

The Mexican Peso Crisis:
Exchange Rate Policy and
Financial System Management

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Introduction

The Mexican peso crisis of 1994 left the international community shocked by its severity. Equally shocking and probably even more so for the Mexicans was the related widespread financial crisis that followed and which left the economy in a state of financial distress. Many questions have to be asked about what had occurred. What did the exchange rate policy leading up to December of 1994 have to do with the currency crisis? What went wrong with the reforms to the financial system and how frail was it? What events ultimately triggered the crisis? Once these questions are answered it will be possible to identify what type of currency crisis occurred and how it plunged the country into a deep financial crisis. To follow, recommendations will be drawn about exchange rate policy alternatives and about the management of the Mexican financial system.

In order to analyze the Mexican peso crisis this paper will review some basic concepts in order to establish a framework from which to study the crisis. Nominal and real exchange rates will be examined as well as the broad spectrum of exchange rate regimes and their respective advantages and disadvantages. The theories of first, second, and third generation currency crisis will also be reviewed followed by an examination of financial crisis and their causes. Once the framework is established a thorough examination of the Mexican currency crisis will be undertaken and some general conclusions will be reached.

Chapter 1: Exchange Rates

The Nominal Exchange Rate

The nominal exchange rate is simply the *price of one currency in terms of another*¹. Any trade between two countries involves the exchange of currency; this enables one country to purchase goods from another country. Due to the necessity of exchanging currency, a foreign exchange market exists. It must be noted that foreign exchange can be quoted in two different ways, the price quotation system and the volume quotation system. The price quotation system defines the number of units of domestic currency per unit of foreign currency. The exchange rate is *the price of foreign currency in terms of domestic currency*². The volume quotation system is the reverse of the price quotation system; it defines the exchange rate as the number of units of foreign currency per unit of domestic currency. The exchange rate is *the price of domestic currency in terms of foreign currency*³.

Each country has a currency, the domestic prices of all goods and services are quoted in this currency. Exchange rates allow us to compare the prices of goods and services in different countries. Using these exchange rates it is possible to determine the price of one country's export in terms of another country's currency. This can be done by multiplying the price of a good in domestic currency by the price of the domestic currency in terms of a foreign currency.

¹ Krugman, Paul R. and Obstfeld, Maurice, "International Economics", Sixth Edition, Addison Wesley, p.412

² Gandolfo, Giancarlo "International Finance and Open Economy Macroeconomics", Springer 2001, p. 8

As the exchange rate appreciates and depreciates the price of goods changes in terms of another countries currency. An appreciation occurs when the domestic dollar price rises in terms of a foreign currency. Depreciation is the reverse, if the price of the domestic currency falls in terms of foreign currency, depreciation has occurred. An appreciation will make a domestic good more expensive in terms of foreign currency while a depreciation will do the reverse.

The Real Exchange Rate

The real exchange rate is the ratio of the general price level in the domestic country and in a foreign country, expressed in one single currency⁴. That is, the nominal exchange rate adjusted for relative prices between two countries being analyzed:

$$p = n p^d / p^f$$

So p , the real exchange rate is equal to the nominal exchange rate, n , multiplied by the domestic price level, p^d , divided by the foreign price level, p^f . Simply, the nominal exchange rate is the actual quoted value of the exchange rate whereas the real exchange rate is the exchange rate adjusted for the relative prices in the examined countries. The real exchange rate is the *relative price of two output baskets*⁵.

³ Gandolfo, Giancarlo “International Finance and Open Economy Macroeconomics”, Springer 2001, p.8

⁴ Gandolfo, Giancarlo “International Finance and Open Economy Macroeconomics”, Springer 2001, p.13

⁵ Krugman, Paul R. and Obstfeld, Maurice, “International Economics”, Sixth Edition, Addison Wesley, p.249.

→Real Appreciation and Depreciation

Referring to the given equation for the real exchange rate, the real exchange rate equates to the nominal exchange rate when the domestic price level is equal to the foreign price level:

$$p^d = p^f, p = n \frac{p^d}{p^f} \therefore p = n(1)$$

As long as n adjusts to fluctuations in the domestic and foreign price levels then the real exchange rate will always equal the nominal exchange rate, $n = p$. When there are fluctuations in the price levels and the nominal exchange rate is fixed or does not automatically adjust, we have what is known as real exchange rate appreciation and depreciation.

The real exchange rate will appreciate (overvalued in relation to the nominal exchange rate) if domestic price level is less than the foreign price level:

$$p^d < p^f, p = n \frac{p^d}{p^f}, p = n \text{ (relative price level } < 1)$$

So given a domestic price level less than the foreign price level, domestic price level over foreign price level will be less than one. This means that it takes less domestic currency to buy foreign currency, the real exchange rate has appreciated. The key result of this is exports of goods and capital will *fall* and imports of goods and capital will *rise*.

Real exchange rate appreciation creates a situation known as real exchange rate *overvaluation*. Due to a fixed or restrained nominal exchange rate not in line with the

current price level the real exchange rate has become overvalued. Such overvaluation can lessen export (goods and capital) growth; domestic goods and capital are, in real terms more expensive. On the other hand, the appreciation will increase imports (goods and services) because imports have become cheaper in real terms. Overvaluation can be harmful to an economy and must be taken into consideration when examining exchange rate regimes.

The opposite of real appreciation is real depreciation. This occurs when the domestic price level is higher than the foreign price level:

$$p^d > p^f, \quad p = n \frac{p^d}{p^f}, \quad p = n \text{ (relative price level } > 1)$$

The higher domestic price level means that the domestic price level over the foreign price level will be greater than one. As a result the real exchange rate depreciates; it takes more domestic currency to buy foreign currency. The result of this depreciation is that exports of goods and capital have *increased* while imports of goods and capital have *decreased*.

Real depreciation creates what is known as real exchange rate *undervaluation*. The unresponsiveness of the nominal exchange rate to a higher domestic price level causes depreciation of the real exchange rate. If this depreciation persists, exports (goods and capital) will become in real terms, less expensive and therefore increase while imports (goods and capital) which are now more expensive in real terms will decrease.

Chapter 2: Exchange Rate Regimes

There exist a whole range of exchange rate regimes. On the one end there is a completely flexible exchange rate. At the other end is a completely fixed exchange rate. In between these two extremes there exist many intermediate exchange rate regimes; these regimes have a limited amount of flexibility.

Flexible Exchange Rates

A flexible exchange rate regime occurs when the national monetary authority does not trade in the foreign exchange market to influence exchange rates. This means that the spot and forward exchange rate of the currency is allowed to freely fluctuate, all based on the supply and demand of the currency in the international currency markets, principally London, New York, and Tokyo.

Fixed Exchange Rates

Broadly writing, a fixed exchange rate refers to any situation where a monetary authority announces the exchange rate of its currency and is committed to support it. The monetary authority determines the *parity* of the currency. Fixed exchange rates began with the gold standard and developed into the Bretton Woods system. Today there are many different forms of exchange rate regimes. To understand today's regimes it is useful to briefly examine the history of exchange rate regimes.

Some History

→The Gold Standard

The gold standard is a classic example of a fixed exchange rate. This occurs when a national currency is fixed to a gold content⁶. This means that the exchange rate between two countries is the ratio of the gold content of the two countries. Each country pegs its currency price in terms of the international standard, gold. The ratio of the gold content of the two countries is known as the mint parity⁷. The stated exchange rate must equal the gold content of the countries under consideration. The exchange rate must not diverge too drastically from mint parity. For example, given Canada and the United States, say that the United States overstates its exchange rate. It would be profitable to exchange Canadian dollars into American dollars, buy American gold and subsequently transport the gold back to Canada where it can be exchanged for Canadian dollars. As long as transportation costs are not too high and the American exchange rate is significantly overstated, this will return a profit. In order for the gold standard to work, the exchange rate must be equal or close to the gold content.

→The Gold Exchange Standard

⁶ Gandolfo, Giancarlo "International Finance and Open Economy Macroeconomics", Springer 2001, p.31

⁷ Gandolfo, Giancarlo "International Finance and Open Economy Macroeconomics", Springer 2001, p.31

Another type of fixed exchange rate is the gold exchange standard. With this system a country must be willing to buy and sell a foreign currency that is convertible into gold. The main difference between this system and the aforementioned gold standard is that only one country actively maintains a gold supply. Other countries must be allowed to freely convert their currency into the currency of the gold holding country.

→The Limping Gold Exchange Standard

The final form of a gold standard is a limping gold exchange standard, this exchange rate system was used during the Bretton Woods era. This system is similar to a gold exchange standard, the main difference being that convertibility is restricted. Only central banks can make requests for convertibility into gold while economic agents trade currency at fixed rates.

→The Bretton Woods System

The Bretton Woods system was implemented after World War II to attempt to avoid trade and currency crisis that had occurred throughout the 1930's under the gold standard. It was a fixed exchange rate system under the category of a limping gold standard. Under this system each country fixed its exchange, plus or minus one percent, in terms of gold. The key currency was the United States dollar; it could be directly converted into gold at a fixed price of \$35 per ounce⁸. Other currencies could then be

⁸ Gandolfo, Giancarlo "International Finance and Open Economy Macroeconomics", Springer 2001, p.33

converted into American dollars at the fixed rate and subsequently converted into gold. Once member countries had established parity with their national currency they were expected to defend the exchange rate through foreign exchange market intervention. Parity meant that the exchange rate must equalize the purchasing power of different currencies. The Bretton Woods system can also be classified as a system of limited flexibility.

The Bretton Woods system collapsed in 1971. The United States declared the dollar was no longer convertible into gold. After the collapse of the last version of the gold standard, the system was completely abandoned. Today, fixed exchange rate regimes are based on pegs, currency boards, and dollarization.

Modern Exchange Rate Regimes

The collapse of the Bretton Woods system was the end of the gold standard era. Many new regimes, not fully floating and not strictly pegged, were created. According to the International Monetary Fund, there exist eight classifications of exchange rate systems. The two extremes, previously mentioned, are a completely flexible exchange rate and a completely fixed exchange rate. In between the two extremes there exist variations upon the float or the peg.

It must be noted that I have chosen to utilize the International Monetary Funds broad exchange rate classification scheme, although there exist many other interpretations of different exchange rate regimes. Refer to the appendix (table 1) for an alternate exchange rate regime classification table.

1-Flexible Exchange Rate: Also known as a pure float, the exchange rate is market determined. Changes in the supply and demand of assets and goods are reflected in the fluctuations of the exchange rate⁹. In principle the monetary authority will not intervene to alter the exchange rate level.

2-Managed Float: This occurs when the monetary authority attempts to influence the exchange rate, without having an actual target. The exchange rate is flexible, there is no announced parity, but the monetary authority will intervene if it deems it necessary to “manage” the float¹⁰. A managed float has two extremes, at one end a monetary authority intervenes only to lessen exchange rate fluctuations while at the other end the monetary authority attempts to adjust the exchange rate to a value that they deem desirable, the latter is known as a “dirty” float. This system was chosen by many countries after the Bretton Woods collapse.

3-Crawling Band: Under this system the currency is allowed to fluctuate somewhat within a predetermined band¹¹. The band may be around a central rate or based on some other system of indicators. This allows the exchange rate to vary in the determined band around parity. The parity and the entire band are allowed to adjust, the upper and lower limits of the band may change or the central target may adjust. This creates the crawling peg system. It must be noted that using this system constricts the use of monetary policy

⁹ Edwards, Sebastian, and Savastano, Miguel A. “Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?”. NBER Working Paper 7228, July 1999, p.6.

¹⁰ Edwards, Sebastian, and Savastano, Miguel A. “Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?”. NBER Working Paper 7228, July 1999, p.6.

because the exchange rate must be maintained within the band; therefore monetary policy is used primarily for that task.

4-Crawling Peg: This regime entails the currency being adjusted based on a series of predetermined indicators or events that deem adjustment necessary¹². The main objective is to allow adjustments in accordance with the parity in a less abrupt fashion than an adjustable peg. For example, under an adjustable peg, when authorities deem a change necessary the change can be very abrupt and potentially damaging. This is due to the fact that abrupt changes cause economic agents to lose confidence in the monetary authority, whereas, with a crawling peg it is known that the exchange rate will move at some rate and therefore create less uncertainty. Using the crawling peg the exchange rate is allowed to slowly adjust; this will create a much less abrupt adjustment of the exchange rate and is less likely to offset whatever parity prevails. This system is similar to the crawling band only there is no room for fluctuation around the target, unlike the crawling band system. Commitment to a crawling peg also limits monetary policy, this is due to the fact that the exchange rate is fixed at some specified crawl and therefore cannot be adjusted using monetary policy.

5-Peg with a Horizontal Band: This consists of the exchange rate being pegged at some rate and allowed to fluctuate around that rate, usually by no more than ± 2 percent.

Unlike both the crawling peg and the crawling band, the exchange rate is not moving in

¹¹ Edwards, Sebastian, and Savastano, Miguel A. "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?". NBER Working Paper 7228, July 1999, p.6.

¹² Edwards, Sebastian, and Savastano, Miguel A. "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?". NBER Working Paper 7228, July 1999, p.7.

some direction, it is fixed with a small degree of fluctuation around the target. This limits monetary policy depending on how narrow the band is. A very narrow band leaves virtually no room for adjustment and therefore monetary policy while a wide band allows for some adjustment and limited monetary policy.

6-Fixed Exchange Rate: A fixed exchange rate occurs when the exchange rate is announced and the monetary authority is willing to supply unlimited currency at that rate¹³. The monetary authority must be prepared to defend the parity it has determined through direct or indirect methods such as sales and purchases in the foreign exchange market and monetary policy including interest rate manipulation. Fixed exchange rates have had many different forms and variations. The classic fixed exchange rate regime being the gold standard followed by the Bretton Woods era, more recently countries fix their currencies at some value, often directly pegged to another currency and stand ready to defend that peg. A fixed exchange rate greatly limits monetary policy; the monetary authority is unable to influence the exchange rate, only able to readjust it on an infrequent basis.

7-Currency Boards: This regime exists when a very strict commitment has been made to exchange the domestic currency for some foreign currency. The monetary authority issues currency that is convertible into some foreign currency on demand or commodity at a fixed rate¹⁴. The anchor currency is usually a widely accepted currency such as the

¹³ Gandolfo, Giancarlo "International Finance and Open Economy Macroeconomics", Springer 2001, p.8

¹⁴ Balino et. al. "Currency Board Arrangements: Issues and Experiences." International Monetary Fund Occasional Paper, Washington, 1997, p.1

US dollar or the Euro; the anchor can also be a basket of currencies.

A currency board must hold reserves that equal the amount of notes and coins in circulation. As reserves the currency board usually holds low-risk, interest-bearing bonds and various assets denominated in the anchor currency. Therefore, issuance of new notes and coins must be accompanied by an increase in reserves. Typically, the currency board will replace the central bank and interest and inflation rates will be close to that of the anchor currency country. The currency board has no ability to use monetary policy; the money supply is determined solely by market forces and the balance of payments¹⁵.

8-Dollarization-No National legal Tender: When a country chooses to adopt another country's legal tender or join a currency union, no separate legal tender exists in that country. This is known as *full dollarization*. There can also exist *informal dollarization*. This occurs when a significant number of economic agents within a country adopt a foreign currency. This is usually the case in developing countries with economic instability such as persistent high inflation and/or risk of devaluation. There are two motives for demand for foreign currency assets that must be explained, currency substitution and asset/liability substitution¹⁶.

Currency substitution occurs when a foreign currency is unofficially adopted and used for transactions; it is a means of payment and a unit of account¹⁷. This arises when there exists extremely high inflation in a country. Domestic residents find another currency to use because use of the domestic currency is costly when prices levels are

¹⁵ Saleh, Sharif, "Currency Board Arrangements: Analysis and Perspective", Department of Economics, Carleton University, Ottawa, 2004, p.13.

¹⁶ Goyes, Alex, "Financial Dollarization and Crisis Management: Lessons from Ecuador", Department of Economics, Carleton University, Ottawa, 2005, p.11.

increasing substantially. It must be noted that this form of dollarization is extremely hard to reverse, people become used to using the alternate foreign currency.

Asset substitution occurs when a foreign currency is used as a store of value¹⁸. Asset substitution is a result of economic agents attempting to diversify their portfolios through foreign denominated assets. Such diversification will ensure against domestic price instability and depression. Even in times of relative economic stability domestic economic agents may wish to hold foreign denominated assets to protect against possible future inflationary threats. Liability substitution is the opposite of asset substitution, domestic residents and firms hold foreign denominated liabilities.

Dollarization eliminates all monetary policy of the country; the adopting country is completely dependant on the actions of the countries whose currency it has adopted. This is the most extreme form of the exchange rate regime, putting all monetary policy control in the hands of another country or institution.

→Conclusion

It is difficult to label each regime in terms of flexible, intermediate and fixed but I have interpreted the regimes as follows. The modern spectrum of exchange rate regimes consists of a flexible exchange rate at one end and a fixed exchange rate at the other. There is only one type of flexible regime; that exists when there is a pure float and the monetary authority does not trade in the foreign exchange market to influence the

¹⁷ Berg, Andrew and Borensztein, Eduardo, "Full Dollarization *The Pros and Cons*", International Monetary Fund, Washington, 2000, p.3.

¹⁸ Goyes, Alex, "Financial Dollarization and Crisis Management: Lessons from Ecuador", Department of Economics, Carleton University, Ottawa, 2005, p.11.

exchange rate. There exists only one intermediate regime, between a flexible regime and a fixed regime and that is a managed float. This regime contains elements of both flexibility and rigidity and is truly an intermediate regime. The remainder of the aforementioned regimes: a crawling band, crawling peg, peg with a horizontal band, fixed exchange rate, currency boards, and dollarization are all classified as fixed exchange rates. Currency boards and dollarization can be classified as “harder” fixed exchange rate regimes due to the strictness of the commitment to the regime. Each one of these regimes has the common element of having the parity fixed; the only elements that vary between the regimes are the amount of flexibility around the parity and the credibility of the regime.

Chapter 3: Advantages and Disadvantages of the Various Exchange Rate Regimes

Exchange rate regimes vary in flexibility. At one end of the spectrum there exists completely floating exchange rates where the monetary authority has no control over the currencies value but is able to utilize all tools of monetary policy. The other extreme is a fixed exchange rate, either fixed to another currency or complete adoption of another currency. Both limit the flexibility of monetary policy and complete adoption of another currency eliminates completely the need for a central bank and any monetary policy at

all. The many intermediate regimes that exist between the two extremes have different advantages and disadvantages and each country chooses a regime it deems best suited to its economy.

Different exchange rate regimes entail different limitations in terms of monetary policy and exchange rates and this is explained by what is known as the impossible trinity¹⁹. Exchange rate regimes create a tradeoff; it is not possible to have full financial integration, monetary independence and exchange rate stability all at the same time. With a fully floating exchange rate, monetary independence and financial integration exist yet there is absolutely no control over exchange rate stability, which is dependant on supply and demand of the currency. A fixed exchange rate is the exact opposite, there is very little to no monetary independence, very little to no financial integration, yet complete exchange rate stability. The intermediate regimes are a balance between monetary independence, full financial integration and exchange rate stability. The following diagram depicts the impossible trinity:

¹⁹ Habib, Maurizio Michael "The Case for Euroization in Central and Eastern European Countries", University College London, p.17

The Impossible Trinity

Figure 1. The Central and Eastern European Countries and the Impossible Trinity

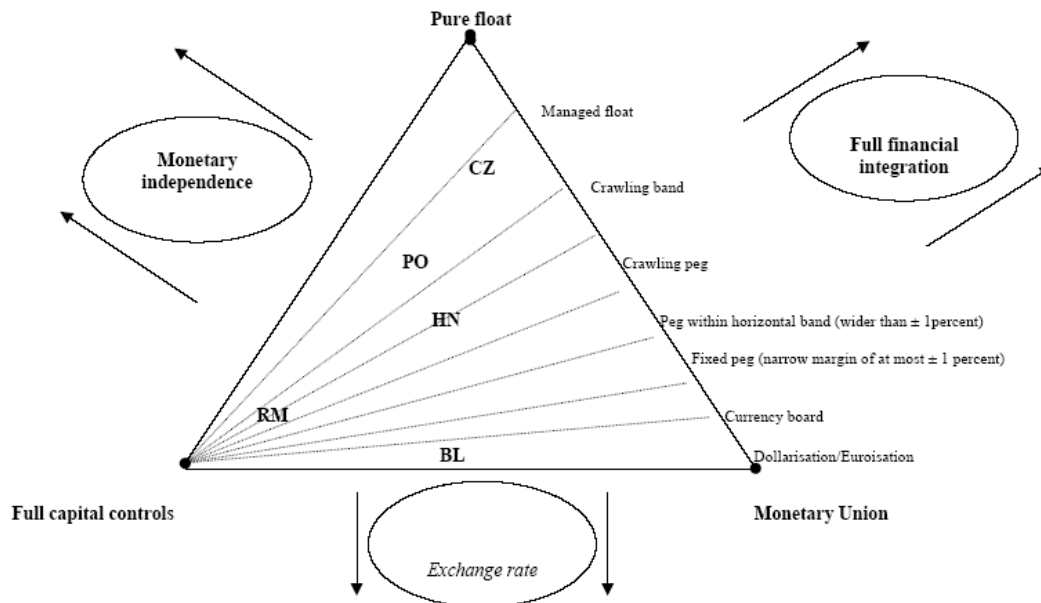


Figure rearranged and extended from Frankel (1999). Exchange rate classification according to IMF Annual Report 2000.

Source: Habib, Maurizio Michael “The Case for Euroization in Central and Eastern European Countries”, University College London, p.20

Advantages and Disadvantages of Flexible Exchange Rate Regimes

As mentioned earlier, a flexible exchange rate refers to any regime where the exchange rate has significant space to fluctuate. The extreme example is a completely floating exchange rate where the exchange rate is determined by supply and demand for the currency. A managed float is an intermediate exchange rate regime; the exchange rate is allowed to fluctuate but is monitored and controlled by the monetary authority. The other exchange rate regimes have a fixed value for the exchange rate. The more liberal regimes are a crawling band while the strict regimes have a fully pegged currency.

The main advantage to a flexible or floating exchange rate regime is monetary policy independence²⁰. Monetary policy is defined as *management of the monetary system toward the achievement of certain objectives*²¹. It is achieved through control of the money supply. Monetary policy is used primarily for two objectives: management of aggregate supply and demand and response to economic shocks. Through expansionary and tight monetary policy the authorities are able to influence aggregate supply and demand in an economy and potentially smooth out business cycle fluctuations. When expansionary monetary policy is pursued (an increase in the money supply), all else equal, the domestic currency will depreciate due to excess supply, domestic interest rates will fall, output will expand and unemployment will fall. When tight monetary policy is pursued (a decrease in the money supply), domestic currency will appreciate due to the tightened supply of currency, interest rates will rise, output will slow, and unemployment will increase. Due to this function monetary policy is a very effective tool for economic management.

The second objective of monetary policy is response to economic shocks. If some economic shock is slowing economic growth monetary policy may be used to expand output and return to a positive growth path. In the case of an “overheating” economy where inflation is on the rise due to fast paced economic growth monetary policy can be used to slow the economy by tightening the money supply and slowing inflation. With a flexible exchange rate the monetary authority is able to use monetary policy to deal with economic shocks. Conversely, with a fixed exchange rate the main goal of monetary

²⁰ Krugman, Paul R. and Obstfeld, Maurice. “International Economics, Theory and Policy, Sixth Edition”. Addison Wesley, 2003, p.568.

²¹ Binhammer, H.H. Sephton, Peter S. “Money, Banking and the Canadian Financial System” Eighth Edition, Nelson 2001.

policy is maintaining the peg, not smoothing domestic and foreign shocks.

Fluctuations in the nominal exchange rate are able to absorb foreign and domestic shocks, acting as automatic stabilizers²². Very simply, during times of recession the domestic currency will depreciate and increase export competitiveness, regardless of monetary policy intervention. This will stimulate economic activity and work to end the recession.

The final advantage to flexible exchange rates is the fact that high levels of international reserves are not required²³. With a fixed exchange rate it is important to have high levels of foreign exchange to remain credible and to defend the peg during times of negative speculation. A flexible rate system does not require large reserves and is therefore less of a burden.

Flexible exchange rates also have disadvantages. With a flexible exchange rate the government has little or no control over the value of the currency. The exchange rate fluctuates freely and can be greatly influenced by speculative behavior. Even in the presence of sound fundamentals the exchange rate may be vulnerable²⁴. The role of expectations and self fulfilling prophecies are important in illustrating this vulnerability. If for example international speculators expect an economic downturn and that the currency will depreciate as a result, they may wish to get rid of the domestic currency that they hold, even in the presence of sound fundamentals. This speculation can hurt the economy, the currency will lose value and the initial expectations have become a self fulfilling prophecy. Depreciation will occur as speculators prophesized. What has just

²² Krugman, Paul R. and Obstfeld, Maurice. "International Economics, Theory and Policy, Sixth Edition". Addison Wesley, 2003, p.569.

²³ Edwards, Sebastian, and Savastano, Miguel A. "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?". NBER Working Paper 7228, July 1999, p.6.

been described is a second generation currency crisis and will be studied further in the following section.

The potential high volatility of both the nominal and real exchange rate can distort resource allocation. Losing control of the exchange rate can make economies, especially small economies, very vulnerable to international speculation.

→Difficulties Maintaining a Flexible Exchange Rate

The primary difficulty with maintaining a flexible exchange rate is remaining committed to the freely floating rate. As discussed, a flexible exchange rate leaves the country in question with no or little direct control over the exchange rate. It is therefore determined principally by supply and demand of the currency in the foreign exchange market. Political pressures may encourage policy makers to alter the exchange rate during economic downturns. For example, if export demand slackens it may be tempting for policymakers to manipulate the value of the exchange rate by devaluing it and therefore stimulating export demand. If the government is *credible* it must remain committed to the freely floating rate and let economic fluctuations resolve themselves.

Advantages and Disadvantages of Intermediate Regimes

→Managed Exchange Floats (Dirty Floats)

²⁴ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 1, Carleton University, Fall 2005, p.79.

Managed floats and/or “dirty” floats have the same benefits of flexible exchange rate regimes²⁵. Monetary policy can be used as desired, nominal exchange rate fluctuations can automatically react to economic shocks and low levels of international reserves are required. It must be noted that more international reserves may be required with a managed float than with a pure float but not significant amounts.

The main disadvantage to such regime is the lack of monetary policy transparency and potential problems with credibility²⁶. If economic agents know that the monetary authority is willing to intervene and affect the value of the exchange rate it creates uncertainty in the economy. Uncertainty can hurt the credibility of the monetary authority and this can lead to speculative behavior on the behalf of economic agents. As well it must be noticed that interventions are usually not as effective as planned and the results may not be very long lasting.

Advantages and Disadvantage of Fixed Exchange Rate Regimes

After the collapse of the Bretton Woods system many exchange rate regimes were created in an attempt to limit the volatility of floating exchange rates. A fixed exchange rate regime is referring to any regime where the monetary authority determines the exchange rate in terms of foreign currency and will trade unlimited amounts at that rate. This includes crawling bands, crawling pegs, pegs with horizontal bands, and fixed exchange rates. As previously noted, currency boards and dollarization are also classified

²⁵ Edwards, Sebastian, and Savastano, Miguel A. “Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?”. NBER Working Paper 7228, July 1999, p.6.

²⁶ Edwards, Sebastian, and Savastano, Miguel A. “Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?”. NBER Working Paper 7228, July 1999, p.6.

as fixed exchange rate regimes but of a “harder” nature.

There are three main advantages to fixed exchange rate regimes²⁷. Firstly, as mentioned in the impossible trinity, a fixed exchange rate gives a country complete control over the stability of the exchange rate. Having a floating exchange rate can lead to volatile swings in the exchange rate which can damage trade and investment. A fixed exchange rate should eliminate this volatility, making for a more stable market. Secondly, it is thought that by pegging the exchange rate to a low inflation currency that domestic inflation will be limited. It is believed that the peg will demonstrate a commitment to low inflation and therefore both the public and private sector will avoid unnecessary inflationary actions. The third advantage to a fixed exchange rate is also related to inflation. By pegging the exchange rate after a period of high inflation it is thought that the fixed rate will “anchor” the inflation. This is achieved through maintaining a fixed nominal exchange rate set at a level below the prevailing rate of inflation²⁸. It must be noted that although a fixed exchange rate will anchor inflation this leads to real exchange rate overvaluation that can have adverse effects on an economy, this will be discussed further in following sections.

Having a fixed exchange rate regime also has disadvantages. Primarily, a fixed exchange rate restricts monetary policy²⁹. With a fixed exchange rate it is not possible for the government to intervene and use monetary policy for stabilization. Say for example that Canada has a fixed exchange rate and there is a sudden drop in export demand. With a fixed exchange rate there is no stabilization reaction that would occur

²⁷ Obstfeld, Maurice and Rogoff, Kenneth, “The Mirage of Fixed Exchange Rates”, *Journal of Economic Perspectives*-Volume 9, Number 4-Fall 1995, p.76.

²⁸ Krueger, Anne O. “Nominal Anchor Exchange Rate Policies as a Domestic Distortion”. NBER Working Paper 5968, March 1997, p.1.

under a floating exchange rate³⁰. Under a floating exchange rate a drop in export demand would lessen demand for Canadian dollars and therefore the exchange rate would depreciate making Canadian dollars less expensive to foreign importers. As well, the monetary authority could lower the interest rate in the domestic economy to further stimulate demand. This would make Canadian exports more affordable and export demand would increase, the exchange rate has acted as an automatic stabilizer. Without this function an economy with a fixed exchange rate must reduce output and therefore employment in response to the drop in demand. Losing monetary control of this sort can be very limiting to an economy.

Loss of monetary policy is essentially loss of control over the money supply³¹. Due to the fixed exchange rate, all economic agents are able to exchange their domestic funds for foreign funds whenever they like at the prevailing exchange rate through the central bank. Therefore if the government wishes to change the money supply and economic agents in the economy do not wish to hold more domestic currency they can simply exchange it for foreign currency. The interchangeability of the currency at a known rate makes controlling the money supply very difficult for the monetary authority.

Loss of monetary policy can be very constraining to a government. Monetary policy is useful in smoothing out economic fluctuations such as the aforementioned drop in export demand. Without the ability to change the money supply the government is very limited in what actions it can take to lessen the impact of such an event.

²⁹ Obstfeld, Maurice and Rogoff, Kenneth. "The Mirage of Fixed Exchange Rates". *Journal of Economic Perspectives*, Volume 9, Number 4, Fall 1995, Pages 74.

³⁰ Krugman, Paul R. and Obstfeld, Maurice. "International Economics, Theory and Policy, Sixth Edition". Addison Wesley, 2003, p.569.

→Difficulties Maintaining a Fixed Exchange Rate

The primary difficulty with maintaining a fixed exchange rate is establishing *credibility* to convince national and international economic agents that the peg will be maintained. If credibility exists the potential for a speculative attack is greatly reduced. As long as speculators and investors believe that the peg will be maintained, there will not be any speculation against the currency.

The previous most widely accepted difficulty with maintaining an exchange rate peg is holding enough foreign exchange to repulse speculative attacks³². If national and international economic agents speculate that the government does not hold sufficient foreign reserves then attacks on the currency may persist. Obstfeld and Rogoff have shown that a speculative attack of any magnitude can be eliminated as long as the monetary authority is willing to forgo any other monetary policy objectives³³. The monetary authority must have enough resources to buy back the high-powered monetary base. The monetary base is defined as the total amount of bank notes and coins plus all direct clearers settlement balances at the central bank³⁴. It must be noted that direct clearers are those institutions that have settlement accounts with the monetary authority. Obstfeld and Rogoff show, using data from 1994, that most countries that had a fixed exchange rate during the 1990's and faced speculative attacks had a ratio over 100

³¹ Obstfeld, Maurice and Rogoff, Kenneth. "The Mirage of Fixed Exchange Rates". Journal of Economic Perspectives, Volume 9, Number 4, Fall 1995, p. 75.

³² Obstfeld, Maurice and Rogoff, Kenneth. "The Mirage of Fixed Exchange Rates". Journal of Economic Perspectives, Volume 9, Number 4, Fall 1995, p.77.

³³ Obstfeld, Maurice and Rogoff, Kenneth, "The Mirage of Fixed Exchange Rates", Journal of Economic Perspectives-Volume 9, Number 4-Fall 1995, p.78.

³⁴ Binhammer, H.H. Sephton, Peter S. "Money, Banking and the Canadian Financial System" Eighth Edition, Nelson 2001, p.387.

percent of foreign exchange reserves to the monetary base. This demonstrates that the main difficulty to maintaining a peg is not foreign reserves but the credibility to remain committed to the peg.

In the event of a speculative attack with a fixed nominal exchange rate, the monetary authority must be willing to allow increases in domestic interest rates³⁵. During a speculative attack short term interest rates will have to rise significantly to support the ongoing rate and limit the outflow of capital. A sharp rise in interest rates can be very damaging to the financial sector of an economy, in particular if that sector is weak. High interest rates make it very difficult for the bank to lend money in the economy. Economic agents will not want to borrow money when rates are so high and banks will suffer from this. This creates a situation of adverse selection; only borrowers who intend to default will borrow at such high interest rates and further increases banks non-performing loans.³⁶ As well, banks themselves will be paying much more interest on any outstanding loans they have, further hurting their bottom line. If high interest rates must be maintained for a significant period of time other parts of the economy will be damaged. Investment will lag due to the high cost of borrowing and this will slow the economy and increase unemployment. If the central bank can make it clear to investors that it will not collapse through the crisis and interest rates will return to normal levels, the crisis can be ended.

In conclusion, a fixed exchange rate is technically feasible (holding enough foreign reserves is attainable), the difficulty with such a regime is maintaining credibility.

³⁵ Obstfeld, Maurice and Rogoff, Kenneth. "The Mirage of Fixed Exchange Rates". *Journal of Economic Perspectives*, Volume 9, Number 4, Fall 1995, p.80.

³⁶ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 1, Carleton University, Fall 2005, p.87.

If the government is credible and macroeconomic discipline is maintained there will be no reason for economic agents to speculate against the currency and the peg can be maintained.

→Advantages and Disadvantages of Crawling Bands

Crawling bands offer some flexibility within the designated band yet limit the exchange rate from fluctuating too extremely. The band does allow for the nominal exchange rate to fluctuate somewhat and this adjustment can counter domestic and foreign economic shocks³⁷. If a country is experiencing high inflation and a crawling band is adopted the movement of the band should discourage high real exchange rate appreciation³⁸. The inflation will tend to lead towards real exchange rate overvaluation but if the band is able to crawl allowing the nominal exchange rate to adjust, the overvaluation will be limited.

The primary disadvantage of such a regime is the choosing of the width of the band³⁹. The larger the width the more fluctuation is allowed in the exchange rate. If an incorrect width is chosen the exchange rate may be too volatile and if the width is too small the real exchange rate may be overvalued and a fixed exchange rate is essentially created.

³⁷ Edwards, Sebastian, and Savastano, Miguel A. "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?". NBER Working Paper 7228, July 1999, p.6.

³⁸ Edwards, Sebastian, and Savastano, Miguel A. "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?". NBER Working Paper 7228, July 1999, p.6.

³⁹ Edwards, Sebastian, and Savastano, Miguel A. "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?". NBER Working Paper 7228, July 1999, p.6.

→Advantage and Disadvantages of Crawling Pegs

Crawling pegs allow more control over the nominal exchange rate without eliminating the ability to adjust the peg. This way the monetary authority can adjust it when it deems such action necessary. The degree of control over the nominal exchange rate value is higher than the control given with a crawling band. Due to the ability to adjust the peg it is possible to relieve real exchange rate appreciations⁴⁰.

The main drawback to such a system is that there is no mechanism for the nominal exchange rate to fluctuate freely to adjust to domestic or foreign shocks. As well, determining the correct rate of crawl is very intricate, if the wrong crawl is selected the real exchange rate will most likely be overvalued and exports will suffer as a result.

→Advantages and Disadvantages of Pegs with a Horizontal Band

A pegged nominal exchange rate with a horizontal band offers a greater degree of control over the value of the exchange rate and eliminates the need for selecting some rate of crawl. The horizontal band allows for small fluctuations to counter foreign and domestic shocks without allowing large fluctuations that could disrupt the economy.

The flexibility offered by this regime is very limited though. The band is usually no wider than ± 2 percent so adjustments are quite small. Determining where to peg the middle of the band is also very difficult. If pegged incorrectly the immediate result is real exchange rate overvaluation. Such a peg also requires large foreign currency

⁴⁰ Edwards, Sebastian, and Savastano, Miguel A. "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?". NBER Working Paper 7228, July 1999, p.7.

reserves to defend the peg. If there is intense pressure to devalue and reserves are low, the central bank has no choice but to devalue and the peg has failed.

→Advantages and Disadvantages of a Fixed Exchange Rate

Fixed exchange rate systems allow for complete control over the exchange rate. This creates macroeconomic discipline in the economy if the authorities wish to remain credible⁴¹. Credibility of the fixed exchange rate will depend on the discipline of the authorities, if economic agents observe irrational behavior by the government, speculation against the currency may result. This should keep the government from being reckless in their macroeconomic policies. Therefore the exchange rate peg is known and credible, this will stabilize the economy.

It must be noted that although the currency is pegged there is no law disallowing the monetary authority from changing the peg. This flexibility is beneficial in the case of real exchange rate appreciation or if the exchange rate peg is not in line with parity⁴². If an exchange rate peg is going to be adjusted there must be sufficient grounds for it and economic agents must be aware of the adjustment to prevent speculative attacks.

The problem with a fixed peg is that there is absolutely no freely floating ability of the currency. Unlike the more flexible regimes the fixed peg allows for absolutely no automatic adjustments based on supply and demand for the currency or foreign and domestic shocks. The only way for the peg to adjust is if the monetary authority deems

⁴¹ Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?" NBER Working Paper 6334, December 1997.

⁴² Edwards, Sebastian, and Savastano, Miguel A. "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?" NBER Working Paper 7228, July 1999, p.7.

necessary and this can damage credibility of the monetary authority. Historically, adjustments of exchange rate pegs have caused huge economic disruptions (due to uncertainty), this makes maintaining the new peg even more difficult due to loss of credibility⁴³.

→Advantages and Disadvantages of Currency Boards

Currency boards have a multitude of advantages. Simplicity of operation, credibility, predictable inflation and interest, and the payments and adjustments mechanism are the main benefits of currency boards⁴⁴.

Simplicity of operation arises from the fact that once the rules are defined there is very little room for maneuver. There is little ability of the government to manipulate the exchange rate or monetary policy. Hence, there is no need for close monitoring of the exchange rate market and simplicity is the result.

Having such a strict peg will make the government very credible. Credibility creates a stable economic environment and encourages domestic and foreign investment. The rules laid out by the currency board are extremely strict and inflexible; this will force the government to be careful in their fiscal policy decisions.

Predictable inflation and interest rates are the major advantages to currency boards. The currency board fights inflation through setting low inflation expectations, these expectations persist due to the stringent rules set out by the currency board.

⁴³ Edwards, Sebastian, and Savastano, Miguel A. "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?" NBER Working Paper 7228, July 1999, p.7.

⁴⁴ Saleh, Sharif, "Currency Board Arrangements: Analysis and Perspective", Department of Economics, Carleton University, Ottawa, 2004, p.25

Because a currency board pegs the exchange rate to some foreign currency or basket of currencies the interest rate will tend to converge to the interest rate of the foreign country that the domestic currency is pegged to. Predictability of inflation and interest keeps expectations positive and the economy stable.

The final advantage of a currency board is the payment adjustment mechanism. In the event of a balance of payments deficit (both a current and capital account deficit) the money supply will fall, this puts upward pressure on the interest rate⁴⁵. A higher interest rate attracts capital inflows, and puts deflationary pressure on the economy. If the deflation is significant exports will become more competitive and the current account will move out of deficit. This would not be the result with a flexible exchange rate. If the current and capital account are in deficit the flexible exchange rate will depreciate, stimulating export demand and putting inflationary pressure on the economy.

Currency boards have disadvantages as well; there is a significant loss of monetary policy, and the loss of the lender of last resort facility. Monetary policy tools such as interest rate manipulations are no longer possible under a currency board arrangement. Loss of these tools leaves the government with little options in the event of external shocks. If the economy is heavily involved in international trade, external shocks can have disastrous effects on the economy and the government has no ability to respond.

The loss of the lender of last resort function occurs due to the fact that a currency board essentially eliminates the central bank and therefore there is no lending ability. The government must fulfill the role of lender of last resort. In the event of a liquidity

⁴⁵ Saleh, Sharif, "Currency Board Arrangements: Analysis and Perspective", Department of Economics, Carleton University, Ottawa, 2004, p.26.

crunch or a run on banks it is usually the central banks job to step in and provide commercial banks with the necessary liquidity to end the panic. Loss of such a function leaves the banking sector vulnerable, especially if it was weak to begin with.

→Advantages and Disadvantages of Dollarization

Full dollarization has the advantage of complete credibility. Because another currency has been adopted there is absolutely no way for the government or monetary authority to intervene and affect the value of the nominal exchange rate. This will eliminate any possibility of a balance of payments crisis. There is no fear of devaluation and therefore no threat of huge and abrupt capital outflows.

Dollarization will also strengthen economic ties. Using for example the US dollar will make lower transaction costs between the domestic country and the US and will ensure price stability⁴⁶. Economic partnership will be stronger and the domestic country will benefit from this.

The final advantage to dollarization is the increased investment that will result from dollarization. By ensuring financial stability through foreign currency adoption, both domestic and international investment will strengthen and help to expand the economy. The threat of inflation is removed by dollarization and this creates a very favorable investment environment.

Dollarization also has its disadvantages, the primary disadvantage being the loss of seigniorage to the government. Seigniorage is the profit raised from the issuance of

⁴⁶ Berg, Andrew and Borensztein, Eduardo, "Full Dollarization *The Pros and Cons*", International Monetary Fund, Washington, 2000, p.13.

money; specifically it is the difference between the face value of the coinage and the cost of minting it⁴⁷. Seigniorage is an important source of revenue for a government; dollarization eliminates this revenue and gives it to the country of the adopted foreign currency. There are two kinds of seigniorage loss, stock cost and future seigniorage earnings cost⁴⁸. The stock cost refers to the initial cost of the monetary authority buying back all the domestic currency from public banks in order to remove it from circulation. As well, future seigniorage earnings are given up because there is no longer the ability to print domestic currency once dollarization is complete.

Dollarization forfeits independence of monetary policy and with it the capacity to adjust to shocks as well as independent exchange rate policy⁴⁹. With full dollarization it is impossible for the government to exercise an exit option. This means that there is complete credibility and the government cannot devalue if it wishes to. Obviously credibility and lack of an exit option is beneficial for economic stability but it eliminates any independent monetary policy and exchange rate policy. As well, the central banks ability to be the lender of last resort is eliminated. If a run on banks occurs, the central bank is no longer able to provide short term liquidity to restore confidence in the economy.

→Conclusion

⁴⁷ Binhammer, H.H. Sephton, Peter S. "Money, Banking and the Canadian Financial System" Eighth Edition, Nelson 2001, p.671.

⁴⁸ Berg, Andrew and Borensztein, Eduardo, "Full Dollarization *The Pros and Cons*", International Monetary Fund, Washington, 2000, p.13.

⁴⁹ Berg, Andrew and Borensztein, Eduardo, "Full Dollarization *The Pros and Cons*", International Monetary Fund, Washington, 2000, p.13.

It is clear that every exchange rate regime is very unique. Each regime has its own set of advantages and disadvantages that must be considered. An individual country must weigh the pros and cons of each regime before determining what best suits its economy. The primary elements that differ between every regime are *credibility* and *flexibility*. A country must determine what regime is suited to it based on these elements. Newly emerging economies with little history or experience with exchange rate management generally opt for a regime that will provide optimal credibility to international markets. Credibility will be accompanied by little flexibility initially and move towards more flexibility as credibility is established. Advanced economies that have attained credibility can opt for a flexible exchange rate. With a strong economy and international credibility it should be possible for an economy to survive any exchange rate fluctuations that accompany a flexible exchange rate regime.

Chapter 4: Currency Crisis

A currency crisis can be very loosely defined as a rapid change in the value of a currency. Currency crisis has occurred if a speculative attack has caused substantial reserve losses or large depreciation of the currency. Paul Krugman writes: “There is no generally accepted formal definition of a currency crisis, but we know when we see one. The key element is a sort of circular logic, in which investors flee a currency because they fear that it might be devalued, and in which much (though not necessarily all) of the

pressure for such a devaluation comes precisely from that capital flight”⁵⁰. There are three generations of currency crisis that must be examined.

→**First Generation:** Also known as exogenous policy models, this form of currency crisis occurs when domestic policy inconsistencies exist in an economy. This model puts emphasis on economic fundamentals causing the crisis⁵¹. Domestic inconsistencies such as commitment to a pegged exchange rate regime yet excessive printing of money will lead to a first generation currency crisis. This policy can exist as long as the country maintains its foreign exchange reserves to support the pegged currency. Foreign reserves will be depleted until they reach a certain minimum level, once this level is reached a final speculative attack will occur and the fixed exchange rate can no longer be held. The immediate cause of this currency crisis is unsustainable fiscal policy; an exchange rate peg cannot be maintained if money is printed at excessive levels. There is a weakness in this theory of currency crisis that must be noted. The first generation currency crisis model assumes that the authorities in this economy are passive, not recognizing the effects of their actions on other parts of the economy⁵². All policies involve tradeoffs and most authorities would consider alternatives and recognize the effect of their domestic policies. This model explains the currency crisis of Argentina (1978-1981) and Mexico (1978-1982) but fails to explain the currency crisis that arose in the 1990’s⁵³.

The second generation model arose to address currency crises that could not be fully

⁵⁰ Krugman, Paul, “Currency Crises”, The University of Chicago Press, 2000.

⁵¹ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 1, Carleton University, Fall 2005

⁵² Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 1, Carleton University, Fall 2005.

⁵³ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 1, Carleton University, Fall 2005.

explained by unsustainable domestic policy.

→**Second Generation**: Also known as the endogenous policy model, this model generally explains the “bandwagon” effect of a currency crisis. As previously noted, this model puts emphasis on the vulnerability of the exchange rate system even when there are sound fundamentals. There are two main reasons for a second generation currency crisis, the first being the role of expectations and self fulfilling prophecies on the part of economic agents and the second being policymakers role in their policy choices⁵⁴. This model assumes that economic agents have expectations about what policy makers may do in the future in response to economic fluctuations. These expectations are therefore incorporated into economic agent’s decision making process. This creates a situation of *self fulfilling prophecy*. If economic agents expect policymakers to abandon a peg in response to economic fluctuations, even when economic fundamentals are strong, the policy makers may be *forced* to abandon the peg due to speculative attacks. Because economic agents expect the peg to be abandoned a small economic fluctuation may trigger massive speculative activities that will force the abandonment of the peg. The “bandwagon” effect means that the actions of a small group of speculators may trigger a mass exodus of capital from the economy. Hence, a self fulfilling prophecy has occurred. The policy maker’s decision to devalue the exchange rate will now be dependant on the political cost/benefit, not on economic or financial circumstances⁵⁵. The policy maker must consider their political “loss function”. This weighs the costs and benefits of

⁵⁴ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 1, Carleton University, Fall 2005.

⁵⁵ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 1, Carleton University, Fall 2005.

different policy options. For example, raising the interest rate to support an exchange rate peg will have negative effects on the banking sector and this must be taken into account when making policy decisions. This model is not yet fully developed but was applied to currency crises in the 1990's in Europe.

→**Third Generation:** Third generation currency crisis are a somewhat new phenomena and focus on the financial system, and more specifically on the health of the banking system. This model recognizes that there may be interaction between a currency crisis and a financial crisis. The model examines the financial system and more specifically any vulnerabilities such as balance sheet imbalances at financial institutions⁵⁶. As an economy opens to international financial markets it will take on excessive foreign liabilities. In the presence of a weak legal, prudential and regulatory framework such liberalization may lead to imbalances in the financial system. More specifically there will be a mismatch of assets and liabilities in domestic and foreign currency on financial institutions balance sheets⁵⁷. If this mismatch occurs at many financial institutions a systemic problem may arise.

Problems arise when foreign investors lose confidence in the economy which may be due to a multitude of reasons. This may cause a financial institution to become *internationally illiquid* as investors withdraw their assets. The financial institutions short term international liabilities may then exceed its short term international assets. Due to the loss in confidence, the financial institution may have predominately short term

⁵⁶ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 1, Carleton University, Fall 2005, p.71.

⁵⁷ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 1, Carleton University, Fall 2005, p.71.

foreign liabilities instead of assets. This makes the institution illiquid in terms of foreign currency and if it becomes systemic a currency crisis can arise. The loss of confidence will also greatly reduce foreign credit; this will further cause illiquidity of financial institutions and trigger recession. Once recession has set in and confidence in the economy is dwindling, policy makers may be forced to devalue.

This generation of crisis can occur without blatant signs existing. The economy may be strong and the country may appear to be developing well but high levels of short-term foreign liabilities will usually cause excessive credit, overheating of the economy, an asset price bubble, and even greater dependence on short-term foreign credit⁵⁸. If the financial system is not strong and there exists excessive short term foreign credit a currency crisis may be very possible

Chapter 5: Financial Crisis

A financial crisis refers to a situation where the financial system has become systemically insolvent⁵⁹. Insolvency means the inability of an economic agent to pay debts as they become due. This crisis is usually caused by the existence of individual or systemic illiquidity. Illiquidity itself is a sign of individual or systemic insolvency.

→Insolvency and Illiquidity

⁵⁸ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 1, Carleton University, Fall 2005, p.72.

⁵⁹ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 1, Carleton University, Fall 2005, p.71.

Insolvency means that an individual or institution is unable to pay its debts. This occurs when there is an excess of liabilities over assets. A financial institution that is insolvent can operate as long as it maintains enough cash flow to pay its most essential debts and operation costs. Insolvent financial institutions can only operate for so long before illiquidity becomes a problem. *Illiquidity occurs when a financial institution does not have enough money to cover any sort of cash related expense.* An insolvent institution will be unable to remain liquid forever; it must restructure its assets and liabilities to return to a state of solvency. Systemic insolvency can lead to complete illiquidity in the financial system. If this occurs the financial system as a whole is in distress and on the verge of crisis.

A financial institution that is illiquid, even if it is solvent, cannot continue to operate. Being illiquid means the institution does not have the cash to operate and must close. On the other hand, an institution that is liquid yet insolvent can operate. The institution may have an excess of liabilities over assets but if it has enough cash to maintain confidence in investors it can continue to operate. It is important that enough confidence is maintained, even if the institution is insolvent, to avoid a run on banks. A run on banks is a situation where depositors have lost confidence in the financial institution and huge amounts of deposit withdrawal occur.

→Covert and Overt Financial Crisis

Financial distress does not necessarily lead to a full fledged financial crisis.

Financial distress can create a situation of covert financial crisis⁶⁰. This occurs when the financial system is operating yet is insolvent. Once liquidity is exhausted the covert crisis can very quickly become overt. If complete confidence is lost by depositors a run on banks will be triggered and full fledged financial crisis has begun.

Causes of Financial Distress and Crisis

There are three main categories of causes, macroeconomic, microeconomic, and institutional⁶¹. It must be noted that the causes of any crisis are never extremely clear and cannot be pinned on one category. There is typically an interaction of many different causes and distresses.

→Macroeconomic Causes

Macroeconomic causes consist of macroeconomic shocks that negatively effect the financial system, macroeconomic meaning the economy as a whole. Both external and internal macroeconomic shocks can occur.

External Shocks - shocks caused by developments of an external nature, originating outside the specified economy. Important and potentially very damaging external shocks are terms of trade fluctuation, real exchange rate fluctuation, large

⁶⁰ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 1, Carleton University, Fall 2005, p.69.

external financial flows, international interest rate fluctuation, and dollarization of an economy⁶². All of these external factors may lead to financial distress and eventually a financial crisis.

Internal Shocks- internal shocks are those shocks that occur domestically. Any macroeconomic fluctuation that occurs domestically can be classified as an internal shock such as interest rate fluctuation, inflation, and political shocks. Both interest rate fluctuation and inflation can distort balance sheets and affect the liquidity of financial institutions. Political shocks such as assassination or changeover to a new regime can trigger uncertainty and a run on banks, this will create illiquidity and financial crisis.

→Microeconomic Causes

Microeconomic causes are mainly information problems and risk management at the institutional level. The important factor is the quality of management at financial institutions. Weak management can cause financial crisis if institutions are poorly managed systemically. Institutions with underdeveloped risk management arms are susceptible to poor lending practices. Large quantities of credit extension without proper research into the borrower can lead to default on loans and eventual illiquidity and insolvency and finally, financial crisis.

⁶¹ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 1 Carleton University, Fall 2005, p.76

⁶² Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 1, Carleton University, Fall 2005, p.79.

→Institutional Causes

Frail institutions can create a financial crisis if the problems are large enough and widespread. Political interference, supervision of the financial system, inadequate legal, regulatory and prudential framework and financial repression can all be causes of an institutional nature⁶³. When institutional management is not adequate the financial system as a whole can become ill. It is very important that the financial systems institutions are strong and well managed.

Chapter 6: Currency and Financial Crisis in Mexico, 1994

Introduction

Now that the concepts of exchange rates, exchange rate regimes, currency crisis and financial crisis have been examined, it is possible to apply them to the crisis that occurred in Mexico. In December of 1994 the Mexican exchange rate regime lost its credibility and a currency and financial crisis ensued. The new government in power had increased the ceiling of the exchange rate band by 15 percent on December 20th 1994 in order to counter a strong speculative attack on the peso. Much to the surprise of the authorities widening the band undermined the exchange rate regime of its credibility and

⁶³ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 1, Carleton University, Fall 2005, p.85

domestic and foreign investors tried to unload their holdings of pesos. Foreign reserves had been declining to dangerously low levels since November of 1994 due to international uncertainties about the state of the Mexican economy and Mexico had become internationally illiquid. The loss of credibility due to the widening of the band caused investors to panic. Both domestic and foreign investors did not believe the new peso parity to be sustainable. The exchange rate moved immediately to the top of the band and mass amounts of foreign reserves were drawn from the Mexican economy as people attempted to get out of pesos and assets denominated in pesos⁶⁴. In one day the Banco de Mexico lost \$4 billion US dollars⁶⁵. The authorities then had no other option but to allow the currency to float freely and the peso depreciated by roughly 50 percent. There was no doubt that a currency crisis had occurred in Mexico.

The currency crisis immediately affected the financial system. As will be shown, the financial system was frail leading up to the currency crisis and extremely susceptible to negative shocks. Liberalization of the financial system had been mismanaged and many financial institutions were not in a position to absorb significant shocks. The devaluation of the peso was followed by a rise in interest rates and recession, these shocks pushed the financial system into a financial crisis. The year 1994 was not good for Mexico and it would take many years to fix the damage that had been done.

Chapter 7: Mexico's Reform, 1988-1994

⁶⁴ Krueger, Anne O. and Tornell, Aaron. "The Role of Bank Restructuring in Recovering From Crises: Mexico 1995-98". NBER Working Paper 7042, March 1999, p.2.

⁶⁵ Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?" NBER Working Paper 6334, December 1997, p.25.

In December of 1988 a new administration took office under Salinas. Their main goal was to combat inflation in the Mexican economy which at the time was extremely high and a fixed nominal exchange rate was put in place. The purpose of the fixed nominal exchange rate was to act as a *nominal anchor* to combat inflation in the economy that had been at levels of over 100 percent in 1987⁶⁶. The Mexican government began a stabilization program, aiming to reduce and stabilize inflation. This was followed by a structural adjustment program aimed at deregulating the economy, opening up international trade to foreign competition, liberalizing the financial sector, and establishing an agreement between the government, the private sector, and unions aimed at guiding wage and price increases known as the Pacto⁶⁷. The Mexican authorities followed various exchange rate regimes mostly aimed at slowing down inflation using the peso as a nominal anchor (refer to table on p.49 “Mexico’s Exchange Rate Policy 1988-1994”). During 1988 the nominal exchange rate was fixed to the US dollar at 2281 pesos per dollar. In 1989 the nominal exchange rate was managed through a crawling peg regime or “tablita” at a preannounced rate of 1 peso per day, similar to the system used in Chile from 1978-79⁶⁸. From November of 1991 to December of 1994 a widening exchange rate band was adopted. The peso was to act as a nominal anchor, guiding expectations downward by devaluing at a *slower* rate than inflation.

→Macroeconomic Indicators

⁶⁶ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.14.

⁶⁷ Edwards, Sebastian. “Exchange Rates as Nominal Anchors”. NBER Working Paper 4246, December 1992, p.16.

⁶⁸ Edwards, Sebastian. “A Tale of Two Crises: Chile and Mexico”. NBER Working Paper 5794, October 1996, p.8.

The following table shows macroeconomic performance from the period 1987-1999.

Mexico's Macroeconomic Indicators-1987-1997

| Year | GDP Growth Rate | Current Account/GDP | Inflation Rate | Budget Deficit/GDP | Exchange Rate Peso/US\$ |
|------|-----------------|---------------------|----------------|--------------------|-------------------------|
| 1987 | 1.9 | 0.5 | 131.8 | -14.4 | 2.2097 |
| 1988 | 1.3 | -1.3 | 114.2 | -10.2 | 2.281 |
| 1989 | 3.4 | 9.8 | 20 | -4.6 | 2.641 |
| 1990 | 5.1 | -2.8 | 26.7 | -2.6 | 2.9454 |
| 1991 | 4.2 | -4.7 | 22.7 | -0.5 | 3.0701 |
| 1992 | 3.6 | -6.7 | 15.5 | 1.5 | 3.1154 |
| 1993 | 2 | -5.8 | 9.8 | 0.7 | 3.1059 |
| 1994 | 4.5 | -7 | 7 | -0.1 | 5.325 |
| 1995 | -6.2 | -0.6 | 35 | 0 | 7.6425 |
| 1996 | 5.2 | -0.6 | 34.4 | 0 | 7.8509 |
| 1997 | 7 | -1.8 | 20.6 | -0.7 | 8.0833 |

Source: Interacciones, La Economía en Cifras, OECD Economic Outlook, December 1998, World Bank Report # 17392

-Taken from: Popiel, Paul A. "Management of Financial Systems and of Financial Crises". Volumes 2. Department of Economics, Carleton University, p. 14.

The table illustrates the progress made under the reforms. The growth rate of GDP was positive from 1987 towards 1994⁶⁹. The growth was relatively modest but still respectable considering the state of the economy before the reforms. The inflation rate drastically declined from the 1987 level of 131.8 to an impressive 7.0 percent in 1994. Clearly the nominal anchor combined with the Pacto was working. As well, the budget deficit went from 14.4 in 1987 to an impressive 0.7 budget surplus by 1993. By these indications it appeared as though the Mexican economy was on track to a more stable,

⁶⁹ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.13.

open, and inflation free economy. Refer to tables 2 and 3 in the appendix for supplementary data pertaining to macroeconomic indicators.

Due to the political reforms being made, the reduction in inflation, and the opening of trade and reduction of protectionism, Mexico was being heralded as a successful example of economic reform. However there still remained a number of weaknesses in the economy. Edwards's points out that although the reform policies themselves appeared to be large achievements, actual economic results from these policies were mixed⁷⁰. Edwards determined that real growth averaged 2.8 percent from the period 1988 to 1994, compared to Chile (7.1 percent) and Colombia (4.1 percent) this was relatively unimpressive⁷¹. The real exchange rate was appreciating, private savings were rapidly declining, productivity growth was unimpressive, and the current account deficit was reaching -7.0 percent by 1994⁷². Table 2 in the appendix shows the modest growth as well as the growing current account deficit and declining foreign reserves. There clearly existed underlying problems with the Mexican reforms yet Mexico was still being heralded as a success.

Despite the optimism and generally positive macroeconomic indicators such as falling inflation and stable exchange rate policy the primary threats to the economy were real exchange rate appreciation and the ever increasing current account deficit. To understand the causes behind these negative aspects of Mexico's stabilization program, nominal anchor exchange rate policies must be looked at more in depth.

⁷⁰ Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?" NBER Working Paper 6334, December 1997, p.4.

⁷¹ Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?" NBER Working Paper 6334, December 1997, p.3.

⁷² Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?" NBER Working Paper 6334, December 1997, p.4.

→Nominal Anchor Exchange Rate Policy

Nominal anchor exchange rate policy is used to slow down the rate of inflation in economies experiencing excessive rates of inflation. This can be achieved by either completely fixing the nominal exchange rate or through a system of mini devaluations, preannouncing the devaluations on a given schedule. It is thought that by devaluing the nominal exchange rate at a rate lower than the rate of inflation, the predetermined time path of the nominal exchange rate will anchor the price level and inflation expectations will be lowered⁷³. Accompanied by the nominal exchange rate anchor should be policy reforms aimed at reducing inflation in the economy. This usually involves restructuring any debt servicing schedules as well as an opening of the economy to a more trade oriented and less protective economy⁷⁴.

Nominal anchor policies may reduce inflation but there are problems with such policies. Firstly, real exchange rate overvaluation may occur under a nominal anchor policy. When domestic inflation continues to rise and the nominal exchange rate is devalued at a slower rate than the rate of inflation, real appreciation is inevitable. Since nominal anchor policies should accompany restructuring of the economy, more specifically a shift from import-competing to export production, real exchange rate overvaluation will limit this shift⁷⁵. If producers recognize that the real exchange rate

⁷³ Krueger, Anne O. "Nominal Anchor Exchange Rate Policies as a Domestic Distortion". NBER Working Paper 5968, March 1997, p.2.

⁷⁴ Krueger, Anne O. "Nominal Anchor Exchange Rate Policies as a Domestic Distortion". NBER Working Paper 5968, March 1997, p.2.

⁷⁵ Krueger, Anne O. "Nominal Anchor Exchange Rate Policies as a Domestic Distortion". NBER Working Paper 5968, March 1997, p.6.

will be overvalued due to the nominal anchor policy, there will be very little incentive to shift production to export production. Real appreciation will erode competitiveness of exporters and deter export production, therefore the policy is contradicting.

The other problem that arises from the use of a nominal exchange rate anchor is the depletion of foreign assets that result from real appreciation. It is very important that an effective “exit policy” be in place when using a nominal anchor to negate foreign reserve depletion⁷⁶. An exit policy must be planned to allow for a smooth transition from a nominal anchor to another regime once inflation has been brought to satisfactory levels. Failure to do so will lead to excessive real exchange rate overvaluation that will discourage export competitiveness.

As the real exchange rate appreciates and exporting becomes less competitive to producers, the current account deficit deepens. The current account is defined as the difference between exports of goods and services and imports of goods and services⁷⁷. When imports exceed exports the country has a current account deficit, if exports exceed imports the country has a current account surplus. There is only one way to sustain a deficit of the current account: it must be offset by capital inflows. When a country is importing more than it is exporting, a current account deficit, it is buying more from foreigners than it is selling to them and therefore must borrow from foreigners. The magnitude of foreign debts is equal to the size of the current account deficit⁷⁸. This is the *dual effect* of real exchange rate overvaluation; a current account deficit must be accompanied by foreign borrowing. Capital inflows will increase to finance the current

⁷⁶ Krueger, Anne O. “Nominal Anchor Exchange Rate Policies as a Domestic Distortion”. NBER Working Paper 5968, March 1997, p.5.

⁷⁷ Krugman, Paul R. and Obstfeld, Maurice. “International Economics, Theory and Policy, Sixth Edition”. Addison Wesley, 2003, p. 300.

account deficit; these inflows put further pressure on the currency in real terms.

→Mexico's Exchange Rate Policy and the Current Account: 1987-1994

Mexico had favorable conditions when beginning with the nominal anchor; the real exchange rate was actually undervalued, leaving some room for appreciation without eroding competitiveness. Simultaneously with the adoption of a nominal anchor policy the Mexican government undertook other reforms usually prescribed with a nominal anchor. Mexico established an income policy to help combat inflation and began trade liberalization, lowering tariffs and almost completely eliminating import quotas⁷⁹. The Pacto de Solidaridad was established in 1987, its primary goal was wage and price reduction through cooperation with unions, entrepreneurs and the government.

The nominal anchor policy began by completely fixing the nominal exchange rate; this was kept up until 1989. After that a system of preannounced devaluation was used and finally from 1991 onwards there was an exchange rate band with a sliding ceiling. The exchange rate devaluation was always set at a rate lower than the rate of inflation, aimed at guiding expectations downwards. Mexico was managing its exchange rate policy exactly as prescribed when using it as a nominal anchor. The following table outlines Mexico's exact exchange rate policy from 1988 to 1994.

⁷⁸ Krugman, Paul R. and Obstfeld, Maurice. "International Economics, Theory and Policy, Sixth Edition". Addison Wesley, 2003, p.302.

⁷⁹ Dornbusch, Rudiger and Werner, Alejandro. "Mexico: Stabilization, Reform, and No Growth". Brookings Papers on Economic Activity. 1;1994, p.262.

Mexico's Exchange Rate Policy, 1988-1994

| | |
|--|---|
| February-December 1988 | Fixed nominal exchange rate at 2281 pesos per dollar |
| January-December 1989 | Preannounced rate of devaluation set at 1 peso per day |
| January-December 1990 | Preannounced rate of crawl of nominal exchange rate set at 80 cents per day |
| December 1990-November 1991 | Preannounced rate of crawl of nominal exchange rate set at 40 cents per day |
| November 1991-October 1992 | Exchange rate band adopted. Floor is fixed at 3050 pesos per dollar, while ceiling slides at 20 cents per day. |
| November 1992-December 19, 1994 | Rate of devaluation of bands ceiling is accelerated to 40 old cents per day (0.0004 new pesos). Bank of Mexico intervened through March 1994 in order to maintain the dollar/peso rate within narrower (confidential) "inner" band. |
| December 20-December 21 st , 1994 | Ceiling of band increased by 15 percent. |
| December 22, 1994 onwards | Flexible exchange rate. |

Source: Edwards, Sebastian. "A Tale of Two Crises: Chile and Mexico". NBER Working Paper 5794, October 1996, p.8.

Despite the "buffer zone" for the real exchange rate to appreciate that existed when the policy was adopted and the establishment of the Pacto, real overvaluation occurred, limiting export competitiveness and creating a large current account deficit. This was due to the nature of the exchange rate regime. From 1987 onwards the nominal exchange rate was permitted to depreciate at a rate that was agreed upon with labor unions in the Pacto. The nominal exchange rate was set to depreciate at a rate slower than the purchasing power parity warranted⁸⁰. This was determined by the inflation rate differential between Mexico and the rest of the world. As the domestic price level

⁸⁰ Krueger, Anne O. "Nominal Anchor Exchange Rate Policies as a Domestic Distortion". NBER Working Paper 5968, March 1997, p.4.

continued to rise, the nominal exchange rate was devaluing at a slower rate, this inherently creates real appreciation. A reduction in domestic savings also contributed to the current account deficit⁸¹. As well, Mexico had not established an exit policy for transition from the nominal anchor to another regime once inflation was at satisfactory levels. These factors contributed to the currency crisis in 1994.

The Mexican Finance Minister, Pedro Aspe, believed that the exchange rate policy combined with the Pacto would reduce “inertial inflation” and “place an upward boundary on the prices of tradeables”⁸². The policy was no doubt initially successful, reducing inflation from pre-policy levels of over 100 percent. The Mexican authorities knew of the real exchange rate appreciation and the current account deficit yet believed that this was part of the reform process. The success of the initial inflation reduction was overshadowing the appreciation of the real exchange rate to the point of overvaluation and authorities were grossly underestimating the impact it was having on the economy.

Real exchange rate appreciation was evident from 1989 onwards. It can be observed in the given table, it demonstrates producer prices in Mexico measured in a common currency relative to those in the US:

⁸¹ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.15.

⁸² Edwards, Sebastian. “The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?”. NBER Working Paper 6334, December 1997.

Competitiveness Measures for Mexico: 1989-1993

Units as indicated

| <i>Measure</i> | <i>1989</i> | <i>1990</i> | <i>1992</i> | <i>1993</i> |
|------------------------------------|-------------|-------------|-------------|-------------|
| Wages in dollars ^a | 1.58 | 1.64 | 2.35 | 2.65 |
| J.P. Morgan index ^b | 108 | 100 | 108 | 117 |
| Banco de México index ^c | 88 | 92 | 109 | 112 |

Sources: Authors calculations based on unpublished data from the US Bureau of Labour Statistics, Banco de Mexico (1993), Morgan Guanty Trust Company (various issues).

a. Hourly compensation in manufacturing in dollars.

b. J.P Morgan multilateral real effective exchange rate index in non-food manufacturing. 1990=100.

c. Real exchange rate index based on the unit labour costs in manufacturing. 1985=100.

-Source: Dornbusch, Rudiger and Werner, Alejandro. "Mexico: Stabilization, Reform, and No Growth". Brookings Papers on Economic Activity. 1;1994, p.263.

The table clearly shows that the real exchange rate had appreciated from 1989 onwards in comparison to the US. Wages in dollars had steadily increased; reaching 2.65 in 1993 and both the Banco de Mexico and J.P Morgan recognized a real appreciation. Although the real appreciation was expected, as it always is when pursuing a nominal anchor policy, the real exchange rate was becoming *overvalued*.

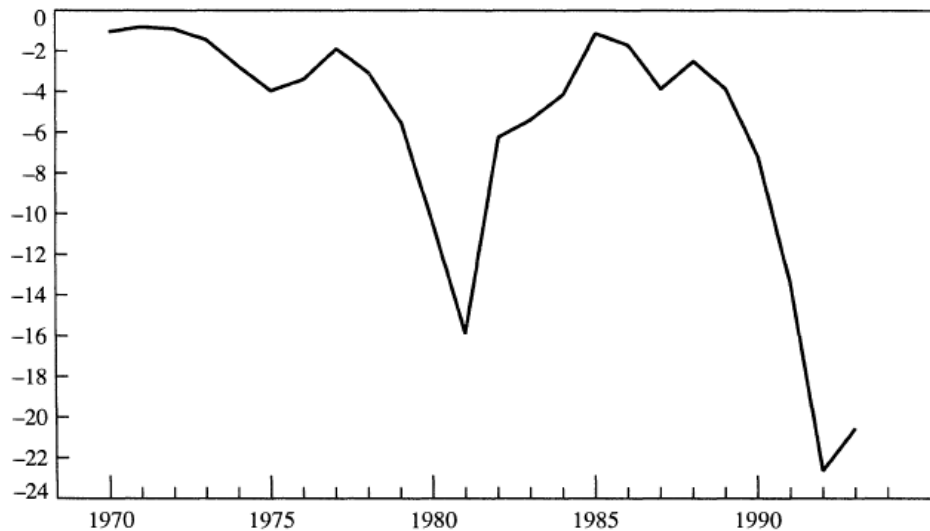
The current account deficit was increasing as a result of the appreciation and the lack of domestic savings. As previously mentioned in Chapter 1, when the real exchange rate appreciates exports become less competitive and importing increases. This is exactly what was happening in Mexico and the only way to finance such an increase in the current account deficit is through capital inflows, the *dual effect* of real exchange rate overvaluation. The current account deficit widened from -2.8 percent of GDP in 1990 to -7.0 percent of GDP in 1994, a very large deficit for a developing economy (see Mexico's Macroeconomic Indicators in the appendix)⁸³. The following graph

⁸³ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.15.

demonstrates the magnitude of the current account deficit:

Mexican Current Account: 1970-1993

Billions of US dollars



Source: Authors' calculations based on Banco de México, *Indicadores Económicos*, various issues.

-Source: Dornbusch, Rudiger and Werner, Alejandro. "Mexico: Stabilization, Reform, and No Growth". *Brookings Papers on Economic Activity*. 1;1994, p.263.

To finance the growing current account deficit significant capital inflows were required. For the most part, the large capital inflows were of a short term nature, invested in the stock market, private debt instruments and government debt⁸⁴. Foreign portfolio investment grew exponentially as a component of portfolio investment, growing from 10.0 percent in 1989 to 90.0 percent in 1993, and with Mexico's entry into the North American Free Trade Agreement (NAFTA) in 1994 further pressure was put on the real

⁸⁴ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.15.

exchange rate⁸⁵.

The nominal anchor exchange rate policy was initially successful in inflation reduction, though there was no doubt that real exchange rate overvaluation was damaging the Mexican economy, Mexico would not be able to sustain such a policy for long.

→The Financial Situation in Mexico Prior to the Crisis

Along with the overall reform program in Mexico, financial liberalization was a large component. Prior to the reforms that took place from 1988 onwards, the financial system in Mexico was severely repressed. It had also been nationalized, meaning all banks were state owned. The government was using tight macroeconomic policy and government controls to attempt to keep the economy stable⁸⁶. The financial system was plagued with high reserve requirements, credit ceilings, directed credit allocation and controlled deposit and loan rates⁸⁷. The authorities recognized that the financial system needed a major overhaul and in 1989 the Mexican congress passed a financial reform package aimed at reforming the legal framework.

The package was aiming to liberalize the repressed financial system and ultimately to achieve four broad goals. 1) Reduce and redesign the regulation of the financial system. 2) Attempt to increase foreign competition through partial lifting of barriers to entry in the Mexican financial system. 3) Increase and strengthen

⁸⁵ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.15.

⁸⁶ Krueger, Anne O. and Tornell, Aaron. "The Role of Bank Restructuring in Recovering From Crises: Mexico 1995-98". NBER Working Paper 7042, March 1999, p.1.

⁸⁷ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.15.

capitalization at all financial institutions. 4) To improve supervision of the financial system by strengthening the Commission Nacional Bancaria (CNB) and the Commission Nacional de Valores (CNV)⁸⁸. These goals were designed to create a sound financial system with liberalized and effective financial intermediation.

Monetary policy was to be reformed as well, this included: liberalization of interest rates and financial instruments maturities, an elimination of reserve requirements instead having a 30.0 percent liquidity ratio, an end to government financing at interest rates below the market rate and finally complete elimination of credit ceilings⁸⁹.

→Privatization of State Owned Banks

The new legal framework and macroeconomic policies were accompanied by re-privatization of the state owned banks of Mexico. The Salinas administration first gave state owned banks more freedom and then moved to completely re-privatize the banks. Bank managers were given more freedom and then slowly exposed to greater levels of competition. With the greater autonomy, the scope of the state banks operations broadened to include: the issuance of short-term paper at market interest rates and participation in the market for government debt instruments, the ability to hold long term government debt instruments until maturity, and a relaxing of ownership constraints allowing large financial conglomerates to be created⁹⁰. As well, from 1989 to 1990 the

⁸⁸ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.15.

⁸⁹ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.16.

⁹⁰ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.16.

Credit Institutions Law was altered to better manage the financial sector. By 1990 private ownership of the state owned banks was allowed and re-privatization began.

Privatization of the Mexican banks took place between 1991 and 1992. A total of 19 Banks that had been nationalized in 1982-83 were privatized. Each bank was sold at many times its book value; the Mexican government believed that the privatization had been a success. What had been overlooked during the sale of the banks was the fact that many of the buyers (mainly industrial or commercial conglomerates) were not experienced at banking and some were operating illegal cartels⁹¹. The inexperience of the banking sector would prove to be fatal for the Mexican financial sector at the onset of crisis.

Along with re-privatization of the banks came reform of the securities market; the stock exchange was opened to foreign investment in 1989. Foreigners could now be more active in the Mexican economy and were allowed to hold securities that were issued by Mexican companies. After the reforms took place foreign holdings of Mexican securities peaked at 50 percent of Mexican GDP⁹².

→Outcomes of Financial Reform

The reforms to the financial system had two major impacts. Firstly, the financial depth increased greatly in Mexico. Secondly, there was a substantial increase in credit to

⁹¹ Edwards, Sebastian. "On Crisis Prevention: Lessons From Mexico and East Asia". NBER Working Paper 7233, July 1999, p.12.

⁹² Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?". NBER Working Paper 6334, December 1997, p.14.

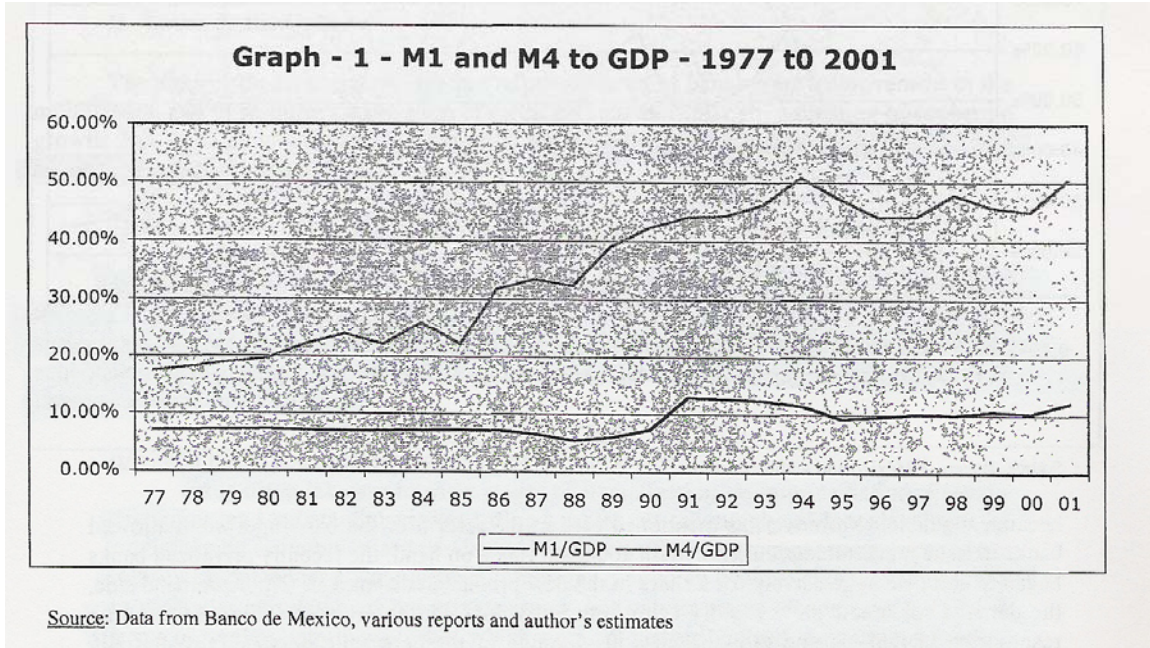
the private sector⁹³. The major weakness to the financial reform was the fact that the reforms to the legal, regulatory and prudential framework were not accompanied by effective increases in the supervision of the financial system.

The increase in financial depth was significant; more financial instruments and services became available in the Mexican financial sector. A combination of lower inflation, liberalized interest rates (as a result of bank privatization), and large capital inflows helped deepen the financial sector⁹⁴. This deepening can be observed through the growth of the M4 money supply. M1 is money and current accounts in an economy. M4 is M1 plus time deposits, commercial paper, banker's acceptances, government bonds, and debt instruments in local and foreign currencies. From the period 1977 to 2001 and specifically from 1988 onwards, the M4 money supply greatly increased, demonstrating movement away from holding cash to holding financial assets⁹⁵. This signifies how much the financial sector deepened during this period.

⁹³ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.18.

⁹⁴ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.18.

M1 and M4 to GDP-1977 to 2001



Source: Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.18.

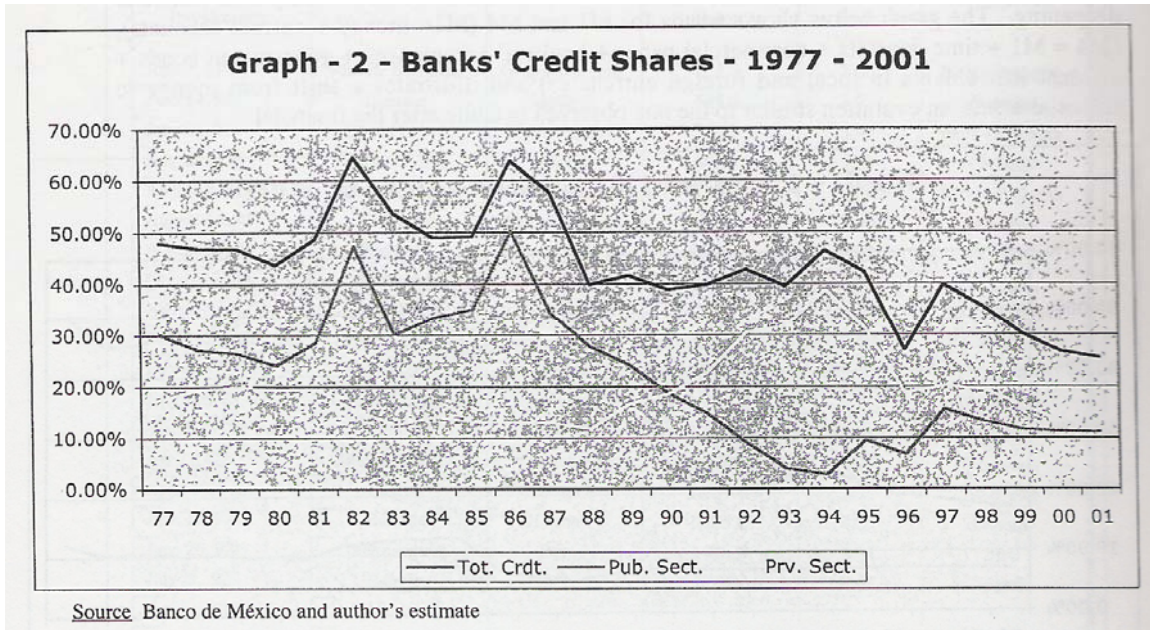
Financial reform also generated strong expansion of credit to the private sector. Privatization of the banks and good fiscal policy were the leading reasons for this. Newly privatized banks were eager to expand their operations and began giving out consumer and housing loans as well as reversed mortgages⁹⁶. The re-privatized banks wanted to make high and quick profits to recapture the expense of buying the banks from the government. This led to aggressive credit expansion with little caution. Tight fiscal policy brought the budget deficit to surplus by 1993(see Macroeconomic Indicators); this meant that there was an abundance of loanable funds; the government was not needing

⁹⁵ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.18.

⁹⁶ Edwards, Sebastian. "On Crisis Prevention: Lessons From Mexico and East Asia". NBER Working Paper 7233, July 1999, p.12.

funds to finance a fiscal imbalance. Private sector credit grew at a phenomenal rate, eight times faster than GDP⁹⁷. The graph shows the high growth of private sector credit leading up to crisis in 1994.

Banks Credit Shares-1977-2001



Source: Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.19.

Not only was the supply of loanable funds increasing but demand was heating up as well. Due to the optimism surrounding Mexican reforms, real incomes grew and private sector demand for loanable funds increased.

Chapter 8: Towards Crisis in Mexico

⁹⁷ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.19.

As mentioned earlier reforms in Mexico had been heralded as a success. The combination of the nominal anchor exchange rate policy, the formation of the Pacto in an attempt to reduce inflation, opening of the economy to international competition, and financial reform were indications of Mexico's commitment to stabilizing the economy⁹⁸. Optimism about Mexico was at all time highs; the IMF, World Bank, and a multitude of investment banks were praising the progress of Mexico. Specifically the IMF praised Mexico's reforms in a report it released called, "Mexico: The Strategy to Achieve Sustained Economic Growth". The paper stated, "The success of Mexico's economic strategy since 1989 has led to its gradually regaining access to voluntary international capital market financing after haven been virtually excluded for much of the decade. This private sector access to capital, in combination with Mexico's broad reform, augurs well for the achievement of sustainable economic growth in the medium term" (Loser and Kalter 1992, page 12)⁹⁹. Despite all the optimism, problems were brewing in Mexico as 1994 approached.

→Overvaluation of the Real Exchange Rate and Current Account Deficit

As previously shown in Chapter 7, the exchange rate policy in Mexico led to overvaluation of the real exchange rate. This limited export competitiveness and, combined with a lack of domestic savings led to a very large current account deficit. The

⁹⁸ Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?". NBER Working Paper 6334, December 1997, p.3.

⁹⁹ Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?". NBER Working Paper 6334, December 1997, p.6.

deficit was at more than 7.0 percent of GDP by 1994¹⁰⁰. Such a large current account deficit is unsustainable, requiring large amounts of capital inflows to finance it. As mentioned, these capital inflows were primarily of a short term nature and therefore potentially volatile.

Dornbusch and Werner warned of real exchange rate overvaluation in their paper “Mexico: Stabilization, Reform, and No Growth” written in 1994. They suggested that the overvaluation was severe, only 40 percent of the real exchange rate appreciation can be credited to actual improvements of economic conditions in Mexico since 1988¹⁰¹. They prescribed the Mexican government to devalue by 20 percent, believing such a devaluation would set the economy back on the right track¹⁰².

→Credit Boom

The financial reforms combined with the aforementioned capital inflows increased the supply of loanable funds in Mexico. New economic growth since the reforms stimulated demand for loans in pesos and US dollars, the result of this being increased financial indebtedness. The private sector became over-leveraged (meaning high reliance on debt financing) in both domestic and foreign liabilities; most of the foreign liabilities were not hedged¹⁰³. This was due to the fact that many Mexican banks

¹⁰⁰ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.21.

¹⁰¹ Dornbusch, Rudiger and Werner, Alejandro. “Mexico: Stabilization, Reform, and No Growth”. Brookings Papers on Economic Activity. 1;1994, p.285.

¹⁰² Dornbusch, Rudiger and Werner, Alejandro. “Mexico: Stabilization, Reform, and No Growth”. Brookings Papers on Economic Activity. 1;1994, p.286.

¹⁰³ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.21.

were meeting demand for loans through short term foreign borrowing. This put the financial system in a very vulnerable position; any shocks could be potentially catastrophic.

→Institutional Flaws

The financial reforms were not properly accompanied by institutional reforms to ensure a stable financial system. There existed four major problems of an institutional nature: 1) The legal, regulatory, and prudential framework was inadequate. 2) As previously mentioned the privatization of the banks had not been carried out correctly. 3) Supervision was weak. 4) The authorities guaranteed all deposits, creating moral hazard opportunities¹⁰⁴.

As previously explained, the financial reforms were accompanied by changes to the legal, regulatory, and prudential system in Mexico. The key problem with the reforms is that they did not fully adapt to a private banking system. Because the privatization resulted in many banks being bought by largely inexperienced managers, strong supervision was required to ensure proper management of the financial system. There existed six major flaws with the legal, regulatory, and prudential framework¹⁰⁵:

1) Loan Classification: Rules pertaining to loan classification were weak.

Prudential rules meant banks only had to record as non-performing the overdue

¹⁰⁴ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.21.

¹⁰⁵ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.21.

portion of a defaulted loan. International standards on the other hand state that the whole loan must be classified as non-performing if in default. This meant that non-performing loans in Mexico were being grossly underestimated. As well, banks were allowed to “roll over” bad loans during restructuring of the loan and record them as non-performing. This led to “evergreening”, rolling over bad debts and accruing interest in an attempt to minimize losses.

- 2) **Improper Accounting and Information Standards:** The rules for accounting and the dissemination of information were not up to international standards. Evergreening meant financial institutions could accrue interest on defaulted loans and operations of subsidiaries were not being correctly reported. This created a severe lack of transparency in the financial system.
- 3) **Information Centralization:** There existed no central institution to gather and share information about loans and borrowers. This resulted in borrowers being able to borrow from multiple institutions, using the same collateral several times over. Without being able to track loans and borrowers the banks were taking large risks by giving out loans. This lack of information helped fuel the credit boom.
- 4) **Bankruptcy Law:** The law was not adequate to protect creditors. The bankruptcy process of foreclosure and collateral recovery was extremely inefficient. It was taking on average three to seven years to legally process a bankruptcy. The lengthy recovery process greatly reduced the value of the collateral once the creditor finally received it. It was also very easy for defaulting debtors to delay the bankruptcy process by objecting throughout the rulings; this meant that the

- courts had to rule on every objection. The result of this ineffective bankruptcy law was moral hazard. Borrowers knew that they could default and face no serious consequences for long periods of time, encouraging risky practices with borrowed money.
- 5) Exit Mechanism: There was no process for distressed banks to quickly and efficiently close. The process of closing involved slow court proceedings and combined with the aforementioned bankruptcy law the overall exit mechanism for distressed banks was extremely inadequate.
 - 6) Capital Requirements: The rule imposed was recommended by the Basle Committee, requiring a minimum 8.0 percent of risk-weighted asset capital ratio. This may have been the stated rule but in actuality the Mexican banks were permitted to include subordinated debt, inflation revaluations and deferred taxes in the 4.0 percent of primary capital. Mexican banks were not sufficiently capitalized.

Flaws with the legal, regulatory, and prudential framework were only some of the institutional weaknesses leading towards crisis. The privatization process, inadequate supervision, and deposit insurance were crucial factors as well¹⁰⁶.

Privatization, as previously mentioned, was initially hailed as a success due to the profits generated from the sales of the previously publicly owned banks. The major problems with re privatization were as follows: purchases were made by large banking conglomerates allowing for connected lending, many banks at the time of purchase were

¹⁰⁶ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.22.

not only undercapitalized but had bad loan portfolios and were technically insolvent, the banks technical operating systems were outdated, most bank purchasers were inexperienced in the function and management of banks, and some banks were purchased using borrowed funds from other financial institutions further increasing the debt of the bank¹⁰⁷. Privatization was completed by 1992 and many of the problems with the re privatization process were yet to be recognized.

Inadequate supervision was rampant in Mexico regardless of reforms to the Credit Institution Law. Most of the reforms were not recognized and important aspects of banking supervision like risk management and overall bank management were not priorities. The Comission Nacional del Bancos was the off site supervisory agency in Mexico and it had been given very little autonomy, rendering it essentially useless¹⁰⁸. Overall enforcement ability was weak as well. The result of all this was incomplete reform of the supervisory institutions.

The final institutional flaw leading to the crisis in Mexico was the implicit deposit insurance scheme in Mexico. The Central bank made a guarantee of all deposits at banks, ensuring that if a financial institution goes insolvent the Central Bank will rescue the institution and reimburse all the depositors of that bank¹⁰⁹. This guarantee reduced financial institutions and depositor's caution, any risky behavior on their behalf was insured by the Central Bank.

→Microeconomic Causes

¹⁰⁷ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.23.

¹⁰⁸ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.24.

Two microeconomic inadequacies were the final factors leading to the crisis. There was inexperience with lending to the private sector and to corporations in the financial institutions and a shortfall of individuals with banking experience at both the management and staff levels. Both were reasons for financial crisis.

Prior to re privatization the Mexican banks faced little competition, low interest rates and directed credit allocation¹¹⁰. This was due to the fact that the banks were state owned. Most of their lending was given to state-owned or public enterprises, this meant that the loans were guaranteed by the government and the perception was that they bore little to no risk. Upon liberalization there was an increase in demand for loans from the private sector, the newly privatized banks began giving loans to private sector businesses. The financial institutions were lacking the experience necessary to lend to individuals and corporations, there existed almost no experience with credit risk management. As foreign borrowing was liberalized financial institutions began lending to non-tradable sector businesses in foreign currencies. Many of these loans were in US dollars and not fully hedged, the borrower was taking on the foreign exchange risk¹¹¹. The banks were lending recklessly in an attempt to gain market share.

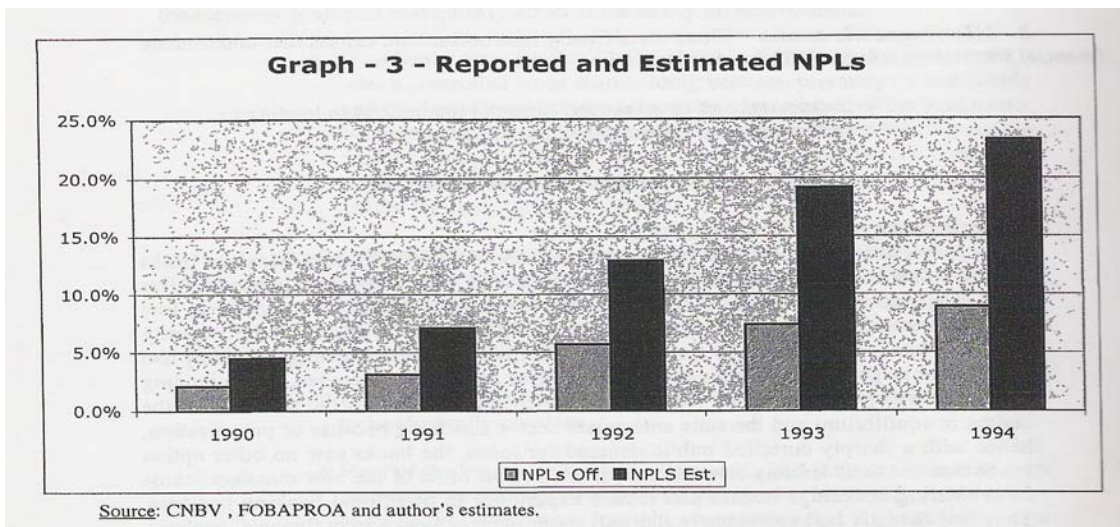
The deterioration in bank portfolios was a result of excessive growth of credit from 1990 to 1994. As mentioned, the banks portfolios were weak to begin with and with reckless loans being given to the private sector the portfolios were getting worse. Non-performing loans rose from 2.1 percent in 1990 to 8.9 percent in 1994, as reported

¹⁰⁹ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.24.

¹¹⁰ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.24.

by the banks themselves¹¹². In reality the level of non performing loans was much higher due to the fact that the practice of evergreening was allowed (rolling over bad debts and accruing interest on them)¹¹³. Also, under the prevailing system only the part of the loan that was unpaid was classified as a bad loan. The correct practice would be to classify the whole loan as non-performing and provision for it, this would have resulted in a much higher reported level of non-performing loans. The following graph shows the actual level of non performing loans as estimated by Popiel:

Reported and Estimated NPLs



Source: Popiel, Paul, “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.25.

¹¹¹ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.24.

¹¹² Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.25.

¹¹³ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.25.

Chapter 9: The Crisis

With an overvalued real exchange rate, unsustainable current account deficit, and a weak financial system, Mexico was vulnerable to a crisis. The following events ultimately triggered the crisis:

→January 1st, 1994

The first shock to occur was internal and of a political nature. In the Mexican state of Chiapas, an uprising of the Zapatista army began. This reminded the international community that despite economic reforms and apparent progress made in Mexico, political instability still existed. On February 17th, six weeks after the uprising the Financial Times wrote an article stating that “low growth has meant that many Mexicans have yet to benefit significantly from economic initiatives that brought inflation down..., and privatized hundreds of state-owned businesses”¹¹⁴.

The result of this uprising and subsequent political uncertainty was movement of the exchange rate to the upper limit of the band in late February of 1994. The interest rates on peso denominated securities (28 day *Cetes* are a good example) did not increase substantially as would be expected due to increased uncertainty¹¹⁵. International reserves did not fall and there was actually a record inflow of foreign investment from January

¹¹⁴ Edwards, Sebastian. “The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?”. NBER Working Paper 6334, December 1997, p.16.

¹¹⁵ *Cetes* is the abbreviation for Treasury Certificates, public debt bonds redeemable and denominated in pesos

through to mid-February¹¹⁶.

After the internal shock of the Zapatista uprising a shock of an external nature occurred in mid-February. The US Federal Reserve raised interest rates to contain inflationary pressures and to slow the heated American economy¹¹⁷. The surprising result of this shock was little to no effect on domestic interest rates and reserves in Mexico. As March came it appeared that the Mexico economy was under control and the initial shock of the uprising had been weathered.

→March 23rd to October, 1994

Three months after the Zapatista uprising the presidential candidate of the ruling party, the PRI (Partido Revolucionario Institucional), Luis Donaldo Colosio was assassinated during a political rally in Lomas Taurinas, Tijuana. This internal shock was met with panic in the financial community; both foreign and domestic investors began to reduce their demand for Mexican securities. Mexican authorities believed that this was a temporary shock and with time the uncertainty would pass, they opted to defend the peso which was already at the top of the exchange rate band and spent close to US \$10 billion in international reserves¹¹⁸. Along with the loss in international reserves the interest rate on 28 day Cetes went up, moving from 10 percent in February to 16 percent in April,

¹¹⁶ Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?". NBER Working Paper 6334, December 1997, p.16.

¹¹⁷ Lustig, Nora, "The Mexican Peso Crisis: the Foreseeable and the Surprise", Brookings Institution, June 1995, p.11.

¹¹⁸ Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?". NBER Working Paper 6334, December 1997, p.17.

reflecting the uncertainty in Mexico¹¹⁹.

It had appeared as though Mexico had yet again weathered an internal shock, but underlying problems existed. The Mexican authorities were having trouble rolling over their short-term, peso denominated debt without raising the domestic interest rate. This left the authorities with three policy options: allow interest rates to rise even more, devalue the exchange rate, or issue debt instruments known as *Tesobonos*. *Tesobonos* were dollar-denominated, short-term government debt instruments. They were redeemable in pesos yet denominated in dollars, this covered investors against the risk of devaluation and would discourage capital outflows¹²⁰. Essentially, the risk premium of the peso was removed from *Tesobonos* because they were dollar-denominated. Hence, the interest rate on *Tesobonos* was lower than on *Cetes* for comparable maturities.

The authorities wanted to avoid an increase in the interest rates, the banking sector was weak as previously shown and they feared that a significant rise in interest rates might trigger financial crisis. The option of devaluing was out of the question, Mexico was about to join NAFTA (North American Free Trade Agreement) and devaluation would not please Mexico's new partners¹²¹. This led the authorities to choose the policy of substituting *Tesobonos* for *Cetes*. As previously noted; *Cetes* were both redeemable and denominated in pesos while *Tesobonos* were redeemable in pesos yet denominated in dollars. It was hoped that the *Tesobonos* would limit capital outflows and relieve pressure on domestic interest rates and on the exchange rate (which was at the top of the band).

¹¹⁹ Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?". NBER Working Paper 6334, December 1997, p.17.

¹²⁰ Lustig, Nora, "The Mexican Peso Crisis: the Foreseeable and the Surprise", Brookings Institution, June 1995, p.12.

There appeared to be stability in Mexico but in actuality the policy of expanding the stock of Tesobonos was only delaying the inevitability of crisis. The stock of outstanding Tesobonos reached \$12.6 billion dollars by June of 1994¹²². As the year progressed the composition of government debt held by foreigners changed: in December of 1993, 70% was in Cetes while 6% was in Tesobonos, by December 1994, 10% of debt was in Cetes and 87% was in Tesobonos¹²³. Essentially what was happening was “dollarization” of public debt in Mexico. This can be seen as a sign that many investors were wary of the exchange rate policy in Mexico, by substituting their Cetes for Tesobonos investors were insuring against devaluation of the peso. The credibility of the government’s exchange rate policy was eroding as investors increasingly doubted its sustainability.

Along with the substitution of Cetes for Tesobonos the authorities chose to “sterilize” the \$10 billion dollar decline in international reserves. This was done by increasing domestic credit equally in an attempt to keep the monetary base approximately the same¹²⁴. Beginning in July domestic interest rates began to decline, at the same time US interest rates were rising and the result was even more pressure on the peso which was continually hitting the top of the exchange rate band. The following table gives an illustration of the increasing yields of American Treasury Bills (3 month) in comparison to Mexican Cetes (1 month).

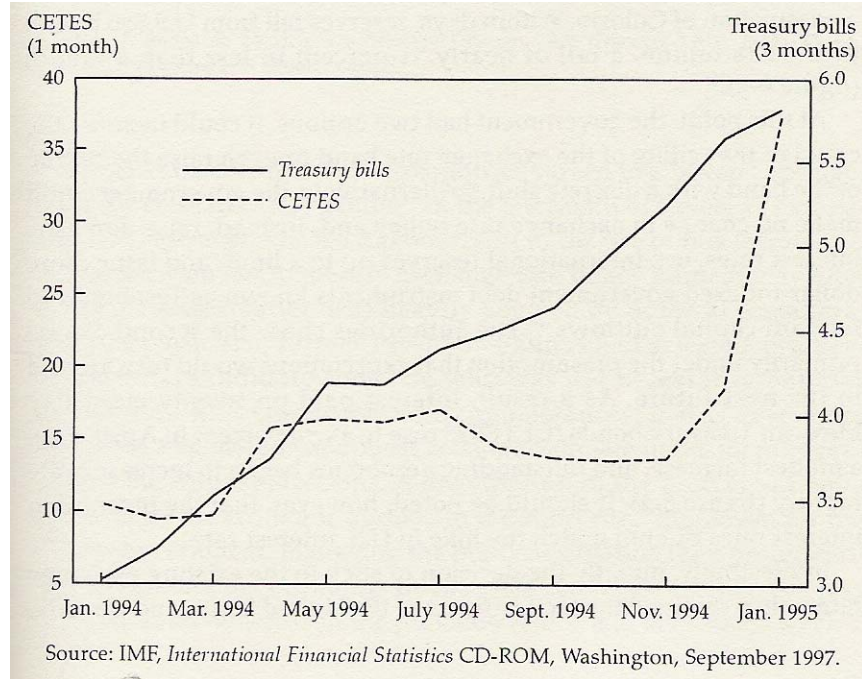
¹²¹ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.27.

¹²² Lustig, Nora, “The Mexican Peso Crisis: the Foreseeable and the Surprise”, Brookings Institution, June 1995, p.13.

¹²³ Lustig, Nora, “The Mexican Peso Crisis: the Foreseeable and the Surprise”, Brookings Institution, June 1995, p.13.

¹²⁴ Lustig, Nora, “The Mexican Peso Crisis: the Foreseeable and the Surprise”, Brookings Institution, June 1995, p.14.

Nominal Interest Rates in Mexico and the United States



Source: Lustig, Nora, "The Remaking of an Economy", Second Edition, Brookings Institution Press, Washington D.C. 1998, p.157.

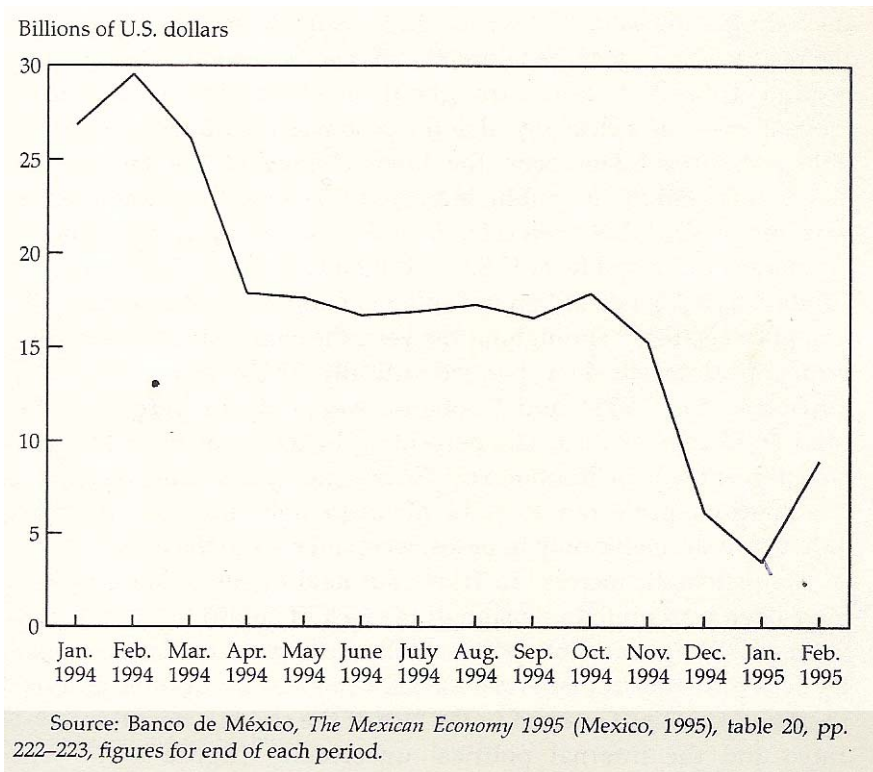
From April onwards there did appear to be stability in Mexico and international reserves remained relatively stable. Although international reserves were not declining, the continual increase in Tesobonos reached a point in August where the total of outstanding Tesobonos was equal to the level of international reserves (around \$16-17 billion)¹²⁵. The continual buildup of foreign denominated government debt would be a key component of the financial crisis that would follow the collapse of the peso.

→September 28th to December 1st, 1994

¹²⁵ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.27.

On September 28th the Secretary General of the PRI, Jose Fransisco Ruiz Massieu, was assassinated¹²⁶. This created heightened uncertainty among investors and the authorities again increased the substitution of Tesobonos for Cetes to calm investors and protect them from exchange rate risk. The Banco de Mexico announced on October 21st that reserves were at US \$17.2 billion¹²⁷. The following figure illustrates the levels of international reserves from January 1994 to February 1995.

International Reserves



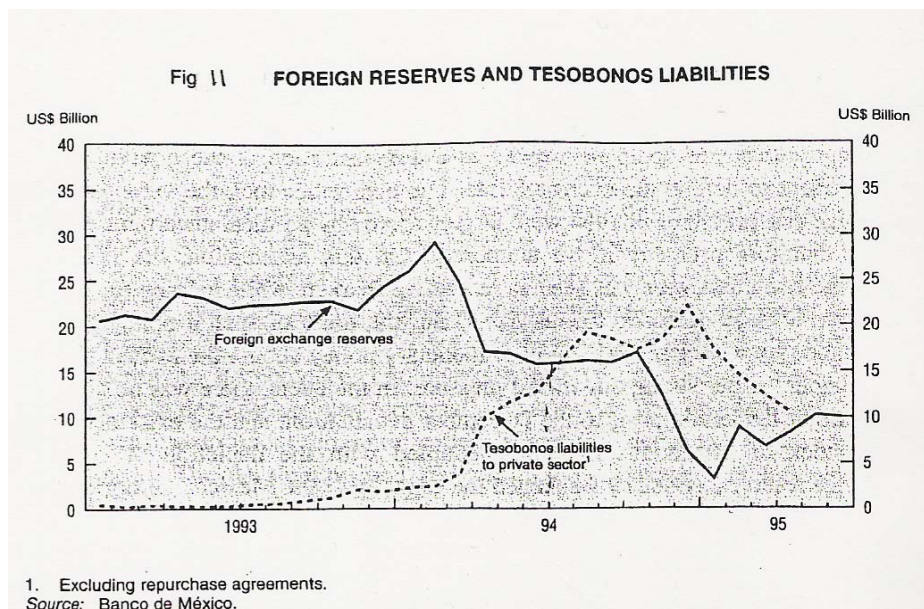
Source: Lustig, Nora, “The Remaking of an Economy”, Second Edition, Brookings Institution Press, Washington D.C. 1998, p.159.

¹²⁶ Edwards, Sebastian. “The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?”. NBER Working Paper 6334, December 1997, p.22.

¹²⁷ Edwards, Sebastian. “The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?”. NBER Working Paper 6334, December 1997, p.22.

By November 1994 the situation was becoming critical. Reserves had now declined to US \$12.5 billion and outstanding Tesobonos had reached US \$19 billion. Because reserves were less than outstanding dollar-denominated debt, Mexico was potentially *internationally illiquid*. The following graph demonstrates the amount of Tesobonos liabilities in relation to foreign reserves leading to the crisis:

Foreign Reserves and Tesobonos Liabilities



Source: OECD 1996, Mexican Economy, p.39.

On December 1st the newly elected administration of Pedro Zedillo took over. Pedro Aspe, the current finance minister and advocate of the exchange rate regime was replaced.

→December 20th, 1994

Reserves were reaching dangerously low levels and on December 20th the authorities decided a policy change was necessary¹²⁸. The exchange rate band was widened to allow for a 15 percent devaluation. The announcement of the widening was not accompanied by any sort of program to support it. Both foreign and domestic investors finally lost all confidence in Mexico; the new exchange rate ceiling was not credible and investors panicked. The exchange rate moved immediately to the top of the band. The change in policy had failed as the Banco de Mexico lost US \$4 billion in reserves in *one* day in an attempt to support the new, wider band¹²⁹. The authorities realized that the new policy would not work and had no choice but to float the peso on December 22nd. This meant that the Banco de Mexico would no longer intervene to support the peso. There was no doubt that currency crisis had occurred and a dramatic financial crisis followed.

Chapter 10: Financial Crisis Following Devaluation

The abandonment of the exchange rate band and subsequent devaluation of the peso finally brought the already distressed financial system into complete financial crisis. The authorities had clearly underestimated the reaction of international financial markets to the devaluation. Foreign investors in the Mexican economy saw the devaluation as a

¹²⁸ Krueger, Anne O. and Tornell, Aaron. "The Role of Bank Restructuring in Recovering From Crises: Mexico 1995-98". NBER Working Paper 7042, March 1999, p.11

¹²⁹ Edwards, Sebastian. "The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?". NBER Working Paper 6334, December 1997, p.25.

loss of credibility to the Mexican authorities and their reaction was a swift withdrawal of capital. By the second week of January the massive outflow of capital had Mexico on the verge of international default¹³⁰. Other Latin American countries felt the effects of Mexico's economic instability in what was known infamously as the "Tequila Effect".

The microeconomic effect of the financial crisis was related to the financial liberalization that took place prior to the currency crisis. As previously mentioned, financial liberalization had resulted in an increase in financial depth and a strong expansion of credit to the private sector. The accompanying financial reforms resulted in an insufficient legal, regulatory and prudential framework, and weak supervision of the financial system. One major weakness with the legal, regulatory, and prudential framework was poor loan classification. This meant that only the overdue portion of a non-performing loan was being classified as non-performing whereas the correct procedure would be to classify the *entire* loan as non-performing. The result was grossly underestimated non-performing loans and many financial institutions were actually in a much worse solvency situation than they may have stated leading to crisis. As well, poor supervision meant that strengthening of prudential rules was ineffective and largely unobserved. The lack of supervision was further aggravated by the fact that there was a lack of experienced personnel at financial institutions, leading to bad lending practices and lending portfolio management. All of these inadequacies allowed for the credit boom to occur unabated.

Much of the credit boom was in both foreign and domestic currencies and was

¹³⁰ Lustig, Nora, "The Mexican Peso Crisis: the Foreseeable and the Surprise", Brookings Institution, June 1995, p.16.

lent to an already over-leveraged (high reliance on debt financing) private sector¹³¹. A large portion of the foreign liabilities were not hedged and vulnerable to shocks of both an internal and external nature. All of these factors had the Mexican financial system ripe for crisis given internal or external shocks.

After devaluation the credit “bubble” burst and the aforementioned microeconomic weaknesses in the financial system were exposed. The weaknesses that existed were aggravated further by macroeconomic shocks such as depreciation of the peso, a sharp rise in interest rates, and recession¹³². At the onset of the peso crisis financial institutions that were already weak due to the aforementioned reasons could no longer service their debts and many institutions became internationally illiquid. Many financial institutions had met the increased demand for foreign currency in the private sector by borrowing foreign currency themselves. Due to inexperience and undercapitalization, when the peso depreciated there suddenly existed an excess of liabilities in foreign currency over assets on the banks balance sheets, which led to large losses.

Financial institutions were damaged through another channel as well, the borrowers. Borrowers were unable to service their debts due to recession, high interest rates (interest rates reached levels as high as 80 percent in 1995 forcing many borrowers to cease payments), and the new exchange rate that made debt servicing loans denominated in US dollars extremely difficult¹³³. The inability of borrowers to service their debts further aggravated the mismatch of assets and liabilities on banks balance

¹³¹ Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.20.

¹³² Popiel, Paul A. “Management of Financial Systems and of Financial Crises”, Volume 2, Carleton University, Fall 2005, p.28.

sheets. As noted, financial institutions US dollar denominated liabilities were growing due to depreciation of the peso and this combined with a lack of liquidity being supplied from borrowers defaulting on their loans led to large losses. Both financial institutions and borrowers had been adversely affected by the devaluation and subsequent rise in interest rates and recession. Financial crisis had occurred in the Mexican financial system.

As previously shown, a financial crisis arises when the financial system has become systemically insolvent. Mexican financial institutions were not only insolvent but more importantly they were actually on the verge of international illiquidity. The Banco de Mexico was internationally illiquid as well. Substitution of Tesobonos for Cetes was the primary cause for this illiquidity, it was estimated that there were US \$50 billion payments that were coming due in 1995 alone (assuming short-term debt would not be rolled over)¹³⁴. At this time the Banco de Mexico held roughly US \$6 billion in international reserves and the first international bailout package was US \$18 billion, clearly not enough to cover the Tesobonos coming due¹³⁵.

To stabilize the financial system and prevent a worldwide shock, an assistance package was given to Mexico. International financial institutions and the governments of the United States, Canada, and a group of Latin American countries brought together US

¹³³ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.28.

¹³⁴ Lustig, Nora, "The Mexican Peso Crisis: the Foreseeable and the Surprise", Brookings Institution, June 1995, p.19.

¹³⁵ Lustig, Nora, "The Mexican Peso Crisis: the Foreseeable and the Surprise", Brookings Institution, June 1995, p.19.

\$52 billion in loan guarantees¹³⁶. The authorities embarked on a stabilization and reform process aimed at stabilization and prevention of further financial system meltdown.

Chapter 11: Conclusions

In conclusion some questions must be asked about what occurred in Mexico. Firstly, exactly what type of crisis occurred in Mexico? Secondly, could the crisis have been avoided through better exchange rate policy? Finally, what could have been done differently to prevent a financial crisis? All of these questions must be answered to fully understand what had occurred.

→Type of Crisis

What type of currency crisis occurred in Mexico? It clearly cannot be fully explained by the first generation currency crisis discussed earlier that is characterized by inconsistencies in domestic policies combined with excessive money printing to finance a budget deficit. As was shown, there was actually a small budget surplus and fiscal policy was disciplined. Although it must be noted that some elements of a first generation currency crisis did exist. The second generation currency crisis which emphasizes the vulnerability of the exchange rate system in the presence of good fundamentals does not fully apply either but elements of such a crisis did exist and must be examined. Mexico

¹³⁶ Krueger, Anne O. and Tornell, Aaron. "The Role of Bank Restructuring in Recovering From Crises: Mexico 1995-98". NBER Working Paper 7042, March 1999, p.13.

did have sound fundamentals leading to crisis (inflation reduction, GDP growth and a budget surplus) but macroeconomic policy was inconsistent and outstanding Tesobonos made Mexico internationally illiquid. As well, interest rates were too low in comparison to external rates. This leaves the third generation currency crisis or “twin crisis”.

The first generation currency crisis results from inconsistencies in domestic policies and excessive money printing. The classic example of this is attempting to maintain a pegged exchange rate while printing excessive amounts of domestic currency. Such a policy can be maintained as long as foreign exchange reserves remain high. Mexican authorities did not do this exactly but the substitution of Tesobonos for Cetes can definitely be characterized as inconsistent domestic policy. Interestingly, by substituting Tesobonos for Cetes the authorities were actually decreasing the peso supply and then sterilized this action by expanding credit. Maintaining the exchange rate regime (band with adjustable ceiling) while running down foreign reserves through the issuance of Tesobonos can be classified as inconsistent domestic policy. Such a policy was sustainable only on a short-term time horizon and would eventually lead to a currency crisis. It is clear that there was more to the Mexican crisis and the first generation model alone cannot explain what had occurred but it is interesting that some elements of such a model exist.

The second generation currency crisis puts emphasis on the vulnerability of the exchange rate system when sound fundamentals exist. The idea of self fulfilling prophecies is the major element of this model; economic agents expect devaluation and pull their investment from the economy which will subsequently force the authorities to abandon the exchange rate regime, all despite sound fundamentals. Sachs, Tornell and

Velasco are proponents of this theory in their paper “Financial Crisis in Emerging Markets: Lessons from 1995”. They state that: “While there were many reasons for a devaluation of the Mexican peso at that time, the speculative attack and the magnitude of the resulting currency depreciation went far beyond what was “inevitable”, based on Mexico’s fundamental conditions”¹³⁷. It is true that most fundamentals in Mexico were sound; as was previously shown the inflation rate had drastically declined, GDP was growing modestly and the budget was in surplus. Despite this, internal shocks (political uprising and assassination) led investors lose confidence in the Mexican economy and the substitution of Cetes for Tesobonos began. Eventually the authorities were forced to devalue when foreign reserves had reached levels below outstanding Tesobonos. The second generation model most definitely applies to what occurred in Mexico. The primary shortcoming of the model though is the fact that it was *not* speculation and self fulfilling prophecy that led to devaluation. Devaluation was a result of the decision of the authorities to avoid a rise in interest rates or earlier devaluation and opt for the issuance of Tesobonos which ultimately left the authorities with no other choice. This rules out the occurrence of a second generation currency crisis.

The first and second generation currency crisis models fall short of completely explaining what occurred in Mexico, this leaves the third generation model. As previously noted, a third generation currency crisis is characterized by vulnerability of the financial system and imbalances on the sheets of banks and other financial institutions. This applies directly to Mexico, financial reforms of both an institutional

¹³⁷ Sachs, Jeffrey D; Tornell, Aaron; Velasco, Andres; Calvo, Guillermo A; Cooper, Richard N. “Financial Crisis in Emerging Markets: The Lessons from 1995”, Brookings Papers on Economic Activity, Vol. 1996, No 1, p.150.

and microeconomic nature led to a very fragile financial sector. As noted the financial reforms had many adverse effects on the financial system including: flaws with the legal, regulatory, and prudential framework, flaws with privatization, poor supervision, implicit deposit insurance creating moral hazard, inexperience in newly privatized institutions with private sector lending, and a deficiency of skilled personnel¹³⁸. With financial reforms came liberalization and a credit boom in Mexico. In the absence of strong fundamentals in the financial system due to flaws in the reform process the credit boom led to an increase in non-performing loans. Consequently, the financial system was insolvent and in an extremely weak position.

Problems arose when financial institutions became internationally illiquid. Many individual financial institutions became internationally illiquid due to poor lending and borrowing practices that resulted in a mismatch of assets and liabilities in both foreign and domestic currency. Financial institutions that borrowed large quantities of US dollars and subsequently lent them to borrowers who did not have any foreign currency inflows (i.e. the non-tradable sector) put themselves in a situation of international illiquidity; their foreign currency loans were unhedged. The mismatch of assets and liabilities and subsequent balance sheet imbalances of financial institutions is what defines the third generation currency crisis. Had there not been such imbalances on the balance sheets of financial institutions, devaluation may have not caused such an impact in Mexico. Financial institutions could have provided the necessary liquidity to survive the period of high interest rates and recession caused by devaluation and the crisis may not have been nearly as severe or even a crisis at all. The fact that the financial system

¹³⁸ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.20.

was so weak and became illiquid once devaluation occurred proves that the third generation model applies exactly to what had occurred in Mexico.

Once the authorities realized that international reserves would not cover outstanding short-term debt and the current system was unsustainable, devaluation occurred and a third generation currency crisis had occurred.

→Exchange Rate Management

Mexico had been initially successful with its exchange rate policy. The system of a preannounced devaluation and then the exchange rate band with a sliding ceiling worked effectively at reducing inflation from levels of over 100 percent. Combined with the Pacto it appeared as though Mexico was following the perfect exchange rate policy to reduce inflation, instill credibility and establish stability in the economy. The flaw with the exchange rate policy was rooted in real exchange rate overvaluation.

It was not unknown to authorities that the real exchange rate was becoming overvalued, it frequently happens with a nominal anchor exchange rate policy. The problem was that the authorities did not recognize the severity of the overvaluation. In 1994, Guillermo Ortiz working under the Secretary of Finance argued whether there was a situation of overvaluation “depended on the equilibrium real exchange rate... The appreciation process is natural, and not necessarily a negative consequence of the reform process in Mexico”¹³⁹. This demonstrates that the authorities knew about overvaluation

¹³⁹ Edwards, Sebastian. “The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?”. NBER Working Paper 6334, December 1997, p.12.

but believed it was natural and would return to normal levels with time.

As was shown, overvaluation led to a large current account deficit (peaking at 7 percent of GDP) and this required large capital inflows. The financial system was going through a process of liberalization and reforms and was not nearly experienced or developed enough to handle large flows of mostly short-term and volatile capital. When internal shocks hit Mexico in 1994 the combination of waning confidence in the exchange rate policy and the weak financial system led to the currency crisis and subsequently to the financial crisis.

Failure to recognize the real exchange rate appreciation and subsequent overvaluation was the major mistake of the authorities. At a time when the financial system was weak this overvaluation should have been avoided.

The best strategy for Mexico would have been devaluation or a change of exchange rate policy prior to 1994. Devaluation at a faster pace (possibly reflecting the real overvaluation) or movement towards more flexibility (a free float) when reserves were still high (US \$27 billion in January 1994) and credibility still existed; accompanied by clear macroeconomic strategies to calm investors could have worked. Once inflation was reduced and reforms were underway, there appeared to be no need for such a rigid exchange rate regime. Dornbusch claimed in 1992 that “the current problem with the Mexican economy is the overvalued exchange rate” and subsequently recommended that the rate of devaluation should be tripled to 120 cents per day¹⁴⁰. A higher pace of devaluation as early as 1992 could have been very successful, instead authorities held on to their current policy and eventually left themselves with no other policy option but

¹⁴⁰ Edwards, Sebastian. “The Mexican Peso Crisis: How Much Did We Know? When Did We Know It?”. NBER Working Paper 6334, December 1997, p.11.

devaluation with very little foreign exchange reserves.

Another policy option was to allow domestic interest rates to rise. This was considered after the assassination of the presidential candidate Luis Donaldo Colosio. The unease caused by assassination combined with rising external interest rates (the United States was raising interest rates to slow their over-heating economy) was making investment in Mexico increasingly unattractive. At the time this policy option was denied because authorities did not want to cause recession with elections looming and more critically because the financial system was weak. A rise in interest rates would have put pressure on borrowers to service their debts because, as previously noted loan portfolios were already weak. This could have pushed financial institutions towards insolvency and illiquidity. If widespread enough systemic financial distress may have resulted and then eventual financial crisis. Miguel Hakim recommended that a rise in interest rates be accompanied by subsidization of the banking system¹⁴¹. This could have been accomplished by the authorities issuing domestic bonds through the Banco de Mexico to financial institutions and effectively re-capitalizing them. Providing liquidity to distressed financial institutions during the interest rate increase could have avoided financial crisis while raising foreign reserves as investment in Mexico would become more attractive. As has been show the authorities decided instead to substitute Tesobonos for Cetes, which eventually lead to international illiquidity.

The fact that elections were on the horizon was a definite factor in the authority's decision to avoid any change of policy. The financial system was weak and recession would have increased non-performing loans, bringing the financial system closer to

¹⁴¹ Popiel, Paul A. "Management of Financial Systems and of Financial Crises", Volume 2, Carleton University, Fall 2005, p.26.

distress and potentially crisis. Regardless of this, it would have been wiser to choose the correct exchange rate policy early for long run success; Mexico had just joined NAFTA and future economic prospects were bright regardless of a short term recession that would most likely have resulted from exchange rate devaluation or interest rate hikes.

Interestingly, the authorities not only chose to maintain the current exchange rate policy but they accompanied it with monetary policy that was completely unsustainable.

External interest rates were rising and yet the authorities allowed domestic interest to fall for fear of hurting the weak banking sector.

Credibility is a recurrent theme with any exchange rate policy. Mexico had established credibility with the international community throughout the reform process and investors thought favorably of Mexico right up to 1994. Internal shocks definitely played a role in damaging the credibility in Mexico but ultimately it was ruined by weak policy choices by the authorities. In response to real overvaluation there were many potential policy options: a faster rate of devaluation reflecting the real exchange rate overvaluation, movement to a free float, or allowing interest rates to rise. Instead the authorities chose to issue Tesobonos which, as previously shown, lead to international illiquidity. The authorities then had to devalue and many investors lost large amounts of capital. The international community felt betrayed by Mexico and credibility was destroyed. Had the financial system been robust, the loss of credibility and currency crisis may have been weathered by financial institutions providing liquidity until credibility was regained and the economy back on track. As noted, the financial system was extremely fragile and therefore loss of credibility and subsequent currency crisis had disastrous effects. Credibility is the key to steady exchange rate management; once this

is lost the economy becomes extremely volatile and subject to international investor speculation.

→Financial System Management

As previously noted the collapse of the peso exposed the weaknesses of the financial system and caused financial crisis. It has been asked, could the financial crisis have been avoided or at least its severity reduced? The answer is yes, had financial reforms been more complete the financial system would have been in a much better position to absorb shocks. Due to the weakness of the financial reforms a credit boom occurred and put the financial system in a precarious position. Financial system management went wrong from the beginning with improper privatization and only got worse as the legal, regulatory, and prudential framework was improperly reformed.

As discussed in Chapter 8, the privatization process was poorly managed. This was the first mistake in terms of financial system management. Privatization resulted in undercapitalized financial institutions with poor loan portfolios and inexperienced management. Had privatization been undertaken more carefully the financial system may have been in a stronger position as currency crisis ensued. Poor privatization became even more of a concern when combined with an inadequate legal, regulatory, and prudential framework, as will be discussed next.

The legal, regulatory, and prudential framework was inadequately reformed, as outlined in Chapter 8. This included: poor loan classification and accounting and information standards, a lack of information sharing, inefficient bankruptcy law, no exit

mechanism for distressed banks, and insufficient capital requirements. Each component mentioned was inadequately reformed and combined with the aforementioned lax supervision; the financial system was in no position to withstand major shocks such as devaluation of the peso and the ensuing rise in interest rates as well as recession. Had the framework been carefully and properly reformed to adequately adapt to the newly privatized financial system, the credit boom and subsequent increase in non-performing loans would not have occurred. Given the currency crisis, the financial system may have withstood the shock because there would not have existed imbalances on financial institutions balance sheets.

The financial system was improperly managed from the beginning, starting with flaws in the privatization process and then inadequate reforms to the legal, regulatory, and prudential framework. All of this combined with lax supervision and an overall lack of experienced personnel in the financial system meant that the financial system was not robust. The result was a credit boom which further damaged financial institutions already weak balance sheets. The mismatch of assets and liabilities in both domestic and foreign currency can be attributed directly to mismanagement of the financial system. It was ultimately this imbalance that led to financial crisis when the peso devalued. Had the system been adequately managed the currency crisis may not have transmitted into such a severe financial crisis, the shock would have been absorbed and Mexico may have come out of the crisis sooner.

→Closing Comments

Mexico should be used as a warning to any country using exchange rate management to guide inflation and create stability at a time of financial liberalization. The key to any such policy will always be *credibility*. Regardless of the policy chosen credibility must be maintained. As was seen with Mexico, when investors get nervous and question credibility of the parity announced by the authorities a withdrawal of capital can have disastrous effects. Like any crisis, in hindsight it is easy to recommend what should have been done. I have recommended alternatives but they are simply suggestions based upon observations and theory. What the correct policy choice should have been will never be known exactly, it can only be hypothesized.

Table 1: Alternative Exchange Rate Regimes

| Regime | Main Features | Main Benefits | Main Shortcomings | Key episodes / Comments |
|---|--|---|---|--|
| 1. Free Float | <ul style="list-style-type: none"> -Value of foreign exchange freely determined in the market. Actual and expected changes in demand/supply of assets and goods reflected in exchange rate changes. | <ul style="list-style-type: none"> -Changes in nominal exchange rate shoulder bulk of adjustment to foreign and domestic shocks. -High international reserves not required. | <ul style="list-style-type: none"> -High nominal (and real) exchange rate volatility may distort resource allocation. -Monetary policy needs to be framed in terms of nominal anchors different from the exchange rate; scope for discretion and inflation bias may be large. | <ul style="list-style-type: none"> -Virtually no country has a pure float. The United States, Germany, Switzerland (with Japan, according to some) come close. |
| 2. "Dirty" Float | <ul style="list-style-type: none"> -Sporadic central bank interventions in foreign exchange market. Modes and frequency of intervention vary, as do the objectives guiding the intervention. -Active intervention (sterilized and non-sterilized) results in changes in international reserves. Indirect intervention (through changes in interest rates, liquidity and other financial instruments) does not result in changes in reserves. | <ul style="list-style-type: none"> -Same as in a free float, except that higher international reserves may be needed. -Dampens "excessive" fluctuations of exchange rates. | <ul style="list-style-type: none"> -Lack of transparency of central bank behavior may introduce too much uncertainty. -Effects of intervention are typically short-lived (even when intended as a signal) and may be destabilizing. -A dirty float could be thought of as a managed float with wide bands, with the (undisclosed) position of the bands providing the criterion for intervention. | <ul style="list-style-type: none"> -Many advanced economies have adopted this regime—Canada, Australia (Japan, according to others). -Mexico adopted a system similar to this following the 1994-95 crisis. |
| 3. Floating within a Band (Target zone) | <ul style="list-style-type: none"> -The nominal exchange rate is allowed to fluctuate (somewhat freely) within a band. The center of the band is a <i>fixed rate</i>, either in terms of one currency or of a basket of currencies. The width of the band varies (in the ERM it was originally = 2.25 percent). -Some band systems are the result of cooperative arrangements, others are unilateral. | <ul style="list-style-type: none"> -System combines the benefits of some flexibility with some credibility. -Key parameters (bands, mid-point) help guide the public's expectations. -Changes in the nominal rate within the bands help absorb shocks to fundamentals. | <ul style="list-style-type: none"> -In some cases (especially when the band is too narrow and when domestic macro policies are not consistent with a "horizontal" band) the system can be destabilizing and prone to speculative attacks. -Selecting the width of the band is not trivial. -Systems that allow for the possibility of realignment of the bands and central parity weaken the credibility afforded by the regime. | <ul style="list-style-type: none"> -The Exchange Rate Mechanism of the European Monetary System is the best known example of this type of regime. -The ERM crises of 1992-93 showed clearly that the system can be subjected to severe speculative pressures, and even collapse, when currencies become misaligned and central banks are hesitant to defend the bands. |
| 4. Sliding Band | <ul style="list-style-type: none"> -There is no commitment by the authorities to maintain the central parity "indefinitely". Instead, it is clear at the outset that the central parity will be adjusted periodically (e.g., due to competitiveness considerations). -The system is an adaptation of the band regime to the case of high-inflation economies. | <ul style="list-style-type: none"> -The system allows countries with an ongoing rate of inflation higher than world inflation to adopt a band without having to experience a severe real appreciation. | <ul style="list-style-type: none"> -The fact that the timing and size of central parity adjustments are unknown, introduces considerable uncertainty, which often leads to high interest rate volatility. -As in the case of the standard band system, it is difficult to choose the appropriate width for the band. | <ul style="list-style-type: none"> -Iceland had a system similar to this from early 1989 to December 1991. -The uncertainty and volatility associated with this system makes it less attractive than other alternatives, such as the crawling band. |
| 5. Crawling Band | <ul style="list-style-type: none"> -A band system whereby the central parity crawls over time. -Different rules can be used to determine the rate of crawl. The two most common are: backward-looking crawl (e.g., based on past inflation differentials), and forward-looking crawl (e.g., based on the expected, or target, rate of inflation). | <ul style="list-style-type: none"> -System allows high inflation countries to adopt a band system without having to undertake (large) stepwise adjustments of the central parity. | <ul style="list-style-type: none"> -Choosing the criteria for setting the rate of crawl entails serious risks. A backward-looking approach can introduce considerable inflationary inertia into the system. A forward-looking approach that sets the "wrong" inflation target can produce overvaluation and give rise to speculative pressures. | <ul style="list-style-type: none"> -Iceland adopted this system in December 1991. Chile had a widening band system from 1986 to mid-1998. Italy also had, effectively, a system of this type between 1979 and 1991. |

Table 1 (Concluded). Alternative Exchange Rate Regimes

| Regime | Main Features | Main Benefits | Main Shortcomings | Key Episodes/Comments |
|---------------------------------------|--|---|--|--|
| 6. Crawling peg | <ul style="list-style-type: none"> -The nominal exchange rate is adjusted periodically according to a set of indicators (usually lagged inflation differentials) and is not allowed the flexibility beyond a narrow range (say, two percent). -One variant of the system consists of adjusting the nominal rate by a pre-announced rate set deliberately below ongoing inflation (variant known as a "tablita" regime). | <ul style="list-style-type: none"> -Allows high-inflation countries to avoid severe real exchange rate overvaluation. -The "tablita" variant helps to guide the public's expectations, and buys a limited amount of credibility. | <ul style="list-style-type: none"> -A pure backward-looking crawling peg (where the nominal rate is mechanically adjusted according to past inflation differentials) introduces inflationary inertia and may eventually cause monetary policy to lose its role as nominal anchor. -Equilibrium changes in the real exchange rate are difficult to accommodate. -A "tablita" system will not last if fiscal and incomes policies are not supportive. | <ul style="list-style-type: none"> -This system became popular in the 1960s and 1970s in Chile, Colombia and Brazil. It had its longer running in Colombia, which to this date has a high degree of inflationary inertia. |
| 7. Fixed-but-adjustable exchange rate | <ul style="list-style-type: none"> -The regime epitomized by the Bretton Woods system. The nominal exchange rate is fixed, but the central bank is not obliged to maintain the parity indefinitely. No tight constraints are imposed on the monetary and fiscal authorities, who can follow, if they so decide, policies that are inconsistent with preserving the parity. -Adjustments of the parity (devaluations) are a powerful policy instrument. | <ul style="list-style-type: none"> -Provides macroeconomic discipline by maintaining (tradable good prices) in line with foreign prices in a context of relatively low uncertainty -The built-in "escape clause" (which allows the authorities to devalue in case of need) provides the system with some flexibility. | <ul style="list-style-type: none"> -Realignments (devaluations) under this system have typically been large and disruptive (introducing uncertainty and inflationary pressures) rather than smooth and orderly events. -If supplemented by the right institutions (e.g., an independent central bank) the time inconsistency problems embedded in the system could be attenuated. | <ul style="list-style-type: none"> -The most popular regime of this century. Most developing countries held on to (variants of) it after the formal collapse of the Bretton Woods agreement in 1973. -Many emerging countries continue to subscribe to this system de facto (e.g., Mexico 1993-93, Thailand, 1997), if not de jure. |
| 8. Currency board | <ul style="list-style-type: none"> -Strict fixed exchange rate system, with institutional (legal, and even constitutional) constraints on monetary policy and no scope for altering the parity. -The monetary authority only can issue domestic money when it is fully backed by inflows of foreign exchange. | <ul style="list-style-type: none"> -The system maximizes credibility and reduces (eliminates) problems of "time inconsistency". | <ul style="list-style-type: none"> -The system is long on credibility but short on flexibility. Large external shocks cannot be accommodated through exchange rate changes but have to be fully absorbed by changes in unemployment and economic activity. -The central bank loses its role as lender of last resort. | <ul style="list-style-type: none"> -Historically, a number of small countries have had systems of this type. Some of them, however, have not been successful. When faced with major external shocks, countries have been forced to abandon the regime. -Currently, Hong Kong and Estonia have currency boards. Argentina and Bulgaria have (quasi)-currency boards arrangements. |
| 9. Full 'dollarization' | <ul style="list-style-type: none"> -Generic name given to an extreme form of a currency board system where the country gives up completely its monetary autonomy by adopting another country's currency. | <ul style="list-style-type: none"> -Credibility is maximized under this regime. Monetary authorities have, in theory, no scope for "surprising" the public. | <ul style="list-style-type: none"> -As in the currency board, the system is long on credibility but short on flexibility. Adverse external shocks have to be absorbed fully by the real economy. -The central bank loses its role as lender of last resort. -A non trivial shortcoming of this system is that it is usually resisted on political and nationalistic grounds. Another one, is that the rules of the game can be changed under extreme circumstances. | <ul style="list-style-type: none"> There are few historical episodes of full dollarization. A regime similar to this has worked relatively well in Panama. However, the case of Liberia unmasked a serious shortcoming of this type of system: when faced with an emergency (civil war) politicians decided to change the ruler of the game and issued a national currency. |

-Source: Edwards, Sebastian, and Savastano, Miguel A. "Exchange Rates in Emerging Economies: What Do We Know? What Do We Need to Know?". NBER Working Paper 7228, July 1999, p.6-7.

Table 2: Mexico Macro Indicators

| | Growth (%) | Inflation (%) | Fiscal Surplus (% of GDP) | RER | Current Account | Reserves (Millions \$US) |
|------|------------|---------------|---------------------------|-------|-----------------|--------------------------|
| 1991 | 4.17 | 22.7 | 2.9 | 103.8 | -5.13 | 17726 |
| 1992 | 3.59 | 15.48 | 2.9 | 111.6 | -7.31 | 18942 |
| 1993 | 2.00 | 9.74 | 2.1 | 120.8 | -5.81 | 25110 |
| 1994 | 4.44 | 6.95 | 0.5 | 97.7 | -6.98 | 6278 |
| 1995 | -6.13 | 35.00 | | 101.7 | -0.23 | 16847 |

Note: An increase in the RER denotes real appreciation

-Source: Chang, Roberto and Velasco, Andres, "The Asian Liquidity Crisis", Federal Reserve Bank of Atlanta, Working Paper 98-11, July 1998, p. 50.

Table 3: Macroeconomic Indicators, 1989 to 1996

| Item | 1989 | 1990 | 1991 | 1992 | 1993 |
|---|-------------|-------------|-------------|-------------|-------------|
| GDP | | | | | |
| 1980 base year | 3.3 | 4.5 | 3.6 | 2.8 | 0.6 |
| 1993 base year | 4.2 | 5.1 | 4.2 | 3.6 | 2.0 |
| Consumption (1993 base year) | | | | | |
| Private | 7.3 | 6.4 | 4.7 | 4.7 | 1.5 |
| Public | 2.2 | 3.3 | 5.4 | 1.9 | 2.4 |
| Investment (1993 base year) | | | | | |
| Private | 5.3 | 13.8 | 14.5 | 15.0 | -3.3 |
| Public | 7.1 | 11.2 | 0.6 | -3.3 | 0.4 |
| Primary government surplus (percent of GDP) | 8.3 | 8.0 | 5.5 | 5.9 | 3.3 |
| Economic Balance (percent of GDP) | -5.0 | -2.8 | -0.5 | 1.6 | 0.7 |
| Current account deficit (percent of GDP) | -2.8 | -3.0 | -5.1 | -7.4 | -5.8 |
| Balance of Trade (percent of GDP) | 0.2 | -0.4 | -2.5 | -4.8 | -3.3 |
| External Debt (percent of GDP) | 46.1 | 42.7 | 40.6 | 35.7 | 32.7 |
| Credit to private sector (percent of GDP) | 18.8 | 22.7 | 28.5 | 36.0 | 41.1 |
| Inflation (annual growth rate) | | | | | |
| Consumer Prices Annual Average | 20.0 | 26.7 | 22.7 | 15.5 | 9.8 |
| Real Exchange Rate (1980=100) | 83.6 | 83.2 | 91.2 | 96.9 | 103.2 |
| Real Interest Rate on one-month CETES (percent) | 33.9 | 17.3 | 4.4 | 1.6 | 7.0 |

| Item | 1994 | 1995 | 1996 | 1997 | Average Growth (1989-94) |
|--|-------------|-------------|-------------|-------------|-------------------------------------|
| GDP | | | | | |
| 1980 base year | 3.5 | -6.9 | Na | Na | 3.0 |
| 1993 base year | 4.5 | -6.2 | 5.2 | 7.0 | 3.9 |
| Consumption (1993 base year) | | | | | |
| Private | 4.6 | -9.5 | 2.2 | 6.3 | 4.8 |
| Public | 2.9 | -1.3 | -0.7 | 1.8 | 3.0 |
| Investment (1993 base year) | | | | | |
| Private | 9.8 | -31.2 | 15.3 | 25.7 | 9.0 |
| Public | 2.9 | -19.8 | 20.3 | 4.3 | 3.0 |
| Primary government surplus (percent of GDP) | 2.1 | 4.7 | 4.4 | 3.5 | 5.5 |
| Economic Balance (percent of GDP) | -0.1 | 0.0 | 0.0 | -0.8 | -0.1 |
| Current account deficit (percent of GDP) | -7.1 | -0.6 | -0.6 | -1.9 | -5.2 |
| Balance of Trade (percent of GDP) | -4.4 | 2.5 | 2.0 | 0.2 | |
| External Debt (percent of GDP) | 33.8 | 59.3 | 50.7 | 38.4 | 38.6 |
| Credit to private sector (percent of GDP) | 52.2 | 41.0 | Na | Na | 33.2 |
| Inflation (annual growth rate) | | | | | |
| Consumer Prices Annual Average | 7.0 | 35.0 | 34.4 | 20.6 | 17.0 |
| Real Exchange Rate (1980=100) | 97.2 | 60.0 | 62.2 | Na | Na |
| Real Interest Rate on one-month CETES (percent) | 6.6 | 4.0 | 9.4 | 5.2 | 11.3 |

Note: An increase in the Real Exchange Rate denotes real appreciation

Sources: Information from the Banco de Mexico website was downloaded on July 23rd, 1997; for 1997 figures, downloaded May 20th, 1998. The figures for 1997 are preliminary.

-Source: Lustig, Nora, "The Remaking of an Economy", Second Edition, Brookings Institution Press, Washington D.C. 1998, p.144-145

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