economics*, Vol. 117, No. 2.
- Frankel, Jeffrey A, S. Schmukler, and L. Servén, 2000, "Global Transmission of Interest Rates: Monetary Independence and Currency Regime," Mimeo, World Bank.
- Frieden, J., P. Ghezzi, and E. Stein, 2000, "Politics and Exchange Rates: A Cross-Country Approach to Latin America," Research Network Working Paper R-421, Inter-American Development Bank, October.
- Ghosh, Atish R., A. Gulde, Jonathan Ostry, and H. C. Wolf, 1997, "Does the Nominal Exchange Rate Regime Matter?," NBER Working Paper 5874 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Glick, R., and A. K. Rose, 1999, "Contagion and Trade: Why Are Currency Crises Regional?," *Journal of International Money and Finance*, Vol. 18, No. 4, pp. 603–17.
- Goldstein, Morris, 2002, "Managed Floating Plus," *Policy Analyses in International Economics*, Vol. 66, March.
- Hausmann, R., U. Panizza, and E. Stein, 2000, "Why Do Countries Float the Way They Float?," IADB Working Paper No. 418 (Washington: Inter-American Development Bank).
- \_\_\_\_\_, M. Gavin, C. Pages-Serra, and E. Stein, 1999, "Financial Turmoil and the Choice of Exchange Rate Regime," IADB Working Paper No. 400 (Washington: Inter-American Development Bank).



- Ize, A., and E. Levy-Yeyati, 1998, "Dollarization of Financial Intermediation: Causes and Policy Implications," IMF Working Paper 98/28 (Washington: International Monetary Fund).
- Jadresic, E., Paul Masson, and Paolo Mauro, 2001, "Exchange Rate Regimes of Developing Countries: Global Context and Individual Choices," *Journal of the Japanese and International Economies*, Vol. 15, pp. 68–101.
- Jeanne, Olivier, 2002, "Why Do Emerging Economies Borrow in Foreign Currency?," Forthcoming. Research Department, International Monetary Fund.
- Juhn, Grace, and Paolo Mauro, 2002, "Long-Run Determinants of Exchange Rate Regimes: A Simple Sensitivity Analysis," IMF Working Paper 02/104 (Washington: International Monetary Fund).
- Klein, M., 2002, "Dollarization and Trade," (unpublished).
- Larraín, B. F., and A. Velasco, 2001, "Exchange Rate Policy in Emerging Markets: The Case for Floating," (unpublished).
- Levy-Yeyati, Eduardo, and Federico Sturzenegger, 1999, "Classifying Exchange Rate Regimes: Deeds vs. Words," Business School, Universidad Torcuato Di Tella, November, [www.utdt.edu/~ely/papers.html](http://www.utdt.edu/~ely/papers.html).
- Martínez, L., and A. Werner, 2001, "The Exchange Rate Regime and the Currency Composition of Corporate Debt: The Mexican Experience," paper prepared for the NBER-Interamerican Seminar on Economics, July 20–21, 2001.
- Masson, Paul, 2001, "Exchange Rate Regime Transitions," *Journal of Development Economics*, Vol. 64, pp. 571–86.
- Mishkin, F. S., and Miguel Savastano, 2000, "Monetary Policy Strategies for Latin America," NBER Working Paper 7617 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Morón, E., and J. F. Castro, 2000, "Uncovering Central Bank's Monetary Policy Objectives: Going Beyond Fear of Floating." This paper is part of the Macroeconomic Studies at the Research Center of Universidad de Pacífico.
- \_\_\_\_\_, and D. Winkelried, 2001, "Monetary Policy Rules for Financially Vulnerable Economies," (unpublished).
- Mundell, R. A., (1961), "A Theory of Optimum Currency Areas," *American Economic Review*, November.

- Mussa, Michael, Paul Masson, Alexander Swoboda, E. Jadresic, Paolo Mauro, and Andrew Berg, 2000, *Exchange Rate Regimes in an Increasingly Integrated World Economy*, IMF Occasional Paper No. 193 (Washington: International Monetary Fund).
- Obstfeld, M., and Kenneth Rogoff, 1995, "The Mirage of Fixed Exchange Rates," *Journal of Economic Perspectives*, Vol. 9, No. 4, Fall, pp. 73–96.
- Parsley, D. C., and Shang-Jin Wei, 2001, "Limiting Currency Volatility to Stimulate Goods Market Integration: A Price-Based Approach," IMF Working Paper 01/197, (Washington: International Monetary Fund).
- Persson, T., 2001, "Currency Unions and Trade: How Large is the Treatment Effect?," *Economic Policy*, Vol. 16, pp. 433–62.
- Restrepo, J.E., 1998, "Reglas Monetarias en Colombia y Chile," *Coyuntura Economica*, Vol. 28, No. 4, pp. 132–54.
- Rose, A. K., 2000, "One Money, One Market: The Effect of Common Currencies on Trade," *Economic Policy*, No. 30, pp. 9–45.
- Svensson, L.E.O., 2000, "Open-Economy Inflation Targeting," *Journal of International Economic* Vol. 50, pp.155–83.
- Taylor, J. B., 2000, "Using Monetary Policy Rules in Emerging Market Economies," revised version of a paper presented at the 75<sup>th</sup> Anniversary Conference: Stabilization and Monetary Policy: The International Experience, November 14–15, 2000, at the Bank of Mexico.
- Tenreyro, S., 2001, "On the Causes and Consequences of Currency Unions," (unpublished; Harvard University).
- Velasco, A., 2001, "The Impossible Duo? Globalization and Monetary Independence in Emerging Markets," paper prepared for the 2001 meeting of the Brookings Trade Forum, May 10 and 11, Washington D.C.