

Commentary: How Should Monetary Policymakers React to the New Challenges of Global Economic Integration

Guillermo Ortiz

Introduction

I

During the last twenty years, global economic integration has proceeded at a very fast pace.¹ International trade in goods and services has returned to the levels observed at the end of last century. World financial flows have recovered to a degree last observed when the Gold Standard was in place, and capital flows to independent, less-developed countries are probably larger than ever before.²

The potential benefits from globalization for developing countries are large. Greater real sector integration leads to higher welfare and growth due to a better allocation of resources, a greater specialization of production, and the transfer of technology through FDI flows. Financial integration provides the resources to take advantage of these new investment opportunities brought about by globalization, as well as by the structural changes that have been undertaken in several emerging markets.³ In addition, the greater supply of foreign capital allows emerging economies to smooth consumption when confronted with transitory shocks.

However, due to the closer links across economies, new risks have emerged. The technical innovations in telecommunications and increases in the speed with which investors receive and process information imply that a country with an open capital account is

more sensitive to changes in the perception about its economic performance and policies. Fixed or semi-fixed exchange rate regimes of developed and developing countries have been subject to speculative attacks translating, whether they succeed or not, into large fluctuations of production and employment. Even countries with solid fundamentals have been subject to bouts of speculative pressure, as was evidenced by the global contagion associated with the Russian crisis that affected countries that had no real or financial links with Russia.

The increase in investors' response speed, combined with a higher sensitivity to developments abroad, has forced countries to implement a more orthodox macroeconomic policy framework. In addition, the difficulty in maintaining exchange rate pegs in open economies and the costs associated with the abandonment of the peg, has led the academic community to argue that countries should move toward one of the following options:

- i) The creation of currency unions, the implementation of currency boards, or the unilateral adoption of a foreign currency.
- ii) The adoption of more flexibility in the exchange rate and a more independent monetary policy.

Without policy coordination, and/or a large degree of flexibility, the first approach implies a painful process of adjustment in response to real shocks in order to generate the deflation necessary to accommodate changes in the equilibrium real exchange rate. In consequence, the difficult prospects for coordinating economic policies between countries, especially between emerging markets and more developed economies, and the limited economic flexibility exhibited by most economies, leaves flexible exchange rates as the most attractive regime for most developing countries with open capital accounts.⁴ This has been evidenced by the increase in the number of countries with such a regime. While in 1990, 16.2 percent of countries had a floating exchange rate, the proportion reached 27.6 percent by 1999.⁵ If we include managed floats without a predetermined trajectory for the exchange rate, the proportion of flexible currencies

has increased from 31.2 percent to 41.6 percent during the same period.

As the number of countries with a flexible regime increases, it is relevant to review the advantages and disadvantages associated with this regime and the policies that should be undertaken to reap its benefits while its costs are minimized. I will discuss these in the following section, with particular reference to the case of Mexico.

The third part of the paper presents an analysis of the effects of greater openness in goods and financial markets on monetary policy, given a context of flexible exchange rates. There are several constraints and challenges imposed on monetary policy by globalization, requiring adjustments in the analysis of inflationary pressures and the type of instruments employed due to changes in the monetary policy transmission channels. I will conclude with a brief review of monetary policy in Mexico and its prospects for the near future.

The Mexican floating exchange rate regime

II

The balance of payments and financial crises that took place in 1994-1995 forced Mexico to adopt a floating exchange rate regime. At the time, it was thought that the combination of an almost non-existent derivatives market, the illiquid positions in foreign currency of many agents, and the high volatility of the currency would result in an unviable foreign exchange rate regime in the medium run. Neither Mexico nor any other emerging market had adopted a floating exchange rate regime for a prolonged period of time, so there was no historical experience about the management of policies under this regime in a developing country. Therefore, it was considered that the floating exchange rate was a transitory solution, and that once the central bank re-established its reserve position and the macroeconomic situation was controlled, it would be possible to move to some form of predetermined currency system.

However, as an orderly macroeconomic situation was re-established, and the refinancing problems of Mexico's external public debt were resolved, the country regained access to international cap-

ital markets, Banco de Mexico was able to accumulate international reserves and the volatility of the main financial variables came down. Simultaneously, as will be discussed later, there was a fast development of derivatives markets associated to the peso/dollar exchange rate, allowing agents to insure against currency movements. Later on, once the Mexican economy started its recovery from the peso crisis, it was confronted with the aftershocks of the emerging markets' crises of 1997-1999 and the sharp fall in the price of oil in 1998. Under these circumstances, the floating exchange rate regime proved to have significant benefits. Therefore, a broader consensus about the convenience of this regime for Mexico has been emerging. In what follows, I will first present some evidence on the behavior of the main financial variables in Mexico to assure the audience that the Mexican peso is floating. Secondly, I will discuss the benefits and costs of this regime focusing on the recent Mexican experience.

Is the peso floating?

II.1

One of the main arguments employed by the proponents of the adoption of a developed country's currency by emerging countries is that, in practice, those countries that adopted a more flexible exchange rate regime are not truly floating. Under this assumption, it would be better for these countries to abandon their independent currency altogether. Their diagnostic on whether a currency floats is based on intercountry comparisons of the ratio of the volatility of the exchange rate to the volatility of interest rates or that of international reserves. In these studies, a country is classified as non-floating if the ratio of the volatility of the exchange rate to international reserves or interest rates is smaller than those of more developed floaters, such as the U.S., Japan, Australia, and others. If this is the case, it is argued that the emerging floaters must be actively setting interest rates and using international reserves to limit currency movements.⁶ The conclusions obtained from these intercountry comparisons are wrong on several accounts.

The benefits from floating derive from the fact that the exchange rate is allowed to respond to shocks, its volatility—though

costly—discourages short term capital inflows, and that its level is determined by participants in the foreign exchange market without government intervention. Given that countries differ in terms of the type, frequency, and magnitude of the shocks they face in their level of financial vulnerability and in their trade structure and the degree of openness in their capital and current accounts, it is difficult to establish a benchmark with which to judge if a country is floating. As such, the simple comparisons across countries can be misleading. So, it is relevant to analyze the evolution of exchange rate volatility in a country before and after it adopted the flexible regime.

In the Mexican case, there is a clear difference between the period 1989-1993 (when Mexico had an exchange rate band), the years 1994 and 1995 (when the exchange rate band was attacked with a consequent crisis and the adoption of the flexible exchange rate regime), and the period of economic recovery under this regime (starting in 1996). If we compare the period 1989-1993 with the period 1996-2000, one finds that the volatility of exchange rate changes has increased dramatically, while those of interest rates and of international reserves have fallen (see Table 1). The increase between both periods in the volatility of exchange rate changes has been 265 percent.⁷ In contrast, the volatility of the growth rate of the level of international reserves in the Bank of Mexico in 1996-2000 has been 66 percent lower than in 1989-1993. The volatility of the level of interest rates is smaller by 43 percent, which is surprising given that the central bank followed a sterilization policy during the first period.⁸ A comparison of the ratio of the volatility of changes in international reserves to the volatility in exchange rate changes between the two periods shows that this has fallen from 19.9 to 1.8, while the ratio of the volatility of the level of interest rates to the volatility of changes in the exchange rate has decreased from 21 to 3.3. This implies a dramatic change in the way the exchange rate fluctuates with respect to these other financial variables.

If we make the international comparison, we find that the volatility of exchange rate changes is larger than that observed for the United States and similar to that for Japan, which are larger and less open economies. It is slightly larger than the one observed in small open

Table 1
Inter-Period Comparison of the Standard Deviation of
Monthly Averages of the Exchange Rate, International
Reserves, and Interest Rates in Mexico
Period 1989-2000

	Volatility			Ratio of variable's volatility to exchange rate volatility	
	Exchange rate	International reserves	Interest rates	International reserves	Interest rates
1989-1993	.619	12.320	13.001	19.913	21.014
1994-1995	9.569	37.802	19.936	3.950	2.083
1996-2000	2.261	4.164	7.356	1.842	3.253

Source: Banxico, period January 1989 - June 2000.

economies that have flexible exchange rate regimes, such as Australia, Canada, and New Zealand, while the volatility of changes in international reserves is smaller (see Table 2).⁹ On the other hand, the volatility of the level of interest rates is greater, but none of these economies are subject to fluctuations in capital flows as those observed in Mexico, or have a history of high inflation that translates into a large pass-through from the exchange rate to inflation. I will dwell more on these points in the next section.

In conclusion, since the abandonment of the predetermined exchange rate in Mexico, the response of financial variables to domestic and external shocks has changed in such a way that it is completely justified to claim that the currency floats. Up to 1994, interest rates and international reserves were the main variables of adjustment, while from 1995 onward the importance of the exchange rate as an adjustment variable has increased considerably, as evidenced by the increase in the volatility of exchange rate changes to levels comparable with other open economies and the reduction in the volatility of interest rates and the variation in international reserves.

Table 2
Inter-Country Comparison of the Standard Deviation of
Monthly Averages of the Exchange Rate, International
Reserves, and Interest Rates
Period 1996-2000

	Volatility			Ratio of variable's volatility to exchange rate volatility	
	Exchange rate	International reserves	Interest rates	International reserves	Interest rates
Mexico	2.261	4.164	7.356	1.842	3.253
United States	1.505	3.335	.600	2.215	.398
Japan	2.913	2.822	.448	.969	.154
Australia	2.123	7.938	1.069	3.739	.503
Canada	1.122	6.850	.623	6.104	.555
New Zealand	1.698	6.969	.929	4.105	.547

Source: IMF, period January 1996 - April 2000. For Mexico: Banxico, data to June 2000.

Benefits and costs from floating

II.2

In the context of a highly integrated world economy, a flexible exchange rate regime has several important benefits. By allowing adjustments in the level of the nominal exchange rate in response to domestic and external shocks that affect the equilibrium level of the real exchange rate, it limits the volatility of production and the level of external imbalances. A related point is that this regime allows the central bank to follow an independent monetary policy in response to these shocks.

So far, the flexible exchange rate regime in Mexico has responded adequately to terms of trade shocks. The negative correlation between the monthly change in the level of the exchange rate and the change in the level of terms of trade has increased over time as the inflation rate has fallen and other shocks have not substantially affected the level of the exchange rate. For the period 1999-2000,

this correlation was -0.4 . So, as a consequence of a deterioration in Mexico's terms of trade, the nominal exchange rate has depreciated, leading to an adjustment in the real exchange rate. In comparison, the correlation was 0.11 in the period 1989-1993, when the exchange rate followed a predetermined path. The exchange rate also responded well to external financial shocks, such as the Russian and Brazilian crises. These events led to depreciations and increases in the volatility of the exchange rate, but the effects were short-lived.¹⁰ As a consequence, Mexico's performance in terms of growth and employment during the period 1998-2000 has been better than that of most countries in the region. Moreover, if we compare the economic performance of the major economies in Latin America that have a flexible regime with that of Argentina, the main fixed regime of the region, it is clear that floaters have done much better in the last two years (see Table 3).

A flexible exchange rate also changes the composition of capital flows toward longer maturities and FDI, as the volatility of the currency is higher in the short term than in the long term. This, in turn, limits the size of possible flow reversals. If we compare the volatility of changes in the exchange rate in Mexico between different time horizons during 1996-2000, the standard deviation is 0.49 for annualized monthly changes 0.14 for annualized six-month changes and 0.09 for yearly changes. The composition of the capital account has changed in consequence, with FDI increasing from an average of 20.4 percent of the capital account surplus in the period 1989-1993 to 80.2 percent in 1996-2000.

In addition, the volatility of the exchange rate rules out the perception by the private sector of the existence of implicit guarantees and avoids one-sided bets against the currency. The fact that the exchange rate adjusts automatically under a flexible exchange rate limits the generation of political pressures to defend unrealistic levels of the exchange rate, to establish ex post capital controls, dual or differential exchange rates, or to implement outright bail outs of both foreign and domestic investors.

There are several costs associated to a floating exchange rate.

Table 3
Growth Rates of Major Latin American Countries
Period 1998-2000

	GDP growth			
	1998	1999	2000*	Average
Argentina	3.9	-3.0	2.2	1.0
Brazil	-.1	1.0	3.6	1.5
Chile	3.4	-1.1	5.9	2.7
Mexico	4.8	3.7	6.3	4.9

* Average of J.P. Morgan, Deutsche Bank, Goldman Sachs, and Credit Suisse forecasts.
Source: International Monetary Fund.

First, investors command a risk premium due to the higher volatility, increasing domestic interest rates. In turn, these higher domestic rates can give a relative advantage to large exporting firms, as these typically find it easier to obtain resources from abroad. Second, the informational content of exchange rates determined by market participants is limited if the market is thin or dominated by a small number of agents. Finally, the absence or low level of development of derivatives markets that allow hedging of exchange rate risk can imply high costs in the form of an inefficient allocation of resources as banks, firms, and individuals need to limit their exchange rate exposures by themselves.

The magnitude of these costs are compounded by the financial fragility of the country. Unhedged positions in foreign currency by the public or private sector, together with lack of liquidity, imply that the negative effects on the economy of a given level of external volatility are larger. In turn, this financially vulnerable position may give rise to multiple self-fulfilling scenarios, leading to higher volatility of exchange rates as the perceived likelihood of a bad scenario increases.¹¹

It has been argued, especially in debates over dollarization of Latin American economies, that the high financial vulnerability of many

emerging markets implies that a flexible exchange rate is not a desirable option, as the observed volatility and the above mentioned costs are too high. However, several of the examples used in this debate correspond to the recent adoption of flexible exchange rates by emerging markets after a balance of payments crisis. In these instances, financial vulnerability is high because of developments that took place when the country had a pegged exchange rate and the ensuing balance of payments crisis. Nevertheless, these costs exist. In order to reduce them, several measures to reduce financial fragility are necessary. The three most important measures are the following:

- i) Development of derivatives markets,
- ii) Policies of debt and liquidity management,
- iii) Development of markets for long-term domestic debt, either with fixed nominal rates or through bonds indexed to the CPI.

The development of derivatives markets allows domestic agents to insure themselves against exchange rate movements. The cost of this insurance is clearly faced by the firms so they internalize the risk associated to the volatility of the exchange rate, instead of counting on an implicit government insurance. Currently, peso/dollar futures and options are actively traded in the Chicago Mercantile Exchange, with the current value of open future contracts amounting to approximately 1 billion dollars. In addition, a domestic derivatives market started operating in December 1998.

After the adoption of the flexible exchange rate regime, corporates have internalized the risks involved in foreign currency borrowing. Today, more than 70 percent of corporate foreign currency debt is held by highly exporting firms, and their annual sales to foreign debt ratio is approximately 60 percent.¹² Therefore, the Mexican experience shows that the adoption of the floating exchange rate regime has been helpful in limiting currency exposure by Mexican corporates.

The public sector must do the same by means of adequate debt and liquidity management policies. We have learned that it is important to avoid the concentrations of debt amortizations, particularly in foreign currency. In consequence, the government has followed a proactive strategy of debt management, increasing the maturity and limiting the concentration of external debt. Currently, market amortizations for 2000 have been rolled over in full, and those expected for 2001 are 1.6 billion dollars, compared with 33.3 billion in 1994 and 1995.

Given the existence of implicit or explicit deposit insurance, countries need adequate regulation and supervision mechanisms to give the banking sector the proper incentives to limit their currency exposure. In the case of Mexico, the regulations on foreign exchange liquidity and assets and liabilities mismatches that were in place before the 1994-1995 crisis had several loopholes, allowing banks to hold low quality assets denominated in foreign currency, such as dollar credits to firms producing non-tradeable goods, to match their liabilities in foreign currency. This was modified so different weights are given to assets depending on their quality. Today, all but assets associated with highly rated countries and firms face heavy penalties. As a result, nowadays, commercial banks have approximately 10 billion dollars in liquid assets, representing more than 25 percent of total foreign currency liabilities of the banking sector, excluding operations in the foreign exchange market.

The efforts undertaken by the private and public sectors in their asset and liability management proved to be extremely useful during the aftermath of the Russian crisis. Although in the second half of 1998 the supply of capital to emerging markets almost vanished, the solid financial position of the Mexican economy allowed the country to minimize the impact of this financial shock and to keep growing at one of the fastest rates in the region during 1998-2000.

The development of long-term markets of domestic debt should contribute substantially to the reduction of financial vulnerability. In their absence, some agents in the economy face either a currency or a maturity mismatch in the structure of their liabilities.¹³ In order to

promote the development of these long-term markets, the government started to issue domestic long-term debt indexed to the CPI (Udibonos) as far back as 1995, and this year started issuing domestic long-term nominal debt (three and five year bonds with a fixed principal and interest rates). The World Bank has also issued a long-term bond denominated in pesos. These should set up a benchmark that allows the development of a long-term market for private sector debt in domestic currency.

Summarizing, a flexible exchange regime can bring significant benefits in terms of providing flexibility to shocks, allowing the implementation of an independent monetary policy, providing clearer information about relative prices that leads to a more efficient allocation of resources, and giving incentives for a change in the composition of capital flows toward longer maturity flows and FDI. The benefits do not come without costs. But these can be reduced substantially by limiting the extent of financial vulnerability of the public sector and promoting the establishment of incentives and markets that induce private agents to do the same.

Monetary policy in the context of a flexible exchange rate regime, a globalized economy, and high uncertainty: the case of Mexico

III

Global economic integration affects monetary policy in several ways, particularly for open emerging markets like Mexico. In terms of policy formulation, the monetary authority needs to focus more closely on developments in international financial and commodities markets, on the evolution of those economies with which the country has important real links, and on the probability that a financial crisis in another emerging market could have important contagion effects, even in the absence of obvious links with that country.

This contrasts with a less open economy where the policymaker can focus more narrowly on internal developments over which he or she can have more control. In open emerging markets, greater financial integration implies that the policymaker must react promptly and accurately to new developments due to the speed with which

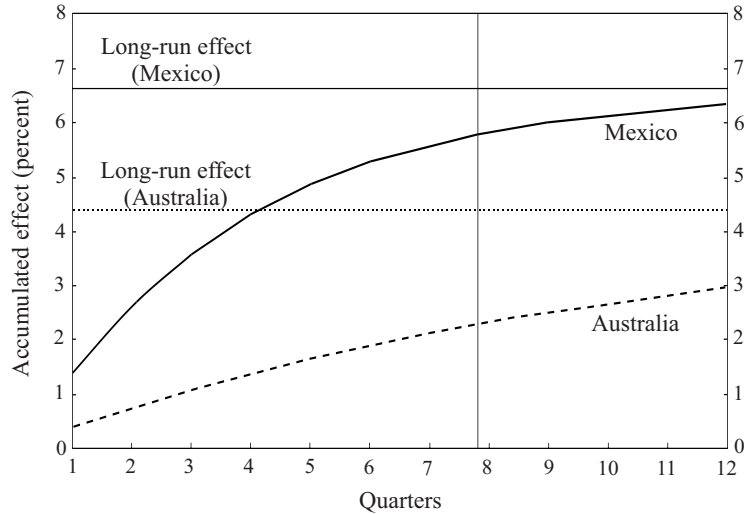
credibility can be eroded and capital rushes for the exit, limiting any margin of error.

Once the policymaker has decided on the correct type of reaction to internal or external developments, there remains the issue of implementation. Global economic integration, high uncertainty, and limited credibility have substantial effects on the transmission mechanisms. In particular, it is likely that the direct effect on aggregate demand of changes in interest rates becomes smaller while the exchange rate channel becomes more important.

There are two reasons why more integration and higher uncertainty translate into a smaller direct effect of interest rates. Financial integration allows firms to have access to foreign sources of financing. In addition, higher uncertainty may limit the development of the domestic financial sector due to the risk premium associated with credits in domestic currency. Both elements reinforce each other, so domestic credit represents a smaller proportion of total financing in the economy.

Simultaneously, the exchange rate transmission channel is stronger, as integration through international trade increases the sensitivity of production, demand, and the price level to changes in this variable. In the Mexican case, the proportion of trade to GDP has increased from 31 percent in 1990 to 58 percent in 1999. In addition, a history of high inflation, as well as the past episodes of one-sided and extreme changes in exchange rates following the balance of payments crises experienced by Mexico, has led to limited credibility of the inflation objective and, therefore, economic agents use exchange rate movements as leading indicators of inflation. These factors explain the very large and fast historical pass-through from movements in the exchange rate to changes in the CPI. A brief comparison between the speed of the pass-through estimated from econometric models for Mexico and Australia highlights the problem we face due to our previous inflationary history, as can be seen in Chart 1. First, the long-term impact of an exchange rate depreciation on non-controlled prices is higher in Mexico than in Australia. Secondly, in our country, half of this effect takes place after two quarters, while 82

Chart 1
Pass-Through from a 10 Percent Increase in the
Exchange Rate to the CPI, Excluding Controlled Prices
Frameworks by Several Small Open Economies



percent takes place within the year. In Australia, only 7 percent takes place after two quarters and 14 percent after a year.¹⁴

There is a final point that I would like to address. In an open economy, when the central bank raises interest rates in response to an acceleration of aggregate demand it runs the risk of increasing the current account deficit—in turn, augmenting the vulnerability of the economy to shifts in investors' confidence. This happens because the increase in real interest rates, in addition to reducing aggregate demand, appreciates the real exchange rate, biasing expenditures toward tradeable goods. Thus, there is a serious trade-off for open emerging markets between following restrictive monetary policies and current account vulnerability. To improve this trade-off, it is imperative to have an extremely good coordination between fiscal and monetary policies. The current situation in Mexico is a perfect

example of this policy dilemma. During the first half of this year, aggregate demand and GDP have been growing at annual rates above 10 and 7 percent, respectively. Due to the threat that this growth above potential represents to long-term inflation targets, the Bank of Mexico has been on a tightening mode throughout the year. This has led to high real interest rates and contributed to the appreciation of the currency. The increase in aggregate demand, and to a lesser extent the appreciation of the currency, generated a doubling of the non-oil trade balance deficit between the first half of 2000 and the same period of 1999. These developments highlight the importance of supporting the monetary policy restriction with a fiscal adjustment to reduce aggregate demand without increasing the vulnerability of our external accounts.

The important influence of external developments, the large role of the exchange rate in the transmission mechanism, the need to increase credibility, and the obligation of central banks to react promptly and accurately has led in the last decade to the adoption of inflation targeting by several small open economies. In these setups, the role of the exchange rate in the transmission of shocks and monetary policy has been explicitly addressed. For example, at some point in time the central banks of Canada and New Zealand have employed a “monetary-conditions index” as both an informational variable and a short-run target. In my view, the main strength of inflation targeting is to establish a transparent framework for the implementation of monetary policy that is useful as a marketing device, a communication tool, and a mechanism of accountability to the public at large.

In Mexico, there has been a gradual convergence toward inflation targeting. Following the 1994-1995 devaluation and financial crisis, there was a brief experience with monetary targeting, as it was imperative to have a very visible intermediate target. As inflation came down and the short-run instability of the relationship between money growth and inflation became evident, the bank shifted toward emphasizing its annual inflation targets. Therefore, since 1997-1998, the monetary policy framework in Mexico has been converging toward inflation targeting. The main elements of the current framework are:

- i) A medium-term goal of reducing inflation toward the levels prevailing in our main trading partners by 2003.
- ii) Annual inflation targets.
- iii) A constant assessment of inflationary pressures to guide monetary policy actions.
- iv) A policy of full transparency where the publication of a quarterly inflation report plays a key role.

The most important difference between the monetary policy framework in Mexico and that of other inflation targeting countries is the instrument of monetary policy. While the other targeting central banks use a short-term interest rate as their policy instrument, Banco de Mexico has a borrowed reserve operating procedure. In short, when Banco de Mexico tightens monetary policy, it increases its borrowed reserves target (known as the “corto”) so that at the end of the day banks will end up with a costly overdraft at the central bank, exerting upward pressures on interest rates. The main motivation behind the adoption of this type of instrument was that the high frequency of external and domestic shocks, together with the important and rapid impact of exchange rate changes on prices, require very frequent and large movements in interest rates (many times in opposite directions). In the early years of the implementation of the current framework, it was thought that a borrowed reserves operating procedure provided a useful mechanism for the market to automatically adjust interest rates to frequent shocks. In addition, the monetary authority would only act whenever it judged that market induced moments were inconsistent with the achievements of the inflation targets.

The evolution of the ex ante real interest rate has been in line with the previous description of a small open economy inflation targeting framework. This can be observed by means of the estimation of an augmented Taylor Rule for Mexico.¹⁵ The determinants of the real interest rate that are included in the analysis are the deviation of expected inflation from the central bank’s objective, a measure of the

output gap employing industrial production, the rate of depreciation of the exchange rate in the previous period, and the interest rate on public debt denominated in foreign currency. The last two variables capture the extra determinants of monetary policy in an open economy.¹⁶

The first column of Table 4 shows the results of such a regression for the period May 1997 to May 2000. The real *ex ante* interest rate has responded in a strong and significant way to changes in the foreign interest rate and to the depreciation of the exchange rate in the previous month. Thus, during this period, the interest rate seems to have responded strongly to foreign developments, limiting inflationary pressures arising from changes in the exchange rate and foreign conditions.

If the sample is divided in two, it is possible to distinguish a clear change over time in the determinants of the interest rate. In the first period, which goes from May 1997 to November 1998, there was considerable turmoil in international financial markets due to the Asian and Russian crises. These events were the major source of volatility, leading to pressure on foreign currency denominated interest rates and in the exchange rate for emerging markets. The second column of Table 4 shows that foreign currency denominated interest rates and the exchange rate were the only significant determinants of real interest rates in this period.

However, the second period, which goes from December 1998 to May 2000, was one of higher stability in international financial markets. In this period, without important external shocks and when the transition to inflation targets has taken place, the relative importance of the determinants of the real interest rates was reversed, as can be seen in the third column of Table 4. The coefficient on the deviation of inflation from the objective increases and becomes very significant. The coefficient for the output gap also increases, although it is significant only at the 15 percent confidence level. Both the foreign interest rate and the rate of depreciation lose importance and significance, completely in the case of the rate of depreciation. Thus, in this more recent period of limited external volatility and transition to an

Table 4
Augmented Taylor-Rule Type Regression of the
Ex Ante Real Interest Rate

Variables	Coefficient		
	(1) May 1997- May 2000	(2) May 1997- Nov 1998	(3) Dec 1998- May 2000
Constant	-22.956 *** (-3.078)	-22.225 ** (-2.171)	-17.717 * (-1.816)
Expected inflation minus inflation objective	.513 (1.372)	.129 (.250)	2.697 *** (3.878)
Output gap	-.039 (-.171)	-.193 (-.465)	.335 (1.543)
Lagged rate of depreciation	.470 ** (2.647)	.591 ** (2.727)	.165 (.566)
Foreign interest rate for government debt	2.811 *** (3.548)	2.804 ** (2.601)	1.649 (1.506)
R ² adjusted	.622	.654	.760
Number of observations	37	19	18
F-statistic	15.821	9.523	14.446

* Significant at the 10 percent confidence level, ** at the 5 percent confidence level, *** at the 1 percent confidence level (t-statistics in parenthesis).

inflation targeting framework, interest rates have responded more closely to the presence of inflationary pressures arising from domestic sources and aggregate demand.¹⁷

Conclusions and challenges for the future

IV

During the transition to inflation targets, the results on the inflation front have been positive. Since December 1995, inflation has come down from 52 percent to an expected level of around 9 percent by December 2000. In addition, inflation was below the central bank

objective during 1999 and it is highly likely that this will also be the case for 2000. At the same time, the inflation targeting framework has been consolidating. A long-term inflation objective has already been established, and the bank reacts whenever market expectations and our own structural forecasts about future inflation deviate from these targets. There is also full transparency surrounding the bank's decisions through the issuing of inflation reports. These factors will surely contribute to reduce the high pass-through from exchange rate depreciations to prices, which, at the moment, represents one of the main challenge of monetary policy.

The evolution of several features of the economy suggests that this transition will be completed in the near future. The development of long-term debt markets in domestic currency, the strengthening of the domestic financial sector, and better debt management by the public sector are likely to increase the attractiveness of issuing debt in domestic markets. So, the effect of the interest rate on aggregate demand will become larger. At the same time, the reduction in mismatches by firms brought about by the availability of hedging mechanisms, the correction of the financial vulnerabilities mentioned before, a greater awareness by the public that changes in the level of the exchange rate can be transitory and go both ways, and the anchoring role played by the inflation target as credibility is being rebuilt are also leading to a reduction in the pass-through from currency movements to inflation.

Therefore, as a last step, in a not-so-distant future, it will be possible to move to an interest rate instrument for monetary policy as the structural changes that were mentioned continue to lead to smaller volatility and costs associated to it, to a larger role for the interest rate in the determination of aggregate demand, and a reduction in the importance of the exchange rate channel.

Endnotes

¹ As Krugman (1995) put it: “The general picture of world integration that did not exceed early 20th century levels until sometime well into the 1970s is broadly confirmed. In the last decade or so, the share of world output has finally reached a level that is noticeably above its former peak.”

² There is an ongoing debate about the degree of trade and financial openness today compared with that at the turn of the 19th century. It has been argued that, even though absolute numbers for trade and financial flows were similar then, they are more important today as integration is more pervasive (see Bordo, Eichengreen, and Irwin (1999)).

³ These views have been expressed in a large body of research by, among others, Robert Barro, Sebastian Edwards, Anne Krueger, and David Dollar.

⁴ In addition, there is not a single major trading partner for most emerging market countries, so even if policy coordination was possible with a more developed country, it is not clear that it would be the most desirable case for the country.

⁵ The classification of exchange rates employed is that of the IMF.

⁶ Studies that include such comparisons are Calvo and Reinhart (1999, 2000), and Hausmann et al. (1999, 2000). In contrast, Levy Yeyati and Sturzenegger (1999) find that the floating exchange regime in Mexico since 1997 has had a behavior similar to that of other floating regimes employing cluster analysis techniques on the change in nominal exchange rates and international reserves.

⁷ This is measured as the standard deviation of the change in monthly averages. The change between the two periods in the volatility of daily movements is even higher.

⁸ In addition, Edwards and Susmel (2000) have noted that the volatility of interest rates increased for most emerging markets since 1994.

⁹ The data on reserves employed are international reserves excluding gold, expressed in U.S. dollars. Therefore, part of the volatility could be explained by exchange rate movements among the different currencies in which reserves are invested.

¹⁰ After the Brazilian crisis, it took forty-five days for the exchange rate to reach the level it had before the crisis. The stock market and the interest rates reached their pre-crisis levels in sixteen and twenty-four days, respectively.

¹¹ This point has been made by Caballero (2000).

¹² For the period 1991-1994, less than 40 percent of corporate foreign currency debt was held by highly exporting firms.

¹³ This has been noted by, among others, Eichengreen and Hausmann (1999).

¹⁴ Garces (1999) and De Brouwer and Ericsson (1998) include an analysis of the pass-through in Mexico and Australia, respectively.

¹⁵ Svensson (1998) develops an open economy structural model with rational expectations and obtains an interest rate reaction function that responds to, among other vari-

ables, the rate of inflation, the output gap, foreign interest rates, and the real exchange rate. The magnitudes of the coefficients found for Mexico are consistent with those obtained in his simulations.

¹⁶ The interest rate on public debt is the gross yield associated with a long-term government bond maturing in 2026 (UMS26). The data on expected inflation are the expectations for the next twelve months obtained from Banco de Mexico's monthly survey of analysts, while the central bank's objective is the linear projection of annual inflation objectives of Banco de Mexico. The series has a monthly frequency.

¹⁷ Messmacher and Werner (2000) discuss the evolution of the relationship between real domestic interest rates and these variables in more detail.

References

- Bernanke, Ben, Thomas Laubach, Frederic Mishkin, and Adam Posen (1999), *Inflation Targeting: Lessons from The International Experience*, Princeton University Press, 382 pp.
- Bordo, Michael, Barry Eichengreen and Douglas Irwin (1999), "Is Globalization Today Really Different Than Globalization a Hundred Years Ago?", NBER Working Paper no. 7195, June, 73 pp.
- Caballero, Ricardo (2000), "Macroeconomic Volatility in Latin America: A View and Three Case Studies," NBER Working Paper no. 7782, July.
- Calvo, Guillermo, and Carmen Reinhart (1999), "Fear of Floating," mimeo.
- Calvo, Guillermo, and Carmen Reinhart (2000), "Fixing for Your Life," mimeo.
- Calvo, Guillermo, and Carlos Végh (1999), "Inflation Stabilization and BOP Crises in Developing Countries," NBER Working Paper no. 6925.
- Carstens, Agustín and Alejandro Werner (1999), "Mexico's Monetary Policy Framework under A Floating Exchange Rate Regime," Serie Documentos de Investigación no. 9905, Banco de México, May.
- Corbo, Vittorio (1999), "Monetary Policy in Latin America in The 90s," mimeo.
- De Brouwer, Gordon and Neil Ericsson (1998), "Modeling Inflation in Australia," *Journal of Business and Economic Statistics*, October, vol. 16(4).
- Edwards, Sebastian, and Miguel Savastano (1998), "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?", NBER Working Paper no. 7228.
- Edwards, Sebastian, and Raul Susmel (2000), "Interest Rate Volatility and Contagion in Emerging Markets: Evidence from the 1990s," NBER Working Paper no. 7813, July.
- Eichengreen, Barry and Ricardo Hausmann (1999), "Exchange Rates and Financial Fragility," NBER Working Paper no. 7418, November.
- Frankel, Jeffrey (1999), "No Single Currency is Right for All Countries or At All Times," NBER Working Paper no. 7338, September.
- Garces, Daniel (1999), "Determinación del nivel de precios y la dinámica inflacionaria en México," Serie Documentos de Investigación no. 9907, Banco de México, December.
- Hausmann, Ricardo, Michael Gavin and Carmen Páges Sierra and Ernesto Stein (1999), "Financial Turmoil and The Choice of Exchange Rate Regime," Working Paper 400, Inter-American Development Bank.
- Hausmann, Ricardo, Ugo Panizza and Ernesto Stein (2000), "Why Do Countries Float the Way They Float?", Working Paper 418, Inter-American Development Bank.
- IMF (2000), "Debt- and Reserve-Related Indicators of External Vulnerability," prepared by the Policy Department and Review Department, March.
- Krugman, Paul (1995), "Growing World Trade: Causes and Consequences," Brookings Papers

- on Economic Activity 1, pgs. 327-362.
- Levy Yeyati, Eduardo and Federico Sturzenegger (1999), "Classifying Exchange Rate Regimes: Deeds vs. Words," mimeo, Universidad Torcuato di Tella.
- Masson, Paul, Miguel Savastano and Sunil Sharma (1997), "The Scope for Inflation Targeting in Developing Countries," IMF Working Paper 97/130.
- Messmacher, Miguel and Alejandro Werner (2000), "The Evolution over Time of a Taylor Rule. The Case of Mexico," mimeo, Banco de Mexico.
- Mishkin, Frederic (2000), "Inflation Targeting in Emerging Market Countries," NBER Working Paper no. 7618, March.
- Mishkin, Frederic and Miguel Savastano (2000), "Monetary Policy Strategies for Latin America," NBER Working Paper no. 7617, March.
- Mussa, Michael, et. al. (2000), "Exchange Rate Regimes in An Increasingly Integrated World Economy," mimeo, IMF, April.
- Svensson, Lars (1996), "Price Level Targeting vs. Inflation Targeting: A Free Lunch?," NBER Working Paper no. 5719, August.
- Svensson, Lars (1997), "Inflation Targeting: Some Extensions," NBER Working Paper no. 5962, March.
- Svensson, Lars (1998), "Open-Economy Inflation Targeting," NBER Working Paper no. 6546, May.