

## Full Dollarization: The Case of Panama

Even the more resolute, on any occasion of disgust or disappointment hereafter, might falter in purpose, and, getting possession of the vessels, abandon the enterprise. The best chance of success was to cut off these means. He came to the daring resolution to destroy the fleet, without the knowledge of his army. . . . The destruction of his fleet by Cortés is, perhaps, the most remarkable passage in the life of this remarkable man. History, indeed, affords examples of a similar expedient in emergencies somewhat similar; but none where the chances of success were so precarious, and defeat would be so disastrous. . . . The measure he adopted greatly increased the chance of success.

—William H. Prescott, *History of the Conquest of Mexico*

**W**hy should a country adopt a foreign currency as its legal tender? Leaving aside the trauma of losing its national symbol, what are the disadvantages and advantages of substituting domestic currency for a hard currency? These questions are becoming increasingly relevant as several countries in Latin America are either adopting (for example, Ecuador and El Salvador) or considering (as in Argentina) the U.S. dollar as the legal tender.

This paper explores these questions by analyzing the case of Panama, one of the largest countries currently using the dollar as its legal tender. Panama has had a dollarized economy for more than ninety years. This allows us to verify some of the predictions of the theory on the costs and benefits of full dollarization. The limits of this strategy are well known: it is difficult to separate the effect of full dollarization from the effects of many other idiosyncratic characteristics of Panama. The paper controls for some of these effects by comparing Panama with the rest of Latin America,

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in particular with Costa Rica (which is also a relatively small economy) and Argentina (which uses a currency board).

The theoretical debate on the benefits and costs of dollarization covers three sequential subjects. The first subject is whether a fixed exchange rate is relatively more advantageous than a more flexible regime. The literature on this issue is vast, in particular in the context of the optimal currency area. Second, once the relative costs and benefits of a fixed exchange regime are laid down, one can analyze which type of fixed regime is more appropriate, for example, a simple parity versus a more rigid regime such as a currency board. Finally, the third subject encompasses the marginal benefits and costs that apply exclusively when a country decides to abandon its currency and adopt a hard currency. Here issues like completely renouncing the associated seigniorage revenues are relevant.

The main issues discussed in the paper are the following: whether dollarization generates sufficient gains in credibility to reduce spreads on sovereign external bonds and also on domestic interest rates; whether the gains on lower inflation offset the cost of losing seigniorage revenues and the ability to use monetary policy to offset external and internal shocks; whether dollarization promotes fiscal discipline; and whether dollarization improves the efficiency of financial markets. In the process of exploring these points, the paper reviews several aspects of the Panamanian experience. First, the paper compares Panama's long-term macroeconomic performance with that of other Latin American countries, concentrating on the effect of different exchange rate regimes. Second, the paper describes Panama's macroeconomic experience in detail, highlighting its low inflation, the growth performance of its gross domestic product (GDP), and its peculiar real exchange rate depreciation trend. Third, the paper evaluates the effect of full dollarization on domestic interest rates and sovereign spreads in Panama. Fourth, the paper analyzes whether the exchange rate regime has induced fiscal discipline in Panama. Fifth, the paper evaluates Panama's performance during the Asian and Russian crises. Finally, the paper studies the effects of external confidence and world production shocks in Panama relative to Costa Rica and Argentina, using a vector autoregressive analysis.

The main conclusions drawn from the case of Panama are that, on one hand, dollarization does not guarantee fiscal discipline, and the elimination of currency risk does not preclude default risk or the high volatility of sovereign spreads. On the other hand, a dollarized economy delivers

an impressive inflation performance and may even reduce the impact of external confidence shocks, although not world production shocks. Finally, it is not clear whether the low interest rates in Panama are a consequence of the dollarization regime or the competitive internationalized banking system.

The paper is organized as follows. The next section addresses theoretical issues. This is followed by a study of Panama's macroeconomic performance and, subsequently, the econometric comparative exercises. The final section presents our concluding arguments. The appendix includes extensions for the econometric exercises.

## Dollarization in Theory

For a country evaluating the possibility of dollarization, the first decision to be made is whether to adopt a flexible or a fixed regime. The literature on this issue is vast. For example, the optimal currency arrangement literature has identified the preconditions for a country to join a monetary union.<sup>1</sup> This body of literature argues that fixed exchange rates are more costly when the shocks are more asymmetrical between the economies and when it is harder for an individual country to smooth shocks by means other than the exchange rate. The adoption of a fixed exchange rate regime without the necessary preconditions may entail large costs in terms of GDP volatility and unemployment. The benefits of the pegged regime are that it reduces the transaction costs and risks associated with a floating regime (which discourage trade and investment) and provides an easy nominal anchor for the economy (pegs have helped reduce inflation in many developing countries). More modern arguments against fixed exchange rate regimes highlight the large costs of the recent exchange rate and financial crises. These costs include not only the large GDP drops that were termed sudden stops, but also the costs associated with bailing out the banking and corporate sectors.<sup>2</sup>

The long list of speculative attacks and exchange rate crises in the last decade has prompted the argument that simple fixed exchange rate regimes are no longer desirable or even sustainable. The alternative for countries

1. See Blejer and others (1997).

2. Dornbusch, Goldfajn, and Valdés (1995); Calvo (1999).

that insist on fixed exchange parities is to make more credible commitments, for example, by making the parity a constitutional amendment and defining the proportion of the domestic currency that would be covered by foreign exchange reserves, as in the currency board regime. Defenders of hard pegs argue that the origin of all the problems is the low credibility of simple fixed regimes. The balance of the costs and benefits of abandoning the peg in moments of distress determines the credibility of the regime. The higher the costs, the more credible the regime would appear. The conclusion, therefore, is that more rigid regimes, defined as those with higher exit costs, would tend to be more credible. The irony is that for a given cost of abandoning the regime, sticking to the parity may not increase the credibility of the policy. In the words of Drazen and Masson, "If there is persistence in unemployment, observing a tough policy in a given period may lower rather than raise the credibility of a no-devaluation pledge in subsequent periods."<sup>3</sup>

The trade-off between credibility and flexibility is crucial, assuming that the latter helps stabilize the economy in the event of a shock. Credibility is enhanced when governments try to tie their hands by increasing ex ante their exit costs through the adoption of a more rigid exchange rate regime.<sup>4</sup> Of course, the cost of abandoning the regime is also partially determined by market forces and the history of the economy. An important example is the existence of an unofficial dollarized economy arising after a history of high inflation rates increases uncertainty. In this case the costs of abandoning the regime could be the return of the inflationary past. Another example is the currency mismatch in the balance sheets of banks and corporations encouraged by the implicit guarantee that a fixed exchange rate would last indefinitely. Under these conditions, modifying the parity could generate a serious banking and corporate crisis.

The presumption that flexibility enhances stability is questioned implicitly by Calvo and Reinhart and by Hausmann, Panizza, and Stein, who stress the harmful effects of the fluctuation on domestic banks and corporate balance sheets with large foreign exchange-denominated liabilities.<sup>5</sup> In this situation, allowing large fluctuations in the exchange rate could be extremely harmful not just for these exposed agents, but also for the entire

3. Drazen and Masson (1994). In a nice analogy, Drazen and Masson argue that the credibility of a fasting diet diminishes as time goes by.

4. See Olivares (2000).

5. Calvo and Reinhart (2000a, 2000b); Hausmann, Panizza, and Stein (2000).

domestic financial system, since abrupt depreciations could generate a situation of generalized insolvency. This argument favors the adoption of hard pegs. Chang and Velasco argue, however, that “the most important caveat for this argument is that, if a real depreciation is called for because of an external shock, it will take place regardless of the exchange rate system.”<sup>6</sup> Céspedes, Chang, and Velasco—who use a small open economy model in which real exchange rates play a central role in the adjustment process and liabilities are dollarized—show that, first, financial fragility alone does not amount to a watertight case against floating and, second, flexible exchange rates can play a stabilizing role even with dollarized liabilities and credit constraints.<sup>7</sup>

Another argument in favor of adopting a hard peg is its alleged incentive for fiscal discipline. Under this line of argument, the elimination of the possibility of printing money would limit the possibilities of financing fiscal deficits and would prompt greater fiscal discipline. As Tornell and Velasco show, however, fixed exchange rates do not necessarily provide more fiscal discipline than do flexible rates.<sup>8</sup> The intuition behind this result is clear: the costs of imprudent fiscal behavior exist under both fixed and flexible exchange rate regimes; the difference between these regimes is the intertemporal distribution of these costs. In a flexible regime, fiscal misbehavior is revealed immediately through movements in the exchange rate and the price level. In contrast, in a fixed regime, fiscal misbehavior is revealed only when the situation becomes unsustainable. Fixed regimes could thus fail to provide increased fiscal discipline if they allow the fiscal authority to hide or postpone the costs generated by their lack of discipline. The authors conclude that “fixed rates induce more fiscal discipline than flexible rates only when fiscal authorities are sufficiently patient, so that future costs have enough deterrent power.”<sup>9</sup> Tornell and Velasco present evidence from Latin American countries to demonstrate that exchange rate–based stabilizations failed to provide more fiscal discipline than did money–based programs.<sup>10</sup> Similarly, Gavin and Perotti do not find evidence that fixed exchange regimes impose greater fiscal discipline in Latin American countries; rather, they find that fiscal expan-

6. Chang and Velasco (2000, p. 73).

7. Céspedes, Chang, and Velasco (2000).

8. Tornell and Velasco (1995, 2000).

9. Tornell and Velasco (1995, p. 761).

10. Tornell and Velasco (1998).

sions in Latin America are significantly associated with exchange rate collapses.<sup>11</sup>

One consequence of implementing more rigid regimes like a currency board or full dollarization is the end of the central bank's role as the economy's lender of last resort. This induces banks to seek alternative contingent credits, particularly foreign funds, to partially fill the role of lender of last resort. The necessity of securing foreign funds gives a competitive edge to international banks over domestic banks, which creates a more international banking system. In this sense, liberalizing the financial sector would be a necessary condition for successfully implementing regimes such as a currency board or full dollarization.

But what determines whether one should choose a currency board or full dollarization? First, one could think of full dollarization as a regime with even more credibility at the cost of even less flexibility. The argument in favor of a more credible fixed exchange rate regime could be taken to the extreme in advocating full dollarization. Second, one of the costs of choosing a full dollarization regime over a currency board is the loss of seigniorage revenues. Although the currency board regime cannot resort to printing money to finance deficits, the country's existing inflation and GDP growth cause a natural expansion in the demand for money, which generates revenues for the government. Finally, one of the crucial issues in the debate is the claim that because full dollarization eliminates currency risk, it can reduce both domestic interest rates and spreads on external bonds. In principle, interest rates could reflect mostly default risks, such that the elimination of currency risk would have little effect on the level of spreads and interest rates. The issue, then, is whether the elimination of currency risk has an effect on the default risk. Empirically, the impact of full dollarization on default risk (and on country risk, in general) remains an open question. The literature includes theoretical arguments that explain the rationale for a positive correlation between currency and default risk, but opposing arguments identify a negative correlation.

There are basically four arguments suggesting a reduction in default risk under full dollarization.<sup>12</sup> The first argument is related to the so-called balance sheet effect. Since most of the countries considering the adoption

11. Gavin and Perotti (1997).

12. See Powell and Sturzenegger (2000).

of full dollarization exhibit a significant currency mismatch in their balance sheets, the elimination of the currency risk would imply that balance sheets are safer and defaults are less likely. The second argument is related to the first: the adoption of full dollarization would eliminate the risk of currency collapse and reduce the risk of speculative attacks, which is one of the main reasons for a high risk premium. Third, because it imposes a straightjacket on fiscal policy, the adoption of full dollarization would increase the credibility of policymakers and reduce interest rates. Finally, the adoption of a hard currency as legal tender may foster financial integration and open the door for efficiency gains within local financial intermediaries, gains that should be reflected in lower interest rates. The effect on the domestic interest rates may depend more on the degree of financial integration than on the full dollarization regime itself. It is difficult to separate the two effects, however. According to Berg and Borensztein, "Another powerful but somewhat hypothetical argument for full, legal dollarization is that the change in monetary regime may establish a firm basis for a sound financial sector, which would provide the basis for strong and steady economic growth."<sup>13</sup>

The arguments identifying an inverse relation between dollarization and default risk are also four.<sup>14</sup> First, the elimination of local currency-denominated bonds could imply that after the adoption of full dollarization, the price of foreign currency-denominated debt would reflect all the risks. Sims defends this argument, claiming that as "soon as dollar debt becomes the entire stock of debt, its return must reflect the full range of uncertainty."<sup>15</sup> Second, the impossibility of using the inflation tax could result in a reduction in the government's ability to pay back its debt, increasing the default risk of this debt. Third, the elimination of local currency-denominated assets would diminish the investors' possibilities of diversification, which may raise the risk premium on the remaining instruments. Finally, in the absence of exchange rate flexibility, the elimination of currency risk may result in an increased probability of default. Without price flexibility, a severe negative terms-of-trade shock, for instance, could require such a large recession that policymakers may prefer to default on external obligations.

13. Berg and Borensztein (1999, p. 14).

14. See Powell and Sturzenegger (2000).

15. Sims (2000, p. 11).

## Full Dollarization in Practice: The Case of Panama

Not many large economies opt for a full dollarization regime. The Republic of Panama is a relatively small economy, which had an overall GDP of \$6.9 billion in 1998. The population is 2.76 million people. According to official statistics, Panama's employed labor force was only 945,000 people in 1998. The U.S. dollar has been legal tender in Panama since 1904, although a national currency, the balboa, is also used for small transactions and as a unit of account.

Panama's decision to dollarize the economy was the outcome of political and historical processes rather than an economic choice for this exchange regime. Because of its strategic location as a narrow strip of land connecting North and South America, Panama has been a natural crossroads for trade and transit since colonial times. This characteristic led, first, to the construction of the Panama Canal at the beginning of this century and, second, to the establishment of the Colón Free Zone in 1948. The Colón Free Zone is an international trade facility that allows businesses to operate without paying import duties or taxes; it is the second largest in the world, just surpassed by Hong Kong. Dollarization came as a natural consequence of the international influence in the area and the importance of Panama.

### *Macroeconomic Performance and the Exchange Regime*

It is important to review the vast literature on macroeconomic performance and the exchange rate regime before analyzing the case of Panama. Edwards uses a sample of fifty-two developing countries to analyze whether a fixed exchange rate regime indeed provides lower inflation rates than more flexible regimes.<sup>16</sup> He finds that countries with fixed exchange regimes have experienced lower inflation rates, but that this result depends on the country's inflationary history.

Edwards and Losada analyze whether fixed exchange rate regimes impose macroeconomic discipline in two small Central American economies, namely, Guatemala and Honduras.<sup>17</sup> These countries had fixed exchange regimes for nearly seven decades (Guatemala from 1926 to 1986 and Honduras from 1918 to 1990). Using time-series methods, they find

16. Edwards (1993).

17. Edwards and Losada (1994).



**TABLE 1. Macroeconomic Performance in Panama and Developing Countries, 1960–95**  
Percent deviation from average for all countries

<i>Macroeconomic indicator</i>	<i>Panama</i>	<i>Average for various exchange rate regimes<sup>a</sup></i>		
		<i>Pegged</i>	<i>Intermediate</i>	<i>Floating</i>
<b>Inflation</b>				
Rate	-5.2	-2.90	-0.10	3.80
Volatility	-2.9	-1.74	0.53	1.67
<b>Output</b>				
GDP growth	-1.6	0.00	0.70	0.50
GDP volatility	0.6	0.08	-0.80	-0.52
Employment volatility	-0.2	0.05	0.01	-0.32

Source: Andrew Berg and Eduardo Borensztein, 1999, "Full Dollarization," International Monetary Fund (IMF), mimeographed. For methodology and results for developing countries, see Atish Ghosh and others, 1997, "Does the Nominal Exchange Rates Regime Matter?" Working Paper 5874, Cambridge, Mass.: National Bureau of Economic Research.

a. Database includes all developing countries with data from 1960 to 1995, classified by exchange rate regime.

that in both countries the fixed exchange rate regime worked relatively well until the mid-1970s, but that the fixed exchange regime was not a sufficient condition to avoid inflation outbursts and balance-of-payments crises. According to these authors, the adoption of fixed exchange regimes imposes some constraints on macroeconomic behavior, but it does not guarantee stability if the country can increase its foreign indebtedness. In fact, they suggest that it was not optimal for these countries to maintain a fixed exchange rate during a period of large negative terms-of-trade shocks in the late 1970s and early 1980s.

Using the Exchange Arrangements and Restrictions published by the International Monetary Fund (IMF), Ghosh and others find reasonable confirmation of the predictions of the theory.<sup>18</sup> First, the paper finds that countries with fixed exchange rate regimes enjoy both lower average inflation rates and less volatility than countries with flexible regimes, which the authors associate with a higher degree of credibility of the authorities. Second, the paper finds that real volatility is higher under pegged regimes than under floating ones.

We tested the results of Ghosh and others by comparing the case of Panama with a group of developing countries. As table 1 shows, Panama follows the pattern of other pegged regimes regarding inflation and GDP

18. Ghosh and others (1997). The IMF's Exchange Arrangements and Restrictions publication is known to report exchange regimes as defined by the reporting country, a procedure that does not always lead to a fair characterization of the regime.

**TABLE 2. Macroeconomic Performance in Latin America, 1970–98**

Percent

Country	Inflation <sup>a</sup>		GDP growth <sup>b</sup>		Fiscal deficit <sup>c</sup> (percent of GDP)
	Average	Volatility	Average	Volatility	
Argentina	46.79	31.50	2.3 (2.4)	5.1 (4.7)	3.7
Brazil	62.43	30.67	4.6 (4.6)	4.4 (3.8)	4.7
Chile	26.42	22.92	4.2 (4.5)	6.3 (5.3)	0.5
Costa Rica	14.20	9.06	4.2 (4.5)	3.5 (2.8)	3.0
Mexico	22.57	14.93	4.0 (4.2)	3.8 (3.2)	4.4
Panama	3.25	3.46	4.1 (4.1)	5.7 (3.6)	3.8
Peru	36.49	27.65	2.6 (2.8)	5.8 (4.9)	3.4

Source: International Financial Statistics (IFS).

a. To avoid outliers, we calculated the average and volatility of inflation using  $\pi' = \pi/1 + \pi$ . Volatility is measured through the standard deviation.

b. The numbers in parentheses are the values obtained after eliminating both the best and the worst observations in the sample.

c. The public sector borrowing requirement of the Central Government.

volatility. First, inflation in Panama is lower than more flexible regimes. Ghosh, Gulde, and Wolf actually find evidence of an inverse relation between the degree of rigidity of the exchange rate regime and inflation rates.<sup>19</sup> According to these authors, the inflation rate in countries with currency boards was about 4 percentage points lower, on average, than under other pegged regimes in the period studied. They conclude that “this lower inflation was achieved by having lower money growth rates (a discipline effect). But the difference in money growth rates is not sufficient to explain the inflation differential, suggesting an additional confidence effect whereby higher money demand results in lower inflation. Numerically, this confidence effect is substantially larger than the discipline effect, accounting for 3.5 percentage points out of the 4.0 percentage point differential.”

Second, average output growth is much lower in Panama than in the average developing country. This suggests that more rigid regimes have lower average growth rates. In fact, table 2 shows that the average growth rate in Panama between 1970 and 1998 is not atypical compared with other Latin American countries. Panama’s overall macroeconomic performance compares well with other Latin American countries over the period, but it is not outstanding. On the one hand, Panama’s superb inflation performance is clearly an exception in Latin America, whether measuring by the average or the volatility of inflation, and average GDP growth is not

19. Ghosh, Gulde, and Wolf (1998, p. 7).

much lower than in any other Latin American country. On the other hand, the country's fiscal performance is not outstanding, ranking above only the worst Latin American performers such as Brazil and Mexico.

The relative volatility of GDP growth in Panama is another interesting issue. Table 1 shows that the volatility of GDP growth is higher in Panama than in other developing countries with pegged regimes, which suggests that the degree of flexibility must be lower in Panama. The volatility of Panama's GDP growth also seems to be higher than that of the other Latin American countries in table 2. Panama's GDP growth volatility is below average, however, when the sample is adjusted to exclude the highest and lowest observations (outliers), in order to capture Panama's large decline due to Noriega's crisis. One could argue that an analysis of the growth performance of Panama should exclude the episode of the sanctions imposed by the United States because it configures a clear outlier. This event may not be independent of the exchange regime chosen, however. The suspension of payments (resulting from the freezing of Panamanian accounts in New York) could be a risk associated mainly with a dollarized economy, given that the dollarization regime leads to a large presence of overseas bank accounts. If this is the case, one should not exclude these large drops in GDP because they are intrinsic to the growth distribution of the regime (and thus do not represent an outlier).<sup>20</sup>

This initial comparison already sheds light on important issues regarding full dollarization. We can summarize Panama's relative performance in three points. First, Panama's experience confirms that an exchange rate peg, with dollarization being the extreme example, generates low and stable inflation. In this regard, it seems that the extreme pegs deliver even better inflation performance than do currency boards. Second, this gain in inflation performance is achieved without compromising average GDP growth, although Panama's experience does not show any gain in average growth, either (in contrast to the evidence on currency boards). Third, the absence of monetary financing did not preclude Panama from having large, persistent fiscal deficits that were no better than the typical Latin American country (again this is at odds with the evidence on currency boards).

20. In the same manner, Panizza, Stein, and Talvi (2000) compare GDP growth and volatility in Latin America since 1960. Their conclusions regarding Panama are similar. In the 1980s, Panama's growth volatility was much higher than the average. Growth volatility in other decades was below average.

*Low Inflation, Real Depreciation, and the Inverse of the Balassa-Samuelson Effect*

This section analyzes the macroeconomic performance of Panama in more detail, concentrating on the behavior of inflation. Subsequent sections cover the real sector; spreads and country risk; fiscal policy; domestic interest rates; the banking system; the absence of a lender of last resort; and the reaction of Panama to the crises in the period 1997–99.

Panama's economy shows an impressive performance in terms of price stability. The adoption of the U.S. dollar as legal tender should have implied that in the medium and long run Panama's inflation would approximate that of the United States, given Panama's relatively open economy (35–40 percent of GDP is exports and imports) and the fact that the United States is the country's main trade partner (50 percent of exports and 34 percent of imports). In fact, the inflation rate in Panama did track the U.S. inflation rate closely over the last thirty years. Notwithstanding the cyclical similarities, however, the inflation trend in Panama was lower than in the United States.

This systematically lower inflation in Panama implies that the real exchange rate (RER) is depreciating in the long run, given that Panama is fully dollarized and the United States is its main trade partner. The depreciation trend is robust to using different measures of the real exchange rate, such as those based on the consumer price index (CPI), the wholesale price index (WPI), or the IMF's real effective exchange rate. Of these, the last is the only multilateral real exchange rate.

This RER depreciation trend is extremely interesting because it is at odds with the typical long-run appreciation trend of developing countries. The common explanation for trends in the real exchange rate is based on different paths for the relative price of nontradable goods between countries. The explanation for the typical appreciation trend, then, relies on the so-called Balassa-Samuelson effect, which is the tendency for countries with higher productivity in tradables versus nontradables to have higher price levels. As developing countries catch up with developed countries with regard to productivity levels in tradable goods, their general price level tends to rise and their real exchange rate to appreciate, provided that the convergence in nontradable goods is slower.

In the case of Panama, an unusually high concentration of GDP in services (around 80 percent) means that most of the per capita GDP growth has to reflect increases in labor productivity in the nontradables sector, which pressures down its relative price. Given the openness of Panama's

economy, the law of one price holds well for tradable goods, and a reduction in the relative price of nontradables implies a depreciation of the RER. In other words, Panama's peculiar concentration of GDP in nontradable goods (services) leads to the inverse of the Balassa-Samuelson effect, namely, the tendency of nontradable prices to become cheaper as Panama develops, which causes the RER to depreciate.

In addition to the lower inflation of nontradable prices, low overall inflation and the real depreciation in Panama were partially caused by major trade liberalization reforms that reduced average import tariffs to around 9 percent in 1998.

### *GDP Performance and the Real Sector*

In the period 1961–98, the average annual growth rate in Panama was 5.3 percent, with a standard deviation of 5.0 percent. This average (5.3 percent) was maintained in the period 1990–98, but with a lower variability of 2.7 percent. With the exception of 1983 (the debt crisis) and the period 1987–88 (the result of sanctions imposed by the United States), Panama experienced positive growth rates. In fact, a good part of the overall variability of GDP growth during this period could be attributed to these two episodes.

Panama's GDP is highly concentrated in services. In 1998, 78.3 percent of GDP was produced in the services sector: 20.8 percent in commerce, trade, and restaurants; 12.3 percent in transport and communications, including the Panama Canal Commission; 13.4 percent in financial intermediation; 13.4 percent in housing; and 15.3 percent in public utilities and administration. Only 13.6 percent of GDP was produced in secondary activities, of which 9.7 percent was in manufacturing and 3.9 percent in construction. This generates a service-oriented GDP that has consequences for the real exchange rate and the effect of shocks in the economy.

The average annual unemployment rate for the period 1991–98 was 9.0 percent, based on the international definition of unemployment.<sup>21</sup> Unemployment (using the international definition) was relatively stable in Panama in the 1960s and 1970s at 6.5 percent per year; it then increased in the 1980s to 8.6 percent. The main reasons for the growth of unemployment seem to

21. Unemployment figures in Panama do not follow international standards and include people not actively seeking work. According to the Panamanian definition, the average unemployment rate in this period was 14.1 percent.

be the weak macroeconomic performance in the 1980s, the debt crisis of 1982, and the severe recession of 1988–89. All these factors, together with the rigidity of the Panamanian labor market, explain the persistence of higher unemployment in the 1990s, despite the recovery of the economy.

### *Not Currency Risk, but Default Risk*

As mentioned in the theoretical discussion, one of the main benefits of full dollarization is the possible reduction of the country's borrowing costs. Countries with more extreme (and possibly more credible) exchange rate regimes should have better credit ratings and lower spreads than other countries.

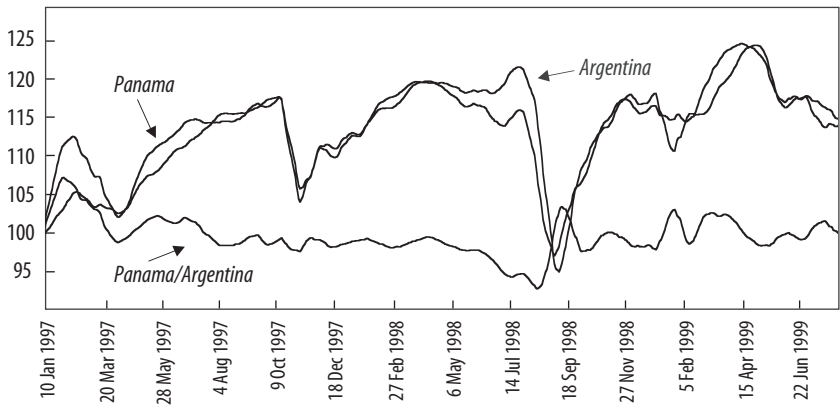
A brief survey of the long-term debt ratings of six Latin American countries, based on the Moody's and Standard and Poor's classifications as of late 2000, is illustrative. According to Moody's, Panama ranks below Argentina, Brazil, and Chile; is at the same level as Costa Rica; and lies above only Peru. Panama fares better under Standard and Poor's, which ranks the country second after Chile. It is thus difficult to conclude that Panama has a better credit rating than the other countries in the sample, despite its completely rigid regime. This suggests that the exchange rate regime is not the single determinant of a country's external credibility.

If currency risk were an important component of default risk, one would expect Panama to pay lower spreads on external bonds than other comparable Latin American countries. Throughout most of 1998, however, Panama paid a higher spread on dollar-denominated external bonds than Costa Rica, for example. This difference increased as the Russian crisis spilled over into a Brazilian crisis. In October 1998, Panama was paying around 700 basis points more than the equivalent U.S. Treasury bond and 340 basis points more than Costa Rica. Therefore one would not necessarily conclude that overall dollarization in Latin America would necessarily reduce spreads across the board.

Another way to analyze this issue is to look at the evolution of the spreads that the countries paid during the recent crises. One would expect, first, that a country with a more rigid regime (implying more credibility) would pay a relatively low spread and, second, that the evolution of this spread would not be affected by the crises, since the credibility of the exchange rate regime would isolate the country from these external problems. Figure 1 shows the J. P. Morgan Emerging Markets Bond Index

**FIGURE 1. Panama and Argentina: J. P. Morgan EMBI+, 1997–99**

31/12/96 = 100



Source: J. P. Morgan.

Plus (EMBI+) for Argentina and Panama. Here we compare spreads paid by Argentina, which is a dollarized economy under a currency board, and Panama, which employs a fully dollarized regime. Both countries were strongly influenced by the Asian, Russian, and Brazilian crises. The Russian crisis seems to have been the most harmful, followed by the Asian crisis. The Russian crisis and its effect on Brazil seem to have affected Argentina more than Panama. In general the behavior of the spreads is not substantially different in Panama and Argentina. This indicates that most of the movement in spreads represents movements in the perception of risk across Latin America, with the different currency regimes having little influence on its behavior. (Other countries, such as Brazil and Mexico, follow the same pattern.)<sup>22</sup> In other words, a specific exchange rate regime seems to be neither a sufficient nor a necessary condition for obtaining credibility in international markets.

Adopting a full dollarization regime does not necessarily reduce spreads on foreign debt bonds, nor does it guarantee automatic access to international markets. At the beginning of March 1999, the government of Panama tried to obtain funds through a bond issue in international markets,

22. Berg and Borensztein (1999) compare Argentine and Panamanian Brady Bonds spreads; they conclude that much of Argentina's spread cannot be attributed to currency risk. The evolution of the J. P. Morgan EMBI+ series seems to reinforce this argument.

but the operation was suspended because of poor market conditions. (Panama was later able to issue thirty-year bonds totaling \$500 million at a premium of 405 basis points.)

### *Fiscal Discipline? Not Panama*

One of the arguments in favor of adopting full dollarization is that it will induce fiscal discipline. Under this line of argument, the elimination of the possibility of printing money and the absence of seigniorage revenues would limit the possibility of financing fiscal deficits and would thus prompt more fiscal discipline. Does the case of Panama support this presumption?

Discipline has not been a virtue of the Panamanian authorities despite the absence of seigniorage revenues. Deficits were the rule rather than the exception in Panama between 1970 and 1998, when the fiscal deficit averaged 3.8 percent of GDP. The trend was reversed in the period 1990–95 thanks to an effort to improve the quality of the fiscal management. Deficits returned in 1996 and 1997, albeit on a small scale, and then spiked in 1998.

Without the possibility of printing money, a fully dollarized country such as Panama finances its deficits by issuing debt, mainly foreign debt. Statistics published by the Panamanian Ministerio de Economía y Finanzas show that in 1995 the total public debt reached almost 100 percent of GDP, with foreign debt representing 75 percent of the total. As a result, Panama continuously sought support from the IMF throughout the 1970s, 1980s, and 1990s, and eventually had to restructure its foreign debt through an external bond exchange and a debt reduction operation. The reduction in foreign debt observed since 1996 is the outcome of this process, which started in 1994 and was concluded in July 1996.

Thus Panama's reputation is not solid. The suspension of external debt payments in the period 1987–88 affected its creditworthiness. Moreover, Panama has received thirteen IMF programs in the last twenty-five years—more than any Latin American country since 1963 and more than fiscally troubled countries such as Argentina, Brazil, Haiti, and Peru. In short, the full dollarization regime was not able to generate fiscal discipline in Panama.<sup>23</sup> Fiscal discipline should be considered a necessary condition for, rather than a natural consequence of, a full dollarization regime, or any other exchange regime for that matter.

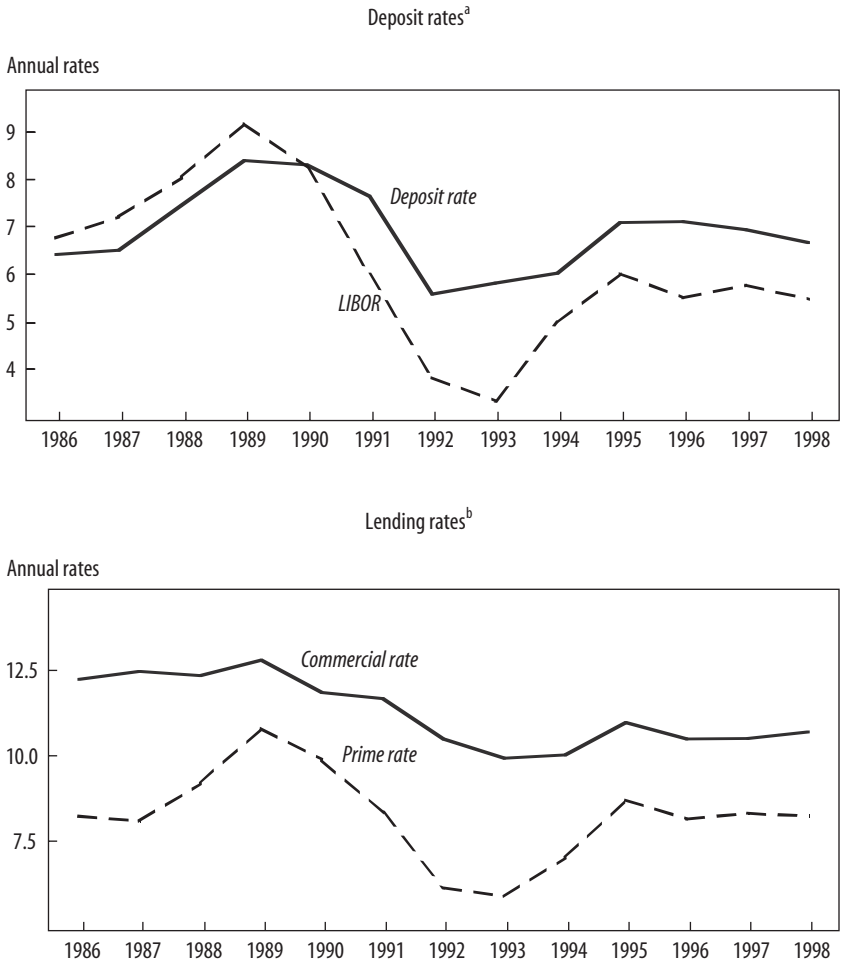
23. This result is in line with the findings of Tornell and Velasco (2000).



*Domestic Interest Rates and the Banking Sector*

Dollarization is assumed to reduce domestic interest rates by eliminating currency risks. Interest rates in Panama relative to international rates are shown in figure 2, which exhibits the six-month deposit rate offered by domestic banks in Panama and the six-month London interbank offered

**FIGURE 2. Deposit and Lending Rates**



Source: International Financial Statistics (IFS).  
 a. Six-month rates are shown.  
 b. Commercial rate is for one- to five-year loans.

rate (LIBOR). Panama's deposit rate closely follows the LIBOR; the spread between them was stable at approximately 100 basis points from 1995 to 1998. Figure 2 also shows the evolution of the lending rate for long-run credits (one to five years) for the commercial sector. As in the case of deposit rates, the lending rates in Panama followed the prime rate. In the period 1990–98 the spread was, on average, 289 basis points, with a maximum of 406 basis points in 1993 and a minimum of 247 basis points in 1998. Interest rates in Panama are probably among the lowest in Latin America. But is it due to the elimination of currency risk?

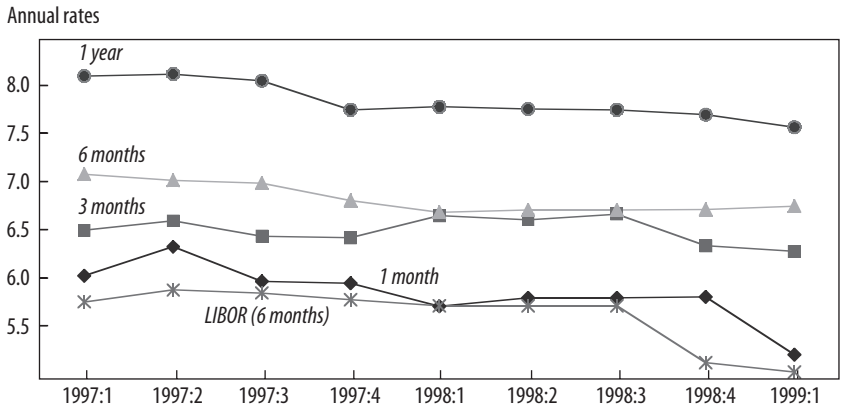
The low interest rates are at least partially determined by Panama's financial openness. As Moreno-Villalaz asserts, Panama is "a dollar economy with financial integration."<sup>24</sup> He defines four characteristics that jointly define the Panamanian monetary system: the use of the U.S. dollar as legal tender; free capital markets; an internationalized banking system; and the absence of a central bank.

Panama liberalized its banking system and freed interest rates in 1970, which supported the modernization of the sector and its integration into world financial markets. The reform implemented in Panama allowed banks to operate in offshore and local markets simultaneously, and it removed restrictions on the banks' ability to allocate funds between domestic and foreign markets. In addition, the government opened the banking industry to foreign participants in an effort to improve efficiency in the allocation of resources and foster economic growth. An efficient capital allocation would place funds in the projects with the highest rates of return to the economy. The result was a substantial reduction in interest rates.

Figures 3 and 4 show that to date interest rates charged by foreign banks are lower than those charged by local banks. The figures show the evolution of the short-run deposit rates (less than one year) offered by domestic and foreign banks between the first quarter of 1997 and the first quarter of 1999. Foreign banks offer lower interest rates than local banks, probably because they offer more security and better services than local banks. In addition, the term structure in foreign banks is flatter than in local banks, which reflects their lower risk premium. It is interesting to note that foreign banks follow the LIBOR more closely than domestic banks do. This implies that the increasing financial opening of Panama has led not only to lower interest rates but also to a higher correlation with international interest rates.

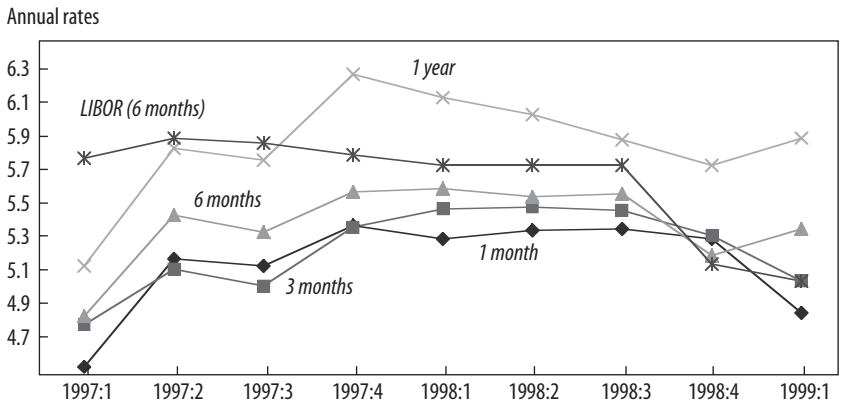
24. Moreno-Villalaz (1999, p. 421).

**FIGURE 3 . Local Banks' Deposit Interest Rates**



Source: Superintendencia de Bancos de Panamá.

**FIGURE 4 . Foreign Banks' Deposit Interest Rates**



Source: Superintendencia de Bancos de Panamá.

One could argue that full dollarization induced low interest rates and the development of the financial system in Panama. As mentioned by Hausmann and Eichengreen, however, it may not be correct to attribute these two facts to the Panamanian exchange rate regime: "A problem with this attribution is that the growth of Panama's financial sector . . . did not coincide with dollarization but postdated it by sixty years. The growth of the Panamanian banking sector only began following the adoption of Law 18 of 1959, which enhanced secrecy and opened the way for numbered bank accounts. . . . This made Panama attractive as an offshore banking center. The irony, then, is that the financial depth and stability of the Panamanian financial system is not associated with the transparency and good practices that dollarization is supposed to bring, but precisely with the country's lack of transparency."<sup>25</sup>

Moreover, Moreno-Villalaz probably overstates the benefits of the adjustment mechanism of the financial system in Panama. If banks have excess liquidity, they allocate these resources abroad, clearing the money market. In the same way, if the problem is lack of liquidity, banks can move resources off the international markets to eliminate the excess money demand. In the words of Moreno-Villalaz, "Access to international capital increases the availability of resources, which allows the level of investment to be independent of, and not limited by, local savings."<sup>26</sup> It is hard to say that investment and savings are independent, however. Local savings financed 91.6 percent of investment, on average, in the period 1993–97 (table 3). This is essentially a restatement of the Feldstein-Horioka saving-investment puzzle for the case of Panama.<sup>27</sup>

### *The Absence of a Lender of Last Resort*

The absence of a central bank in a fully dollarized economy implies that the economy has no lender of last resort. This induces banks to seek alternative contingent credits, particularly foreign funds, to partially fill that role. The necessity of securing foreign funds gives a competitive edge to international banks over domestic banks, which creates a more international banking system. Table 4 and figure 5 indicate the extent of foreign participation in the Panamanian banking system. The banking system itself

25. Hausmann and Eichengreen (1999, pp. 31–32).

26. Moreno-Villalaz (1999, p. 422).

27. See Feldstein and Horioka (1980).

**TABLE 3. Saving and Investment in Panama**

Percent of GDP

<i>Component</i>	1993	1994	1995	1996	1997
Gross domestic investment	24.1	24.5	26.2	23.6	25.4
Fixed capital formation	23.8	24.2	25.0	25.1	25.9
Public sector	4.0	3.4	3.4	3.8	4.4
Private sector	19.8	20.8	21.5	21.3	21.5
Changes in inventories	0.3	0.3	1.3	-1.5	-0.5
Gross national saving	22.0	24.1	22.8	22.0	22.4
Public sector saving	2.6	3.8	3.5	4.2	3.3
Private sector saving	19.4	20.4	19.3	17.8	19.1
Foreign saving	2.2	0.4	3.4	1.6	3.0

Source: International Monetary Fund (IMF), 1999, *Panama: Recent Economic Developments*, Staff Country Report 99/7, Washington.

represents approximately 90 percent of the financial sector of Panama, measured in terms of assets and net worth. The overall participation of foreign banks amounts to approximately 55 percent of banking activity.

### *The Performance of Panama during the Asian and Russian Crises*

Panama's reaction to the crises in 1997 and 1998 was relatively mild, although not better than other countries in the region. Table 5 compares the growth performance of Panama with other countries in Latin America and the Caribbean. In 1997, the country's growth rate was below the

**TABLE 4. Weight of Foreign Banks in the Panamanian National Banking System, December 1998**

Billions of dollars

<i>Balance sheet item</i>	<i>Foreign banks (A)</i>	<i>National banking system (B)</i>	<i>A ÷ B (percent)</i>
Total assets	15.70	28.50	55.1
Liquid assets	2.80	7.00	40.1
Loans	11.33	17.90	63.3
Investments	0.79	2.30	34.3
Other assets	0.78	1.29	60.2
Total liabilities plus capital	15.71	28.50	55.1
Deposits	10.01	19.67	50.9
Liabilities	3.61	4.82	75.0
Other liabilities	0.69	1.24	55.4
Capital	1.39	2.77	50.3

Source: Superintendencia de Bancos de Panamá.

**FIGURE 5. Structure of the International Banking Center**

Source: International Monetary Fund (IMF), 1999, *Panama: Recent Economic Developments*, Staff Country Report 99/7, Washington.

regional average, but in 1998 its growth rate was higher than the average. Panama's GDP performance was worse than Argentina, which uses a currency board, as well as Mexico and the Dominican Republic, which have flexible regimes.

The effect of the crisis on Panama can be gauged by looking at higher frequency data. The Panamanian Contraloría General de la República cal-

**TABLE 5. GDP Growth in Latin America and the Caribbean, 1997–98**

Annual rate		
Region and country	1997	1998
Latin America	5.2	2.3
Argentina	8.4	4.0
Brazil	3.0	0.5
Chile	7.4	3.4
Colombia	3.0	2.0
Costa Rica	3.7	5.5
Dominican Republic	5.2	7.0
Mexico	7.0	4.5
Nicaragua	5.0	3.5
Panama	4.7	3.9
Peru	7.4	1.0
Venezuela	5.1	-1.0
Caribbean	2.0	1.2

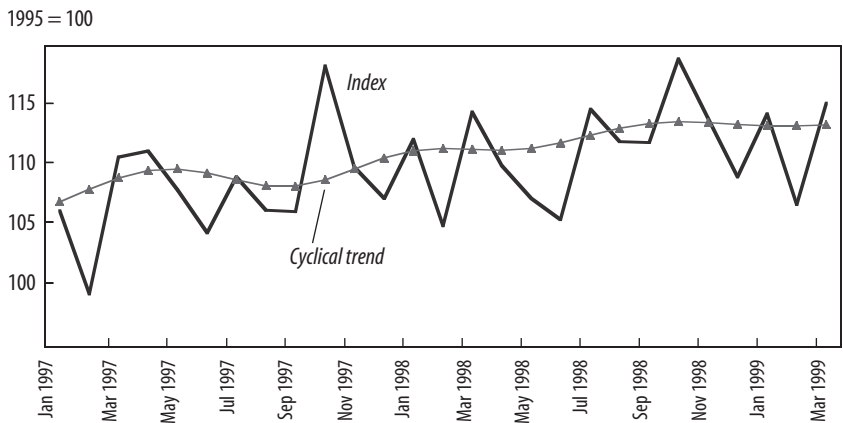
Source: Ministerio de Economía y Finanzas de Panama, 1999, *Informe Económico 1998*, Panama City.

culates a monthly index of economic activity, which tracks the evolution of the level of activity in Panama. Figure 6 plots two series: the index itself and a seasonally adjusted series. The two peaks observed in October 1997 and October 1998 are actually explained by seasonal factors. The two valleys in the adjusted series occur exactly during the crises, indicating that Panama was affected by both crises, albeit mildly.

As discussed above, inflation in Panama is correlated to inflation in the United States, usually with a downward bias that depreciates the real exchange rate. In 1997 and 1998 the CPI inflation rates in Panama were -0.5 percent and 0.6 percent, respectively. A comparison of monthly changes in the CPI inflation rate in the two countries shows that Panama is subject to higher volatility than the United States and even records deflation in some months. In particular, Panama experienced a strong deflation during the Asian crisis, as a result of the drop in oil prices and in the prices of Asian products, stemming from the devaluation of the currencies in that region.

The crises are most likely transmitted to Panama through the interest rates offered by the Panamanian banking system. The task of judging whether the Asian or Russian crisis had a stronger effect is a difficult one in that the interest rates charged by local and foreign banks point in different directions. On the one hand, the relatively high rates in local banks

**FIGURE 6. Economic Activity Index**

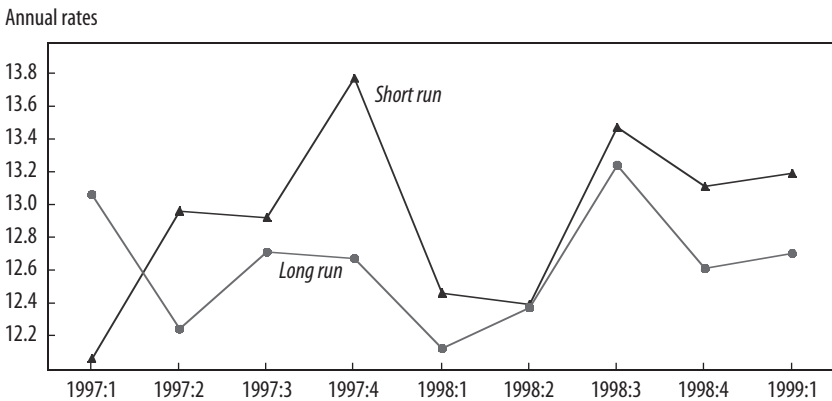


Source: Ministerio de Economía y Finanzas de Panamá.

remained stable during both crises, which implies that the spread relative to the LIBOR increased during the Russian crisis (see figure 3, above). On the other hand, deposit rates in foreign banks closely followed the deposit rates in international markets, which increased substantially during the Asian crisis but not during the Russian crisis (see figure 4, above). In short, the overall effect of the crises on Panama was an increase in deposit rates in foreign banks during the Asian crisis, as a consequence of the increase in international interest rates, combined with a relative increase in interest rates charged by local banks during the Russian crisis.

The dynamics of the lending rates in Panama confirm that the Asian and Russian crises had an important effect on the economy (see figure 7). The short-run lending rate—that is, consumer credit with a maturity of less than one year—shows two peaks that coincide with the Asian and the Russian crises (the fourth quarter of 1997 and the third quarter of 1998, respectively). The long-run rate—credit with a maturity of over five years—shows just one peak, in the third quarter of 1998. This fact is consistent with the perception that the Asian crisis was a temporary event, whereas the Russian crisis was a more permanent one, perhaps as a consequence of the spillover to Brazil and the rest of Latin America. The effect of the Asian crisis was therefore also seen as temporary; it was mostly concentrated in a large fall in prices rather than quantities. In contrast, the Russian crisis,

**FIGURE 7. Lending Rates**



Source: Superintendencia de Bancos de Panamá.



with its contagion to Latin America, was seen as a permanent shock, increasing long-term lending rates and reducing GDP growth rates.

### **Econometric Exercise: The Effects of External Shocks**

This section analyzes the effects of external shocks on growth, interest rates, and the real exchange rate in Panama. The analysis is conducted on a comparative basis to gauge the relative effects of an external shock on a dollarized economy. We have chosen Costa Rica and Argentina as the control countries, because the former is a small Latin American economy with a floating exchange regime and the latter uses a currency board, which is the closest alternative to a full dollarization regime.

Analyzing the effects of external shocks under different exchange rate regimes is obviously not the only way to study the insulating properties of the regimes. Recent studies using bigger samples examine this issue through the sensibility of the domestic interest rate to international interest rates under different exchange rate regimes.<sup>28</sup> The results obtained show that domestic interest rates are more sensitive to international rates in countries under fixed regimes than in countries under flexible regimes, implying that flexible regimes provide better protection than fixed regimes against nominal shocks (that is, shocks to the international interest rates).

In this paper we estimate a vector autoregression (VAR) model for each of the three countries and analyze the effect of an external shock on domestic variables and the resulting dynamics. The domestic variables include the real exchange rate, the domestic nominal interest rate, and the level of economic activity. The external factors are captured through the J.P. Morgan Latin American Emerging Markets Bond Index Plus (Latin EMBI+), representing foreign confidence in Latin American countries and the cost of external funds, and an index of industrial production by the industrialized countries, representing the world's level of economic activity.<sup>29</sup> Because of data limitations, the exercise covers the period 1994–99, with monthly entries.

The ordering of the variables always starts with the external variable (either the J. P. Morgan Latin EMBI+ or the industrial countries' indus-

28. Frankel, Schmukler, and Servén (2000); Borensztein and Zettelmeyer (2000); Goldfajn and Olivares (2001).

29. The exercise was replicated using the federal funds rate instead of the EMBI+ as the external variable. It is available from the authors on request.

trial production index), followed by the real exchange rate and, finally, the economic activity level. The real exchange rate was assumed to precede the activity level variable, but the results are robust to changes in the ordering.

The different real exchange rate series used here are all the real effective exchange rates from the Information Notice System database, maintained by the International Monetary Fund. The industrial countries' industrial production index was taken from the IMF's International Financial Statistics. Three series are used to measure the activity level: the monthly series of industrial production for Argentina; the Monthly Economic Activity Index published by Panama's Dirección de Estadística y Censo; and a monthly series based on quarterly GDP for Costa Rica.<sup>30</sup> All variables except interest rates are expressed in logs.

Finally, just a few words about the stationarity of the series. All models are estimated with the variables in levels. We are aware that some or all of the variables might possibly be nonstationary in levels and that if the variables are integrated, then there might also be a set of cointegration restrictions that, if imposed, would improve the efficiency of the estimation. We accept this loss in efficiency, however, in preference to imposing possibly incorrect restrictions on the data, which would result in a misspecified model.

### *The Effect of a Negative External Confidence Shock*

This first exercise consists in the estimation for each country of a small VAR model, including the J. P. Morgan' EMBI+, the real exchange rate, and the index of economic activity, in that order. Formally, the structural model estimated for each country is the following:

$$(1) \quad \mathbf{A}(L)\mathbf{y}_t = \mathbf{e}_t,$$

where  $\mathbf{A}(L)$  is a matrix polynomial in the lag operator  $L$ ,  $\mathbf{y}_t$  is a  $3 \times 1$  data vector, and  $\mathbf{e}_t$  is a  $3 \times 1$  structural disturbances vector. The elements of  $\mathbf{e}_t$  are serially uncorrelated with  $\text{Var}(\mathbf{e}_t) = \mathbf{\Lambda}$ , a diagonal matrix. In this exercise we have  $\mathbf{y}_t = (\text{LEMBI+}_t, \text{RER}_t, \text{EA}_t)'$ , where LEMBI+ is the

30. The series for Panama starts in January 1995. For Costa Rica we used the RATS *distrib.src* procedure to obtain the monthly series from quarterly data.

J. P. Morgan Latin EMBI+, RER is the real exchange rate, and EA is the monthly index of economic activity.

We estimate the following reduced-form equation:

$$(2) \quad \mathbf{y}_t = \mathbf{B}(L)\mathbf{y}_t + \mathbf{u}_t,$$

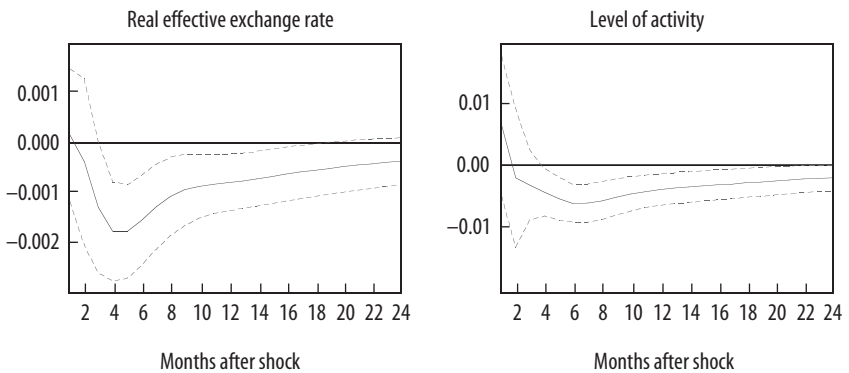
where  $\mathbf{B}(L)$  is a matrix polynomial in lag operator  $L$  and  $\text{Var}(\mathbf{u}_t) = \Sigma$ . The identification of the structural parameters from the estimated parameters of the reduced-form equations was done using the standard Choleski decomposition. The order of the VAR for each country was determined using the Schwarz and Akaike information criteria.

Figures 8, 9, and 10 show the response of the level of economic activity and the real exchange rate to a negative shock in the Latin EMBI+ index, which represents a negative confidence shock on Latin American countries.

**PANAMA.** A negative confidence shock has a negative and significant effect on the real exchange rate (real depreciation). The effect on the level of economic activity is initially positive and insignificant, but five months after the shock we observe a negative and significant effect. In other words, a negative confidence shock generates a recession in Panama (see figure 8).

The variance decomposition of the forecast errors of the estimated VAR shows that after twenty-four months, 34 percent of the variance of the

**FIGURE 8 . Response of Panama to a Negative Latin EMBI+ Shock**



Source: Authors' calculations.

**TABLE 6. Variance Decomposition, Panama**

<i>Variable and period</i>	<i>Standard error</i>	<i>Latin EMBI+</i>	<i>Real exchange rate</i>	<i>Economic activity</i>
<i>Real exchange rate</i>				
1 month after shock	0.043721	0.121416	99.87858	0.000000
6 months	0.095298	22.34655	73.20348	4.449969
12 months	0.112384	29.85842	63.88347	6.258112
18 months	0.119382	32.80853	60.62932	6.562143
24 months	0.122386	34.01723	59.27944	6.703323
<i>Economic activity</i>				
1 month after shock	0.004563	3.072169	0.148170	96.77966
6 months	0.006930	7.652978	5.226561	87.12046
12 months	0.007450	13.96428	4.965100	81.07062
18 months	0.007648	16.17047	4.821566	79.00796
24 months	0.007735	17.13086	4.760561	78.10858

Source: Authors' calculations.

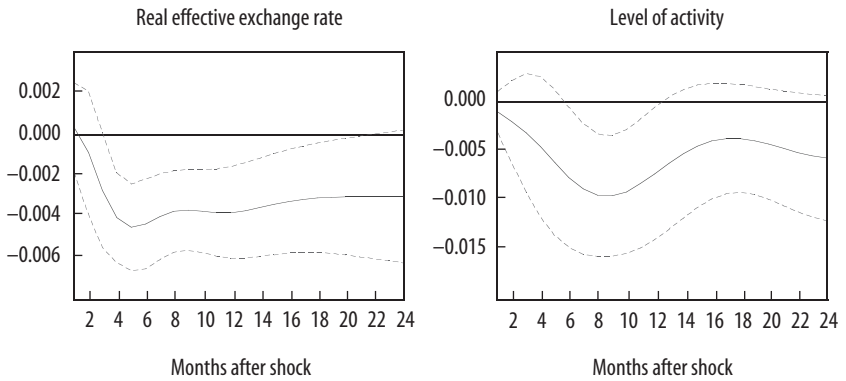
real exchange rate is explained by the external confidence variable. In the case of the level of economic activity, the external confidence variable explains only 17 percent of the variance (see table 6).<sup>31</sup>

**COSTA RICA.** In this case we have used data from the period January 1994 to June 1999. The results for Costa Rica show that a negative confidence shock has a strong effect on the real exchange rate. Figure 9 shows that the shock generates a strong real depreciation. The effect of the shock on the level of economic activity is negative and becomes statistically significant after six months, attaining its lowest value nine months after the shock. One year later, the effect becomes insignificant.

The variance decomposition of the forecast errors of the real effective exchange rate and the estimated monthly GDP series show that, in the first case, the Latin EMBI+ series explains more than 58 percent of the variance in a twenty-four-month horizon. In the case of economic activity, the Latin EMBI+ series explains more than 30 percent of the variance in a twenty-four-month horizon (see table 7). These variances are larger than in Panama.

To check the robustness of our results, we ran an alternative VAR including the Latin EMBI+, the domestic discount rate, and the real exchange rate for the same period. The results are equivalent (see the appendix).

31. One could argue that a shock in the EMBI+ does not represent an external confidence shock for Panama. The appendix shows an equivalent exercise using the federal funds rate instead; the results are similar, although less significant.

**FIGURE 9 . Response of Costa Rica to a Negative Latin EMBI+ Shock**

Source: Authors' calculations.

**ARGENTINA.** Figure 10 shows the impulse-response graphs for Argentina, estimated with a VAR including the Latin EMBI+, the real exchange rate, and an index of industrial production in the period January 1994 to June 1999.<sup>32</sup> A negative confidence shock has a significant impact on both the real exchange rate and the economic activity series. In other words, a negative confidence shock generates a real depreciation and a recession. Both results are as expected.

The variance decomposition of the forecast error of the real exchange rate series shows that, after twenty-four months, 38 percent of the variance is explained by the Latin EMBI+ series. In the case of the level of economic activity, the Latin EMBI+ series explains 32 percent and the real exchange rate series 25 percent of the variance (see table 8).

### *The Effect of a Negative World Production Shock*

This section replaces the EMBI+ series with the industrial countries' production index for each country. The idea is to analyze the effect of a negative world production shock (instead of a confidence shock) on Panama, Costa Rica, and Argentina. We use a model similar to the one represented by equations 1 and 2 above, but in this case  $y_t = (IC_t, RER_t, EA_t)'$ , where IC is the

32. We replicated the same exercise using the domestic money market rate in dollars (MMDAR) instead of the real exchange rate. Results are shown in appendix A.

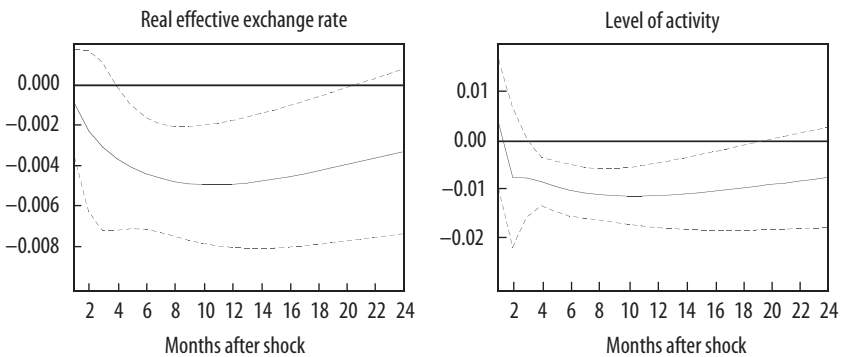
**TABLE 7. Variance Decomposition, Costa Rica**

<i>Variable and period</i>	<i>Standard error</i>	<i>Latin EMBI+</i>	<i>Real exchange rate</i>	<i>Economic activity</i>
<i>Real exchange rate</i>				
1 month after shock	0.047318	0.160730	99.83927	0.000000
6 months	0.122291	26.36421	71.06209	2.573701
12 months	0.160113	44.47961	52.58600	2.934384
18 months	0.187989	53.39919	43.67360	2.927217
24 months	0.209052	58.58272	38.70104	2.716238
<i>Economic activity</i>				
1 month after shock	0.008662	1.506547	0.040876	98.45258
6 months	0.015621	8.447155	8.229046	83.32380
12 months	0.018425	25.81713	6.976569	67.20630
18 months	0.020255	27.86489	6.458307	65.67680
24 months	0.021634	30.45789	6.648489	62.89363

Source: Authors' calculations.

industrial countries' monthly production index, RER is the real exchange rate, and EA is the monthly index of economic activity. To recover the structural parameters from the estimated reduced form, we again use the Choleski triangular decomposition and the Schwarz and Akaike information criteria to determine the order of each VAR. In this second exercise there is a stronger case for considering the industrial countries' production index as an exogenous variable in all three cases, but we do not impose these restrictions in the models. Figures 11, 12, and 13 show the responses of both the real exchange rate and the level of economic activity for each country.

**FIGURE 10. Response of Argentina to a Negative Latin EMBI+ Shock**



Source: Authors' calculations.

**TABLE 8. Variance Decomposition, Argentina**

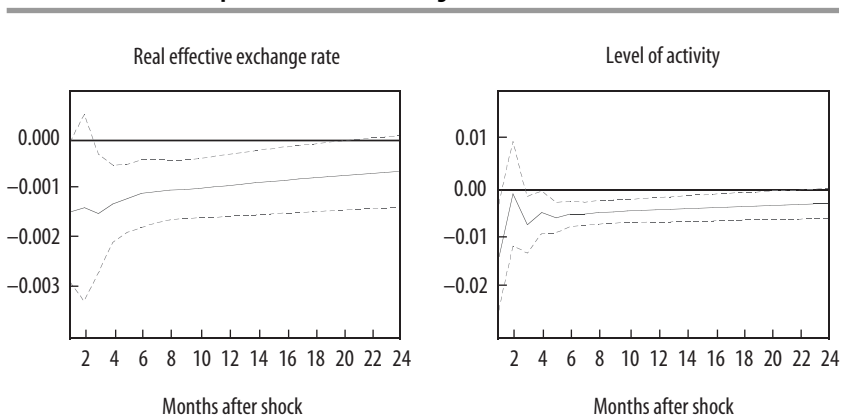
<i>Variable and period</i>	<i>Standard error</i>	<i>Latin EMBI+</i>	<i>Real exchange rate</i>	<i>Economic activity</i>
<i>Real exchange rate</i>				
1 month after shock	0.045105	0.792458	99.20754	0.000000
6 months	0.130612	13.22874	86.27524	0.496012
12 months	0.190385	31.45689	67.71139	0.831719
18 months	0.223148	37.50190	61.77723	0.720874
24 months	0.240270	38.04168	61.34600	0.612316
<i>Economic activity</i>				
1 month after shock	0.009940	0.560508	5.307466	94.13203
6 months	0.021770	10.05138	11.39081	78.55781
12 months	0.025185	24.03217	11.88120	64.08663
18 months	0.029304	30.10064	18.95965	50.93971
24 months	0.032526	31.59138	25.19599	43.21263

Source: Authors' calculations.

**PANAMA.** A negative world production shock generates a real depreciation and a recession in Panama, as expected. The depreciation becomes statistically significant after the third month and remains significant for seventeen months. The recession also becomes significant after three months and lasts nineteen months (see figure 11).

The variance decomposition shows that after twenty-four months, 31 percent of the variance of the real exchange rate and 29 percent of the

**FIGURE 11. Response of Panama to a Negative World Production Shock**



Source: Authors' calculations.

**TABLE 9. Variance Decomposition, Panama**

<i>Variable and period</i>	<i>Standard error</i>	<i>World production</i>	<i>Real exchange rate</i>	<i>Economic activity</i>
<i>Real exchange rate</i>				
1 month after shock	0.005577	8.706003	91.29400	0.000000
6 months	0.010401	17.61085	76.94175	5.447402
12 months	0.013228	24.56638	69.58477	5.848851
18 months	0.014875	28.73996	65.06955	6.190491
24 months	0.015916	31.32330	62.27634	6.400361
<i>Economic activity</i>				
1 month after shock	0.004932	13.03384	0.171464	86.79469
6 months	0.007690	19.05990	3.295870	77.64423
12 months	0.008113	24.26642	3.190026	72.54355
18 months	0.008393	27.43776	3.056819	69.50542
24 months	0.008580	29.45332	2.974488	67.57220

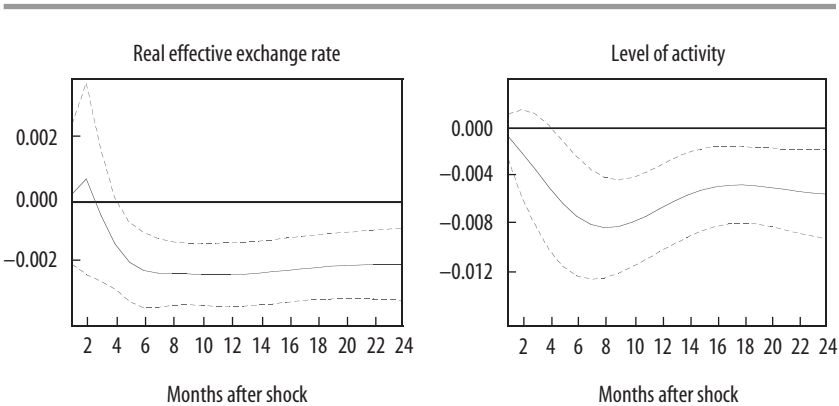
Source: Authors' calculations.

variance of the level of economic activity are explained by the external variable (see table 9).

**COSTA RICA.** A negative world production shock similarly provokes both a real depreciation and a recession in Costa Rica. The effects on Costa Rica seem to last longer than on Panama. The real depreciation and the recession both remain significant after twenty-four months (see figure 12).

The variance decomposition shows that after twenty-four months the external variable explains 29 percent of the variance of the real exchange

**FIGURE 12. Response of Costa Rica to a Negative World Production Shock**



Source: Authors' calculations.



**TABLE 10. Variance Decomposition, Costa Rica**

<i>Variable and period</i>	<i>Standard error</i>	<i>World production</i>	<i>Real exchange rate</i>	<i>Economic activity</i>
<i>Real exchange rate</i>				
1 month after shock	0.006766	0.055044	99.94496	0.000000
6 months	0.013908	4.230179	94.86453	0.905293
12 months	0.019594	14.24593	82.42421	3.329864
18 months	0.023615	21.76496	75.17314	3.061902
24 months	0.026775	27.06418	69.94662	2.989199
<i>Economic activity</i>				
1 month after shock	0.010693	0.617590	0.053107	99.32930
6 months	0.016514	9.125956	0.847742	90.02630
12 months	0.017753	24.72531	1.333429	73.94126
18 months	0.018611	29.51954	1.499522	68.98094
24 months	0.019306	33.73024	1.402571	64.86719

Source: Authors' calculations.

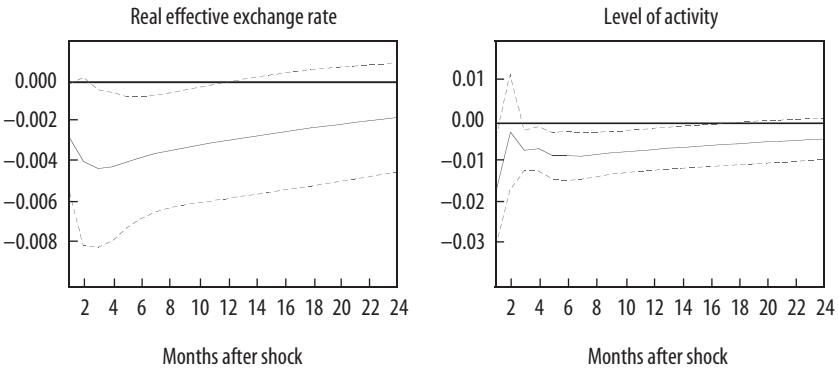
rate and 34 percent of the activity level variance. For the real exchange rate, the proportion that is explained by the external variable is smaller in the case of Costa Rica than in the case of Panama. For the level of economic activity, the proportion of the variance that is explained by the external variable is larger in Costa Rica than in Panama (see table 10).

**ARGENTINA.** In the case of Argentina, the negative world production shock also has negative effects on both the Argentine real exchange rate and the level of economic activity, but these effects seem to be shorter than in the cases of Panama and Costa Rica. The real depreciation becomes significant after three months and remains so for nine months. The recession becomes statistically significant three months after the shock and lasts fourteen months (see figure 13).

The variance decomposition shows that after twenty-four months the external variable explains 21 percent of the variance of the real exchange rate and 20 percent of the variance of the level of economic activity. For both variables, the proportion of the variance explained by the real external variable is lower in Argentina than in Costa Rica and Panama (see table 11).

### *Summary of Econometric Results and Comparative Analysis*

Under the hypothesis that a negative shock in the J.P. Morgan Latin EMBI+ represents an external negative confidence shock, the paper has analyzed the effects of a confidence shock on the real exchange rate, the domestic interest rates, and the level of economic activity in Panama,

**FIGURE 13 . Response of Argentina to a Negative World Production Shock**

Source: Authors' calculations.

Costa Rica, and Argentina, with two main results. First, as expected, a negative external confidence shock significantly affects the level of economic activity, generating recessions in all three countries. Since these countries maintain different exchange rate regimes, one may conclude that an external confidence shock has significant effects on the level of economic activity in Latin American countries independently of the exchange rate regime. The extent of the shocks varies, however. The variance decomposition

**TABLE 11 . Variance Decomposition, Argentina**

<i>Variable and period</i>	<i>Standard error</i>	<i>World production</i>	<i>Real exchange rate</i>	<i>Economic activity</i>
<i>Real exchange rate</i>				
1 month after shock	0.005826	6.999612	93.00039	0.000000
6 months	0.010098	12.74856	84.91073	2.340703
12 months	0.012457	16.83459	79.59655	3.568865
18 months	0.013699	19.47201	76.65064	3.877346
24 months	0.014403	21.11278	74.89653	3.990697
<i>Economic activity</i>				
1 month after shock	0.010299	10.38105	5.006202	84.61275
6 months	0.026085	11.86123	17.59437	70.54440
12 months	0.029570	15.92782	24.81283	59.25936
18 months	0.030775	18.40577	25.55210	56.04213
24 months	0.031316	19.91565	25.46791	54.61643

Source: Authors' calculations.

analysis provides evidence that the external shocks in Panama explain a much smaller proportion of the overall variance in the activity level—about half the proportion explained in Argentina and Costa Rica. This result occurs even though Panama is a very open economy and foreign interest rates quickly translate into domestic interest rates. One explanation, of course, is that the credibility gained in a dollarized economy helps insulate the economy from adverse shocks. The problem is that domestic interest rates react strongly to the external environment. Another possible explanation lies in the fact that Panama's activities are concentrated in services, which may fluctuate less in response to external factors or may have more automatic stabilizers.

Second, negative external confidence shocks provoke real depreciations in all the countries. It seems, therefore, that the direction and significance of the effect are independent of the exchange rate regime, although the intensity of the shock differs across the countries, as expected. Costa Rica experienced a larger effect on the real exchange rate than either Argentina or Panama, basically because of the floating exchange regime. Fixed exchange regimes minimize the effect on the variability of the real exchange rate. This does not mean that the price effects are negligible in Panama, but simply that they are smaller than the exchange rate variations in Costa Rica. In fact, price movements were sometimes substantial in Panama, as in the case of the deflation during the Asian crisis.

Our second exercise analyzed the effects of a negative world production shock on the real exchange rate and the level of economic activity in Panama, Costa Rica, and Argentina. In contrast to the previous exercise, the external shocks seem to have a stronger effect on the activity level in Panama and Costa Rica than in Argentina. This result contradicts the hypothesis that Panama's service economy is generally less affected by external shocks than are the other economies, suggesting instead that financial shocks, in particular, have mild effects. Indeed, world production shocks have strong effects on both the real exchange rate and the level of economic activity in Panama.

The results are theoretically intuitive. Floating regimes handle world production shocks better than fixed regimes, while (extremely) fixed exchange regimes fare better than floating regimes in the face of confidence shocks. The evidence of the VAR impulse responses and variance decompositions shows that Panama performs better than Argentina and Costa Rica if the source of the shock is confidence (that is, an external

confidence shock), but not if the source of shocks is real (namely, a world production shock).

## Conclusions

This paper has analyzed the effects of Panama's extreme exchange rate regime. The objective was to provide some empirical evidence on the experience of one of the largest dollarized economy in the world, in order to further the debate on the benefits and costs of full dollarization. The limits of this strategy are well known. It is difficult to separate the effects of full dollarization from the effects of other idiosyncratic differences in Panama. The paper has tried to control for some of the other effects by comparing Panama with similar countries, first with the rest of Latin America as a whole and then, more specifically, with Argentina and Costa Rica.

Notwithstanding this intrinsic difficulty, the paper offers a few conclusions regarding the effect of full dollarization. First, inflation performance is impressive in terms of both the average rate and the degree of volatility over the last thirty years. Panama's record is helped by the fact that the relative price of nontradables has experienced a long-run downward trend. Second, domestic interest rates are indeed lower in Panama than in other Latin American countries. This fact, however, must be attributed partially to the reform of the financial system that both freed financial markets and completely opened them to foreign participation. Third, full dollarization does not necessarily reduce spreads on foreign debt bonds, and it does not guarantee automatic access to international markets. Panama's spreads are relatively low compared to the average in Latin America, but they are not lower than in Costa Rica. Moreover, Panama's external debt spreads are highly correlated to other spreads, such as Argentina's, for example. Dollarization reduces currency risk, but not necessarily default risk. Fourth, the absence of inflationary finance does not necessarily induce more fiscal discipline. Panama's fiscal performance has been poor and has led to very high public debt and even default on external obligations. In the last twenty-five years, Panama has been the beneficiary of thirteen IMF programs—more than any other Latin American country since 1963.

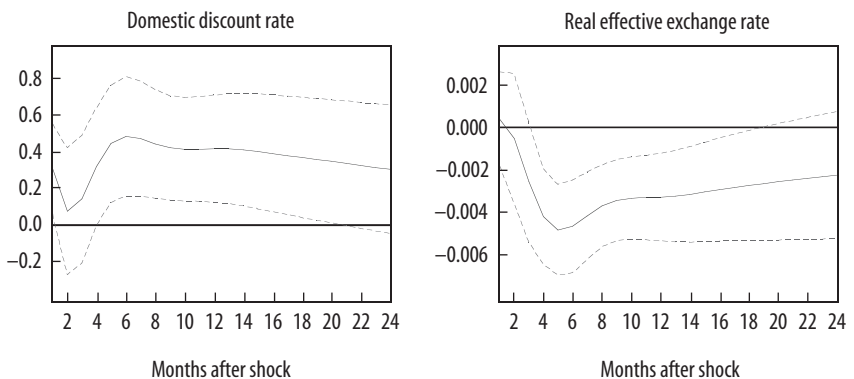
Fifth, the absence of a lender of last resort has induced banks to seek alternative contingent funds. This gives a competitive edge to international

banks over domestic banks, inducing a more international banking system in Panama. Finally, in the empirical exercises, the external confidence shock explains a much smaller proportion of the overall variance of the activity level in Panama than in Argentina or Costa Rica. This could be interpreted as evidence that general confidence shocks have a smaller effect on more credible currency regimes. This interpretation is supported by the fact that once confidence variables are replaced by real shocks, the level of economic activity of Panama reacts as strongly as in Costa Rica and stronger than in Argentina. These two results suggest that adopting a more rigid regime could be useful for minimizing the effects of confidence shocks, but not necessarily for reducing the effect of real shocks.

## Appendix: Robustness Checks for the Econometric Exercise

To check the robustness of our results, we ran an alternative vector autoregression (VAR) for each of the three countries included in the original exercise. The regression for Costa Rica included the Latin EMBI+, the domestic discount rate, and the real exchange rate for the same period. The results appear in figure A1. Observe that a negative confidence shock generates, as expected, a significant rise in the domestic discount rate and

**FIGURE A1. Response of Costa Rica to a Negative Latin EMBI+ Shock**



Source: Authors' calculations.

a significant impact on the real exchange rate; this is the same result we obtained in the first VAR. The fall in the domestic discount rate is also compatible with the response of our estimated monthly GDP series in the first VAR. In fact, a VAR including the Latin EMBI+, the domestic discount rate, and the estimated monthly GDP (results not reported here) indicates that a negative confidence shock has a positive and significant effect on the domestic discount rate and a negative and significant effect on the level of economic activity, as expected.

The results of the variance decomposition of the second VAR show that the Latin EMBI+ series explains 45 percent of both the domestic discount rate and the real exchange rate twenty-four months after the crisis.

For Argentina, we did the same exercise using the domestic money market rate in dollars (MMDAR) instead of the real exchange rate. As expected, a positive confidence shock has a temporarily significant decrease in the MMDAR and a statistically significant increase in the level of economic activity. We obtained similar results using the domestic currency money market interest rate.

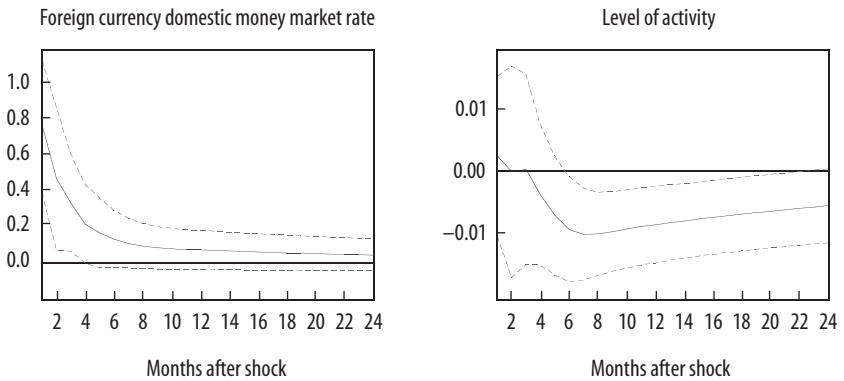
The variance decomposition shows that the MMDAR explains more than 58 percent of its own variance in a twenty-four-month horizon and that the Latin EMBI+ index contributes almost 39 percent. In the case of industrial production, the series itself explains more than 70 percent twenty-four months after the crisis.

**TABLE A 1. Variance Decomposition, Costa Rica**

<i>Variable and period</i>	<i>Standard error</i>	<i>Latin EMBI+</i>	<i>Discount rate</i>	<i>Real exchange rate</i>
<i>Discount rate</i>				
1 month after shock	0.046301	10.48636	89.51364	0.000000
6 months	0.117557	16.08615	67.44465	16.46921
12 months	0.161630	32.26448	51.43597	16.29955
18 months	0.190659	41.03516	44.35566	14.60918
24 months	0.208999	44.57994	40.84389	14.57618
<i>Real exchange rate</i>				
1 month after shock	1.003604	0.481595	3.219275	96.29913
6 months	2.123572	25.54785	3.095166	71.35698
12 months	2.454586	38.79801	5.755333	55.44665
18 months	2.694124	43.51540	8.061586	48.42301
24 months	2.887880	45.37475	9.490765	45.13449

Source: Authors' calculations.

**FIGURE A 2 . Response of Argentina to a Negative Latin EMBI+ Shock**



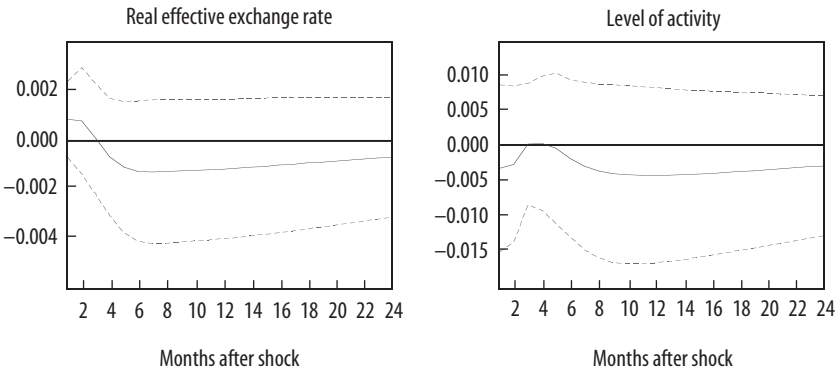
Source: Authors' calculations.

Figure A3 shows our main results for Panama using a VAR including the federal funds rate (FFR), the real exchange rate, and the economic activity index for the period January 1995 to March 1999. A positive federal funds rate shock (representing a tight U.S. monetary policy) generates a recession and a depreciation, although these effects are not statistically significant.

**TABLE A 2 . Variance Decomposition, Argentina**

<i>Period</i>	<i>Standard error</i>	<i>Latin EMBI+</i>	<i>Domestic rate</i>	<i>Economic activity</i>
<i>Domestic rate</i>				
1 month after shock	0.046313	26.86912	73.13088	0.000000
6 months	0.112388	37.33098	60.12886	2.540164
12 months	0.142088	38.25743	59.20288	2.539693
18 months	0.157649	38.71350	58.75781	2.528689
24 months	0.166621	38.99262	58.48558	2.521792
<i>Economic activity</i>				
1 month after shock	1.484510	0.380491	7.290141	92.32937
6 months	1.663503	2.901571	9.319610	87.77882
12 months	1.681245	11.27500	10.66474	78.06026
18 months	1.691006	15.62388	11.31196	73.06416
24 months	1.697059	18.06257	11.67289	70.26454

Source: Authors' calculations.

**FIGURE A 3 . Response of Panama to a Positive Federal Funds Rate Shock**

Source: Authors' calculations.

The analysis of the variance decomposition shows that after twenty-four months, the real exchange rate series continues to be the main cause (more than 72 percent) of its own forecast errors, with the FFR explaining 18 percent. The same thing occurs in the case of economic activity. The series itself explains more than 62 percent of its own variance twenty-four months later, while the real exchange rate series contributes 30 percent and the FFR almost 8 percent.

**TABLE A 3 . Variance Decomposition, Panama**

<i>Period</i>	<i>Standard error</i>	<i>Federal funds rate</i>	<i>Real exchange rate</i>	<i>Economic activity</i>
<i>Real exchange rate</i>				
1 month after shock	0.110633	2.708065	97.29193	0.000000
6 months	0.266693	4.736536	88.39042	6.873047
12 months	0.314043	11.66755	79.18429	9.148154
18 months	0.334016	15.80471	74.43492	9.760377
24 months	0.343859	17.97125	72.03201	9.996747
<i>Economic activity</i>				
1 month after shock	0.005322	0.518876	4.454170	95.02695
6 months	0.009837	0.696024	28.45759	70.84639
12 months	0.010713	3.414312	31.05125	65.53444
18 months	0.011147	6.060028	30.65321	63.28676
24 months	0.011373	7.636968	30.25525	62.10778

Source: Authors' calculations.