
Guillermo Ortíz

Governor, Bank of Mexico

I. INTRODUCTION

Although there is a substantial body of literature on macroeconomic policies in Latin America, the role of fiscal and monetary policies as tools to stabilize the business cycle has not received much attention. This is understandable in light of the fact that during the last thirty years, both fiscal and monetary policies were responsible, to a large degree, for the region's history of macroeconomic and financial instability. Rather than being tools for the stabilization of the business cycle, they were typically managed in a way that amplified the effects of shocks on output and interest rates.

Therefore, the literature on macroeconomic policy has concentrated on the role played by the monetary and fiscal authorities in the region's history of balance of payments and financial crises and their quest to re-establish macroeconomic order and stability. Macroeconomic policies were mostly procyclical, as they fueled an overheated economy in the run-up to the crises and were strongly tightened when the external constraints became binding.¹

Governor Ortíz's remarks, "Monetary Policy in a Changing Economic Environment: The Latin American Experience," are on the bank's website at www.kc.frb.org. He would like to thank Miguel Messmacher and Alejandro Werner of the Bank of Mexico for their valuable comments and suggestions.

During the 1980s, the financial fragility associated with the debt crisis implied that, in Latin America, monetary and fiscal policies could not be oriented toward smoothing the business cycle. Balance sheet problems implied that countries were in a particularly vulnerable situation, so negative shocks translated into considerable instability, loss of credibility and, therefore, the need to implement procyclical policies when faced with negative shocks. Thus, macroeconomic policies were geared toward solving persistent solvency, balance of payments, and inflationary problems.²

During this period, it became clear that increasing the role of the private sector while the size of the public sector was reduced was a necessary condition for sustainable growth.³ As a consequence, a comprehensive reform effort was implemented in many countries. An important objective of this reform process was the restoration of macroeconomic stability. Therefore, monetary policy experienced substantial changes during this period. The main factors that influenced the transformation of monetary policy in Latin America were:

First, mounting evidence from the region's experience with high rates of inflation, and hyperinflation in some cases, that showed the large costs of inflation in terms of output growth, income distribution, and financial sector deepening. The increased awareness regarding the high costs of the monetary authority not focusing on price stability gradually closed the door to the pressures for expansionary monetary policy aimed at "fueling economic growth."

Second, after years of fiscal mismanagement, stabilization efforts were anchored on a significant strengthening of public finances and a trend toward improving fiscal institutions, eliminating pressures for monetizing public sector deficits. However, it should be noted that results on the fiscal front have differed significantly among countries in the region. In particular, after positive developments in the initial stages of the reform process, many countries have not been able to carry out further fiscal consolidation, leading to an increase in the public debt-to-GDP ratio even in times of positive economic performance.⁴

Third, the independence gained by the regional central banks gave incentives for a further consolidation of public finances, since the monetary authorities were forbidden to finance public sector deficits. Central bank independence was a signal that Latin America was committed to

institutionalize the initial move toward responsible fiscal and monetary policies. However, in many cases, of which Mexico is an example, the independence was granted during a period when predetermined exchange rate regimes were in place. This last element severely curtailed monetary autonomy, as the establishment of a predetermined exchange rate and the opening of the capital account precluded the independent implementation of monetary policy.

Thus, the fourth element that shaped the recent evolution of monetary policy in the region was the balance of payments *cum* financial crises of the 1990s, which highlighted the difficulties of fixing the exchange rates in a world of highly mobile capital. The collapse of the European Monetary System (EMS) in 1992, the Mexican crisis of 1994 to 1995, and the subsequent crises in emerging markets motivated several countries in the region to abandon their predetermined exchange rate systems and adopt a free-floating regime. The adoption of floating regimes proved to be the other big turning point for monetary policy in the region. Central bank autonomy and fiscal discipline eliminated fiscal influence on monetary policies, and a free-floating exchange rate opened the door for the monetary authorities to implement monetary policy with price stability as its primary objective.

While these elements were put in place, Chile, Mexico, Brazil, Peru, and Colombia began to move toward an inflation-targeting framework. As the first three countries are the ones whose experiences are better documented, in the rest of paper I will focus on them. Chile started in 1990 a gradual transition where an inflation-targeting framework coincided with a crawling exchange rate band. In 1999, once the effects of the 1998 international financial crisis receded, Chilean authorities decided to abandon the exchange rate target zone and let their currency float. Mexico also underwent a gradual transition toward inflation targeting since the adoption of the floating exchange rate in December 1994. On the other hand, Brazil embraced a full-fledged inflation-targeting framework immediately after the devaluation of the real in 1999 as a way to generate sufficient confidence in the new regime to avoid the inflationary effects of the currency movement.

In an environment of greater fiscal discipline, the adoption of a floating exchange rate regime, together with inflation targeting, works toward re-establishing the role of monetary policy as an additional policy instrument given that:

(1) It frees monetary policy from the constraint of defending the exchange rate and allows it to be carried out, taking into account both domestic and foreign variables to achieve price stability.

(2) It provides an additional adjustment variable that can respond to shocks.

(3) It eliminates the implicit exchange rate insurance and, thus, provides less incentives for the generation of currency mismatches among assets and liabilities.

However, to fulfill these tasks, to minimize the costs associated with a flexible exchange rate regime, and to have an inflation-targeting regime where the targets work properly by anchoring expectations, there are several prerequisites that need to be met:

(1) The history of high inflation implies that the most important challenge facing the monetary authority is to establish its credibility. The public needs to be confident that the central bank will react in order to attain its targets, countering inflationary pressures that would lead to deviations. Building credibility is a process that takes several years. The inflation-targeting framework stresses the importance of increasing transparency and improving communication with the public to strengthen trust.⁵ The continuous fulfillment of the targets is an important factor to accelerate the recovery of credibility.

(2) Given that, in the past, monetary policy was constrained by the exchange rate regime, the technical tools to conduct monetary policy were underdeveloped. Therefore, increasing the understanding of the transmission mechanism of monetary policy is crucial to assess the effect of monetary policy in the economy, the speed of the response, make inflation forecasts, and carry out a proactive monetary policy.

(3) To minimize exchange rate mismatches and, therefore, to be in a situation in which exchange rate volatility does not lead to financial vulnerability, there is the need to develop markets to ensure these risks. There are two markets that need to be developed. The first is a derivatives market that allows firms to hedge exchange rate risk. The second is a long-term domestic debt market, so firms are able to

obtain long-term funding in domestic currency. Both are clearly complementary in order to allow firms to reduce currency and maturity mismatches at minimum cost.

As a result of the changes mentioned in the macroeconomic framework of these countries, inflation has fallen sharply in most of them and the attainment of price stability is in sight.

The remainder of the paper discusses the main hurdles (mentioned before) that had to be overcome to accomplish this task and stresses how in 2000-2002 we have already seen the first examples of a countercyclical monetary policy in some of these countries. Finally, I will conclude with some challenges that monetary authorities face in Latin America.

II. RE-ESTABLISHING MONETARY POLICY AS AN ADDITIONAL POLICY INSTRUMENT

As was mentioned in the introduction, there are several hurdles that monetary authorities had to overcome to re-establish monetary policy as a useful stabilization tool. In this section I will go into more detail on how we are dealing with these issues.

Restoring credibility

The monetary authority's credibility regarding its inflation targets and its resolve to meet them are crucial elements to:

- (1) Increase the effectiveness of monetary policy to achieve its goals.
- (2) Reduce the costs of the disinflation effort.
- (3) Allow monetary policy to function as a countercyclical tool.

The first two points hinge on the fact that monetary policy actions affect price-setting behavior through the "transmission mechanism." One of the main components of the mechanism, as we all know, are expectations, given that current monetary policy actions only affect short-term interest rates, but aggregate demand is influenced also by the evolution of long-term interest rates, other asset prices, the real exchange rate, etc. These prices depend, to a large extent, on expectations of future policy actions. In addition, wage and price-setting behavior is influenced by the public's perception about future price

behavior and monetary policy actions. Therefore, the more credible and predictable monetary policy is, the more effective it becomes and, thus, the social cost of the disinflationary process falls.

Regarding the third point, it is useful to split the discussion of countercyclical monetary policy actions on how the authority should react to demand and supply shocks. In the first case, there is no conflict between the actions needed to achieve the inflation target and those needed to smooth the business cycle, given that inflationary pressures arise as output is above its long-run potential. Thus, the policy prescription of tightening monetary conditions helps to reduce inflation and return output to its long-run equilibrium level. However, when confronted with a negative supply shock, the monetary authority faces the typical tradeoff between achieving the inflation target or partially counteracting the negative effect of the shock on output. In this situation, when the targets are credible, the increase in inflation will tend to be perceived as transitory, and the authority will be able to pursue its smoothing role without concerns that the temporary deviation of inflation from the target would feed into medium-term inflation expectations.

For these reasons, it was crucial that monetary authorities, at the time of adoption of inflation targets, gained the public's trust. At the same time, the inflation-targeting framework was adopted with this aim, making significant efforts in the areas of transparency and communication. Also, hitting the inflation targets and running the risk of undershooting the targets was essential to accelerate the recovery of credibility. When there is less than full credibility, the policy reaction function should be asymmetric, given that the cost of overshooting the target goes beyond the typical quadratic loss that we put in our models due to the additional cost associated with a loss of trust.⁶ Some technical papers have found that the credibility of the targets has improved significantly in Chile, Mexico, and Brazil, and that inflation expectations have become less dependent of transitory inflationary shocks.⁷ However, due to the asymmetric policy response I mentioned earlier, *ex post*, the targets were achieved by a comfortable margin in Mexico since 1999.

In addition to the econometric exercises done by other authors, it is useful to provide a graphical proof of how expected inflation has been converging to the future inflation targets as these have been met. To this effect, Chart 1 shows the evolution of inflation and the targets and

Chart 2 shows inflation expectations for the next twelve months and the twelve months ahead inflation target for Mexico and Chile. It is clear how, in both cases, as the targets have been met, inflation expectations have become more similar to the targets.

Another consequence of the increase in credibility is the weakening of the pass-through from exchange rate movements to inflation that has taken place in these economies (more on this in section III).

The transmission channels and the disinflation strategy

To carry out an independent monetary policy in the context of a flexible exchange rate and an inflation-targeting regime, it is useful to develop macroeconomic models to understand the inflation process, evaluate the effect of monetary policy on the economy, and make inflation forecasts.

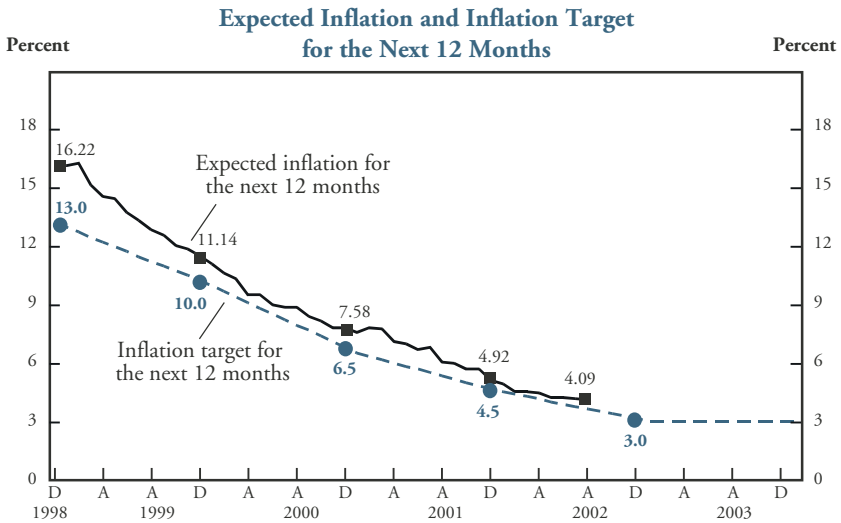
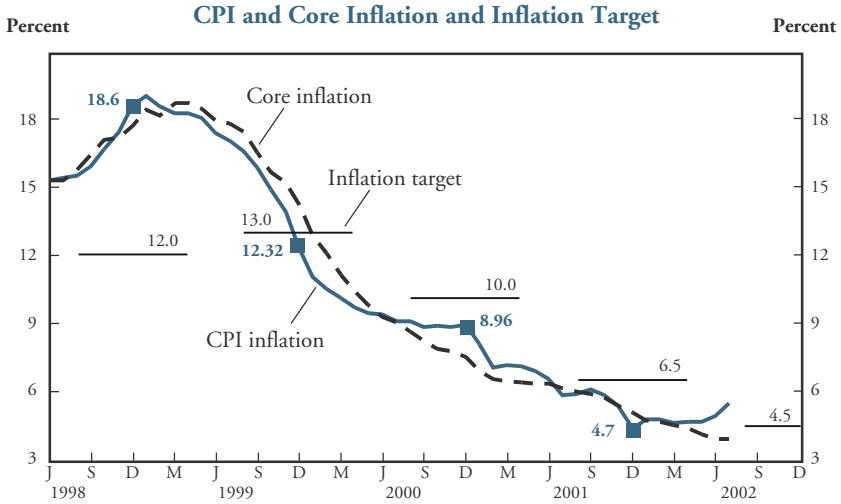
In consequence, the central banks of Brazil, Chile, and Mexico have been developing models and undertaking research to assess the transmission channels of monetary policy.⁸ This is a challenging endeavor for several reasons.

First, changes in regime may affect the relationship between instruments, transmission channels, GDP, and prices due to Lucas Critique-type of arguments. For instance, the causes and effects of a change in interest rates are likely to be different under a floating exchange rate regime than under a fixed one. So, historical estimations of the effect of monetary policy can be misleading. Second, the economy has been changing rapidly because of both internal and external factors, independently of the changes in monetary policy regime. For example, past structural reforms are consolidating, old bargaining structures are changing because of political and social changes, international integration of goods and financial markets continues, and there is technological innovation in the financial sector.⁹ Third, in several instances, data that is relevant to evaluate conditions in the economy are of poor quality or even nonexistent.

Finally, the structural changes in these economies imply that equilibrium values of key variables may be evolving over time, such as the growth rate of potential output, the noninflationary rate of

Chart 1

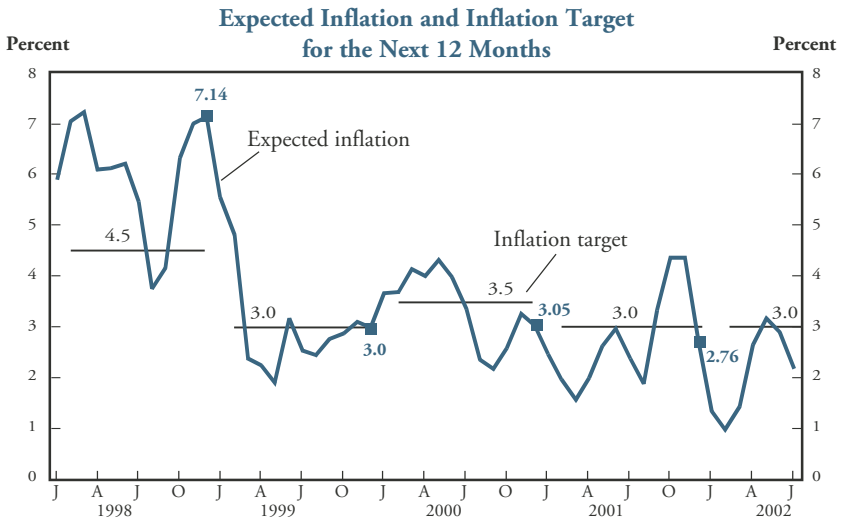
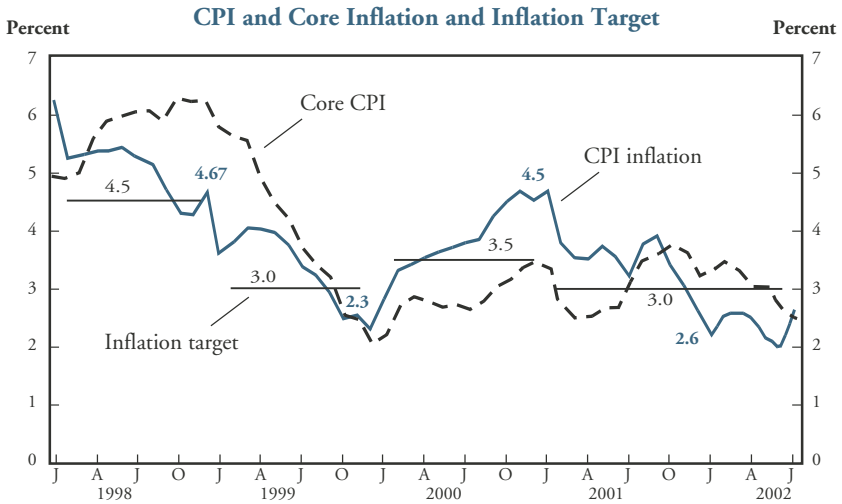
INFLATION, EXPECTED INFLATION, AND INFLATION TARGET IN MEXICO (ANNUAL PERCENTAGE CHANGE)



Source: Inflation and targets are from the Bank of Mexico. Expected inflation is obtained from the Monthly Survey of Private Sector Analysts conducted by the Bank of Mexico.

Chart 2

INFLATION, EXPECTED INFLATION, AND INFLATION TARGET IN CHILE (ANNUAL PERCENTAGE CHANGE)



Source: Inflation and targets are from the Central Bank of Chile. Expected inflation is obtained from the difference between nominal interest rates and the Unidad de Fomento indexed (real) interest rates of equivalent maturity.

unemployment, and the equilibrium levels of the real interest rate and the real exchange rate. In this context, it is not easy to judge whether a variable is converging or deviating from its long-run equilibrium value.

These uncertainties are particularly important for both Brazil and Mexico, given the more recent structural changes and episodes of balance of payments or banking crises and high inflation. In Chile, many of the most significant structural reforms were made two decades ago, and it has not been subject to a major crisis, leading to an acceleration of inflation since the period 1982-1983. This has allowed the Central Bank of Chile to have a clearer view about what the fundamental relationships are between different variables and a more precise estimation of the effects of monetary policy. In contrast, the changes in the Brazilian and Mexican economies imply that model developers often have to use more calibration and guesswork in their models, given the present instability in econometric estimates.

The empirical work that has been done in the three Latin American countries shows that the transmission channels are qualitatively the same as in industrial countries, though their quantitative importance varies, conditioned by the degree of financial penetration, credibility, and trade openness in the economy.¹⁰ The three main channels are: (1) an interest rate and credit channel that affect aggregate demand and through it wages and the prices of nontradable goods; (2) a capital flow channel that affects the level of the exchange rate, in turn influencing directly the prices of tradable goods and indirectly those of nontradables because of the effect of a more appreciated real exchange rate on aggregate demand; and (3) an expectations channel that affects the determination of wages and prices directly, as well as asset prices.

In the case of Brazil and Mexico, the effect of interest rates on economic activity through the interest rate and credit channel affecting aggregate demand is likely to be lower compared with industrial countries or in Chile, given the more limited development of the financial sector (Table 1). Thus, larger interest rate adjustments would be needed to see equivalent changes in economic activity and prices of nontradable goods, as those observed in industrialized countries or in Chile.¹¹

On the other hand, Mexico and Chile are fairly open economies, with trade representing 62 percent and 61 percent of GDP respectively in the period 1997-2001 (Table 1). In addition, their levels of

Table 1

BANKING SECTOR CREDIT AND TRADE AS PROPORTIONS OF GDP: AVERAGE 1997-2001 (PERCENTAGE)

	<u>Brazil</u>	<u>Chile</u>	<u>Mexico</u>	<u>United States</u>	<u>Canada</u>	<u>Germany*</u>	<u>France*</u>
Banking sector credit/GDP	33.8	60.4	16.3	67.6	67.2	58.0	41.9
Trade/GDP	22.6	60.5	62.0	24.3	82.5	23.3	16.5

* Trade outside the European Union.

Source: Trade to GDP was obtained from the OECD for industrial countries and from national statistical offices of the three Latin American countries. Banking-sector credit was obtained from the IFS.

development imply that tradable goods account for a larger proportion of the CPI, so the influence of interest rates on the exchange rate may translate into significant effects on prices of tradable goods and the CPI. Nevertheless, the relationship between movements in the exchange rate and prices has historically been larger in the three countries than would be justified by their degree of openness and development. That is because in economies with high inflation, the nominal exchange rate is also a leading indicator of inflationary pressures, and changes in this variable were often taken as a lack of commitment by the central bank with price stability.

In contrast, in more stable economies the pass-through tends to be lower, irrespective of the degree of openness, because of several factors. First, expectations and contracts are anchored at low levels of inflation and are not affected by exchange rate movements. Second, a significant part of the changes in costs of imported goods is absorbed by the profit margins of distributors. Finally, the type of shocks leading to movements in exchange rates are more predominantly real shocks, not nominal ones. For example, if there is a terms-of-trade shock that leads to a fall in output and aggregate demand, a depreciation of the exchange rate should have a small effect on prices. In contrast, a depreciation that corresponds to a looser stance of monetary policy or a decline in the demand for the country's assets—when the economy is growing at its potential—should have a larger effect on prices.

Summarizing, Chile's transmission channels are likely to be similar to those of a country like Canada, with significant financial penetration, a very open economy but an already low pass-through given the consolidation of low inflation. The case of Brazil is one in which both the interest rate and credit channel and the exchange rate channel are relatively weak. The Mexican case is between these two extremes, with a relatively weak effect on aggregate demand from the interest rate and credit channel, and a stronger exchange rate channel, though its importance seems to have diminished.

The adoption of an inflation-targeting framework in the three countries should lead to a reduction in the relationship between exchange rates and prices, and increase the role of expectations. Past stabilization programs in Latin America were typically based on maintaining the exchange rate as a nominal anchor, so this variable played both a direct role affecting prices of tradable goods and an indirect role, as expectations were anchored around its level so movements in this variable affected all the prices in the economy. With inflation targeting, the short- and medium-run targets are the new nominal anchors. This implies that even though the inflation-targeting scheme was initially applied in industrial countries, it is of particular relevance for emerging markets countries that are following a disinflationary process. In addition to the substitution of the exchange rate as a nominal anchor, the establishment of a long-term target and an increase in transparency are of particular importance in order to avoid shocks driven by expectations and confidence crises, as those observed historically in many emerging markets.¹²

There is another particular element that conditioned the disinflationary strategy followed in the three countries. As in industrial countries, there are important labor market rigidities, related with contracts and costs of adjusting the amount of employment in a firm, that imply that monetary conditions in the economy translate into wage adjustments with a significant lag. However, high past levels of inflation implied that the necessary adjustment in nominal wage increases was much larger than any seen recently in industrial countries. In addition, high inflation also led to significant wage and contract indexation, especially in Brazil and Chile, introducing an additional element of inflation inertia. Finally, past inflation might have made workers accustomed to

receiving large nominal wage increases, creating “money illusion.” In the case of Mexico, important real wage increases have been observed during the last four years, whereas the years of high inflation with higher nominal increases implied significant real losses for workers. Yet occasionally, under the new low-inflation environment, nominal wage increases that imply real increases are rejected for being “too low.” However, this is another area where the establishment of inflation targets and the importance of credibility can have a substantial contribution, as both firms and workers internalize the targets when negotiating nominal wage increases. Otherwise, firms know that a lax stance when negotiating wages in a low-inflation environment can imply a sharp erosion of profit margins.

The existence of price and wage rigidities and the need to build credibility imply that emerging-market central banks need to follow a very proactive communication strategy that includes publishing quarterly reports, giving constant public speeches, and scheduling meetings with both managers or owners of firms, trade unions, and political leaders. The objective is to generate a sharper coordination of expectations around the targets, reducing the costs of attaining the disinflation.

How does the need to build credibility and the characteristics of the transmission channels condition the strategy for disinflation? It turns out that there are several elements that would call for different speeds and degrees of aggressiveness for reducing inflation. There are three main elements that justify a more gradual process.

First, there is a tradeoff between the benefits of lower inflation and the costs associated with its reduction. To minimize the latter due to the presence of rigid wages and a lack of credibility, it is convenient to follow a gradual process of adjustment.

Second, it is relatively easy to reduce inflation quickly based on anchoring the exchange rate and, thus, engineering a reduction in the prices of tradable goods. However, past stabilization processes in Latin America and elsewhere have shown that disinflationary efforts based mainly on the exchange rate frequently translate to an increase in external vulnerabilities that ultimately leads to a crisis and a loss of past stabilization achievements. Thus, a successful stabilization of inflation needs to be based on a balanced approach, allowing for an adjustment

of expectations and the prices of both tradable and non-tradable goods. The adjustment in expectations and nontradable goods takes longer to engineer.

Finally, as mentioned, there are important uncertainties about the relative strengths of the different transmission channels of monetary policy due to the important structural changes that have been observed in the economy and the monetary policy regime. This implies that there needs to be a continuous re-evaluation of the strength of the different channels and of the effects of the monetary instruments. It would be rash in such a context to follow very extreme policies.

This last argument was formalized by Brainard (1967). He found that a prudent monetary policy should be followed when facing uncertainty about policy multipliers.¹³ In the case of emerging markets, the argument is compounded with respect to that noted by Brainard, as there is parameter, information, and structural uncertainty. Therefore, taking these uncertainties into account, the recommendation would be that policymakers should compute the magnitude and direction of the change in the monetary instrument and then do less.¹⁴

However, when credibility is at stake, it is difficult to follow an extremely gradual approach and a very cautious strategy. The need to build credibility implies that the disinflationary process needs to work as a signal of the commitment of the central bank with price stability. Therefore, the response of monetary policy to shocks should be forceful to guarantee the attainment of the targets, and the disinflation implicit in the targets needs to be substantial.

As a result of the previous considerations, authorities needed to strike a balance between both concerns. Thus, a gradual disinflation process was established in terms of progressively smaller targets for inflation. But once these were established, credibility was pursued by complying strictly with them by reacting aggressively to potential inflationary pressures that would generate permanent deviations from the targets.

The gradual strategy was followed in the three countries, while the need to avoid any upward deviation from the targets has been particularly emphasized in Chile and Mexico. In Brazil, inflation was reduced fairly quickly from a level of 5,000 percent in 1994 to 2.5 percent in 1998, in the context of the exchange-rate-based "Plan Real." It then increased to 8.4 percent in 1999 as a result of the devaluation of the

real, falling gradually to close to 5 percent in 2000. However, it has been pushed up again by a series of negative price shocks. In the case of Chile and Mexico, inflation has fallen gradually but steadily. Chilean inflation was reduced from 30 percent to 3 percent in ten years, while in Mexico it fell from 52 percent to 5 percent in six years. In both countries, core inflation has been below the target for the last three years, and it is likely that this will again be seen in 2002. These results also show that an exchange rate anchor is not necessary to attain price stability in emerging markets.

Developing financial markets

There can be instances when financial developments reduce the effectiveness of monetary policy and impose restrictions on the actions of the central bank. There are four of these issues that are of particular relevance in Latin America: (1) a low level of domestic financial development or a process of disintermediation that reduces the effectiveness of monetary policy through the aggregate demand and credit channels, though a response to changes in opportunity costs is always present; (2) liability dollarization that leads to an excessive monetary reaction to exchange rate movements; (3) weakness in financial intermediaries that may imply problems in the banking sector when the stance of policy is changed;¹⁵ and (4) the possibility of perverse debt dynamics arising from a tightening of policy when, for example, a large proportion of public debt is at variable interest rates,¹⁶ so a confidence crisis may ensue.¹⁷ Therefore, an additional objective of the authorities should be further consolidation of the credit channel, increasing the amount of intermediation in the domestic financial sector, and giving proper incentives to limit currency and maturity mismatches.

In the Mexican case, the balance of payments crisis of 1994-1995 translated into a deep banking-sector crisis, as conditions in the economy were such that the number of non-performing loans increased substantially and bank capital was eroded. Decisive actions were carried out to support the banks, being fully successful in that no bank runs were observed during this period and there was no need to impose capital controls. However, there has not been a sustained recovery in bank lending to the private sector.

There are several causes that have limited the recovery of the banking sector. On the supply side, banks needed to replenish their level of risk-adjusted capital and, thus, invested mostly in government bonds that, during a large part of the period, were high-return, low-risk instruments. In addition, the crisis episode made it clear that institutional characteristics of the credit market made it very difficult to recover loan guarantees and that bankruptcy problems took a long time to solve. It might also have been the case that the relatively high real interest rates that were maintained during the period limited the demand for loans.

These three issues were recently addressed. Banks have progressed in their recapitalization, with the ratio of capital to risk-adjusted assets standing at 15.05 percent as of March 2002. Two legal reforms oriented toward easing collateral recoveries and making bankruptcy procedures more expedient were made in 2000. Finally, real interest rates on government bonds have remained at levels below 4 percent since mid-2001, their lowest levels since these were initially issued at the beginning of the 1980s. This implies that the structural conditions that would allow for a credit recovery seem to be in place, at least since mid-2001. However, the recent deceleration in economic activity has led to a reduction in the demand for credit. It will be necessary to wait for stronger evidence of economic recovery to be sure that past reforms were sufficient to guarantee a recovery in bank loans.

There has been progress on other components of the Mexican financial system. In particular, the reform to the pension system toward individual accounts implies that the amount of resources invested in capital markets will steadily increase. The amount of resources intermediated through individual retirement accounts has increased to almost 5 percent of GDP as of July 2002 and is expected to increase at a rate of approximately 1 percent of GDP per year. In addition, a long-term domestic bond market has been developed, initially trading only with government bonds but increasingly being used by nonfinancial firms to obtain long-term resources in domestic currency for investment and by financial companies to provide long-term loans, such as mortgages. So far, the outstanding value of private-sector bonds has reached more than \$6 billion.

In terms of liability dollarization, it is likely that the three countries, and particularly Brazil and Mexico, are currently in a transition process toward lower levels of foreign indebtedness.¹⁸ Previously, high levels of debt denominated in foreign currency responded in an important way to the implicit insurance associated with the fixed exchange rates that were in place. The disappearance of these makes foreign financing less attractive, as firms have to recognize the currency risk associated with such operations. Consequently, in Mexico the ratio of foreign debt to assets fell by 4.5 percentage points from 1994 to 2000 for nonexporting firms listed in the stock market, while it remained virtually constant for exporting firms. The ratio of exports to debt in dollars has increased substantially, from 2 percent in 1994 to 7 percent in 2000, suggesting that firms are maintaining a less-exposed position to currency risk.¹⁹

Therefore, the change to a flexible exchange rate regime is generating an automatic recomposition of liabilities. However, the incentives provided by the regime should be complemented by other actions. A derivatives market needs to be developed to allow firms to hedge the risk derived from the financing obtained from diversified sources.²⁰ In addition, the lack of long-term domestic debt markets implied that firms either had a currency or a maturity mismatch with respect to the assets bought with the financing. The development of a long-term debt market should contribute to solve this problem.²¹

III. THE EVOLUTION OF THE PASS-THROUGH AND THE MONETARY POLICY RESPONSE IN PRACTICE

In this section, I comment briefly on the fact that the exchange rate pass-through, an important constraint to the implementation of an independent monetary policy, has weakened in the last couple of years. I also look at the effect that this phenomenon, together with the improvements in credibility and the success in the stabilization process, has had on the policy reaction function.

The exchange rate pass-through and exchange rate shocks

Historical estimations of the exchange rate pass-through indicate that this had been high and quick in the case of the three countries. Chart 3 shows the evolution of annual inflation and depreciation rates for the three countries, and it is evident that there was a very strong link. As mentioned, this was due both to the direct effect of exchange rate movements on prices of tradable goods and on the role of nominal anchor that the exchange rate had played historically.

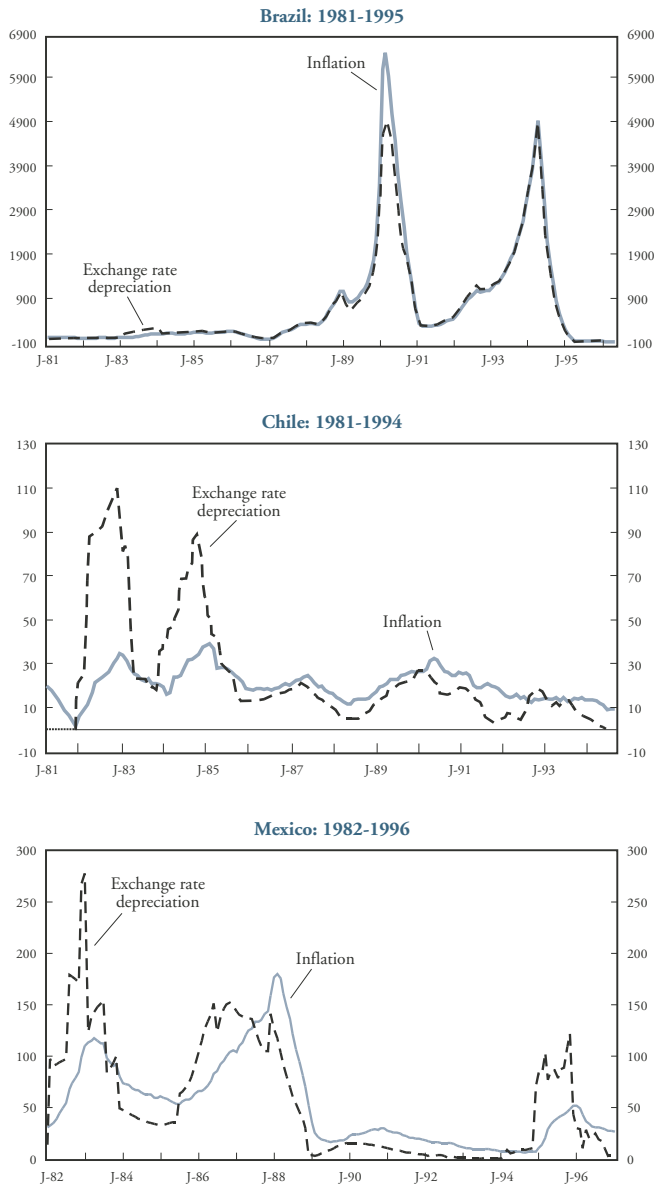
Such high pass-through imposes several restrictions on monetary policy, particularly on the ability to let the exchange rate respond to shocks and, thus, having a well-functioning floating exchange rate regime. If movements in the exchange rate have such a strong effect on prices, the central bank will need to respond strongly in order to limit their inflationary impact, even if there is no explicit exchange rate target. If the private sector expects this reaction, then it will behave as if the exchange rate fluctuations that the central bank is willing to allow are limited, and, thus, the incentives for proper liability management are dented. In addition, the exchange rate won't be allowed to respond fully to counter shocks.

Fortunately, there are several good theoretical reasons to expect the pass-through to have fallen in the three countries during the recent period. First, the transition from an exchange-rate-based monetary policy to an inflation-targeting framework implies that the signaling role on the stance of monetary policy played by the nominal exchange rate in the past is substituted by the targets and explicit actions of monetary policy. Second, the fact that the exchange rate is allowed to fluctuate, and it both appreciates and depreciates, implies that prices setters are more likely to wait to adjust their prices until they have better information about whether a given change is permanent or transitory. Third, increasing competitiveness in the economy implies that price setters are less able to pass to consumers increases in costs of imported inputs.²²

Empirically, there is strong evidence to support this hypothesis. Chart 4 shows the evolution of annual inflation and depreciation rates during the most recent period. The exchange rates in Brazil and Chile have depreciated very significantly with little or no effect on prices. The evidence is not as strong in the Mexican case, as there have been no

Chart 3

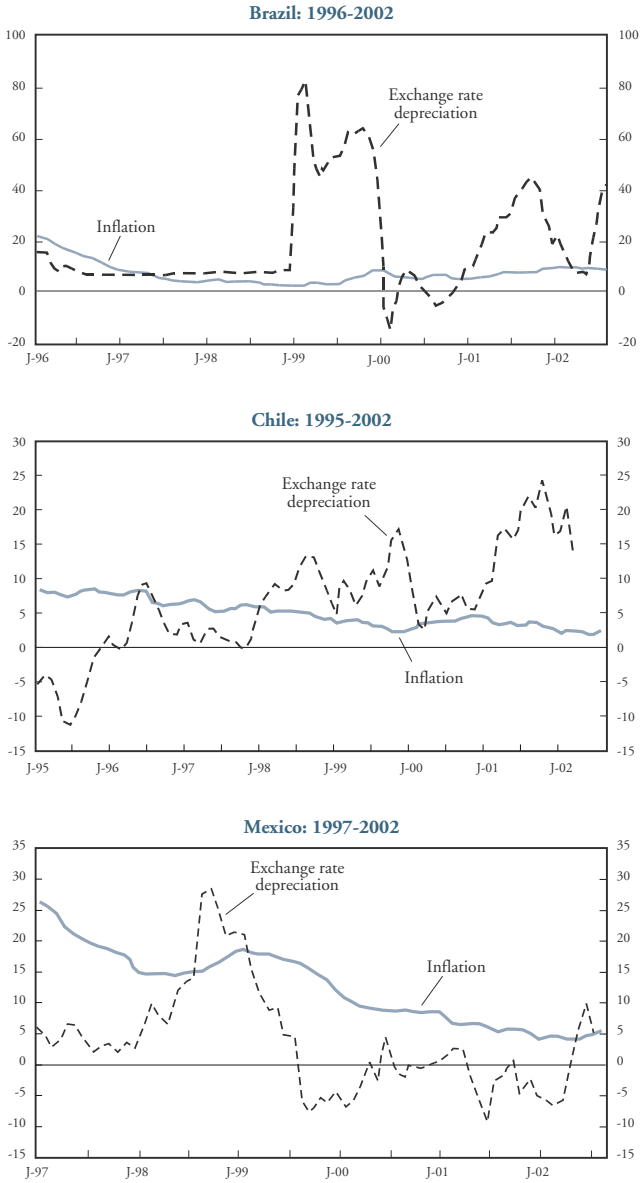
HISTORICAL SERIES OF ANNUAL INFLATION AND DEPRECIATION RATES IN BRAZIL, CHILE, AND MEXICO (PERCENTAGE POINTS)*



* The data are from each country's central bank.

Chart 4

RECENT EVOLUTION OF ANNUAL INFLATION AND DEPRECIATION RATES IN BRAZIL, CHILE, AND MEXICO (PERCENTAGE POINTS)*



* The data are from each country's central bank.

Table 2

RESULTS FROM A REGRESSION OF THE ANNUAL INFLATION RATE ON THE ANNUAL DEPRECIATION RATE²⁴

Country and sample period	Coefficient on exchange rate depreciation	Country and sample period	Coefficient on exchange rate depreciation
1) Brazil		4) Australia	
1982-2002	1.187***	1980-2002	.009
1982-1995	1.193***	1980-1990	.021
1996-2002	-.035	1991-2002	.004
2) Chile		5) Canada	
1982-2002	.216***	1980-2002	-.114
1982-1994	.151***	1980-1990	.202*
1995-2002	-.192***	1991-2002	-.152***
3) Mexico		6) New Zealand	
1980-2002	.583***	1980-2002	.029
1980-1996	.542***	1980-1990	.006
1997-2002	.316***	1991-2002	-.020

*Significant at 10 percent.

***Significant at 1 percent.

wide fluctuations in the exchange rate during the last four years, when the average value of the exchange rate has been \$9.44 pesos/dollar and has fluctuated between -3 percent and 7 percent of this value. However, on those occasions when the exchange rate has moved, the speed of disinflation has not been affected.

The graphical evidence can be supported by a simple econometric exercise. The effect of the annual depreciation rate on annual inflation rates was estimated for the three Latin American countries, as well as Australia, Canada, and New Zealand, using a sample that begins in the early 1980s and also for two subsamples. The first of these covers most of the 1980s and early 1990s, and the second subsample starts in the 1990s and ends in 2002. The results are quite striking. The pass-through coefficient falls in a very important way for all Latin American countries from the earlier subperiod to the latter one. Something very similar happens in Canada, which has very similar coefficients to Chile,²³ while Australia and New Zealand have much smaller coefficients for the whole period and both subsamples. Thus, the countries in the Western Hemisphere have been converging with the two in Oceania.

The monetary policy response

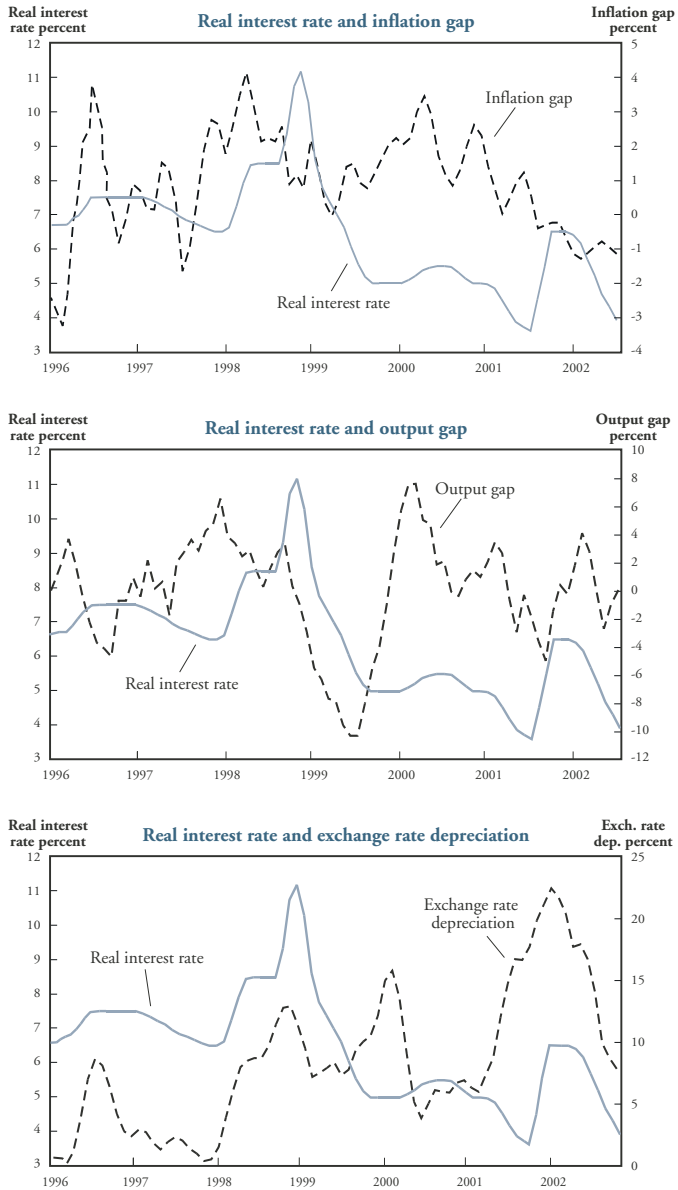
During the period 1998-2002, there were several episodes that required important decisions in terms of the implementation of monetary policy. It is interesting to highlight the different policy reactions to the 1998-1999 and the 2001 shocks, both in Mexico and Chile, and the acceleration of aggregate demand observed in Mexico during 2000. In 1998, the strong financial contagion and concerns with a strong pass-through led to a significant tightening of monetary conditions in both countries, a procyclical response. However, in 2000, policy was tightened in Mexico in response to a potential overheating of the economy. Finally, in 2001-2002 the absence of financial contagion allowed the monetary authorities in Chile and Mexico to reduce interest rates and follow more countercyclical policies, even in periods of exchange rate depreciation.²⁵

Charts 5 and 6 show the level of short-term real interest rates, the inflation gap, the output gap, and exchange rate movements in Chile and Mexico, respectively. The shocks in 1998-1999 were associated with the contagion arising from the Russian and Brazilian crisis, which led to an important depreciation of the currency and an increase in the inflation gap in Mexico, and a depreciation of the Chilean peso. In both economies, there was a sharp interest rate response to limit the effects from the depreciation on prices, as well as to counter what were considered as speculative pressures not responding to fundamentals. To some extent during this period, the consideration of financial contagion and the assumption of a high pass-through translated into an important policy tightening that produced a procyclical response, as the original shock had a negative effect on output.

A first example of countercyclical monetary policy is the one seen in Mexico in 2000. During this year, the economy grew by almost 6.6 percent, but, more importantly, aggregate demand was growing at a substantially higher rate (10.5 percent). This had the potential of translating into future inflationary pressures, so monetary policy reacted, leading to a substantial increase in interest rates, even though inflation at the moment was in a declining trend and the objective for the year was attained.

Chart 5

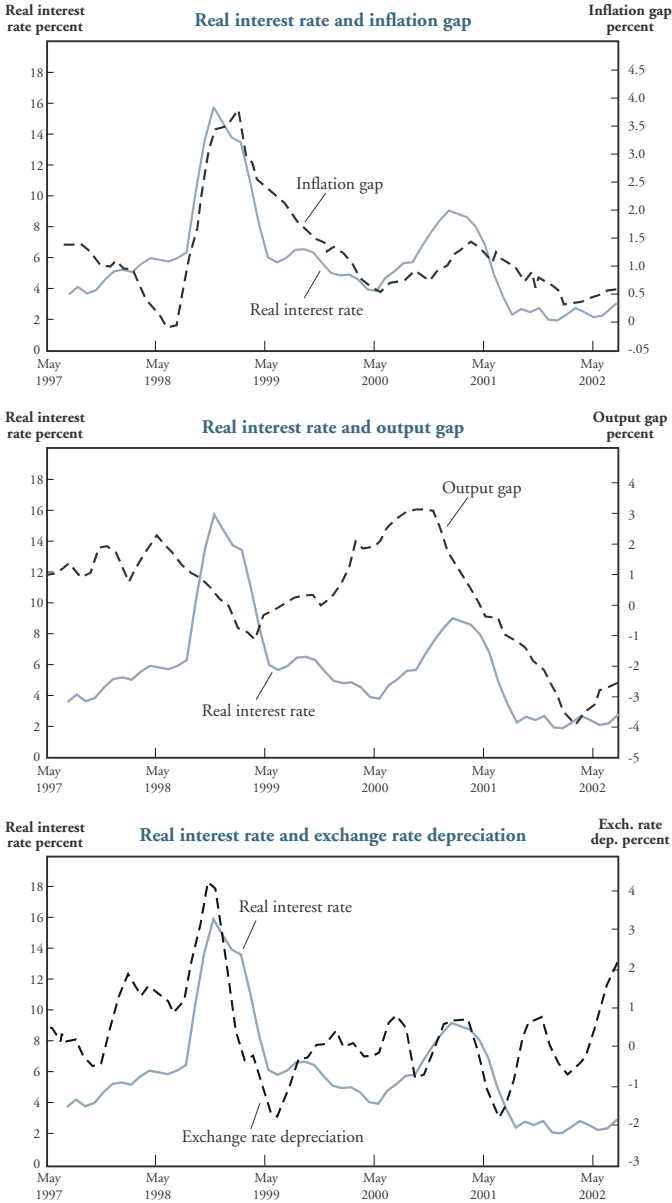
CHILE: REAL INTEREST RATE, INFLATION GAP, OUTPUT GAP, AND EXCHANGE RATE DEPRECIATION (IN PERCENT: THREE MONTHS MOVING AVERAGE)*



* The data are from each country's central bank.

Chart 6

MEXICO: REAL INTEREST RATE, INFLATION GAP, OUTPUT GAP, AND EXCHANGE RATE DEPRECIATION (IN PERCENT: THREE MONTHS MOVING AVERAGE)*



* The data are from each country's central bank.

In the period 2001-2002 there was an increase in the ability of the monetary authorities in Mexico and Chile to carry out a countercyclical monetary policy when the economy was subject to negative shocks. The worldwide deceleration of economic activity observed during 2001 impacted the Mexican and Chilean economies in a negative and significant way. However, for the first time in the last thirty years in Mexico, an external shock of this magnitude did not translate into extreme volatility of financial variables, a balance of payments crisis, and a deep recession. After a period of three decades, Mexico experienced a normal business cycle, such as those observed in industrial economies. This is a reflection of the increased credibility attained by the monetary and fiscal authorities as well as the new economic conditions of the Mexican economy.

The Bank of Mexico was able to ease monetary conditions in response to the shock, with real rates falling from 10 percent at the beginning of the year to 1.3 percent at the end. This was due to the recognition that the negative effect of the external shock on domestic conditions would lead to a reduction in inflationary pressures. In the past, with lower credibility, the move could have been interpreted as the central bank responding to objectives other than inflation, due to particular interests in the bank or to outside pressures. However, the stable evolution of the exchange rate and interest rates implies that it was interpreted correctly as a response to a change in the determinants of inflation. The Chilean experience shows a very similar and more extreme countercyclical response. As can be seen in Chart 5, in 2001 and 2002 there was a very large depreciation and a significant reduction in interest rates. The movements of these two variables obviously help to partially compensate the negative output effects of the worldwide slowdown.

Thus, after a very long period, the Bank of Mexico and the Central Bank of Chile were able to respond successfully to shocks in particular by easing policy in response to a negative external shock instead of having to tighten it in order to counter confidence problems. However, it should be noted that credibility is still fragile, particularly in Mexico. This is due to the fact that the credibility of the monetary policy is also conditioned by the institutional environment in the country. Specifically, structurally fragile public finances and the lack of political

agreements to strengthen them impose severe constraints on the ability of the central bank to maintain price stability. At a minor level, the government may need to increase public prices by decree. At a larger level, high public debt to GDP may curtail the ability of the central bank to modify monetary conditions because of the perverse debt dynamics that were mentioned earlier, specially if the debt is indexed to the exchange rate or has variable interest rates. In an extreme case, this could lead to a balance of payments crisis. The Central Bank of Brazil is currently facing such an environment.

IV. CONCLUSIONS

The adoption of a floating exchange rate regime and an inflation-targeting strategy posed several challenges to central banks in Latin America. In particular, after a history of high inflation and predetermined exchange rate regimes, monetary authorities needed to re-establish their credibility and substitute the traditional exchange rate anchors for credible inflationary goals. To accomplish this, countries followed a strategy that emphasizes the understanding of the transmission mechanism to sustain monetary policy decisions and the strengthening of transparency and communication with the public to build credibility. The available evidence suggests that this strategy has been successful so far as inflation has converged, or is close to doing so, to price stability in many of these economies.

In the following years, our understanding of how our economies work under price stability, a phenomenon that has not been seen in many decades, will provide important information to keep updating our monetary policy framework, further improving the effectiveness of monetary policy.

In particular for the case of Mexico, agents and policymakers should learn to live in a low-inflation environment. On the part of the monetary policy authority, the policy response should become more symmetric and gradual. In addition, the regional experience with low inflation will provide useful evidence to assess what is the appropriate definition of price stability for developing countries.

On the part of the public, it is important to consolidate the notion that irrespective of short-term inflation deviations due to exchange rate movements, the authority will deliver an inflation rate that, on average, is equal to the target. Therefore, long-run inflation expectations should be anchored around that level, and prices and wages should be based on this expectation.

Finally, the institutional framework in which a central bank operates is of the utmost importance. Fragility in public finances, compounded by a lack of political agreements to strengthen them, implies that the costs and difficulties from attaining and consolidating economic stability are much larger. More work is needed in Latin America in this respect.

ENDNOTES

¹Although there are some studies that clearly document the procyclical role of fiscal policy in Latin America, (for example Gavin and Perotti (1997), and Vegh and Talvi (1996)), there is no study that focuses on the pro or countercyclical nature of monetary policy in the region.

² Stiglitz (2002) has criticized both the IMF and emerging-market governments for backing procyclical policies in response to negative shocks. However, this criticism does not take into account that many of these episodes were characterized by severe confidence crises, in response to which authorities needed to follow tight monetary and fiscal policies.

³ The so-called "Washington consensus."

⁴ The lack of consolidation is explained in most cases by the inability to create the political consensus necessary to carry out additional reforms. These have been especially elusive in those countries where a large proportion of spending is determined at the state level, as each state governor has incentives to see the government's budget as a public good and knows that a purely individual attempt at adjustment has scant chance of success while it carries important political costs.

⁵ Credibility is also a prerequisite in order to be able to carry out countercyclical fiscal policy. Agents must be willing to believe that an increase in the budget deficit is temporary and only seeks to smooth the business cycle, not a more permanent deterioration in public finances that can lead to an unsustainable debt trajectory.

⁶ As Almeida and Goodhart (1998), and Bernanke and others (1999) have found, the adoption of inflation targets has led to a reduction of inflation expectations but only gradually. This suggests that the process of confidence building is a difficult and lengthy one and might even be asymmetrical. If it is easier to lose credibility than to win it, authorities have to be particularly careful at the time when this is being built.

⁷ Specifically, the following results have been found for the three countries: (1) the inflation target has become a more important determinant of inflation expectations; (2) it has become easier to predict inflation, and this last variable has converged toward the targets; (3) the sensitivity of core inflation and inflation expectations to general consumer price inflation shocks has become smaller. Some of the papers reporting these results include: Mishkin and Schmidt-Hebbel (2001); Corbo and Schmidt-Hebbel (2001); Corbo, Landerrechte, and Schmidt-Hebbel (2001); and Schmidt-Hebbel and Werner (2002).

⁸ For examples of the types of models that have been developed, see García and others (2002) for Chile; Springer and Kfoury (2001) for Brazil; and Martínez, Messmacher, and Werner (2002) for Mexico.

⁹ For reviews of the reform process in Mexico, see Lustig (1998); in a general Latin American framework see Edwards (1995); and in Mexico's financial sector see Ortíz (1994).

¹⁰ See, for example, Bogdanski, Tombini, and Werlang (2000) for Brazil; Cabrera y Lagos (2000) for Chile; and Martínez, Sanchez and Werner (2000) in the Mexican case.

¹¹ However, the disparities observed in terms of banking credit to GDP exaggerate the differences in terms of the effects on consumption and investment of higher interest rates, as an opportunity cost always arises from higher rates. Thus, the amount of retained earnings allocated to fixed investment, trade credit from firms, and the supply of loans by retailers to customers are likely to fall.

¹² The vulnerability of these countries to confidence crises is implicit evidence of the importance of the expectations channel in these economies.

¹³ These considerations are also important in industrial countries, as noted by Blinder (1998).

¹⁴ In the case of changes in variables, when there is uncertainty about whether they respond to a shock that has changed its equilibrium value, such as the real exchange rate, the authority needs first to evaluate the different effects that a convergence to or a deviation from the equilibrium would have and observe the available information carefully to make a diagnosis about the adjustment. For example, a depreciation in the equilibrium real exchange rate should lead to an adjustment in the relative prices of tradable and nontradable goods, but not to inflationary pressures in the nontradable sector.

¹⁵ Financial fragility of banks after the balance of payments and banking crises of 1995-1996 in Mexico imposed a severe restriction in terms of the scope of reaction of monetary policy. Sharp increases in interest rates would have worsened the situation of banks, increasing the default rate on loans and, thus, leading to a larger fall in bank capital and a higher fiscal cost of supporting the sector. In turn, this could have translated into a larger confidence crisis, even counteracting the desired effect from the tightening of monetary policy.

¹⁶ In the case of Brazil today, a large proportion of domestic public debt is either at variable interest rates or indexed to the currency.

¹⁷ In the case of debt indexed to foreign currency, an attempt to ease policies that generates a depreciation of the currency can also lead to the perception that the country may have problems servicing its debt.

¹⁸ Nevertheless, the extent of liability dollarization and the use of the dollar for current transactions is surprisingly low in Mexico, in spite of the past balance of payments crises, episodes of high inflation, and extremely close links with the United States.

¹⁹ See Martinez and Werner (2002) for an extensive analysis of how the structure of liabilities has changed for Mexican-listed firms.

²⁰ For a more in-depth discussion about the importance of the development of a derivatives market and what has occurred in Mexico, see Ortíz (2000).

²¹ Proponents of dollarization or hard pegs in Latin America, such as Hausmann and others (2001), and Calvo (2000), argued that there was an intrinsic "original sin" in the countries of the region, i.e., it was not possible or too expensive to obtain long-term financing in domestic currency, so a currency or maturity mismatch always appears. The Chilean and Mexican examples indicate that the "original sin" is not immutable.

²² For recent empirical analysis of the determinants of the pass-through, see Goldfajn and Werlang (2000), Arias and Messmacher (2002), and Schmidt-Hebbel and Werner (2002).

²³ The negative coefficient in the Chilean and Canadian cases suggests that in the latter period the exchange responded to real shocks that were affecting the economy. For example, a reduction in the price of commodities and in the demand for exports translated into a deceleration of the economy and a depreciation of the exchange rate. The effect of the economic deceleration dominated any inflationary pressures arising from the exchange rate adjustment.

²⁴ The regression is of the form: $\Pi_t = \alpha_0 + \alpha_1 \Delta e_t + \varepsilon_t$, where Π_t is the annual inflation rate and Δe_t is the annual depreciation rate. In the case of the three Latin American countries, the data has monthly frequency and was obtained from each central bank. In the case of the three industrial countries, the data have quarterly frequency and are from the IFS.

²⁵ For an empirical assessment of the policy reaction functions, see Schmidt-Hebbel and Werner (2002).

REFERENCES

- Almeida, Antonio, and Charles Goodhart. "Does the Adoption of Inflation Targets Affect Central Bank Behaviour?" Banca Nazionale del Lavoro *Quarterly Review*, 51(204), supplement (March 1998), pp. 19-107.
- Arias, Luz Marina, and Miguel Messmacher. "The Effect of the Exchange Rate Regime on the Pass-Through Coefficient," mimeo, Bank of México, 2002.
- Bernanke, B., Laubach, T., Mishkin, F., and A. Posen. *Inflation Targeting: Lessons from the International Experience*. Princeton, N.J.: Princeton University Press, 1999.
- Blinder, Alan. *Central Banking in Theory and Practice*. MIT Press, 1998.
- Bogdanski, Joel, Antonio Tombini, and Sergio Werlang. "Implementing Inflation Targeting in Brazil." working paper no. 1, Central Bank of Brazil, 2000.
- Brainard, William. "Uncertainty and the Effectiveness of Policy." *American Economic Review*, 57:1967, pp. 411-425.
- Cabrera, Angel, and Luis Felipe Lagos. "Monetary Policy in Chile: A Black Box?" working paper no. 88, Bank of Chile, 2000.
- Calvo, Guillermo. "The Case for Hard-Pegs," mimeo, University of Maryland, 2000.
- Corbo, Vittorio, Oscar Landerretche, and Klaus Schmidt-Hebbel. "Does Inflation Targeting Make a Difference?" working paper no. 106, Central Bank of Chile, 2001.
- _____, and Klaus Schmidt-Hebbel. "Inflation Targeting in Latin America." working paper 105, Central Bank of Chile, 2001.
- Edwards, Sebastian. *Crisis and Reform in Latin America*. World Bank, Oxford University Press, 1995.
- García, Pablo, Igal Magendzo, and Jorge Restrepo. "A Medium-Sized Macroeconometric Model of the Monetary Transmission Mechanism in Chile," mimeo, Central Bank of Chile, 2002.
- Gavin, Michael, and Roberto Perotti. *Fiscal Policy In Latin America*, NBER Macroeconomics Annual, 1997.
- Goldfajn, Ilan, and Sergio Werlang. "The Pass-Through from Depreciation to Inflation: A Panel Study," working paper no. 5, Central Bank of Brazil, 2000.
- Hausmann, R., Panizza, U., and E. Stein. "Original Sin, Pass-Through and Fear of Floating." mimeo, KSG Harvard University, 2001.
- Lustig, Nora. *Mexico: The Remaking of an Economy*, 2d ed. The Brookings Institution, 1998.
- Martínez, Lorenza, Oscar Sanchez, and Alejandro Werner. "Consideraciones Sobre la Conducción de la Política Monetaria y el Mecanismo de Transmisión en México." working paper 2001-3, Bank of Mexico, 2001.
- _____, Miguel Messmacher, and Alejandro Werner. "A Small Structural Macroeconomic Model for México," mimeo, Bank of Mexico, 2002.
- _____, and Alejandro Werner. "The Exchange Rate Regime and the Currency Composition of Corporate Debt: The Mexican Experience," forthcoming in the *Journal of Development Economics*, 2002.
- Mishkin, Frederic, and Klaus Schmidt-Hebbel. "One Decade of Inflation Targeting in the World: What Do We Know and What Do We Need to Know?" working paper no. 101, Central Bank of Chile, 2001.

- Ortíz, Guillermo. "La Reforma Financiera y la Desincorporación Bancaria," fondo de Cultura Económica, 1994.
- _____. "How Should Monetary Policymakers React to the New Challenges of Global Economic Integration," in *Proceedings of a Conference on Global Economic Integration: Opportunities and Challenges*, (Federal Reserve Bank of Kansas City, August 24-26, 2000), pp. 255-276.
- Schmidt-Hebbel Klaus, and Alejandro Werner. "Inflation Targeting in Brazil, Chile, and Mexico: Performance, Credibility, and the Exchange Rate." *Economía*, vol. 2, no. 1, pp. 31-89, 2002.
- Springer, Paulo, and Marcelo Kfoury. "A Simple Model for Inflation Targeting in Brazil." working paper no. 18, Central Bank of Brazil, 2001.
- Talvi, Ernesto, and Carlos Vega. "Can Optimal Fiscal Policy be Procyclical?" mimeo IDB, 1996.