

**CREDIBILITY AND BUSINESS CYCLES
IN EXCHANGE RATE BASED
STABILIZATION PROGRAMMES**

by

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ABSTRACT

Differently from orthodox stabilization programmes, exchange rate based stabilization programmes (ERBS) show a peculiar cycle. Output, growth and consumption rise from the onset and there is a huge current account deficit. Since several programmes have been accompanied by huge capital inflows, the economic cycle is known as the capital inflows problem.

The economic literature has identified the capital inflows problem with a situation where there is not fiscal adjustment or people do not believe in the programme (see chapter two). However, chapter one of this thesis shows that the cycle has been observed in successful and consistent programmes (Argentina 1991- , Bolivia 1985- , Israel 1985- and México 1987-1994). It has been also observed in absence of capital inflows (México 1988). Furthermore, some of its negatives consequences (eg balance of payments crises) have occurred in programmes under fiscal adjustment. These observations deserve an explanation.

Chapter two makes a review of the literature about the economic effects of ERBS.

Chapter three questions why successful ERBS have observed increases in long run growth and/or output from the onset and also the symptoms of the capital inflows problem (higher consumption, current account deficits). To answer the question, the chapter sets a growth model in a cash in advance economy. The main results are that sluggish disinflation can increase the long run growth and definitely increases the long run output of the economy. However, it cannot explain the symptoms of the capital inflows problem by itself. When the model is extended to

capture some externalities, then it suggests that the structural policies accompanying successful ERBS are responsible of higher consumption and current account deficits. In those cases, that situation is not a problem.

Chapter four questions why the symptoms of the capital inflows problem may appear in absence of capital inflows. The answer is that these symptoms emerge when there is lack of credibility and the monetary policy is accommodative. In this context, actual fiscal policy is irrelevant to combat the problem if it cannot change expectations of future inflation. Monetary policy is effective but often produces huge fiscal costs since real interest rates have to rise considerably. When the actual fiscal deficit increases the future expected inflation, tight monetary policy may generate a perverse effect fuelling the symptoms of the problem.

Chapter five questions why ERBS that apparently are consistent may be subject to the capital inflows problem and eventually to balance of payments crises. Political factors are responsible of this situation. The chapter sets a model that resembles the Mexican political system. Actual government chooses its successor. The former has incentives to choose a future candidate with preferences for high inflation. People, forecasting this possibility, consumes more in periods of low inflation. That generates the capital inflows problem.

Chapter six concludes.

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TO ANGELES AND ISABEL

UNIT ONE: INTRODUCTION AND BACKGROUND

GENERAL INTRODUCTION

In its first part, this introduction explains the origins of exchange rate based stabilization programmes (ERBS) and the emergence of the so-called capital inflows problem. The second section addresses the objectives, methodology and organisation of the thesis.

ORIGINS OF EXCHANGE RATE BASED STABILIZATION PROGRAMMES AND THE CAPITAL INFLOWS PROBLEM

Academic and popular voices consider inflation as one of the most harmful economic problems. The consequences of increasing prices are the disruption of information on markets¹ and reductions on the capital stock and growth². It is also important to consider changes in the distribution of income (Taylor (1991)) and the emergence of an inefficient tax (Friedman (1968)), only to mention some of the most known arguments.

But if inflation has huge associated costs, its reduction also generates problems. Combatting inflation has been related to the emergence of unemployment. The reasons for this phenomenon are inertial factors and price inflexibility downwards³.

Several empirical studies⁴ find traditional Phillips curves in the short run. This relation is clear when inflation is moderate (around 20-30%. See Dornbusch and Fischer (1991)) and economic policy reduces it to low levels. For very

¹Fischer (1986), Fischer and Modigliani (1978)

²Stockman (1981), Hung (1993)

³See for example Taylor (1979) (1980) or Chadha, Masson and Meredith (1991) for the inertial factors and Dornbusch (1976), Buitier and Miller (1985) for price inflexibility downwards.

⁴Gordon (1982), Kiguel and Liviatan (1988)

high inflation the costs of stabilization are smaller.⁵ Phillips curves in open economies are related to the exchange rate regime. In many Latin American countries there have been chronic inflation episodes. The rate of growth of prices is high but stable⁶. Disinflation policies using the public deficit or money as main instruments have produced unemployment (Kiguel and Liviatan (1988)). A clear example is México in 1983 and 1995. After balance of payments crises, traditional stabilization programmes generated big recessions.

Because of the costs of disinflation, several countries decided to carry out different stabilization programmes. In the late seventies, Argentina, Uruguay and Chile adopted the exchange rate as the main instrument to reduce inflation. Before, other countries had maintained fixed exchange rates to preserve price stability.⁷

Among all, Latin American countries are perhaps the most viable economies to manage the exchange rate. They are very open economies and their volumes of trade with The United States are enormous.

In the late seventies, policy makers thought that the law of one price (purchasing power parity proposition PPP) would always prevail. Fixing or managing the exchange rate

⁵Sargent (1982) shows negligible costs of disinflation in the hyperinflation episodes of the 1920's. Sachs (1986) (1987) reports similar results for the Bolivian stabilization programme in 1985. According to Bruno (1993) and Buiter and Miller (1985), the absence of high costs of stabilization under high inflation is related to the short period of contracts. All inertial factors disappear and the dichotomy between the real and monetary sectors reappears (see Bruno (1991)).

⁶Between 100% and 200% see Bruno (1993), Dornbusch and Fischer (1991) and Pazos (1972)

⁷ During 1954-1976 the Mexican peso was pegged to the US dollar at the fixed rate of 12.5 pesos/dollar. Central American countries also had fixed parities to the US dollar (see Edwards (1995a)).

would be analogous to manage the rate of inflation itself. The new stabilization strategy through the exchange rate in Latin America produced different results to traditional programmes⁸. Argentina, Uruguay and Chile did not show an initial recession but an expansion. The current account became a deficit.⁹ The real exchange rate appreciated considerably, showing to the PPP advocates they were wrong (see Dornbusch (1982)).

The most surprising result of the new programmes was the inflow of considerable amounts of foreign capital. They could finance not only the growing current account deficit, but also an accumulation of international reserves.¹⁰

Though the initial effects of the exchange rate based stabilization programmes (ERBS) were positive, after two or three years the economies under consideration started showing negative signs. The real appreciation reduced competitiveness. Growth fell and banks, who initially had lend huge amounts of money, were unable to recover their loans. Several authors talked about a new problem. Carlos Diaz Alejandro (1981) gave it a name: the peso problem. Later, Guillermo Calvo (1983) renamed it as the capital inflows problem.

It is not possible to find a clear definition of this problem. Its main characteristics are loss of competitiveness and a current account deficit that weakens the external position of the country. The symptoms are similar to the so-called dutch disease.¹¹ Nonetheless, this time the apparent cause of the problem is not the rise in

⁸see Kiguel and Liviatan (1992)

⁹Very huge in Chile: 14% of GDP in 1982.

¹⁰ Between the end of 1976 and the end of 1980, central bank reserves rose from 1.8 to 7.7 billion dollars in Argentina (Calvo (1983), Obstfeld (1985)). A similar process occurred in Chile and Uruguay.

¹¹See Buiters and Purvis (1990) and van Wijnbergen (1984).

some important export product, but the financial inflows of foreign capital associated to an ERBS.

The described phenomenon in Latin America was not completely new. McKinnon and Pill (1996) report several examples across the world with similar features. By the time Argentina, Chile and Uruguay started their programmes (1978-1979), México was also under an ERBS. This country faced also similar problems: a current account deficit, a real appreciation of the exchange rate and expansions of the GDP. However, in México private capital inflows were not very important at that time.

The final result of the first ERBS, including México 1976-1982, was a balance of payments crisis. Afterwards, the rate of inflation increased even above the levels preceding the programmes.

In the late eighties and early nineties, other ERBS started. In 1985 Argentina, Brazil and Israel carried out stabilization policies through the exchange rate. Bolivia also set up a strategy to combat the hyperinflation.¹² At the end of 1987 México adopted an ERBS. Since 1991 Argentina again fights inflation through the exchange rate.

These new programmes showed again the symptoms of the capital inflows problem: current account deficits, real exchange rate appreciations and GDP expansions. Capital inflows have been important in some cases but not in all of them, or at least not always.

There have been important differences in the outcomes of the latest programmes. At least Bolivia, Israel and Argentina (since 1991) have been successful ERBS. México faced a balance of payments crisis in 1994 but apparently the stabilization programme broke a flat profile of GDP in

¹²Chapter 1 shows that the Bolivian stabilization programme can be considered an ERBS in many respects.

the eighties. Argentina in 1985- and other intents afterwards- and Brazil failed and had similar results to the first ERBS.

An interesting observation of the outcomes in ERBS is the diversity in the results and the common factors of all the programmes. The capital inflows problem has appeared often. However, not always has been a severe problem. Fiscal adjustment has been absent in many failed programmes, but not in all of them. During the stabilization programme, Chile and México adjusted their public finances. The experiments collapsed anyway. Real interest rates fell in the initial programmes (see Dornbusch (1982), Rodriguez (1982)). In the following programmes real interest rates increased (see Agénor (1994b)).

The experiences of successful programmes suggest that the capital inflows problem is not necessarily a problem. The presence of similar symptoms in episodes where there are not private capital inflows, indicates that they are not crucial to produce the problem.¹³

After this brief explanation, we offer an new definition of the capital inflow problem:

It is a situation where ERBS produce current account deficits, real exchange rate appreciations and GDP expansions. Many - not all- of these episodes are accompanied by huge private capital inflows. Some of them - again not all- finish with balance of payments crises and renewed inflation.

¹³Ades, Kiguel and Liviatan (1993) show that Denmark in the eighties was also a successful ERBS. The programme showed also the capital inflows problem.

OBJECTIVES, METHODOLOGY AND ORGANISATION

The main objective of this thesis is to answer some questions related to the capital inflows problem. It is mainly theoretical work but motivated on empirical observations.

We will follow the methodology suggested by Obstfeld (1985). Rather than being an accurate description of the events in which it is motivated, this thesis sets highly stylized models to look for the causes behind the occurrence of certain phenomena.¹⁴ The models should have two characteristics: a) Be sufficiently general to be useful for explaining other potential cases 2) Have at least some predictive power in the cases in which are motivated.

Objectives

The thesis addresses three specific questions:

Question one: Why do successful ERBS show the symptoms of the capital inflows problem and better performance on long run output or growth or both of them? Is the capital inflows problem indeed a problem in these cases?

Question two: Are capital inflows necessary for the emergence of the capital inflows problem?

¹⁴The exact quotation by Obstfeld (1985 pp. 606) is:
"This paper attempts to explain aspects of the Southern Cone experience by developing a simple intertemporal optimizing framework and using it to study a small open economy's response to a preannounced, gradual disinflation... The framework developed below is highly stylized, and does not pretend to offer a realistic description of Southern Cone economies or an accurate account of events there... The goal of the present work is to elucidate a channel through which capital inflows and real appreciation may occur even if agents have rational expectations, policy is credible and market clearing prevails".

Question three: Why do some countries under ERBS and with public finances in equilibrium or surplus have suffered the capital inflows problem?

Question one is based in the empirical observation of four episodes: Bolivia (1985-), Israel (1985-), Argentina (1991-) and México (1987-1994). All these countries reduced inflation and experienced the capital inflows problem. México faced a balance of payments crisis. However, in all of them the reduction of inflation seems to be associated with a better performance of output and growth relatively to trend.

The empirical motivation of question two is based in the fact that in the 1987-1994 Mexican ERBS all the symptoms of the capital inflows problem started in 1988. However, in that year there were not capital inflows but huge capital outflows.

Finally, the last question is motivated by facts observed in México in the period 1990-1994. During most of the time of the stabilization programme, the government pursued a fiscal adjustment consistent with disinflation. Nevertheless, the capital inflow problem appeared. At the end of 1994 the programme collapsed. Fiscal adjustment has been considered as a key element for the success of ERBS. It is important to answer what other elements produce these cycles and crises and how to avoid them.

Methodology and Organisation

The thesis is divided in three units:

Unit one includes the introduction and background of the thesis. It is composed of this general introduction and

chapters one and two

Chapter one shows the stylized facts already described in general terms in the questions addressed in previous paragraphs.

Chapter two analyses the literature concerning the questions addressed in this introduction. It also discusses what has not been answered about these problems.

Unit two constitutes the extensions and main theoretical and empirical contributions of this thesis. It is composed of chapters three, four and five. These chapters answer questions one, two and three respectively.

Unit three contains the general conclusions of the thesis in chapter six and several appendixes. These may be very important but are left until the end because of their technical difficulty. The theoretical chapters will mention the appendixes emphasizing the importance of their results to answer the questions already addressed.

Once some common elements are considered, the theoretical chapters are self-contained. Therefore, it is possible to read them in an independent way.

The theoretical part of the thesis assumes rational individuals and rational expectations. The analysis starts from the dynamic optimisation approach in continuous time. Consumers and producers have maximising behaviour. All the theoretical chapters assume a cash in advance constraint for consumption goods.

CHAPTER 1: MACROECONOMIC PERFORMANCE IN SOME EXCHANGE RATE BASED STABILIZATION PROGRAMMES.

INTRODUCTION

This chapter presents the facts that motivate the questions already explained in the general introduction. It is descriptive. The intention is to analyse and discuss the facts rather than offering an explanation for them.

The first section of the chapter presents facts showing that in four successful stabilization programmes the reduction of the rate of inflation was correlated with higher growth and output. However, the countries under consideration also showed the symptoms attributed to failed programmes and known as the capital inflows problem.

Second section shows that in the first year of the Mexican stabilization programme 1987-1994 the symptoms of the capital inflows problem appeared. Nonetheless, instead of capital inflows there were capital outflows.

Finally, the third section shows that during 1990-1994, the current account deficit showed an unsustainable trajectory in México. At the end of 1994, the stabilization programme collapsed and then the deepest recession since 1932 took place in 1995. The interesting point is that the process preceding the crisis was accompanied by high international reserves, huge capital inflows and a surplus in the public balance.

1.1.- SOME STYLIZED FACTS OF FOUR SUCCESSFUL ERBS

This section analyses the stylized facts of four countries whose stabilization programmes were successful.

The definition of success obeys two criteria:

- 1) Permanence of low or falling inflation.
- 2) Increasing in the long run output or growth due to the stabilization programme.

1.1.1.- The Chosen Countries

We have chosen four ERBS to analyse their stylized facts: Israel from 1985, Bolivia after the stabilization programme of 1985, Argentina from the last ERBS in 1991 and México after 1987.

Israel is possibly the most representative case. The stabilization programme has lasted for more than ten years. It was conceived and announced as an ERBS. The reduction of inflation has been gradual but now the rate of growth of prices is barely above 10%.

Argentina is a country with a pegged exchange rate since 1991. The success of the programme is considered for the following reasons:

- a) There has been a spectacular increase in output after the stabilization programme started.
- b) The economy faced a recession in 1995. Output growth fell from approximately 7.5% in the four previous years to -4.4% in 1995. Nonetheless this adjustment was enough to reduce the current account deficit almost to zero.

The other two cases: Bolivia and México require further discussion.

The stabilization programme in Bolivia has also lasted for more than ten years. Among the analysed cases, it is the

only one in which there was hyperinflation. The average rate of inflation of the last five years has been below 10%. The reduction in inflation was dramatic and definite. The Bolivian programme has been regarded not as an ERBS, but as an orthodox strategy or MBS (money based stabilization programme). Nevertheless, certain facts suggest that it was much nearer to an ERBS than to an orthodox programme:

- a) There were very important movements in the level of international reserves. For that reason it is difficult to think in this programme as a flexible exchange-rate.
- b) The Bolivian economy showed similar stylized facts to those of Argentina, Israel and México.
- c) The most important fact implying the classification of the Bolivian programme as an ERBS comes out from the analyses of Sachs (1986), Sachs (1987), Morales (1988) and Morales (1991). Not only there was a lot of intervention in the foreign exchange market, but also a mechanism to increase the real money supply almost identical to that of crawling peg regimes (see Obstfeld (1985), Drazen and Helpman (1987) and van Wijnbergen (1988)).¹⁵ Furthermore,

¹⁵In his 1986 paper pp. 30-31 Sachs asserts:

" One of the central policy issues at the end of hyperinflation is how the increase in real money demand should be accommodated. Through domestic credit expansion to the public sector, or the private sector (e.g via rediscounting of private paper), or through foreign reserve inflows through the balance of payments (i.e central bank purchases of foreign exchange at a pegged rate or in a dirty float). The Bolivian government chose the third, and clearly most conservative strategy, of relying on the balance of payments. It was felt that with large Bolivian hoards of U.S. dollars, both in Bolivia and abroad, there was sufficient availability of foreign exchange holdings in private sector hands to provide the basis for the needed expansion of the domestic money supply."

In his 1991 paper pp 22, Morales says:

" The above description shows that the central bank has several ways of intervening in the *bolsín*, while preserving its image as a market mechanism. A few weeks ago after the system was implemented, the difference between the official

Sachs (1986) presents a model for the Bolivian case in which there is PPP and the government fixes the exchange rate to reduce inflation!

Among the four programmes, the ERBS of México in the period 1987-1994 is the one that can be considered successful only with great difficulty. The programme lasted seven years and had very positive results during the first four. In the following two years, output growth fell and at the end of 1994 there was a balance of payments crisis. 1995 was the year of the deepest recession since 1932 (7% of reduction in GDP).

However, there is an argument that probably contains what is needed to classify the Mexican programme as successful. The ERBS of 1988-1994 broke the negative trend of growth of the eighties.¹⁶

exchange rate and the floor price narrowed to almost nothing, except occasionally. In the rare cases of speculative attacks against the boliviano, the central bank discretely increased the amount supply in the auction in order to align the bid prices with the floor price. Symmetrically, in even more rare cases, the central bank reduced the amount supplied to the auction, to devalue in discrete steps."

The *bolsín* was an auction of U.S dollars. the boliviano was the new currency introduced in Bolivia just after the programme started.

¹⁶During the period 1982-1987 total GDP growth was near to zero (actually negative). With a rate of growth of population around 2%, per capita output fell by more than 12%. Between 1988-1995 total GDP growth was around 12%, even considering the severe recession of 1995. In 1996, inflation fell again and the rate of growth of the whole year was 5.2%. The recovery has been quite fast. On average, the impact of the ERBS in output was positive.

1.1.2.-The Origins of Inflation in the Analysed ERBS.

The economies under consideration are very different (see table 1.1). Israel is a rich country. Bolivia, with per capita income of 800 US dollars per year, is a poor country. They have also experienced different rates of inflation. Table 1.1 shows the maximum and the minimum rates of inflation of the last 20 years. México did not experience a high inflation episode, relatively speaking. Nonetheless, and except the case of Argentina, all of them are very open economies. Table 1.1 shows their share of trade as a percentage of GDP.

TABLE 1.1 General Indicators of Selected Countries

	Argentina	Israel	Mexico	Bolivia
GDP per capita (US d1ls)	8174	12365	3968	795
Average Trade (%GDP)	11	50	23	26
Average rate of growth high inflation period	0.2	2.7	0	-3.1
Average rate of growth after the programme	7.7	4.7	2.7	1.9
Maximum inflation in twenty years	2313	372	130	11750
Minimum inflation after the programme	4.3	11	6.9	8.5

Sources: International Financial Statistics (IMF)

Country Reports: Economic Intelligence Unit

The emergence of high inflation and hyperinflation in these countries had different reasons in each case:

Israel was exposed to external shocks in the late seventies because of the increase in the prices of oil and other raw materials. Backward indexation of wages and accommodative policies transformed a negative shock in the aggregate supply in an inflation spiral (see Bruno (1993), Bruno and Fischer (1986) and Liviatan and Pitterman (1986)).

In Argentina, high public deficits financed with external debt in the seventies, a weak position of the government to strengthen the public finances, and a relatively strong position of some unions to maintain high real wages, produced very high inflation episodes since 1975¹⁷. Fiscal accounts were never balanced (see for example Kiguel and Liviatan (1994)), implying several failed stabilization plans in the late seventies and in the eighties.¹⁸

The reason for the Bolivian hyperinflation may be found in two types of problems: first, as in Argentina, there was a fiscal imbalance covered by external debt. Second, the country is very sensitive to movements of the prices of its main exports: tin, natural gas and cocaine (illegal). In the middle eighties the price of these three products fell. Also, financial restrictions stopped the possibility of further indebtedness. Strong devaluations and a high inflation tax were necessary to cover the imbalances and debt overhang.¹⁹

¹⁷see Canavese and Di Tella (1988), De Gregorio (1991), Fernández (1991) and Machinea and Fanelli (1988)

¹⁸See Canavese and Di Tella (1988), De Gregorio (1991) Dornbusch (1982), Fernández (1991), Heymann (1987) (1991), Rodríguez (1988).

¹⁹See Maiken (1988), Morales (1988) (1991), Ramos (1988), Sachs (1986), Sachs (1987)

México is also a country in which the origins of inflation are found in high external indebtedness in the seventies. The policy of those years was to expand the aggregate demand through government expenditure financed with external debt. The government believed in a future permanent rise in the oil prices (the main export of the country) and a permanent reduction of the international interest rate. However, these variables changed in the opposite direction since 1981.²⁰

In 1982 the Mexican economy faced sharp devaluations. The government suspended the payment of its international obligations for a while. There was a significant reduction in the public deficit. Nonetheless, it was insufficient to pay huge amounts of principal of the foreign debt, as well as to finance a rise in international reserves necessary to avoid speculative attacks. The government then resorted in the inflation tax to cover the fiscal imbalance.

1.1.3.-Common and Different Factors of the Analysed ERBS

Except the case of Bolivia, the stabilization plans of the analysed economies were announced as ERBS. In all of them there were several common economic consequences and characteristics:

a) Immediately after the implementation of the ERBS in Argentina, there was a significant change in the output growth relatively to trend. A similar phenomenon happened in the other countries with a small lag (no more than one year and a half. See chart 1.1 in which the vertical line shows the beginning of the ERBS).

The cases of Bolivia, México and Argentina are the most significant:

In the period 1980-1984 the average rate of growth of

²⁰See Aspe (1992)(1993), Aspe and Córdoba (1984), Bazdresh and Levy (1991), Gil Díaz (1984), Gil Díaz and Ramos Tercero (1988), Ortiz (1985), Ortiz (1991)

Bolivia was -3.12%. GDP continued falling in 1985, date in which the stabilization plan started, and 1986. Afterwards there was a sharp increase in this variable. The average growth rate of the economy during the period 1985-1991 was 1.93%. It is significant that growth accelerated quite rapidly, in such a way that in 1991 it reached 4.5%.

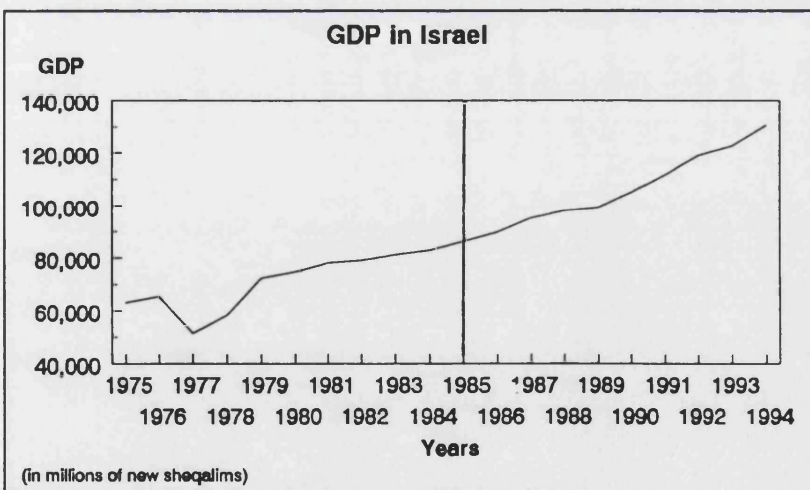
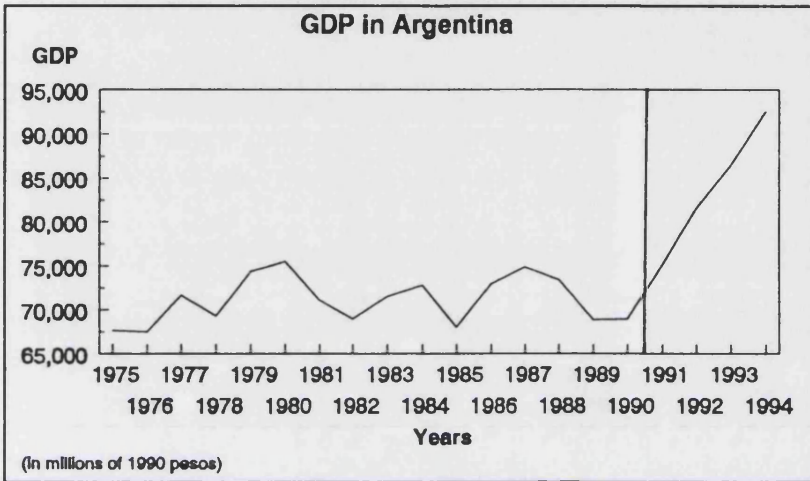
During 1982-1987 México faced a relatively high rate of inflation and no growth. The average rate of growth of the economy in such period was -0.073%. During the stabilization programme (1988-1994) the country grew at an average level of 2.73%.

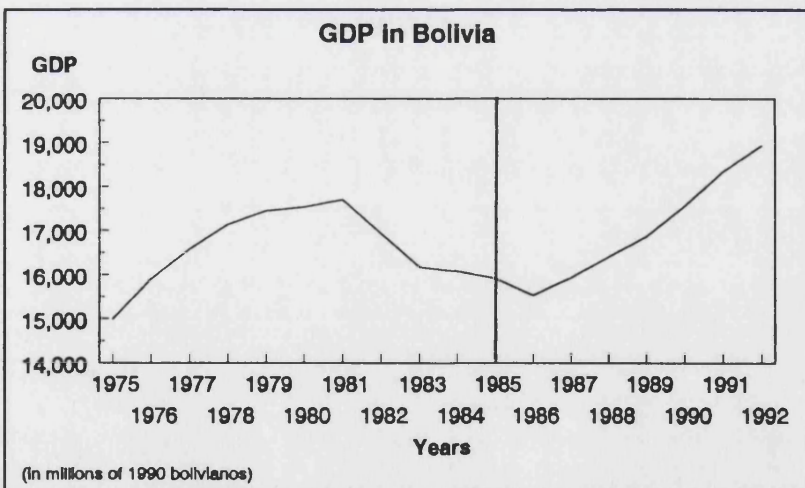
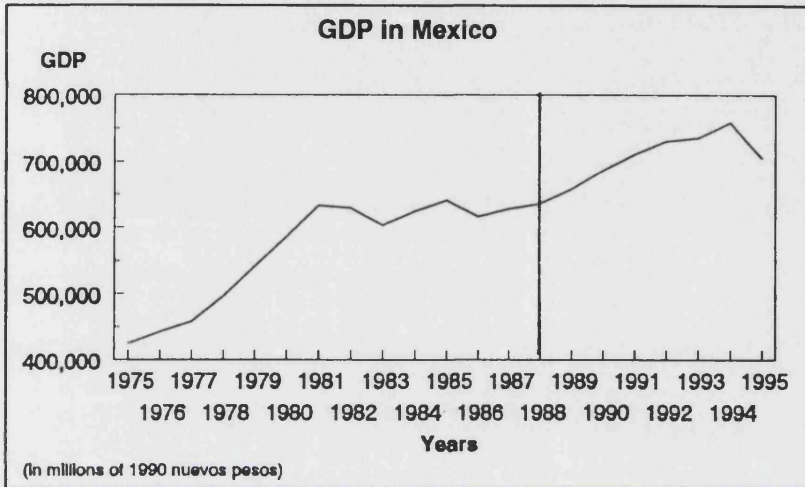
The most amazing case is Argentina. This country faced a very long period of stagnation and high inflation. During 1976-1990, the average rate of growth of the economy was 0.22%. Since the ERBS started, such measure has changed dramatically to a very high 7.67 (1991-1994). Even considering that in 1995 the estimated growth of the economy was negative in 4.4%, the total growth of GDP since the implementation of the ERBS has been near to 30%. Measured in US dollars, the per capita income of this country has passed from \$4342 in 1990 to \$8174.4 dls in 1994. This figure is similar to the one of some European countries, like Ireland or Portugal.

Israel has also achieved a good performance. During 1975-1984 its average rate of growth was 3.73%. Nevertheless, during the years of high inflation this measure fell to 2.74%. Since the stabilization programme started, growth has increased to 4.67% on average. Several cycles have taken place: The first, with high rates of growth, started just after the ERBS began (1985-1988). In a second cycle (1988-1991) growth fell below average. Finally, starting in 1991 there has been accelerated growth.

CHART 1.1:

REAL GDP IN SELECTED COUNTRIES





Source: International Financial Statistics. IMF

Several econometric specifications show that disinflation has a significant and positive effect over growth in Bolivia and México. According to other estimations, in Argentina and Israel disinflation affects positively the long run level of output but not the rate of growth (see econometric appendix at the end of the thesis).

b) All the economies faced increasing current account deficits (see chart 1.2). In Israel and Bolivia the deterioration of this figure did not last for more than two years. The current account balance in Argentina passed from a surplus of 3% of GDP to a deficit of a similar magnitude in less than two years. Then, it stabilized, remaining as deficit, for around one year. By the end of 1995 it is expected to be near to equilibrium.

In México there was also a high increase in the current account deficit. Differently from the other countries, it continued deteriorating. In 1994 it reached 8% of GDP. The situation proved to be unsustainable and a balance of payments crisis occurred at the end of 1994. The government abandoned the crawling peg exchange rate regime and now there is a dirty float. However, the consequences have been painful. GDP fell 7% in 1995, but the current account balance was restored to near equilibrium.

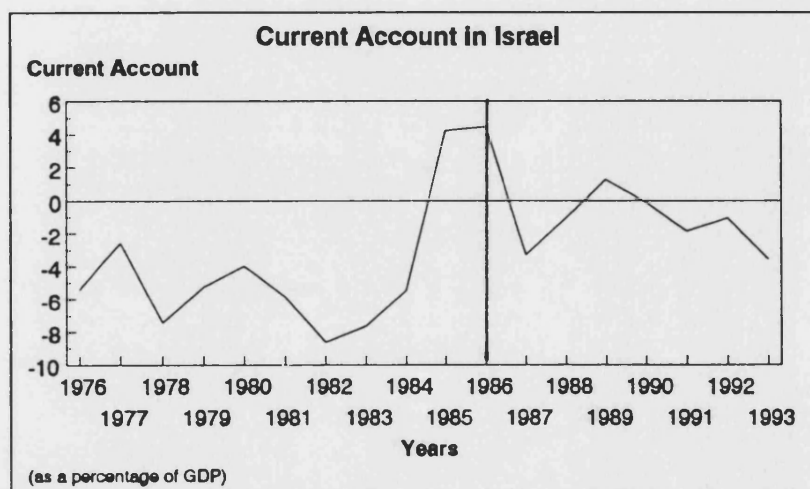
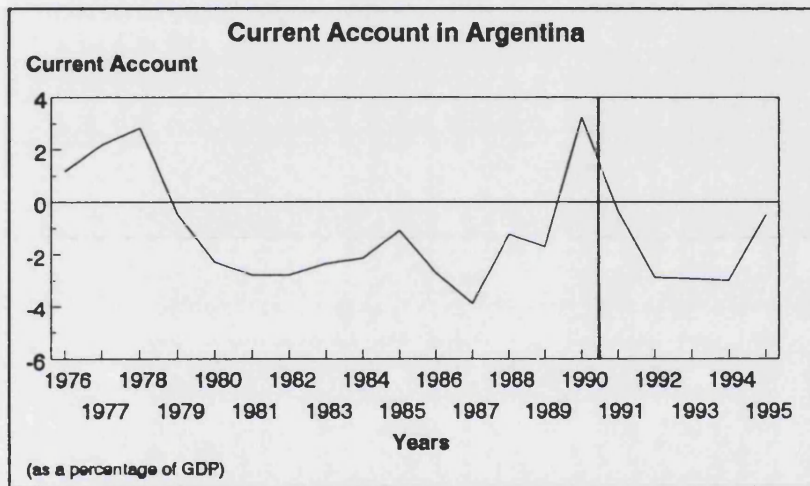
c) For all the countries analysed private consumption has been procyclical (see chart 1.3). Consumption has been one of the most dynamics elements of the aggregate demand at least in the first stages of the stabilization programme. As we will show afterwards, that is the reason why the total savings of the countries under consideration have felt for a while.

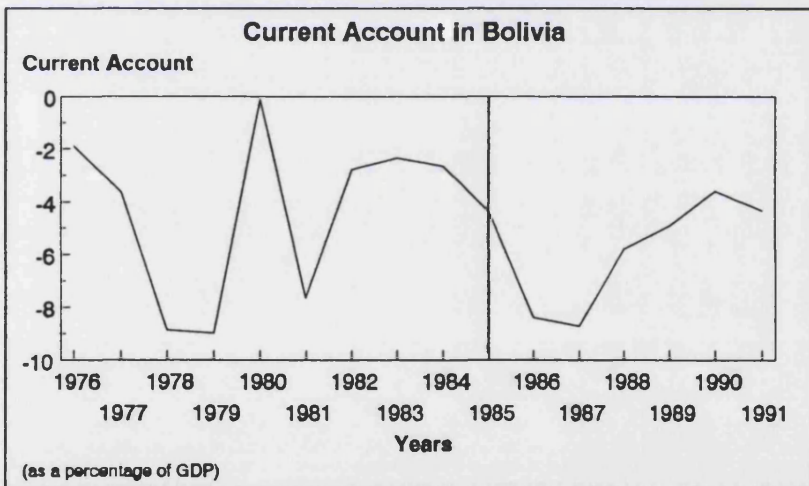
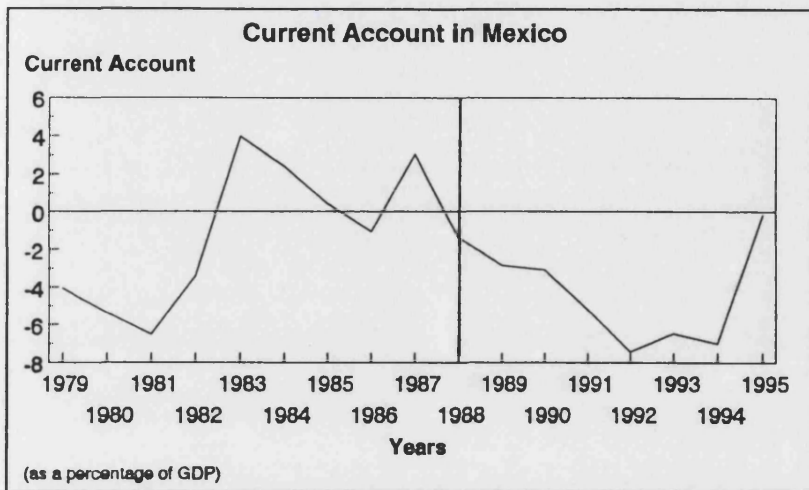
d) At some point, some of these economies faced recessions or rates of growth below trend. After a period of high growth, the Argentinean economy suffered a recession in 1995. The Israeli economy has shown some cycles in its

activity. Bolivia is still growing quite fast; and México observed also some cycles during 1988-1994 which, given the very negative trend of the previous years, were not necessarily below trend.

CHART 1.2:

CURRENT ACCOUNT IN SELECTED COUNTRIES

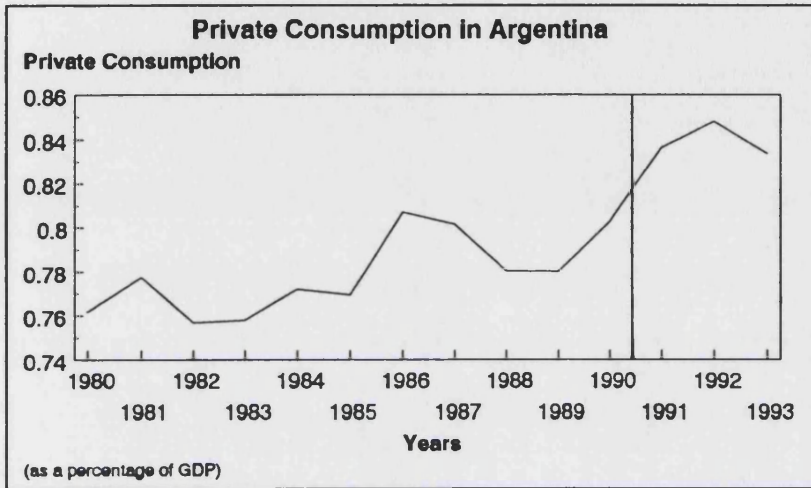


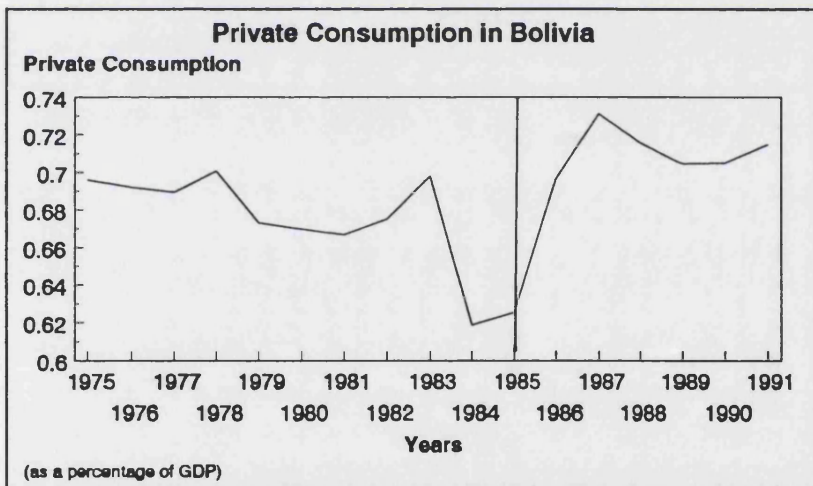
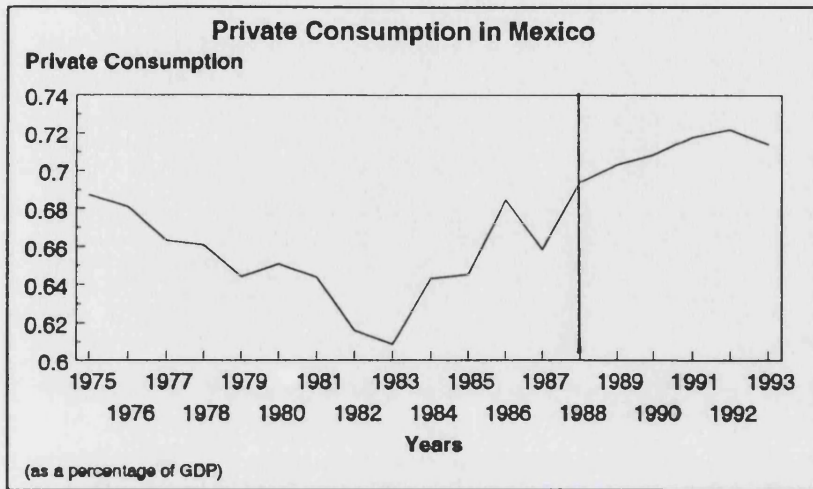


Source: International Financial Statistics. IMF

CHART 1.3:

PRIVATE CONSUMPTION IN SELECTED COUNTRIES





Source: International Financial Statistics. IMF

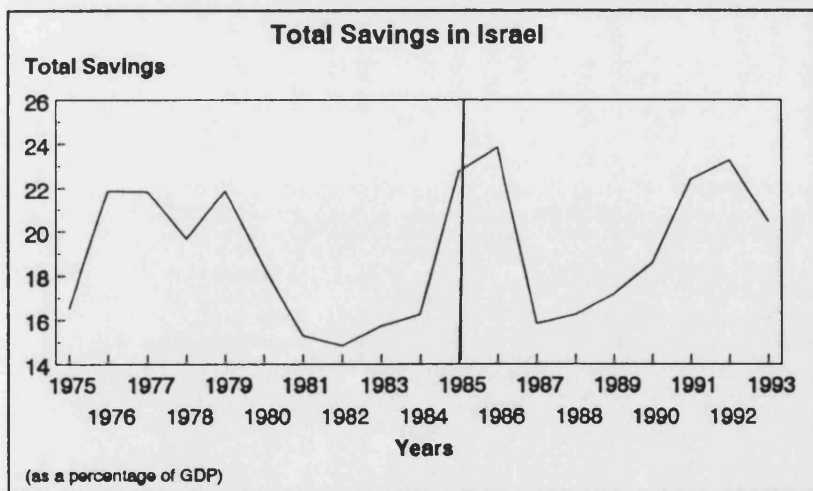
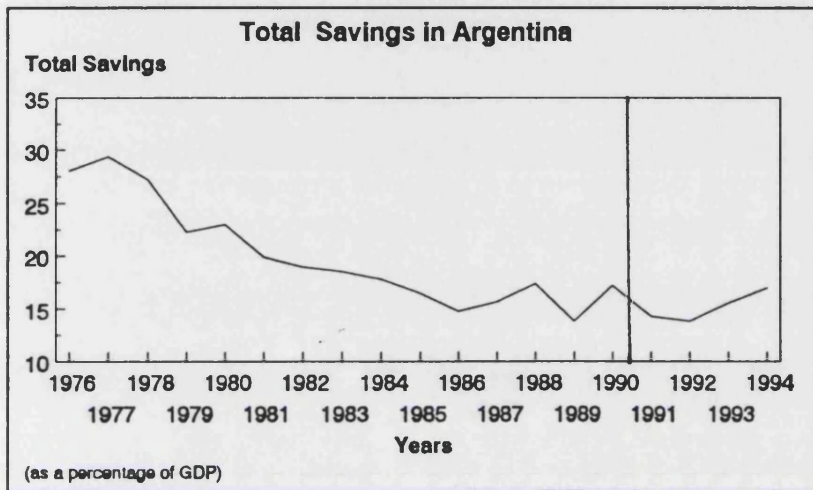
e) A Possible indicator of the pressure on the stability of the exchange rate regime is a measure of the total savings of the economy. The chapter defines this measure as the sum of the current account surplus and of total (gross) investment. The current account balance represents the increase in the total financial claims of people from the country (inside and outside). Investment is the total change in the physical assets of the economy. The sum measures the gross increase in the total assets of the country. To account for the net change, it is necessary to consider the rate of depreciation of physical capital and the capital earnings of the financial instruments held by nationals.²¹

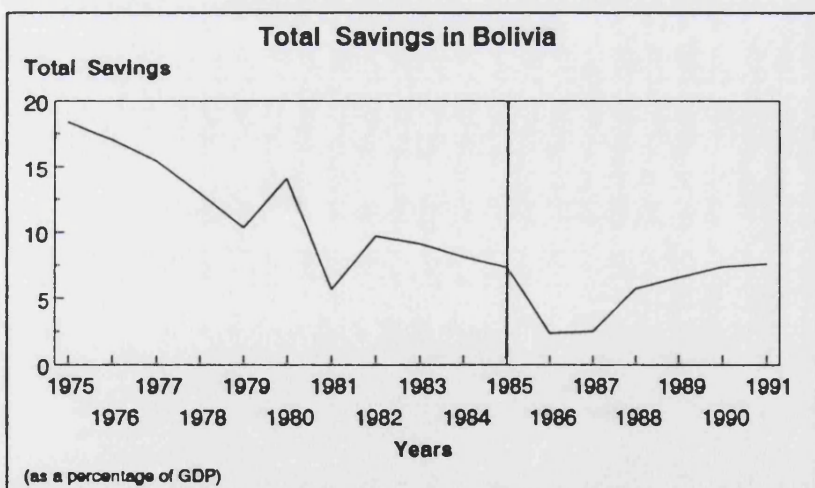
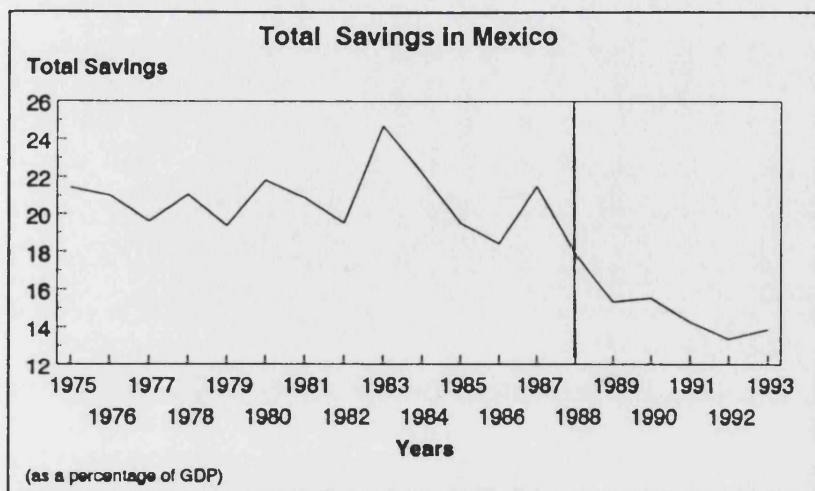
In all cases, after the programme started, there was an immediate reduction of savings. However, Argentina has stopped the continuous fall of this variable. Israel reversed the negative trend very soon as well as Bolivia did. México was the only country in which savings fell during all the time the stabilization programme lasted. It has been also the only one facing a balance of payments crisis.

²¹Traditionally what we consider total savings has been called domestic savings and the negative of the current account is known as external savings. The sum of them is equal to total investment in the country. Nevertheless, such definition implies that an economy where physical capital remains constant does not save. If the current account is in surplus, the financial assets of the economy are growing and in fact total savings are positive.

CHART 1.4:

TOTAL SAVINGS IN SELECTED COUNTRIES





Source: International Financial Statistics. IMF

f) All the countries under consideration accompanied the stabilization programme with a structural adjustment policy that included trade and financial liberalisation, foreign debt rescheduling, privatisation and deregulation. However, the structural policies did not follow the same steps in every country and show particularities in each case.

By 1991 Argentina had already free financial markets. Nonetheless, in the trade sector there were many non tariff barriers and a discriminatory treatment to foreign investment. The structural adjustment programme eliminated virtually all taxes in exports and reduced import duties and non tariff barriers. It also eliminated the discriminatory practices against foreign investment.

With respect to the external debt, the government carried on an agreement with the International Monetary Fund (IMF) in two stages. There was a stand by loan in 1991 and an extended facility in 1992. The government also rescheduled the debt services with creditors members of the Paris club in 1991.

The Argentinean government launched a very ambitious privatization programme that has lasted until these days (see Cavallo (1992)).

Bolivia initiated its stabilization programme with a unilateral suspension of the debt service with commercial banks. The strategy was successful in the sense that it helped to reduce the public deficit dramatically, strengthening the disinflation programme. Once the international community realized that the stabilization plan was serious and committed to low inflation targets, there was a debt rescheduling. Since 1986 the country received loans and eliminated debt with the commercial banks, the IMF, the Andean Reserve Fund and the World Bank. Apart from the debt rescheduling, Bolivia launched an ambitious trade liberalisation policy since the

stabilization programme started. The intention was to increase competition and set price ceilings for many products. The policy was so aggressive that some measures were reversed in order to avoid social unrest (see Sachs (1986) and Morales (1991)).

The main structural adjustment in Israel occurred in the financial markets, though it was a gradualist policy. At the beginning of the stabilization programme there were foreign exchange decontrols and a reduction of segmentation and quantitative restrictions in credit markets. These policies helped to reduce interest rate differentials. Other measures included more independence to the central bank and the development of new financial instruments. Trade liberalisation was also an important instrument of the structural adjustment. Although Israel had been a very open economy, in the years of the inflation crisis there was a set back. Import licensing was reintroduced and non tariff barriers proliferated. To overcome these problems, the government negotiated a free trade agreement with United States in 1985. However, still the country remain with considerable protection against countries in South East Asia, South America and Eastern Europe (see Bruno (1993)).

In the case of México, four were the main instruments of the structural policy accompanying the stabilization programme: a) The renegotiation of the external debt. b) Trade liberalisation. c) Financial liberalisation and d) Divestiture of state owned enterprises.

Among these instruments, trade liberalisation was deepened by the government at the very initial stage of the programme²². Between December 1987 and December 1988 the

²²A very aggressive policy of trade liberalisation had started in 1985, with a huge elimination of quotas. 83% of the value of imports was subject to quotas. At the end of 1985 less than 28% of that value were subject to quotas. The weighted tariff level was brought down from 16.4% to

maximum tariff was brought down from 100% to 20% and the number of items subject to quantitative restrictions from 1200 to 325. The policy continued. By 1991 less than 10% of the total value of imports was subject to import licensing. The North American Free Trade Agreement (NAFTA), signed by the Presidents of Canada, United States and México in 1993, has increased trade between its members. It is, according to the public, a crucial factor explaining why the Mexican economy recovered quite fast from the 1995 recession. México rescheduled its external debt in 1989. There were agreements with the IMF, the World Bank, the Paris Club and the commercial banks that reduced the level of transfers abroad. The debt service fell from 8.3% of the GDP in 1987 to 6.4% and 5.2% in 1989 and 1990, respectively. For the immediate and medium terms of the ERBS, probably the most important instrument of the structural adjustment was the financial liberalisation. It started in 1988 with the elimination of credit quotas and continued with a reduction of compulsory reserve requirements in the central bank by the commercial banks. In 1989, there was an abolition of the reserve requirement of the total savings of the banks (around 30% of the total savings). It was substituted by an ad-hoc variable rate oscillating around 10%. Financial liberalisation channelled quite a lot of the capital inflows coming to the country to the private sector (see Aspe (1993)).

13.1% and the dispersion was reduced from 16 to 11 different tariffs (see Aspe (1993)).

1.1.4 Success and Failure: Some Explanations

The chapter claims that the four programmes described in the previous section were successful. There are two main elements in this definition of success:

The first is a sustained reduction in the rate of inflation. The second is a long run increase in economic activity.

A sustained reduction in the rate of inflation has been achieved by Bolivia and Israel. In these countries there are no pressures for higher inflation and the exchange rate regime has become more flexible. The programme in Argentina is still in a relatively early stage. The real exchange rate has appreciated considerably and some popular voices say that the programme may be abandoned soon.

Nonetheless, for this last case there are some indicators showing a possible long duration of the programme. Instead of a balance of payments crisis, the 1995 recession was enough to adjust the external accounts. Also, the size of the monetary base is equal to the level of international reserves (the convertibility plan or the so-called currency board). A speculative attack can be theoretically supported because there will be always a positive demand for money.²³ Furthermore, the legislative power is the only one authorized to modify the exchange rate between the Argentinean peso and the US dollar. This measure has the intention of creating credibility in the convertibility plan.²⁴

The case of México is more difficult. The balance of payments crisis and the abandonment of the ERBS increased

²³Nobody can carry out a speculative attack that reduces international reserves to zero. That would produce money going also to zero. As long as there is a positive demand for money, that cannot happen.

²⁴See Cavallo (1992) for a good description of the intention of the Argentinean programme.

inflation for a while. In 1994, inflation had fallen to 7.8%, in 1995 it was 51%. In 1996 the peso stabilized considerably relatively to the US dollar, and there was a small real appreciation. Capital inflows returned to the country. The rate of inflation for the last year was 27% and at the end of 1997 is expected to be 15%. That could imply better economic prospects.

With respect to the second definition of success, all the economies seem to be better than the trend before the programme. In Argentina the cumulative increase in GDP of 1991-1995 is around 30%. Compared with the very poor performance of the previous fifteen years, it is almost sure that the Argentinean economy has improved permanently.

Bolivia and México show a similar performance. The cumulative growth in Bolivia in the period 1985-1991 was 14%, the trend before the programme was actually negative. The same figure for the case of México in 1988-1995 is 12% (considering the recession of 7% in 1995), against a flat profile of the GDP in 1982-1987.

Chapter three intends to explain why successful stabilization programmes observed a similar economic cycle that the unsuccessful experiments of the early and mid eighties.

1.2.- MEXICO 1988: THE CAPITAL INFLOWS PROBLEM WITHOUT CAPITAL INFLOWS

This section shows that during the first year of the Mexican stabilization programme 1987-1994, México observed the symptoms of the capital inflows problem already explained. However, this phenomenon occurred in the presence of high real interest rates and capital outflows, which is a strange situation whose causes will be explained in chapter four.

1.2.1.- The Symptoms of the Capital Inflows Problem in the first year of the Mexican Stabilization Programme.

After the debt crisis in 1982, the Mexican economy entered a difficult economic situation for several years. In 1987, inflation reached 160%, the highest rate in the history of the country. On 15th of December of that year, President Miguel de la Madrid announced a comprehensive package to stabilize the economy. Among its main instruments the most important was the control of the exchange rate.

During 1988, inflation fell from 140% on average to 100% (from 160% to 50% comparing the consumer price index from December to December). The economy started to recover from six years of stagnation. However, it showed some of the facts already observed in previous ERBS:

a) Private consumption increased in real terms and as a percentage of the GDP, which can be seen in figure 1.5. In the previous years to the stabilization programme consumption had shown a very bad performance. Starting in 1988, the figure initiates an ascending trajectory (see the de trended figure). It is remarkable that the recovery took place also as a percentage of the GDP.²⁵

²⁵The de trended figure was obtained running the regression

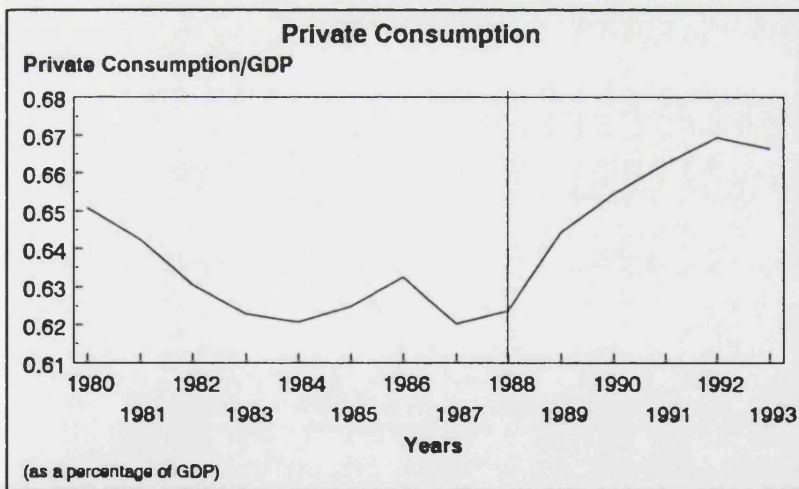
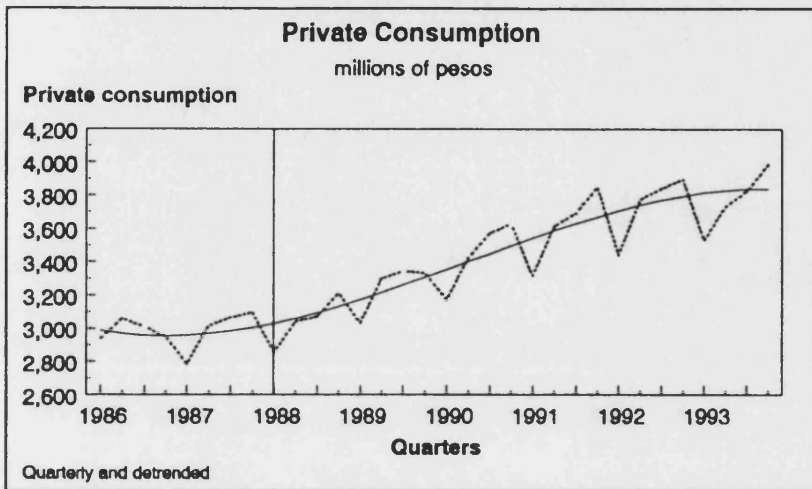
$$C = 3014.7 - 31.4t + 4.41t^2 - 0.082t^3$$

(28.0) (-1.12) (-2.11)

Where t is time. t statistic in parentheses.

R²: 0.868 D.W.: 2.36 F(3,28): 61.9
 Quarterly data from 1986 to 1993. t statistics in parentheses.

CHART 1.5: PRIVATE CONSUMPTION IN MEXICO

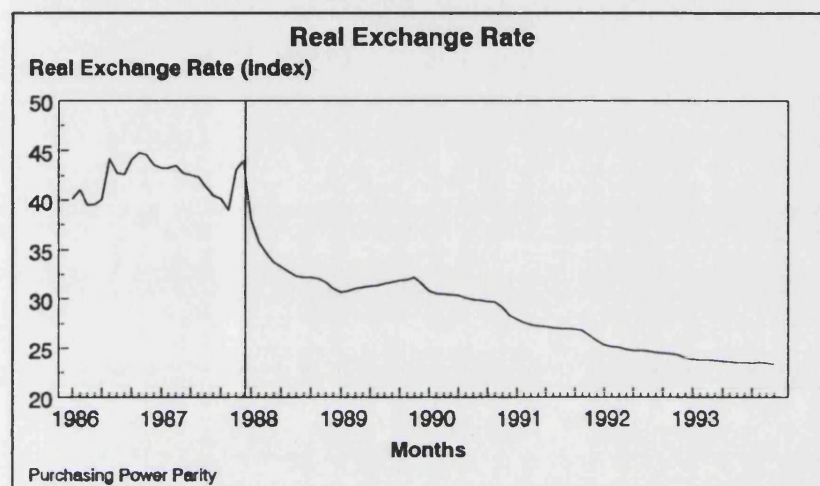


Source: International Financial Statistics. IMF

B) There was a significant exchange rate appreciation.

During 1988 the real exchange rate²⁶ fell by 29.5% (see figure 1.6). The reduction was gradual but sustained through the year and it continued in the following years.

CHART 1.6: REAL EXCHANGE RATE IN MEXICO

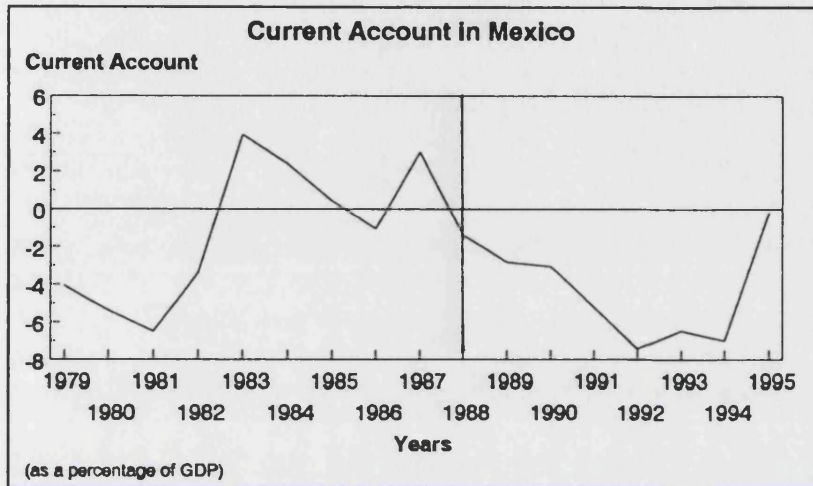


Source: Carpeta Histórica de Banco de México

C) A current account deficit emerged.

As we already discussed in the previous section of this chapter, during several years before the stabilization programme México experienced current account surpluses. In 1988 a modest current account deficit developed.

²⁶The measure is the typical EP^*/P where E is the nominal exchange rate, P^* is the consumer price index in United States and P is the consumer price index in México.

CHART 1.7: CURRENT ACCOUNT BALANCE IN MEXICO

Source: International Financial Statistics. IMF

These are some of the main symptoms of the capital inflows problem. The strange fact is that they occurred in absence of capital inflows as we will see now.

1.2.2.- High Real Interest Rates and Capital Outflows

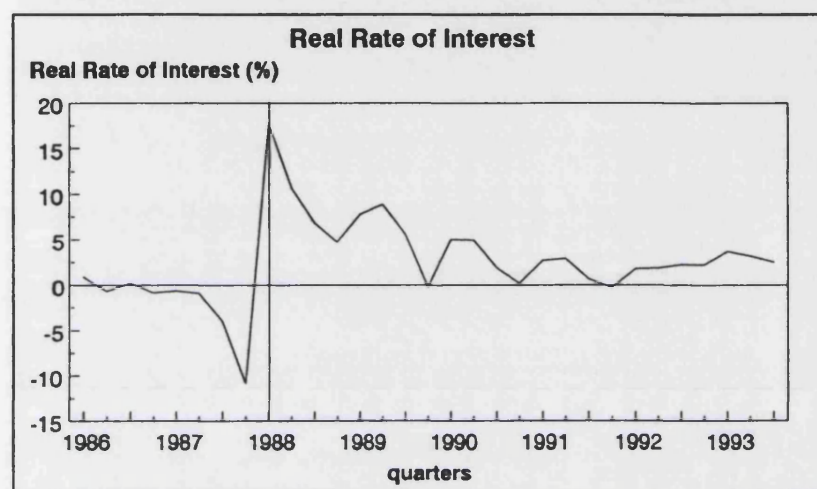
Together with the symptoms of the capital inflows problem, there were high real interest rates and a complete absence of capital inflows.

A measure of the real interest rate shows that before the stabilization programme, ex-post real interest rates were negative. The reason for this fact is that in the first three months of the stabilization programme (December, January and February), inflation rose with respect to the same figure in the previous quarter. The inflation outburst can be explained because to increase public incomes the government raised the price of several public goods (mainly

gasoline and electricity). Stabilization was not expected. Ex-post real rates fell below ex-ante rates.²⁷

However, since 1986 real interest rates were around zero, which anyhow means an important effect upwards of the stabilization programme on real interest rates.

CHART 1.8: REAL INTEREST RATE IN MEXICO



Source: Indicadores Económicos. Carpeta Histórica de Banco de México.

Perhaps the most surprising fact observed in the first year of the ERBS in México was the presence of capital outflows. Usually, after an ERBS, the symptoms already explained are accompanied by capital inflows. Nonetheless, in 1988 they were absent. The composition of the balance of payments makes us to suspect that an important proportion of the outflows were capital flight.

²⁷The measure of the real interest rate takes the nominal rate of interest of three months Mexican CETES (Certificados de la Tesorería de la Federación) which are Mexican T-Bills and compares it with the inflation of the following quarter.

TABLE 1.2: Balance of Payments in México (billions of dollars)

	1983	1984	1985	1986	1987	1988
C.A	5.9	4.2	0.8	-1.4	4.2	-2.4
F.A	-2.1	0.08	-0.6	1.6	-3.1	-4.5
E.O	-3.1	-2.1	-2.9	-0.7	2.9	-3.2
C.R	0.7	2.1	-2.7	-0.5	4.1	-10.0

C.A: Current Account

F.A: Financial Account

E.O: Errors and Omissions

C.R: Change in International Reserves

Source: International Financial Statistics. IMF

The current account passed from a surplus of 4.2 billion dollars (bd) in 1987 to a deficit of 2.4 bd in 1988. In this year, the financial account, which is the official measure of the capital account, was a 4.4 bd deficit. However, errors and omissions were also negative in more than 3 bd. It is known that this category concentrates an important part of the capital flight.

The presented scenario is challenging. As we have already explained, it is our objective to explain why the symptoms of the capital inflows problem may appear without capital inflows. It is also important to answer what the role of economic policy is to overcome this problem.

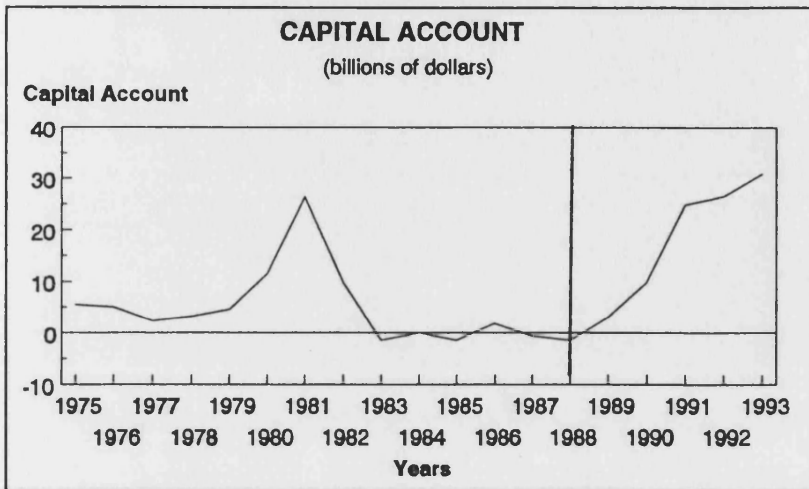
1.3.- THE CAPITAL INFLOWS PROBLEM IN A "CONSISTENT" STABILIZATION PROGRAMME (MEXICO 1989-1994): A CREDIBILITY ISSUE?

This section analyses some stylized facts of the Mexican stabilization programme after 1988. The most important financial variables indicate, apparently, a consistent stabilization programme. This observation is reinforced by the fact that the ERBS was accompanied by a structural adjustment in different areas (see section 1.1 in this chapter). However, the experiment collapsed at the end of 1994, raising a doubt: Was this programme consistent and credible?

1.3.1.- Financial Indicators of the Mexican Stabilization Programme

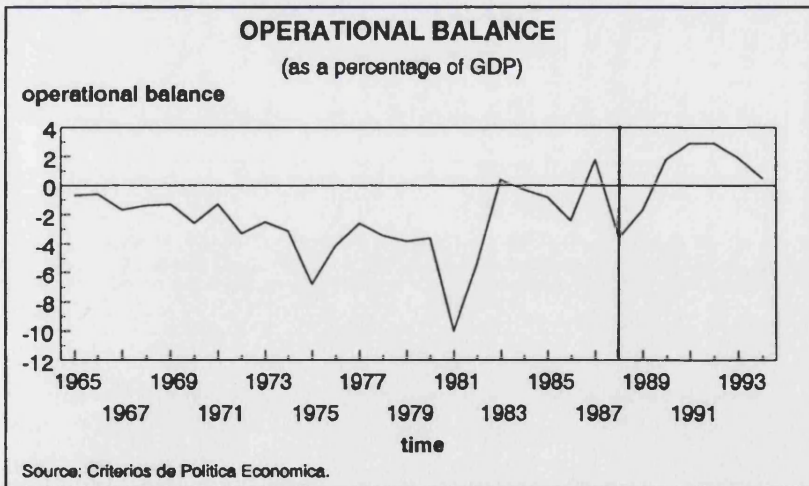
Starting in 1989, the macroeconomic performance of México changed in several respects. Consumption continued growing (see chart 1.5) and the real exchange rate deteriorated even more (see chart 1.6). However, in the financial side there were some significant changes. Capital flight stopped in 1989 and was substituted by huge capital inflows (see chart 1.9). The public operational balance was a deficit mainly because of high real interest rates. From 1990, it became a surplus, reaching levels of 2.5% of the GDP in 1992 (see chart 1.10). Finally, international reserves started accumulating in a considerable way (see chart 1.11). The domestic credit of the central bank to the government fell in a dramatic way. By 1993 it had almost disappeared.

CHART 1.9: CAPITAL ACCOUNT IN MEXICO



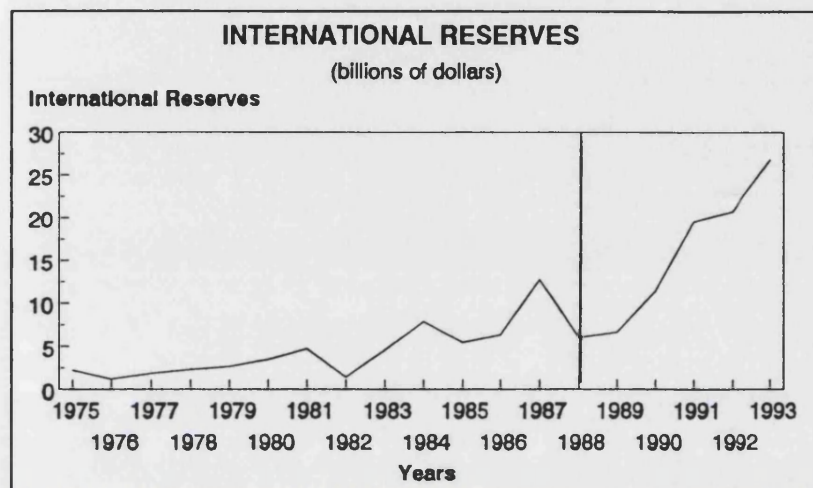
Source: International Financial Statistics. IMF

CHART 1.10: OPERATIONAL BALANCE IN MEXICO



Sources: Criterios General de Política Económica. INEGI

CHART 1.11: INTERNATIONAL RESERVES IN MEXICO



Source: Carpeta Histórica de Banco de México.

These indicators show an apparent consistency of the programme. At least until 1993 there were not pressures in the financial side of the economy to trigger a speculative attack on the local currency (peso). Nonetheless, the size of the current account, the exchange rate appreciation and the behaviour of the total savings of the economy were inconsistent with long run stability (see sections 1.1 and 1.2 in this chapter).

1.3.2.- Lawson Law, the Crisis and the Long Run in the Mexican Stabilization Programme.

The British Ex-Chancellor of the Exchequer, Nigel Lawson used to say that current account deficits are not a problem when public finances are in equilibrium (see Cline (1995) and Edwards, Lozada and Steiner (1995)). That assertion is

known commonly as Lawson law or Lawson proposition. Some historical evidence contradicts the Lawson proposition: First, the collapse of the European Monetary System in 1992, then the Mexican crisis in 1994 and 1995 and very recently, in 1997, the collapse of the currency in Thailand. In all these episodes the actual public balance has not been a problem. In some cases it was a surplus (México), in others it did not show negative values higher in absolute value to the historical trend. However, the levels of the current account deficit proved to be unsustainable at the end. The result in all cases was a balance of payments crisis.

In the particular case of México, the balance of payments crisis occurred when the public operational balance showed a surplus of around 1% of the GDP. The current account had deteriorated since 1988 and at the end of 1994 reached a deficit of more than 8% of the GDP. The private sector was spending too much money and there is not still a good explanation of why this phenomenon happened.

Nonetheless, as section 1.1 of this chapter explains, the stabilization programme in México produced good results at the very end. Even considering the painful effects of the crisis, growth and production have been greater after the programme than before.

For all these reasons, it is our intention to explain in chapter five what was behind the capital inflows problem in México. It was not a problem of disequilibrium in public finances. It could be a problem of credibility, but then it is relevant to ask why credibility was absent in an apparently very consistent programme. We also intend to answer why the production capacity of México apparently increased after the programme.

**CHAPTER 2.- RECENT DEVELOPMENTS IN THE THEORY OF EXCHANGE
RATE BASED STABILIZATION PROGRAMMES**

INTRODUCTION

This chapter divides the exposition about recent developments on ERBS into three topics. The organisation is related as much as possible with the questions already explained.

The first topic is ERBS and real activity. Activity considers not only output and growth, but also consumption, investment and other real variables.

Second section makes a review of the literature on the importance of capital inflows in the capital inflows problem.

Third section describes recent developments in the topic of the capital inflows problem in the presence of fiscal adjustment. It also makes a review of the literature on balance of payments crises (bpc) when the public balance is in equilibrium.

Finally, the last section makes a critical assessment of the literature, emphasizing what questions have not been answered.

2.1.- ERBS AND REAL ACTIVITY

The basic theory about ERBS shows that under perfect capital mobility, perfect competition and full employment these programmes should be neutral and equivalent to money based stabilization programmes (MBS).²⁸

Changes in the real system due to ERBS require some kind of imperfection, or at least to break traditional assumptions.

This section identifies five possible sources of changes in the real system due to ERBS (analysed in the literature):

²⁸see Obstfeld (1985) and Drazen and Helpman (1987)

a) The Nature of the Utility Function and Disinflation.

This argument is mainly due to Obstfeld (1981) (1985) . Obstfeld (1985) starts from the traditional Sidrausky dynamic optimisation model. The peculiarity of the utility function is that it may be non separable. The rate of devaluation does not fall in a sudden way, but sluggishly (as in the so-called tablita experiments of the southern cone in the late seventies)²⁹. When consumption and money are substitutes, a reduction of the rate of inflation in steps produces a gradual increase in money and a similar reduction of consumption (substitution effect). The only way in which consumption can fall without violating the intertemporal budget constraint, is increasing discretely and in one jump at the beginning of the experiment. This behaviour explains the current account deficits observed in ERBS.

Though interesting, the Obstfeld result is not supported by the facts. In the tablita experiments consumption increased at the beginning and continued increasing for a while.

b) Inertial Inflation:

This was probably the first explanation for the stylized facts of ERBS (Rodriguez (1982), Dornbusch (1982)).³⁰ The argument is relatively simple. Suppose a perfect capital mobility economy where inflation responds sluggishly to changes in the rate of devaluation (there is not PPP). The covered interest premium is zero. A reduction in the rate of devaluation implies an appreciation of the currency and, given the interest rate parity, an immediate reduction in the real interest rate. Aggregate demand and output

²⁹Specially the programmes of Argentina (1978-1981), Uruguay (1978-1982) and Chile (1979-1982).

³⁰See also Dornbusch (1993), Dornbusch and Werner (1994) and Kiguel and Liviatan (1992).

increase but reinforce the real appreciation of the currency. Eventually this effect dominates and the initial expansion is followed by a recession.

This appealing explanation has a fundamental problem, only in the first ERBS (Argentina, Chile and Uruguay) there was a reduction in the real interest rate. In all the others this variable increased.

c) Lack of Fiscal Adjustment

The intuitive explanation of this argument to account for more dynamic economic activity is the following: a reduction in the inflation tax generates disposable additional resources, increasing demand and output.

However, if the expansion of demand is large compared with that of output, there will be a tax adjustment in the future. The rise in production is not enough to increase the tax base, or to compensate the reduction of the inflation tax through higher demand for money. It is not possible to close the public deficit. Rational people would consider this fact not raising demand on the first instance. Ricardian equivalence prevails (see Barro (1974)).

To increase demand when a tax falls there must be exceptions to the Ricardian equivalence proposition. The model by Blanchard (1985) assumes finite horizons. Helpman and Razin (1987) use a modified version of this model to generate some stylized facts of ERBS. People that are going to die before the future taxes are levied, raise consumption at the beginning of the programme. As time passes, the burden of new generations increases. There is a point in which the future burden of taxes is greater than the original release of resources. Then consumption starts falling.

The assumption that people die and do not care about their heirs is not necessary to produce bpc preceded by

unsustainable current account deficits.³¹ Calvo (1987) works a cash in advance model where people have infinite horizons. Ricardian equivalence prevails. The reason why a reduction in inflation not backed with fiscal adjustment produces a rise in consumption is the following:

The rate of depreciation of the exchange rate falls. Inflation falls by the same magnitude (because of PPP). The public sector maintains the same taxation and expenditure. An overall public deficit emerges when the inflation tax falls. This situation can only last while international reserves are positive. When they vanish there will be a balance of payments crisis and the system will enter a floating regime³². People anticipate higher inflation in the future relative to the present.

Comparing the period of low inflation with a future under higher inflation, people decide to increase the demand for money in the first period. Consumption also increases (because of the cash in advance constraint). A current account deficit appears. If the utility function is logarithmic, the only force driving the balance of payments crisis is the higher current account deficit. The capital account remains constant (see Rodriguez-Arana (1995)). The model behaves as if Ricardian equivalence were absent. The

³¹van Wijnbergen (1988) advocates a similar argument. In his model two factors imply that a stabilization programme without fiscal adjustment produces an unsustainable current account deficit. The first is that people can die. The second is that the utility function is non separable.

³²This problem was originally addressed by Krugman (1979) and later by Connolly and Taylor (1984), Flood and Garber (1984), Obstfeld (1984) and Sachs (1986) (see Flood and Garber (1994) for a good summary of the problem). In the original Krugman model the imbalance of the public sector does not translate into higher private consumption but in an increase in foreign private bonds with a counterpart in a decline of international reserves. In a dynamic optimisation approach (see Obstfeld (1984) and Sachs (1986)) a separable utility function imply no movements of private consumption whatsoever and the balance of payments crisis comes from the capital account.

reduction of the inflation tax produces a rise in consumption of the same amount.³³

d) Lack of Credibility

This factor is related to the previous one. When fiscal adjustment is absent there is lack of credibility. Nonetheless, lack of credibility may exist though there is fiscal adjustment. Calvo (1986) shows that a perceived increase of inflation in the future produces a rise in consumption today. The mechanic of the problem is similar to the already quoted 1987 paper. Calvo and Vegh (1993) conclude that the same argument generates a temporal increase in output when there are overlapped price contracts. Reinhart and Vegh (1995) perform an empirical assessment of this hypothesis for several countries under ERBS. They found that the argument may be considered for some cases but not for many others.

e) Supply Side Effects

In the explanations already analysed there are not permanent changes in output. The possible increase in economic activity is driven by demand factors and takes place because of sticky prices. In the long run, when all prices are flexible, output and employment return to natural levels.

Nonetheless, when disinflation affects factors of production, output may change permanently.

³³It is interesting to notice that the same would happen with a reduction of lump sum taxes. People would anticipate higher inflation in the future and then they would consume more today. The increase of consumption would be of exactly the same magnitude than the reduction of taxes.

To show that Ricardian equivalence exists in this model it is easy to see that if taxes fall today and people anticipate not a balance of payments crises, but a future rise in the present value of taxes, then nothing will happen to consumption today.

There are two types of supply side effects identified in the literature:

The first is a substitution effect between consumption and leisure in a cash in advance model (Roldós (1993)). When inflation falls, the price of consumption also falls (because of the cash in advance constraint) and people substitutes leisure by consumption. The supply of labour rises as well as consumption, which increases the aggregate supply of the economy.

The second effect considers the relation between inflation and transaction costs (see Rebelo and Vegh (1995), Roldós (1995) and Uribe (1995)). If investment is subject to transaction costs with money, the reduction of inflation increases the desired capital-output ratio. The same happens under a cash in advance constraint. There is an investment boom accompanied by a current account deficit. According to this approach the situation is optimal from the social point of view (Roldós (1995)) and the government should not intervene to stop it.

In their empirical investigation, Rebelo and Vegh (1995) find support for this effect in Argentina (1991-) (see also Baxter (1995)).

2.2.- THE CAPITAL INFLOWS PROBLEM WITHOUT CAPITAL INFLOWS

The symptoms of the so-called capital inflows problem have been studied always in economies open to trade and capital markets. However, as we have shown before, this problem is not exclusive of economies under high capital mobility.

Some studies analyse the behaviour of consumption in ERBS and in absence of capital mobility. Calvo (1981) presents a model where increases of the rate of growth of the nominal exchange rate raise consumption in the short run. A straightforward exercise would show that reductions of such rate reduce also consumption. That is to say, disinflation generates the opposite solution to the capital inflows problem.

Calvo (1986) asserts that in his cash in advance model capital inflows are necessary to produce the symptoms of the capital inflows problem. He describes disinflation exercises in models with money in the utility function, in absence of capital mobility and under lack of credibility. The result is that even in these cases the initial effect of an ERBS is to reduce consumption.

Auernheimer (1987) extends the Calvo (1981) model to analyse the effects of ERBS not supported by fiscal adjustment. In the examples provided by him, consumption falls at the beginning and then rises to levels greater than the original. Without fiscal adjustment the system collapses in a different way than models under perfect capital mobility. Since people cannot attack the foreign exchange market, the bpc is accompanied by a sharp devaluation.

More recently, Velasco (1993) has studied disinflation under zero capital mobility again. In his paper, lower inflation induces a raise in the demand for money that increases the real interest rate in the short run. This effect worsens the public deficit and jeopardizes the stabilization programme. However, in this study the effect of disinflation over consumption is not studied at all and not even mentioned by the author.³⁴

³⁴Agénor (1994b) also studies the effect of disinflation over real interest rates in a partial capital mobility model. The effect is ambiguous. When capital mobility is low, the increase in the demand for money raises the real interest rate. When capital mobility is high the Dornbush-Rodriguez effect dominates and the real interest rate falls.

2.3.- THE CAPITAL INFLOWS PROBLEM AND BALANCE OF PAYMENTS CRISES UNDER FISCAL ADJUSTMENT

In the late seventies and early eighties, several countries experienced the symptoms of the capital inflows problem and eventually faced bpc. Most of these experiments did not care about the public deficit. With the inflation tax falling, the fiscal authorities were unable to sustain the same pattern of public expenditure. Inevitably their public deficits became financed by the domestic credit of the central bank. The ensuing reduction of the international reserves produced a speculative attack and inflation increased again in a floating regime.

The observation of these episodes produced a huge literature on the topic of balance of payments crises. In 1979, Paul Krugman wrote a seminal paper that in the following years was the starting point of many extensions and adaptations.³⁵

However, as some other historical episodes show, bpc are not produced by lack of fiscal adjustment exclusively. In several countries the public balance was in equilibrium, or at least was not higher than the historical trend, and the crawling peg regime collapsed anyway.³⁶

Balance of payments crises in countries that pursued fiscal adjustment were preceded by the symptoms of the capital

³⁵See for example Connolly and Taylor (1984), Flood and Garber (1984), Obstfeld (1984), Sachs (1986), Calvo (1987), Drazen and Helpman (1987) (1988), van Wijnbergen (1988), Flood and Garber (1994).

In the topic of the capital inflows problem, the literature of bpc in absence of fiscal adjustment has been studied by Calvo (1987) and van Wijnbergen (1988), as we have already analysed.

³⁶Chile 1976-1982, Italy, Portugal, Spain and the United Kingdom before 1992, México at the end of 1994 and Thailand in 1997

inflows problem. Calvo (1987), Helpman and Razin (1987) and van Wijnbergen (1988) explain that current account deficits are linked in almost one to one basis to the public deficit. However, when the public balance is in equilibrium, the current account deficit is produced by a disequilibrium in the private sector. The ensuing exchange rate collapse corrects a problem in the private sector, which is challenging.

The economic literature has not been ignorant to these episodes and has been providing hypotheses for their occurrence. There are basically four explanations: a) The excess confidence hypothesis b) The lack of credibility explanation c) The self-fulfilling prophecies and vulnerability of capital markets story d) The external shock's argument.

The first two hypotheses are useful to explain the emergence of the capital inflows problem in the presence of fiscal adjustment. The last two explain the mechanics of the crisis itself.

a) Excess Confidence

Before the European Monetary System (EMS) collapsed in 1992, several authors pointed out the risks of current account deficits and the overvaluation of the currencies in some countries.³⁷ The explanation for this phenomenon was that people had very positive expectations on the future performance of the economies under consideration.³⁸

According to this approach, the media and even serious economists overestimated the positive effects of more integrated and global markets (the so-called Washington

³⁷See for example Muellbauer and Murphy (1990) and the comments of King (1990) and Pagano (1990).

³⁸ See especially the comments by Mervyn King to the Muellbauer and Murphy (1990) article.

consensus). People became convinced that because of these structural changes the macroeconomic performance of many economies was going to be much better in the future. However, according to Krugman (1995), while structural policies have produced a better allocation of resources, they have not been so good increasing growth and output. The result has been the emergence of a new type of crisis in modern capitalism.

The excess confidence hypothesis, first used to explain the collapse of the EMS, has been also advocated to explain the capital inflows problem and the bpc in México. McKinnon and Pill (1996) assert that once credit and capital markets are more open, better technologies with increasing returns are available. However, banks find profitable to exaggerate the positive aspects of the projects to increase the loans, knowing that they will be bailed out in the future.

These results are interesting for México. After the exchange rate collapse, there was a financial crisis in the banking system. Many people were unable to repay their debts and the government entered to rescue banks with huge amounts of money.³⁹

b) Lack of Credibility

Lack of credibility in the spirit of the Calvo (1986) model has been also considered a cause of the capital inflows problem under fiscal adjustment. For the specific case of México, Reinhart and Vegh (1995) assert that the increase in consumption during the period 1988-1994 is consistent with the lack of credibility hypothesis. Leiderman and Thorne (1995) point out indicators of fiscal relaxation in 1994 that contributed to generate a credibility problem in the Mexican stabilization programme. Mendoza and Uribe

³⁹Other studies about the Mexican crisis based in the excess confidence hypothesis are due to Agénor and Masson (1996) and Sachs, Tornell and Velasco (1995).

(1996) extend the basic Calvo model to explain cases under uncertainty. In a calibration exercise, these authors assert that the capital inflows problem in México is well explained under the assumption of lack of credibility.

c) Self-Fulfilling Prophecies and Vulnerability of Capital Markets.

According to this approach, bpc under fiscal adjustment happen because of self-fulfilling prophecies.⁴⁰ Krugman (1996) summarizes the main arguments of this hypothesis: The government will devalue the currency if it is costly to maintain the exchange rate peg. A devaluation reduces the burden of the domestic debt and increases the level of employment in the presence of sticky wages. The maintenance of the exchange rate peg under expectations of future devaluation raises interest rates and worsens public finances. These factors induce the government to devalue. However, there may be a huge political cost for the devaluation.⁴¹

When the cost of devaluation is smaller than the cost of maintaining the peg, the government devalues. The interesting point is that expectations may be self-fulfilling. When people expect a devaluation, the costs of maintaining the peg may go above the costs of devaluation. Then there is a balance of payments crisis.

Though Krugman explains this hypothesis, he does not agree with it. The fact that the government has public finances in equilibrium does not guarantee that is doing things right. According to him, the collapses observed in Europe 1992 and México 1994 and 1995 were not produced by self-

⁴⁰Among the academics that defend this position are Eichengreen, Rose and Wyplosz (1995), Obstfeld (1996), Obstfeld and Rogoff (1995) and for the Mexican case Cole and Kehoe (1996).

⁴¹Agénor (1994a), Cukiermann, Kiguel and Liviatan (1992) and Edwards (1992) discuss the costs of precommitment to an exchange rate target.

fulfilling prophecies. They were produced more by the perception that the governments were going to relax the fiscal or the monetary policy or both in the future. For the case of Europe, Krugman presents some evidence that the monetary policy became more relaxed in several countries.⁴²

An approach very related to the self-fulfilling prophecies hypothesis is the one of vulnerability of capital markets. According to it, the new type of crises occurs not because there is excess confidence or lack of credibility but because very open capital markets are vulnerable. When there are imbalances between some stocks, there may be self-fulfilling financial crises (Calvo and Mendoza (1996)).

To clarify this last point, we take again the case of México at the end of 1994. By that time the level of international reserves was huge. However, the size of domestic debt denominated in US dollars (the so-called TESOBONOS) was even larger. Not even with a devaluation was possible to reduce this debt, because it had to be paid in foreign currency. If someone expects future debt repudiation and takes the money out of the country, others will follow him/her in herding behaviour. Then a crisis will emerge (see Calvo and Mendoza (1996) (1996b)).

d) External Shocks

This argument asserts that consistent stabilization programmes collapse because of external shocks. When the nominal exchange rate is an instrument, terms of trade deterioration or increases in the international rate of interest raise the vulnerability of the country. Expectations of future devaluation develop and there are

⁴²In this respect, there seems to be a contradiction between the articles by Krugman in 1995 and in 1996 already quoted. In the first excess confidence produces the capital inflows problem. In the second there is lack of credibility.

two possible outcomes: either the government devalue or people attack the foreign exchange market producing the crisis. The approach is not necessarily mutually exclusive with the previous one and has been in the literature for about five years.⁴³

For the Mexican case, the argument has been slightly modified. Instead of terms of trade deterioration it has been said that there were several political shocks that generated lack of confidence in capital markets, producing the crisis. The described shocks were basically two: the uprising revolution in the Southern state of Chiapas and the assassination of two political figures⁴⁴ (see Gil Díaz and Carstens (1996), Leiderman and Thorne (1995) and Savastano, Roldós and Santaella (1995)).

2.4.- CRITICAL ASSESSMENT OF THE LITERATURE

This section will make a critical assessment of the review of the literature about the three topics of our interest. The objective is to explain what is not yet explained about these problems.

2.4.1.- The Capital Inflows Problem in Successful ERBS

Most of the literature on the real effects of ERBS explains short run movements in output. Recently there have been explanations of why ERBS produce permanent increases in the level of activity.

According to the literature, there are two main channels why ERBS affect output permanently: a) The effect of inflation on the supply of labour b) The effect of

⁴³ See for example Agénor (1994a), Cukiermann, Kiguel and Liviatan (1992), Edwards (1992) (1995a) and Kiguel and Liviatan (1994).

⁴⁴Mr Luis Donaldo Colosio, the candidate of the ruling party to the Presidency (Partido Revolucionario Institucional) and Mr José Francisco Ruiz Massieu, the General Secretary of the same party

inflation on investment through the cash in advance constraint or transaction costs where money is needed to invest.

In our opinion both explanations may be criticized. The first because it ignores non linearities in the labour market; the second because in the modern world it is implausible to think that cash is necessary to invest.

Let us start with the first criticism:

To assume that leisure is in the utility function is sensible. What is not a very plausible assumption is that the labour market is as flexible as other markets. In reality there are many restrictions and at least in formal markets people do not choose the number of hours to work. Considering that many people are subject to a fixed schedule reduces the effect that changes in the desired supply of labour may have on output.

With respect to the second hypothesis, the assumption that cash is necessary to invest is unrealistic. The cash in advance constraint is more related to consumption goods and especially to those obtained in casual or informal markets. The same criticism applies to the transaction costs approach. Eliminating this assumption breaks the relation between disinflation and permanent changes in economic activity described by an important string of the literature.

There are other two factors that may generate permanent changes in output and/or growth and consumption booms from the onset: a) The dynamics of inflation; b) The role of the structural change accompanying ERBS. The first factor was analysed by Obstfeld (1985) but not in a context of changing output and growth. The second factor has been mentioned by several authors⁴⁵. However, they do not explain in what way the structural change interacts with the stabilization programme to derive the stylized facts of

⁴⁵ For the Israeli programme by Bruno (1993), for the Mexican programme by Aspe (1993).

successful ERBS.

2.4.2.- The Capital Inflows Problem Without Capital Inflows

Out of the three described topics, this is the one where there has been less research. However, it is an important topic for at least two reasons: First to explain why the symptoms of the problem may occur in absence of capital inflows or even in the presence of capital outflows (the case of México in 1988); second, because there are some voices promoting the control or even bans on capital inflows to avoid current account deficits and real exchange rate appreciations.⁴⁶

The described controls could be useless if the factors behind the symptoms of the capital inflows problem are independent of capital inflows. That seems to be the case of México in 1988. Instead of controlling capital inflows, it is much better to attack the fundamental causes of the problem.

Another problem related to this topic is the use of interest rate policies to stabilize. Can they stop the symptoms of the capital inflows problem? In a context of imperfect capital mobility Calvo and Vegh (1990) conclude that increasing interest rates may generate a perverse effect, increasing consumption. If that result were true also in complete absence of capital mobility, tight monetary policy would fuel the symptoms of the capital inflows problem. That situation needs more research.

⁴⁶See Calvo (1986), Eichengreen, Rose and Wyplosz (1995), Edwards (1995b), Krugman (1996), McKinnon and Pill (1996).

2.4.3.- The Capital Inflows Problem and Balance of Payments Crises under Fiscal Adjustment

According to the review of the literature, there has been much research in this topic. Several hypotheses explain the reasons for this phenomenon and it is difficult to aggregate more to the causes of the problem.

Our interest here will concentrate more on the Mexican case. We will investigate the reasons producing the capital inflows problem of 1990-1994 rather than the mechanics of the balance of payments crisis. Since the hypotheses of self-fulfilling prophecies and vulnerability of capital markets are designed to explain the crisis, we will concentrate in the other two explanations. The Mexican capital inflows problem was produced either by excess confidence in the stabilization programme or by lack of credibility.

Among the two explanations, excess confidence is appealing because of the structural change pursued in México. However, the natural question is why the positive expectations did not take place. The lack of credibility hypothesis seems to have fulfilled possible expectations of renewed inflation in the future (inflation in México was 8% in 1994 and 51% in 1995). The question here is what factors produced a credibility problem when the government pursued a consistent fiscal policy.

UNIT TWO: EXTENSIONS

CHAPTER 3:**DISINFLATION AND REAL ACTIVITY: THE EFFECT OF EXCHANGE RATE
BASED STABILIZATION PROGRAMMES (ERBS) IN THE BEHAVIOUR OF
OUTPUT AND GROWTH.****INTRODUCTION**

Chapter one shows that in some successful ERBS⁴⁷ the reduction of inflation has been followed by higher growth, higher current account deficits and consumption booms from the onset (or the so called capital inflows problem).

The observation is apparently contradictory. If growth rises, there should be an initial reduction of the total expenditure of the economy, because savings are increasing.⁴⁸ To observe both, consumption increases and sustained or long run growth, there must be something that triggers the actual or perceived production capacity of the economy.

The economic literature says that one of the factors explaining the initial expenditure boom of the economy and higher growth is the behaviour of employment. Disinflation affects negatively leisure in a cash in advance economy (see for example De Gregorio (1993) or Roldós (1993)). Other approaches consider the role of inflation over investment. When a cash in advance constraint affects investment, the reduction of inflation increases the size of physical capital in the economy at once (Rebelo and Vegh (1995), Roldós (1995), Uribe (1995)).

Both approaches may be criticized. The first because it is difficult to think that people have really the option of

⁴⁷Israel (1985-), Bolivia (1985-), México (1987-1994) and Argentina (1991-)

⁴⁸The behaviour of consumption in Israel could be compatible with this hypothesis. At the very beginning of the programme private consumption fell and then rose in a very fast way. However, the time in which consumption was below average was very short in order to produce a boom in the rate of growth (see Bruno (1993) or Drazen (1990)).

choosing the number of hours to work (see chapter two). The second argument rests too much on the argument that money is necessary for investment. As time passes, in the modern world that is less plausible. Credit markets are very developed especially for certain goods. The cash in advance constraint or the transaction costs approach seem to be more relevant for consumption.

From the previous analysis two questions emerge. The first asks what is behind the fact that disinflation increases growth. This question is important because traditional approaches link disinflation with higher growth also through the relation between money and investment.⁴⁹ Abstracting for this relation, are there other channels linking directly disinflation and growth?

The second question tries to look for the factors behind the initial increase in consumption in successful ERBS. The question is worthwhile because a branch of the literature considers lack of credibility as the main responsible factor for the initial consumption boom (see Calvo (1986) and Kiguel and Liviatan (1992)). However, it is not clear why successful and consistent ERBS should be non credible.

The chapter is divided in three sections:

First section analyses an ERBS in an endogenous growth model that considers a small economy inserted in a global environment (see the Rebelo model for open economies: Rebelo (1991b)). The main result is that the sluggish reduction of inflation has a positive impact on the growth of the small economy. When inflation is falling forever, there is a permanent impact on growth. When inflation is falling only for a short period, there is a transitory impact on growth and a permanent effect on output. However, in every case the sluggish reduction of inflation reduces

⁴⁹See for example Orphanides and Solow (1990), Hung (1993), De Gregorio (1992) (1993).

consumption at the initial stage and cannot explain the so-called capital inflows problem.

Second section introduces the role of externalities and structural policies in ERBS. In the presence of some externalities and constant returns to scale in the capital stock, structural changes generate capital inflows that may trigger an initial expansion on consumption. Growth is reinforced if, furthermore, disinflation is sluggish.

Finally, the last section compares the results of the chapter under ERBS with other possible results under MBS. The exchange rate regime seems to have an important role in the final outcomes of the chapter.

3.1.- EXCHANGE RATE STABILIZATION IN AN ENDOGENOUS GROWTH MODEL.

To explain why disinflation affects growth, this section sets up a growth model.

The model is constructed mainly of two different sources:

a) The Rebelo model for open economies (Rebelo (1991b)).⁵⁰ We take this model to characterize the production of the economies under consideration. The Rebelo version assumes that all economies of the world have constant returns to scale in an aggregate measure of capital that may include human resources. The possibility of different productivities in open economies implies that all the production of the world can take place in only one location (Rebelo (1991b) pp 1, 24). When productivities are the same, the GDP of the economies of the world is indeterminate. However, the GNP of the particular economies of the world is always determinate.

⁵⁰This model is based in the very well known endogenous growth model also by Rebelo (Rebelo (1991a)).

b) The cash in advance constraint for consumption goods:
This assumption has been widely used by several authors. In models dealing with ERBS has been used by Calvo (1986) (1987). In his analysis of inflation and growth, Stockman (1981) shows that when the cash in advance involves only consumption goods, the capital stock of the economy is unrelated to the rate of inflation. Orphanides and Solow (1990) and Hung (1993) rescue this argument to say that long term endogenous growth is unrelated to inflation when investment goods are not included in the cash in advance constraint. According to the results of this section, when only consumption goods are included in the cash in advance constraint, the acceleration of inflation has real effects on output and growth.⁵¹

The model analyses the particular behaviour of a small economy that interacts with other economies in the world. There are three main actors in this economy: consumers, producers and the government.

+ Consumers:

A representative individual maximises the following utility function:

⁵¹Growth models introduce money in different ways: Sidrausky (1967) and Brock (1974) assume money in the utility function. Stockman (1981) and Hung (1993) set a cash in advance constraint for consumption and investment goods. Stockman (1981) and Orphanides and Solow (1990) consider the possibility of the cash in advance being relevant only for consumption goods (see also Lucas and Stockey (1987)). They set up a model where some goods are subject to the cash in advance constraint while others can be acquired in credit markets). Alogoskoufis and van der Ploeg (1994) work with an overlapping generations model. De Gregorio (1992) (1993) uses a transaction technology: introducing more money reduces an implicit tax caused by shopping costs.

$$\text{Max} \int_0^{\infty} U(C_t) \exp(-\theta t) dt \quad (3.1)$$

The utility function has the traditional characteristics: it is strictly concave and twice continuous differentiable. The maximisation is subject to the private budget constraint

Where:

$$T_t + r_t K_t + r^*_t b_t - C_t - \pi_t m_t = Dm_t + Db_t + DK_t \quad (3.2)$$

C: private consumption
 T: net government transfers
 K: capital stock
 π : rate of inflation
 m: real quantity of money
 b: foreign bonds.
 r: domestic real rate of interest
 r^* : foreign real rate of interest
 D: operator differential: $Dx=dx/dt$

The private sector can save in money, foreign bonds or shares of new capital stock.

It is clear that if

$$r^* > r \quad K = 0$$

$$r > r^* \quad b = 0$$

The model assumes $r=r^*$

$$V = m + b + K$$

V is total wealth for the individual.

There is also a cash in advance constraint for consumption goods:

$$m \geq \phi C \quad (3.3)$$

People carry on money in order to purchase consumption goods.

If $r+\pi>0$ (3.3) will hold as an equality (Calvo (1986)).

The Hamiltonian of the problem is:

$$U(C) + \lambda (T + rV - C(1 + \phi(r + \pi))) \quad (3.4)$$

First order conditions are:

$$U_c - \lambda (1 + (r + \pi) \phi) = 0 \quad (3.5)$$

$$D\lambda = (\theta - r) \lambda \quad (3.6)$$

$$\lim_{t \rightarrow \infty} \lambda_t V_t \exp(-\theta t) = 0 \quad (3.7)$$

Assuming a fixed real rate of interest r but a possible variable inflation, (3.5) and (3.6) give as a result:

$$DC = (\theta - r) \frac{U_c}{U_{cc}} + \frac{\phi D\pi}{(1 + (r + \pi)\phi)} \frac{U_c}{U_{cc}} \quad (3.8)$$

Which is the dynamical optimal trajectory for consumption. If the utility function is isoelastic (see for example Blanchard and Fischer p. 44 (1989)).

$$U = \frac{C^{1 - \frac{1}{\rho}}}{1 - \frac{1}{\rho}} \quad (3.9)$$

Where ρ is the intertemporal elasticity of substitution of present for future consumption.

Then:

$$\frac{DC}{C} = \rho \left(r - \theta - \frac{\phi D\pi}{(1 + (r + \pi)\phi)} \right) \quad (3.10)$$

Observe that if inflation is falling ($D\pi < 0$) there is a positive impact over the rate of growth of consumption with

respect to the case in which inflation is constant.⁵²

+ Production Sector

The model assumes the following production function for the economy as a whole:

$$Y = A_i K_i \quad A = A_i = A_j \quad \forall j \neq i \quad (3.11)$$

Assuming perfect competition

$$r = \frac{\partial Y}{\partial K} = A \quad (3.12)$$

The production function of the particular economy under analysis is identical to the production function of all other economies of the world. The rate of interest, which is equal to the marginal productivity of capital, is the same everywhere. It is independent of size of capital. In a world in which capital can move from one country to another, this fact means that the GDP of any particular economy is indeterminate. However, we will see that the GNP is perfectly determined, as in the Rebelo model for open economies (Rebelo (1991b)).

+ Government

The consolidated government-central bank spends in consumption, net transfers and interest payments of public external debt. It derives incomes from interest payments on its international reserves and the inflation tax. Any disequilibrium is financed printing money, increasing the level of foreign debt or through the reduction of net international reserves.

The consolidated government-central bank budget deficit (COBD) is then defined as

⁵²Obstfeld (1985) derives this result when money and consumption are complementary goods.

$$g + T + rD - rR - \pi m = Dm + DD - DR \quad (3.13)$$

Where g is government consumption, D foreign public debt and R net international reserves.

3.1.1.- Long Run Sluggish Disinflation

This subsection investigates how the real variables of the small economy react when the government decides to reduce inflation sluggishly and in a permanent way. Obstfeld (1985) addressed this argument originally to show that reducing inflation in steps produce real effects in some cases.

Combining (3.13) and (3.2):

$$rS - C - g = DS \quad (3.14)$$

$$S = R + K + b - D$$

S is the total net number of assets of the economy and rS is the GNP. Though the GDP is indeterminate, the GNP is determined by (3.14).⁵³

A convenient additional assumption is that the government of this economy carries out a policy where $m=R$. The monetary base is equal to international reserves.

If the rate of inflation is constant, a balanced growth equilibrium means:

⁵³It is interesting to observe that money is not an asset for the economy as a whole because it is a liability for the government.

$$\frac{DC}{C} = \rho (A - \theta) = \frac{DS}{S} = \frac{Dm}{m} = D \frac{(K + b)}{(K + b)} = \frac{DD}{D} \quad (3.15)$$

Any discrete unexpected change in the rate of inflation will not affect the balanced growth path. It will not change any real variable, either (superneutrality). Since the cash in advance constraint does not include investment goods, there is not relation between the level of inflation and growth.⁵⁴

However, a gradual reduction (increase) in the rate of inflation will have real effects.

Let us assume that the described small open economy sets up an exchange rate based stabilization programme (ERBS). The rate of devaluation of the currency falls sluggishly. In the presence of perfect competition, absence of transport costs and prices abroad constant and equal to one, there will be purchasing power parity (PPP). Setting a trajectory for the rate of devaluation is the same than setting the trajectory for the rate of inflation itself.

Assume that the rule for the reduction of inflation is:

$$\frac{\phi D\pi}{(1 + (r + \pi)\phi)} = -\gamma \quad \gamma \geq 0 \quad (3.16)$$

The policy lasts forever. Given this differential equation, the solution for the rate of inflation is:

$$\pi(t) = (\pi(0) + (\frac{1}{\phi} + r)) \exp(-\gamma t) - (\frac{1}{\phi} + r) \quad (3.17)$$

When t approaches ∞

$$\lim_{t \rightarrow \infty} \pi(t) = -(\frac{1}{\phi} + r) < 0 \quad (3.18)$$

Given this rule, at some moment a revaluation of the currency starts.

Under these assumptions a balanced growth path emerges.

⁵⁴Stockman (1981) and Orphanides and Solow (1990) derive also this result.

$$\frac{DC}{C} = \rho(A - \theta + \gamma) = \frac{DS}{S} = \frac{Dm}{m} = D \frac{(K + b)}{(K + b)} = \frac{DD}{D} \quad (3.19)$$

The faster inflation falls, the more the economy grows. There is a negative association between the acceleration of inflation $D\pi$ and growth.

To analyse what happens to consumption in this case, it is necessary to divide (3.14) by S assuming $g=0$ without loss of generality.

Doing that:

$$r - C_s = G_s \quad (3.20)$$

$$C_s = \frac{C}{S} \quad G_s = \frac{DS}{S}$$

Where G_s is the growth of GNP and C_s is the level of consumption in terms of total assets. When inflation falls in the way already explained, G_s rises forever. Since r is constant, C_s has to fall. S is a predetermined variable. Therefore, consumption falls initially and then grows at a higher rate. The model can explain higher growth but can not explain the initial increase in consumption (see appendix 3.3 to see the effect over the current account)

3.1.2.- Short Run Solutions for Sluggish Disinflation

The assumption that inflation is falling forever is unrealistic. More unrealistic is the possibility of deflations in the long run. The balanced growth result of the last subsection is subject to another criticism:

If originally the world economy was growing at the rate $\rho(A-\theta)$ and now the analysed small economy is growing at the rate $\rho(A-\theta+\gamma)$, an infinite horizon cannot sustain the assumption of small economy.

To rescue the balanced growth exercise in the small open economy we should assume that the size of θ in the analysed country is greater than the world average θ . The small economy is becoming even smaller before its government

introduces the disinflation policy.

Something observed in many countries is that over some period inflation pass from one stable plateau to another, where the level is smaller. In other cases (México 1987-1994) once inflation reached the lower plateau, it jumped to higher levels.

In this subsection, the chapter investigates what kind of short run solution can emerge when inflation is falling sluggishly but only for a short period. Credibility is assumed. People believe that the reduction of inflation is permanent.

The experiment is the following. In period (t_0, t_x) inflation is falling according to the rule

$$\phi D\pi = -\gamma (1 + (r + \pi)\phi) \quad (3.16')$$

Between (t_x, ∞) :

$$\pi = \pi(t_x) = (\pi(0) + (\frac{1}{\phi} + r)) \exp(-\gamma t_x) - (\frac{1}{\phi} + r) \quad (3.21)$$

Starting in t_x inflation becomes a constant.

The analysis is subject to cases where

$$\pi(t_x) \geq 0$$

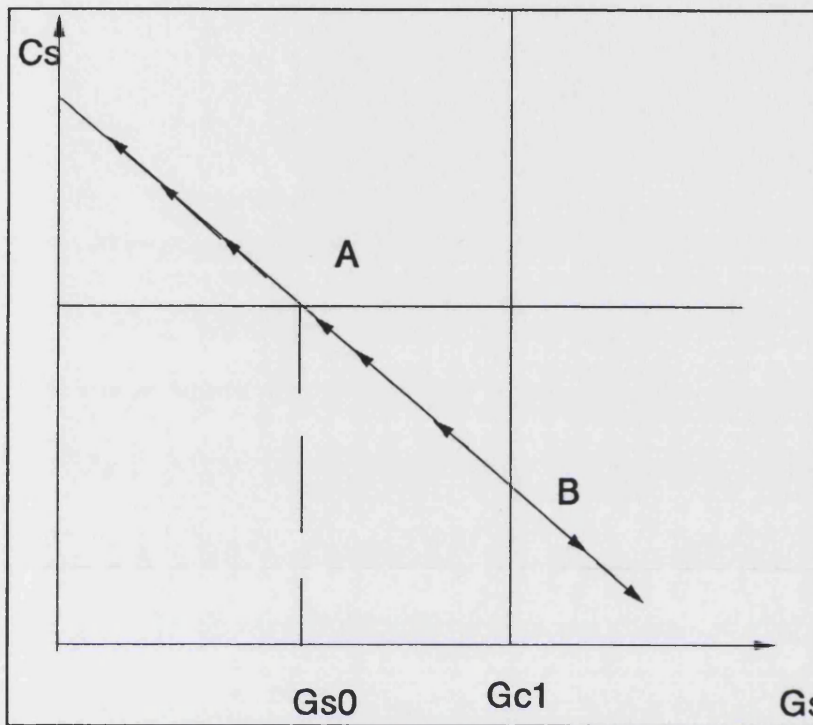
Rewriting (3.20) for convenience

$$r - C_s = G_s \quad (3.20')$$

$$C_s = \frac{C}{S} \quad G_s = \frac{DS}{S}$$

It is possible to analyse the case in figure 3.1

Figure 3.1



The economy starts in point A in figure 3.1, where:

$$G_{s0} = \rho(A - \theta) \quad (3.22)$$

In the interval (t_0, t_x) the rule for inflation reduction implies that consumption is growing at the rate:

$$G_{c1} = \rho(A + \gamma - \theta) > G_{s0} \quad (3.23)$$

That growth is represented by the vertical line in figure 3.1.

From t_x to infinity $D\pi=0$. Balanced growth implies that the economy has to return to point A in t_x . The questions are

what the initial condition for consumption is and what trajectory the rate of growth of GNP follows.

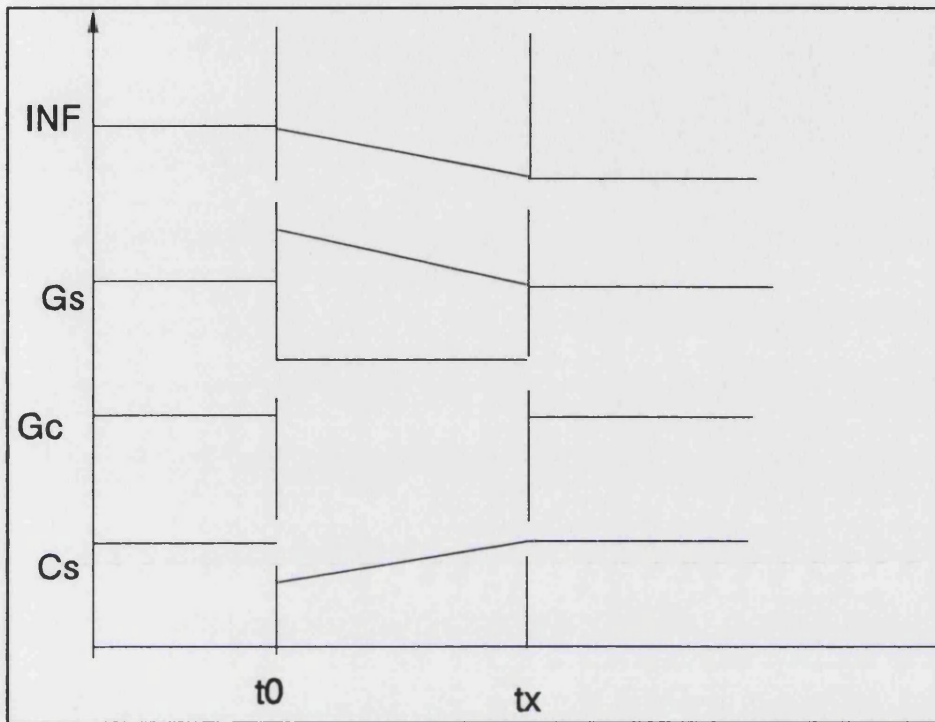
Along the frontier and to the right of the line G_{c1} , $G_s > G_c$ and C_s is falling. To the left of G_{c1} , $G_c > G_s$ and C_s is growing. If the initial condition for consumption were such that $C_{s1} > C_{s0}$ the economy would be in the northwest of point A. Since consumption cannot jump twice⁵⁵, the economy could never reach equilibrium again.

On the other hand, if the initial condition for consumption were to the right of G_{c1} , the ratio C_s would be falling forever. The economy never would return to the balanced growth path in t_x . Therefore, the initial condition for consumption must be between A and B. The exact position being determined by the length t_x . At that precise moment consumption growth is again the original and all the economy is in equilibrium in point A.

The trajectories of the main variables can be observed in figure 3.2.

⁵⁵This is because in this case inflation is predetermined. If inflation changed in discrete ways, consumption could jump again (see Calvo (1986)).

Figure 3.2



Growth increases temporarily. However, the sluggish reduction of the rate of inflation has permanent effects. Consumption falls at the beginning. The results show again that there is not a capital inflows problem.

3.2.- GROWTH, DISINFLATION AND INTERNATIONAL PORTFOLIO MOVEMENTS

So far, the obtained results seem to explain only part of the story of successful stabilization programmes. The observed permanent changes in GNP of the analysed countries are related to disinflation. Nonetheless, the model cannot account for the capital inflows problem.

Soon after disinflation started, the countries analysed in chapter 1 showed high increases in the current account deficit. They quite possibly increased its debt-GDP ratio.⁵⁶ These facts seem to be correlated with higher consumption from the onset.

Several reasons can account for the increase in the total debt-GDP ratio:

- a) A reduction in inflation and its variability often reduces the country risk, inducing higher supply of foreign investment.
- b) Successful ERBS have been accompanied by structural adjustments⁵⁷. These policies include deregulation in several areas, financial liberalisation, privatization of state enterprises and a better fiscal performance (reduction of tax rates and increase in tax bases). It is quite intuitive to think that these changes have opened opportunities to foreign investment, increasing financial flows to these countries (see chapter one).
- c) All the analysed ERBS received foreign aid from international organisations or the United States government (see chapter one). In general these resources were given as debt. As we will see, sometimes that can have real effects.

⁵⁶The measure of total debt of the country is difficult to obtain because usually there are not good statistics for private debt.

⁵⁷see Bruno (1993) for several cases and especially for Israel. Aspe (1993) for México, Morales (1991) for Bolivia, and Cavallo (1992) and Kiguel and Liviatan (1994) for the last ERBS in Argentina

In other cases there was a net transfer of resources. Mexico, for example, negotiated its foreign debt in 1989, obtaining a considerable reduction in the principal and interest payments.

The question addressed is whether the structural policies, the lower perceived risk and foreign aid may be responsible of the observed initial consumption boom.

To answer this last question we will modify the model of the previous section slightly:

First of all the chapter will work again with a small economy but where production takes place geographically. It will be important to know what happen to both the GDP and the GNP.

Second, the analysis will concentrate on the small economy and its constraints and will not ask how the production function of other economies is. That is to say, it will be a general equilibrium analysis for the particular economy but will be a partial analysis with respect to the world.⁵⁸

Third, the chapter will consider the role of the Romer

⁵⁸There are two reasons to do that: a) The Rebelo model for open economies can be highly counterfactual. If productivities are different, production does not take place in countries with low productivity, something that has not been observed in any part of the world; if productivities are the same, production is indeterminate and can take place everywhere or in only one place, or in several countries but not in others. b) The Rebelo model is very strict setting the AK model for all countries in the world. There may be countries with increasing returns and others with diminishing returns. The general equilibrium of a world where some countries have some returns and some other have different returns can be very difficult. Instead, setting one country under the AK model and making sensible assumptions about the flows of capital or the behaviour of its own investment, may give light some issues. Furthermore, this methodology permits to open the discussion of the interaction of economies under increasing returns with economies with diminishing returns (see appendix 3.2)

externality (Romer (1986)) and its influence in growth and consumption.

Fourth, the section will consider an initial financial repression for the small economy. Foreign assets are limited, which can occur for at least three reasons: a) Perceived risk b) Because the government of the small economy limits these flows on purpose (see appendix 3.2), c) Because the governments have followed policies not favoured by international organisations.

The first exercise of this section will show that in the original AK model increasing capital inflows from abroad do not change the GNP of the economy, only increase the GDP. Since there is not a wealth effect, consumption is not affected for these flows.

The previous assertion can be proved setting a modified version of equation (3.14)

$$r(K + f) - C = D(K + f) \quad (3.24)$$

$$f = R + b - D$$

Equation (3.24) determines the behaviour of $f+K=S$ endogenously. If f falls (there are more resources from abroad) and the economy is in the steady state, the only change is an immediate rise in K of the same magnitude than the reduction of f . The GDP of the economy rises but the GNP remains constant. For the same reason, consumption and wealth also remain constant.

To obtain that greater resources from abroad change welfare and output without changing conditions for endogenous growth, it is necessary to change slightly the model seen previously.

This section will change basically the production sector. The production function will be defined now as:

$$Y = AK^\alpha L^{1-\alpha} \quad \alpha < 1 \quad (3.25)$$

Where L is labour.

It is assumed that in this small economy people work a fixed number of hours and do not derive utility from leisure. The utility function of the representative agent remains as previously.

For each firm in the economy there are constant returns to scale in labour and capital. However, for the economy as a whole:

$$A = A_1 K^{1-\alpha} \quad (3.26)$$

Where A_1 is a parameter.

None individual firm recognizes (3.26). It is only when capital increases in all the economy when productivity also increases. This is the Romer externality (Romer (1986), see also De Gregorio (1992a)).

In the presence of perfect competition

$$r = \frac{\partial Y}{\partial K} = \alpha A K^{\alpha-1} L^{1-\alpha} \quad (3.27)$$

$$W = \frac{\partial Y}{\partial L} = (1 - \alpha) A K^\alpha L^{-\alpha} \quad (3.28)$$

Where W is the real wage.

Taking into account (3.26), equations (3.25), (3.27) and (3.28) become

$$Y = A_1 K L^{1-\alpha} \quad (3.29)$$

$$r = \alpha A_1 L^{1-\alpha} \quad (3.30)$$

$$W = (1 - \alpha) A_1 K L^{-\alpha} \quad (3.31)$$

(3.29) implies that in the economy as a whole there are increasing returns. (3.30) shows again that the perceived marginal productivity of capital is, at the end,

independent of the quantity of capital in the economy⁵⁹. (3.31) asserts that the higher the level of capital in the economy the higher are wages. This relation is interesting when all economies of the world have this technology and are similar in productivities. No matter that they are open, those economies with greater levels of capital will pay higher wages. Since labour can not move there is not factor price equalization.

Setting $L=1$ for convenience and adding up $W+rK$ we obtain Y . Again there are not extraordinary profits. That is consistent with the fact that the representative individual derives incomes from wages and his/her capital stock.⁶⁰

Now suppose that r is the same everywhere in the world. The combination of the private and the government budget constraint produces

$$A_1 K + rf - C - g = DK + Df \quad (3.32)$$

Where A_1K is the GDP and A_1K+rf is the GNP. Observe that this equation has not solution for $K+f$, as previously, because A_1 is different from $r=\alpha A_1$.⁶¹

To solve the system the chapter assumes that the small economy is limited in its foreign financial flows or credit. f is given exogenously and we will analyse what

⁵⁹The true marginal productivity of the economy is $A_1L^{1-\alpha}$

⁶⁰The new private budget constraint is

$$W + rK + r^* b + T - C - \pi m = Dm + Db + DK$$

Provided leisure is not in the utility function, nothing happens to first order conditions for introducing labour.

⁶¹We are assuming that $r=\alpha A_1$ but that is not the important point. What is necessary is that the externality is such that the productivity of this economy is higher than the interest rate paid to foreign capital. See appendix 3.2 for an example where r is determined endogenously.

happen when this limit changes.⁶²

It is convenient to make an additional assumption: $\alpha A_1 = 0$. Therefore, in the steady state growth is zero.

Now the question is whether higher financial flows from outside accompanying an ERBS can account for an initial expansion in consumption.

For simplicity and following the previous section, the chapter assumes that inflation falls sluggishly.

The current account of this economy is given by Df . Setting (3.32) in another way (the chapter assumes $g=0$ without any loss of generality).

$$DK = Y + rf - C - Df \quad (3.33)$$

It is also true that

$$Y = A_1 K \quad (3.34)$$

The experiment is the same already explained in last section. Between (t_0, t_x) inflation falls in the way (3.16') indicates.

Given the new assumptions, during (t_0, t_x)

$$C = C_i \exp(\rho \gamma t) \quad (3.35)$$

and

$$f = f(0) \exp(-\Omega t) \quad (3.36)$$

Where Ω is a factor of growth of foreign assets. If $f < 0$ and

⁶²Since long time ago many economists have considered the role of financial repression in the economy (see for example McKinnon (1973)). Appendix 3.2 sets a more formal model of financial repression in which the flow of foreign resources is derived endogenously.

$\Omega < 0$ there is a rise in the total foreign debt of the country.

Before t_0 and after t_x

$$DK = DY = Df = 0 \quad (3.37)$$

In (t_x, ∞)

$$C = C_i \exp(\rho \gamma t_x) \quad (3.38)$$

Substituting these assumptions in (3.37) for the period (t_0, t_x)

$$DK = A_1 K + r f(0) \exp(-\Omega t) - C_i \exp(\rho \gamma t) + \Omega f(0) \exp(-\Omega t) \quad (3.39)$$

The solution for this differential equation is (see Chiang (1984) pp 480-482):

$$K(t) = H_0 \exp(A_1 t) - \frac{(r + \Omega)}{(\Omega + A_1)} f(0) \exp(-\Omega t) - \frac{C_i \exp(\rho \gamma t)}{(\rho \gamma - A_1)} \quad (3.40)$$

$$H(0) = K(0) + \frac{(r + \Omega)}{(\Omega + A_1)} f(0) + \frac{C_i}{(\rho \gamma - A_1)} \quad (3.41)$$

After t_x the balanced growth equilibrium is zero and:

$$C_i \exp(\rho \gamma t_x) = A_1 K(t_x) + r f(0) \exp(-\Omega t_x) \quad (3.42)$$

Equation (3.40) valued in t_x , (3.41) and (3.42) solve for H_0 , $K(t_x)$ and C_i (the initial condition for consumption). The system has analytical solution but the interpretation is not easy. A simple simulation exercise shows the desired results: growth increases as well as the initial condition for consumption when the debt-output ratio rises. A second column shows that growth may increase though total debt remains constant (or falling respect to GDP). In that case,

however, consumption falls at the beginning.⁶³

Table 3.1: Assumptions of simulation 1

	(1)	(2)
$K(0)$	11	11
α	0.1	0.1
A_1	1	1
γ	0.07	0.075
ϕ	0.04	0.04
t_x	1	1
$\pi(0)$	2	2
$f(0)$	-10	-10
Ω	-0.1	9.535
ρ	1.0	1.0

⁶³This simulation was performed using the previous model in a lotus 1-2-3 programme, setting a simple algorithm which gives an arbitrary C_1 to equation (3.40) calculates $K(t_x)$ and $H(0)$ and then check if (3.42) holds. If it does not hold, it gives another C_1 and repeats this operation until convergence.

Table 3.2: Results of simulation 1

	(1)	(2)
Y(0)	11	11
r	0.1	0.1
C(0)	10	10
C(i)	10.132	9.535
$\pi(t_x)$	0.168	0.042
K(t_x)	11.97	11.27
Y (t_x)	11.97	11.27
(f/y) (0)	-0.90	-0.90
(f/y) (t_x)	-0.92	-0.88

Exercise 1 shows an expansion of consumption and positive growth in the period (t_0, t_x) . The debt/GDP ratio passes from 0.9 to 0.92. Inflation passes from 200% to 17%. After $t_x=1$ the economy returns to its zero balanced growth path. There are always positive assets.

Exercise 2 shows that the size of the absolute debt remains constant. However, considerable disinflation increases also growth. In this case the initial condition for consumption is smaller than the original equilibrium.

The intuitive reason why growth and consumption increase when the debt-output ratio rises, is the following:

Increasing K and the debt by one unit, increases output by A_1 and interest payments by αA_1 . The remaining $(1-\alpha)A_1$ additional units increase welfare and are ready for consumption or new investment (see appendix 3.2). The debt-output ratio will increase for sure if $A_1 < 1$.

According to the exercises, growth is positively influenced by two factors: the steady reduction of inflation and the rise in the debt-output ratio. Instead, the capital inflows problem is negatively related to the sluggish reduction of inflation (as we have seen in the previous section) but positively influenced by higher debt-output ratio. In some circumstances the net effect of a negative association between higher debt-output ratio and inflation produces both higher growth and the capital inflows problem.

To avoid an excess of technical matters in the main story, the chapter leaves an interesting exercise for appendix 3.2. In it a small developing economy (or group of economies) subject to constant returns in the capital stock, interact with a more developed world. The most developed countries operate under decreasing marginal returns of capital and initially have a huge amount of capital. The governments of the emerging economies find profitable to limit the access of capital from abroad. They pay a very low rate of interest to the developed world and take the difference between the real productivity of the emerging economy and the rate of interest paid to the developed world (in the same way that a tax). Financial liberalisation increases both the flows of capital from abroad and the rate of interest paid to foreign people. In the presence of the Romer externality, the increase of capital from abroad raises wealth. However, the effect of raising also the net interest rate paid abroad may affect the emerging economy. The model shows that in absence of externalities it is not convenient to open financial markets completely. When the Romer externality is present, it may be convenient to reduce all barriers to foreign capital. If that is the case, the structural change accompanying the disinflation strategy may produce a capital inflows problem.

3.3.- ERBS versus MBS

The chapter has assumed solutions under ERBS. If there is PPP, the gradual reduction in the rate of growth of the exchange rate is also a reduction on inflation. However, it is possible to think that in a world of flexible regimes the monetary authorities manage the rate of growth of money downwards. An equivalent solution for the rate of inflation should appear. The question addressed in this section is whether that policy produces different real results.

Flexible regimes are always related to constant international reserves. Nonetheless, in growth models that assumption is not plausible. An economy growing at high rates is reducing the real size of these assets. It is more sensible to assume predetermined international reserves.

Let us analyse first disinflation in the Rebelo model of section 3.1: as the chapter explains, the gradual reduction of inflation produces an initial condition for consumption smaller than the original. In ERBS the financial solution to this result is to reduce at once the quantity of money (cash in advance constraint). The private sector increases the size of foreign bonds, which produces a reduction in international reserves (Obstfeld (1985)). In MBS the financial solution that produces an equivalent real solution is different. Predetermined international reserves imply a sudden increase in the price level with constant reserves and bonds. Therefore, the reduction of inflation is originally accompanied by an increase in the price level, something that contrasts with other results of the literature (Buiter and Miller (1985), Sargent and Wallace (1973)).

In the case with externalities (section 3.2), initial consumption may rise. ERBS imply a reduction of foreign bonds, a capital inflow and a rise in international reserves (Drazen and Helpman (1987), Obstfeld (1985)). To be equivalent in real terms to ERBS, MBS with predetermined

reserves would imply an appreciation of the currency and a reduction of the price level.

Downward inflexibility of prices would change the result (see Buiters and Miller (1985)). To maintain predetermined prices, consumption must be also predetermined. This can only occur if there is some transitory or permanent unemployment of labour or capital. If capital is unemployed, it is not true that the risk of this economy is lower under the disinflation policy. Neither it is true that the possible financial liberalisation or deregulation open real opportunities to foreign capital.

The last analysis suggests that under downward rigidity of prices and flexible regimes the perception of risk or new opportunities because of disinflation and the structural change is not the same than under ERBS.

CONCLUSIONS

The main conclusions of this chapter are two. The first is that sluggish disinflation promotes higher savings and growth. Consequently, it reduces consumption in a first instance and it is not responsible of the so-called capital inflow problem in credible successful ERBS. The second conclusion is that the structural changes accompanying ERBS constitute the most plausible candidate factor to explain the initial consumption boom in this kind of programmes. Both effects have probably coexisted in successful ERBS. Structural changes reduced the country risk or increased the potential rate of return of the economy (see appendix 3.2), generating actual and perceived capital inflows. In the presence of externalities, they produced higher perceived productivity, promoting higher initial consumption. As capital inflows entered to the economies, stopped a possible reduction of total investment. The contribution of sluggish disinflation was to avoid a greater increase in the initial consumption, which marginally increased the rate of growth of the economy (see

section 3.2).⁶⁴

Several authors would support this view⁶⁵. They assert that the structural change has been a determinant factor of the transformation of the analysed economies. Nonetheless, they do not explain formally and systematically how these effects can take place. It is the role of capital inflows the one that affects positively consumption. We show either in section 3.2 or in appendix 3.2 that this assertion is not obvious. In some plausible cases more capital inflows do not affect consumption or actually deprive it.

With respect to the channel between growth and inflation, the chapter reports that in absence of the traditional relation between money and investment, still there is a negative relation between the acceleration of inflation and growth. However, the reason why disinflation promotes growth is very different to other approaches.

When money is needed to invest, a reduction in the rate of inflation is a reduction in an indirect tax to investment. Therefore, higher investment promotes growth. In our approach, when inflation falls sluggishly, the shadow price of consumption is falling in time (because of the cash in advance constraint). Comparing the present with the future, people decide to consume more in the future, when the price is smaller. Consumption falls initially and that promotes higher savings and growth. It is interesting to notice that a sluggish reduction of the rate of some consumption taxes,

⁶⁴In absence of sluggish disinflation consumption maintains a flat performance (when $r=0$). The initial condition is higher than when inflation is falling in steps. That effect reduces the marginal investment and growth.

⁶⁵Aspe (1993) for México, Bruno (1993) and Bruno and Meridor (1991) for Israel, Cavallo (1992) for Argentina and Morales (1991) for Bolivia. In Britain, the ex-chancellor of the exchequer Nigel Lawson used to say that capital inflows promote higher current account deficits (the so-called Lawson law). That is very related to the analysis of this chapter. (see Cline (1995) for an explanation of the Lawson law).

for example the VAT, would also promote growth.

The chapter also concludes that ERBS could produce different real solutions to MBS especially when capital inflows come from abroad and induce consumption booms. The reason is that under ERBS prices are, by definition, predetermined, whereas in MBS the sudden increase in consumption should be accompanied by a sudden fall of prices, which can not be obtained without some unemployment.

As a corollary of these conclusions there are some policy recommendations: the first is that the way in which governments design stabilization policies affects the patterns of growth. A same inflation target can produce very different solutions for the real system and growth when it is achieved at once or little by little. If the intention of the policy maker is to increase growth, the chapter recommends to reduce inflation sluggishly.

The second policy recommendation is that though the structural change (namely financial liberalisation or better opportunities for foreign investment) seems to have promoted welfare in some ERBS, it is not necessarily true that it will always do that (see for example appendix 3.2). Policy makers have to evaluate and balance the costs and benefits of particular structural policies.

CHAPTER 4:**DISINFLATION, CONSUMPTION CYCLES AND THE CAPITAL INFLOWS
PROBLEM: THE ROLE OF ECONOMIC POLICY****INTRODUCTION:**

In several countries, stabilization programmes based in the exchange rate (ERBS) have produced the capital inflows problem: a situation characterized by huge private capital inflows, current account deficits and a real appreciation of the exchange rate.

Popular analyses of that problem stress the role of capital mobility. Capital inflows have been advocated as the responsible evil of the final consequences of some ERBS (collapsing exchange rate regimes, reductions in consumption, big recessions). Informal analyses recommend reducing or stopping capital movements to overcome the undesirable results of some stabilization programmes.

Formal studies also question the role of capital mobility in stabilization programmes. Dornbusch (1982) considers that Argentina made a mistake maintaining an open capital account during the 1981 crisis.⁶⁶ Calvo (1986) asserts that in his cash in advance model zero capital mobility would not produce the symptoms of the capital inflows problem. He calls for further research.

In a very strict sense, the capital inflows problem cannot appear without the presence of capital inflows because they are part of the definition. However, some empirical observations create doubts about the nature of the problem:

a) During 1988, there were capital outflows in México. The

⁶⁶This position has been criticized by Dellas and Stockman (1993) who assert that capital controls only make the situation worse.

ERBS started at the end of 1987. The symptoms of the analysed problem appeared the year of the capital outflows (see chapter one).

b) In 1994, the final year of the ERBS in México, the current account continued deteriorating. Private capital inflows were small with respect to the size of the current account deficit (14 billion dollars and 28 billion dollars respectively). The final result was a substantial decline in international reserves and a collapse.⁶⁷

These facts suggest that the symptoms of the capital inflows problem may appear for different reasons to those of capital inflows.

Given this introduction, the aim of this chapter is to find alternative explanations for the capital inflows problem. The motivation is based on the Mexican episode of 1988 explained in chapter one. However, the objectives are mainly theoretical. The chapter looks for the causes behind the problem rather than to be an accurate description of what happened in some specific cases. Anyhow, the explanation seems also compatible with the Mexican episode, as one section of the chapter explains. At the end the main objective is to have a better knowledge of what the role of capital mobility is in the emergence of the problem.

The chapter is divided in five sections. The first develops an optimising model under zero capital mobility. Since the main interest is to find factors other than capital inflows producing the described problem, the chapter develops a model under zero capital mobility. This is the best way to

⁶⁷Here it is very important to stress that the reduction in capital inflows and the collapse took place even though the public balance was in surplus. Other studies, like the one of Krugman (1979), Drazen and Helpman (1987), Calvo (1987) and van Wijnbergen (1988) derive capital outflows as a consequence of deficits in public finances.

isolate other possible explanations.

Second section analyses the emergence of the symptoms of the capital inflows problem in absence of capital mobility.

Third section analyses the instruments of policy to cope with the problem.

Section four describes a simulation of different policies to combat the capital inflows problem using parameters and data of the Mexican economy.

Finally, the last section reflects on the effectiveness of tight monetary policy to cope with the problem.

There are two main results in the chapter:

First, capital mobility is neither necessary nor sufficient to produce the symptoms of the capital inflows problem. They may appear when there is lack of credibility and monetary policy is accommodative.

Second, in the presence of government bonds monetary policies aimed to avoid the capital inflows problem may produce unsustainable financial costs for the government. For that reason there is an incentive to abandon these policies partially, which produces a peculiar consumption cycle observed in cases like México in 1988.

The chapter concludes that it is better to generate credibility through stronger institutions than to fight the problem with a costly monetary policy.

4.1.- A DYNAMIC OPTIMISATION MODEL UNDER ZERO CAPITAL MOBILITY

This section presents a cash in advance model very similar to the model of the previous chapter. The main difference is in the production sector. A small economy produces one perishable and tradeable good in constant amounts. The economy under consideration is open to trade but closed to capital mobility. In principle, people can save in money

and government bonds. There are two main actors in the economy, the government and the private sector.

+ The problem of the private sector

A representative individual maximises an intertemporal utility function that depends upon consumption.

$$\text{Max} \int_0^{\infty} U(C_t) \exp(-\theta t) dt \quad (4.1)$$

$$U_c > 0 \quad U_{cc} < 0$$

Where

$U(\cdot)$: Instantaneous utility function

C_t : Consumption in period t

θ : Subjective discount factor of the utility

The problem is subject by two constraints: the private intertemporal budget constraint and the cash in advance constraint.

$$Y_t + T_t + r_t B_t - C_t - \pi_t m_t = Dm_t + DB_t \quad (4.2)$$

$$m \geq \phi C \quad (4.3)$$

Where:

Y_t : Given output

T_t : Net government transfers

B_t : Government bonds

r_t : real interest rate

π_t : Rate of inflation

m_t : Real money in terms of tradeable goods

D : Operator difference: $Dx = dx/dt$; x being any variable

(4.2) is the intertemporal budget constraint and (4.3) the

cash in advance constraint.

Standard procedures yield to the first order conditions (see chapter 3)

$$U_c - \lambda (1 + (r + \pi)\phi) = 0 \quad (4.4)$$

$$D\lambda = (\theta - r) \lambda \quad (4.5)$$

$$\lim \lambda_t V_t \exp(-\theta t) = 0 \quad (4.6)$$

Where

$$V_t = m_t + B_t \quad (4.7)$$

From (4.4) and (4.5)

$$DC = (\theta - r) \frac{U_c}{U_{cc}} + \frac{(Dr + D\pi)\phi}{(1 + (r + \pi)\phi)} \frac{U_c}{U_{cc}} \quad (4.8)$$

(4.8) defines an optimal trajectory for consumption. Since the utility function is strictly concave, consumption increases in time when the rate of interest is greater than the subjective discount factor of the utility. It falls gradually when the nominal interest rate is increasing on time.

+ The Government

The behaviour of the consolidated government-central bank budget deficit (COBD) is characterized by the equation:

$$g_t + r_t B_t + T_t - r^* R_t - \pi_t m_t = Dm_t + DB_t - DR_t \quad (4.9)$$

Where g is government consumption, r^* is the foreign interest rate and R_t the level of international reserves. As in the previous chapter, the interest payments of international reserves are incomes for the consolidated government-central bank. Differently from chapter three, this time the government may finance its deficit with bonds.

We are going to assume that the foreign rate of interest is equal to the subjective discount factor of the utility always ($r^*=\theta$).

+ General Equilibrium

The chapter assumes again PPP and a crawling peg regime. It also assumes that inflation abroad is zero. Therefore:

$$\pi_t = \frac{DE}{E} \quad (4.10)$$

Inflation (π) is equal to the rate of growth of the nominal exchange rate E .

Combining equations (4.9) and (4.2)

$$Y_t + r^* R_t - C_t - g_t = DR \quad (4.11)$$

Since foreign bonds are assumed to be zero, the equation of the current account is the same than the equation of motion of international reserves. Differently from the previous chapter, now R is predetermined.

Equations (4.3), (4.8), (4.9), (4.10) and (4.11) solve for five variables of the set m , C , r , π , B and R . To determine what variables are unknowns, it is necessary to specify the monetary policy. The government can follow a policy in which changes in the real quantity of money are always equal to changes on international reserves. That kind of policy has been studied by Calvo (1981) and Velasco (1993) in models under zero capital mobility. However, the government can follow other policies. It can fix the rate of interest r , or the quantity of government bonds, B , for example.⁶⁸

⁶⁸ Velasco (1993 pp. 264) says about his zero capital mobility model

" Now the possibilities of running down reserves enlarge the government's financial options. We must therefore specify how the authorities choose among the various alternatives."

Different instruments of monetary policy can survive at least in the short run. In the long run, any policy that does not reach the system to a steady state can survive only if the transversality condition (4.6) holds.⁶⁹

4.2.- THE CAPITAL INFLOWS PROBLEM WITHOUT CAPITAL INFLOWS

In his excellent 1986 paper, Guillermo Calvo suggests that capital inflows are necessary to generate the symptoms of the capital inflows problem in a cash in advance model.⁷⁰ In our opinion there are two crucial elements behind this result: a) absence of alternative assets to money and b) an adequate fiscal adjustment.

This section will prove now that the Calvo assertion is true only in absence of alternative domestic assets to money and in the presence of fiscal adjustment. We will show first that absence of alternative domestic assets to money and absence of present fiscal adjustment produce one variety of the capital inflows problem. In a second stage,

⁶⁹McCallum (1984) and Obstfeld (1985) show examples where the transversality condition holds even though the used models do not have steady state.

⁷⁰The exact quotation by Calvo (1986 pp. 1328) is:
 " A matter of considerable interest is the role of international mobility. It is quite clear that, in terms of the model of section II, results would be drastically different in no capital mobility were allowed. For example, if initially neither the government nor the private sector hold international bonds..., the only possible solution would be $C=Y$ for all t , independently of the exchange rate policy. The prohibition of capital mobility would therefore succeed in eliminating the distortionary effect of temporary policy!"

In page 1329, Calvo says:

" In sum, then, there seems to be a possible case for imposing capital controls on capital mobility in situations where, for some reason, the stabilization is, or is expected to be, temporary. More research is, however, needed before we are able to reach a useful conclusion in this respect."

we will show that the presence of alternative domestic assets may produce the symptoms of the problem even though there is fiscal adjustment.

4.2.1.- The Capital Inflows Problem in Absence of Alternative Assets to Money

To prove what the previous paragraph says, we take equation (4.2). In absence of government bonds, this equation is transformed in:

$$Y_t + T_t - C_t - \pi_t m_t = Dm_t \quad (4.12)$$

Together with the cash in advance constraint, (4.12) determines both consumption and money, which can be seen in figure 4.1.

Figure 4.1

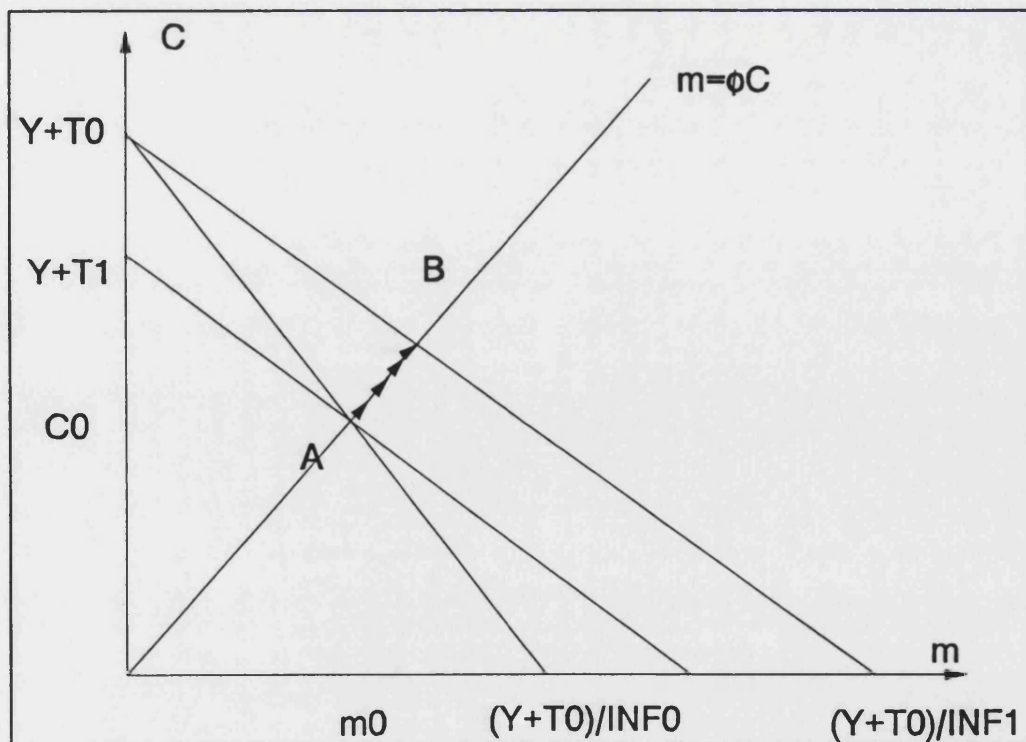


Figure 4.1 shows equation (4.12), with negative slope and well defined limits $((Y+T_0), (Y+T_0)/\pi_0)$, and the cash in advance constraint (4.3). The original equilibrium is in A with C_0 units of consumption and m_0 units of money. Let us assume that the economy is in equilibrium originally, in such a way that

$$Y + r^* R - C_0 - g_0 = 0 \quad (4.13)$$

Suppose an ERBS reducing inflation from π_0 to π_1 . The private budget constraint (4.12) shifts to the right but nothing happens to the cash in advance constraint. A new potential equilibrium is in B. The private sector is accumulating money and, by the cash in advance constraint, is consuming more. That produces a current account deficit. All of these are symptoms of the capital inflows problem. The counterpart of the real solution is a continuous reduction of international reserves. If the government does not reduce transfers at some moment, there will be a collapse of the exchange rate regime. It will occur before the private sector reaches the point B. As Auernheimer (1987) explains, collapses in a zero capital mobility economy show very different patterns to those under perfect capital mobility. When the exhaustion of international reserves takes place, there is a sharp devaluation that produces a drastic reduction of consumption and money.⁷¹

However, an adequate fiscal adjustment would maintain the economy in equilibrium. If at the moment in which inflation falls, transfers fall from T_0 to T_1 , the equilibrium remains always in A.

An interesting observation of this solution without alternative assets to money is that the utility function

⁷¹This solution contrasts sharply with models under perfect capital mobility since here there is not way of attacking the foreign exchange market (see Auernheimer (1987)).

does not play any role. Here there are many constraints, relatively speaking. The cash in advance constraint and the private budget constraint determine the endogenous variables of the system. For such reason, credibility is irrelevant. The absence of capital markets precludes any possible substitution between assets.⁷²

Nonetheless, absence of capital mobility is not the same that absence of capital markets. The presence of alternative assets to money opens possibilities for different varieties of the capital inflows problem. Among them one analogous in real terms to the Calvo (1986) model.

4.2.2.- Non Credible ERBS and Full Monetary Accommodation

Now the chapter recovers the assumption of government bonds in the economy. Under these circumstances the government sets a temporary stabilization programme where:

In the interval of time $(0, t_x)$ $\pi = \pi_1 < \pi_0$ (4.14)

Between (t_x, ∞) $\pi = \pi_0$ (4.15)

A full monetary accommodation implies that the government fixes the nominal rate of interest and carries on open market operations to maintain that rate.

In the context of crawling peg regimes and zero capital mobility, fixing the nominal rate of interest is the same than fixing the real interest rate. At least for a while, the government can do that since it prints the bonds and there is not any additional competition in capital markets.

This subsection will work under the assumption that the government sets $r = \theta$ always. It will be quite

⁷²A situation where the government sets $R = m + K$, K being a constant, would produce the Calvo solution, without any change in real variables. However, in his model Calvo (1986) does not specify any policy and seems to refer to all situations under zero capital mobility.

straightforward to show that the real solution of this problem is strictly analogous to the Calvo (1986) model. Therefore, capital inflows are not necessary to produce the capital inflows problem. Furthermore, it can occur independently of the present state of public finances.

Given these assumptions, (4.8) shows that $DC=0$ both in $(0, t_x)$ and (t_x, ∞) . However, consumption in both periods is not at the same level since by (4.4) and (4.5).

$$\frac{U_{c1}}{(1 + (r + \pi_1))} = \frac{U_{c2}}{(1 + (r + \pi_0))} \quad (4.16)$$

Where C_1 is the level of consumption in period $(0, t_x)$ and C_2 is the level of consumption in period (t_x, ∞) . Since $\pi_1 < \pi_0$, $C_1 > C_2$. At the same time, $C_1 > C_0 > C_2$ because the present value of consumption is given. Therefore, between $(0, t_x)$ there is a current account deficit and international reserves are falling.

$$Y + r^* R - C_1 - g = DR < 0 \quad (4.17)$$

As long as expectations of inflation do not change, this result is independent of the behaviour of the actual COBD. If the public sector is always in equilibrium:

$$g + T + rB - r^*R - \pi_1 m_1 = DB - DR = 0 \quad (4.18)$$

International reserves are falling and the government is reducing its domestic debt. Any change in the actual fiscal policy, without changes in the future perceived inflation, will change the behaviour of government bonds only. That situation contrasts with the case where there are not alternative assets to money, in which actual fiscal policy had a very important effect in the dynamics of consumption.

Once the government reduces inflation in a temporary basis, money jumps. Full monetary accommodation maintains the real interest rate given an equal to θ . There is an open market operation. The government reduces the quantity of bonds at

once and injects money to the system. Afterwards, consumption and money remain constant but international reserves are falling continuously. In t_x , the government increases again the rate of depreciation of the exchange rate. Consumption falls to C_q and there is a reversion of the original open market operation. Money falls and government bonds increase at once.

The symptoms of the capital inflows problem appear in the same way than in the perfect capital mobility case. The real solution is the same (see Calvo (1986)), being the difference in the financial markets. Money does not come from abroad but from open market operations under a monetary rule. There is not way in which the government can influence the behaviour of international reserves, which is an opposite result to the perfect capital mobility case (see chapter 5). Instead, the behaviour of the public deficit determines the path of government bonds.⁷³

4.3 POLICIES TO COMBAT THE CAPITAL INFLOWS PROBLEM

In the presence of alternative domestic assets to money, actual fiscal policy is irrelevant to combat the capital inflows problem.⁷⁴ However, monetary policy may be effective.

This section investigates the use of two different monetary policies to overcome the consequences of the credibility problem. The first one is a policy of zero monetary accommodation and the second is a policy of partial monetary accommodation. The main conclusion is that

⁷³In this solution balance of payments crises are independent of the behaviour of the government budget constraint in the short run. We have assumed implicitly that the level of international reserves is sufficiently large. If it were small, the exchange rate regime would collapse before.

⁷⁴Provided it does not change expectations of future inflation.

both policies may overcome the symptoms of the capital inflows problem. However, if credibility is very low, the financial costs of the policies may be so large that the government has strong incentives to abandon them.

4.3.1.- Lack of Credibility and Zero Monetary Accommodation

As we have already comment, in a zero capital mobility economy there is scope for monetary policy. In the previous example, the government set $r=0$ and with the credibility problem that fact produced the symptoms of the capital inflows problem. Now this subsection will investigate the consequences of setting the policy $m=R+K$, where K is a constant. In that policy, the government prints nominal money according to the behaviour of international reserves and the rate of inflation. For such reason, changes in real money are associated to changes on international reserves in a one to one basis.

If the government follows the described policy, equation (4.11) becomes

$$Y_t + r^*m_t + r^*K_t - C_t - g_t = Dm_t \quad (4.11')$$

This equation together with the cash in advance constraint (4.3) determine m and C (see appendix 4.1 to check the stability conditions.)

It is easy to observe that these two equations do not include the rate of inflation and then this one is neutral to the system.⁷⁵ For the same reason credibility is also neutral to the real solution. The policy is then equivalent to a zero monetary accommodation policy.

Nonetheless, the credibility problem continues when people perceive the stabilization programme as temporary. If now the problem can not be reflected in higher consumption, it will be reflected on the behaviour of the real interest

⁷⁵Appendix 4.1 shows that even though inflation is neutral under this policy, devaluation is never neutral.

rate.

To prove this assertion, we take equation (4.8). Knowing that during $(0, t_x)$ $\pi = \pi_1$, setting $C = C_0$ and assuming an isoelastic utility function (see chapter 3), we obtain:

$$(r - \theta) = \frac{Dr \phi}{(1 + (r + \pi_1)\phi)} \quad (4.19)$$

Where ρ is the intertemporal elasticity of substitution in consumption.

Solving for Dr :

$$Dr = r^2 + \left(\frac{1}{\phi} + \pi_1 - \theta\right)r - \theta \left(\frac{1}{\phi} + \pi_1\right) \quad (4.20)$$

Which is a non linear differential equation in the real interest rate.

In the steady state $Dr=0$ because $\theta=r$. If the term $(1/\phi) + \pi_1 - \theta$ is greater than zero and $r > \theta$, r shows an unstable path growing without bound. Instead, if $(1/\phi) + \pi_1 - \theta < 0$, there could be some cycles of the rate of interest followed maybe by an explosive path towards very high positive values.

The analytical solution of (4.20) is not easy. Because of the existence of a constant term, the Bernoulli solution is not applicable to this case (Chiang (1984) pp.491-492). However, an heuristic argument will show us the qualitative path of interest rates under the credibility problem.

Suppose that $(1/\phi) + \pi_1 - \theta > 0$, condition that will hold always when ϕ and θ are both smaller than one.⁷⁶ Assume also that the beliefs of people are:

$$\text{During } (0, t_x) \quad \pi = \pi_1 < \pi_0 \quad (4.21)$$

⁷⁶These are plausible assumptions. In México, for example, the ratio of money to consumption is around 10%. On the other hand, the rate of discount of the utility must be around the real rate of interest, which is difficult to think is greater than 100%.

During (t_x, ∞) $\pi = \pi_0$ (4.22)

and

from (t_x, ∞) $r = \theta$ (4.23)

Instead of an initial condition for the real rate of interest, there is a terminal condition. This one asserts that starting from t_x the real rate of interest will be equal to the subjective factor θ again. That is a plausible assumption. People expect normality conditions in the long run.

Using the fact that the lagrange multiplier λ is predetermined (see equation (4.8)) and that consumption remains in C_0 always:

$$\frac{U_{c0}}{(1 + (r(t_x) + \pi_1)\phi)} = \frac{U_{c0}}{(1 + (\theta + \pi_0)\phi)} \quad (4.24)$$

Equation (4.24) shows that the nominal rate of interest is predetermined.

and then

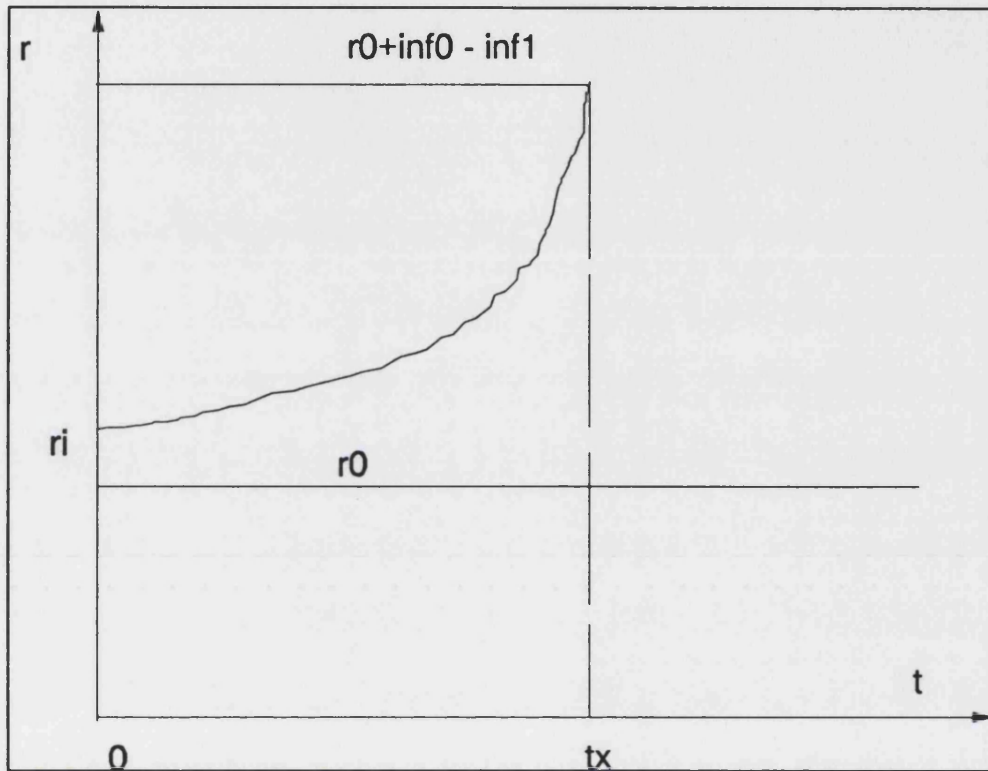
$$r(t_x) = \theta + \pi_0 - \pi_1 \quad (4.25)$$

The real rate of interest just before the government reverses the stabilization programme, has a direct and unitary relation with the difference between inflations π_0 and π_1 . If the reduction of inflation is temporary and huge, so will be the real rate of interest before the end of the programme.

Given this information, it is possible to check what must be the initial condition for r and its trajectory.

Equation (4.20) shows that if $r = \theta$, $Dr = 0$. When $r > \theta$, $Dr > 0$ and if $r < \theta$, $Dr < 0$. Therefore, the initial value of r (r_1) must be greater than $\theta = r_0$. r is growing continuously until it reaches the value $\theta + \pi_0 - \pi_1$ in t_x .

Figure 4.2



The described trajectory of the real interest rate may represent a severe financial cost for the government when the stabilization programme is very ambitious. The COBD is:

$$g + T + rB - r'R_0 - \pi_1 m_0 = DB \quad (4.26)$$

Since $C=C_0$, $m=m_0$ and $R=R_0$. The COBD determines the trajectory of the domestic debt.

When the problem of credibility is such that r is growing too much, either domestic debt is growing enormously or the

fiscal effort to stabilize through higher taxation becomes unsustainable. Lack of credibility may generate dramatic increases in the real interest rate.⁷⁷

4.3.2.- The Capital Inflows Problem and Partial Monetary Accommodation

The financial costs of reverting the capital inflows problem completely may be very high. However, between the policies of full monetary accommodation and zero monetary accommodation there is an option. That is to set a higher but unique interest rate and follow a full monetary accommodation at that new real interest rate.

Though the described policy seems attractive, there are several problems for the government when it follows the prescription:

First, from the beginning the government is assuming a higher financial cost over the public debt.

Second, it is not clear for how long the government must set this higher rate.

Third, it is necessary to analyse the effectiveness of the policy.

With respect to the second problem, the government could theoretically set a higher interest rate forever. However, that would produce a secular increase in consumption⁷⁸. The absence of a steady state may be consistent if the transversality condition holds. However, it may be inconsistent with artificial limits to the size of the

⁷⁷Agénor (1994b) and Velasco (1993) assert that increases in real interest rates in ERBS occur even though there is perfect credibility. Nonetheless, this chapter shows that lack of credibility does affect real interest rates.

⁷⁸See for example Drazen and Helpman (1987) and Obstfeld (1985) for situations where consumption can increase forever with a given output.

public debt.⁷⁹ Therefore, another possibility is to set a temporal policy of higher interest rates.

Nonetheless, and related with the third problem, the use of temporal higher interest rates has to be carefully studied. Calvo and Vegh (1990a) show that this policy may actually generate current account deficits and consumption booms. Instead of combat the capital inflows problem, higher real interest rates would fuel it.⁸⁰

For the purposes of this chapter, we will assume that given the credibility problem the government sets a higher real interest rate for the duration of the stabilization programme. The chapter proves that this policy deprives always consumption initially with respect to the case of full monetary accommodation (see appendix 4.2). However, since r becomes greater than θ , consumption starts growing and again it is very difficult to combat the capital inflows problem.

The policy is described as:

During $(0, t_x)$ $r=r_1 > \theta$ and $\pi=\pi_1 < \pi_0$ (4.27)

During (t_x, ∞) $r=\theta$ and $\pi=\pi_0$ (4.28)

⁷⁹Sargent and Wallace (1982) fix a limit for the size of government bonds (see also Drazen (1985) and Liviatan (1984) for related topics). McCallum (1984) proves that a situation where debt tends to infinity may be compatible with transversality conditions, so the limits imposed by Sargent and Wallace are not necessary. Obstfeld (1985) shows examples where there are secular current account surpluses or deficits. The first case implies a raise of the financial total assets of the economy to infinity in the long run. However, that is consistent with transversality conditions.

⁸⁰Calvo and Vegh (1990) use also a cash in advance model. However, they assume that the government bonds provide liquidity services. That assumption is crucial for getting their results.

Since during (t_x, ∞) $Dr=D\pi=0$ and $r=\theta$, C is constant in an endogenous value C_q .

During $(0, t_x)$ and assuming the isoelastic utility function:

$$\frac{DC}{C} = \rho(r_1 - \theta) > 0 \quad (4.29)$$

and then

$$C(t_x) = C(i) \exp(\rho(r_1 - \theta)t_x) \quad (4.30)$$

Where $C(i)$ is an initial endogenous value for consumption that takes place at the moment where r rises to r_1 .

Since the lagrange multiplier λ is predetermined, it must be true that

$$\frac{U_c(C(t_x))}{(1 + (r_1 + \pi_1)\phi)} = \frac{U_c(C(q))}{(1 + (\theta + \pi_0)\phi)} \quad (4.31)$$

Which means that λ just before the end of the programme is equal to λ just after the programme.

Finally, integrating the overall budget constraint of the economy

$$\int_0^{t_x} C(i) \exp(\rho(r_1 - \theta) - \theta)t + \int_{t_x}^{\infty} C_q \exp(-\theta t) = \frac{Y_0 - g_0}{\theta} + R(0) \quad (4.32)$$

Which implies

$$\frac{C(i)}{(\theta - \rho(r_1 - \theta))} (1 - \exp((\rho(r_1 - \theta) - \theta)t_x)) + \frac{C_q}{\theta} \exp(-\theta t_x) =$$

$$\frac{Y_0 - g_0}{\theta} + R_0 \quad (4.33)$$

Equations (4.30), (4.31) and (4.33) solve for $C(i)$, $C(t_x)$ and C_q . Appendix 4.2 shows that if $\rho=1$ the system is linear and has analytical solution. It also shows that in such case higher r_1 reduces the initial level of consumption.

The way in which the model works is the following:

If there is a credibility problem, full monetary accommodation with $r=\theta$ will generate the Calvo (1986) solution. In $t=0$ consumption will grow at once but will remain constant during $(0, t_x)$. In t_x it will fall to a smaller value. On the other hand, when $r_1 > \theta$ during $(0, t_x)$, initial consumption will fall below the level of the Calvo model⁸¹ but will grow during the transition. The questions that we address are:

- 1) What is the necessary increase in the real interest rate to avoid the initial consumption boom? that is to say to set $C_1 = C_0$.
- 2) What is the necessary increase in r to avoid the long run consequences of the capital inflows problem? That is $C_q = C_0$.

The answers of these questions will show the financial costs of reverting the capital inflows problem. For both cases, the graphical solution for consumption will be:

⁸¹But not necessary below C_0 .

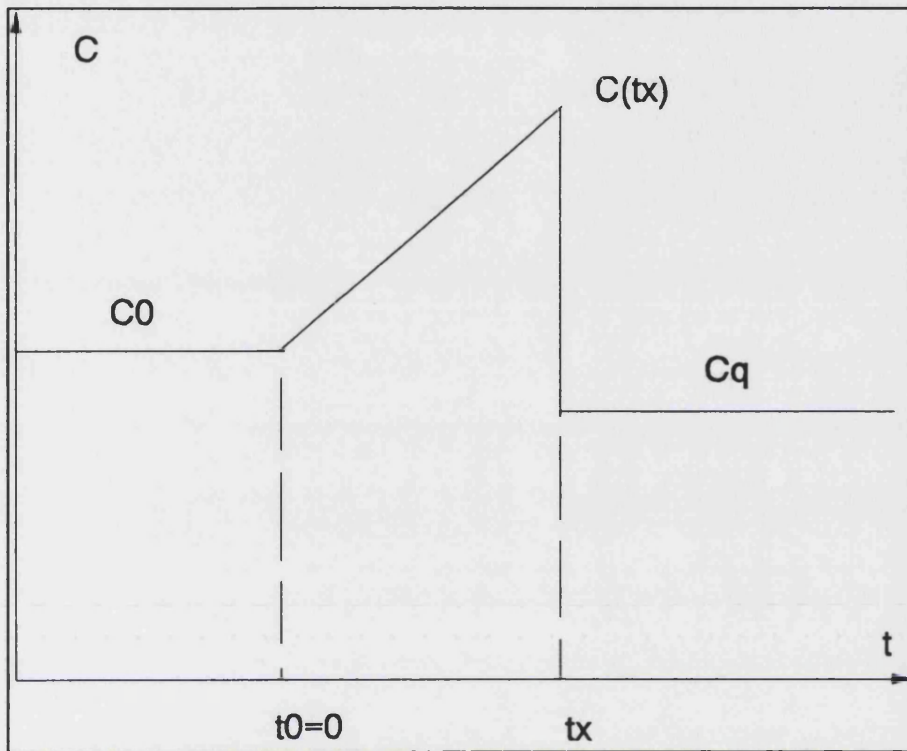
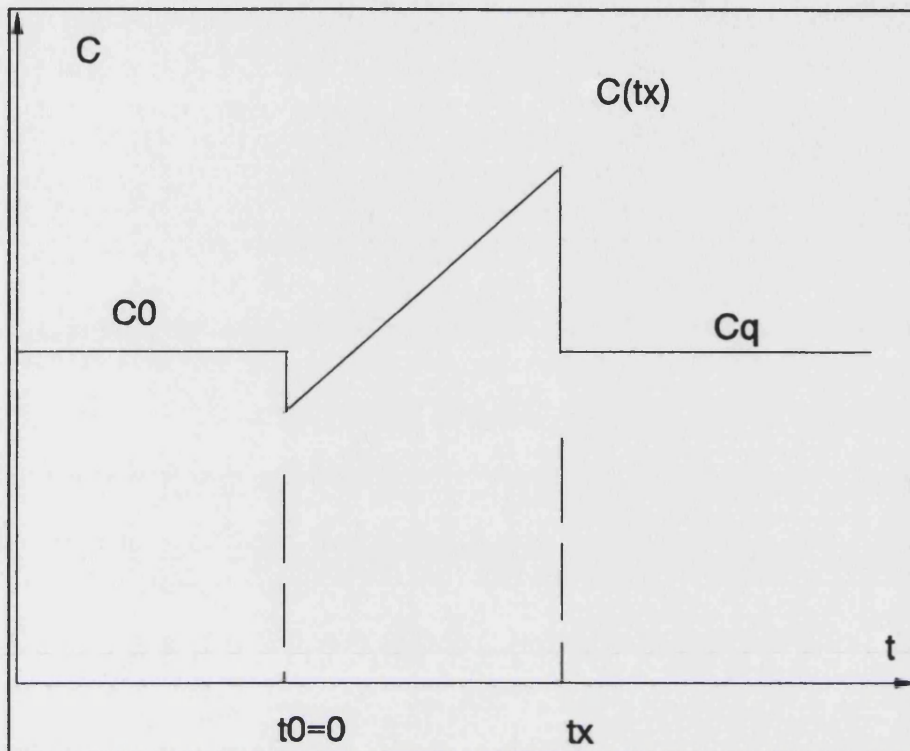
Figure 4.3: Case $C(i)=C_0$ 

Figure 4.4: Case $C_q=C_0$ 

In figure 4.3 $C(i)=C_0$ but since consumption grows in the period $(0, t_x)$, there must be a reduction of the long run consumption C_q ($C_q < C_0$). A new modality of the capital inflows problem appear. With C growing and C_0 being its initial value, there is again a current account deficit and a loss of international reserves. This time, however, under higher real interest rates.

In figure 4.4 the government avoids the long run reduction of consumption with an even higher real interest rate. Nonetheless, it cannot avoid the emergence of a current account deficit at sometime. If $C_q=C_0$, it means that starting from t_x international reserves must be the same

than the original. There is first a current account surplus and then a current account deficit. At the end, there is an unavoidable reduction of consumption with respect to the highest peak.

4.4.- SOME SIMULATIONS FOR THE CASE OF MEXICO

Chapter one shows that in at least one occasion México experienced the symptoms of the capital inflows problem without having capital inflows. For that reason, it is useful to analyse the costs of reducing or eliminating that problem for that specific country.

To analyse the described costs, this section carries on two simulation exercises that consider some parameters and data of the Mexican economy.

In a first instance, these exercises simulate a reduction of inflation similar to the observed in the period 1987-1988 (from 140% on average to 100%). A second stage compares different monetary policies and derives the necessary increase in the real interest rate to get some goals.

The section is divided in two subsections. Both of them consider that people believed that the stabilization policy would be aborted at the end of 1988.⁸²

First subsection asks three specific questions:

- a) What was the necessary increase in the real interest rate to avoid an initial consumption boom (namely $C_1=C_0$)?
- b) What should be the increase in r to avoid the long run consequences of the credibility problem, namely $C_q=C_0$?
- c) What are the results of the model under full monetary accommodation and $r=\theta$?

Second subsection asks what the trajectory of the real interest rate should have been to maintain a constant level

⁸²In 1988 there was a rumour that the stabilization policy would be abandoned at the end of the year, when the new administration took office. Chapter five explains why stabilization programmes in México are affected by political changes.

of consumption during 1988.

Both exercises assume that the changes in the rate of interest to combat the capital inflows problem last for one year.

4.4.1.- Simulation under Partial Monetary Accommodation

The first simulation uses the extension of the model already shown in subsection 4.3.2. It assumes an intertemporal elasticity of substitution ρ of 2.5, which is a value calculated by Arrau (1990) in a model of transaction costs.⁸³ To calculate ϕ , we simply took the historical relation of the monetary aggregate $m1$ over private consumption, which is around 0.1.

The data used for the simulation corresponds with the national accounts identity of 1987. We assume a hypothetical steady state taking the observed values of output, consumption (private and public) and investment (I). A shadow foreign interest rate of 10% is also assumed. The following equation derives the total foreign assets of the economy.

$$f(0) = \frac{C_0 + I_0 + g_0 - Y_0}{r^*} \quad (4.34)$$

The consistent foreign assets f have a negative value of 90% of the GDP (Y).

In order to be able to generate a steady state, θ is calculated in 10% also.

The exercise considers that between the components of f , only international reserves show dynamics. Other private foreign bonds remain constant always.

The fictitious steady state is the following:

⁸³The model used by Arrau (1990) corresponds qualitatively to this model, in the sense that different rates of inflation between periods affect consumption today.

Table 4.1. Simulation 2: Fictitious Steady State

$Y(0)$	4883.7
$I(0)+g(0)$	1377.5
$f(0)$	-4500
$C(0)$	3044.95
θ	0.10
$r(0)$	0.10
ϕ	0.1
$t(x)$	1.0
$\pi(0)$	1.4
$\pi(1)$	1.0

Y_0 , I_0 , g_0 , C_0 and f_0 are valued in millions of pesos of 1980.

Since the data is in annual basis, the subjective duration of the programme (t_x) is supposed to be 1.

The solutions for the questions already described are:

Table 4.2: Simulation 2: Behaviour of Consumption and Interest Rate

	(a)	(b)	(c)
$C(0)$	3044.95	3044.95	3044.95
$r(1)$	0.1334	0.155	0.10
$C(i)$	3044.95	2887.7	3296.9
$C(t_x)$	3289.7	3284.5	3296.9
$C(q)$	3032.9	3044.5	3017.7

(a) Policy of avoiding the initial consumption boom ($C_i=C_0$)

(b) Policy of avoiding the long run consequences of the capital inflows problem ($C_q=C_0$)

(c) Full monetary accommodation ($r=0$).

In order to avoid the initial consumption boom, the real interest rate has to be around 13%. With respect to the fictitious steady state, r has to increase 3.3 percentage points. However, in México, previously to the ERBS, real interest rates were negative (see chapter 1). The increase in the real interest rate under the credibility problem had to be huge according to this exercise, as it was in reality. Even in these circumstances, the described policy does not avoid the symptoms of the capital inflows problem.

To avoid the long run consequences of the credibility problem, the rate of interest should have increased to more than 15%. A current account deficit would have emerged also at some point.

Finally, a full monetary accommodation policy has a long run cost for society of 0.4% lower long run consumption than in the case where $C_1=C_0$. The same measure with respect to the case that avoids the long run costs is 0.9%.

The exercise also calculates the financial cost of the domestic debt in each case. For this concept we understand the interest payments of such debt divided by the GDP. Considering an initial public domestic debt of 30% of GDP⁸⁴, the estimated cost of the debt under the three policies is:

⁸⁴That was the size of the public domestic debt at the end of 1987

Table 4.3. Simulation 2: Estimated Cost of the Domestic Debt

(in % of GDP)

Policy $C(i)=C(0)$	4.02
Policy $C(q)=C(0)$	5.01
Full Monetary Accommodation	3.01

There are almost two percentage points of difference between the cases of full monetary accommodation and the one that eliminates the long run effects on consumption. Though it might not sound too much, the additional fiscal effort to overcome the credibility problem has to be added to the initial effort to reduce inflation.

Still there are some additional short run costs for a government that tries to overcome the credibility problem. In the presence of non tradeable goods, an initial reduction of consumption would probably produce a recession (see appendix 4.3). Given this fact, the taxes linked to these activities would fall. For that reason, the government would not have incentives to follow a very tight monetary policy in the short run. Instead, the model suggests the intermediate policy ($C_1=C_0$) as one that reduces the problem but does not eliminate it at all. That prescription seems to be consistent with the Mexican facts in 1988 and 1994.⁸⁵

⁸⁵Sachs, Tornell and Velasco (1995) assert that the monetary policy followed by the Mexican authorities was not sufficiently tight.

4.4.2.- Behaviour of Interest Rates under Zero Monetary Accommodation.

The second exercise simulates the hypothetical behaviour of interest rates under zero monetary accommodation ($C=C_0$ always).

In subsection 4.3.1, the real interest rate was characterized by the differential equation:

$$Dr = r^2 + \left(\frac{1}{\phi} + \pi_1 - \theta\right)r - \theta\left(\frac{1}{\phi} + \pi_1\right) \quad (4.35)$$

We have already explained why if $\theta=r$, $Dr=0$.

Since the analytical solution of this equation is very complex, we used an approximation in discrete time. The assumption is that in monthly terms the real interest rate behaves as (4.35). Then, the monthly interest rate is:

$$r_t = r_{t-1} + r_{t-1}^2 + \left(\frac{1}{\phi} + \pi_1 - \theta\right)r_{t-1} - \theta\left(\frac{1}{\phi} + \pi_1\right) \quad (4.36)$$

Changing the calculation from annual to monthly terms also changes some parameters. ϕ is now 1.2^{86} . Since the calculation is now in monthly terms, $\theta=0.1/12=0.008333$ and the rate of inflation falls from an average monthly rate of 0.11666 ($1.4/12$) to 0.08333 ($1.0/12$).

The exercise assumes that π falls from π_0 to π_1 . Inflation is the same every month of the year. People believe that the duration of the stabilization programme is only for one year and after that inflation will rise to an annual rate of 1.4 again.

As we have already explained in subsection 4.3.1, it has to be true that in the last month of the year:

⁸⁶This is because money is a stock but consumption is a flow. Since monthly consumption must be on average twelve times smaller than annual consumption, the relation between the stock of money and monthly consumption is now $0.1(12)$.

$$r_{12} = \theta + \pi_0 - \pi_1 = 0.05842 \quad (4.37)$$

In december, the monthly real interest rate must be 5.84%, that is 70.04% in annual terms. That unsustainable value has never been observed in México.

Given all this information, a simple programme⁸⁷ for equation (4.36) consists of finding r_1 such in the last month $r_{12}=0.0584$. The programme solves for the trajectory of the real interest rate.

Table 4.4.- Simulation 3: Trajectory of Real Interest Rates (% annual terms)

January	10.3
February	10.33
March	10.41
April	10.56
May	10.84
June	11.39
July	12.45
August	14.50
September	18.43
October	26.09
November	40.09
December	70.04

The trajectory is exponential. During more than six months of the year, real interest rates remain relatively stable.

⁸⁷The programme is to simulate (4.36) and was made in Lotus 123.

Afterwards, they increase to very high levels. The average real rate of interest for the year is 20.5%. It would generate a financial cost for the public debt of 6% of the GDP, the double of case of full monetary accommodation. However, the fact that interest rates are growing in an exponential way, implies that the situation is unsustainable.

4.5.- SOME REFLECTIONS ON THE USE OF INTEREST RATES TO STABILIZE

Throughout the exposition we have assumed that expectations of inflation are exogenous. For that reason, in the presence of alternative assets to money actual fiscal policy does not have any effect. However, in a more realistic environment it is plausible to think that future inflation is expected to rise if there are fiscal imbalances today. Several authors⁸⁸ have analysed the case where an unsustainable fiscal deficit produces a balance of payments crisis in the future. In the cash in advance model, Calvo (1987) asserts that when there are unsustainable fiscal deficits, future expected inflation rises and the symptoms of the capital inflows problem appear.

In the particular problem analysed in this chapter, the use of the rate of interest to combat the symptoms of the capital inflows problem presents an interesting challenge. Suppose that for given expected higher inflation, the government decides to increase the rate of interest. The objective could be, for example, to avoid the long-run effects of the credibility problem (namely $C_t=C_0$). The increase in the rate of interest represents an additional

⁸⁸See for example Krugman (1979), Flood and Garber (1984), Obstfeld (1984), Sachs (1986), Calvo (1987) and van Wijnbergen (1988). For a good summary see Flood and Garber (1994).

fiscal cost to the government. In plausible scenarios, it would increase even more the future expected inflation. But if that is the case, then for the same increase in the rate of interest actual consumption rises and the government is unable to fulfil its desires. A further increase in interest rates is needed. This one would produce even higher future inflation and can undermine the intentions of the government again.

The fact that expected inflation may have a huge elasticity with respect to the actual fiscal deficit, can generate an unstable situation. There the government is unable to use the rate of interest to cope with the symptoms of the capital inflows problem.

A similar situation to the one just explained happens under a policy of zero monetary accommodation. Lack of credibility produces a temporal increase on real interest rates. The fiscal deficit deteriorates and it is likely that future expected inflation increases more. That implies a pattern of even higher interest rates and so on. If the situation is unstable, the rate of interest should go to infinity. The government would be unable to follow this policy, having to accept the presence of some modality of the capital inflows problem.⁸⁹

⁸⁹The nature of the cash in advance constraint is responsible of the potential unstable situation already explained. Money and consumption are linked in a one to one basis. Expectations of higher inflation in the future increase the demand for money and consumption today. Higher interest rates tend to reduce consumption in the presence of given expectations of inflation (see appendix 4.2). However, their indirect effect over the public deficit may generate the opposite result.

CONCLUDING REMARKS

In 1988 and 1994 México experienced the symptoms of the capital inflows problem without capital inflows. The episodes were accompanied with huge real interest rates. From these observations, several questions have emerged: First, why is it possible that these symptoms appear without capital inflows?

Second, what is the effectiveness of interest rates policies to control these situations?

Third, what is the role of economic policy about this problem?

This chapter have tried to answer these questions in a cash in advance model. The main conclusion is that when it is a problem, the so-called capital inflows problem is not a matter of capital inflows but a credibility issue. Therefore, the ingredients for the symptoms to emerge will be there as long as stabilization programmes have low credibility.

The government can use interest rate policies to overcome the described symptoms. However, these policies generate at least two additional problems:

a) If credibility is very low they generate unsustainable financial costs.

b) Huge financial costs may reinforce expectations of higher inflation in the future. That situation produces an indirect effect that may generate a perverse effect in which higher interest rates fuel the symptoms of the capital inflows problem.

Because of this explanation, it is much more recommended to generate credibility than to try to fight the problem with short run monetary policies. Institutions and long run rules are the answers. In the particular case of México, the political system has been quite responsible of consumption cycles, as chapter five will describe more

accurately. Changes in the political rules will probably have a strong effect in expectations. In this sense, the fact that democracy is increasing in that country seems to be a very good new.

CHAPTER 5:**STABILIZATION UNDER SHORT TERM GOVERNMENTS:****IS IT CONVENIENT FOR THEM TO CREATE LACK OF CREDIBILITY?****INTRODUCTION**

At the end of 1987, the Mexican government set up a stabilization programme (ERBS) that lasted for seven years. During this time, inflation fell from 160% to 7%, public finances were in equilibrium since 1990 and the symptoms of the capital inflows problem appeared from the onset. In December 1994, the programme collapsed with a sharp devaluation. During 1995 the deepest recession since 1932 developed.

The collapse of the Mexican stabilization programme has generated an important discussion in the literature. México adopted many market reforms accompanying the stabilization programme. Capital markets became more open and there was a structural change in many areas. Deregulation, financial liberalisation and privatization of state owned enterprises are among the main structural reforms. The balance of payments crisis of 1994 seems to defy the advantages of openness and market oriented changes.⁹⁰

Following this line, several authors sympathize with the idea that very open economies are vulnerable and may be subject to self-fulfilling crises.⁹¹ However, in a very recent article Paul Krugman (Krugman (1996)) challenges that hypothesis. He proposes that collapses occur because

⁹⁰Many analysts discuss now on the convenience of open capital markets and market oriented reforms. See for example Edwards (1995b), Eichengreen, Rose and Wyplosz (1995), McKinnon and Pill (1996), Obstfeld (1996), Krugman (1996)

⁹¹See for example Cole and Kehoe (1996), Eichengreen, Rose and Wyplosz (1995), Obstfeld (1996) and Obstfeld and Rogoff (1995).

the government is doing something wrong. The Krugman assertion is important for the case of México and for the intentions of this chapter.

In the last Mexican stabilization programme public finances were in equilibrium or surplus almost all the time. For this reason, it seems that the public finance approach to the capital inflows problem and balance of payments crises cannot be a good explanation of the Mexican collapse. Nonetheless, this chapter concludes that behind the Mexican capital inflows problem and its eventual crisis there was a perceived relaxation in public finances. The chapter then rescues the Krugman hypothesis. The government was doing something wrong.

In order to prove what the previous paragraph says, the chapter analyses the Calvo approach to the capital inflows problem and balance of payments crises (Calvo (1986) (1987), Calvo and Vegh (1993)). Straightforward calculations show that lack of credibility in ERBS reduce the necessary fiscal adjustment to stabilize in the short run. It also increases international reserves and, as Calvo and Vegh (1993) assert, can raise the level of activity for a while. Some short term governments could be tempted to generate lack of credibility to increase their popularity and ease the fiscal adjustment.

The chapter shows that in some historical situations, the nature of the Mexican political system could be the main factor behind capital inflows problems or balance of payments crises. The presence of governments with certain characteristics implies that by creating lack of credibility they may get some goals.

A way in which the government can create lack of credibility is the following:

In México, it is a commonplace to say that the president chooses his successor. A government with short term goals will be tempted to choose a future government whose projected expenditure is huge. The strategy of the first

government will be to reduce inflation and to set an equilibrium target for the overall budget deficit. Expected inflation will be higher because of the future high expenditure. The demand for money will increase in the present period as well as private consumption. The inflation tax will fall but not as in the case where inflation is always low. At the same time, international reserves will increase, reducing the net interest payments on the consolidated foreign debt. Employment can also rise.

Still the government follows an apparent consistent fiscal policy. There is a current account deficit but is financed with speculative private capital inflows in a one to one basis.

The problem is that the experiment is unsustainable. At some moment there must be an adjustment of the current account. This one will produce a drastic reduction of consumption and international reserves, but by that time the short term government will not be in power anymore.

The chapter shows that the kind of government described does not survive in power, unless there are uncertainty and mistakes. The combination of governments with short term goals and the fact that they can choose their successors produce a high rate of inflation in the long run. In the last twenty five years the average rate of inflation in México has been greater than 30%. Our study suggest that we should not ignore political factors in this result.

At the end, we compare this explanation based on lack of credibility with the alternative of excess confidence. This one proposes that because of the structural adjustment, people believe that the future performance of the economy will be very good.⁹² Maybe because the government convinces

⁹²Krugman (1995) assert that there was an excessive optimism in the structural reforms of emerging markets. We have already said that these reforms did have an impact in

them, people overestimate the future perspectives, consuming and bringing money from abroad. The result is observationally equivalent to the model under lack of credibility. However, a simple test presented in appendix 5.1 shows that for the excess confidence hypothesis to hold, people in México should have believed unlike rates of growth of GDP.

The chapter is divided in four sections:

Section one presents an overview of the 1987-1994 Mexican stabilization programme. Section two shows the Calvo (1986) model and derives possible advantages for short term governments creating lack of credibility. Section three presents a political model where the actual government chooses its successor. It obtains the complete sequence of future governments and investigates when lack of credibility may be endogenous. Finally, section four compares the explanations of lack of credibility and excess confidence for the case of México.

several countries (see chapter three) but still it can be true that people expected even more. The case of the last ERBS in Argentina may be a good example. The economy is much better than before the programme in terms of growth and level of GDP. However, consumption grew too much from 1991 to 1995 and there was an adjustment and a recession in 1995. After that, the economy has grown again at relatively high levels.

5.1.- THE MEXICAN STABILIZATION PROGRAMME OF 1987-1994: GENESIS AND CRISIS

Chapter one shows some stylized facts of the Mexican stabilization programme (1987-1994). These observations are sufficient motivation for writing two chapters. However, it is in this chapter when we make a broader investigation of how the programme started, developed and finally collapsed. The stabilization programme lasted for seven years (December 1987-December 1994). It was an ERBS considered as very successful (see for example Bruno (1993)). During the programme, inflation fell from 160% to 7%. Growth increased from 0% (average) in the period 1983-1987 to 2.8 % over the next six years

Since 1988 the reduction of inflation was huge (from 160% to 50%). The current account started to deteriorate and there were capital outflows. High real interest rates prevailed, producing a negative behaviour on the public sector operational balance. The economy started to recover quite fast from six years of stagnation and private consumption grew considerably.

At the beginning of the programme the financial situation of the country was fragile. Each year México paid out around eight or nine billion dollars in interest payments of foreign debt. This burden together with the strict amortization schedule of the principal, implied a liquidity problem and a need to resort to the inflation tax. With the debt overhang, the prospects of long run stability seemed dubious (see Aspe (1992) (1993) for a detailed explanation of the problem).

When President Carlos Salinas de Gortari (from now on CSG) took office in December 1988, there was a fair decision to reschedule foreign debt. In August 1989, México adopted the Brady Plan, which reduced transfers abroad (see Aspe (1993)). From that point on, the stabilization programme took a different pattern. Capital flight stopped and was

replaced by huge private capital inflows. The current account deficit deteriorated but the capital account surplus was greater in absolute value, producing an accumulation of international reserves. Real interest rates fell and all the definitions of the public balance went into surplus. By 1992, the domestic credit of the central bank to the government disappeared. Economic growth increased⁹³ and private consumption continued growing considerably (see chapter one).

Since 1987, the International Monetary Fund (IMF) and the World Bank supported the stabilization programme. By 1992, the reduction of public external debt had been substantial. México then concluded its adjustment programme with the IMF.

The government claimed that México had entered a new economic era. In 1990 negotiations for a free trade agreement with United States and Canada started. They lasted until 1993, when the Presidents of the three countries signed the North American Free Trade Agreement (NAFTA), and it was approved by the respective congresses.

Although inflation fell considerably during these years, economic activity started showing negative signs since 1992. Growth declined. By 1993 it fell to 0.4%. The real rate of interest remained high. According to Dornbusch (1993) and Dornbusch and Werner (1994) the real exchange rate was overvalued.

The government intended to introduce more flexibility to the exchange rate mechanism. Before November 1991, there was a preannounced crawling peg. At the end of that year, a target zone was adopted. The upper band devalued in a preannounced way, while the lower band remained fixed. Nonetheless, some analysts consider that the mechanism was not enough. Dornbusch (1993) recommended a devaluation

⁹³At least during 1989-1991

consistent with an inflation target of around 20% per year, like in Chile or Colombia. In 1993 Paul Krugman expressed concern on the overvalued currency.

The response of the government to these criticisms was to resort to the argument that an appreciation of the currency is a natural consequence of a more open economy.⁹⁴ With respect to the slowdown of growth, the official position related it to the structural change in the productive sector due to privatisation, trade liberalisation and deregulation. The argument was that this process required adjustment in employment and huge transaction costs.⁹⁵

The reduction of growth in the economy was followed by a higher current account deficit and a huge capital account surplus. In the seventies and eighties, these inflows were considered a problem, the capital inflows problem as we have seen before. In México the government claimed that capital inflows were produced by restored confidence in the future performance of the country. It claimed, also, that the current account deficit was a natural consequence of capital inflows. Therefore, a sudden reduction in them would reduce the current account deficit without any risk of an exchange rate collapse.

But the most important argument of the government in favour of the programme was the fiscal adjustment. According to it, stabilization programmes where the public deficit is

⁹⁴Dornbusch and Werner (1994) agree with the argument but consider that the orders of magnitude of the variables in México indicate an important overvaluation of the currency.

⁹⁵The general idea is that at the beginning of the programme the structural change raises growth. At some stage, however, it produces the opposite result as a consequence of transactions costs and higher transitional unemployment. See Bruno (1993) and Bruno and Meridor (1991) for a similar discussion in the case of Israel.

under control cannot fail.⁹⁶ Adjusted public finances guarantee permanent disinflation.⁹⁷

Some historical evidence (Uruguay (1978-82), Chile (1979-82) and several European countries in 1992 (Spain, Portugal, Italy and Britain)) shows that balance of payments crises (bpc) can occur in the presence of fiscal adjustment. However, the government resorted in the explained argument throughout the "sexenio"⁹⁸.

The political and economic situation deteriorated in 1994. An uprising revolution surged in the southern state of Chiapas. The candidate of the official ruling party⁹⁹ for the presidency, Luis Donaldo Colosio, was assassinated in March. Capital inflows fell dramatically (from 30 billion dollars in 1993 to 14 billion dollars in 1994). The current account deficit remained very high (28 billion dollars-more than 8% of GDP), which discredited the argument that it was produced by capital inflows. Surprisingly, growth increased.

Fears of devaluation started very soon in the year, which

⁹⁶The government claimed that a current account in the presence of fiscal adjustment is not a problem. For example, Aspe (1993 page 225) writes:

"For instance, in the late 1970's, a sizable current account deficit was a cause for concern. Usually it was the result of an overheated economy pushed by the government spending and financed by increasing external borrowing. Nowadays a current account deficit of the same size, relatively to GDP, means a strong expansion of private investment financed by capital repatriation or direct flows from foreign investment into the country."

Pedro Aspe was Minister of Finance of the CSG government.

⁹⁷The government was borrowing an argument by Nigel Lawson in Britain (see Cline (1995)): current account deficits produced by the private sector are not a problem (see chapter three).

⁹⁸Sexenio is the six years period of the President in México.

⁹⁹Partido Revolucionario Institucional (PRI)

can be detected in the composition of the public debt. An important part of private capital inflows were saved in public bonds. Among them, the so-called Certificados de la Tesorería (CETES) were particularly favoured by foreigners. However, though the rate of interest of CETES was high, they are not indexed to the exchange rate. Other government bonds (TESOBONOS) are indexed to the US dollar. Since March 1994, there was a portfolio movement against CETES and in favour of TESOBONOS. By the end of the year, TESOBONOS accounted for almost 40 billion dollars. The maturity of 75% of this debt was not more than six months ahead.

Several speculative attacks took place during 1994. The huge amount of international reserves could cope with them. The government did not change the exchange rate policy. Low inflation was considered priority.¹⁰⁰

The response of the government to the political shocks was to consider them as transitory (see Leiderman and Thorne (1995)). Monetary policy, instead of being contractionary, was relatively expansionary. International reserves were falling but the real quantity of money was growing, creating an important domestic credit of the central bank to the government (Edwards (1995b), Edwards et al (1995), Sachs, Tornell and Velasco (1995)).

President Ernesto Zedillo (EZ) took office in December 1994. Fifteen days after, a speculative attack reduced the level of international reserves from twelve billion dollars (bd) to five bd. A further three bd flew away in the following three days. A sharp devaluation of 70%¹⁰¹ occurred and the new government adopted a floating regime.

The amount of TESOBONOS owned by foreigners and their short

¹⁰⁰In 1994 inflation reached 7% the lowest in 25 years. Not for a long time, unfortunately.

¹⁰¹Additional devaluations took place during 1995. The cumulative depreciation of the peso against the U.S dollar between December 1994- January 1996 was around 130%.

maturity make people fear debt repudiation.¹⁰² The US government instrumented a bail out covering the value of these bonds (even against some congressmen). Guillermo Calvo had suggested a similar scheme in April (see Dornbusch and Werner (1994) and the comment by Calvo). The loan was an implicit debt rescheduling and has exacerbated nationalistic feelings both in México and US.¹⁰³

The costs of bringing down the current account deficit were enormous. Private consumption fell by almost 15% in 1995. GDP fell by 7%. As in Chile in 1982, there was a crisis in the banking system. Fiscal adjustment, the favourite argument of the CSG government to defend the ERBS, proved not to be a sufficient condition to avoid bpc.

Apart from economic considerations, México now faces many political problems. Former President Carlos Salinas blamed President Zedillo for mismanagement of the exchange rate policy. Before, no former President had blamed new governments. The debate has concentrated in who is responsible of the crisis. The reality is that the size of the current account in the CSG government could not be

¹⁰²By the end of 1994 the Mexican government was illiquid. For several authors that fact has been considered the main cause of the crisis. Calvo and Mendoza (1996a) (1996b) argue that people followed herding behaviour when the capital flight started. Sachs, Tornell and Velasco (1995) share this view.

Though the observation is valid, the cause of the crisis was not a self-fulfilling prophecy but several years of current account disequilibrium. At the end, herding behaviour and self-fulfilling expectations exacerbated the damages of the crisis.

¹⁰³A very polemic discussion started in México because the loan has the incomes of oil exports as a guarantee. The Congress in México is dominated by the ruling party PRI but the opposition deputies voted against the loan. Several people assert that some deputies from PRI were personally against the loan.

In United States Senator D'Amato has opposed vigorously to the rescue package to México. Groups related with the most conservative wing of the Republican Party are also opposed to increase the loan.

compatible with the moderate rate of growth of the economy (see section 5.4. and appendix 5.1. See also Edwards (1995b), Edwards et al (1995) and Oks and van Wijnbergen (1995) for very related topics). On the other hand, it is true that some mistakes of the new government created more problems.¹⁰⁴

5.2.-EXPLOSIVE CURRENT ACCOUNT DEFICITS AND CONSISTENT MACROECONOMIC POLICIES

As some chapters and the general introduction of this thesis explain, the capital inflows problem has been observed also in consistent ERBS. Some countries like Argentina, Bolivia and Israel have had current account deficits during stabilization programmes. Nonetheless, those have fallen in time to levels that can be managed. In the experience of México, however, the current account deficit reached unsustainable levels, producing a balance of payments crisis (bpc) at the end of 1994.

This section analyses public finances in a non-credible ERBS, obtaining the result that temporal reductions of inflation reduce also the necessary fiscal effort to stabilize. They also increase the level of international reserves and probably can raise the level of economic activity for a while (see for example Calvo and Vegh (1993)). For these reasons, it seems that some short term governments may be tempted to create lack of credibility in

¹⁰⁴One day before the government abandoned definitely the foreign exchange market, the Minister of Finance announced a 15% devaluation. Nobody believed that it could be sufficient to stop the speculative attack and in fact this one was more aggressive. Several authors (Edwards et al (1995), Leiderman and Thorne (1995), Savastano, Roldós and Santaella (1995) and Sachs, Tornell and Velasco (1995)) consider there was economic mismanagement in the last year of CSG government. On the contrary, Gil Díaz and Carstens (1996) consider that economic policy was in principle right. According to them the crisis was produced by political shocks.

their own stabilization programmes.

To prove what the previous paragraph says, the first two subsections show the Calvo (1986) cash in advance model. Then, in a third subsection, we analyse what the results for public finances are. We prove also that an observational equivalent result can be obtained when instead of lack of credibility there is excess confidence in the future performance of the economy. Therefore, if the actual government wants to reduce the fiscal effort to stabilize and to increase consumption, it can try to convince people that the actual rate of inflation is unsustainable. It can also try to convince people that the future performance of the GDP of the economy will be great. The results on fiscal and macroeconomic grounds will be the same at least in the short run.

5.2.1.- The Cash in Advance Model

The Calvo (1986) model assumes a perfect capital mobility small economy. People maximise the following intertemporal utility function. (See also chapters three and four).

$$\int_0^{\infty} U(C_t) \exp(-\theta t) \quad (5.1)$$

Where

C_t : Private Consumption

θ : Subjective discount factor of the utility

The maximisation is subject to the constraints

$$Y_t + r_t b_t + T_t - C_t - \pi_t m_t = Dm_t + Db_t \quad (5.2)$$

$$m_t = \phi C_t \quad (5.3)$$

Where

Y_t : Output (given)

b_t : Foreign bonds
 r_t : foreign real rate of interest
 T_t : Government Transfers
 π_t : Rate of inflation
 m_t : Real quantity of money
 D : Operator Difference

(5.2) is the private intertemporal budget constraint and (5.3) the cash in advance constraint. People save in money and foreign bonds.

The model assumes that output is given.

First order conditions of the problem are

$$U_c - \lambda (1 + (r_t + \pi_t)\phi) = 0 \quad (5.4)$$

$$D\lambda = (\theta - r_t)\lambda \quad (5.5)$$

$$\lim_{t \rightarrow \infty} \lambda_t V_t \exp(-\theta t) = 0 \quad (5.6)$$

Where

$$V_t = m_t + b_t \quad (5.7)$$

U_c is the marginal utility of consumption. Since the utility function is assumed to be strictly concave, $U_c > 0$ and $U_{cc} < 0$. If furthermore we assume $r = \theta$, $D\lambda = 0$. Therefore, the term¹⁰⁵

¹⁰⁵Several authors assume $r = \theta$. See for example Calvo (1986) (1987), Drazen and Helpman (1987) (1988), Obstfeld (1985). If r is different from θ there is not steady state and yet the model is consistent (see Obstfeld (1985) for an example). However, to rescue the steady property for any value of r and θ , Obstfeld (1981) assumes that θ has a dynamic trajectory and van Wijnbergen (1988) takes the Blanchard (1985) approach under finite horizons.

$$\frac{U_c}{(1 + (r_t + \pi_t) \phi)} = \lambda = \text{constant} \quad (5.8)$$

The behaviour of the consolidated government-central bank budget deficit (COBD) is:

$$g_t + T_t - r_t R_t - \pi_t m_t = Dm_t - DR_t \quad (5.9)$$

Where:

g_t : Government consumption

R_t : International reserves

The COBD is financed printing money or reducing international reserves. Foreign debt is normalized in zero and assumed constant.

Combining (5.2) and (5.9)

$$Y_t + r_t f_t - C_t - g_t = Df_t \quad (5.10)$$

$$f_t = b_t + R_t \quad (5.11)$$

Where f represents total foreign assets in the economy (foreign bonds plus international reserves) and Df is equal to the current account.

Since the economy is open to goods and capital markets, and we assume perfect competition, there is PPP. If inflation abroad is zero, the rate of growth of the nominal exchange rate is equal to inflation.

5.2.2.- Credible and Non Credible ERBS

A credible ERBS sets $\pi = \pi_A < \pi_0$ from (t_0, ∞) . π_0 is inflation in the original steady state previous to t_0 .

(5.8) shows that if inflation is constant, C is also constant. If the economy starts in a steady state, it has to remain in it, otherwise foreign assets would explode upwards or downwards without limit (see equation 5.10).

Therefore:

$$C = Y_0 + rf_0 - g_0 = C_0 \quad (5.11)$$

The chapter assumes that Y and g are always constant.

However, a non credible ERBS produces a current account deficit in some period. Suppose people believe that during (t_0, t_x) $\pi = \pi_A$, and during (t_x, ∞) $\pi = \pi_p > \pi_A$. By (5.8) $C_A > C_p$, where C_A is consumption in the first interval of time and C_p in the second. That implies a current account deficit in (t_0, ∞) , since integrating (5.10)

$$\int_0^{\infty} C_t \exp(-\theta t) = \frac{C_A}{r} (1 - \exp(-rt_x)) + \frac{C_p}{r} \exp(-rt_x) =$$

$$\frac{Y_0 - g_0}{r} + f_0 \quad (5.12)$$

The present value of consumption is a constant and it is also a weighted average of C_A and C_p . Since $C_A > C_p$, and $C_A > C_0$.

$$Y_0 + rf - C_A - g_0 = Df < 0 \quad (5.13)$$

and during (t_0, t_x) there is a current account deficit.

5.2.3.- Current Account Deficits, Public Finances and International Reserves

Now we will expose some of the characteristics and patterns of public finances and international reserves in non credible ERBS.

First: Given a belief ($\pi_A < \pi_p$), the behaviour of the actual public deficit determines only the pattern of international reserves and that of private capital inflows

Proof:

The COBD is again:

$$g_0 + T_t - rR_t - \pi_A m_A = -DR \quad (5.14)$$

π_A , g_0 , T and r are parameters. $m_A = \phi C_A$ because of the cash in advance constraint. $m_A > m_0$ (m_0 is money in the previous steady state). Since C_A is constant, m_A is also constant. Then $Dm = 0$.

The COBD solves for international reserves. If it is in equilibrium, $DR = 0$ and the current account deficit must be equal to the capital account surplus. Since foreign debt is zero, the capital account is given by private flows. Therefore, under lack of credibility and public finances in equilibrium, there are speculative capital inflows financing the current account deficit in a one to one basis.

When the COBD is in surplus, $DR > 0$ and capital inflows are greater than the current account deficit. When the COBD is in deficit, $DR < 0$ and private capital inflows are not enough to finance the current account deficit.

In this model, when expectations of inflation do not depend in actual public finances, the public deficit is independent of the current account. In a more realistic environment this result still may hold. That happens when the actual current account does not depend on present public finances but in the present value of public finances. Future expected transfers raise future expected inflation, generating an actual current account deficit. However, actual transfers do not produce any effect in the current account if they are compensated by future taxes in present value.¹⁰⁶

Second: Explosive current account paths are associated with higher international reserves when the COBD is in equilibrium or surplus.

¹⁰⁶Calvo (1987) presents a model where actual public finances produce a current account deficit and an eventual balance of payments crisis.

Proof:

When inflation falls to π_A and people expect that in the future it will be higher, consumption and money increase at once. There is a portfolio movement. People reduce foreign bonds and increase money. Since the total financial assets of the economy are predetermined, the reduction of bonds is reflected in a sudden increase of reserves. Afterwards, if the COBD is in equilibrium, international reserves remain constant. If the COBD is in surplus, international reserves are growing. (see equation (5.14)).

Third: If the COBD is in equilibrium, the necessary fiscal effort to reduce inflation from π_0 to π_A is smaller under lack of credibility than under perfect credibility

Proof:

Under perfect credibility C and m are constant and equal to C_0 and m_0 . If the COBD is in equilibrium, R is also constant in R_0 . The necessary fiscal effort to reduce inflation is

$$(T_0 - T_A) = (\pi_0 - \pi_A) m_0 > 0 \quad (5.15)$$

Which implies that T_A has to fall below T_0 (net transfers have to fall).

Under lack of credibility:

$$(T_0 - T_A) = \pi_0 m_0 - \pi_A m_A + r(R_0 - R_A) \quad (5.16)$$

The sign is not even defined. $\pi_0 > \pi_A$ but $m_A > m_0$ and $R_A > R_0$. What is a fact is that for the same reduction of inflation the fiscal effort is smaller under lack of credibility than under perfect credibility.

Fourth: An observational equivalent result for the current account and public finances appears when instead of lack of credibility there is excess confidence in the future performance of the economy.

Proof:

Suppose that inflation falls from π_0 to π_A and people believe that in the future output will increase. For example, between (t_0, t_x) $Y=Y_0$ and between (t_x, ∞) $Y=Y_1 > Y_0$ (see chapter three for a related analysis). Now C is always equal to C_h but the permanent income has increased, since¹⁰⁷

$$\frac{C_h}{r} = -\frac{g_0}{r} + \frac{Y_0}{r} (1 - \exp(-rt_x)) + \frac{Y_1}{r} \exp(-rt_x) + f_0 > \frac{Y_0 - g_0}{r} + f_0 \quad (5.17)$$

Between (t_0, t_x) there will be a current account deficit with all the characteristics observed when there is lack of credibility. Public finances will behave also in the same way during the first interval of time. If the confidence is based in real facts, then at the moment in which Y increases the current account disappears. If there is excess confidence, which means that the future increase in output does not take place, there will be a drastic reduction in consumption, money and reserves. In that case, the result for the real system will be the same than under lack of credibility.

These characteristics of ERBS imply that lack of credibility in the programme or excess confidence in the future performance of the economy may benefit short term governments. If they want to reduce inflation, they need to make a lower fiscal effort and have an apparent consistent fiscal policy. They also may benefit from the transitory increase on international reserves. Sometimes, international organisations set higher reserves as a condition for lending money.

A situation where the public balance was in equilibrium or surplus, and there was a huge increase in consumption and

¹⁰⁷Equation (5.17) is derived integrating equation (5.13) for the cases where Y remains always in Y_0 and that where Y is Y_0 in the period (t_0, t_x) and $Y_1 > Y_0$ in the period (t_x, ∞) .

international reserves, happened in México in 1990-1994. Then, at the end of 1994 the situation collapsed and there was a drastic reduction of consumption and international reserves. Since these facts may happen under lack of credibility or excess confidence, it is worthwhile to ask which one was behind.

Next section shows that given some features of the Mexican political system, lack of credibility is a good candidate to explain the capital inflows problem of 1990-1994.

5.3.- A POLITICAL MODEL OF CREDIBILITY

The previous section shows that non credible ERBS increase international reserves and reduce the necessary fiscal adjustment to stabilize. In a more sophisticated model they could produce temporal expansions in economic activity (see Calvo and Vegh (1993)).

Most economic models assume that credibility is exogenous. Our interest is to find a possible explanation for the capital inflows problem in México. This country has a peculiar political system and for that reason it is convenient to investigate whether political elements may be behind the 1990-1994 events.

In order to do what the previous paragraph says, it is important to discuss the nature of short term governments. All of them like low inflation, equilibrium in public finances and higher international reserves, consumption and economic activity. Traditional analyses assert that a reduction of unemployment is obtained at the cost of higher inflation, or that stabilization requires a huge adjustment in public finances. However, the lack of credibility hypothesis may produce other results. When the actual government can convince people that future governments will increase inflation, the reduction of inflation today will

be less costly. There will be also higher consumption, higher international reserves and possibly increasing economic activity.

While these results are interesting, it is useful to ask under what conditions they can occur. In a perfect democracy they probably will not take place. If the electorate likes low inflation, the actual government will not be able to convince people that future governments will increase inflation. The electorate will choose candidates whose priority is low inflation. On the other hand, a dictatorship has a long run horizon. To generate short run advantages, the dictator has to convince people that in the future he will change. However, when that future arrives he will not have any incentive to change (time inconsistency problem). Anticipating this behaviour, people will expect the status quo and nothing will happen.

A situation in which the already explained results can happen is one where the actual government chooses its successor. The activities of the successor do not affect necessarily the utility of the actual government (the actual government may have a finite horizon). Some elements of that peculiar situation have happened in México in the last seventy years.

5.3.1.- Some Basic Elements of the Mexican Political System.

The Mexican political system has been described as highly presidential (Philip (1992)). The political party called Partido Revolucionario Institucional (PRI) has been in power for more than seventy years.¹⁰⁸ Though the country has a very advanced Constitution, many political analysts

¹⁰⁸PRI started being a party in the centre. However, many of his members have a tendency to be either from the left wing or from the right wing. The party itself has tended to the left sometimes and some others to the right.

consider that the president in power has almost unlimited powers (Cosío Villegas (1975), Philip (1992), Zaid (1987)). His very particular limitation is the impossibility of extending his six-year period. Nonetheless, he has great powers choosing his successor among the members of his cabinet (Cosío Villegas (1975), Philip (1992)). Once this happens, the successor becomes the candidate of the PRI for the next presidency. These candidates have always won the election against other parties.¹⁰⁹

A peculiar feature of the PRI is that it has members of different ideologies and political perspectives. It can be considered neither a left wing party nor a right wing party. In different stages of history it has tended to the left and in others to the right. In general it has been a party in the centre, reconciling many different views. That has constituted an important part of its success.

5.3.2.- Incentives and Endogenous Lack of Credibility

Considering the previous information, this section sets a model where there are short term governments lasting equal intervals of time in an infinite sequence. Each of these governments chooses its immediate successor among candidates with different characteristics and at the end of its period of power. The already explained Calvo (1986) model is relevant for the economy.

The economy under consideration operates always under a crawling peg regime. Governments set the rate of growth of

¹⁰⁹The present situation is changing very fast. Still eight years ago all the governors of the thirty one states that constitute the Federation were, and had always been, from the PRI. In 1997 there are four governors from the right wing party (Partido Acción Nacional (PAN)). For the first time in more than eighty years, in July 1997 there were elections for the Governor of the Federal District (The Major of México City). The winner was Mr Cuauhtemoc Cárdenas, the candidate of the left-wing party (Partido de la Revolución Democrática (PRD)). The right wing party PAN won the election for governments in two additional states. Democracy seems to be increasing along the country.

the exchange rate and by PPP and zero inflation abroad, the rate of inflation itself. There are not sharp devaluations, only possible changes in the rate of depreciation of the exchange rate. Any discrete change in the demand for money is adjusted selling or buying international reserves.

The questions of this subsection are the following:

- 1) Starting with governments that have certain characteristics, what is the sequence of governments in power?
- 2) Is it possible that because of the peculiar political system the capital inflows problem may appear?

The way in which the model works is the following:

Once a government is in power, it sets the rate of growth of the exchange rate. For a given rate of inflation, the government in power chooses the next government in order to get certain goals. It has to take into account that the next government will follow the same game and so on.

+Description of the candidates

There are two types of candidates. If they were ruling the country, they would operate under certain constraints and preferences.

Candidate A would set a low rate of inflation. However, it does not care about the welfare of society in an infinite horizon. Instead, it tries to maximise consumption, transfers and international reserves during its own period on power.

Candidate P would set a high rate of inflation. It cares about the same goals than government A. That is to say, it is also a short term government.

+ First stage of the game

During the first stage of the game and when these candidates are in power, they maximise the function:

$$U_A = -a\pi_A^2 + 2b\pi_A \quad (5.18)$$

$$U_P = -a\pi_P^2 + 2b_1\pi_P \quad (5.19)$$

Where π_x is the rate of inflation chosen by candidate x $x=P, A$.

As in the Barro-Gordon approach¹¹⁰ (Barro and Gordon (1983)), governments dislike inflation because of the distortions it produces in the economy (see for example Fischer and Modigliani (1978)). However, inflation has a positive impact in the utility of governments. Differently from the Barro-Gordon approach, that positive impact is produced by the seigniorage generated by higher inflation (Bruno (1991)). When Laffer curve is positively sloped, higher inflation generates always more fiscal revenues.

Inflation enters the utility function in a different way for candidates A and P. Candidate P likes more revenues and candidate A is moderate in this respect ($b_1 > b$).

The first step of the game is to maximise (5.18) and (5.19) and to obtain the rates of inflation:

¹¹⁰There are many articles explaining high or moderate inflation in the Barro-Gordon approach. See for example Bruno (1991), Dornbusch and Fischer (1991) and Fischer and Summers (1989). Some studies that take into account political factors to produce high inflation or inertial inflation in stabilization programmes are those of Cukiermann and Liviatan (1990), Cukiermann, Kiguel and Liviatan (1992) and Kiguel and Liviatan (1990). A good summary of these papers is provided by De Gregorio (1992b).

$$\pi_A = \frac{b}{a} \quad (5.20)$$

$$\pi_P = \frac{b_1}{a} \quad (5.21)$$

$$\pi_P > \pi_A \quad (5.22)$$

If he/she were in the government, candidate P would set a higher rate of inflation than candidate A . The rules of the game indicate that they choose inflation independently of the values of other variables and only respecting the fact that, at the end, higher inflation increases fiscal revenues.

+ Second stage of the game

In the second stage of the game, the government in power chooses its immediate successor as to maximise other goals.¹¹¹

It is convenient to explain this stage analysing what happen when each of these candidates is in power

- Candidate P

After the first stage of the game, candidate P maximises

$$U_{P2} = \gamma_1 C_P + \gamma_2 T_P + \gamma_3 R_P \quad (5.23)$$

Where C_P , T_P and R_P are consumption, transfers and international reserves in the period of power of government

¹¹¹ This way of maximising different goals in different stages simplifies the problem enormously because in the second stage inflation is given. If all the maximisation were done at the same time, both inflation and the optimal sequence of governments should be solved simultaneously.

P.

The chapter assumes that all candidates maintains the public balance in equilibrium while they are in power, therefore:

$$g_0 + T_p - rR_p = \pi_p \phi C_p \quad (5.24)$$

Since π_p is a fixed value, C_p is constant during the period of power of P. This is because of equation (5.8), which we reproduce for convenience

$$\frac{U_c}{(1 + (r_t + \pi_t) \phi)} = \lambda = \text{constant} \quad (5.25)$$

λ is a constant and π_p is also a constant value. Then C_p remains the same throughout the period of P in the government. Given the cash in advance constraint, m_p is also constant during the same period.

(5.24) implies that the public balance is in equilibrium, hence $DR=0$. There is a direct link between R and m. Due to the crawling peg regime, any discrete change in m is also a change in R. Given the cash in advance constraint, there is a linear relation between C and R.

Considering these facts (5.24) becomes

$$(g_0 - rJ) + T_p = (r + \pi_p) \phi C_p \quad (5.26)$$

J is a constant and g_0 is a parameter. Once candidate P sets π_p , he/she chooses the candidate that maximises C_p . In that way he/she also maximises R_p and T_p .

The present value of net income¹¹² at the moment in which P takes office is:

¹¹²This is the measure of the present value of net income multiplied by the constant foreign rate of interest.

$$C_h = Y_0 + rf_i - g_0 \quad (5.27)$$

Where f_i is the level of foreign assets at beginning of the period of power of P.

Inflation can take only two values π_p or π_A and $\pi_p > \pi_A$. For the same reason consumption can take also two values. If candidate P chooses A as successor, equation (5.25) indicates that $C_p < C_A$. Whoever this new candidate A chooses, $C_p < C_h$. This is because the present value of income (C_h) must be equal to the present value of consumption, and this one is a weighted average of the possible values of consumption (C_p and C_A), which are only two.

On the other hand, suppose that government P evaluates the sequence where all future governments are P. Since in that case inflation remains constant in π_p , consumption also remains constant and equal to the present value of net income. Therefore $C_p = C_h$.

An initial government P has the incentive of choosing another government P, expecting that this one chooses another P and so on. But this actually happens, because the next P government makes exactly the same evaluation and chooses another P. Hence, if the initial government is P there will be an infinite sequence of P governments in power.¹¹³

$$P_1 \rightarrow P_2 \rightarrow P_3 \rightarrow P_4 \dots$$

- Candidate A

If A is the initial government, he will maximise:

¹¹³It is important to observe that any sequence involving A governments produce a situation where $C_p < C_h$.

$$U_{A2} = \gamma_1 C_p + \gamma_2 T_p + \gamma_3 R_A \quad (5.28)$$

We maintain the assumption that this government sets the public balance in equilibrium. Therefore, for the reasons already explained

$$(g_0 - rJ) + T_A = (r + \pi_A) C_A \quad (5.29)$$

and A has to find the optimal successor to maximise C_A .

If A chooses P, then $C_A > C_p$. But we have already explained that P will choose another P and so on. Then $C_A > C_h > C_p$.

If A chooses other candidate A and the game is repeated $C_A = C_h$. A sequence where there is one initial A government, then several (one or more) A governments and then an infinite sequence of P governments will generate a value for C_A smaller than the one produced by an initial A government and a future sequence of just P governments (see appendix 5.3). Therefore, A has strong incentives to choose a P candidate.

When A is an initial government, the sequence of future governments will be

$$A_1 \rightarrow P_1 \rightarrow P_2 \rightarrow P_3 \rightarrow P_4 \dots$$

It is in this case where the capital inflows problem appears. During the A government, consumption will increase, producing a current account deficit. The increase in consumption will induce an initial raise of international reserves and will increase the inflation tax, financing greater transfers. Since the public balance is in equilibrium, international reserves remain constant throughout the period. The current account deficit is financed with speculative private capital inflows. At the moment in which government P takes office, there is a drastic reduction of consumption and international

reserves.

5.3.3.- The Role of Uncertainty

In this analysis, all governments choose successors at the end of their period on power. Therefore, it could be the case that at that moment they do not have incentives to choose the candidates that the previous analysis suggest (time inconsistency problem).

Since A and P have only short term goals, at the end they have the same incentives to choose any of the candidates available¹¹⁴. The cost of precommitment to choose the candidate that at the beginning maximise their goals is zero. Quite possibly they will precommit to do it.

Nonetheless, the question of what happen if they do not precommit is valid and we should analyse the outcomes under that possibility.

Suppose that government A is in power and did not precommit to choose successor. At the beginning of his period, he had the incentive to choose a P candidate, but at the end he has the same incentive to choose any of the candidates. If he precommits since the beginning, the future government will be P. If he does not precommit, then people expect the following rate of inflation for the next period of power and in fact for all future periods:

$$\pi_A^e = \left(\frac{1}{2}\right)\pi_A + \left(\frac{1}{2}\right)\pi_P > \pi_A \quad (5.30)$$

Let us assume that the Calvo model operates in a similar way when there is uncertainty.¹¹⁵ The presence of government A in power implies that expected inflation is greater than present inflation. This is because π_A is the minimum possible rate of inflation in the model. A capital inflows

¹¹⁴We are abstracting here from personal preferences, friendship and so on.

¹¹⁵For a lack of credibility model under uncertainty see Mendoza and Uribe (1996).

problem will appear though not as severe as it happens under perfect certainty.

Now suppose that a government P is in power and does not precommit to choose a future P government. He/She sets π_p but the expected inflation is:

$$\pi_p^e = \left(\frac{1}{2}\right)\pi_p + \left(\frac{1}{2}\right)\pi_A < \pi_p \quad (5.31)$$

Then there is a new result. When government P is in power and does not precommit to choose a future P government, there will be a peculiar situation characterized by a current account surplus financed entirely with private capital flight.

5.3.4.- Some Reflections about the Results of the Model

One of the most important results of the model is that in an economy whose political system is like the one described here high inflation is an equilibrium value. No matter what candidate is in government today, at the end there will be high inflation.

The result is interesting when we compare it with the outcomes of pure democracies or dictatorships. In the last one, the long run value of inflation depends on the desires of the dictator. In a democracy it depends on the desires of the majority of the electors. If they like low inflation, they will vote always for candidates A and the long run inflation will be low. Still it is true that the long run inflation can be high. This happens when the distribution of income is very distorted, the majority is poor and the government give transfers to that majority, resorting in an inflation tax over the whole population. The majority will vote for P governments.

A very important difference between the outcomes of a democracy and the outcomes of the presented model, is that in the first, inflation is what people like. In the second the long run equilibrium inflation is the one that the

short term government with high inflation wants.

Another interesting point derived from the model is concerned with the identities of the candidates. The model concludes that A governments are unstable, in the sense that they cannot last in power. It suggests that all possible candidates will say that they are P to have possibilities of election. If that were the case and the government in power cannot identify them, the model under uncertainty would operate. However, if the government in power is very clever and can recognize the candidates, all the results of the original model can be rescued.

Finally, it is interesting to ask why an A government can be in power if nobody has incentives to choose him. Again, some uncertainty is necessary. The previous government recognized candidate A as P but in fact he/she was A. If it was a unique mistake, all the model can operate as described.

5.3.5.- Lack of Credibility and the Mexican Stabilization Programme

Is all of this explanation interesting for the case of México in 1990-1994? Probably yes. Though President Carlos Salinas did not choose a P government, he seems to have played with the idea. His possible successor was one of four Ministers. Two of them can be considered conservative (Mr Ernesto Zedillo, the actual president, at that time Minister of Education, and Mr Pedro Aspe the Minister of Finance of CGS government). There was a candidate quite in the centre, Mr Luis Donaldo Colosio, then Minister of Social Development. The last candidate was probably more concerned with social projects (Mr Manuel Camacho Solís, the Major of México City in the period 1989-1993). President Salinas chose Luis Donaldo Colosio. However, several analysts consider that he played with the idea of

substituting him for Mr Camacho Solís (Proceso (1996) several issues). At the end, Mr Colosio was tragically assassinated and Mr Zedillo took his place, winning the election for the presidency.

Another point in favour of the presented model is the history of inflation. For more than twenty-five years the country has experienced relative high rates of inflation. In 1993 and 1994, this figure was around 7.5%. It is plausible to think that people believed in this situation as unsustainable. The average rate of expected inflation was above. The differences in the profiles of the candidates already explained reinforce this point. In this respect, the Dornbusch (1993) recommendation of setting a rate of inflation around 20% was maybe very good. It was necessary to look for a moderate candidate, nor very inflationist but not married with the idea that inflation had to fall to one digit, either.

5.4.- LACK OF CREDIBILITY VERSUS EXCESS CONFIDENCE IN THE MEXICAN STABILIZATION PROGRAMME 1987-1994.

The first section of this chapter shows that the capital inflows problem may appear when there is lack of credibility or when there is excess confidence. The short run results over the fiscal variables and international reserves are the same. Both explanations are observationally equivalent.

The second section shows a model that derives endogenous lack of credibility under certain circumstances. The model is appealing for the case of México, since it reproduces some political features of that country.

Some studies that reinforce the hypothesis that lack of credibility was behind the capital inflows problem in México (1990-1994), are those of Arrau (1990) and Reinhart

and Vegh (1995).

In his empirical investigation, Arrau finds that there is a huge intertemporal elasticity of substitution between present and future consumption in México (around 2.5). The study obtains a result where perceived changes in the future inflation produce changes in consumption in the present, as in the cash in advance model.¹¹⁶ Reinhart and Vegh (1995) use the estimation by Arrau, showing that the increase in consumption in México in the early nineties is compatible with such estimation.

These two studies suggest not only that the ingredients of the lack of credibility hypothesis were present in México, but also that, considering them, it was possible to forecast what in fact happened. Now, in this chapter we find an explanation where lack of credibility could be generated by the peculiar Mexican political system. Can we then conclude that this is the right explanation for the case of México?¹¹⁷

To answer the question, it is necessary to look at the alternative explanation of excess confidence. Several authors assert that the capital inflows problem in México was produced because people overestimated the expected performance of the economy (Agénor and Masson (1996), Krugman (1995), McKinnon and Pill (1995), Sachs, Tornell and Velasco (1995)). The structural change (deregulation, financial liberalisation, reduction of country risk), produced capital inflows that increased productivity (see chapter three for an explanation of this process). However, though they improved the production capacity, were not

¹¹⁶ In the Arrau (1990) paper, there is also a substitution effect in which a higher permanent inflation reduces the demand for money also permanently.

¹¹⁷The authors that support the lack of credibility hypothesis as the main cause producing the capital inflows problem, and the eventual balance of payments crisis in México, are: Calvo (1994), Mendoza and Uribe (1996) and Reinhart and Vegh (1995).

compatible with the huge rise in consumption. People expected even more in the future. The increase in the perceived future income explains the huge raise in consumption. When people realized that their expectations were too optimistic, there was a drastic reduction in consumption and money. It produced a fall in international reserves and the balance of payments crisis, just in the same way of lack of credibility.¹¹⁸

Appendix 5.1 shows that to have excess confidence, people in México should have expected either an unbelievable increase of the total debt of the country, or an unbelievable raise in productivity. Excess confidence does not seem to be the correct answer for the capital inflows problem in México given the results of a very simple exercise of consistency.

Nonetheless, the fact that the Mexican economy has shown better performance on average, shows that lack of credibility could live together with some confidence in the programme. Appendix 5.2 shows an example based in the ideas of chapter three and those of this chapter. In the presented model there are asymmetric beliefs. National consumers do not believe in the permanence of low inflation. Foreign investors take advantage of the financial liberalisation and invest. The result is a cycle where growth increases but there is an initial increase in consumption. The economy is better at the end and the final

¹¹⁸Krugman (1995 page 30) refers specifically to the case of México in the following way:

"And yet México's crisis is neither a temporary setback nor a purely Mexican affair. Something like that crisis was an accident waiting to happen because the stunning initial success of the Washington consensus was based not on solid achievements, but on excessively optimistic expectations."

By the Washington consensus Krugman understands that structural change and market oriented reforms would have an important impact on output and growth (the term Washington consensus was coined by John Williamson).

consumption is greater than the original but lower than the highest peak. An adjustment in consumption is needed at some point.

CONCLUDING REMARKS

The results of this chapter have been sufficiently summarized in the introduction. However, several remarks seem important.

THEORETICAL CONSIDERATIONS:

After reading the explanation we might conclude, erroneously, that short term governments are inconvenient for society because they may produce cycles and crises. A permanent dictatorship could be recommended. It cannot take advantage of the uncertainty of the policy of future governments.

The suggestion, which can be criticized on the grounds of arguments far away from economics, is not true in economic terms, either. If the dictator imposes inconsistent or wrong policies there is no mechanism for these policies to be corrected.

Nonetheless, the existence of short term governments without full democracy may be very harmful for societies. Curiously the problem is worse under a complete openness of the capital account. In the presented model, the incentives to generate the capital inflows problem occur because it is possible to produce current account deficits without losing international reserves. At the same time, consumption and money can jump without transition dynamics. Under low or zero capital mobility lack of credibility produces a loss of international reserves that jeopardizes the stabilization programme (see chapter four). That is not

good for governments in power.¹¹⁹

A way to avoid volatility of expectations is reinforcing institutions and rules and not imposing capital controls. If the central bank is independent and set for example a currency board, the credibility problem analysed in this chapter disappears. The bank has the commitment of setting low inflation always. Even if the political system is as the one described here, the government can not force the bank to finance higher transfers.¹²⁰ In this respect it is important to emphasize the case of Argentina. The currency board is in the constitution and nobody except the congress can change the rule.

Another important topic is the role of international organisations. So far, they have favoured targets for international reserves, the public deficit and the domestic credit of the central bank, for example. These targets may induce short term governments to cheat and create uncertainty about the future. Little attention has been paid to the size of the current account deficit and its consistency with investment and long term growth.

Possibly, in the future international organisations will penalize inconsistent current account deficits, although the overall public balance is in equilibrium. That would imply a fiscal over adjustment in the present when people forecast future inconsistent fiscal policies.

¹¹⁹This analysis does not mean that open capital markets are undesirable, what it means is that the political system has to be reformed according to the structural change in the economy. When that does not happen, the actual or perceived discretion of governments generates beliefs that are reflected at once in capital markets.

¹²⁰Again that does not mean that a currency board is the solution for México. It stresses only the importance of institutions and long term rules in an environment of perfect capital markets.

EMPIRICAL CONSIDERATIONS

A critical issue in the case of the 1994 Mexican balance of payments crisis is the responsibility of the government and international organisations. If the capital inflows problem and the ongoing crisis were produced by lack of credibility, then certainly CSG government has political responsibility for the consequences. Even if it did not promote that situation, it could take some measures before. The government was obliged to perform at least simple tests about the consistency of the current account, as those presented in this chapter (appendix 5.1). Curiously the same conclusion appears if the problem was produced by excess confidence. People are not obliged to know economics. Policy makers are. Very positive expectations can be also disastrous when they are not based in anything real (Krugman (1995)). The lack of consistency of the current account deficit was a problem never correctly addressed by the government. But international organisations also have responsibility. Edwards et al (1995) report:

" The World Bank was aware of the vulnerability and difficulties of the Mexican economy, and it communicated repeatedly its assessment to the Mexican authorities." (Edwards et al p. 3)

They also say

" The Mexican authorities chose to disregard many of the Bank's suggestions" (Edwards et al p. 3)

But they also report:

" In spite of the divergence between policy actions and economic results, the Mexican reforms were consistently praised by the media, financial experts, academics and the multilaterals - including the World Bank - as major success." (Edwards et al p.4)

In other part of their article the authors suggest that the World Bank spoke to the public with two voices: one trying to calm financial markets stressing México's policy accomplishments; the other expressing some concerns regarding the path the Mexican economy was taking (Edwards et al p.3). They also assert that even in 1994 some reports of the World Bank praised the monetary policy of the central bank in México (Edwards et al (1995) p.17 footnote 30).

There is one possible interpretation to this analysis: there was disagreement among the officials of the Bank. It produced inconsistency on the behaviour of the institution towards México. The lack of a unified view gave an incentive to the Mexican government not to take seriously the warnings.

On the other hand, the targets of the IMF should be questioned. The presented model shows possibilities where the targets of increasing international reserves, balanced public finances and control of the domestic credit of the central bank hold. However, still there is an increasing vulnerability of the economy and a capital inflows problem. Are these targets myopic? They may be. They actually may give incentives for the capital inflows problem to appear in the case in which rising international reserves is awarded. Praising the behaviour of the public finances in México was a mistake when the observed current account deficit was unsustainable.

UNIT THREE: CONCLUSIONS AND APPENDIXES

CHAPTER 6: GENERAL CONCLUSIONS

This chapter is divided in three sections. The first points out the main contributions and limitations of the thesis. The second analyses possible implications of the results for economic policy. Third section discusses the implications for the particular case of México.

6.1.- CONTRIBUTIONS AND LIMITATIONS

This section outlines the main conclusions of the thesis. The first part describes general conclusions, the second part more particular results. Third subsection discusses the limitations of the analysis.

6.1.1.- General Results of the Thesis

The main result of the thesis is about the nature of the capital inflows problem. This phenomenon, characterized by increases in consumption and economic activity, current account deficits and real exchange rate appreciations accompanying ERBS, is not necessarily a problem. It is neither a matter always generated by capital inflows. It is a situation that may be produced by different factors: In the positive side by the effect that the structural change has in the perceived lower risk of the economy, in the negative side by absence of credibility or excess confidence in the stabilization programme.

To avoid the capital inflows problem when it is a problem, it is recommended to follow long run invariant fiscal and monetary policies. The use of a restrictive fiscal policy may be useless. Tight monetary policy may help under low capital mobility, but often it produces unsustainable fiscal costs. They may even generate perverse results in which higher real interest rates fuel the problem.

6.1.2.- Main Results of the Theoretical Chapters

The theoretical chapters provide more particular conclusions:

Chapter three concludes that under plausible assumptions, the stylized facts of successful stabilization programmes¹²¹ occur for two reasons: the dynamics of inflation and the structural change going with ERBS in several countries. The gradual reduction of inflation raises growth at least in the short run and output in a permanent way. The structural change increases the production capacity of the country through capital inflows from abroad, generating a consumption boom from the onset.

Chapter four concludes that the capital inflows problem is not necessarily a situation produced by capital inflows. It can emerge when there is lack of credibility, alternative domestic assets to money and high degree of monetary accommodation. When expectations of future inflation are independent of the actual public balance, fiscal policy is useless to combat the problem. Instead, tight monetary policy can eliminate it but often to a very high fiscal cost. If expectations of future inflation are linked to the actual public deficit directly, tight monetary policy may generate a perverse effect fuelling the symptoms of the problem.

The main conclusion of chapter five is that some short term governments may be tempted to create lack of credibility in their own stabilization programme. If they are successful, the fiscal effort to combat inflation falls, there is an accumulation of international reserves and there may be

¹²¹ Higher long run output or growth and the emergence of the symptoms of the capital inflows problem in a first stage.

even a temporal increase in economic activity. Yet the government in power follows an apparent consistent fiscal and monetary policy where the public deficit and the domestic credit of the central bank are under control. The problem is that the experiment is unsustainable and there must be an adjustment at some moment.

The argument is appealing for the Mexican economy in the 1990-1994 period, especially because in this country the president in power has an enormous power to choose his successor. The chapter shows a repeated game in which governments setting low inflation choose future governments with preferences for higher inflation. These last governments tend to choose other governments also with high inflation priorities. Therefore, the economy ends up on high equilibrium inflation.

6.1.3.- Main Limitations of the Analysis

The main limitation of the analysis is the assumption of a cash in advance constraint for consumption goods. While there are advantages in this assumption, it eliminates the substitution effect between money and consumption due to changes in the nominal interest rate. Models incorporating money in the utility function or transaction's technology frameworks capture such effect.¹²²

Nonetheless, for the purposes of this work the simple cash in advance constraint is very useful. It is equivalent to the case in which money is in the utility function and is

¹²² Models incorporating money in the utility function or transaction's technology frameworks capture the substitution effect. For the first class of models see Sidrausky (1967), Calvo (1981), Obstfeld (1985) and many more. For models incorporating transactions technologies see Arrau et al (1995) or Reinhart and Vegh (1995). For an example in which a cash in advance constraint is combined with precautionary motives to rescue the substitution effect see Blanchard and Fischer (1989 pp. 167 and 168).

a perfect complement of consumption. It captures the positive association between the demand for money and consumption, which is the factor producing all the main results of this thesis¹²³.

The use of the simplest cash in advance constraint is compatible with potential results of other more realistic assumptions. Complementarities between money and consumption may exist also in Sidrausky type models (see Obstfeld (1985)) or in the transactions technology model (see Reinhart and Vegh (1995)). The results under these approaches would be similar to those under the cash in advance constraint. However, the mathematical treatment would be more difficult.

Another limitation of the thesis is the assumption of fixed output in chapters four and five, while chapter three describes a growth model. However, all the chapters are motivated by episodes happening in México.

There are some arguments overcoming this apparent limitation or potential contradiction:

First of all, the motivation of chapter three is based not only in the Mexican experience but also in other countries. Second, we show in appendix 5.2 that the results of chapter five are compatible with those of chapter three when there are asymmetric beliefs. People living in the country do not believe in the permanence of low inflation. Foreign investors believe in the advantages of the structural change and invest. The result is a cycle where output rises permanently but there is a consumption crisis at some point. All the essential results remain.

On the other hand, the results of chapter four are motivated by facts observed in México in 1988, when output growth did not change significantly with respect to the

¹²³ It is responsible that sluggish disinflation generate higher growth in chapter three; It is also responsible that lack of credibility and excess confidence produce the capital inflows problem in chapters four and five.

previous year. The assumption of fixed output should be harmless.

Finally, as we already explained in the General Introduction, a theoretical work based in some empirical facts is worthwhile not because it reproduces accurately some particular episode, but because it elucidates channels and effects potentially important for many other cases. In this sense chapters three and four can explain other possible cases. More difficult is that chapter five can be extended to cases different to México, since some of the assumptions are very particular of that country.

6.2.- IMPLICATIONS OF THE RESULTS FOR ECONOMIC POLICY

This section explores the main implications of the results of the thesis for economic policy.

The first subsection answers what the results tell us about the use of exchange rates to stabilize. A second subsection analyses how to cope with the capital inflows problem. The third implication is over the convenience of opening the economy to international capital markets under ERBS.

6.2.1.- Choosing the Exchange Rate Regime

The analysis of this thesis is on economies under crawling peg regimes and specifically in ERBS. Are they superior to flexible regimes?

ERBS in small open economies under high inflation are probably very recommended. They avoid some problems of flexible regimes. Chapter three shows that greater foreign portfolio investment because of the disinflation is unlikely to occur in MBS when prices are not flexible downwards.

ERBS may be very effective and fast to reduce inflation. Bolivia is a good example. Though it has not been considered an ERBS, the mechanism of disinflation was much

nearer to a programme using the exchange rate than to other programmes (see Sachs (1986) and chapter three). Israel is also an example of a programme without the painful initial recession that often reduces the expected success.

Nonetheless, non credible ERBS can result in balance of payments crises and deep recessions. Flexible regimes avoid sudden outbursts of inflation and maintain international reserves.

The analysis suggests that for small open economies the best strategy to reduce inflation is a credible ERBS.

6.2.2.- Coping With The Capital Inflows Problem

As this chapter has already concluded, the so-called capital inflows problem is neither necessarily a problem nor necessarily a situation produced by capital inflows. Chapter three shows a model where such phenomenon occurs and its appearance is desirable. Chapters four and five set up models where the appearance of the symptoms of the problem anticipates future negative events.

Under the ambiguity of the conclusion, it is necessary to establish what policies are desirable to cope with the situation when it is a problem. It is also advisable to create mechanisms to discover when the symptoms of the phenomenon do not constitute future negative events.

A recommendation for economic policy is to perform simple tests once the symptoms of the problem appear. Chapter five recommends checking the consistency of the current account (see appendix 5.1). Policy makers can suspect a credibility problem if the current account/GDP ratio is much higher than the growth of the economy.

More difficult than the diagnostic is the solution of the problem. If it is caused by a lack of credibility, the ideal solution would be to reestablish confidence. However, that has a huge associated cost. Once an unsustainable current account deficit is on, there will be a crisis. This

one would occur at the moment in which people recover confidence. Governments, especially if they are in power for short periods, are certainly tempted to delay the correction of the problem (chapter five).

On the other hand, when excess confidence causes the problem, the solution is even more difficult. A government realizing that the optimistic views of the agents are false has not incentives to tell them the truth, since that would generate a crisis.

In any case, an implication of the results of this work is that it is better to act before. The more an unsustainable current account deficit lasts, the higher the long run costs for the economy.

Finally, it is important to discuss the use of fiscal and monetary policies to cope with the capital inflows problem.

Fiscal policy is very important as an indicator of long run consistency. If a small public deficit today indicates healthy public finances in the future, lack of credibility will not emerge. The government will overcome one of the negative factors producing the problem. However, not always discipline in public finances in the present guarantees control of fiscal accounts in the future. A fiscal over adjustment in the present may be useless when people believe that it will be compensated with higher transfers in the future.

On the other hand, under imperfect capital mobility, tight monetary policy may overcome the symptoms of the problem (see chapter four). Nonetheless, when expected inflation is very high, the costs of this policy may be unsustainable and it will need a very restrictive fiscal adjustment if the intention is to maintain expectations of future inflation at the same level.

For the explained reasons, the best way to cope with the capital inflows problem is to combat its fundamental

causes: excess confidence or lack of credibility. There is not a single recommendation for succeeding in this task. Better institutions and independence of the central bank may help, but there are other factors depending upon particular situations. We will come again to this point in the section dedicated to México.

6.2.3.- Opening the Economy to Capital Markets

Is it desirable to open the economy to capital markets? Chapter five shows that it can create incentives for short term governments to generate lack of credibility in the stabilization programme. Chapter three (appendix 3.2) shows that under increasing returns, some degree of financial repression with respect to foreign capital may be optimal.

However, there are many advantages of opening the economy to capital markets. Small economies can grow very fast if investment comes from abroad. This is particularly true when there are decreasing returns (see Barro and Sala i Martin (1995)), but it is also true in small open economies under increasing returns if they constitute guarantees to foreign investment (see chapter three). Furthermore, capital mobility is not responsible of lack of credibility, which is an important negative factor generating the capital inflows problem (see chapter four).

The role of international organisations on capital mobility is crucial. Capital controls for speculative motives may be desirable as a short run policy (Edwards (1995b), McKinnon and Pill (1996)). International organisations should also set conditions on the size of the current account deficit relative to the growth or GDP. This is a way to avoid government incentives for future inconsistent policies (chapter five). Indirectly, it stops speculative capital movements.

6.3.- IMPLICATIONS OF THE RESULTS OF THE THESIS FOR MEXICO

Two of the main chapters of this thesis are motivated on empirical observations of México. The motivation of chapter three lies in observations of several countries, among them also México. For these reasons this section discusses the implications of the results for that country.

According to the results of this thesis, the capital inflows problem in México appeared by two factors: lack of credibility of the consumers and better opportunities for foreigners due to structural policies.

Lack or credibility generated an increase in the demand for speculative capital. Better opportunities for foreigners increased the supply of foreign capital allocated to productive activities. The result was a peculiar cycle in which there was a consumption boom, followed by a crisis, but where the production capacity of the economy increased, breaking several years of stagnation.¹²⁴

Two questions surging from this analysis are a) why lack of credibility and confidence in the programme could live together and b) How efficient the Mexican government was combatting the negative aspects of the capital inflows problem.

Chapter five explains that the nature of the political system in México is a plausible potential factor to explain lack of credibility in the stabilization programme. However, and as other ERBS in the last years, the Mexican programme was accompanied by many structural policies. Though some of these policies depend upon low inflation to last, some others can work under very different rates of

¹²⁴The very rapid recovery of the economic activity in 1996, after the severe recession of the previous year, shows that the structural change improved the capacity of the economy to overcome its problems.

inflation.¹²⁵ Therefore, the fact that people believe in a short duration of low inflation, does not necessarily invalidate the belief in a more productive economy in the future.

Apart from the above argument, in the Mexican context it is not implausible to think that asymmetric beliefs between nationals and foreigners could last for some time. Since the populist administrations of the seventies, Mexican people have lost confidence in their governments. President Carlos Salinas de Gortari was very popular in United States and other first world countries. Foreign investors saw Mr Salinas as a truly reformer committed to long run low inflation. This perception was probably shared by many people in México but not for many others. Middle and low classes were expecting a reversion of the stabilization programme since the beginning.

With respect to the second question, the central bank and the government faced the capital inflows problem with tight monetary and fiscal policies since the beginning of the stabilization programme. Given the credibility problem, these policies were very costly and unable to avoid the consumption boom (see chapter four). In 1993, the government granted independence to the central bank, a very important step to generate endogenous credibility. Nonetheless, it is still not clear how independent is the bank. In 1994, capital inflows fell dramatically compared with the size of the current account deficit. Consumption continued being very high and international reserves fell. The central bank increased the domestic credit to the government considerably (see Sachs, Tornell and Velasco (1995)). A truly independent central bank could set a ceiling to this credit.

¹²⁵ For example, the effects of NAFTA, deregulation and even from the financial liberalisation are relatively independent of inflation.

With institutions that depend very much on a short run presidency, the combat of the credibility problem is very difficult. Actual and perceived discretionary policies make almost impossible to set long run targets for inflation. Though the president in power may not have intentions of choosing a candidate with preferences for high inflation, uncertainty could generate the capital inflows problem (see chapter five).

Things may be changing in México nowadays. At least there is an intention to enlarge democracy. In an environment of high capital mobility, the control of monetary policy should go to a truly autonomous central bank, which sets long run targets independent of who is the actual president in power.

Appendix 3.1

On the Feasibility of Balanced Growth Paths:

This appendix analyses the feasibility of balanced growth paths under disinflation.

To do that, the explained model in the text assumes $DD/D = DS/S$. Because of the rule linking money and reserves, $Db/b = DS/S$. All the real variables grow at the same rate.

Proposition: In every circumstance, a balanced growth path is feasible when the real rate of interest is greater than the rate of growth of GNP.

Proof:

The transversality condition is

$$\lim_{t \rightarrow \infty} \lambda_t V_t \exp(-\theta t) = 0 \quad (\text{A.3.1.1})$$

Because of first order conditions, and given the isoelastic utility function:

$$\lambda_t V_t \exp(-\theta t) = \frac{C_t^{-1/p} V_t \exp(-\theta t)}{(1 + (r + \pi)\phi)} \quad (\text{A.3.1.2})$$

$C^{-1/p}$ is the marginal utility of consumption U_c .

Using (3.16), (3.23) and the balanced growth assumption

$$\lambda_t V_t \exp(-\theta t) = \frac{V_c \exp(-\theta t)}{C_t^{\frac{1}{p} - 1} (\phi\pi(0) + 1 + r\phi) \exp(-\gamma t)} \quad (\text{A.3.1.3})$$

V_c is V/C a constant term because the balanced growth assumption.

But

$$C_t = C_i \exp(G_s t) \quad (\text{A.3.1.4})$$

Where G_s is the rate of growth of GNP DS/S .

Hence:

$$\lambda_t V_t \exp(-\theta t) = \frac{V_c \exp\left(\left(\gamma - \theta - \left(\frac{1}{\rho} - 1\right)G_s\right)t\right)}{C_i^{\frac{1}{\rho} - 1} (\phi\pi(0) + 1 + r\phi)} \quad (\text{A.3.1.5})$$

For the transversality condition to hold we need

$$\gamma - \theta - \left(\frac{1}{\rho} - 1\right)G_s < 0 \quad (\text{A.3.1.6})$$

Substituting $G_s = \rho(r + \gamma - \theta)$ and rearranging:

$$A > \rho (A + \gamma - \theta) \quad (\text{A.3.1.7})$$

or

$$r > G_s \quad (\text{A.3.1.8})$$

Appendix 3.2:**The Effect of Financial Repression and Liberalisation over Welfare and Consumption.**

This appendix shows that developing countries liberalising their economies to international capital markets completely, can increase welfare and consumption when there are externalities.

The result reinforces the example already shown in the text, where new capital inflows have real effects.

The model under consideration assumes either two countries or two types of countries. One group consists of developed countries that possess a huge amount of capital. They operate under decreasing returns on capital. The other group contains developing countries with small initial stock of capital but operating under constant returns to scale in that stock.

The assumption of different returns for different stages of development is not entirely unrealistic. In developing countries opportunities are higher and in general, without uncertainty or risk, the rate of return of capital is very high.¹²⁶

The economies under consideration interact. In principle, if the productivity of capital of the small economy is relatively high and the developed country possess lots of capital, this one should flow from the developed world (DEW henceforth) to the developing world (DIW henceforth).

For the small emerging economy or economies

¹²⁶Barro and Sala i Martin (1995 pp 50) set an example where an economy with low stock of capital has diminishing returns. An intermediate amount of capital is consistent with increasing returns and a large capital stock is consistent with diminishing returns again.

$$r = \alpha A_1 \quad \text{or} \quad r = A \quad (\text{A.3.2.1})$$

The private perceived rate of return of capital will be equal to αA_1 if there is a Romer externality or to A without externalities (see text). The marginal productivity of capital is independent of the size of the stock of capital.

For the developed world the production function is

$$Y_d = A_d K_d^{\alpha_d} \quad \alpha_d < 1 \quad (\text{A.3.2.2})$$

Where

Y_d : Output of the DEW

A_d : Productivity parameter

K_d : Total capital of the DEW geographically in DEW

The rate of return of capital of the developed world is

$$MP_{kd} = \alpha_d A_d K_d^{\alpha_d - 1} \quad (\text{A.3.2.3})$$

Where MP_{kd} is the marginal productivity of capital in DEW. If DEW could interact with the developing world without barriers

$$MP_{kd} = \alpha A_1 \quad \text{or} \quad MP_{kd} = A$$

The rate of return of capital of the world would be determined by the perceived private marginal productivity of capital in the developing world.

This appendix will show now that if capital is going to flow from DEW to DIW it is profitable for the governments of DIW to avoid the total liberalisation of the capital markets. To do that, the government has to find an optimal rate of return payable to the capital that comes from DEW. The government has to control the market setting a custom for the capital that comes from abroad.

Mathematically the government of DIW maximises

$$B = (r - \Omega) K_e \quad (\text{A.3.2.4})$$

Subject to

$$\Omega = \alpha_d A_d K_d^{\alpha_d - 1} \quad (\text{A.3.2.5})$$

$$K_d + K_e = K_T \quad (\text{A.3.2.6})$$

- Where:
- B: are benefits for the government.
 - r: the perceived productivity of capital in DIW.
 - Ω : the rate of return that the government sets for the capital of DEW geographically in DIW.
 - K_e : Capital, property of DEW but geographically in DIW.
 - K_T : Total capital property of DEW.

The implicit assumption is that the government takes the capitals coming from abroad pays Ω to them and then invest them in the productive sector, earning r . The difference $r - \Omega$ is the per unit earning of the government. An almost identical analysis could be carried on assuming that the government sets a tax to the capital from abroad.

Solving for K_d in (A.3.2.5), considering (A.3.2.6), substituting in (A.3.2.4) and rearranging:

$$B = rK_T - \frac{rX}{\Omega^H} - \Omega K_T + \frac{X}{\Omega^{H-1}} \quad (\text{A.3.2.7})$$

$$X = (\alpha_d A_d)^{\frac{1}{1-\alpha_d}} \quad (\text{A.3.2.8})$$

$$H = \frac{1}{1 - \alpha_d} > 1 \quad (\text{A.3.2.9})$$

Taking the derivative $dB/d\Omega$, equating it to zero and

rearranging:

$$H rX - \Omega^{H+1} K_T - \Omega (H - 1) X = 0 \quad (\text{A.3.2.10})$$

The second derivative is

$$-(H + 1) \Omega^H K_T - (H - 1) X < 0 \quad (\text{A.3.2.11})$$

This expression is smaller than zero because $H > 1$, $X > 0$ and Ω can not be negative. Therefore, the government is maximising benefits.

(A.3.2.10) solves for the critical point or points.

Since the government is maximising and K_e is necessarily greater than zero, $r > \Omega$. From the point of view of the government it is optimal to restrict the flow of capital from DEW. What about socially? Would it be convenient for society to have a complete financial liberalisation (namely $\Omega = r$)?.

To answer these last questions the appendix proceeds in two steps:

First, assume that there are not externalities in DIW and then $r = A$ (the traditional AK model).

In this case the optimal degree of financial repression implies

$$C_a = A (K_i + K_{ea}) - \Omega K_{ea} = AK_i + (A - \Omega) K_{ea} \quad (\text{A.3.2.12})$$

Where

C_a : consumption in DIW under the optimal degree of financial repression

K_i : Stock of capital property of DIW and geographically also in DIW

K_{ea} : Stock of capital property of DEW and geographically in DIW under the optimal degree of financial repression.

Without financial repression $r = \Omega$.

$$C_b = A (K_i + K_{eb}) - AK_{eb} = A K_i \quad (A.3.2.13)$$

Where

C_b : Consumption of DIW under complete financial liberalisation.

K_{eb} : Stock of capital property of DEW, geographically in DIW under complete financial liberalisation.

Clearly $C_a > C_b$. Without externalities and from the point of view of the developing world, there is an optimal degree of financial repression. Taking away such repression would reduce welfare and consumption.

The rationale for the last result is relatively simple. Without externalities a good government should maximise consumption. With a given stock of capital property of the developing world (K_i), consumption is maximised when $(A-\Omega)K_e$ is maximised (in equation (A.3.2.12)). That implies some degree of financial repression that produces $K_e > 0$ and $\Omega < A$. The optimal rate Ω is given by the solution of (A.3.2.10) when $r=A$.¹²⁷

Now let us analyse the case where there is a Romer externality.

In that case again with the optimal degree of financial repression.

$$C_a = A_1 (K_i + K_{ea}) - \Omega K_{ea} \quad (A.3.2.14)$$

and with complete financial liberalisation:

$$C_b = A_1 (K_i + K_{eb}) - \alpha A_1 K_{eb} \quad (A.3.2.15)$$

Since $\alpha A_1 = r > \Omega$, $K_{eb} > K_{ea}$.

The net effect is ambiguous. Complete financial liberalisation implies $\alpha A_1 = \Omega$. The rate of interest paid to foreigners rises and that is a cost for the society.

¹²⁷Observe that zero capital mobility (namely $\Omega=0$) would be equivalent in welfare terms to complete financial liberalisation ($K_{ea}=0$ when the payment is zero), since $C=AK_i$ in both cases.

However, the flows of capital increase and that raises welfare. In the case of externalities a complete financial liberalisation could be optimal.¹²⁸

The reason for this last result is that to maximise monetary benefits, the government maximises $(\alpha A_1 - \Omega)K_e$. Nonetheless, if it wants to maximise social benefits, the maximisation has to be done over the term $(A_1 - \Omega)K_e$, because A_1 is the true marginal productivity of capital. Maximising the first expression implies a very low Ω . A partial or total liberalisation may improve welfare and consumption.

Some examples may clarify things. The following table shows two simulations. The first column assumes an externality a la Romer. The government maximises the term $(\alpha A_1 - \Omega)K_e$ and obtain a limited quantity of capital from abroad (K_e). The second column shows that a total liberalisation ($\alpha A_1 = \Omega$) improves welfare because consumption rises.

Columns 3 and 4 show a situation where there are not externalities. The government maximises the term $(A - \Omega)K_e$ in column three. A total liberalisation brings almost the total capital of the developed world (K_T) to the developing world. GDP rises but GNP falls dramatically, in such a way that consumption falls from 789.5 units to 100.0 units.¹²⁹

¹²⁸Actually there could be cases in which it is optimal not only to liberalise but to subsidize capital inflows. This is when Ω is optimal in the programme $(A_1 - \Omega)K_e$ and also $(\alpha A_1 - \Omega)K_e < 0$.

¹²⁹The simulation was performed in a Lotus 1-2-3 programme with a simulation that iterate values for Ω in (A.2.2.10) until it is equal to zero.

Table A.3.2.1 Simulation 4.

	(1)	(2)	(3)	(4)
α	0.1	0.1	1.0	1.0
A1	10.0	10.0	10.0	10.0
αd	0.5	0.5	0.5	0.5
Ad	15.0	15.0	15.0	15.0
KT	100.0	100.0	100.0	100.0
Ki	10.0	10.0	10.0	10.0
r	1.0	1.0	10.0	10.0
Ω	0.86	1.0	2.157	10.0
B	3.35	0.0	689.5	0.0
Kd	75.7	56.3	12.1	0.562
Ke	24.3	43.8	87.9	99.4
C	321.8	493.8	789.5	100.0

This appendix is useful because it provides an alternative explanation for the capital inflows problem in some ERBS that is also consistent with the one provided in the text. The argument is that such problem (that in these cases is not a problem) may have been produced by the structural measures accompanying disinflation rather than by stabilization itself. The analysis also suggest that the existence of some financial repression is not necessarily harmful for the economy under consideration. In this context, economic policy has to balance the cost and benefits of the possible structural change.

The analysis can be extended in numerous ways. Here we have assumed that the developing world has monopsony power and

can set the rate of interest paid to the developed world. Competition in Bertrand between similar countries of DIW would break the monopsony power and all countries should liberalise or nobody would invest in them. However, the possibility of coalitions or other ways of financial repression - like competing in Cournot and not in Bertrand - would rescue the main message of this appendix: that there is an optimal degree of financial repression and that liberalisation may be desirable especially under some kind of externalities.

Appendix 3.3.- The Capital Inflows Problem in Balanced Growth Equilibrium

One of the most important questions of this chapter is whether the capital inflows problem arises in a balanced growth path. That would happen if the initial condition for consumption were greater than the original. This is because then money rises and under a predetermined exchange rate there is a capital inflow (Drazen and Helpman (1987), Obstfeld (1985)).

To investigate this question, it is convenient to write (3.14) in the text in terms of the GDP (Y) and to assume that all assets of the economy, including physical capital, grow at the same rate. Government consumption g is supposed to be zero without loss of generality.

$$1 + rf_y - G_y \left(\frac{1}{A_1} + f_y \right) = C_y \quad (\text{A.3.3.1})$$

$$f = b + R - D \quad f_y = \frac{f}{Y} \quad G_y = \frac{DY}{Y} \quad C_y = \frac{C}{Y} \quad Df_y = D\left(\frac{f}{Y}\right)$$

f represents total foreign financial assets.

The impact of higher growth in the ratio of consumption-GDP is:

$$\frac{\partial C_y}{\partial G_y} = - \left(\frac{1}{A} + f_y \right) \quad (\text{A.3.3.2})$$

This expression inside the parentheses is positive because the GNP is positive. Therefore, and assuming that physical capital is predetermined, consumption always falls at the beginning when growth rises.

Nonetheless the total financial assets of the economy may be negative. That actually happens when the economy is highly indebted. If that is the case, increasing growth implies greater equilibrium current account deficit. The reason is the following:

The current account as a percentage of GDP is, in a balanced growth path

$$\frac{Df}{Y} = G_y f_y \quad (\text{A.3.3.3})$$

$$\frac{\partial}{\partial G_y} \left(\frac{Df}{Y} \right) = f_y \quad (\text{A.3.3.4})$$

If $f_y < 0$ a rise in G_y increases the equilibrium sustainable current account deficit (see Edwards (1995b) and Edwards et al (1995)). When $f_y > 0$ the economy increases its current account surplus.

Notice that initial reductions in consumption and capital outflows may be accompanied with higher current account deficits when $f_y < 0$ but $f_y + (1/A) > 0$.

Appendix 4.1.- Devaluation and Zero Monetary Accommodation

This appendix shows that if the government devalues the currency and sets a policy where $Dm=DR$, it reverts the symptoms of the capital inflows problem completely. Now, however the real interest rate will rise because of the devaluation itself and by the lack of credibility in the reduction of inflation. Again there may be a severe fiscal cost.

To prove what the previous paragraph says consider the current account identity:

$$DR = Y + r^*R - C - g \quad (A.4.1.1)$$

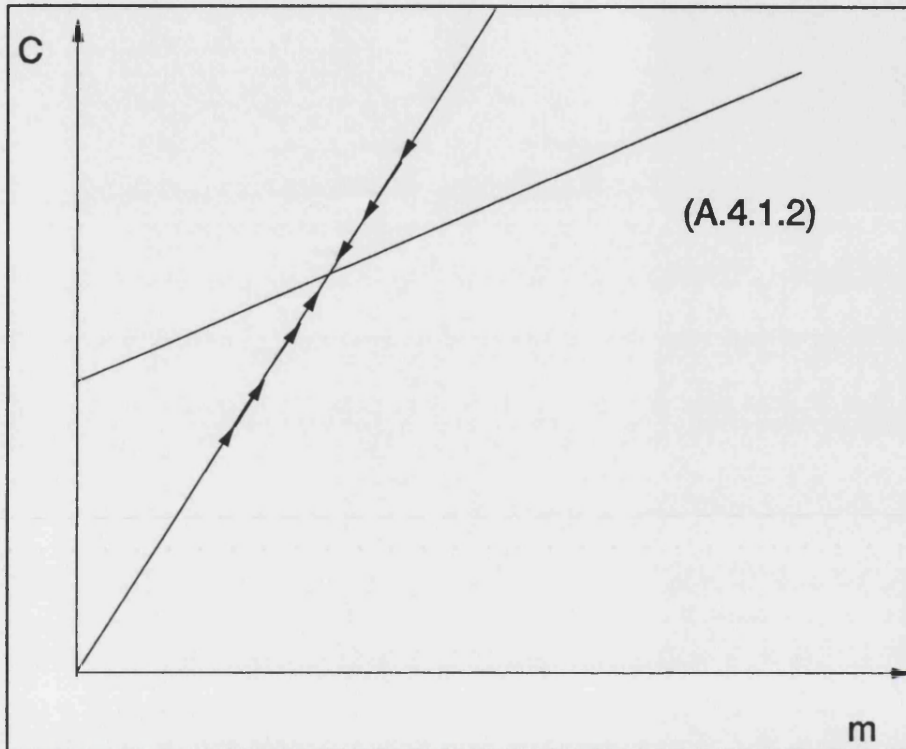
and the monetary policy $R=m+K$, where K is R_0-m_0 .

Then

$$Dm = Y + r^*m + r^*K - C - g \quad (A.4.1.2)$$

Given this monetary policy, (A.4.1.2) and the cash in advance constraint determine consumption and money independently of the other equations of the system.

Figure A.4.1.1



Where the line with steeper slope represents the cash in advance constraint and the other line is equation (A.4.1.2).

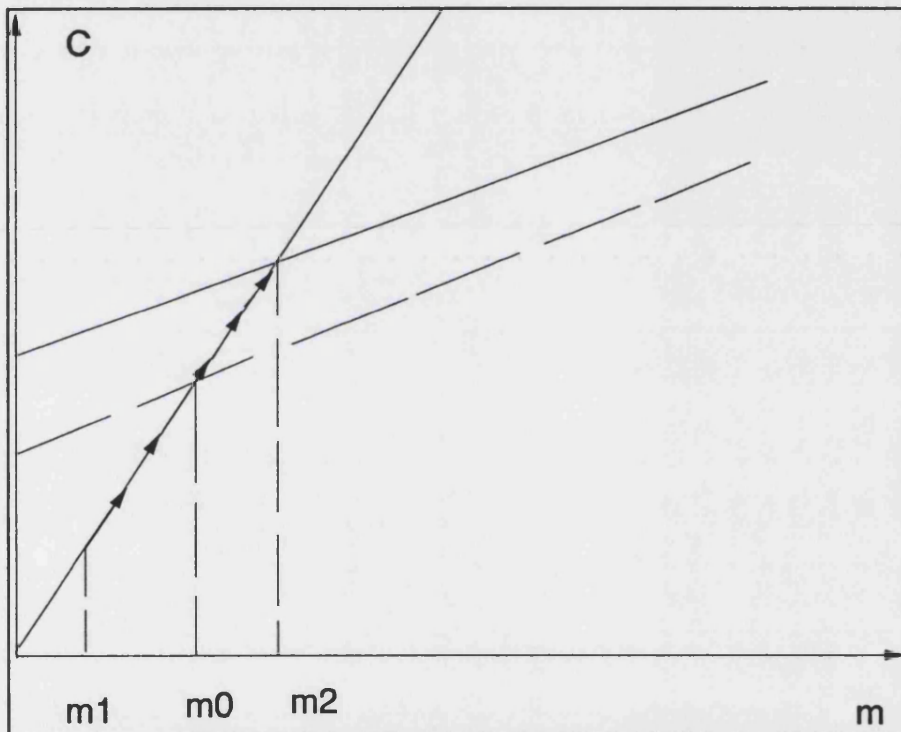
The system is stable if $1/\phi > r^*$, which is a plausible assumption. The stable path is the cash in advance constraint and the economy has to be always on it.

As already explained in the text, this system is independent of expectations. If the government follows this policy, consumption does not change when expectations of

inflation rise.

A devaluation in this context has two effects. First, with predetermined international reserves it reduces money at once. Then, since starting from this point the government follows a policy of printing money according to international reserves, K has to rise. That shifts the line representing equation (A.4.1.2) to the left.

Figure A.4.1.2



Originally the equilibrium has m_0 as solution. Just after the devaluation m pass to m_1 and the line representing the current account balance shifts to the left. The new equilibrium has m_2 as solution. There is a current account

surplus in between and an accumulation of money and international reserves. Devaluation is neither neutral in the short run nor in the long run. It produces higher consumption and money at the end.

The intuitive reason for this result can be explained because when money falls, consumption also falls. The economy generates savings and the interest payments earned by international reserves increase. When the economy reaches m_1 again, its net incomes have increased. Consumption can increase a bit more.¹³⁰

Observe that changes in the rate of inflation do not affect the equilibrium of m and C . It is clear also that the utility function does not have any role in the configuration of the equilibrium. The variable that the utility function affects is the real interest rate. To prove it, it is necessary first to solve the differential equation (A.4.1.2).

Substituting the cash in advance constraint in (A.4.1.2) and rearranging we get

$$\frac{Y}{\phi} + \frac{r^*}{\phi}K - \left(\frac{1}{\phi} - r^*\right)C = DC \quad (\text{A.4.1.3})$$

This differential equation in consumption is stable, since $1/\phi > r^*$.

The solution for the equation is:

$$C(t) = A \exp\left(-\left(\frac{1}{\phi} - r^*\right)t\right) + H \quad (\text{A.4.1.4})$$

$$H = \frac{Y + r^*K}{(1 - r^*\phi)} \quad (\text{A.4.1.5})$$

¹³⁰Calvo (1981) presents an example of devaluation in a Sidrausky type model. However, since in his model there are not reserves, the final equilibrium is the same than the original. Auernheimer (1987) includes international reserves in his analysis.

$$A = C_0 - H \quad (\text{A.4.1.6})$$

$$DC(t) = -\left(\frac{1}{\phi} - r^*\right) A \exp\left(-\left(\frac{1}{\phi} - r^*\right) t\right) \quad (\text{A.4.1.7})$$

Previously to the devaluation $DC=0$ and $C_0=H$. At the moment of the devaluation K rises and H becomes greater than C_0 , which means $A<0$. Therefore

$$DC(t) > 0 \quad (\text{A.4.1.8})$$

The problem is subject to cases where $C(t)>0$.

To know what happens with the rate of interest, we rewrite equation (4.8) of the text using the isoelastic utility function.

$$\frac{DC}{C} = \rho(r - \theta) - \frac{Dr\rho}{(1 + (r + \pi)\phi)} \quad (\text{A.4.1.9})$$

Because of the already explained behaviour of consumption

$$\frac{DC}{C} = W(t) > 0 \quad (\text{A.4.1.10})$$

Then (A.4.1.9) can be rewritten as

$$\frac{Dr\rho}{(1 + (r + \pi)\phi)} = \rho(r - \theta) - W(t) \quad (\text{A.4.1.11})$$

If the present rate of inflation remains forever, the devaluation must produce an initial raise in the real interest rate. If it were not like that then Dr would be smaller than zero and r would be departing of θ on time. If initial r is greater than θ and $W(t)>\rho(r-\theta)$, r is falling on time towards θ . In $t=\infty$, $W(t)=0$ (see equations (A.4.1.4) and (A.4.1.7)) and $r=\theta$. A plausible behaviour of r is one in which at the initial stage it raises and then falls in time.

When there is lack of credibility, the effect of high real interest rates is reinforced at the beginning. People expect that in t_x inflation will rise. Since consumption is predetermined and the lagrange multiplier is also predetermined, it must happen that

$$r(t_{x-}) = r(t_x^+) + \pi_0 - \pi_1 \quad (\text{A.4.1.12})$$

$$r(t_{x-}) > r(t_x^+) \quad (\text{A.4.1.13})$$

Where $r(t_{x-})$ is the real rate of interest just before the government reverts the low rate of inflation and $r(t_x^+)$ is the same variable just after the reversion.

(A.4.1.13) implies that initially the trajectory of interest rates must observe very high values. In t_x there is a sudden reduction of this variable and then it tends steadily to θ .

Appendix A.4.2: Different Effects of Parameters on Initial Consumption

This appendix shows first that for a logarithmic utility function a temporal increase in the real interest rate reduces always initial consumption. It shows also that higher inflation in the future increases initial consumption. Therefore, if higher real interest rates are associated to higher inflation in the future, the effect of increasing the real interest rate over consumption is ambiguous.¹³¹

Under the isoelastic utility function the equations to solve C_i , $C(t_x)$ and C_q in subsection 4.3.2 in the text are:

$$C(t_x)^{\frac{1}{\rho}} (1 + (r_1 + \pi_1)\phi) = C_q^{\frac{1}{\rho}} (1 + (\theta + \pi_0)\phi) \quad (A.4.2.1)$$

$$\frac{C_i(1 - \exp((\rho r_1 - \rho\theta - \theta)t_x))}{\theta(1 + \rho) - \rho r_1} + \frac{C_q}{\theta} \exp(-\theta t_x) = \frac{Y_0 - g_0}{\theta} + R_0 \quad (A.4.2.2)$$

and

$$C(t_x) = C_i \exp(\rho(r_1 - \theta)t_x) \quad (A.4.2.3)$$

When ρ is different to 1 this system is non-linear and may not have analytical solution. An iterative numerical algorithm is useful to solve different exercises. It consists of giving an arbitrary C_i in (A.4.2.3), solve C_q in (A.4.2.1) and check that (A.4.2.2) fits. If it does not fit, the process must be repeated iteratively until the

¹³¹In the simulation exercises where $\rho \neq 1$ all the experiments showed that temporal increases in the real rate of interest reduce initial consumption.

system converges.¹³²

However, when $\rho=1$ the utility function is logarithmic, the system is linear and has analytical solution. A simple way to solve it is substituting (A.4.2.3) in (A.4.2.1) and then solve simultaneously (A.4.2.1) and (A.4.2.2) for C_i and C_q . Finally, solve recursively $C(t_x)$ in (A.4.2.3).

Once (A.4.2.3) is substituted in (A.4.2.1), the simultaneous system becomes

$$AC_i - BC_q = 0 \quad (\text{A.4.2.4})$$

$$A'C_i + B'C_q = J \quad (\text{A.4.2.5})$$

Where:

$$A = \exp((r_1 - \theta) t_x) (1 + (r_1 + \pi_1) \phi)$$

$$B = (1 + (\theta + \pi_0) \phi)$$

$$A' = \frac{(1 - \exp((r_1 - 2\theta) t_x))}{2\theta - r_1}$$

$$B' = \frac{\exp(-\theta t_x)}{\theta}$$

$$J = \frac{Y_0 - g_0}{\theta} + R_0$$

The solution for initial consumption C_i in this system is

$$C_i = \frac{J (1 + (\theta + \pi_0) \phi)}{DET} \quad (\text{A.4.2.6})$$

Being DET the determinant of the system, which is equal to:

¹³²This is the algorithm used for the simulations of sub section 4.4.1 in a lotus programme.

$$\exp((r_1 - 2\theta)t_x) \left(\frac{(1 + (r_1 + \pi_1)\phi)}{\theta} - \frac{(1 + (\theta + \pi_0)\phi)}{(2\theta - r_1)} \right) + \frac{(1 + (\theta + \pi_0)\phi)}{(2\theta - r_1)}$$

When $t_x \rightarrow \infty$ and $r_1 = \theta$:

$$C_i = \theta J = Y_0 + \theta R_0 - g_0 \quad (A.4.2.7)$$

The response of initial consumption to inflation in period $(0, t_x)$ is negative since π_1 in the denominator of (A.4.2.6) with positive sign.

The response of C_i to higher future expected inflation π_0 is:

$$\frac{\partial C_i}{\partial \pi_0} = \frac{1}{DET^2} \frac{\phi J (1 + (r_1 + \pi_1)\phi) \exp((r_1 - 2\theta)t_x)}{\theta} > 0 \quad (A.2.4.8)$$

To evaluate the impact of temporal changes in the real interest rate r_1 over initial consumption, it is necessary to evaluate the impact that this factor has in the determinant. r_1 only appears in the denominator of (A.4.2.6), then

$$Sgn \frac{\partial C_i}{\partial r_1} = - Sgn \frac{\partial DET}{\partial r_1} \quad (A.2.4.9)$$

Evaluated in the steady state

$$\frac{\partial DET}{\partial r_1} = t_x \exp(-\theta t_x) \left[\frac{(\pi_1 - \pi_0)\phi}{\theta} \right] + \frac{\phi}{\theta} \exp(-\theta t_x) +$$

$$\frac{(1 + (\theta + \pi_0)\phi)}{\theta^2} (1 - \exp(-\theta t_x)) \quad (A.2.4.10)$$

Apparently, this derivative has an ambiguous sign, since

$$1 > \exp(-\theta t_x) \quad \text{but} \quad \pi_1 < \pi_0$$

However, we will show that the sign is always positive.

The value $t_x \exp(-\theta t_x)$ is maximum when

$$t_x = \frac{1}{\theta} \quad (\text{A.4.2.11})$$

Using this value, substituting in (A.4.2.10) and rearranging

$$\frac{\partial DET}{\partial r_1} \Big|_{t_x = \frac{1}{\theta}} = \frac{\pi_1 \phi}{\theta^2 e} + \frac{\phi}{\theta e} + \left(\frac{1}{\theta^2} + \frac{\phi}{\theta} \right) \left(1 - \frac{1}{e} \right) + \left(\frac{\phi}{\theta} - 2 \frac{\phi}{\theta^2 e} \right) \pi_0 \quad (\text{A.4.2.12})$$

$1 > 2/e > 1/e$, therefore

$$\frac{\partial DET}{\partial r_1} \Big|_{t_x = \frac{1}{\theta}} > 0 \quad (\text{A.4.2.13})$$

But if this derivative is positive when $t_x = 1/\theta$, will be always positive. This is because it is in the case where $t_x = 1/\theta$ when the negative difference $(\pi_1 - \pi_0)\phi/\theta$ is maximum in absolute value. Therefore

$$\frac{\partial DET}{\partial r_1} > 0 \quad (\text{A.4.2.14})$$

and then

$$\frac{\partial C_i}{\partial r_1} < 0 \quad (\text{A.4.2.15})$$

We can notice by (A.4.2.10) that the policy of raising interest rates to reduce consumption loose effectiveness when the difference $\pi_1 - \pi_0$ is large, that is to say when the stabilization is very ambitious and non credible.

Now it is clear that if increases in r_1 rise expectations of future inflation (in this case π_0), a policy trying to overcome the capital inflows problem through higher interest rates may actually exacerbate it.

Appendix 4.3.- An Extension of the Model in the Presence of Non Tradeable Goods

The results of chapter four remain almost unchanged if the model considers the existence of non tradeable goods. A new important variable in this case is the real exchange rate.

Suppose that the maximisation of the private sector is now over the intertemporal utility function:

$$\text{Max} \int_0^{\infty} U(C_T, C_N) \exp(-\theta t) dt \quad (\text{A.4.3.1})$$

Where C_T is the consumption of tradeable goods and C_N the consumption of non tradeable goods. The utility function U is supposed to be additive and separable in its arguments and strictly concave.

The programme (A.4.3.1) is subject to the constraints

$$Y_T + prY_N + rB - C_T - prC_N - \pi_T m_T = Dm_T + DB \quad (\text{A.4.3.2})$$

$$m_T = \phi (C_T + prC_N) \quad (\text{A.4.3.3})$$

Where:

- Y_T : Production of tradeable goods (given)
- Y_N : Production of non tradeable goods (given)
- pr : Relative prices (non tradeable/tradeable)
- π_T : Rate of growth of prices of tradeable goods.
- B : government bonds
- m_T : Money in term of tradeable goods.

(A.4.3.2) is the intertemporal private budget constraint and (A.4.3.3) is the cash in advance constraint in the presence of non tradeable goods.

Government bonds are indexed to the price of tradeable goods, or alternatively, as we will see, to the exchange rate.

There is PPP in tradeable goods. Then

$$P_T = E \quad (\text{A.4.3.4})$$

Where P_T are nominal prices of tradeable goods and E is the nominal exchange rate. the level of tradeable goods abroad is supposed to be one.

Maximisation of (A.4.3.1) subject to (A.4.3.2) and (A.4.3.3) gives as a result:

$$U_{CT} - \lambda(1 + (r + \pi_T)\phi) = 0 \quad (\text{A.4.3.5})$$

$$U_{CN} - \lambda(1 + (r + \pi_T)\phi)pr = 0 \quad (\text{A.4.3.6})$$

$$\frac{d\lambda}{dt} - \theta\lambda = -r\lambda \quad (\text{A.4.3.8})$$

$$\lim_{t \rightarrow \infty} \lambda_t V_t \exp(-\theta t) = 0 \quad (\text{A.4.3.9})$$

$$V_t = m_T + B \quad (\text{A.4.3.9})$$

V_t is financial wealth in terms of tradeable goods.

Combining (A.4.3.5) and (A.4.3.6)

$$\frac{U_{CN}}{U_{CT}} = pr \quad (\text{A.4.3.10})$$

Which is the usual marginal condition between goods.

By (A.4.3.5) and (A.4.3.8) and remembering the separability assumption

$$DC_T = (\theta - r) \frac{U_{CT}}{U_{CTCT}} + (Dr + D\pi_T)\phi \frac{U_{CT}}{U_{CTCT}} \quad (\text{A.4.3.11})$$

(A.4.3.11) shows the same configuration of equilibrium that in the case of only tradeable goods.

The government budget constraint of this economy is

$$g_T + prg_N + rB - r^*R - \pi_T m_T = Dm_T + DB - DR \quad (A.4.3.12)$$

Where g_T is government consumption in tradeable goods and g_N government consumption of non tradeable goods.

The general equilibrium of the economy is obtained combining the private budget constraint (A.4.3.2) and the government budget constraint (A.4.3.12).

$$Y_T + r^*R - C_T - g_T = DR \quad (A.4.3.13)$$

Since

$$g_N + C_N = Y_N \quad (A.4.3.14)$$

Using equations (A.4.3.11) and (A.4.3.13) it is possible to arrive to the same results of the text in chapter four. The additional result is given by (A.4.3.10) for the behaviour of relative prices. Since the utility function is separable and strictly concave, the marginal utility of consumption of any good depends negatively in its own consumption. Relative prices pr (P_N/P_T) depend positively in the ratio (C_T/C_N). C_N is a parameter given by $Y_N - g_N$.

In the case of full monetary accommodation, C_T rises for the period $(0, t_x)$ and relative prices also increase. There is a real appreciation of the exchange rate. However, in t_x C_T falls suddenly and so does pr . Therefore, there is a once and for all reduction in the nominal price of non tradeable goods. In this case, inflation is always equal to the growth of the nominal exchange rate.

On the other hand, when the government follows a policy of increasing r_1 to set $C_{T1} = C_{T0}$, the inflation of non tradeable goods is greater than the inflation of tradeables in the period $(0, t_x)$. This is because in that interval C_T is increasing while C_N remains unchanged (relative prices are increasing). Therefore, this policy is more inflationary

than the full monetary accommodation.

Sudden reductions of C_T produce nominal reductions in the price of non tradeable goods. That could not happen if this prices were inflexible downwards. If that is the case, some unemployment may appear and that is an additional cost for the government that tries to avoid the symptoms of the capital inflows problem.

Appendix 5.1.- Lack of Credibility versus Excess Confidence in the Mexican Stabilization Programme.

One way of checking if the Mexican stabilization programme was credible is to analyse the consistency of the current account deficit.

This appendix performs a very simple test to check if the macroeconomic parameters of CSG government were consistent. The test analyses first the identity of the current account in actual pesos. Second, it assumes constant forecasted relative prices:

$$PY + r_n E f - PC - Pg - P I = E Df \quad (A.5.1.1)$$

Where I is the total level of investment (public and private), g is government consumption and r_n is the foreign nominal interest rate. Dividing the equation by the nominal exchange rate E, assuming that people perceive the real exchange rate of that moment as an equilibrium rate, and dividing again the equation by YP/E

$$1 + r_n f_y - C_y - g_y - I_y = \frac{Df}{P^* Y} \quad (A.5.1.2)$$

P^* is the foreign price level (in this case the US index).

X_y is any variable X divided by GDP.

After some manipulation (A.5.1.2) becomes:

$$1 + (r - \frac{DY}{Y}) f_y - C_y - g_y - I_y = Df_y \quad (A.5.1.3)$$

r is the real rate of interest of abroad and Df_y represents the change of the total foreign assets of the economy with respect to GDP. In México, f_y is negative because the size of foreign debt is huge.

There must be a link between the ratio of investment to GDP I_y and the rate of growth DY/Y . We performed the following regression from 1965 to 1993 in annual terms (see also

Econometric Appendix at the end of the thesis)

$$\text{CRIPC} = -15.26 + 83.84 I_y \quad (\text{A.5.1.4})$$

$$(-3.87) \quad (4.34)$$

$R^2 = 0.42$ $D.W = 1.4$ $F = 18.9$
 Serial Correlation $F(1,25) : 2.04$
 Normality $\chi^2(2) : 2.49$
 Heteroscedasticity: $F(1,26) : 0.2722$
 Stability: CUSUM, CUSUMSQ good
 Predictive Failure 1965-1987:
 $F(1,19) = 1.3$
 Chow Test: $F(2,24) : 0.647$
 D.F for residuals: -3.78
 ADF for residuals: -3.53

Where CRIPC is the annual growth of the real per capita GDP. I_y is the ratio of fixed capital formation to GDP. The statistical analysis shows absence of serial correlation for residuals (F test. Durbin Watson is not conclusive), absence of heteroscedasticity, relative normality of the residuals and stability of the parameters (CUSUM, CUSUMSQ, predictive failure and Chow Tests)¹³³. The Dicky-Fuller tests are in the limit of tolerance for cointegration. It is possible to conclude that the real per capita growth and the ratio of investment to GDP cointegrate.

The exercise is the following: suppose that at the end of every year of the CSG administration a hypothetical representative individual looks the macroeconomic parameters of (A.5.1.3). He/She assumes a balanced growth equilibrium from that moment onwards; supposes C_y and g_y remaining at the level they have that year; takes f_y as the

¹³³We made a break point in 1987 because of the stabilization programme. However, the parameters seem very stable.

initial value at that time and set a forecasted rate of growth linking I_y through (A.5.1.4).

If $r > DY/Y$, $f_{y0} < 0$ and $Df_y < 0$ the system explodes. The terminal condition for the debt-GDP ratio is infinity and C_y and g_y are inconsistent. The argument that C_y increased because of growth considerations cannot be maintained and the lack of credibility hypothesis may be rescued.

If $DY/Y > r$ mathematically (A.5.1.3) is stable, and theoretically C_y and g_y could take any value. However, there must be financial restrictions. It is implausible a terminal condition in which the debt-GDP ratio is very large. There is a limited quantity of resources that can be obtained from abroad.¹³⁴

This appendix assumes two scenarios. In both of them $r = 3\%$ (the average implicit foreign real rate of interest 1989-1993 was 3.7% for the Mexican debt). In the first scenario growth is equal to 2.5% (the average rate of growth of the period 1989-1997 was 2.97%). Then we check what the consistent $C_y + g_y$ is to maintain balanced growth equilibrium. In the second scenario growth is 5%. Considering that the real macroeconomic parameters ($C_y + g_y$) remain forever, the system solves for f_y when t tends to infinity. All exercises consider a rate of growth of the population of 2.0%. The results are:

¹³⁴In a market economy, an originally small economy that start growing very fast can, at some moment, influence the foreign rate of interest. This one would become greater than growth.

Table A.5.1.1. Simulation 5 .Stable Case $DY/Y > r$

(%)	1993	1992	1991	1990	1989
DY/Y	5	5	5	5	5
I/y	21.9	21.9	21.9	21.9	21.9
r	3	3	3	3	3
Cy+gy	85.5	85.6	83.7	81.8	80.4
fy (0)	-26	-27	-29	-38	-43
fy terminal	-3.7	-3.7	-2.8	-1.8	-1.1
CA/Y next four years	-9.7	-9.8	-8.0	-6.5	-5.4
	-10.2	-10.3	-8.3	-6.7	-5.4
	-10.6	-10.8	-8.7	-6.9	-5.5
	-11.0	-11.2	-9.0	-7.1	-5.6

Table A.5.1.2. Simulation 5. Complete Balanced Growth Equilibrium $r > DY/Y$

(%)	1993	1992	1991	1990	1989
DY/Y	2.5	2.5	2.5	2.5	2.5
I/Y	18.9	18.9	18.9	18.9	18.9
CA/Y	-1.7	-1.7	-1.8	-2.5	-2.8
Cy+gy	80.9	80.9	80.9	80.8	80.8

In all the scenarios the sum $C_y + g_y$ considered the observed inventories.

In the unstable case ($r > DY/Y$ second table) the actual level $C_y + g_y$ in 1993 is almost five percentage points above to the compatible level with 2.5% balanced growth (85.5 versus 80.9). The exercise shows that starting from 1990, growth below r is inconsistent with the observed macroeconomic parameters. Rational people could not believe in a balanced growth path.

In the stable case ($DY/Y > r$), the first table shows a huge increase (in absolute value) of the terminal ratio f_y since 1989. Actual macroeconomic parameters do not seem consistent with possible future financial restrictions. México has never had negative foreign assets to GDP superior in absolute value to 80%. Even under NAFTA and economic reform the results of the first table are hard to believe. Projected current account deficits are growing. They show levels well above the historical trend.

Nonetheless, the previous analysis could be criticized. It is plausible to think that people were not expecting a balanced growth path but a huge increase of output in the future. NAFTA and economic reform opened opportunities for long run projects. In that case, the excess confidence argument would imply a sudden increase in current consumption. This would be in response to the expected increase in future output.

McKinnon and Pill (1996)¹³⁵ defend this hypothesis for the case of México. However, they argue that excess confidence was not totally based on real opportunities. Banks found profitable to cheat people exaggerating the profile of some projects to lend resources because of moral hazard arguments.

Some analysts have tried to assess the impact of NAFTA in

¹³⁵See also Muellbauer and Murphy (1990), King (1990) and Pagano (1990) for a similar argument in the economy of Great Britain or Ades, Kiguel and Liviatan (1993) for the case of the current account deficit in Denmark.

the economy. Sobarzo (1994) (1995) shows that under increasing returns the impact on GDP could be huge (13% in the most optimistic scenario). However the variance between the optimistic estimation and the most conservative is large (the minimum estimated impact is 5%). The author does not say for how long this impact would take place. The result rests in the assumption of increasing returns. Conservative applied general equilibrium models (i.e under decreasing or constant returns) would show little impact of the agreement on GDP.¹³⁶

We performed again the exercise of balanced growth. This time it tries to calculate the necessary windfall in output (due probably to productivity improvements) to generate a credible scenario. Here the ratio $C_y + g_y$ falls immediately because of the windfall and follows a balanced growth afterwards.

The chosen growth in the balanced growth path was 5%. The exercise is very similar to the previous. In every year of the CSG administration the representative consumer checks the likelihood of the results. The financial restriction sets the level of foreign assets (negative) with respect to GDP at most in 100%. The results are:

¹³⁶Interesting opinions assert that there was nothing clear about the future performance of the Mexican economy (Krugman (1995)). Other authors (Oks and van Wijnbergen (1995)) stress some mistakes in economic agents. They were expecting a boom in the manufacturing sector.

Table A.5.1.3. Simulation 6.

	1993	1992	1991	1990	1989
DY/Y	5	5	5	5	5
I/Y	21.9	21.9	21.9	21.9	21.9
Cy+gy	80.1	80.1	80.1	80.1	80.1
fy (0)	-0.26	-0.27	-0.29	-0.38	-0.43
fy terminal	-1.0	-1.0	-1.0	-1.0	-1.0
CA/Y on impact	-3.9	-4.0	-4.1	-4.7	-4.8
Windfall on impact	10.1	10.2	7.8	5.0	2.3

According to this table, a windfall of 10% in present value was needed in 1992 and 1993. Only in this way it would be possible to maintain a balanced growth path of 5% and f_y growing to 100% (in absolute value) in the long run.

The exercise suggests the following:

If the windfall lasted only for 1 year, a balanced growth path of 5% would have required an increase in output higher than 15%, which surely was unbelievable. If it took for example 10 years, the economy should be growing at around 8% every year in the next 10 years, which again is hard to believe. Therefore, it seems that from 1991 the macroeconomic parameters were inconsistent.

This appendix has identified lack of consistency with lack of credibility. The reason to do that, is the following:

If the macroeconomic parameters are inconsistent, consumption must jump downwards in the future. In an optimising framework this only happens when there is lack

of credibility. Therefore, if people understand the inconsistency they cannot believe in the programme.¹³⁷

Appendix 5.2:

Can Lack of Credibility and Confidence in the Programme Live Together?

Chapter three stresses the role of confidence in the emergence of the capital inflow problem. Chapter five emphasizes the role of lack of credibility in the same problem. Can these two possibilities live together?

The stabilization programme in México (1987-1994) is a good candidate for the hypothesis that both situations could live together. The lack of credibility problem produced the consumption crisis. Confidence increased investment in the country. The long run output is above the flat trend of the eighties but consumption is still well below the 1994 peak.

Let us set up a very simple model. It is based in the framework explained in chapter three and in the ideas of the lack of credibility hypothesis explained in chapter five.

The assumptions are the following:

$r = \alpha A_1 = \theta$ (see chapter three).

In $t_0 = 0$, the government announces that in the interval (t_0, t_x) inflation will follow the trajectory:

$$\frac{\phi D\pi}{(1 + (r + \pi)\phi)} = -\gamma \quad (\text{A.5.2.1})$$

and in (t_x, ∞) :

¹³⁷Oks and van Wijnbergen (1995) also agree that macroeconomic parameters were inconsistent in México since the beginning of the 1990's. They say that the future perceived reduction of consumption would bring about a recession.

$$\pi = \pi(t_x) \quad (\text{A.5.2.2})$$

Foreign investors believe this premise. Therefore, the associated perceived country risk of the economy falls. Assume that foreign investors decide to increase the capital stock of the country at the same rate of consumption in period (t_0, t_x) (see chapter three for reasons why investment can be decided in this way).¹³⁸ The rate of growth of consumption in that period is, according to (A.5.2.1) and the intertemporal elasticity of substitution ρ , $\rho\gamma$.

Therefore, in period (t_0, t_x)

$$K = K(0) \exp(\rho\gamma t) \quad (\text{A.5.2.3})$$

In (t_x, ∞)

$$K = K(0) \exp(\rho\gamma t_x) \quad (\text{A.5.2.4})$$

On the other hand, consumers believe in the rule (A.5.2.1). However, for the period (t_x, ∞) they believe:

$$\pi = \pi(0) \quad (\text{A.5.2.5})$$

They expect a sudden reversion of the policy in t_x . That possibility is not implausible. Inflation in México was falling sluggishly during 1987-1994. In 1995 it rose in a sudden way to a relative high level.

In the original steady state:

$$Y(0) + rf(0) = C(0) \quad (\text{A.5.2.6})$$

Between (t_0, t_x) :

$$\pi = (\pi(0) + (\frac{1}{\phi} + r)) \exp(-\gamma t) - (\frac{1}{\phi} + r) \quad (\text{A.5.2.7})$$

¹³⁸If there is more foreign direct investment than financial investment, it is possible to target the trajectory of K instead than the trajectory of f .

$$C = C_i \exp(\rho\gamma t) \quad (\text{A.5.2.8})$$

Where C_i is the initial condition for consumption in t_0 .

The production function is (see chapter three):

$$Y = A_1 K \quad (\text{A.5.2.9})$$

Substituting these assumptions in the national accounts identity

$$Y(0) \exp(\rho\gamma t) + rf_t - C_i \exp(\rho\gamma t) = \rho\gamma K(0) \exp(\rho\gamma t) + Df_t \quad (\text{A.5.2.10})$$

This is a differential equation for f whose solution is:

$$f(t_x) = H_0 \exp(rt_x) + \frac{(Y(0) - C_i - \gamma\rho K(0))}{(\rho\gamma - r)} \exp(\rho\gamma t_x) \quad (\text{A.5.2.11})$$

$$H(0) = f(0) - \frac{(Y(0) - C_i - \rho\gamma K(0))}{(\rho\gamma - r)} \quad (\text{A.5.2.12})$$

Also, since $\theta=r$ $D\lambda=0$

$$\frac{U(C_x)}{(1 + (r + \pi(0))\phi)} = \frac{U(C_i)}{(1 + (r + \pi(0))\phi)} \quad (\text{A.5.2.13})$$

Where C_x is the new steady state consumption once inflation rises in a sudden way, as consumers believe. Given that inflation is constant in the period (t_x, ∞) , C is equal to C_x . K is also given by the assumptions.

From (A.5.1.13) is clear that $C_i=C_x$.

Therefore

$$C_x = C_i = Y(0) \exp(\rho\gamma t_x) + rf(t_x) \quad (\text{A.5.2.14})$$

Equations (A.5.2.11), (A.5.2.12) and (A.5.2.14) solve for C_i , $f(t_x)$ and $H(0)$. The system has analytical solution but the interpretation of the results is not easy.

A simulation exercise gives the following results:

Table A.5.2.1: Simulation 7.

Assumptions

Results

K (0)	10	Y (0)	10
α	0.1	r	0.1
A ₁	1.0	C (0)	9.2
γ	0.07	$\pi (t_x)$	0.168
ϕ	0.04	Y (t _x)	10.72
t _x	1.0	f (t _x)	-9.37
$\pi(0)$	2.0	C (t _x)	10.49
f(0)	-8.0	C _i	9.78
ρ	1.0	(f/y) (0)	-0.8
		(f/y) (t _x)	-0.87

The capital inflows problem appears. Consumption increases at the beginning. At the end the sharp reduction in consumption and money also occurs, which is consistent with the lack of credibility hypothesis. Nonetheless, output rises in a permanent way (the trend of growth is zero). The total rise in the foreign debt of the country is the result of both phenomena: lack of credibility of consumers and confidence in the foreign investors.

If at time t_x the government policy holds, the solution is exactly the same. This is because from that point of time there will be another steady state. If, on the contrary, consumers were right, a reduction of capital could take place. As long as investment is irreversible, the solution will be also the same in this case.

Appendix 5.3: Proof that consumption under governments A (C_A) is greater when the time of governments A in power is smaller.

An infinite sequence of A governments gives as a result $C_A=C_h$. A sequence of some A governments followed by an infinite sequence of P governments will produce $C_A>C_h$ as we have seen in the text. C_A will be greater the smaller the time governments type A are in power. In the context of the analysed political model it means that an initial government A has always incentives to choose a P government.

Proof:

The present value of consumption multiplied by the constant rate of interest is:

$$r \int_0^{\infty} C_t \exp(-rt) dt = C_h = Y_0 + rf_0 - g_0 \quad (A.5.3.1)$$

If a sequence of governments A takes office in the interval $(0, t_x)$ and a following sequence of P governments take office in the interval (t_x, ∞) , (A.5.2.1) becomes

$$C_A (1 - \exp(-rt_x)) + C_P \exp(-rt_x) = C_h \quad (A.5.3.2)$$

Now we will compare two sequences. In the first, governments A last the interval $(0, t_{x1})$ and governments P last (t_{x1}, ∞) . In the second governments A last $(0, t_{x2})$ and governments P (t_{x2}, ∞) . Also $t_{x1} < t_{x2}$.

Solving for C_A in (A.5.3.2) and substituting t_x for t_{x1} and t_{x2} , it is possible to compare the two sequences.

$$C_{A/t_{x1}} = \frac{C_h}{(1-\exp(-rt_{x1}))} - \frac{C_p \exp(-rt_{x1})}{(1-\exp(-rt_{x1}))} \quad (\text{A.5.3.3})$$

$$C_{A/t_{x2}} = \frac{C_h}{(1-\exp(-rt_{x2}))} - \frac{C_p \exp(-rt_{x2})}{(1-\exp(-rt_{x2}))} \quad (\text{A.5.3.4})$$

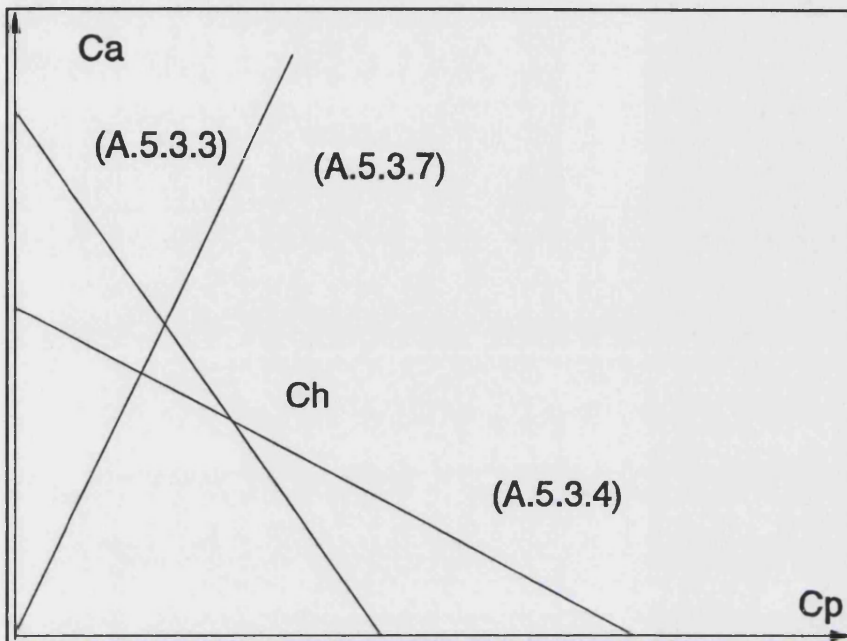
$$\frac{1}{(1-\exp(-rt_{x1}))} > \frac{1}{(1-\exp(-rt_{x2}))} \quad (\text{A.5.3.5})$$

$$\frac{\exp(-rt_{x1})}{(1-\exp(-rt_{x1}))} > \frac{\exp(-rt_{x2})}{(1-\exp(-rt_{x2}))} \quad (\text{A.5.3.6})$$

Equations (A.4.3.5) and (A.5.3.6) happen because $t_{x1} < t_{x2}$.

Representing (A.5.3.3) and (A.5.3.4) in the plane C_A and C_P , it is easy to realize that the equation where A lasts for less has greater constant term and also greater slope in absolute value

Figure A.5.3.1



Equating (A.5.3.3) and (A.5.3.4) it is straightforward to see that the intersection point between these two equations corresponds to the value C_h .

Now it is necessary to use condition (5.8) or (5.25) in the text:

$$\frac{U_{CA}}{(1 + (r + \pi_A)\phi)} = \frac{U_{CP}}{(1 + (r + \pi_P)\phi)} = \lambda = \text{constant} \quad (\text{A.5.3.7})$$

Since $\pi_P > \pi_A$, $C_A > C_P$, which implies $C_A > C_h > C_P$.

There is a line with positive slope crossing equations (A.5.3.3) and (A.5.3.4) at the northwest of C_h , which means:

$$C_{A/t_{x1}} > C_{A/t_{x2}} \quad (\text{A.5.3.8})$$

Consumption in the period of A is greater the smaller is the time A is in government. An initial government A has always incentives to choose a P successor.

ECONOMETRIC APPENDIX:**EMPIRICAL RELATIONS BETWEEN INFLATION AND GROWTH**

The main objectives in this appendix are the following:

- a) Check if the stylized facts of the four chosen countries in chapter one can be supported by the empirical data.
- b) Check if the model showed in section 3.1 of chapter three, which links growth with the acceleration of inflation, is empirically relevant for the analysed countries.

Visual inspection of the time series suggest a negative relation between inflation and long run growth (see chart 1.1 in chapter one) However, this observation does not imply necessarily that such relationship in fact occurs. Other variables, negatively correlated with inflation and positively correlated with growth, may be responsible of the observation. A good econometric analysis should confirm if the original suspicion is correct.

The second objective is to answer what is the relevant measure of inflation affecting growth. Is it the rate itself? Is it the acceleration as the presented model suggests? To check this fact may theoretically help policy makers to design stabilization policies. If the acceleration of inflation is the measure affecting the long run growth, then it is advisable to reduce the rate of inflation in steps.

Several theoretical and empirical works relate inflation to growth¹³⁹. At an empirical level, most of the studies are based in the so-called Barro regressions (see Barro (1991), Barro (1995) and Barro and Sala i Martin (1995).). Using cross-section studies and average panel data, these specifications impose, in many cases, a similar response of

¹³⁹In theoretical grounds see Stockman (1981), Hung (1993), De Gregorio (1992a) (1993) and Orphanides and Solow (1990).

every country to changes in some exogenous or control variables. The use of dummies may characterize some particular behaviour, but it is impossible to generate different coefficients for every different country.

The specification of the Barro regressions has been criticized for several reasons. In different articles¹⁴⁰ per capita growth is related to an initial value of per capita output. If the coefficient for this value is negative, the conclusion is that there is conditional convergence (Barro and Sala i Martin (1995)). Hypothetically, countries with very different initial stock of capital, but with similar technology and tastes, would converge to the same output per capita.¹⁴¹

Nonetheless, statistically it is a mistake to conclude convergence based in the negative sign of the coefficient of output on growth in panel data. Galton fallacy may exist (Quah (1993)) and that coefficient is then naturally biased to negative values. The conclusion is that this kind of analysis cannot constitute a proof of convergence. The regressions are not specified correctly.

Another line of criticism is the lack of dynamics. Bruno and Easterly (1995) use non parametric techniques for the specific topic of our interest (inflation and growth). They conclude that changes in the rate of inflation do not have a unique effect over growth.

According to Bruno and Easterly (1995), for high inflation countries stabilization policies tend to accelerate growth temporarily. Afterwards growth reaches normal levels again. Countries in which inflation accelerates sharply observe an important reduction of growth. Countries with relatively high inflation rates may grow fast (Brazil). Their study

¹⁴⁰Barro (1991), Barro (1995), Barro and Sala i Martin (1995). De Gregorio (1992a) (1993), Kormendi and McGuire (1985), Levine and Renelt (1992), Levine and Zervos (1994).

¹⁴¹ Poor countries grow more than rich countries. This fact has been advocated as a proof of the Solow growth model (Solow (1956)). If growth depends negatively on the level of output, it is exogenous in the long run.

seems to be compatible with the model presented in section 3.1 chapter three.

The empirical part of this chapter is based in traditional econometric techniques. Instead of pooling the four countries, there is a case by case study. Doing this, we hope to overcome the problem of assigning similar coefficients to different countries. The growth of some country responds to some variables and possibly the growth of other country responds to other variables.

Finally, the analysis of time series introduces dynamics in a natural way. Variables can affect the long run growth of the economy in different ways. Some of them may have permanent effects, some others only temporal. This is something possible to check opening the time span of the variables over the objective value.

The Relation of Inflation and Growth in Selected Countries

This section reports the results of ad-hoc regressions of per-capita growth against several control variables. First of all, we set dynamic relations with several lags for the endogenous and exogenous variables (see Cuthbertson, Hall and Taylor (1992) chapter 4). The best specifications in econometric terms are reported in this section.

Dynamics was important only in some specifications. Given the relatively long term of one year in annual data, most of the control variables affect growth in the contemporaneous year.

The rate of inflation was always a significant control variable. It is necessary to be aware that almost in every system inflation is an endogenous variable. There is a positive probability of having simultaneous equation bias and inconsistent estimators. This problem has been addressed by Barro (1995) and Fischer (1991). Barro used

several instrumental variables and reports satisfactory results. Fischer could not find convincing specifications using instrumental variables and reports the results using the rate of inflation itself.

To avoid as much as possible inconsistencies, this appendix did not use directly the rate of inflation, but the rate of growth of the nominal exchange rate. The analysed economies have been subject to exchange rate management several times. Sometimes they have had fixed regimes (for example México in the whole period 1965-1975). The use of this variable, instead of inflation, avoids the simultaneous equation bias when the economy is subject to crawling peg regimes.

Unfortunately, in all the cases studied there have been long episodes of floating regimes. Then the exchange rate is also an endogenous variable with possibilities of correlation with the disturbance term. The problem is also subject to the Lucas critique (Lucas (1976)). Different regimes may change the value of the coefficients and sometimes the sign.

To check if changes in the regime have modified substantially the coefficients, we performed predictive failure tests and analysed the CUSUM and CUSUMSQ tests since the last ERBS started. In none of the cases we find evidence of significant changes in the coefficients.

The chapter also tried to use other instrumental variables for inflation, for example lagged inflation or lagged growth of the nominal exchange rate, but except for Bolivia, they did not work (see Fischer (1991) for a similar result).

+ Argentina

The case of Argentina is perhaps the most straightforward. The best specification was a relation of per capita growth against the rate of growth of the nominal exchange rate (rgner), rgner two years before and the nominal rate of

interest of abroad (libor).

First regression

Sample: Annual data 1965-1993. Source of data International Financial Statistics (IFS). International Monetary Fund (IMF). Annual Book 1995

$$\begin{aligned} \text{CYPAR} = & 5.37 - 0.0006109 \text{ rgner} + 0.000509 \text{ rgner}_{t-2} \\ & (2.32) \quad (-2.09) \quad (1.74) \\ & - 0.5127 \text{ LIBOR} \\ & (-2.21) \end{aligned}$$

R^2 : 0.40 D.W: 2.54 F(3,22): 4.82

t statistic in parentheses

Serial Correlation: F(1,21): 2.05

Functional Form: F(1,21): 0.0714

Normality: $\chi^2(2)$: 0.356

Heteroscedasticity: F(1,24): 1.83

CUSUM, CUSUMSQ: O.K

Wald Statistic for sum of coefficients of
rgner and rgnert-2=0: $\chi^2(1)$: 0.05830

Predictive failure (period 1965-1990): F(3,19): 1.13

Variables

CYPAR: Per capita growth rate in Argentina

rgner: rate of growth on nominal exchange rate

LIBOR: LIBOR rate of interest in nominal terms

There is a very important negative effect of inflation on the contemporaneous rate of growth of per capita output (CYPAR). Also, increases in the foreign rate of interest have significant and negative effect on growth. The reason, which we did not investigate in the model, may be that Argentina is a highly indebted country. When the foreign rate of interest rises, it reduces the available resources

for investment.¹⁴² An interesting aspect is that the real rate of interest was not significant. The nominal rate was.

According to this analysis, the level of inflation is not important to determine growth in the long run. The sum of the coefficients of $rgner$ and $rgner_{t-2}$ is statistically zero (see Wald statistic), implying that the acceleration of inflation produces negative effects on growth. That is consistent with the model explained in chapter three.

The regression can be considered a good representation of the process of growth in the sense that the statistics are satisfactory. Serial correlation is low and the statistic for functional form is almost zero (suggesting a correct specification). Residuals are normal and heteroscedasticity is not significant. The predictive failure test indicates that changes in the regime (the last stabilization programme started in 1991) do not modify the coefficients in a significant way.

Nonetheless, the R^2 is relatively low. Changes in the parameters can only account for 40% of changes in growth. Since most of the statistics are correct, we suspect growth is very volatile in Argentina.

+ Israel:

For the case of Israel it was not possible to find good specifications of per capita growth. Instead, we ran a regression where the logarithm of the output level depends on several control variables. Time is one of them, suggesting a process of endogenous growth due to structural factors.

¹⁴²This effect is often studied in structuralist analyses, in which investment becomes a residual after all the other macroeconomic variables are determined (specially consumption as a percentage of GDP). (see for example van Wijnbergen (1989) or Oks and van Wijnbergen (1995)).

Annual terms: 1968-1993 (Source of data IFS. IMF annual book 1995)

$$\text{LYPISR} = 5.3 + 0.01774 \text{ time} - 0.0001289 \text{ rgner}$$

$$(19.2) \quad (4.2) \quad (-2.56)$$

$$-0.00228 \text{ LIBOR} - 0.13317 \text{ LCOMEXT} + 0.587 \text{ LGRISR} + 0.116 \text{ D79}$$

$$(-0.88) \quad (-2.94) \quad (21.27) \quad (4.50)$$

$$R^2: 0.997 \quad \text{D.W. } 2.53 \quad F(6,18): 1050.7$$

t statistics in parentheses

Serial Correlation: $F(1,17): 1.5555$

Functional Form: $F(1,17): 0.7729$

Normality: $\chi^2(2): 3.74$

Heteroscedasticity: $F(1,23): 0.1624$

CUSUM, CUSUMSQ tests: O.K.

Predictive failure (period 1968-1984): $F(9,9): 1.6393$

Variables

LYPISR: Real GDP per capita in logarithmic terms

LCOMEXT: Index of the volume of trade
((imports+exports)/GDP) in log terms.

LGRISR: Real government consumption in per capita terms
(logs).

D79: Dummy for 1979.

There is a significant and negative relation between the rate of inflation and the level of per capita output (LYPISR). That means a negative association between growth and the acceleration of inflation. Time has a significant and positive value over the level of output, supporting again the endogenous growth hypothesis. In an ideal steady state situation, output per capita would grow at a positive value of 1.77%, driven by structural factors (productivity,

discount of the utility for consumers).

The coefficient of the nominal foreign rate of interest is negative. Other effects are surprising: LCOMEXT is an indicator of the openness of the economy. The effect of this variable on the level of per capita output is negative.¹⁴³ That may be related to the fact that Israel is a rich country, with probably a high ratio of per capita stock of capital. In exogenous growth models, economic integration means that countries with relatively high capital stocks export part of their capital to emerging markets, where productivity is higher. The process may produce a reduction in the GDP per capita but not necessarily in the GNP per capita (see for example Barro and Sala i Martin (1995)).

A process of endogenous growth in aggregate terms does not rule out the possibility of diminishing returns in some sectors. Those could be enough to produce a decline of GDP when the economy becomes more open. A clear explanation of this result is beyond this work and it is necessary more research about the topic.

The other surprising result is the coefficient of the per capita real government consumption (LGRISR) over output per capita. It is positive and very large and significant.¹⁴⁴ Theoretical foundations of this phenomenon can be found in growth models with finite horizons (see Alogoskoufis and van der Ploeg (1994)). In this approach economic policy through demand may be quite effective at least in the short run. As in the case of the openness, further research about this topic would be of particular importance.

Finally, we had to adjust the regression with a dummy in 1979 (d79).

In statistical terms, the regression is also a good

¹⁴³Cardoso and Fishlow (1989) show a positive association between trade and growth for a pool of latin american countries.

¹⁴⁴ Other studies (Fischer (1991)) find that economies with larger deficits grow by less.

description of growth. There is not significant serial correlation and the functional form is correct. Residuals are a bit abnormal - but not too much- and heteroscedasticity is low. Stability tests imply no significant changes on the parameters due to changes in the exchange rate regime.

+ Bolivia

The best specification for the Bolivian growth included inflation with a lag.

Sample: Annual data 1965-1991 (Source of Data: IFS.IMF)

$$\begin{aligned} \text{CYPBOL} = & 1.83 - 0.000491 \text{rgner}_{t-1} + 20.2 \text{COMEX} - 0.6705 \text{LIBOR} \\ & (0.64) \quad (-3.068) \quad (2.95) \quad (-4.75) \\ & -5.72 \text{D83} \\ & (-2.53) \end{aligned}$$

R^2 : 0.78 D.W.: 1.58 F(4,20): 17.8
t statistics in parentheses.

Serial Correlation: F(1,19):1.075

Functional Form: F(1,19): 0.0078

Normality: $\chi^2(2)$: 0.5072

Heteroscedasticity: F(1,23): 0.4989

CUSUM, CUSUMSQ: Unstable in small parts of the sample

Predictive Failure (period 1965-1984): F(9,14): 1.15

There is a negative association between the lag of the rate of inflation and the per capita growth. Differently from the cases of Argentina and Israel, we could not find a relation between the acceleration of inflation and growth. The index of openness implies that trade liberalisation has promoted growth in a very important way. Again, this is possibly related to the fact that Bolivia is a poor

country, but perhaps with high levels of productivity. Opening the economy implies a huge increase in investment and GDP. The reason why openness affects growth and not the level of output remains a topic for future study. Spillover effects over sectors with increasing returns may be part of the answer.

As in the case of Argentina, we found again a negative association between growth and the foreign nominal rate of interest. Bolivia is also a huge indebted country.

In statistical terms the regression is not as good as in the other cases. There is a small instability in the visual inspection of the CUSUM test (non reported here). However, the predictive failure test shows no significant changes because of the new regime starting in 1985.

The significant and negative coefficient of the dummy in 1983 may well reflect terms of trade deterioration (see chapter one and Morales (1988)).

Inflation is a crucial factor to explain growth in Bolivia. Controlling for other factors associated with disinflation (for example the openness of the economy) means that the channel of inflation over growth is direct.

+ México

A parsimonious specification of the per capita growth in México is the following (sample annual 1965-1993):

$$\begin{aligned} \text{CYPMEX} = & -2.98 - 0.0306 \text{ rgner} + 10.93 \text{ TTRAD} - 0.0049 \text{ CGR} \\ & (-1.34) \quad (-5.03) \quad (3.79) \quad (-2.32) \\ & -7.08 \text{ D83} \\ & (-4.2) \end{aligned}$$

R^2 : 0.769 D.W. 1.91 $F(4,23)$: 19.2

t statistics in parentheses

Serial correlation: $F(1,22)$: 0.02647

Functional Form: $F(1,22)$: 0.005845

Normality: $\chi^2(2)$: 0.26061

Heteroscedasticity: $F(1,26)$: 0.76120

CUSUM CUSUMSQ tests: O.K.

Predictive failure (period 1965-1987): $F(6,17)$: 0.7803

Variables

CYPMEX: growth of per capita GDP

rgner: rate of growth of nominal exchange rate

TTRAD: terms of trade (Index of price of exports/index of price of imports).

CGR: real government consumption.

D83: Dummy for 1983

The coefficient of the rate of inflation is negative. We could not find any relation between the acceleration of inflation and growth.

Apart from inflation, other factors influencing growth considerably are terms of trade and government consumption. Both of them have the expected sign. These effects can be explained by a structuralist approach. An increase in the price of exports, CETERIS PARIBUS, increases the real resources of the economy, increasing investment. A rise in government consumption reduces the disposable resources to invest.

The regression shows satisfactory statistics. Serial correlation does not exist. Functional form is very good. Residuals are normal and heteroscedasticity is absent. Stability parameters are also satisfactory, with the predictive failure test showing no significant impact on the change of regime over the coefficients.

We tried other specifications including the foreign rate of interest. The coefficients were not significant. However, we performed an experiment suggested by De Gregorio (1993): He asserts that in Latin America the rate of inflation impacts growth through productivity and not through investment. Bruno and Easterly (1995) report similar results in a study that includes other countries. The model

presented in chapter three establishes a relation between the acceleration of inflation and investment, whilst productivity is constant. The Stockman's 1981 model and most of his derivations (especially Hung (1993)) also finds a relation between inflation and investment.

The quality of data for México permits to know how much inflation affects investment and how much investment influences growth. We performed the exercise in two stages (two stage least squares). First, we run a regression of the ratio investment/GDP (I_y) against some control variables. Second, we regress the growth of per capita output against the forecasted value of the ratio I_y .

The results are the following (sample: annual 1965-1993)

$$I_y = 0.0704 - 0.000126 \text{ rgner} + 0.2064 \text{ TTRAD} \\ \quad (6.75) \quad (-3.92) \quad (13.57) \\ - 0.002659 \text{ RLIBOR} - 0.036923 \text{ D8384} \\ \quad (-3.31) \quad (-5.66)$$

R^2 : 0.911 D.W: 2.25 F(4,23): 59.4
t statistics in parentheses

Serial Correlation: F(1,22): 0.7395

Functional Form: F(1,22): 1.0018

Normality: $\chi^2(2)$: 0.9222

Heteroscedasticity: F(1,26): 2.355

CUSUM CUSUMSQ tests: O.K.

Predictive Failure (period 1965-1987): F(6,17): 0.258

RLIBOR: labor rate of interest in real terms.

The second regression is (sample annual 1965-1993):

$$\text{CYPMEX} = -15.26 + 83.8 I_{ye} \\ \quad (-3.9) \quad (4.3)$$

R^2 : 0.42 D.W.: 1.41 F(1,26): 18.9

Serial correlation: $F(1,25)$: 2.04

Functional Form: $F(1,25)$: 2.09

Normality: $\chi^2(2)$: 2.49

Heteroscedasticity: $F(1,26)$: 0.2722

CUSUM CUSUMSQ tests: O.K.

Predictive Failure (period 1965-1987): $F(1,19)$: 1.30

Inflation has an important negative effect over the ratio investment/GDP. This one has a positive and significant influence over per capita growth. However, I_y can only explain around 40% of per capita growth. The set of variables of the first regression for México can account for almost 80% of movements in CYPMEX. The channel of the relation between inflation and growth seems to go from inflation to investment as well as from inflation to productivity.

+ Common Characteristics of the Estimations:

In the analysed economies, the process of disinflation and the management of exchange rate have exerted a positive and permanent effect over growth or/and the level of output. After controlling for other variables usually correlated with disinflation,¹⁴⁵ it is possible to assert that there is a direct channel from the rate of inflation through growth.

Nonetheless, this fact does not necessarily mean that controlling the exchange rate is a desirable policy. Reductions in the rate of inflation under inconsistent fiscal policies often produce future higher inflation, and according to the presented view, future small rates of growth. Policies to combat inflation must be well designed to avoid future collapses of the exchange rate regime. For the cases of Argentina and Israel, the results of the empirical part support the conclusions of the theoretical

¹⁴⁵Openness of the economy or the reduction of the government expenditure.

part of chapter three. The acceleration of inflation is the variable related to growth. Instead, the data for Bolivia and México support more the results already found in quite a lot of theoretical and empirical studies.

A final remark is to call for future research on other determinants of growth: specially trade liberalisation, the financial rate of interest and demand factors. Many of these variables seem to have a very important effect on the determination of the long run growth. However, their influence is not yet very clear.

DATA APPENDIX

Data for Econometric Appendix is in the following units

CYPX: Growth of GDP in per capita terms (eg if it is 10% then CPYX=10) X= AR, BOL, MEX (Argentina Bolivia and México)

rgner: Rate of growth of nominal exchange rate. The same kind of measure than per capita growth

LIBOR: Same measure. If it is 6% LIBOR= 6

COMEX: Index of trade for Bolivia. Percentage terms/100 (eg if 20% then COMEX=0.2)

TTRAD: Terms of trade in México. Index (1980=1)

CGR: Government consumption/GDP in México. (eg if 20% CGR=0.2)

RLIBOR: $(LIBOR - INFUS) / (1 + (INFUS/100))$

INFUS: Rate of inflation in US (eg if 10% INFUS=10)

I_y: Investment/GDP (eg if 20% I_y=0.2)

LYPISR: Log of per capita output in Israel. GDP is in millions of new shequelims. Population is in millions.

LCOMEX: Log of index of volume of trade in Israel: $(\text{exports} + \text{imports}) / \text{GDP}$ both measures are in US dollars. The result is if for example the volume of trade is 20%, COMEX=0.2

LGRISR: Log of real consumption in per capita terms. Government consumption is in millions of new shequelims of 1990. Population is in millions.

Sources: IMF, IFS annual book 1995.

Carpeta Histórica de Banco de México for TTRAD, CGR, I_y.

REFERENCES

Ades, A., M. Kiguel and N. Liviatan (1993). "Exchange Rate Based Stabilization: Tales From Europe and Latin America," World Bank Working Paper. WP/433/1087.

Agénor, P.R (1994a) " Credibility and Exchange Rate Management in Developing Countries." Journal of Development Economics, 45, p.p. 1-16.

Agénor, P.R (1994b) " The Behaviour or Real Interest Rates in Exchange Rate Based Stabilization Programmes." IMF Working Paper WP/94/75.

Agénor, P.R and P. Masson (1996) "The Mexican Peso Crisis: Overview and Analysis of Credibility Factors." IMF Working Paper WP/96/6.

Alogoskoufis, G and F van der Ploeg (1994) "Money and Endogenous Growth." Journal of Money Credit and Banking, vol 24-4, pp. 771-791.

Arrau, P (1990) "Intertemporal Substitution in a Monetary Framework: Evidence from Chile and Mexico." World Bank Working Paper 549.

Arrau, P, J. De Gregorio, C. Reinhart and P. Wickham. (1995) " The Demand for Money in Developing Countries: Assessing the Role of Financial Innovation." Journal of Development Economics, 46, p.p. 317-340.

Aspe, P (1992) " Macroeconomic Stabilization and Structural Change: The Experience of Mexico 1982-1990." European Economic Review., 36, pp. 320-328

Aspe, P (1993). "Economic Transformation: The Mexican Way"

MIT Press: Cambridge Massachusetts, London England.

Aspe, P and J. Córdoba (1984) "Stabilization Policies in México (1983-1984)." Mimeo MIT.

Auernheimer, L (1987) " On the Outcome of Inconsistent Programs under Exchange Rate and Monetary Rules or Allowing the Market to Compensate for Government Mistakes." Journal of Monetary Economics, 19, p.p 280-305.

Banco de México (1993) "The Mexican Economy." Banco de México. México D.F.

Banco de México (1993) "Carpeta Histórica de Información Económica." Banco de México. México D.F.

Barro, R (1974) " Are Government Bonds Net Wealth." Journal of Political Economy, 82, p.p. 1095-117

Barro, R (1991) "Economic Growth in a Cross Section of Countries." Quarterly Journal of Economics, 106, pp. 407-443.

Barro, R (1995) " Inflation and Economic Growth." Bank of England Quarterly Review. May 1995 p.p 166-175.

Barro, R. and D. Gordon (1983). "A Positive Theory of Inflation in an Natural Rate Model," Journal of Political Economy, 91, p.p 589-610.

Barro, R and X. Sala i Martin (1995) "Economic Growth". Mc Graw Hill inc.

Baxter, M (1995) " Comment to S. Rebelo and C.Vegh article. NBER Macroeconomics Annual. MIT Press. Cambridge Massachusetts.

Bazdresch, C and S. Levy (1991) "Populism and Economic Policy in Mexico, 1970-1982." in "The Macroeconomics of Populism in Latin America." R. Dornbusch and S. Edwards (eds). University of Chicago Press.

Blanchard, O (1985) "Debt, Deficits and Finite Horizons." Journal of Political Economy, 93, pp. 223-247.

Blanchard, O. and S. Fischer (1989). "Lectures on Macroeconomics," The MIT Press. Cambridge Massachusetts. London England.

Brock, W (1974) "Money and Growth in the case of Long Run Perfect Foresight." International Economic Review, 15, pp. 750-777

Bruno, M (1991) "High Inflation and the Nominal Anchors of an Open Economy." Essays in International Finance. Princeton University.

Bruno, M (1993). "Crisis, Stabilization and Economic Reform: Therapy by Consensus," Clarendon Press, Oxford.

Bruno, M. and S. Fischer (1986). "The Inflationary Process, Shocks and Accommodation," in The Israeli Economy Maturing Through Crises, ed. by Ben Porath, Y. Harvard University Press. Cambridge, Massachusetts. London, England.

Bruno, M and L. Meridor (1991). " The Costly Transition from Stabilization to Sustainable Growth: Israel Case." in Lessons of Stabilization and its Aftermath Bruno, M. E. Helpman and N. Liviatan (Cambridge Massachusetts MIT Press).

Bruno, M and J. Easterly (1995) " Inflation, Crises and Long Run Growth." World Bank working paper. WP/433/1517.

Buiter, W and M. Miller (1985) " Costs and Benefits of Anti Inflationary Policy: Questions and Issues" in Angry, V and J. Neville (eds) Inflation and Unemployment: Theory, Experience and Policy Making. London, Boston and Sydney. Allen and Urwin.

Buiter, W and D. Purvis (1990) "Oil, Disinflation and Export Competitiveness: A Model of the Dutch Disease." in W. Buiter: International Macroeconomics; Oxford University Press.

Calvo, G.A (1981) "Devaluations: Levels versus Rates." Journal of International Economics.,11, p.p 165-172

Calvo, G.A (1983) "Trying to Stabilize: Some Theoretical Reflections based in the case of Argentina." in Financial Policies in the World Capital Markets. The Problem of Latin American Countries Aspe, P, R.Dornbusch, M. Obstfeld (eds). The University of Chicago Press. Chicago and London.

Calvo, G.A (1986) "Temporary Stabilization: Predetermined Exchange Rates." Journal of Political Economy,94, pp 1319-1329

Calvo, G.A (1987) "Balance of Payments Crises in a Cash in Advance Economy." Journal of Money, Credit and Banking,19, pp 19-32

Calvo, G.A (1994) "Comment to the Paper by R. Dornbusch and A. Werner. Brookings Papers on Economic Activity pp. 298-303.

Calvo, G.A and C.Vegh (1990) "Interest Rate Targeting in a Small Open Economy: The Predetermined Exchange Rates Case." IMF Working Paper wp/90/21

Calvo, G.A and C. Vegh (1993) "Exchange Rate Based Stabilization under Imperfect Credibility." in Open Economy Macroeconomics. H. Frisch and A. Worgotter (eds). London, Mc Millan.

Calvo, G.A and E. Mendoza (1996a) " Reflections on Mexico's Balance of Payments Crisis: A Chronicle of a Death Foretold." International Finance Discussion Papers. Board of Governors of the Federal Reserve Bank number 545.

Calvo, G.A and E. Mendoza (1996b) "Petty Crime and Cruel Punishment: Lessons from the Mexican Debacle." American Economic Review, 86. Papers and Proceedings. pp. 170-175

Canavese, A and G. Di Tella (1988) " ¿ Estabilizar la Inflación o evitar la Hiperinflación?" El Caso del Plan Austral. in Inflación y Estabilización: la Experiencia de Israel, Argentina, Brasil, Bolivia y México. Bruno, M; G. Di Tella; R. Dornbusch and S. Fischer (eds). El Trimestre Económico. Fondo de Cultura Económica. México.

Cardoso, E and A. Fischlow ((1989) " Latin American Economic Development:1950-1980." NBER Working Paper 3161. National Bureau of Economic Research.

Cavallo, D (1992) " Economic Reorganization as a Prerequisite to Growth." in Policies for Long Run Economic Growth. A Symposium Sponsored by the Federal Reserve Bank of Kansas City. Jackson Hole Wyoming.

Chadha, B P. Masson and G. Meredith (1991) "Models of Inflation and the Costs of Disinflation." Working Paper IMF. WP/91/97.

Chiang, A (1984) " Fundamental Methods of Mathematical Economics." Mc Graw Hill. International Student Edition.

Chiang, A (1992) "Elements of Dynamic Optimization." Mc Graw Hill International Editions. Economic Series.

Cline, W (1995) "International Debt Re examined." Institute for International Economics. Washington D.C. (p.p 300 and 497)

Cole, H and T.Kehoe. (1996) "A Self Fulfilling of Mexico's 1994-95 Debt Crisis." Federal Reserve Bank of Minneapolis. Staff Report 211.

Connolly, M and D. Taylor (1984) "The Exact Timing of the Collapse of an Exchange Rate Regime and its Impact on the Relative Price of Traded Goods." Journal of Money, Credit and Banking, 16, pp. 194-207.

Cosío Villegas, D (1975) "La Sucesión Presidencial." Cuadernos de Joaquín Mortiz. México.

Criterios Generales de Política Económica (1994) Presidencia de la República. México.

Cukiermann, A and N. Liviatan (1990) "The Dynamics of Optimal Gradual Stabilizations. Mimeo.

Cukiermann, A M. Kiguel and N.Liviatan (1992) " How Much To Commit to an Exchange Rate Rule?: Balancing Credibility and Flexibility." Revista de Análisis Económico, vol 1.

Cuthbertson, K, Hall, G and M. Taylor (1992) "Applied Econometric Techniques." Harvester Wheatsheaf.

De Gregorio.J (1991) "Comment to R.Fernández Article" in The Macroeconomics of Populism in Latin America. R. Dornbusch and S. Edwards (eds). The University of Chicago Press. Chicago and London.

De Gregorio, J (1992a) " The Effects of Inflation on Economic Growth. Lessons from Latin America." European Economic Review. vol 36 pp 417-25.

De Gregorio, J (1992b) " The Persistence of Inflation and Gradual Stabilization." IMF Working Paper. WP/92/19.

De Gregorio, J (1993) " Inflation, Taxation and Long Run Growth." Journal of Monetary Economics, 31, p.p 271-298.

Dellas, H and A. Stockman (1993) " Self-Fulfilling Expectations, Speculative Attacks and Capital Controls." Journal of Money Credit and Banking, 25-4, p.p. 721-730

Díaz Alejandro, C (1981) " Southern Cone Stabilization Plans" in Economic Stabilization in Developing Countries. ed by William Cline and S. Weintraub. (Washington: The Brookings Institution)

Dornbusch, R (1976) " Expectations and Exchange Rate Dynamics." Journal of Political Economy.,84, p.p 1161-76.

Dornbusch, R (1982). "Stabilization Policies in Developing Countries. What have we Learned?" World Development,10, pp 701-708

Dornbusch, R (1993). "Mexico, How to Recover Stability and Growth?" Mimeo MIT.

Dornbusch, R and S. Fischer (1991) " Moderate Inflation." World Bank Working Paper (WP/433/807).

Dornbusch, R and J. Frenkel (1973) "Inflation and Growth." Journal of Money, Credit and Banking, 5, pp. 141-156.

Dornbusch, R and A. Werner (1994) " México: Stabilization, Reform and No Growth." Brookings Papers on Economic

Activity, 1, p.p 253-297.

Drazen, A (1985) "Tight Money and Inflation: Further Results." Journal of Monetary Economics.,15, p.p. 113-120

Drazen, A (1990) "Comment to the Paper by Giavazzi and Pagano." NBER Macroeconomics Annual. MIT Press. Cambridge Massachusetts.

Drazen, A and E. Helpman (1987) "Stabilization with Exchange Rate Management." Quarterly Journal of Economics.,102, 835-855

Drazen, A and E. Helpman (1988) " Stabilization with Exchange Rate Management under Uncertainty." in E. Helpman, A. Razin and E. Sadka (eds) Economic Effects of the Government Budget. MIT Press. Cambridge Massachusetts. London, England.

Economic Intelligence Unit. Country Reports for Bolivia, Argentina and México. Several numbers. London, England.

Edwards, S (1992) " Exchange Rates as Nominal Anchors." NBER Working Paper 4246.

Edwards, S (1995a) "Exchange Rates, Inflation and Disinflation: Latin American Experiences." in Capital Controls, Exchange Rates and Monetary Policy in the World Economy. Sebastian Edwards (ed) Cambridge University Press.

Edwards, S (1995b) "Crisis and Reform in Latin America: From Despair to Hope." The World Bank. Oxford University Press.

Edwards, S. F. Lozada and R. Steiner (1995) The Mexican Crisis: Bad Policies or Bad Luck?" Mimeo World Bank.

Eichengreen, B, A Rose and C.Wyplosz (1995). "Exchange Market Mayhem: The Antecedents and Aftermath of Speculative Attacks." Economic Policy, 21, pp 249-312.

Fernández, R. (1991). "What Have Populist Learned from Hyperinflation?," in The Macroeconomics of Populism in Latin America. R.Dornbusch and S. Edwards (eds). The University of Chicago Press. Chicago and London.

Fischer, S (1986) "Inflation, Indexing and Economic Policy." MIT Press. Cambridge Massachusetts.

Fischer, S (1991) " Growth, Macroeconomics and Development." NBER Working Paper 3702. National Bureau of Economic Research.

Fischer, S and F. Modigliani (1978) " Towards an Understanding of the Real Effects and Costs of Inflation." Weltwirtschaftliches Archiv, 114, pp. 810-832.

Fischer, S and L. Summers (1989) "Should Governments Learn to Live with Inflation." American Economic Review pp 382-387

Flood, R and P. Garber (1984) "Collapsing Exchange Rate Regimes: Some Linear Examples." Journal of International Economics, 17, pp. 1-13.

Flood, R and P. Garber (1994) "Speculative Bubbles, Speculative Attacks and Policy Switching." The MIT Press. Cambridge Massachusetts. London, England.

Friedman, M (1968) "The Role of Monetary Policy." American Economic Review, 58, pp. 1-17.

Giavazzi, F and M. Pagano (1990) "Can Severe Fiscal Contractions be Expansionary ? Tales of two Small European

Countries." NBER Macroeconomics Annual. MIT Press. Cambridge Massachusetts.

Gil Díaz, F (1984) " México's Path from Stability to Inflation." in World Economy Growth. A. Harberger (ed) (San Francisco: Institute for Contemporary Studies).

Gil Díaz, F and R. Ramos Tercero (1988) "Lecciones desde México" in Inflación y Estabilización: la Experiencia de Israel, Argentina, Brasil, Bolivia y México Bruno, M G .Di Tella, R. Dornbusch and S. Fischer (eds). El Trimestre Económico. Fondo de Cultura Económica. México.

Gil Díaz, F and A. Carstens (1996) "One Year of Solitude: Some Pilgrim Tales About Mexico's 1994-1995 Crisis." American Economic Review, 86. Papers and Proceedings. pp. 164-169.

Gordon, R (1982) "Why Stopping Inflation may be Costly" in Inflation: Causes and Effects. R.E Hall (ed) (Chicago: University of Chicago Press).

Helpman, E and A. Razin (1987) "Exchange Rate Management: Intertemporal Tradeoffs" American Economic Review pp 107-123

Heymann, D (1987) "The Austral Plan." American Economic Review, 77, pp. 284-87.

Heymann, D (1991) " From sharp Disinflation to Hyperinflation, Twice: The Argentine Experience: 1985-1989." in Lessons of Stabilization and its Aftermath. M. Bruno, E. Helpman and N. Liviatan (eds). The MIT Press. Cambridge Massachusetts. London, England

Hung, V. (1993) "Essays of Economic Growth and Fluctuations." Unpublished PH'D Dissertation. London School

of Economics.

International Financial Statistics (1995) "Year Book"
International Monetary Fund.

Jones, L and R. Manuelli (1993) "Growth and the Effects of Inflation." National Bureau of Economic Research, Working Paper 4523.

Kiguel, M and N. Liviatan (1988) "Inflationary Rigidities and Orthodox Stabilization Policies." The World Bank Economic Review , 2, pp 273-297

Kiguel, M and N. Liviatan (1990) "Some Implications of Policy Games for High Inflation Economies." World Bank Working Paper WPS 379.

Kiguel, M and N. Liviatan (1992) "The Business Cycle Associated with Exchange Rate Based Stabilizations." The World Bank Economic Review pp 279-305

Kiguel, M and N. Liviatan (1994) " Exchange Rate Based Stabilizations in Argentina and Chile: A Fresh Look." in Frameworks for Monetary Stability ed by T. Baliño and C. Cottarelli (eds). International Monetary Fund.

King, M (1990) "Comment to Muellbauer and Murphy Article." Economic Policy, a European Forum, 11.

Kormendi, R and P. Meguire (1985) " Macroeconomic Determinants of Growth: Cross Country Evidence." Journal of Monetary Economics, 16, p.p 141-164.

Krugman, P (1979) "A Model of Balance of Payments Crises." Journal of Money, Credit and Banking, 11, p.p 311-326.

Krugman, P (1995) " Dutch Tulips and Emerging Markets."

Foreign Affairs, vol 74, 4, pp. 28-44.

Krugman, P (1996) "Are Currency Crises Self-Fulfilling." NBER Macroeconomics Annual. National Bureau of Economic Research. The MIT Press. Cambridge Massachusetts.

Leiderman, L and A.Thorne (1995) " Mexico's 1994 Crisis and its Aftermath: Is the Worst Over?" Mimeo Tel Aviv University.

Levine, R and D. Renelt (1992) "A Sensitivity Analysis of Cross-Country Regressions." American Economic Review, 82, pp. 942-63.

Levine, R and S. Zervos (1994) " What we know about Policy and Growth from Cross Country Analysis?" in L. Pasinetti and R. Solow (eds) Economic Growth and the Structure of Long Term Development. IEA. (International Economic Association). Conference St Martin's Press.

Liviatan, N (1984) "Tight Money and Inflation." Journal of Monetary Economics.,13, p.p 5-15

Liviatan,N and S.Pitterman (1986) "Accelerating Inflation and Balance of Payments Crises 1973-1984." in The Israeli Economy Maturing Through Crises Ben Porath,Y (ed). Harvard University Press. Cambridge Massachusetts. London, England.

Lucas, R (1976) "Econometric Policy Evaluation: A Critique." in K.Brunner and A. Meltzer (eds) The Phillips Curve and Labour Markets. Carnegie Rochester Conference Series, vol 1. Amsterdam, North Holland pp. 19-46.

Lucas, R and N. Stockey (1987) "Money and Interest in a Cash in Advance Economy." Econometrica, 55, pp. 491-514.

Machinea. J and J. M Fanelli (1988) " El Control de

Hiperinflación. El Caso del Plan Austral, 1985-1987." in Inflación y Estabilización: la experiencia de Israel, Argentina, Brasil, Bolivia y México. M. Bruno, G. Di Tella, R. Dornbusch and S. Fischer (eds). El Trimestre Económico. Fondo de Cultura Económica. México.

Maiken, G (1988) " Comment to J.A Morales Article." in Inflación y Estabilización: la experiencia de Israel, Argentina, Brasil, Bolivia y México. M. Bruno, G. Di Tella, R. Dornbusch and S. Fischer (eds). El Trimestre Económico. Fondo de Cultura Económica.

McCallum, B (1984) "Are Bond Financed Deficits Inflationary?: A Ricardian Analysis." Journal of Political Economy., 92, p.p. 123-135

McKinnon, R (1973) "Money and Capital in Economic Development." Washington, D.C: Brookings Institution.

McKinnon, R and H. Pill (1996) " Credible Liberalizations and International Capital Flows: The Overborrowing Syndrome." Mimeo.

Mendoza, E and M. Uribe (1996) " The Syndrome of Exchange-Rate Based Stabilizations and the Uncertain Duration of Currency Pegs. Mimeo Division of International Finance. Board of Governors of the Federal Reserve System. Washington D.C.

Morales, J.A (1988) " La Inflación y Estabilización en Bolivia." in Inflación y Estabilización: La Experiencia de Israel, Argentina, Brasil, Bolivia y México. M. Bruno, G. Di Tella, R. Dornbusch and S. Fischer (eds). El Trimestre Económico. Fondo de Cultura Económica. México.

Morales, J. A (1991) " The Transition from Stabilization to Sustained Growth in Bolivia." in Lessons of Stabilization

and its Aftermath. M. Bruno; E. Helpman and N. Liviatan (eds). MIT Press. Cambridge Massachusetts.

Muellbauer, J and A. Murphy (1990) "The UK Current Account Deficit." Economic Policy: A European Forum, 11

Obstfeld, M (1981) "Capital Mobility and Devaluation in an Optimizing Model with Rational Expectations." American Economic Review, 71, p.p. 217-221

Obstfeld, M (1984) "Balance of Payments Crises and Devaluation." Journal of Money, Credit and Banking, 16, pp. 208-17.

Obstfeld, M. (1985). "The Capital Inflow Problem Revisited: A Stylized Model of Southern Cone Disinflation," Review of Economic Studies, 52, p.p. 605-23.

Obstfeld, M (1996) "Models of Currency Crises with Self Fulfilling Features." European Economic Review, 40. pp 1037-1048.

Obstfeld, M and K. Rogoff (1995) "The Mirage of Fixed Exchange Rates." Journal of Economic Perspectives, 9. pp 73-96.

Oks, D and S van Wijnbergen (1995) Mexico after the Debt Crisis: Is Growth Sustainable? Journal of Development Economics, 47, pp. 155-178.

Orphanides, A and R. Solow (1990) " Money, Inflation and Growth." in B. Friedman and F. H Hahn (eds). Handbook of Monetary Economics Volume I. Elsevier Science Publishers.

Ortiz, G (1985) " Economic Expansion, Crisis and Adjustment in México (1977-1983)" in The Economics of the Caribbean Basin M. Connolly and J.M Dermott (eds) (Praeger).

Ortiz, G. (1991). "México Beyond the Debt Crisis: Towards Sustainable Growth with Price Stability," in Bruno, M., Helpman, E. and N. Liviatan (eds). Lessons of Stabilization and its Aftermath. MIT Press. Cambridge, Massachusetts.

Pagano, M (1990) " Comment to Muellbauer and Murphy Article." Economic Policy: A European Forum, 11.

Pazos, F (1972) "Chronic Inflation in Latin America." New York Praeger.

Philip, G (1992) "The Presidency in Mexican Politics." McMillan in association with St Anthony College, Oxford.

Proceso (1996) Several Issues.

Quah, D (1993) "Galton's Fallacy and Test of Convergence Hypothesis." Scandinavian Journal of Economics, 95, pp. 427-443.

Ramos, J (1988) " Comment to J.A Morales Article." in Inflación y Estabilización. La Experiencia de Israel, Argentina, Brasil, Bolivia y México. M. Bruno, G. Di Tella, R Dornbusch and S. Fischer (eds). El Trimestre Económico. Fondo de Cultura Económica. México.

Rebelo, S (1991a) " Long Run Policy Analysis and Long Run Growth." Journal of Political Economy, 99, p.p. 500-521.

Rebelo, S (1991b) " Growth in Open Economies." World Bank Working Paper (433/799).

Rebelo, S and C. Vegh (1995) " Real Effects of Exchange Rate Based Stabilization: An Analysis of Competing Theories." NBER Macroeconomics Annual. National Bureau of Economic Research.

Reinhart, C and C. Vegh (1995) "Nominal Interest Rates, Consumption Booms and Lack of Credibility: A Quantitative Examination." Journal of Development Economics, 46, pp. 357-378.

Roldós, J (1993) " On Credible Disinflation." IMF Working Paper WP/93/90.

Roldós, J (1995) " Supply Side Effects of Disinflation Programmes." Staff Papers, 42, p.p. 158-183. International Monetary Fund.

Rodriguez, C.A. (1982). "The Argentine Stabilization Plan of December 20th," World Development.,10, p.p. 801-11.

Rodríguez, C. A (1988) " Comment to papers in Argentina." in Inflación y Estabilización: La Experiencia de Israel, Argentina, Brasil, Bolivia y México. M. Bruno, G. Di Tella, R. Dornbusch and S. Fischer (eds). El Trimestre Económico. Fondo de Cultura Económica.

Rodríguez-Arana, A (1995) " Balance of Payments Crises, Economic Fluctuations and Financial Restrictions." Mimeo London School of Economics.

Romer, P (1986) "Increasing Returns and Long Run Growth." Journal of Political Economy, 90, pp. 1257-1278.

Sachs, J. (1986) " The Bolivian Hyperinflation and Stabilization." NBER working paper 2073.

Sachs, J. (1987). "The Bolivian Hyperinflation and Stabilization," American Economic Review.,77, p.p. 275-78.

Sachs, J A. Tornell and A. Velasco (1995) " The Collapse of the Mexican Peso: What have We Learned." NBER Working Paper 5142. National Bureau of Economic Research.

Sargent, T. (1982). "The Ends of Four Big Inflations," in R.E. Hall (ed) Inflation: Causes and Effects. (Chicago: University of Chicago Press).

Sargent, T. and N. Wallace (1973). "The Stability of Models of Money and Growth with Perfect Foresight," Econometrica 41, p.p. 1043-48.

Sargent, T. and N. Wallace (1982). "Some Unpleasant Monetarist Arithmetic," Federal Reserve Bank of Minneapolis. Quarterly Review.

Savastano, M J. Roldós and J. Santaella (1995) "Factors Behind the Financial Crisis in Mexico." in World Economic Outlook. (Washington: International Monetary Fund).

Sidrausky, M. (1967). "Rational Choice and Patterns of Growth in a Monetary Economy," American Economic Review 57, p.p. 534-44.

Sobarzo, H (1994) "The Gains for Mexico from a North American Free Trade Agreement. An Applied General Equilibrium Assessment." in Modelling Trade Policy. Joseph F. Francois and Clinton R. Shiells (eds). Cambridge University Press.

Sobarzo, H (1995) "A General Equilibrium Analysis of the Gains from NAFTA for the Mexican Economy." in Modelling North American Economic Integration, Patrick J. Kehoe y Timothy J. Kehoe (eds). Kluwer Academic Publishers.

Solow, R (1956) "A Contribution to the Theory of Economic Growth." Quarterly Journal of Economics, 70, pp. 75-94.

Stockman, A. C (1981) "Anticipated Inflation and the Capital Stock in a Cash in Advance Economy." Journal of Monetary Economics, 8, pp. 387-393.

Taylor, J. B (1979) " Staggered Wage Setting in a Macro Model." American Economic Review.,69, pp. 108-112.

Taylor, J.B. (1980). "Aggregate Dynamics and Staggered Contracts," Journal of Political Economy,88, pp. 1-23.

Taylor, L (1991) "Income Distribution, Inflation and Growth: Lectures on Structuralist Macroeconomic Theory." MIT Press. Cambridge Massachusetts. London, England.

Uribe, M (1995) " Exchange Rate Based Inflation Stabilization: The Initial Real Effects of Credible Plans." Board of Governors of the Federal Reserve System. International Finance Discussion Paper 503.

Velasco, A (1993) " Interest Rates and Government Debt During Stabilization." Journal of Money, Credit and Banking,25, p.p 259-272.

van Wijnbergen, S (1984) "Inflation, Employment and the Dutch Disease in Oil Exporting Countries: A Short Run Disequilibrium Analysis." Quarterly Journal of Economics.,99,pp. 233-50.

van Wijnbergen, S. (1988). "Inflation, Balance of Payments Crisis and Public Sector Deficits," in E. Helpman, A. Razin and E. Sadka (eds). Economic Effects of the Government Budget. Harvard University Press.

van Wijnbergen, S (1989) "Inflation, Debt and Output Growth in Mexico: An Empirical Investigation." Mimeo World Bank.

Zaid, G (1987) "La Economía Presidencial." Editorial Vuelta. México.