

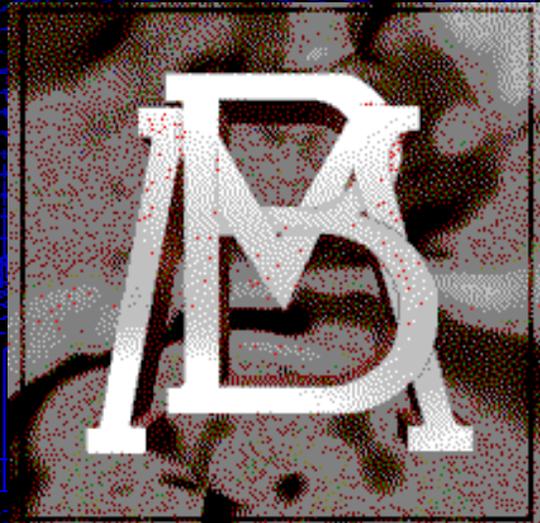
**March 2001**

**Mexico's Experience with a  
Floating Exchange Rate †**

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Banco de México

† Paper prepared for the High Level Seminar “Exchange Rate Regimes: Hard Peg or Free Floating”, organized by the IMF Institute, held in Washington DC, March 19-20, 2001.

# MEXICO'S EXPERIENCE WITH A FLOATING EXCHANGE RATE



**BANCO DE MÉXICO**

March, 2001

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## **II. ARE WE AFRAID TO FLOAT?**

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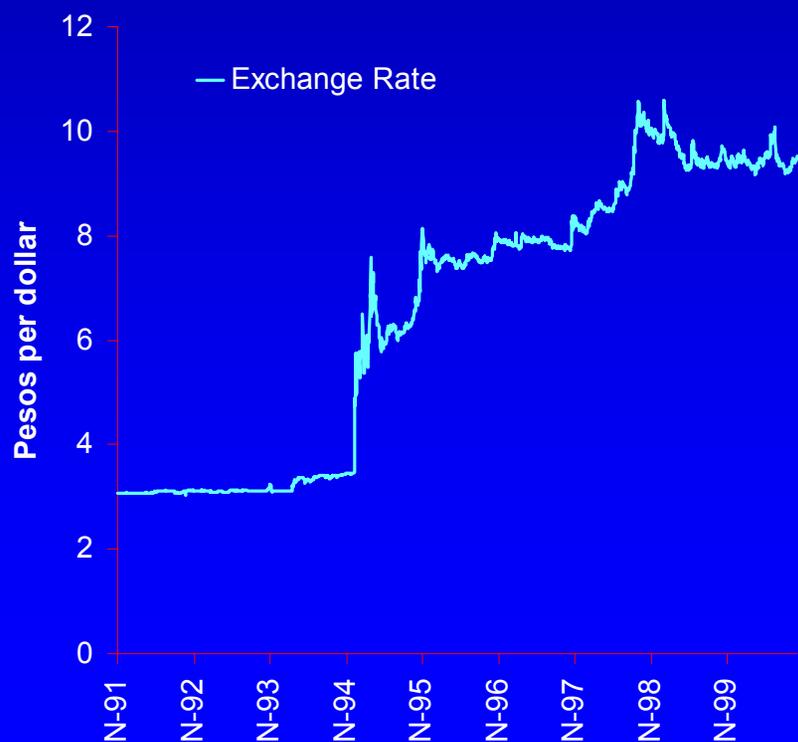
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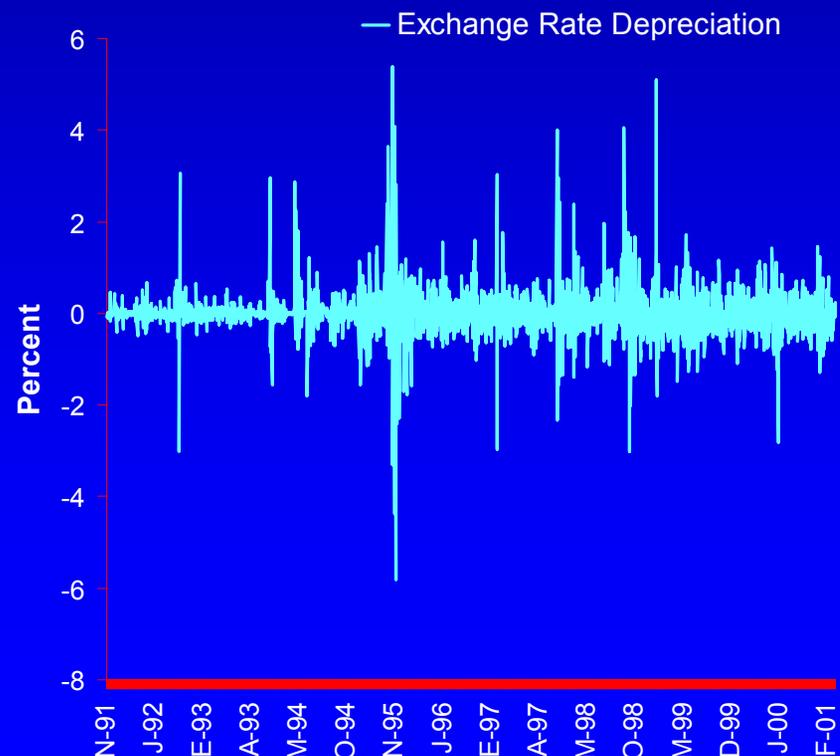
# I. Introduction

- After the devaluation of the peso in December 19th of 1994, Mexico adopted a floating exchange rate.
- Although, at that time most people thought of this regime as transitory, as time went by it has gained substantial support.

**NOMINAL EXCHANGE RATE  
1991-2001**



**NOMINAL DEPRECIATION  
1991-2001**



# I. Introduction

- The volatility of the peso has been similar to that of other floating currencies.

## EXCHANGE RATE VOLATILITY OF SOME COUNTRIES VIS-A-VIS THE USD

	Annualized Volatility* (Percent)													
	1995-I	1995-II	1996-I	1996-II	1997-I	1997-II	1998-I	1998-II	1999-I	1999-II	2000-I	2000-II	2000-III	2000-IV
<b>México</b>	<b>48.56%</b>	<b>17.60%</b>	<b>5.99%</b>	<b>5.31%</b>	<b>4.92%</b>	<b>10.69%</b>	<b>6.68%</b>	<b>10.95%</b>	<b>9.92%</b>	<b>7.05%</b>	<b>6.60%</b>	<b>12.70%</b>	<b>9.05%</b>	<b>6.40%</b>
New Zealand	6.67%	5.35%	5.56%	6.01%	5.88%	8.61%	12.45%	14.95%	9.54%	10.09%	12.35%	9.89%	11.37%	15.59%
Australia	8.86%	7.87%	6.10%	6.70%	7.65%	10.29%	11.91%	14.93%	12.09%	11.88%	11.07%	10.17%	10.73%	12.84%
Sweden	12.70%	9.91%	8.02%	7.28%	10.26%	10.58%	9.57%	12.59%	8.73%	9.22%	11.32%	10.86%	11.16%	12.62%
Canada	5.13%	5.92%	3.64%	3.33%	5.46%	4.24%	4.32%	6.95%	5.72%	5.24%	5.09%	4.83%	4.49%	5.72%
South Africa	5.64%	2.34%	13.86%	7.20%	5.25%	4.34%	5.35%	23.07%	12.01%	5.64%	8.85%	9.08%	7.87%	11.21%
United Kingdom	10.45%	7.41%	5.60%	6.30%	8.13%	8.03%	7.11%	7.33%	6.86%	7.28%	7.72%	8.69%	8.11%	10.79%
Japan	14.12%	14.04%	8.14%	7.09%	12.56%	12.29%	12.56%	20.08%	13.60%	12.49%	11.82%	8.83%	7.92%	7.44%
Germany/Euro	13.87%	10.89%	6.28%	6.87%	9.79%	9.76%	8.14%	9.15%	8.87%	9.99%	12.32%	10.76%	11.01%	12.66%

\* The annualized volatility is defined as the annualized standard deviation of the daily fluctuations of the exchange rate.

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## II. Are we afraid to float?

- Some authors have claimed that EM with floating exchange rates are really not floating.

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

**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			Volatility			Ratio of variable's volatility to exchange rate volatility	
	Exchange rate	International reserves	Interest rates	International reserves	Interest rates		Exchange rate	reserves	rates	reserves	rates
1989-1993	0.6	12.3	13.0	19.9	21.0	Mexico	2.3	4.2	7.4	1.8	3.3
1994-1995	9.6	37.8	19.9	4.0	2.1	United States	1.5	3.3	0.6	2.2	0.4
1996-2000	2.3	4.2	7.4	1.8	3.3	Japan	2.9	2.8	0.4	1.0	0.2
						Australia	2.1	7.9	1.1	3.7	0.5
						Canada	1.1	6.9	0.6	6.1	0.6
						New Zealand	1.7	7.0	0.9	4.1	0.5

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

## II. Are we afraid to float?

- Interest rates have reacted less to exchange rate movements under the flexible exchange rate regime and the impact of dollar rates has been similar across regimes.

### IMPACT OF EXOGENOUS VARIABLES ON INTEREST RATES

	Interest Rates		Long-Run Elasticities	
	1991-1994	1996-2001	1991-1994	1996-2001
<b>Constant</b>	0.90737* (4.36)	0.13958* (2.26)		
<b>EMBI</b>	0.00306* (6.83)	0.00072* (5.53)	0.02	0.03
<b>Exchange Rate Depreciation</b>	2.261* (2.13)	-0.0608 (-0.18)	16.01	-2.48
<b>Lagged Interest Rate</b>	0.8491* (51.81)	0.9755* (250.5)		
<b>R-squared</b>	0.88	0.99		

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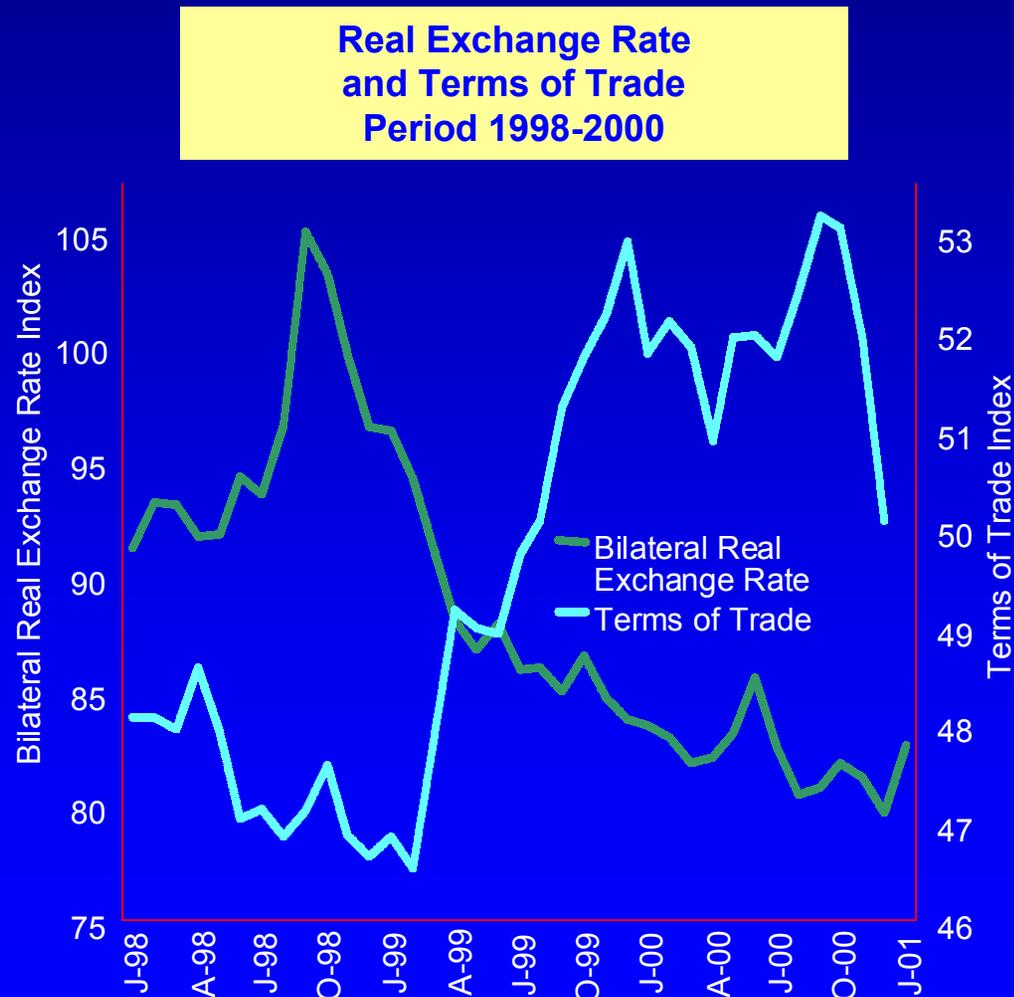
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### III. Benefits of a Floating Exchange Rate

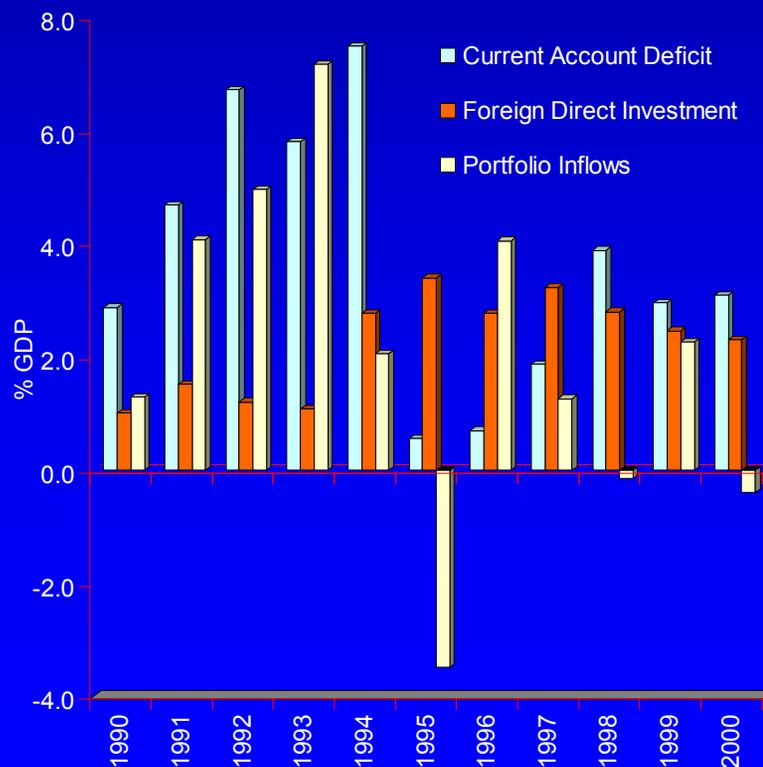
- Equilibrium of real exchange rate adjustments are less costly.
- Independent monetary policy.



### III. Benefits of a Floating Exchange Rate

- Composition of capital flows.

**Foreign Direct Investment and Portfolio Inflows Period 1990-2000**



**Stock Exchange Firms Liabilities (millions of dollars)**

	Large Exporter	Medium Exporter	Small Exporter	No Exports	Total
Short Term Liabilities	9,420	3,851	2,513	679	16,463
Total Liabilities	24,878	8,739	8,866	1,436	43,919
Ext. Sales/ Total Liabilities	90%	42%	21%	0%	51%
Assets	20,062	4,540	7,125	465	32,192
Assets/ Short term liabilities	213%	118%	284%	68%	196%
Assets/ Total Liabilities	81%	52%	80%	32%	73%
Firms	35	25	31	34	125

Source: BMV September 2000

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## IV. The Exchange Rate and Monetary Policy

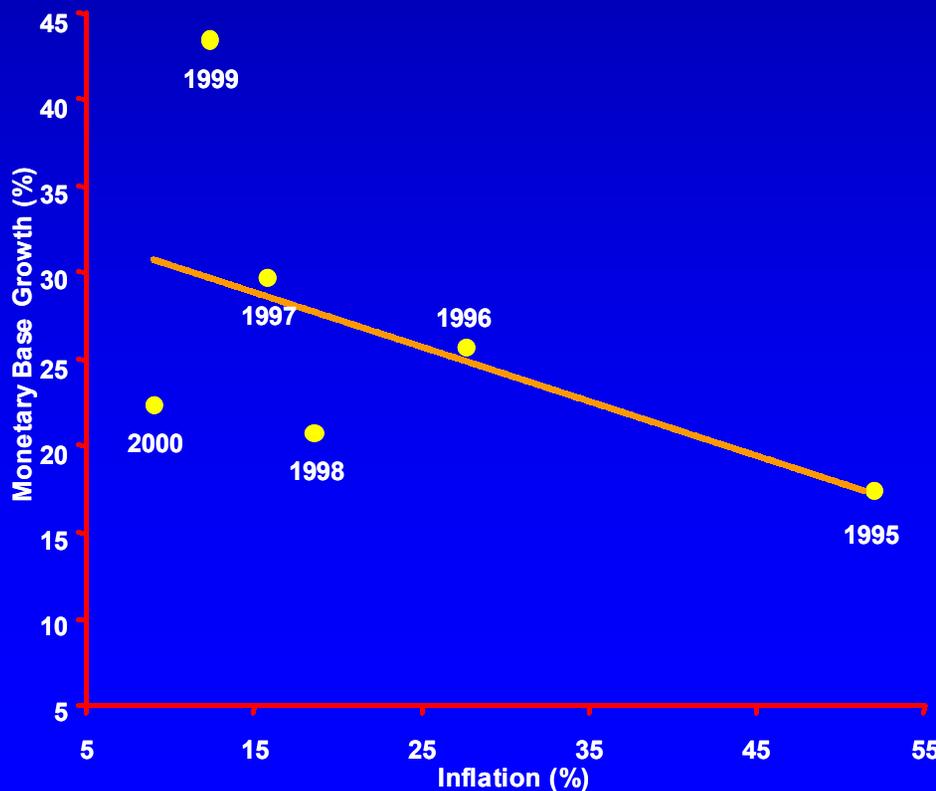
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- The Monetary Policy framework transitioned towards an inflation targeting regime.
  - ③ Starting point: monetary policy subordinated to the exchange rate regime.
  - ③ Transition: monetary policy used money aggregates as intermediate targets.
  - ③ Current situation: in order to implement monetary policy, all sources of inflationary pressures are evaluated. Multi-annual inflation targets have been established.
  - ④ Remaining issues:
    - ➔ Operational instruments.

## IV. The Exchange Rate and Monetary Policy

- Although in the long run there is a close relationship between inflation and the growth of the monetary base, in recent years the annual growth of the monetary base has not been positively correlated with inflation.

### MONETARY BASE ANNUAL GROWTH AND INFLATION: 1995 - 2000



### MONETARY BASE AND INFLATION (%)

	Inflation Objective	Observed Inflation	Targeted Monetary Base Growth	Observed Monetary Base Growth	Inflation Expectations at the Start of the Year
1995	42.0	52.0	29.1	17.3	29.9
1996	20.5	27.7	28.6	25.7	28.6
1997	15.0	15.7	24.5	29.6	18.2
1998	12.0	18.6	22.5	20.8	13.2
1999	13.0	12.3	18.1	29.8	16.5
2000	10.0	8.9	20.6	22.4	11.1

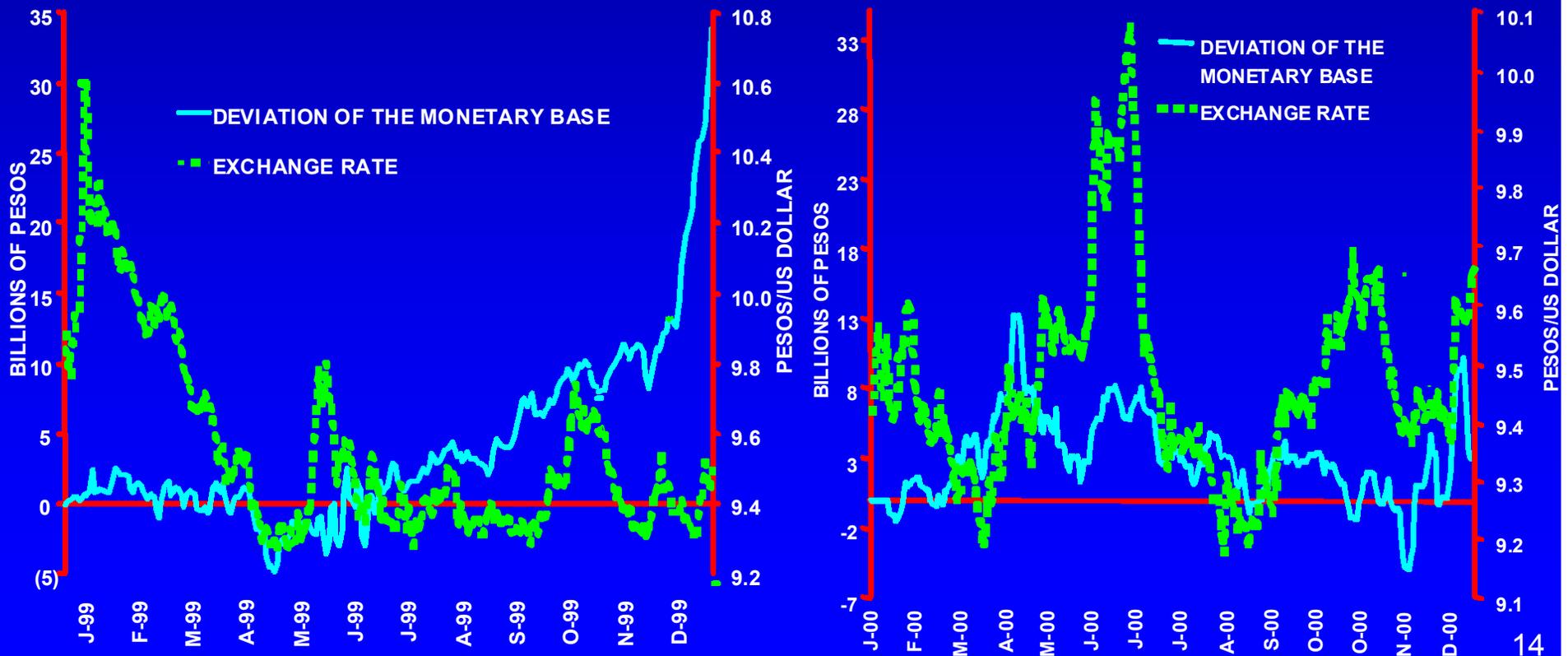
## IV. The Exchange Rate and Monetary Policy

- The deviation of the observed monetary base from the projected path in the last two years accelerated the transition towards inflation targeting.

### MONETARY BASE DEVIATIONS AND THE EXCHANGE RATE

1999

2000



## IV. The Exchange Rate and Monetary Policy

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- From 1996 to 2000, all monetary programs included the following elements:
  - ① An annual inflation objective established jointly with the Federal Government.
  - ② Limits to the expansion of net domestic credit, targets for net international reserves accumulation and a projection of monetary base growth.
  - ③ An operational rule by which, on a daily basis, the central bank satisfies the public's demand for base money.
  - ④ The possibility for the central bank to discretionally adjust the monetary policy stance, by changing the terms under which base money is supplied.
  - ⑤ In 2001, the NDC and IR targets were eliminated.
- Recent elements in Banco de México's framework:
  - ① In 1999, a medium-term inflation objective was established: to lower the domestic rate of inflation towards that prevailing in the economies of Mexico's main trading partners by 2003.
  - ② In 2000, Banco de México started publishing quarterly inflation reports. Explicit inflation targets were announced for 2001, 2002 and 2003.

## IV. The Exchange Rate and Monetary Policy

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### Monetary Policy Strategy

Gradual disinflation.  
Gradual offset of  
inflationary shocks.



Sustainable  
stabilization

### Objectives

Annual inflation target established jointly with the Federal Government (<6.5% in 2001).  
Medium and long term inflation targets (<4.5% in 2002, 3% in 2003).

### Main Instruments

Borrowed Reserves Target (“Corto”)

### Supporting Instruments

Compulsory deposits.  
Minimum rates on Open Market Operations.

## IV. The Exchange Rate and Monetary Policy

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### Monetary Policy Reaction Function Includes:

- Gap between expected inflation and inflation target.
- Wage settlements.
- Unit labor costs.
- Exchange rate.
- Public sector prices.
- Output gap.
- Supply and demand growth.
- Monetary Aggregates.

## IV. The Exchange Rate and Monetary Policy

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- Monetary policy instruments used by modern central banks can be classified in two main groups:
  - ① Money market intervention in order to fix a level of the interest rate
  - ② Management of money market conditions through quantitative restrictions.
- Today monetary policy instrumentation in most countries is done by fixing the short-term nominal interest rate.
- In the past, however, there have been central banks that operated via adjustments to the quantity of loanable funds to the system. This was the case of the systems denominated
  - ① “Non-Borrowed Reserves”, US Federal Reserve during the early 1980s
  - ② “Settlement Balances”, Reserve Bank of New Zealand until march 1999.
- Today Mexico has a system that resembles a “Borrowed-Reserves” target.

## IV. The Exchange Rate and Monetary Policy

This mechanism responds to two main factors:

- 1 High volatility of returns on dollar denominated bonds

**STANDARD DEVIATION OF RETURNS OF GOVERNMENT  
BONDS PLACED ON INTERNATIONAL MARKETS**  
(Basis Points)

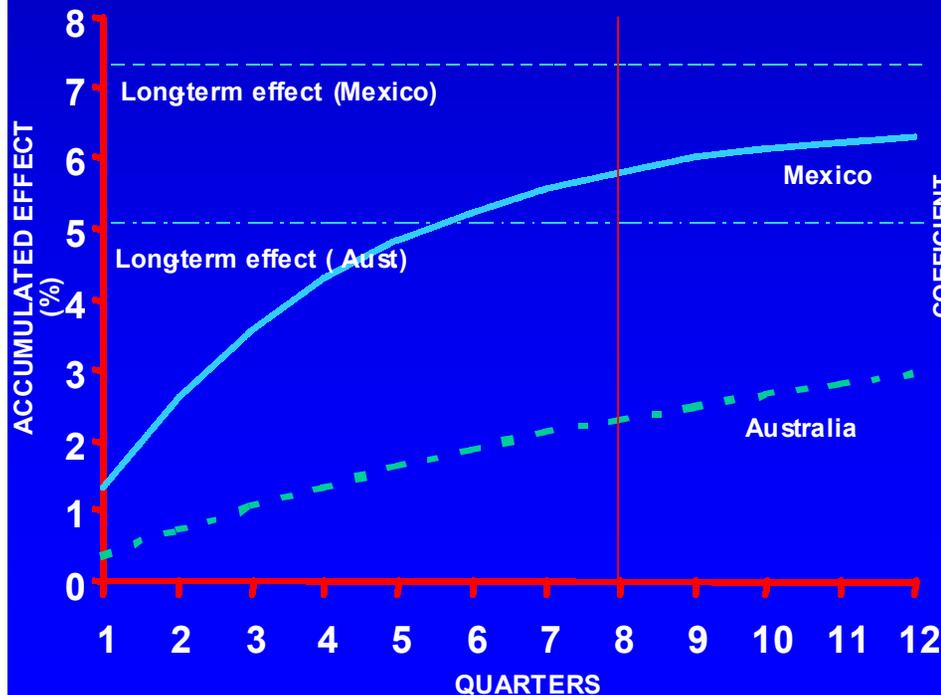
	MEXICO	CANADA	AUSTRALIA	NEW ZEALAND
97-I	20	9	10	N.D.
97-II	15	7	8	7
97-III	11	8	8	8
97-IV	28	7	7	7
98-I	10	8	10	8
98-II	11	5	5	7
98-III	54	7	7	6
98-IV	30	13	15	11
99-I	31	10	11	10
99-II	21	11	10	9
99-III	14	11	9	9
99-IV	13	9	10	9
00-I	21	8	8	8
00-II	23	14	14	13
00-III	12	6	9	6

# IV. The Exchange Rate and Monetary Policy

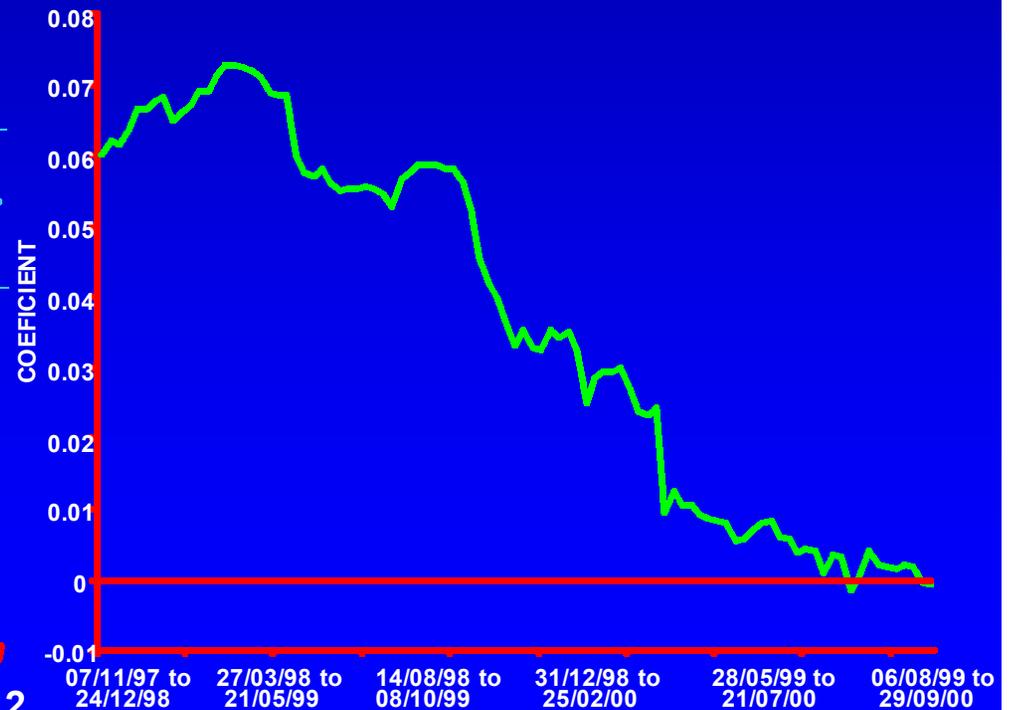
## ② High Pass-Through

- The high pass-through that exists in Mexico can be illustrated by comparing the speed of response of prices to exchange rate changes with that observed in other countries.

**EXCHANGE RATE PASS THROUGH: MEXICO AND AUSTRALIA**



**RECENT BEHAVIOR OF THE COEFFICIENT OF EXCHANGE RATE DEPRECIATION**



## IV. The Exchange Rate and Monetary Policy

- These factors require a more volatile interest rate to partially absorb domestic and foreign shocks.

### CHANGES IN THE TARGET RATE

	Australia		Germany*		Israel		Canada		England		United States		Mexico	
	Changes		Changes		Changes		Changes		Changes		Changes		Changes	
	Total	Direction	Total	Direction	Total	Direction	Total	Direction	Total	Direction	Total	Direction	Total	Direction
1996	3	(+) 0 (-) 3	1	(+) 0 (-) 1	9	(+) 4 (-) 5	16	(+) 4 (-) 12	4	(+) 1 (-) 3	1	(+) 0 (-) 1	17	(+) 6 (-) 11
1997	2	(+) 0 (-) 2	0	(+) 0 (-) 0	4	(+) 1 (-) 3	4	(+) 4 (-) 0	5	(+) 5 (-) 0	1	(+) 1 (-) 0	19	(+) 8 (-) 11
1998	1	(+) 0 (-) 1	0	(+) 0 (-) 0	10	(+) 2 (-) 8	5	(+) 2 (-) 3	4	(+) 1 (-) 3	3	(+) 0 (-) 3	21	(+) 9 (-) 12
1999	1	(+) 1 (-) 0	2	(+) 1 (-) 1	6	(+) 0 (-) 6	3	(+) 1 (-) 2	6	(+) 2 (-) 4	3	(+) 3 (-) 0	26	(+) 11 (-) 15
2000	4	(+) 4 (-) 0	6	(+) 6 (-) 0	8	(+) 0 (-) 8	3	(+) 3 (-) 0	2	(+) 2 (-) 0	3	(+) 3 (-) 0	11	(+) 6 (-) 5
Probability of change in the target rate	9		11		14		26		14		27		57	

\* For 1999 and 2000 the source is the European Central Bank

- Mexico's hypothetical rate is characterized not only by more movements, but by more frequent changes of direction.

## IV. The Exchange Rate and Monetary Policy

- Moreover, the response of the real interest rate has been consistent with an optimal rule for an emerging market.

### DETERMINANTS OF EX-ANTE REAL INTEREST RATE

Variables	Coefficient					
	(1) May 97 - Ago 00		(2) May 97 - Nov 98		(3) Dic 98 - Ago 00	
Constant	-21.811 (-3.244)	***	-18.190 (-1.794)	*	-13.855 (-1.859)	*
Expected Inflation inflation minus inflation objective	0.586 (1.643)		0.228 (0.461)		3.317 (4.549)	***
Output gap	0.078 (0.361)		-0.288 (-0.734)		0.480 (2.500)	**
Lagged rate of depreciation	0.399 (2.314)	**	0.718 (3.127)	***	0.085 (0.447)	
Foreign interest rate for government debt	2.688 (3.743)	***	2.382 (2.227)	**	1.077 (1.221)	
R <sup>2</sup> adjusted	0.587		0.689		0.750	
Number of observations	40		19		21	
F-statistic	14.874		10.974		15.975	

\* Significant at the 10% confidence level, \*\* Significant at the 5%. \*\*\* Significant at the 1%.

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## V. Intervention and International Reserves under floating exchange rates

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- Why hold international reserves under a floating regime?
  - ➔ To provide insurance against a sudden loss of access to international capital markets.
  - ➔ To avoid self-fulfilling runs against the country's debt.
- How much?
  - ➔ Variations on Guidotti's rule

## V. Intervention and International Reserves under floating exchange rates

- How do we intervene?
  - ➔ Buy to accumulate through options mechanism.
    - Banco de México auctions rights to sell dollars to the central bank (put options) among credit institutions.
    - Holders of these rights can sell dollars to Banco de México at the interbank exchange rate of the previous business day, if the exchange rate is not higher than the average exchange rate for the 20 business days previous to date on which these rights are exercised.

### RESULTS OF THE AUCTION OF OPTIONS 1997-2001

Million Dollars

	<b>Amount Offered</b>	<b>Amount Exercised</b>
1997	5150	4476
1998*	2,750	1,428
1999	3,000	2,225
2000	3,000	1,844
2001		
January	250	240
February	250	245
March	250	190
<b>Total</b>	<b>14,650</b>	<b>10,648</b>

## V. Intervention and International Reserves under floating exchange rates

➔ Sell to provide liquidity through auctions

↳ When devaluatory spirals are experienced, a contingent dollar sale scheme is introduced.

↳ Banco de Mexico auctions every day 200 million dollars with a minimum price that is two percent above the preceding day's exchange rate.

### DOLLARS SALES SCHEME 1998-2000

Million dollars

Date	Amount
January 12th, 1998	75
May 27th, 1998	10
August 21st, 1998	200
August 26th, 1998	200
September 10th, 1998*	200
September 21st, 1998	10
October 8th, 1998	200
<b>Total 1998</b>	<b>895</b>
January 12th, 1999	140
January 13th, 1999	200
May 25th, 1999	65
<b>Total 1999</b>	<b>405</b>
June 8th, 2000	200
<b>Total 2000**</b>	<b>200</b>

\* In this particular date the "Exchange Commission" decided to sell directly to the market 278 m.d. in addition to the specified amount of 200 m.d.

\*\* Last Data: October 23th, 2000.