Policies for international reserve accumulation under a floating exchange rate regime: the experience of Mexico (1995-2003)

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1. Introduction

During the past eight years the Bank of Mexico, has implemented monetary policy under a floating exchange rate regime. The central bank has refrained from discrete interventions in the foreign exchange market and avoided signalling any desired exchange rate level. Nevertheless, an impressive stock of net international reserves has been accumulated throughout this period. This paper deals with the policies of international reserve accumulation adopted by the Mexican financial authorities from 1995 to 2003. In particular, it shows that authorities have taken decisions by assessing the benefits and costs of marginally increasing international reserves, taking into account the restrictions imposed by the prevailing economic conditions and institutional arrangements. They have ensured that central bank participation in the foreign exchange market follows previously announced rules so as not to disturb the normal operation of the floating exchange rate regime.

The paper is organised in five sections. The first discusses the reasons behind the decision to adopt a floating exchange rate regime and deregulate the foreign exchange market; the second describes the mechanisms used to accumulate international reserves during the period 1996-2001; the third deals with the consequences of international reserve accumulation, both for the formulation of monetary policy and for the financial situation of the central bank; the fourth focuses on the policies of international reserve accumulation put in place during the period 2001-03, after the Bank of Mexico had acquired a large stock of foreign assets; and the fifth offers some conclusions.

2. Floating as a long-term policy decision

For a number of years before the onset of the 1994-95 financial crisis, Mexico's exchange rate regime had been gradually becoming more flexible. To begin with, the rate had been allowed to fluctuate within an ever widening band, with a fixed floor and an upward crawling ceiling. Furthermore, some initial steps had been taken to foster the development of an institutional framework that would support more exchange rate flexibility.

Aiming for more flexibility was consistent with a series of liberalisation measures introduced in Mexico at the beginning of the 1990s. These policies deregulated the financial sector and reduced the participation of the public sector in the economy. As an important aspect of the latter, a large number of public sector enterprises were sold to the private sector. Deposit and lending rates were freed, commercial banks' liquidity requirements were eliminated and credit allocation directives were abolished. Last but not least, a free trade agreement was signed with Canada and the United States and restrictions on foreign ownership of financial and non-financial companies were largely phased out.

After pegging the exchange rate for close to seven years, the Bank of Mexico was forced to let the peso float in December 1994. This was the only viable alternative at the time considering that the stock of international reserves had been almost completely depleted fending off several speculative attacks during 1994. Thus, the central bank was unable to influence exchange rate levels through foreign exchange market intervention. Furthermore, available international reserves barely covered a

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minimal part of the debt amortisation payments in foreign currency due at that time, which were concentrated in tesobonos (dollar-indexed government securities) and in short-term liabilities of Mexican commercial banks (Table 1).

Table 1

Net international assets and short-term amortisation payments

In billions of US dollars

	1994	1995
Net international assets	2.3	–1.5
International reserves	6.1	15.7
Less liabilities with:		
IMF	3.9	15.8
Other central banks	0.0	1.5
Short-term amortisation payments	57.9	26.3
Tesobonos	29.2	0.2
Public sector	6.4	7.2
Commercial banks	15.5	11.9
Private sector	6.8	6.9

Sources: Bank of Mexico, *Annual Report*, 1994 and 1995; Ministry of Finance and Public Credit, *Data Book*, 1994 and 1995.

Tesobonos were zero coupon bills which paid, at face value, the amount of Mexican pesos required to buy a fixed quantity of US dollars. The pesos that the government had to disburse to the holder were computed by applying the spot exchange rate prevailing in the market two days in advance of maturity. This procedure implied that, to hedge their risk exposure, holders had to buy US dollars precisely at the time when the settlement exchange rate was determined. Therefore an important source of instability was introduced into the foreign exchange market, since bondholders became indifferent to any peso depreciation induced by their demand for US dollars. Moreover, during the first quarter of 1995 depreciation pressures on the peso arose after foreign financial institutions decided to close short-term credit lines to Mexican commercial banks.

The immediate goal of economic policy in early 1995 was to stabilise the exchange rate and ensure the solvency of the government. The first required securing an international financial assistance package, very aggressive hikes in domestic interest rates and the removal of dollar-indexed government securities holders from the foreign exchange market. The second involved a refinancing of liabilities, expenditure control and more revenues.

A priority during 1995 was to honour all short-term amortisation payments by refinancing them with credits obtained from alternative sources (multilateral financial organisations, central banks and the US government). In addition, a macroeconomic adjustment programme ensured an orderly contraction of domestic demand consistent with significantly narrowing the current account deficit and reducing the public sector borrowing requirements. In order to ease pressures on the foreign exchange market, the Bank of Mexico opened a facility to settle the amortisation of tesobonos directly in US dollars. The central bank also provided a credit line in US dollars to the deposit insurance trust fund (FOBAPROA), which in turn offered foreign currency liquidity to Mexican commercial banks facing the closure of interbank credit lines with foreign counterparts.

By the end of 1995 it was evident that the strategy had been successful. Payment obligations were honoured and the economy embarked on a process of rapid recovery. The financial situation was not as critical as it had been before. Short-term capital payments for 1996 were less than half the amount previously estimated for that year (Table 1). Mexican commercial banks regained access to foreign credit, so that during the second quarter of 1995 the central bank's emergency credit line to

FOBAPROA was fully paid back. In addition, by the end of the year the federal government was able to place debt instruments in international financial markets.

The improving macroeconomic environment and the stabilisation of the exchange rate opened the opportunity to reconsider the prevailing exchange rate arrangement. Mexico had a long history with fixed or quasi-fixed exchange rate regimes. However, at that point it had only very limited experience with a free float. Policymakers pondered the merits of keeping the float as an important element of long-term economic policy. In fact, the suggestion to adopt a currency board - which had been rejected in the past - gained renewed strength.

Many raised their voices in opposition to maintaining the float. The fragility of the banking system and the high levels of uncertainty prevailing in the domestic financial markets were often mentioned as factors to justify a framework for pegging the exchange rate. There were also some prestigious academics who vehemently argued in favour of reintroducing a currency band, pointing to the then successful Chilean experience.

The “fear of floating” literature and the lack of instances of other emerging market countries with a float continued to fuel doubts about the regime. In this regard some argued that implementing monetary policy in small open economies was not feasible without a nominal anchor. They warned that “fear of floating” would prevail over any other objective variable. Even though all kinds of different concerns were covered in the analysis, the financial authorities decided that a floating exchange rate regime was the best policy option for Mexico.

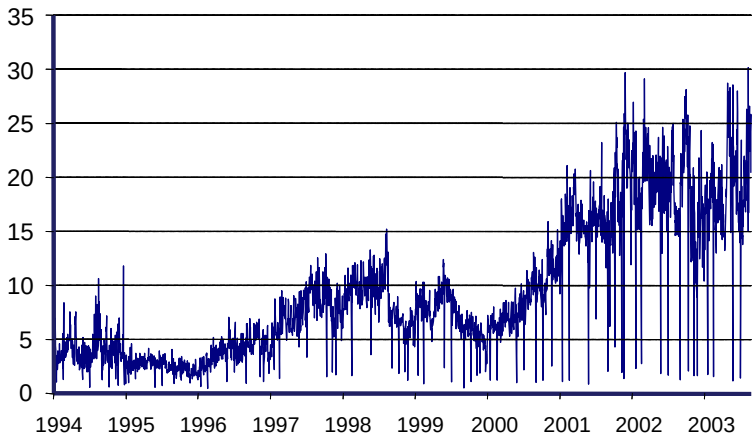
The decision to continue floating was based on the conviction that it was the best arrangement to prevent the exchange rate from drifting away from its equilibrium value for long periods, discourage short-term capital inflows, inhibit speculative attacks and extract information on market expectations. The authorities were convinced of the difficulties of targeting the exchange rate in a small open economy with unrestricted capital movement. The intensity of the 1994 speculative attacks on the peso, as well as the 1992 European experience with fixed exchange rates, also played an important role in convincing the authorities of their inability to counter the effects of today’s huge international capital flows.

The authorities were aware that, for the floating exchange rate regime to function properly, it was essential to have liquid markets. Otherwise, the exchange rate could become highly volatile. To increase liquidity in the peso foreign market, the Bank of Mexico removed all the restrictions imposed in preceding years and encouraged the development of derivatives markets. Hence, during 1995 the central bank allowed participants to operate forwards and authorised foreign banks to settle their foreign exchange transactions in pesos. As a result, the daily volume traded in the foreign exchange market increased tenfold (Graph 1).

Graph 1

Daily volume traded in the foreign exchange market

In billions of US dollars



Source: Bank of Mexico.

3. The policy of international reserve accumulation during 1996-2001: a float with accumulation

Although the exchange rate was to be determined by market forces, Mexican financial authorities decided to include the build-up of international reserves as an objective in the 1996 economic programme. There was at the time, in some influential circles, scepticism about Mexico's ability to put its house in order. If this view became widely shared it was feared that the liquidity crisis could take a turn for the worse, becoming a fully fledged solvency crisis. Therefore, the rationale behind reserve accumulation went beyond its importance in ensuring compliance with Mexico's foreign debt payments. It was also a signal to foreign investors and international rating agencies, which tend to associate a higher level of international reserves with lower country risk. Consequently, a large stock of international reserves also meant that Mexican borrowers could have access to more external financing on better terms.

Other catalysts for holding a larger amount of international reserves came to the surface during 1995. The first emerged at the beginning of that year, when the Bank of Mexico acted as lender of last resort in foreign currency to support some Mexican banks through FOBAPROA. The second arose at the end of the year, when the central bank was compelled to intervene in the market to put an end to speculative pressures on the peso, fed by perceptions of its unwillingness to intervene given the low level of international reserves at hand.

With the decision to adopt a floating exchange regime for the long term, the policy of international reserve accumulation was then designed to avoid, as much as possible, any interference with the normal functioning of the foreign exchange market. In this regard, with a view to regaining market credibility, the authorities' commitment to the floating regime was frequently emphasised along with their decision to conduct monetary and exchange rate policies transparently.

The policy of international reserve accumulation took into account the restrictions imposed by the institutional framework affecting foreign exchange operations undertaken by the Bank of Mexico with public sector entities.

3.1 Foreign exchange operations with public sector entities

For several years the Bank of Mexico has conducted, almost on a daily basis, foreign exchange transactions with the federal government and with Pemex,[2] the public enterprise that deals with all aspects of the oil industry. Given the large size and unpredictable timing of these foreign currency operations, the Foreign Exchange Commission[3] deemed it convenient to prevent them from taking place directly in the foreign exchange market and causing unwarranted volatility. The specific strategy that the Bank of Mexico applies to operate with public sector entities relies on the use of international reserves as a buffer stock. Thus, Pemex's net foreign exchange receipts (from oil exports and external financing) have been partially used to finance the federal government's foreign exchange requirements to service its external debt. Since Pemex's receipts have usually exceeded the federal government's external debt servicing needs, the central bank has ended up increasing its international reserve stock.

The regulation imposed on Pemex does not coerce the firm to sell to the Bank of Mexico any specific fraction of its foreign currency receipts at a particular date. In fact, it has total discretion on the amount

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[2] The legal basis for these transactions is found in the Law of the Bank of Mexico. Article 3 enables the central bank to provide treasury services to the federal government. Article 34 entitles the central bank to impose restrictions on foreign currency operations conducted by entities of the Federal Public Administration. The only entity that is currently subject to this restriction is Pemex, which has to carry out with the central bank any buy/sell operation of foreign currency against Mexican pesos.

[3] According to Article 21 of the Law of the Bank of Mexico, in foreign exchange matters the central bank shall act in accordance with the guidelines established by the Foreign Exchange Commission. This Commission is formed by the Secretary and Undersecretary of the Ministry of Finance and Public Credit, another undersecretary of said Ministry appointed by the Secretary, the central bank Governor and two more members of the Board of Governors selected by the Governor. The Commission is presided over by the Secretary of Finance and Public Credit, who has the decisive vote in the event of a tie. Resolutions of the Commission are reached by majority vote, if and only if such majority includes at least one vote from a representative of the aforementioned Ministry.

and timing of any foreign currency sales to the central bank, subject only to some contractual conditions of an operational nature. The main reason for Pemex's selling most of its foreign currency receipts to the central bank follows from its legal obligation to discharge its tax liabilities with Mexican pesos.

In terms of their contribution to international reserve accumulation, Table 2 shows that foreign exchange operations conducted by Bank of Mexico with public sector entities have been the most significant source of reserves.

Table 2

Decomposition by source of annual flows of international assets

In billions of US dollars

	Total	Pemex	Federal government	Market operations	Other[1]
1996	6.3	9.0	–3.6	0.9	0.0
1997	13.5	8.5	0.9	3.8	0.4
1998	3.7	5.4	–3.3	0.3	1.2
1999	3.9	7.4	–6.5	1.8	1.2
2000	8.2	11.2	–6.8	1.8	2.1
2001	9.2	8.9	–2.4	1.4	1.4

[1] Includes net income generated by investment of the Bank of Mexico's international assets.

Source: Bank of Mexico.

International reserve accumulation was particularly intense during 1996 and 1997, reflecting:

(1) Relatively high oil prices (the average WTI price then was 20% above the level seen in previous years); and

(2) The federal government's successful efforts to secure foreign financing in excess of its external debt service needs.

This favourable situation was reversed during 1998, when oil prices declined by almost 30% and the availability of foreign financing was substantially curtailed due to the East Asian and Russian crises.

3.2 Automatic mechanisms

In August 1996 the Foreign Exchange Commission announced the implementation of a scheme to buy US dollars through put options, which gave commercial banks the right to sell them to the central bank provided certain conditions in terms of the foreign exchange rate were satisfied. The objective was to accumulate international reserves beyond those flows obtained through foreign exchange operations conducted with public sector entities.

The options strategy enabled the central bank to increase international reserves without exerting undue pressure on the foreign exchange market or sending signals that could interfere with the proper functioning of the floating exchange rate regime. The aim was to purchase US dollars when the market offered them and to refrain from doing so when the exchange rate was under depreciation pressure. These objectives were incorporated into the mechanism's design, which included special features such as:

(1) ***Exercise price.*** "Fix" exchange rate (MXN/USD) computed for the preceding day.[4] Consequently, this price was not set at a level previously determined by the financial authorities, but endogenously adjusted to market conditions.

(2) ***Knock-in restriction.*** Financial intermediaries could sell US dollars to the central bank if and only if the exercise price was below the moving average of the "fix" exchange rate computed for the previous 20 working days. Because of this the central bank was able to avoid purchasing dollars when the exchange rate appreciated from one day to the next (perhaps due to a possible correction in response to a previous overshooting). Otherwise it would have been favourable for option holders to exercise them and immediately repurchase the dollars on the exchange market.

(3) ***Option type and placement.*** Put options were of the American type, so that in any day of the month commercial banks could exercise them as long as the knock-in restriction was satisfied. Regarding the procedure to place these options among banks, this was carried out through a multiple price auction conducted on the last working day of the previous month.

The put options programme successfully attained its objectives. From August 1996 to June 2001 the Bank of Mexico accumulated USD 12.2 billion of international reserves through this mechanism, an amount equivalent to 75% of the total auctioned (Table 3). Put options contributed almost one third of the increase in international reserves during the aforementioned period. Moreover, this accumulation was achieved without causing severe distortions to the foreign exchange market or altering the nature of the flexible exchange rate regime.

Table 3

Put options mechanism

In billions of US dollars

	Options	
	Placed	**Exercised**
1996[1]	0.9	0.9
1997	5.2	4.4
1998	2.8	1.5
1999	3.0	2.2
2000	3.0	1.8
2001[2]	1.5	1.4
Memo: 1996-2001	*16.3*	*12.2*

[1] Starting in August. [2] Up to June.

Source: Bank of Mexico.

To complement the options scheme for accumulating reserves, on 19 February 1997 the Foreign Exchange Commission authorised the Bank of Mexico to undertake daily sales of up to USD 200 million to market participants through auctions. This mechanism was geared to mitigate the volatility in the foreign exchange market by providing liquidity during days when uncertainty prevailed, thus discouraging some participants from engaging in speculative strategies. The selling process was implemented through auctions conducted each day and by imposing on banks the requirement that

[4] The "fix" exchange rate is determined by the central bank as an average of quotes in the wholesale foreign exchange market for transactions payable in 48 hours (spot).

valid bids had to be at least equal to a minimum price, determined by the "fix" exchange rate of the previous day multiplied by a depreciation factor of 1.02.

Recourse to the auction facility to sell dollars to participants in the foreign exchange market was infrequent. This was so because only under fairly atypical conditions did the exchange rate depreciate at least 2% in a single day. In fact, the sales facility was activated on only 14 days between February 1997 and June 2001. Furthermore, almost 60% of total sales occurred during the period from August 1998 to January 1999, which was characterised by very high volatility in international financial markets. Because liquidity was smoothly provided to the foreign exchange market during episodes of turbulence, it can be said that this strategy was also successful. Yet, it did not prevent the Bank of Mexico from implementing its only discrete intervention after 1995, which took place on 10 September 1998, involving a sale of USD 278 million. The net accumulation of international reserves obtained through the use of automatic mechanisms is presented in Table 4. In particular, it is important to underline that close to 16% of the dollars acquired by the central bank through the exercise of put options were recycled to the foreign exchange market via auctioned sales.

Table 4

International reserve accumulation through automatic mechanisms

In billions of US dollars

	Options exercised	Sales auctioned	Net accumulation
	(A)	**(B)**	**(A–B)**[1]
1996[2]	0.9	0.0	0.9
1997	4.4	0.6	3.8
1998	1.5	0.9	0.6
1999	2.2	0.4	1.8
2000	1.8	0.1	1.8
2001[3]	1.4	0.0	1.4
Memo: 1996-2001	*1.4*	*0.0*	*1.4*

[1] Some entries are subject to rounding error. [2] Starting in August. [3] Up to June.

Source: Bank of Mexico.

4. Consequences of the build-up of international reserves: the sterilisation policy and its costs

The accumulation of international reserves had implications for the implementation of open market operations aimed at regulating money market liquidity. As the central bank's international reserves grew, so did the amount of liquidity that had to be sterilised. By April 1997, international reserves measured in pesos were larger than the stock of base money (Graph 2). As the accumulation continued, the central bank had to devise more effective means to nullify the monetary impact of its acquisition of foreign currencies, since the sterilisation policies being followed were having undesirable effects on the conduct of monetary policy.

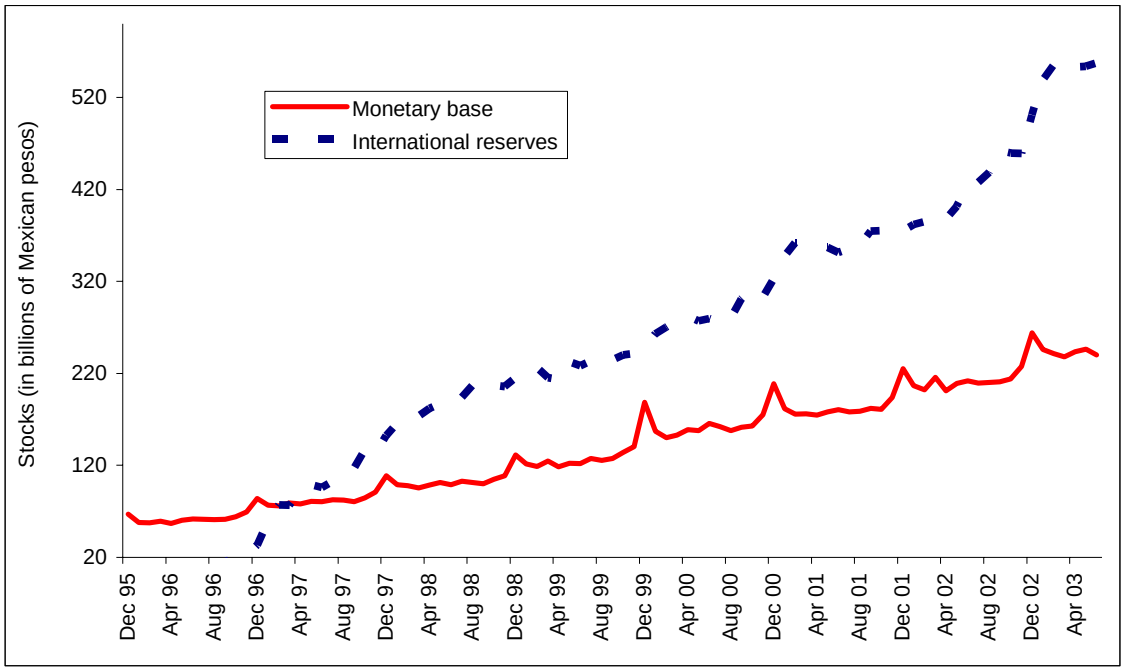
4.1 Monetary policy implications

Sterilisation policies implemented as from 1997 were designed to avoid signalling desired interest rate levels to the market. This was considered of crucial importance given that the operational procedures

to implement monetary policy have as their target commercial banks' end-of-day settlement balances at the central bank. It is important to stress that the central bank does not remunerate settlement balances. Therefore, for reasons of symmetry, it charges a penalty rate on overdrafts equivalent to twice the overnight interbank interest rate. Restrictive monetary policies are signalled by announcing the intention of the central bank not to fully satisfy the demand for funds, thus forcing some commercial banks to incur overdrafts on their accounts at the central bank. In other words, the central bank leaves the market short of funds. This is the mechanism known as "corto" in Spanish. Such monetary policy signalling, transmitted through changes in the settlement balances objective, is designed to indicate desired upward or downward changes in interest rates without specifying particular levels.

Graph 2

International reserves and the monetary base



Source: Bank of Mexico.

The speed and scale of international reserve accumulation in 1997 led the Bank of Mexico to reduce its primary credit. Otherwise, the excess money supply that would have been created could have resulted in higher inflation and rising nominal and real interest rates. Thus, from the beginning of 1997 the stock of net domestic credit moved to negative territory. In order to drain the liquidity resulting from international reserve accumulation, commercial banks were induced to make deposits at the central bank. In addition, at a later date, the Bank of Mexico sold government paper in the open market. Consequently, the financial position of the central bank went from net creditor to net debtor. Meanwhile, vis-à-vis the rest of the world, its net creditor position strengthened.

From the early months of 1997 on, the policy of absorbing liquidity relied mainly on auction-determined commercial bank deposits at the central bank. During March and early April, interbank rates started to climb, notwithstanding the fact that the exchange rate was appreciating and rates on government paper remained relatively stable. This odd behaviour of short-term interest rates and the exchange rate was the outcome of a temporary erosion of competition in the money market, due to the following factors:

(1) Commercial bank deposits at the central bank had no secondary market. Consequently, banks attempted to obtain a risk premium to compensate for their lack of liquidity and demanded a much higher return in order to make additional deposits.

(2) Occasionally, liquidity was concentrated in a small number of banks and it was relatively easy for them to apply money market strategies aimed at securing higher returns on their deposits at the central bank.

To deal with this situation, and restore orderly conditions in the money market, the Bank of Mexico increasingly turned to sales of long-term government paper (BONDES), both through direct sales and repos. Commercial banks were then willing to forgo their liquidity since in return they received government paper which had a secondary market.

Upward pressure on interest rates eased and the premium demanded on deposits at the central bank virtually disappeared as more players participated in the market. The latter were banks which did not have excess liquidity at the time of the auctions held to entice deposits. In the new setup, those banks could incur overdrafts on their current accounts at the central bank to acquire government paper. Should the need arise, banks could resell the paper immediately and thus cover the overdraft.

Maintaining a net creditor position vis-à-vis the financial system in order to preserve the effectiveness of monetary policy became an explicit objective of the Bank of Mexico. In addition to recurrent sales of long-term government paper, it relied on compulsory deposits wherever the expansion of liquidity outran the sterilisation process. These deposits were implemented as a once-and-for-all given amount of liquidity drawn from the money market sporadically.[5]

By the middle of 2000 it became obvious that commercial banks were holding too much long-term government paper as a result of the sterilisation process. Moreover, the banks were funding their holdings of long-term government paper on a daily basis. Thus, banks were unduly exposed to upward movements in interest rates, at a time when the central bank was implementing a restrictive monetary policy to counter aggregate demand pressures.

In response, beginning in August 2000 the Bank of Mexico started to issue its own securities, called BREMs (Monetary Regulation Bonds).[6] BREMs are marketable floating coupon bonds (the coupon is determined every 28 days and is equal to the average of the daily overnight interbank interest rate observed during that 28-day period) which have a relatively long term to maturity (one and three years). These securities are placed weekly through primary auctions that are open to commercial banks, brokerage houses and investment funds.

The stock of sterilisation instruments (BREMs) placed by the Bank of Mexico has followed an upward trend (Graph 3) in tandem with the path of international reserves. On average, close to 76% of the stock of international reserves valued in Mexican pesos has been financed through such instruments. The remaining portion has been financed mainly with base money. To the extent that domestic interest rates have remained significantly above the level of international rates, the Bank of Mexico has faced the non-trivial costs of accumulating international reserves.

Regarding the choice of sterilisation instrument, it is important to stress that this decision does not depend on the type of factor inducing the excess of liquidity, but rather on the actual and projected path of liquidity.

4.2 Implications for the financial situation of the central bank

Even though sterilisation policy helped preserve the effectiveness of monetary policy procedures, success came at a cost. First of all, given that domestic interest rates have been higher than international rates, the liabilities in pesos incurred by the central bank have an impact on interest costs in excess of the returns obtained from investing the stock of international reserves. Furthermore, as the exchange rate has fluctuated, the value in pesos of a given stock of international reserves has

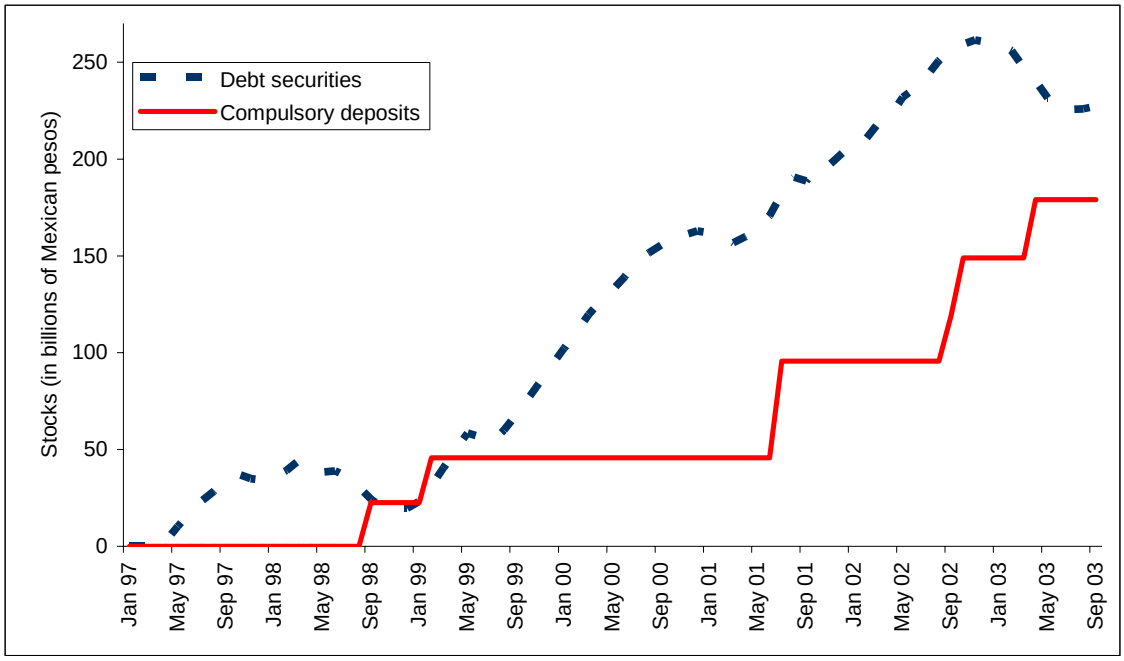
[5] Compulsory deposits have been required on several occasions (September 1998; February 1999; July 2001; and April 2003). There was also an instance of voluntary deposits in September 2002 which were converted to mandatory deposits in April 2003.

[6] Before August 2000, the Bank of Mexico used government securities in the sterilizsation process. However, in order to have total independence from the federal government regarding sterilisation policy, and to take advantage of the intense activity in the overnight market, the Bank took the decision to issue BREMs.

gone up or down. Since the appreciation trend of the exchange rate lasted until April 2000, its influence on the financial results of the Bank of Mexico was not trivial (Graph 4).

Graph 3

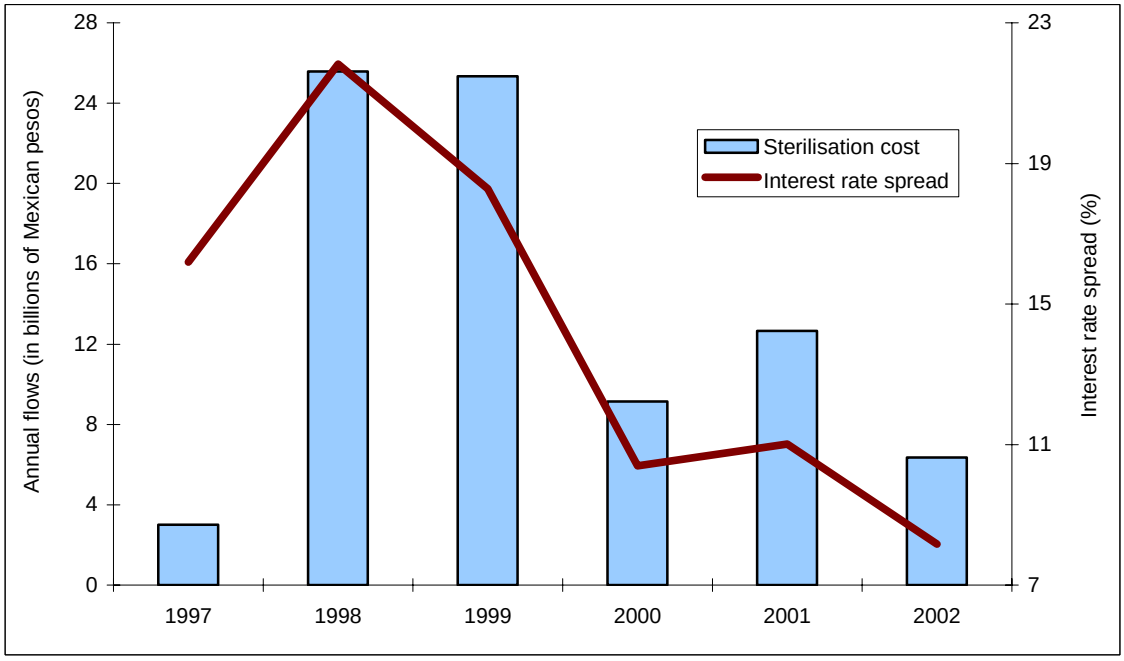
Sterilisation instruments



Source: Bank of Mexico.

Graph 4

Sterilisation costs and interest rate spread



Source: Bank of Mexico.

5. The policy of international reserve accumulation during 2001-03: slowing the pace

Through its policy of international reserve accumulation, the Bank of Mexico purchased more than USD 38 billion up to March 2001. However, the trend of such purchases and the implications of funding the corresponding peso stock motivated an analysis of the benefits and costs of continuing with the strategy. The results of this appraisal indicated that the benefits of holding a continuously increasing amount of international reserves were not as compelling as before, mainly because Mexico had just been granted an investment grade status by all major credit rating agencies and the external debt profile of both the public and private sectors had continuously improved during the previous years. Cost considerations became more relevant, not just those stemming from the sterilisation policy, but also the opportunity costs regarding alternative productive uses of the foreign financing accumulated as international reserves.

The process of assessing the relative advantages of further accumulating international reserves benefited from some technical papers produced by Bank of Mexico staff in order to estimate the "adequate" level of international reserves. Some of those papers even questioned the wisdom of maintaining international reserves under a floating exchange rate regime. The answer to this was that international reserves were required by central banks, among other reasons, because they are deemed by credit agencies and some financial institutions to be an important factor influencing the availability and cost of foreign financing. Accordingly, the "adequate" level of international reserves was estimated as a function of the present value of Mexico's external debt amortisation flows. This implied that as the payment profile of the country's foreign debt improved, the need for international reserves should be reduced. The papers provided estimates derived from ad hoc rules and also from theoretical models aimed at minimising both the carry-on costs of international reserves and the interest rate spread on the external debt. All of them suggested that the level of reserves then at hand was more than "adequate". The case for not pursuing a much higher level of international reserves was further strengthened by the possibility that Mexico could become the first country to have access to the Contingent Credit Line (CCL) facility that the IMF was planning to unveil. The CCL offered emergency resources to countries with good fundamentals that suffered contagion from events unfurling elsewhere. Alternatively, contingent lines could be arranged with foreign commercial banks at a lower cost than that associated with additional international reserve accumulation.

Nonetheless, international reserves continued rising and the stock reached USD 48 billion by December 2002, clearly indicating that the termination of the put option mechanism - in June 2001 - in order to slow the pace of accumulation had turned out to be insufficient.[7] This result was mainly associated with the restrictions imposed by the institutional arrangement regarding the foreign exchange operations of the Bank of Mexico with Pemex. In particular, since 1999, Pemex has obtained foreign financing for investment projects (PIDIREGAS) that have a special off-budget treatment because of their long-term horizon and high rate of return. As shown in Graph 5, foreign exchange operations conducted by the Bank of Mexico with Pemex related to PIDIREGAS projects have increased both in absolute and in relative terms.

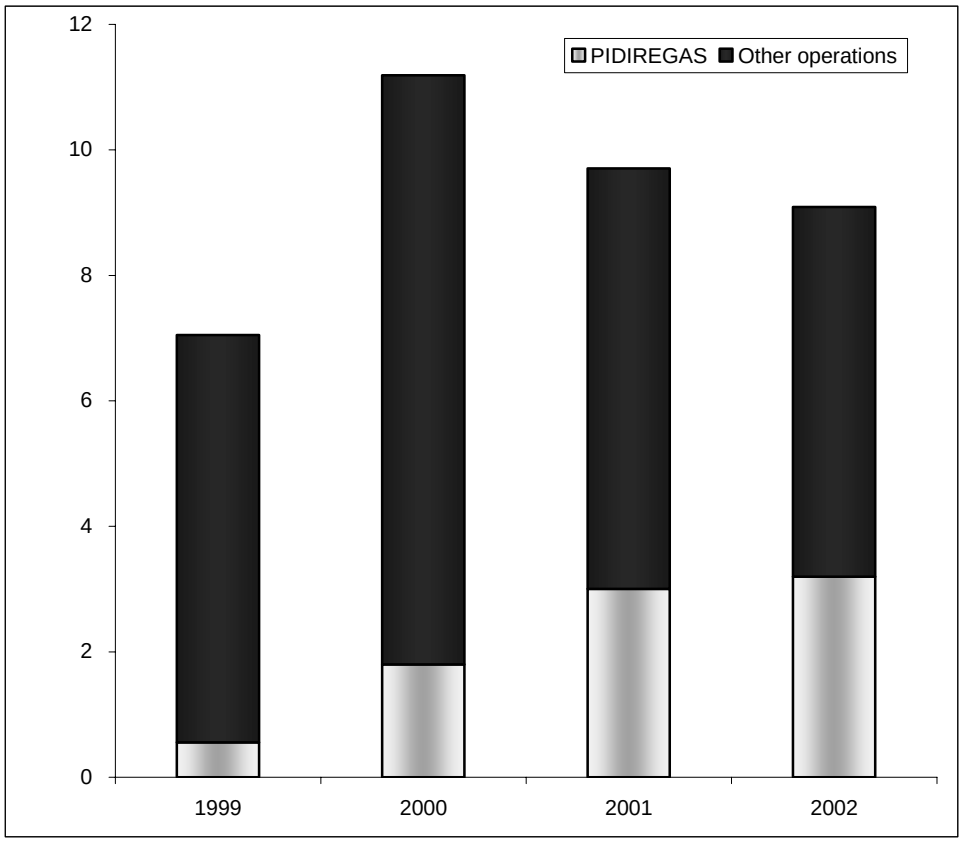
Taking into account the projected international reserve flows to be derived mainly from foreign exchange operations conducted with Pemex, the arguments stressing that the costs of additional accumulation were now larger than the benefits acquired added relevance. Consequently, the Foreign Exchange Commission decided to implement, starting in May 2003, an automatic mechanism in the foreign exchange market with the aim of further easing the pace of international reserve accumulation. It is important to underline that by introducing this mechanism the Mexican financial authorities neither adopted a target nor defined an optimal level for international reserves. Instead, the objective is to supply a fraction of the marginal accumulation of reserves to the market in order to contain the financial and opportunity costs of holding additional foreign currency.

[7] The daily sales scheme was phased out in July 2001.

Graph 5

Decomposition of foreign currency sales by Pemex to the Bank of Mexico

In billions of US dollars



Source: Bank of Mexico.

The objective of slowing the pace of accumulation has been pursued by the Bank of Mexico by selling, through daily auctions, a fixed amount of dollars in the foreign exchange market. The selling mechanism is based on a transparent procedure designed to prevent additional uncertainty in the financial markets and to minimise discretionary actions by the financial authorities. The main features of the mechanism are:

(1) ***Amount.*** The Bank of Mexico sells US dollars in the foreign exchange market in an amount based on the international reserves accumulated during a 13-week measurement period. Given the objective of slowing the pace of accumulation, the central bank sells half of the international reserves flow registered during the measurement period, whenever the flow has a positive sign. The fixed amount of dollars to be sold daily is obtained by dividing the total amount allowed under this rule by the number of working days in a three-month period.

(2) ***Transitory suspension.*** The selling mechanism is temporarily suspended if the amount of international reserves to market, obtained in any measurement period of 13 weeks, falls below USD 125 million. The mechanism is reactivated once the total accumulation of international reserves exceeds USD 250 million for the measuring period.

(3) ***Operational features.*** Auctions are conducted through an electronic interactive framework with Mexican resident banks, at the same time (9.30 am) each working day. The results are publicised 10 minutes after the auction is closed at the latest.

Up to the time of writing (November 2003) there have been three measurement and sales periods using the automatic mechanism of daily sales of US dollars through auctions (Table 5). In each of them the application of the rules has resulted in a net measured accumulation of international reserves, above USD 250 million, and the mechanism has been activated. However, the amount of

daily sales has decreased from USD 32 million initially to USD 6 million at the time of writing, an outcome of the relatively high demand for foreign currency by the federal government to service its foreign debt, specifically for the prepayment of Brady bonds in August 2003.

Table 5

Automatic mechanism for daily sales of US dollars through auctions

In billions of US dollars

	Measurement periods		
	1st	**2nd**	**3rd**
	17 Jan-16 Apr 2003	**16 Apr-18 Jul 2003**	**18 Jul-17 Oct 2003**
International reserves			
I. Cumulated flow	4.2	0.0	–0.3
Explained by:			
a. Pemex	3.7	3.0	3.1
b. Federal government	0.1	–1.8	–2.7
c. Market operations	0.0	–1.8	–1.1
d. Other	0.4	0.5	0.4
	Sales periods		
	1st	**2nd**	**3rd**
	1 May-31 Jul 2003	**1 Aug-31 Oct 2003**	**1 Nov 2003-31 Jan 2004**
A. Net accumulation (I–a)	4.2	1.8	0.8
B. Number of working days	65	65	61
Memo: Daily amount of sales (A.5/B)*	*0.032*	*0.014*	*0.006*

Source: Bank of Mexico.

In terms of the effectiveness of the sales mechanism, a significant easing of the pace of international reserve accumulation has been observed and there is no evident impact of the daily auctions on the functioning of the foreign exchange market. Nevertheless, the mechanism has caused uncertainty among market participants because of the difficulties involved in estimating precisely the amount of US dollars that the central bank could sell in the near future.

6. Concluding remarks

The experience of Mexico in implementing a floating exchange rate regime has been successful, as evidenced by the relatively low level of volatility of the Mexican peso implicit in option prices, the wide choice of hedging instruments and the high volume traded daily in the foreign exchange market. This regime is a key element of a strategy that pursues a strictly market-oriented financial system. In this regard monetary policy relies on the market to determine the proper level of interest rates while the role of central bank actions is limited to signalling the desirable direction of interest rate movements. Under this framework market participants decide on the combination of interest and exchange rates that is adequate to respond to disturbances affecting the economy.

This paper has discussed the policy of international reserve accumulation implemented by the Bank of Mexico during the period in which the Mexican peso has been floating. It has been stressed in the discussion that this policy has been designed with the objective of not interfering with the nature of the floating exchange rate regime. This is achieved by relying on automatic mechanisms based on previously announced rules that do not predetermine any level of the exchange rate. Furthermore, the policy of accumulation has been implemented as an element supporting the workings of the floating regime, by providing the central bank with degrees of freedom to face unexpected shocks. This policy has also taken into account the restrictions imposed by the prevailing environment and the institutional arrangements under which the central bank undertakes transactions with public sector entities.

Mexican financial authorities have made decisions regarding the accumulation of international reserves after careful analysis of the benefits and costs of additional flows, rather than by selecting an optimal or desired stock. In this regard, international reserve accumulation was chosen as a specific economic policy objective. It should be recalled that at the end of 1995 net international assets were negative, so that the benefits of accumulating international reserves were clearly higher than the foreseeable costs. To attain this objective, due advantage was taken not only of routine foreign exchange transactions with public sector entities but also of automatic mechanisms specially designed to minimise interference with the operation of the foreign exchange market. As international reserves began mounting, the Bank of Mexico had to face the consequence, and did so by sterilising the expansion of liquidity in the domestic money market. This policy brought about carry-on costs that adversely affected the financial situation of the central bank. The financial authorities recently implemented a new automatic mechanism to slow the speed of international reserve accumulation, because it was deemed that the financial and opportunity costs induced by the rapid inflow of reserves had exceeded the benefits.