Financial Fragility Dynamics in Developing Countries, the Mexican Case

Andrés Blancas•

Abstract

The aim of this paper is to show the financial fragility dynamics in developing countries following the last theoretical advances. As an empirical application we prove that the Mexican economy has been characterized by financial fragility, mainly during the crisis terms. Financial fragility has created difficult problems for policy makers; in trying to fix it by restricted monetary and fiscal policies, they have triggered the generalized financial crises. Whereby, financial fragility can be diagnosed as an structural problem of developing countries like Mexico and a real potential risk of generalized economic crisis in the process of economic liberalization nowadays.

Key Words: Economic dynamics, financial fragility, developing countries, financial crisis, monetary policy and Mexican economy

JEL Classification: C61, E44, E58, F34, O5

1 Introduction

The 1990s financial crises in developing and newly industrializing countries exemplify the risk of financial volatility and economic instability that has accompanied the economic liberalization and the deregulation of financial markets. For these countries, particularly in Asia and Latin America, the first part of the 1990s was distinguished by hopeful and cheerful

economic growth. However, the crises made irruption in Mexico (1994-1995), Asia (1997-1998), Russia, Brazil, and several other Latin American countries (1998-1999), and Argentina (2001-2002). These kinds of crises showed that there was something wrong in the so-called "emergent economies" under the new "market friendliness" environment. In spite of the financial liberalization reforms, the economic crises in those countries could imply there are structural factors that make them more vulnerable to speculative attacks under conditions of economic globalization.

In fact, freely flowing capital can be destabilizing; when the so-called "hot money" veersat high speed local currencies are devaluated out of control, and play disorder with economic management. The fear of currency crises and the resulting unemployment, bankruptcies, and economic stagnation have made many developing countries' governments to state capital regulations and reject further capital liberalization.

These crises have also raised policy and theoretical issues regarding the management of risks related with economic liberalization and regulation of financial markets. Several theoretical explanations of financial crises have been offered. One set of explanations can be identified with the mainstream economics of the sort exposed by Krugman (1999) and by Glick, Moreno, and Spiegel (2001). Another set of alternative explanations of the financial crisis has been given by economists like Minsky (1975, 1986, 1991, 1995), Arestis and Murray (1999), Dymsky (1999) and academics from New School University: Taylor-O'Connell (1989), Foley (2001), Taylor (1998, 2001), Eatwell and Taylor (2002), Schroeder (2002), Semmler (2003), and Neftci (2000).

Some important differences between these theoretical explanations are the economic theory background and the methodological approach. While the mainstream models rely on the neoclassical economic theory that focus always on optimizations by agents subject to given constraints, the alternative explanations are based on Keynesian and Post Keynesian economics, where the historical analysis of how the constrains affect macro equilibrium subject to plausible closure assumptions plays a key role, as they themselves change over time.

Methodologically, the mainstream economics models of the crises take to Mundell-Fleming model as the workhorse of open-economy macroeconomics, refined by accommodate expectations, accumulation, and price adjustment over time, and they are applied indistinctly for both developed and developing economies. Meanwhile, the alternative theoretical explanation, in a Keynesian and Kaleckian style, has differentiated between models for industrialized economies and those that try to explain in a well-behavior way the dynamics of developing country crises.

The aim of this paper is to prove that the Mexican economy has been characterized by financial fragility, mainly during the crisis terms. Financial fragility has created difficult problems for financial authorities; in trying to fix financial fragility by restricted monetary and fiscal policies, they have triggered the financial crises that have led very quickly toward generalized economic crises, like those in the 1980s and 1994-95. Whereby, financial fragility can be diagnosed as a real potential risk of generalized economic crisis and it can be identified with the Minskian theoretical tools.

This analysis is conducted by the last developments in the Minskian financial fragility theory elaborated by Taylor and O'Connell (1989), Foley (2001), and the empirical application of Schroeder (2002). Such analyses provide, theoretically and methodologically, a

better understanding of the structural financial conditions that led to developing countries like Mexico toward generalized economic crises in the process of economic liberalization.

The next section points out some theoretical explanations of the crisis, emphasizing the Minskian theory and the models for developing economies built up by Taylor-Oconnell and Foley, who have improved the understanding of financial crises in developing countries from a Minskian perspective. Section three shows an empirical application of the Minskian fragility theory for the Mexican economy. Last section summarizes some conclusions.

2 Theoretical Explanations of the Crises

2.1 The Mainstream Economic Models

The 1990s financial crises in developing countries have generated several controversies about its origin and extend as well as the proper policy response. For instance, from the mainstream perspective, Krugman (1999), and Glick, Moreno, and Spiegel (2001) summarize the theoretical controversies about the crises with two generation models. The so-called first-generation models (e.g., Krugman, 1979) explain crises as the result of budget deficits in a world of perfect foresight: disproportionate monetary increase to monetize fiscal deficits can reduce the central bank's foreign exchange reserves and decline its capacity to preserve fixed exchange rate or peg. The second-generation models (e.g., Obstfeld, 1994) consider that crises are a consequence of a conflict among a currency peg and the desire to follow a more expansionary monetary policy; when investors commence to expect that the government will prefer do not hold the parity, the effects on interest rates can themselves push to modify the

exchange rate, which under certain conditions may involve more than one equilibrium for the exchange rate.

While the two kinds of models are not mutually exclusive, their policy propositions differ significantly. If a panic not linked to fundamentals was the most important impulse for the financial crises in emerging markets, reforms in macroeconomic or financial sector policy are not required in planning recovery. If, however, policy mistakes or other fundamentals were the most important contributors to the crises, reforms are indeed indispensable (see Glick, Moreno, and Spiegel 2001). However, neither of these models seems to be meaningful to explain crises in the most of developing countries. By conventional fiscal measures the government budget balances of these economies were in good shape at the beginning of 1997; while growth had slowed and some signs of excess capacity appeared in 1996, none of them faced a clear tradeoff between employment and exchange stability. As a result, Krugman (1999) has pointed out the need for a "third-generation" crisis model.

Some of the most important candidates to build up such a model have underlined the weakness and distortions in financial systems of those countries. McKinnon and Pill (1998) and Corsetti, Pesenti, and Roubin (1998) have suggested that moral-hazard-driven lending could have provided a sort of hidden subsidy to investment, which collapsed when visible losses led governments to withdraw their implicit guarantees. According to this view, then, the apparent soundness of budgetary and macroeconomic policy was an illusion: under the surface, governments were actually engaged in reckless and unsustainable spending.

Under a different perspective, Chang and Velasco (1998a, b) try to explain currency crises as the result of a bank run, modeled *a la* Diamond and Dybvig (1983) as a self-fulfilling

loss of confidence that compels financial intermediaries to liquidate their investments precipitately. Sachs, Tornell, and Velasco (1996a, 1996c), and Radelet and Sachs (1998) have indicated that the crises were not the result of fundamentals, but were largely unexpected and reflected self-fulfilling panics by foreign investors. In this view, these crises need not have occurred: If foreign lenders had not panicked, financial systems would not have experienced credit interruptions, and the resulting costly economic disruptions, justifying the pessimistic expectations, would have been avoided. At most they can be said to have suffered from some kind of "financial fragility" that made them vulnerable to self-fulfilling pessimism on the part of international lenders.

In most cases the financial crisis did involve an epidemic of financial distress that cannot be resolved simply by fixing the banks. Even a very clean and pudent banking system may not be enough to protect open economies from the risk of self-reinforcing financial collapse. The increasing doubt about whether either a moral-hazard or a Diamond-Dybvig story can really explain the crises, Krugman (1999) roughs out another candidate for third-generation crisis modeling, one that emphasizes the role of companies' balance sheets in determining their ability to invest, and that of capital flows in affecting the real exchange rate which impact on those balance sheets.

More recently, Ranciere, Tornell, and Westermann (2003) argue that there is a common trade of between stability and average growth rates. They present a two-sector endogenous growth model, in which financial crises can occur, and analyze the relationship between financial fragility and growth. They state that countries that have experienced "occasional" crises have grown on average faster than countries with smooth credit conditions. The

underlying credit market imperfections generate borrowing constraints, bottlenecks and low growth. Under certain conditions endogenous real exchange rate risk arises and firms find it optimal to take on credit risk in the form of currency mismatch. Along such a risky path average growth is higher, but self-fulfilling crises occur occasionally. It would thus appear that factors that contribute to "financial fragility" have also been a source of growth, even if they have led to occasional crises. They put together two complementary views of financial liberalization. In one view, financial liberalization induces excessive risk-taking, increases macroeconomic volatility and leads to more frequent crises. In another view, liberalization strengthens financial development and contributes to higher long-run growth. But, this does not imply that financial crises are good for growth. It suggests that undertaking credit risk has led to higher growth, but as a side-effect, it has also led to occasional crises. The theoretical result is that a financially fragile economy will, on average, grow faster than a safe economy even if crisis costs are large, provided that contract enforceability problems are "severe, but not too severe."

In this model, however, the financial fragility concept is used in the same theoretical context as above to self-fulfilling pessimism by international lenders and to justify "occasional" crises that for most Latin American countries have not been certainly occasional, but a structural characteristic of their economic history. As the next section shows, there is different theoretical explanation that fits better for the 1990s developing country crises than the mainstream models.

2.2 The Alternative Theoretical Explanation of Crises

The fact that the 1990s Asian and Latin America crises had started with financial collapses followed by generalized economic dismals after financial liberalization programs have generated alternative theoretical explanations different from those pointed out above. A more realistic story is what Taylor (1998) calls the Frenkel-Neftci cycle, where--given an initial situation in which the nominal exchange rate is credibly fixed--the public an private sectors generate positive financial feedbacks between themselves first at the micro and then at the macro levels, ultimately destabilizing the system.

Alternative theoretical explanations have remarked the importance of Minsky's financial crisis theory as a powerful analytical tool in the understanding of such crises. By the way, the literature about Minsky's work has been prolific. For instance, Semmler (1989, 2003), Taylor and O'Connell (1989), Arestis and Glickman (1999), Foley (2001), Bellofiore and Ferri (2001), and Schroeder (2002) have indicated the relevancy of the Minskian ideas to explain the instability of the modern capitalist economies.

The financial crisis followed by an economic collapse is not a new issue at all either in Mexico or in the Asian countries or in any developed country, where it is easy to find what Kindleberger (1978) termed as "hyperbolic statements" about separate crises. In the 1930s, Keynes (1964) explained the crisis by a sudden collapse in the marginal efficiency of capital, which is determined by the "uncontrollable and disobedient psychology of the business world". From this Keynesian perspective, Minsky (1975, 1986, and 1991) points out that investment fluctuations are due to the portfolio preferences, financial conditions and uncertainty, so serious business cycles are due to financial attributes that are essential to

capitalism. There is a broad acceptance among economist, out of the mainstream neoclassical theory, about the evidence that "financial instability is a significant characteristic of modern capitalism" (see Minsky 1989). One cause of such instability lies in the financing needs of industrial and industrializing economies, and it exacerbates as production becomes more capital intensive and as the relative cost and gestation periods of investment good increase.

Minsky's (1986) financial fragility theory departs from the analysis of how financial commitments affect the economy. To do so, he looks at the economic units--households, corporations, and the different levels of government--in terms of their cash flows. Particularly, he focuses on "a firm's cash flow accounting categories". In Miskian terms there are three basic types of cash flows: income, balance-sheet and portfolio. Income cash flows correspond to wages and salaries, the payments from one to another stage of production and trade, and gross profits after tax of business; balance-sheet cash flows are the existing and inherited liabilities or debt instruments; and portfolio cash flows are those that result of transactions in which capital and financial assets change hands. Financial instability is close related to the relative weight of those cash flows in an economy.

Income cash flows are the foundation upon which the balance-sheet and portfolio cash flows rest. In the case that realized and expected income cash flows are enough to fulfill all the payment obligations on the outstanding liabilities of a unit, the unit will be hedge financing. If the balance-sheet cash flows are larger than the expected income receipts so that the only way a unit can meet its payment commitments is by rolling over or even increasing debt, then units are engaged in speculative finance, and those that increase debt to pay debt service are engaged in Ponzi finance. In consequence, speculative and Ponzi financing units

require engage in portfolio transactions -selling assets or debts- to meet their payments responsibilities, while units engaged in hedge finance can fulfill their payment obligations on debts without portfolio transactions. This means that, while hedge units are not dependent upon financial market conditions in order to meet commitments, speculative and Ponzi units are.

Speculative financing units can become Ponzi by a rise in interest or other costs or a shortfall in income. On the contrary if earnings are better or costs, particularly interest rates, fall, Ponzi financing units can be converted into speculative ones. Refinancing, which modify the payments due, can transform the balance-sheet position of a unit. Debt restructuring can change speculative in hedge financing, and concessions in financing commitments by lenders may change Ponzi units into speculative units. Although periods of Ponzi finance may be part of the normal cyclical experience of firms, being forced into Ponzi-financing arrangements by income shortfalls or interest costs escalation is a systemic part of the process that leads to widespread bankruptcy.

The relative importance of the different kind of cash flows in an economy regulates the vulnerability of the financial system to disruption. An economy is relatively immune to financial crises when income cash flows predominate in fulfilling balance-sheet responsibilities: it is financially healthy. On the contrary, an economy is "crisis-prone" or at least "potentially financially fragile" if portfolio transactions are widely used to acquire the resources to pay balance-sheet commitments.

The Ponzi finance is quite associated with fraudulent financial practices, and the greater the weight of speculative and Ponzi finance, the smaller the overall margins of safety in the

economy and the greater "the fragility of the financial structure." Like Keynes, Minsky (1986) considered also the importance of time and uncertainty in the economic process of finance. In a world of uncertainty, he pointed out, given capital assets with a long gestation period, private ownership, and the sophisticated financial practices of Wall Street, the successful functioning of an economy within an initially robust financial structure will lead to a structure that becomes more fragile as time elapses. Endogenous forces make a situation dominated by hedge finance unstable, and endogenous disequilibrating forces will become greater as weight of speculative and Ponzi finance increases. Therefore, the economy is unstable because of capitalist finance. This is what Minsky (1991) termed as a "pessimistic" hypothesis.

However, Keynes and Minsky dealt with industrialized economies and the crises we are dealing with are from developing countries. Then, the questions are: Is there a model in a Miskian style for developing economies to deal with such economic crises? If so, how can it be applied to a particular case? The positive answers to these questions imply to regard some methodological steps.

Taylor and O'Connell (1989) gave the first step in the analysis of the developing economy dynamics from a Minskian perspective. Their document contains a useful conceptual framework that merits a detailed description. They formalize the main Minsky's ideas that characterize the crisis in a Kaleckian macro model for a closed economy. In this model, the small closed economy is represented in two sets of equations that characterize the production and financial sides of the economy or the commodity and financial markets, respectively, under two general assumptions: that total nominal wealth depends on confidence and the state

of the cycle, and that there is high substitutability between assets in household portfolios. With endogenously wealth changes over time, uncoordinated portfolio decisions among firms and households interrelate to generate debt deflation and crises. In the production side of the economy or the commodity market, prices (*P*) are determined by prime costs and a markup rate (τ); the rate of profit (*r*) is defined by the relationship between the markup pricing rate and capital stock; the investment depends on anticipated profits and a discount factor. The investment demand (*I*) depends on the price differential P_k-*P*, where P represents the supply price of new investment goods, and P_k is the capitalized value of expected earnings per unit of investment. Then, *I* is a function of the capital stock growth (*g*) and *h,* the firms' investment response to the expected difference between profit and interest costs.

In this model, workers do not save and spend all their income in consumption, and profits are all distributed to rentiers, then, the aggregate saving supply flow (*S*) depends on a saving rate (*s*), the markup rate, the prime costs and the labour-output ratio. The excess demand for goods is the difference among the investment demand and the saving supply. From the first condition for equilibrium in the commodity market, where *I* = *S*, the model states that if the profit rate, *r*, or the output level, X, increases when there is excess demand, commodity market adjustment is stable if the condition $s - h > 0$ is satisfied -investment must react less to profit raises that saving. From the reduced form for the capital stock growth rate, $g = I/K$, the model states that a fall in the interest rate or an increase in anticipated profits leads to a higher growth rate. Since the growth rate, g, depends on the saving and profit rates, the profit rate and capacity utilization go up as well.

In the financial market, the model identifies an outside primary asset (F), or fiscal debt, that can take the form of money (M) or short-term bonds (B) issued by government and held by rentiers; the outstanding stock of equity (E) emitted by firms; and the firm net worth (N) as the difference between the value of capital stock and equity. Given the firm balance sheet identity, where assets equal liabilities for both firms and rentiers, the adjusting variables are the price of equity and net worth. The total wealth of rentiers increases from capital gains and financial saving. Rentiers distribute their wealth across assets according to the market balance equations for money, equity, and bonds, where the key variable is the anticipated corporate return. An increase in the anticipated corporate return will raise the outstanding stock of equity, and thus share price and financial wealth will increase. From this model perspective, an open market operation to increase the money supply would augment the money debt ratio and decrease the interest rate for a given profit rate. A raise in the expected extra profit rate will decrease the interest rate when there is a high degree of asset substitutability. In equilibrium, where both the money and equity markets clear, the price of equity and nominal wealth are determined along by the profit and interest rates.

The short-run stability implies that the slope of the financial market curve must be less negative than the slope of the commodity market schedule. An augment in the profit rate will drag rentiers in the direction of equity to reduce the interest rate. In the commodity market, a higher profit rate motivates investment demand, thus raising output and the rate of profit. On the contrary, if expectations appear dismal, a decrease in expected profits will direct rentiers to run off toward money, increase interest rates, and suppress growth. A rigorous monetary policy would have an analogous effect, changing the financial market schedule upward. The

result would be an increase in interest rate and a decrease in the rate of profit (Figure 1). This is the mechanism of the crises and the details to see the way in which anticipated profits and monetary policy evolve over time are explained with a "normal" dynamic story about anticipated profits. Such profits fall when the rate of interest surpasses its normal long-run level and the money-debt ratio changes in accordance with the capital stock movements, given a fixed money growth rate. When the interest rate equals its normal long-run level and the capital stock rate equals the money growth rate, the dynamical system has steady-state equilibrium, but it is "potentially instable".

In this model the economy changes from complete steady-state equilibrium toward disequilibrium point when a momentary lapse of confidence diminishes the expected profits. Similarly, a one-shot market operation to decrease the money supply would provoke the interest rate to augment. Given a new lower money-debt ratio, the expected profits would begin to go down from an equilibrium point, starting a dynamic process that can go back the starting point (Figure 2).

If the money supply growth is held constant when the economy is not in equilibrium, then a below-equilibrium value of the expected profits is related to slow capital stock growth and a rising money debt ratio. Such an increase would diminish the interest rate and increase the expected profits. If this effect were strong as much as necessary, the economy would ensue a path and go back to the steady-state position. An insignificant crisis takes place in the sense that the profit rate and output go down, leading to an inferior interest rate, elevated investment demand, and eventual recovery.

Figure 1. Responses of the Interest Rate and Profit Rate to an Increase in the Expected Incremental Profit Rate ρ.

Interest rate i

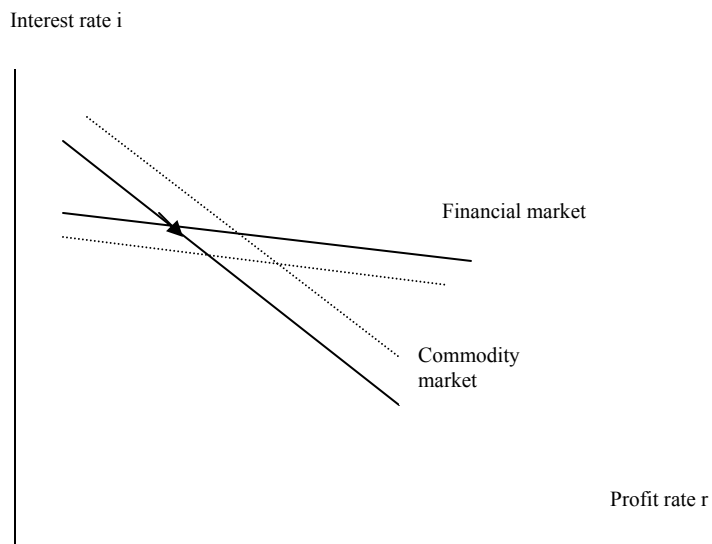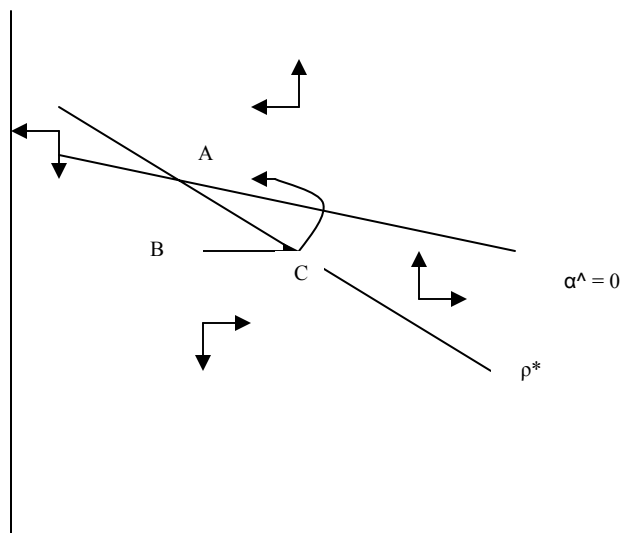Financial market

Commodity market

Profit rate r

Figure 2 Adjustment Dynamics When a Fall in the Expected Incremental Profit Rate ρ from an Initial Equilibrium at A Leads Finally to a Return to Steady-State

A

B

C

α^ = 0

ρ*

In the case that the trajectory of the money-debt ratio and the profit rate does not lead to the steady-state, the system goes into a Fisherian debt-deflation contraction. Output and investment can go down forever or at least until the model changes. The model presents a Minsky crisis when a fall in the expected profit rate induces the interest rate to augment and the profit rate to decrease, leading rentiers into money and additionally pressing up the interest rate. Expected profits go down still more and the process never finishes. An unstable Minsky crisis seems like motion into a "liquidity trap" but that the interest rate is progressively going up. The tumble into the trap is combined with dropping capitalized quasi rents and equity prices -general financial disintermediation. Financial demands and counter demands fall down as the microeconomic symptom of the crisis.

The model underlines also the role of financial intermediaries as catalyzers during both boom and crisis by generating and eliminating "layered" financial structures. At the beginning of an expansion, profit rates increase, and interest rates go down. If favorable conditions hold, then at the start of a boom firm net worth will commence to increase. They will be disposed to ask for credit contrary to this raise, generating assets that financial intermediaries can then increase through the economy. The procedure will change to the opposite direction and the intermediaries' overall significance will contract. A the top of the expansion, the ratio of firm debt to their net worth goes up, and they change progressively from "hedge" to "speculative" and even "Ponzi" positions. The phase is stated at the micro level for financial crisis, in the end some signal of collapse mobilizes it. Assets and liabilities of the financial intermediaries restrict, as the value of capitalized anticipated profits goes down. The process carries with it bankruptcies and financial adversity, in particular for the Ponzi firms that had been issuing

new liabilities to pay current interest costs. Bankruptcies of firms are an inherent feature of the downtrend. The government deficit and monetary policy are important factors to prevent continuous debt deflations and stop crisis.

Finally, Taylor and O'Connell observe that for empirical testing, the key mechanism in the crisis theory is the negative relationship of expected profits and the rate of interest, which requires an important degree of substitutability between equity and other assets in the aggregate portfolio.

In the understanding of financial crises in developing economies from a Minskian perspective, the next methodological step is given by Foley (2001), who modifies the Taylor-O'Connell model and derives interesting conclusions about the dynamics of a small open economy. In both models, there are two levels of analysis. (1) The financial fragility in the individual firm, which is in the main analysis of Minsky and (2) The level of a representative firm like an average of the firms in a nation that can be applied equally well to a national economy. By trying to explain the 1997 Asian financial crisis, Foley (2001) introduces in his model the open economy assumption, because in the Taylor-O'Connell closed model the economy cannot set into the speculative regime. With the Foley's assumptions of an open and developing economy the model can import capital to finance investment, so that it can reach the speculative regime. Foley's (2001) paper contains the main conceptual framework used in the empirical application for the Mexican economy that merits also a detailed description.

Foley's (2001) model starts by representing the Minsky's financial fragility ideas in accounting terms, which are valid for firms and for the economy as a whole. The cash flow

identity equates the firm sources of funds from net operating revenues, R, and new borrowing, D, to its uses of funds for investment, I, and debt service, V.

$$R + D = I + V$$

The net worth of the firm or of the economy, W is equal to the difference between the value of its assets, A, and liabilities or the value of its debts, B. Net worth is increased by investment, which is the change in assets, $A^* = I$, and reduced by borrowing, which is the change in debt, $B^* = D$

$$N = A - B$$

$$N^* = A^* - B^* = I - D$$

If a bankrupt firm turns out to be insolvent, $N^* \leq 0$, then its creditors will be unable to recover the principal value of their loans. In Minskian terms there are three possible firm financial states which also applies for the total economy:

A hedged firm has $R \geq V + I$, so that $D \leq 0$.

A speculative firm has $R \geq V$, but $R < V + I$, so that $D \geq 0$, but $D < I$.

A Ponzi firm has $R < V$, so that $D > I$.

Foley expresses the Miskian firm financial states in terms of rates of change and return on assets and debt. Then, $g = I/A$ is the growth rate of the firm assets, $r = R/A$ its profit rate, and $i = V/B$ its interest rate (the ratio of debt service to the stock of debt).

The equations describing the financial dynamics of a "representative firm" apply equally well to a national economy, viewed as a set of firms, in which the real output X is divided in wages, W, and profits, P.

$$X = W + P \tag{1}$$

P is defined as a fraction π of the total real output, $P = \pi X$, a fraction s of which are saved, then replacing P in (1) and solving for W, the total wages are defined by the difference between the real output and profits:

$W = (1 - \pi)X$

Under the assumption that workers do not save, $W = C_w$, the total expending is divided in investment, I, and total consumptions, C,

$X = C + I$ (2)

Total profits are spent in consumption, C_k, and investment, I,

$P = C_k + I$

Then, total saving as a fraction of profits, $S = s\pi X$, is the difference among profits and consumption C_k,

$S = P - C_k$

Replacing S by $s\pi X$ and P by πX in the last identity we get

$s\pi X = \pi X - C_k$,

rearranging terms and solving for C_k that can be defined in terms of P or X:

$C_k = (1 - s)P$, or

$C_k = (1 - s\pi)X$

Then, C is defined as the difference between total real output and total saving:

$C = W + (1 - s)P = (1 - s\pi)X$, or

$C = C_w + C_k$

The current account balance is defined as the difference between output (1) and expenditure (2) or the difference between investment and total saving:

$D = X - C + I = I - s\pi X$, since total saving is the difference between total income and total consumption. D is analogous to the D defined for the representative firm above, since it represents new borrowing. Writing $d = D/K$, $g = I/K$, and $r = \pi X/K$ where K is the capital stock, then

$$D = g - sr \qquad (3)$$

Given d and g the actual output-capital ration, X/K, must adjust to determine a realized profit rate r that satisfies equation (3). Taylor and O'Connell's model has $d = 0$, which implies that $g < r$, on the assumption that $s < 1$. As a result, their model cannot get into the speculative regime where, $g > r > i$. The open economy of the Foley's model, however, can import capital to finance investment, so that it can reach the speculative regime.

d is assumed to be dependent on the real interest rate i, controlled by the monetary authority, and the profit rate r:

$$d = d_o + \eta i - \psi sr \qquad (4)$$

where η and ψ are positive parameters, on the assumptions that an increase in the real interest rate will augment capital inflows, and that capitalists use a fraction of their saved profits to buy foreign assets.

The growth rate of capital g depends on the profit rate r, the real interest rate I, and a confidence factor ρ:

$$g = g_o + h(r + \rho - i) \qquad (5)$$

Note that h is positive and $r = (g - d)/s$, replacing (4) and (5) in r and solving for r and g:

$$r = (g_o - d_o + h\rho - (h + \eta)I / s(1 - \psi) - h \qquad \text{----(6)}$$

$$g = (s(1 - \psi)g_o - hd_o + hs(1 - \psi)\rho - h(s(1 - \psi) + \eta)I) / s(1 - \psi) - h \qquad \text{----(7)}$$

An increase in the interest rate provokes a rise in capital inflows and imports, and a decrease in domestic investment, both falling domestic output, the output-capital ratio, and the profit rate. A rise in the growth rate of capital increases domestic investment, the output-capital ratio, and the profit rate.

Equations (3), (4), and (5) determine r, g, and d, given ρ, i, and the structural parameters. Note that ρ and i are the state variables. Since g and ρ are related monotonically, g and i can alternatively be taken as state variables, considering that ρ is being determined implicitly. In this way, it is possible to observe the dynamics of the economy in (g, i) space, where the relationships defining financial fragility are more transparent.

Thus, r and d can be written in terms of g and i:

$$r = (g - d_o - \eta i) / s(1 - \psi) \qquad\qquad \text{---(8)}$$

$$d = (\psi g - d_o - \eta i) / s(1 - \psi) \qquad\qquad \text{---(9)}$$

With Figure 3, Foley (2001) shows the regions in (g, i) space corresponding to the different regimes of finance. The dashed 45-degree line on which $i = g$ is the boundary between the $g > i$ regime below and the $i > g$ regime above. Each combination of g and i determines a particular profit rate r in short-run equilibrium through equation (8). The bold line in is the locus of (g, i) pairs on which $r = i$. Above this line $i > r$, which shows the state of Ponzi finance. An economy which crosses this boundary is vulnerable to a financial crisis. The undashed line is the locus of (g, i) on which $r = g$, and marks the boundary (where $i \leq r$) between the regime of hedged a speculative finance.

Figure 3: Minskian Regimes
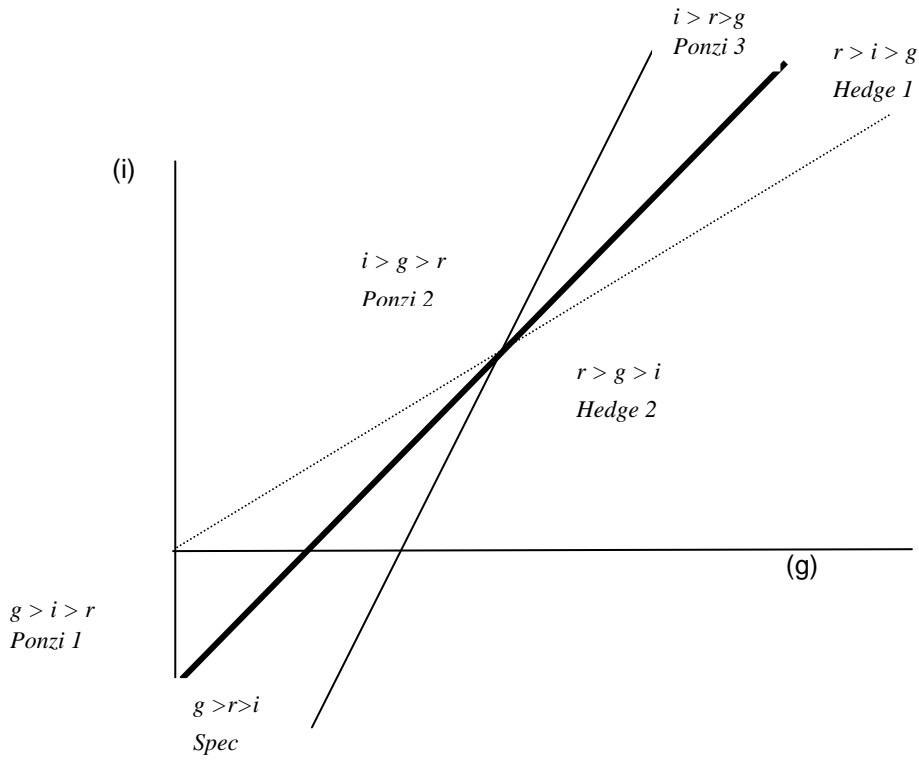
This model underlines the relationship between the growth rate and the profit rate. An increase in the growth rate reduces financial fragility because it increases the profit rate. From this model, Folley derives the laws of motion for the state variables ρ *and i*, and differentiated the respective equations for *i* and *g* with respect to time, he defines the dynamical system representing the economy. Thus, an economy at stable equilibrium in the speculative finance regime may respond to a positive shock to the growth rate by following a path that crosses into the Ponzi finance regime.

The economy is called hedged when the rate of profit r is greater than the rate of accumulation g and the rate of interest i: r > g > i. Under these conditions debt service is paid out of profit and new investment is covered by a combination of profit and borrowing. *The economy is in the speculative state when the rate of accumulation is greater than the profit rate g > r > i,* If interest rate rises, debt service payments can still be made, as long as they do not exhaust profit obtained from productive investments. As soon as interest rate becomes greater than profit rate, *the economy passes into the Ponzi state: i > r*. In this state, the economy is vulnerable to financial crisis or is financially fragile.

Solvency is now entirely dependent upon creditors' confidence in the economy's ability to generate revenue. If this ability is perceived to be impaired, creditor confidence will diminish. During the Ponzi-finance period the economy remains vulnerable to a financial crisis precipitated by the unavailability of new borrowing in sufficient magnitude. Such a crisis may interrupt the smooth adjustment back to equilibrium, driving real interest rates sharply higher, and growth and profit rates sharply lower, forcing many firms or financial

intermediaries into bankruptcy. Just here the financial intermediaries are dragged by the private bankruptcy.

From his model, Foley (2001) points out two lessons of policy issues. The first lesson is that the central bank should not target too low a growth rate as its equilibrium. At low growth rates, profit rates are low, and the economy is closer to the Ponzi regime. The economy may face other constraints that limit its growth rate, such as the provision of complementary infrastructure and the supply of competent entrepreneurship, but within these constraints it is more likely to avoid financial crisis at higher rather than lower targeted growth rates.

The second lesson is that to stabilize the economy against a positive shock by raising interest rates, the central bank should take into account the impact of the relation of interest rates and profit rates on the financial viability of firm balance sheets. An overly vigorous interest rate policy may inadvertently trigger financial fragility and financial crisis.

Thus, Foley concludes that in a small, open, developing economy it is likely that the financial fragility of the private sector is converted into financial vulnerability of the public sector, and the financial crisis that occurs can appear in the form of a crisis of public finance and foreign exchange reserves.

3 The evidence of Financial Fragility in the Mexican Economy

The Mexican crisis of 1994-1995 has also generated several theoretical explanations about its origin as well as the proper policy response. For example, Gil-Diaz and Carstens (1996) summarize a set of hypotheses that have followed the mainstream perspective pointed out above. More recently, and under the same analytical perspective Ortiz M. G. (2002) has

pointed out that, although weak fundamentals did play a role, the main feature of the crisis was the "financial panic;" Messmacher (2000) considered the "fluctuations" as a result of supply shock. Some alternative hypotheses developed by Ruiz (1995), López (1997), and Lustig and Ros (1999) consider structural factors. However, there is no evidence of a formalized model from a Minskian analysis to explain the dynamics of the Mexican financial crisis. To prove that the Mexican economy has been characterized by financial fragility, the economy was analyzed using annual data from 1960 to 2002. All data sources and details on the elaboration of the figures we used are described in Appendix 1. Note that the estimated annual rates of profit (r), interest (i), and capital accumulation (g) are presented in two ways: average and incremental rates (see Table 1). The average rates are ratios among variables in real terms, and they are thought to be good approximations of the rates described by Foley (2001). The incremental rates are defined as the ratio among incremental change of variables in real terms. Following Shaikh's (1996) work about the near rate of return, Schroeder (2002) points out that the incremental profit rate tends to be more volatile that the average rate used by Foley (2001), as it reproduces cyclical short-term changes in aggregate demand.

	g	r	(i)	g'	r'	i'	Total Debt Stocks (B)	Total debt Service (V)
Table 1 Average and Incremental rates of growth (g), profit (r), and interest (i) for the Mexican Economy, 1960-2002								
							(Billion of pesos 1980=100)	
1960	21.2	35.1	12.5				209.1	26.2
1961	21.6	39.2	15.4	7.0	-100.0	-11.5	186.9	28.7
1962	15.0	29.0	19.2	0.0	6.1	60.1	204.4	39.3
1963	18.4	36.7	17.7	-8.2	-22.9	2.9	225.1	39.9
1964	16.1	31.2	17.0	9.2	15.3	10.1	247.0	42.1
1965	27.5	54.8	15.4	-1.8	-5.5	9.7	316.6	48.8
1966	21.0	41.0	16.1	5.3	7.7	21.5	353.3	56.7
1967	16.3	32.9	14.4	2.5	9.5	7.2	435.7	62.7
1968	12.9	24.2	14.8	5.6	5.4	17.7	491.4	72.5
1969	11.0	24.6	14.0	-13.0	29.8	9.3	572.9	80.1
1970	15.5	35.1	15.5	-2.6	-7.1	20.0	775.1	120.5
1971	12.6	32.0	13.3	-2.6	16.1	21.6	566.2	75.3
1972	13.2	31.2	12.4	21.6	19.1	7.0	656.6	81.7
1973	11.0	26.4	16.7	5.2	13.2	33.1	827.3	138.3
1974	10.7	22.8	11.2	9.1	5.2	-26.2	948.4	106.5
1975	15.7	31.5	15.2	-0.8	2.6	46.9	1066.5	161.9
1976	15.3	29.9	12.1	1.5	-25.3	-5.8	1252.8	151.1
1977	12.2	25.4	13.5	-4.7	1.2	15.6	2120.6	286.2
1978	11.8	23.7	17.6	9.5	14.4	58.8	2334.1	411.7
1979	10.6	19.7	21.5	6.5	5.4	94.1	2456.7	527.0
1980	11.4	20.0	19.9	27.0	26.1	7.2	2748.7	548.1
1981	12.7	20.7	21.5	67.3	49.6	30.7	3209.3	689.7
1982	9.0	18.5	28.5	-46.3	-14.6	46.5	4456.3	1269.0
1983	5.5	16.0	31.0	-12.9	3.4	120.1	4580.7	1418.4
1984	5.5	16.2	30.1	7.1	19.9	42.7	4266.6	1284.3
1985	7.3	18.9	30.3	-4.3	1.0	25.2	4075.9	1236.2
1986	4.9	13.4	80.7	-7.3	-14.9	-4.4	1663.3	1342.7
1987	7.2	19.9	94.4	-1.0	-3.2	20.6	1355.1	1279.3
1988	12.8	28.4	67.5	-9.9	-6.4	232.1	1133.7	765.5
1989	12.2	27.6	44.6	9.8	23.7	-96.7	1317.9	587.3
1990	10.9	24.6	37.0	5.4	12.5	-40.4	1446.2	535.5
1991	18.2	39.8	22.5	-1.9	-2.1	-119.4	1593.7	359.3
1992	25.7	54.0	18.8	-3.0	-0.3	-16.8	1762.3	331.0
1993	13.0	29.4	18.6	-3.2	-1.9	-6.9	1777.6	329.9
1994	14.3	30.9	15.5	131.8	168.4	-6.6	2023.9	313.7
1995	10.5	25.7	45.1	-183.3	-243.9	-77.9	1537.2	692.7
1996	8.5	18.6	30.7	4.9	6.6	69.8	971.9	298.3
1997	5.6	11.0	19.1	2.4	2.1	4.9	1760.7	336.9
1998	9.8	20.2	21.1	-0.4	-2.4	-32.4	1696.4	357.7
1999	7.4	15.8	19.7	0.9	3.6	30.2	1476.8	291.5
2000	7.8	16.2	18.2	13.4	22.7	13.1	1901.4	347.0
2001	7.0	16.2	13.9	505.4	30.2	63.9	1735.7	241.2
2002	6.9	15.9	9.4	-3.4	-16.0	-37.0	1903.7	179.0

Note: See Appendix 1 for construction and data sources

3.1 Minskian Dynamics in Terms of Average Rates

Figure 4 shows the performance of the average rates g, r, and i for the Mexican Economy from 1960 to 2002. The first thing that can be observed is the cyclical behavior of the economy. We can also observe the "natural way", pointed out by Foley (2001), of an open economy to capital inflows from abroad to let capital accumulation rates to go above profit rates leading the economy to Minsky's speculative and Ponzi regimes. Moreover, it illustrates the high positive correlation between capital accumulation and profit rates observed by Taylor and O'Connell (1989).

Figure 5, which was elaborated on the base of Figure 3 and the average rates of Table 1, is like a picture of a financial electrocardiogram that permits to analyze in a straightforward manner the financial fragility dynamics. This figure shows the relationship between each year of the data series and the six regions that correspond to the six Minskian regimes stated by Foley in Figure 3. Whereby, the Minskian dynamic for average rates shows that hedge regimes are related with periods of economic growth and relative price stability; while, Ponzi regimes are characterized by generalized economic crises. Thus, the average approach of the Minskian analysis identifies and explains the path with picks and bottoms of the Mexican economic cycle. For example, the hedge regimes 1 and 2 match with stability and economic growth periods like those during the "stabilizing development" in the 1960s and the oil boom in 1978, 1980, the mid 1990s, and the first two years of the Fox administration. On the contrary, as it will be showed in detail below, the Ponzi regimes go with generalized economic crises, "stagflation", and overgeared, like those in 1982-83, 1986, and 1994-95.

Figure 4 Average Rates of Capital Accumulation (g), Profit (r),   and Interest (i) for the Mexican Economy, 1960-2002.
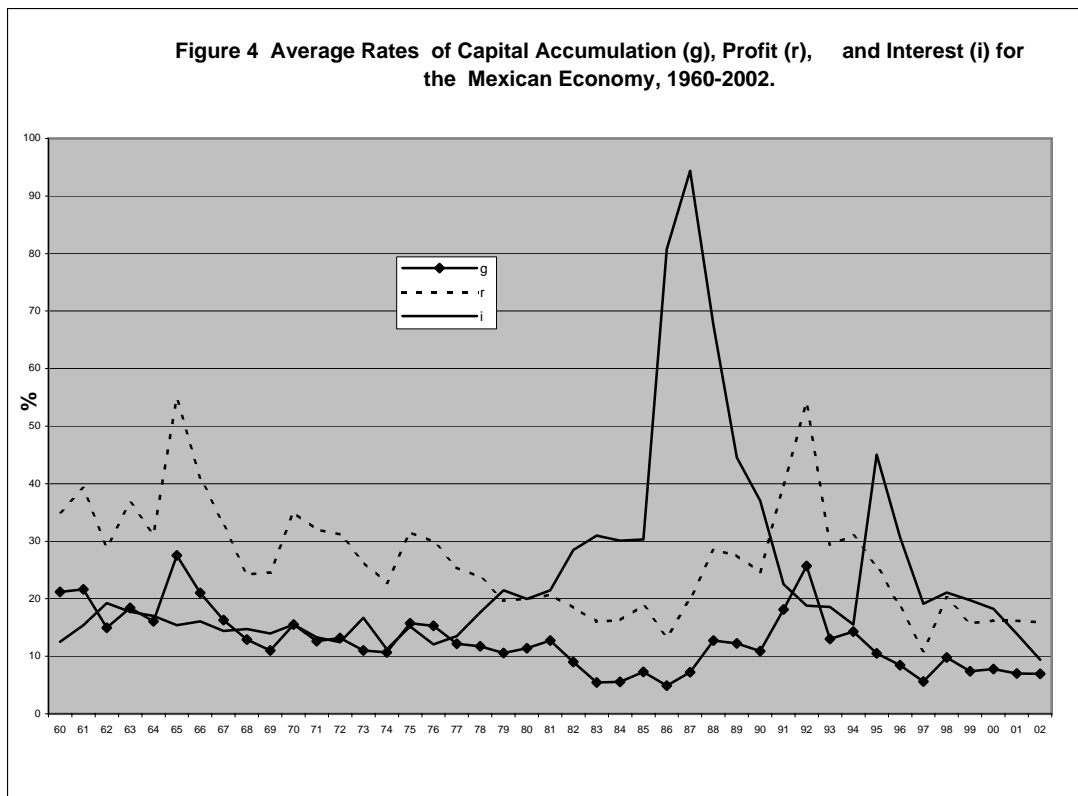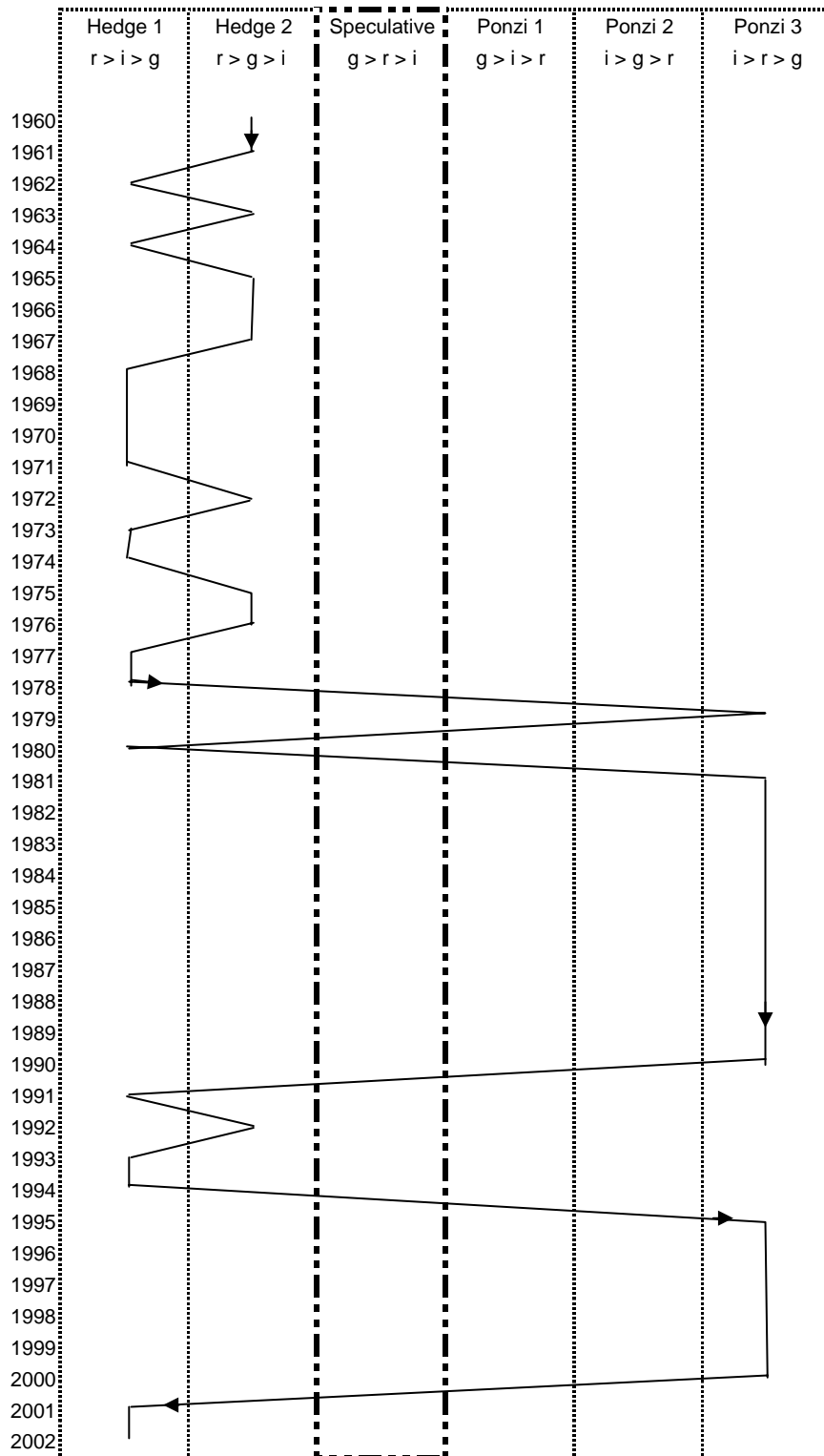
Figure 5   Minskian Dynamics with Average Rates

According to the average rates, from 1960 to 1978 the Mexican economy was in the hedge regime 1 and 2 in ping-pong movements that began from hedge regime 2, where the profit rate is greater than the capital accumulation rate, and it is greater than the interest rate, that is, $r > g > i$, and later to hedge 1, where $r > i > g$, and go back to hedge 2, and so on until 1978.

In general terms, two economic phenomena predominated during this period: the "stabilizing development" and the "Oil boom." Figure 4 and Table 1 show that the so-called "Mexican miracle" of the stabilizing development, during the López Mateos (1958-1963) and Díaz Ordaz (1964-1969) administrations (see Ortiz 1969), was characterized by the highest combination of capital accumulation and profit rates of all data series, followed by those at the beginning of the 1990s.
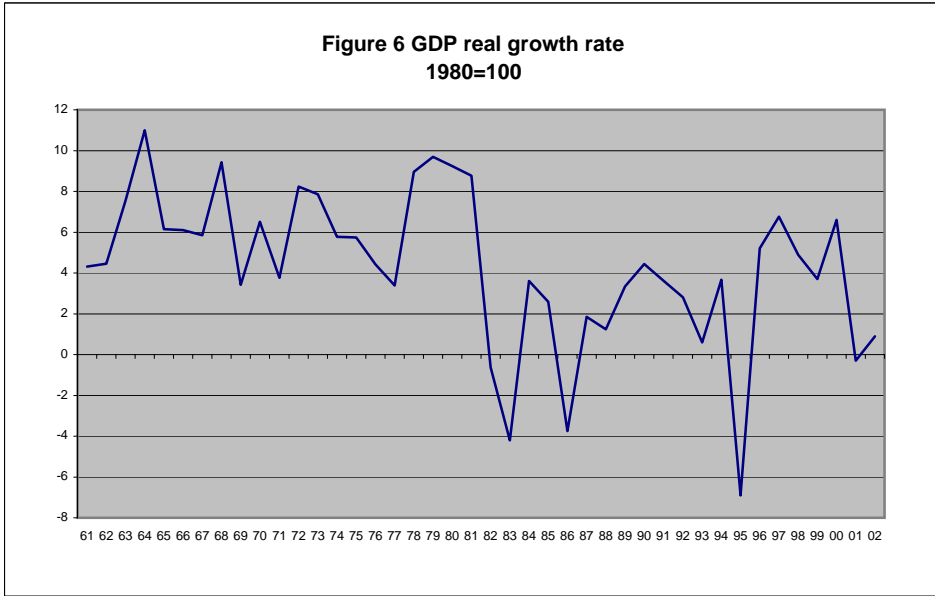
If average rates of Table 1 are estimated for every six years according to each presidential term,[1] then during the Diaz Ordaz administration the economy was in a hedge regime 2, where $r > g > i$; the average profit rate was 35 percent during this presidential period, the average capital accumulation rate was 17.5 percent, and the average interest rate was 15.3 percent.[2] On average, this results in a good combination of high capital accumulation and profit rates with relatively low interest rate. The stabilizing development is the period of the import-substituting industrialization with economic growth (Figure 6), price stability (Figure 7) and increasing financial intermediation. The exchange rate remained fixed, until the 1976 peso devaluation, and the differential of domestic inflation rates between Mexico and
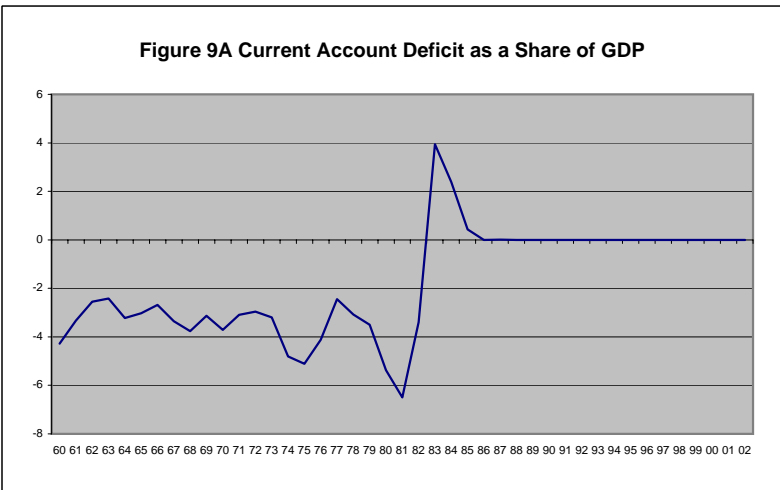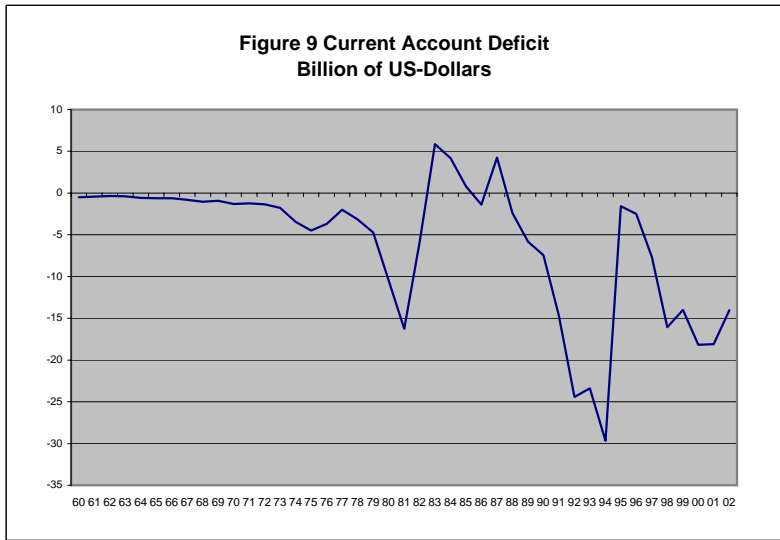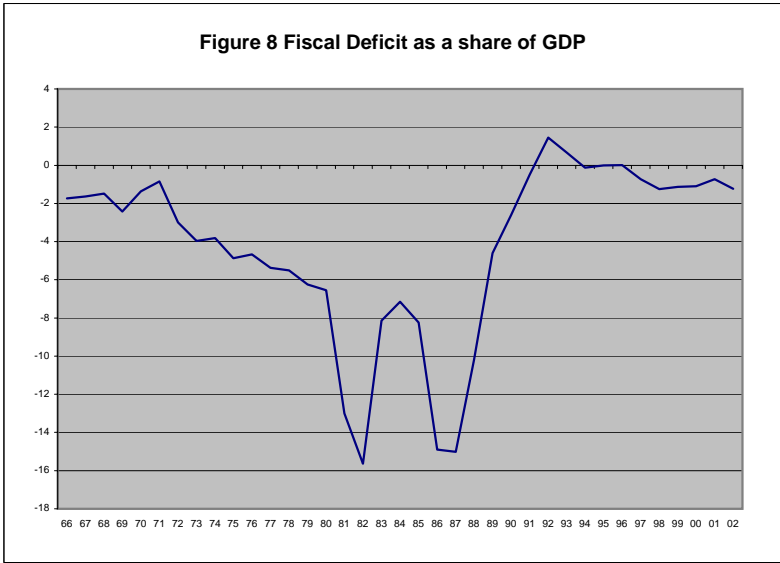
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[1] It is interesting to underline the presidential terms because from the mid 1970s crises have occurred during the change of each government. Although, at the beginning of the Fox administration in December 2000 there not was a generalized economic crisis, in 2001 the GDP fell in -0.3 percent, which was the first negative growth rate after the 1994-95 crisis, Figure 6.

[2] Note that highest average rates of all presidential periods belong to the López Mateos' government, but the data are incomplete. Since every six years-presidential period starts on December, average rates were estimated from the next year.

U.S.A. was very low. On the contrary to the next presidential terms, domestic and foreign debt remained at low levels. Fiscal (Figure 8) and current (Figures 9 and 9A) deficits were relatively lower than those in the 1970s. The central bank reserve requirement was the main source of finance fiscal deficits, while foreign founds were used as a complement to avoid inflationary finance. Thus, government spending levels limited the high-powered money. Domestic voluntary savings were promoted with additional flows through financial intermediaries; real deposit interest rates were put adequately above the levels of the U.S. market. However, the stabilizing development was not free of structural and political problems that led to dramatic social tensions in 1968 and severe restrictions on further economic progress (see Solís 1981 and Carmona 1973).

During the Echeverría Álvarez administration, through 1970-1976, the economy held in a hedge regime 1, but the capital accumulation, profit, and interest rates fell with respect to the previous six years: the average capital accumulation rate decreased to 13.4 percent, the profit rate also diminished to 29.8 and the interest rate was 13.8 percent. Through this period, Mexican authorities promoted the so-called "sharable development," and abandoned the fiscal and monetary policy of previous years. Such a change restricted the financial relations with international markets, and permitted a highly concentrated and regulated banking system, which let the government to finance public spending through reserve requirements. At the end of the presidential period, the peso was devaluated after a long term of fixed exchange rate, from 1955 through 1976. However, such devaluation was not followed by economic stagnation, given the high capital accumulation and profit rates, which were combined with the still low interest rate. Consequently, the economy remained in the hedge regime 1.

**Figure 6 GDP real growth rate
1980=100**

Figure 7 Infation rate 1980=100

Figure 8 Fiscal Deficit as a share of GDP

**Figure 9 Current Account Deficit
Billion of US-Dollars**

Figure 9A Current Account Deficit as a Share of GDP
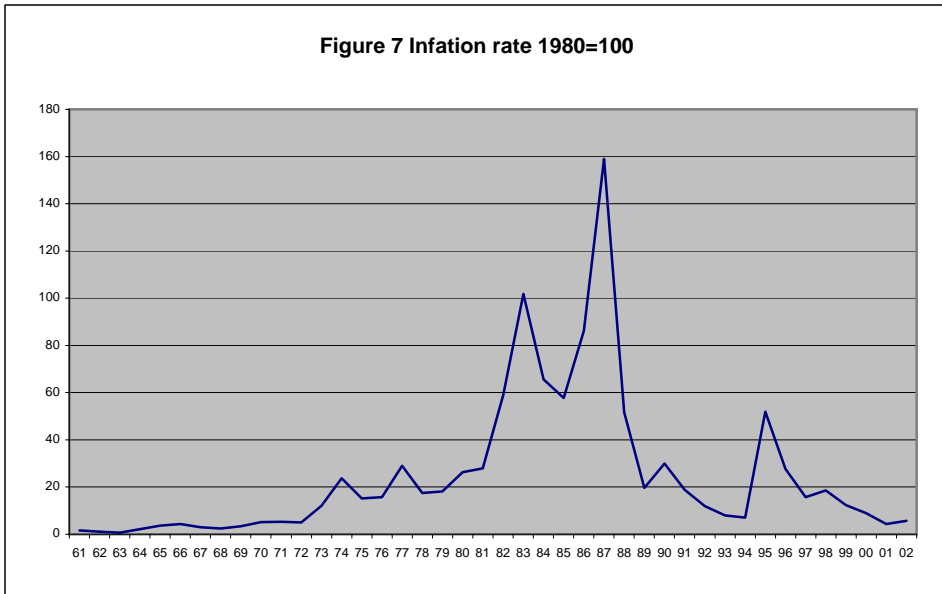
Under the Löpez Portillo administration (1977-1982), the economy remained in the hedge regime 1 with a higher average interest rate (20.4 percent) than the average capital accumulation rate (11.3 percent); while the average profit rate followed diminishing to 21.3 percent with respect to previous periods. The "oil boom" at the end of the 1970s provoked economic allegory in policy makers and improved the financial expectations and confidence, which were lost during the Echeverría's regime, of both domestic and foreign investors. Thus, the economic growth through this period, just before the debt crises in 1982, was prompted by increasing oil exports financed by a rising and an easy access to foreign indebtedness at relatively low lending interest rates. However, the decreasing capital accumulation rate and the increasing tendency of the interest rate were indicating the change of the economy toward a more financial vulnerable position. With increasing oil exports the economy started to change toward a model based on exports and more vulnerable to changes in international financial conditions and foreign export prices.

From 1978 to 1980, the Mexican economy changed in a ping-pong style from the hedge regime 1 (where the profit rate is still greater than the growth rate but the interest rate has increased to be greater than the growth rate, $r > i > g$) to Ponzi regime 3, where $i > r > g$, and again to hedge 1. The drop in oil prices in 1981, the increasing foreign debt, mainly public debt, the increasing international interest rates, and the pressure in terms and conditions of the service debt led the economy to the Ponzi regime 3 for almost a decade, starting from the debt crises that irrupted in 1982. Table 1 and Figure 4 show that from 1980 to 1981 the economy commenced to move toward the Ponzi regime 3 with increasing average interest rates, combined with a critical fall in both the average capital accumulation rate, from 12.7 in 1981

to 9 percent in 1982, and the average profit rate, from 20.7 percent to 18.5 percent, respectively. However, the bottom of the crisis was not in 1982 but in the forthcoming years.

During the De la Madrid administration (1983-1988), the economy was in the Ponzi regime 3 with the lowest average capital accumulation rate, 7.2 percent, associated with a decreasing average profit rate, 18.8 percent, and the highest, average interest rate, 55.7 percent, of all the administration periods. In 1983 and 1984 the Mexican economy was in Ponzi regime 3, where the interest rate is greater than the profit rate, and it is greater than the capital accumulation growth rate: $i > r > g$. In 1983, the generalized economic stagnation was greater than that in 1982, in terms of average capital accumulation and profit rates, GDP growth rate, inflation, bankruptcies, devaluation rate, and unemployment. The set of failed policy reforms promoted by the IMF and characterized by orthodox policies -particularly market regulation and tight fiscal policy- could not change the economy to the hedge regime, although the capital accumulation and profit rates began to rise after 1986.

However, from 1986 to 1988 the economy remained in the Ponzi regime 3, as a result of the strong effect of the highest average interest rate during this period, (Figure 4). The "orthodox" programs failed, the public and external deficit started to increase again in spite of the fact that the tight fiscal policy led to a "primary surplus" (which does not include the interest payments) since 1983. The exchange rate was devaluated as a result of the falling foreign reserves and capital flight, the inflation rate raised to three digits, and the stock market collapsed influenced also by the "largest fall" in the U.S. stock market in 1987 (see Kaufman 2000 and Minsky 1989). As a result, the "orthodox" program was replaced by a "heterodox" plan, which linked the traditional control in monetary and fiscal policies, trade liberalization

and an income policy. The heterodox program success can be observed in the growing of profit and capital accumulation rates, which almost duplicated in 1988 to those of the previous year; this was combined with a drop in the average interest rate.

Through the Salinas administration (1989-1994), the economy returned toward a hedge regime 1 with increasing average, capital accumulation and profits rates (15.7 percent and 34.4 percent, respectively) and a falling average interest rate, 26.2 percent. The good combination of high levels of capital accumulation and profit rates with decreasing interest rates are comparable only with those during the 1960s, although the average interest rate was still greater than those previous to De la Madrid government. Whereby, before the Mexico's economic crisis in December 1994, it was said that this economy was one step away from being at the level of developed economies, just on the right track of the economic transformation; of what the former Treasury secretary, Pedro Aspe (1993), called "the Mexican way." However, since then the Mexican economy has shown to be deteriorated.

In the curse of the Zedillo presidential term (1995-2000), the economy returned again to the Ponzi regime 3, since the average, capital accumulation, profit, and interest rates were 8.3 percent, 7.9 percent, and 25.7 percent, respectively. Moreover, note the decreasing tendency of average capital accumulation and profit rates and the relative falling of the average interest rate from 1995 to 2002, except in 1998. During the early 1990s, the economy changes to the hedge regime where $r > g > i$. Nevertheless, the economy turned into the Ponzi regime again from 1995 to 2000, with a higher frequency of change from hedge to Ponzi regimes, which means a grater financial instability. Actually, the 1994-95 economic crisis is the deepest

economic collapse in the contemporaneous Mexican economic history as it can be observed in Figure 6.

The capital outflow of almost $2 billion dollars started before the December 1994 devaluation, the presidential change and other political phenomena like the power struggle into the PRI party and the "Zapatismo" in Chiapas had changed the "stable economic environment." By reducing reserves of foreign currency and under a contentious environment, the new government devaluated the peso provoking a financial panic, generalized economic instability and deep recession. The central bank monetary policy -to reduce the level of inflation and interest rates and to stabilizing the exchange rate- was the retaining of the net domestic credit. This monetary policy provoked a process of bank-led disintermediation and liquidity crisis; the monetary base came down -24.1 percent in real terms by the third quarter of 1995; M1 composed by the sum of bills, currency outside banks and checking accounts, fell -35.1 percent in the same period; the average balance of the financial saving, in terms of M4 minus bills and currency out of banks, decreased in -14.0 percent; and the attracting deposits fell -9.2 percent in the third quarter of 1995. The Federal reserves of foreign currency evaporated from 26, 135 million of dollars in the first quarter of 1994 to 6,148 million in the last quarter in the same year.

Mexico's economic depression of 1994 is a kind of financial crisis that evolved very quickly toward an economic collapse, which is the most severe economic crisis since the 1930s. It changed from the hedge regime in 1994 toward the Ponzi regime in 1995. Such a change provoked an historical impact in the level of output and employment. In 1995 GDP

fell -6 percent, compared only with similar growth rates during the 1930s,[3] total investment

collapsed -27.35 percent, the level of inflation rose from 7 percent on December 1994 to 51

percent on December 1995. The nominal short-run interest rate increased from 16.62 percent

on November 1994 to 35.42 percent on October 1995. At the end of September 1995, the rate

of total unemployment was 7.5 percent.[4]

Lustig and Ros (1999) consider the "financial vulnerability" as a structural factor. In

fact, it was the "volatility of capital flows" which turned the December 1994 devaluation into

a financial "crisis of massive proportions". The financial liberalization promoted the portfolio

foreign investment in money and stock markets since 1989. Thus, the volatility of capital

flows was rising with the increasing portfolio investment in domestic financial markets from

0.5 billion dollars in 1989 to 1.9 billion dollars in 1994. The most important aspects of the

"Mexican disease" are the overselling of the "Washington consensus", the systematic denial

of the symptoms of fragility, the complacency with a rising investment-saving gap, because it

originated in decisions made by the private sector. When the adjustment process was

complicated by adverse political shocks in the PRI party (mainly the assassination of Colosio

as presidential candidate) and high vulnerability of the banking system, the reversal of

expectations was abrupt and the process landed in a crash. These events aggravated the

"financial vulnerability". Behind the Mexican crisis of 1994-95 there were market and

government policy failures. Financial markets were misled by bullish speculation. Policy

failures had to do with the combination of trade liberalization and real currency appreciation,

which modified the structure of relative prices in such a way as to stimulate imports and

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[3] The lowest GDP growth rates registered have been in 1930, -6.6, and 1932, -14.8. (see Inegi 2004)
[4] Banco de México. *Indicadores Económicos*.

consumption rather than production and investment. Inadequate financial liberalization and banking regulation further contributed to a consumption boom and a sharp decline in private savings, and thus to an allocation of resources in the opposite direction of what was required for a process of sustained growth

The fact is that such a crisis has shown that the Mexican economy's main concern is not only to obtain foreign financial aid from international financial institutions to repay debt, but also to improve the income distribution and living conditions, capital accumulation, and regional economic problems. In Mexico still it is important the reducing of the extreme poverty and the wide differences between geographical regions (see Perez 2004) Further, the financial crack put in evidence how vulnerable and unstable Mexico's financial system is, and that the potential risk of financial crisis there exists.

Finally, during the first two years of the Fox administration the economy was in hedge regime, which is explained by the fall of the average interest rate. However, note the decreasing tendency of average capital accumulation and profit rates in Table 1 and Figure 4. This is a dangerous tendency that is been reflected in low GDP growth and employment rates. By the way, such low rates that have been linked to the U.S. economic performance are so far from those that Fox promised during his election campaign. Under conditions of financial fragility, it is not only important to reduce the average interest rate, but also to increase the capital accumulation and profits rates. If the tendency of the capital accumulation and profit rates is not reverted, then the annual 7 percent growth rate of GDP that the president Fox promised will not be obtained even adding growth rates up of all his administration.

3.2 The Minskian Dynamics in terms of Incremental rates.

Figures 10, 10A, 10B, and 11 show the three regimes of Minskian dynamics in a more pronounced and volatile cycle than Figures 4 and 5. With capital accumulation, profit, and interest incremental rates the economy shifted from hedge and speculative to Ponzi regimes. Through 1960-1979 the economy changed permanently from hedge and speculative to Ponzi regimes, but the higher rates of capital accumulation diminished the financial fragility because it raised the profit rates, which is an important argument deduced by Foley (2001). Moreover, from the Minskian perspective, the role of the financial institutions determines the way in which the financial crisis unfolds; in this case, the fiscal and monetary policy and the increasing financial intermediation during this period, pointed out above, did not permit a financial crisis.

In 1980 and 1981 the economy was in speculative regime and it changed toward a Ponzi regime 3, from 1982 to 1985. The financial crisis infected the rest of the economy from 1982 to 1984 and from 1986 to 1988, when it changed toward Ponzi regimes being negatives almost all incremental rates. This also was reflected in negative growth rates of GDP in 1982, 1983 and 1986. In the next two years the economy moved toward a hedge regime, as a result of the debt relieve derived from a successful heterodox plan. In 1991, the economy moved toward the speculative regime and shifted to the hedge regime 2 in the next three years. In 1995, the financial fragility derived in financial crisis very quickly affected the overall economy due to the biggest dropping in capital accumulation and profit incremental rates of all data series. From 1995 to 2002, the economy has fallen again in a long wave of Ponzi and speculative regimes.

Figure 11 shows a straightforward tendency of the economy to be in speculative and Ponzi regimes during the Fox administration. The high frequency of speculative and Ponzi

Figure 10 Incremental Rates of Capital Accumulation (g), Profit (r), and Interest (i) for the Mexican Economy, 1961-2002
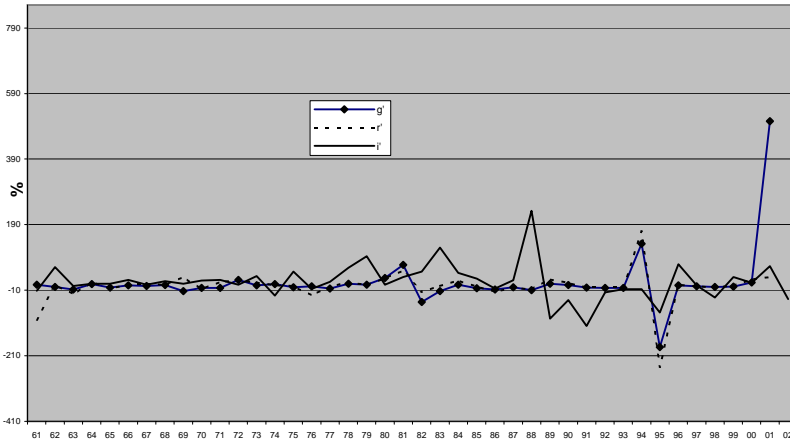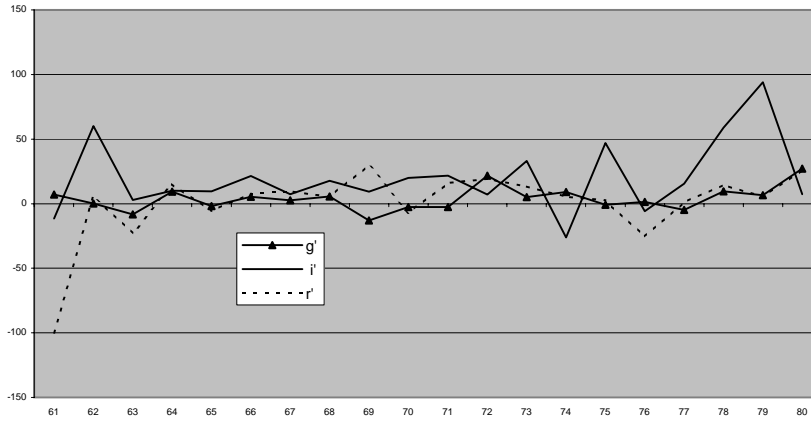
Figure 10A Incremental Rates g', r' and i', 1961-1980

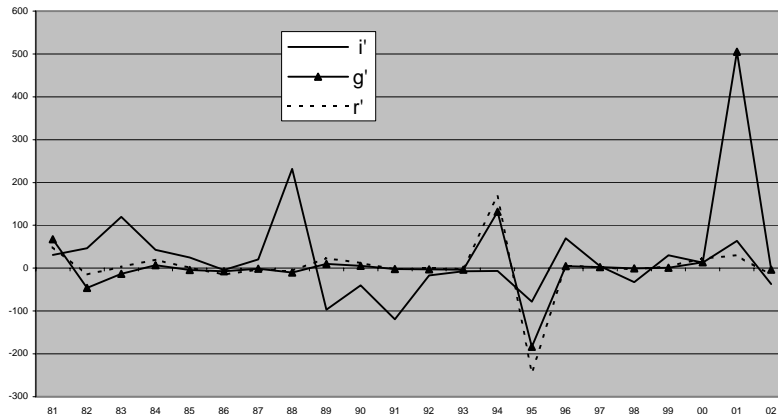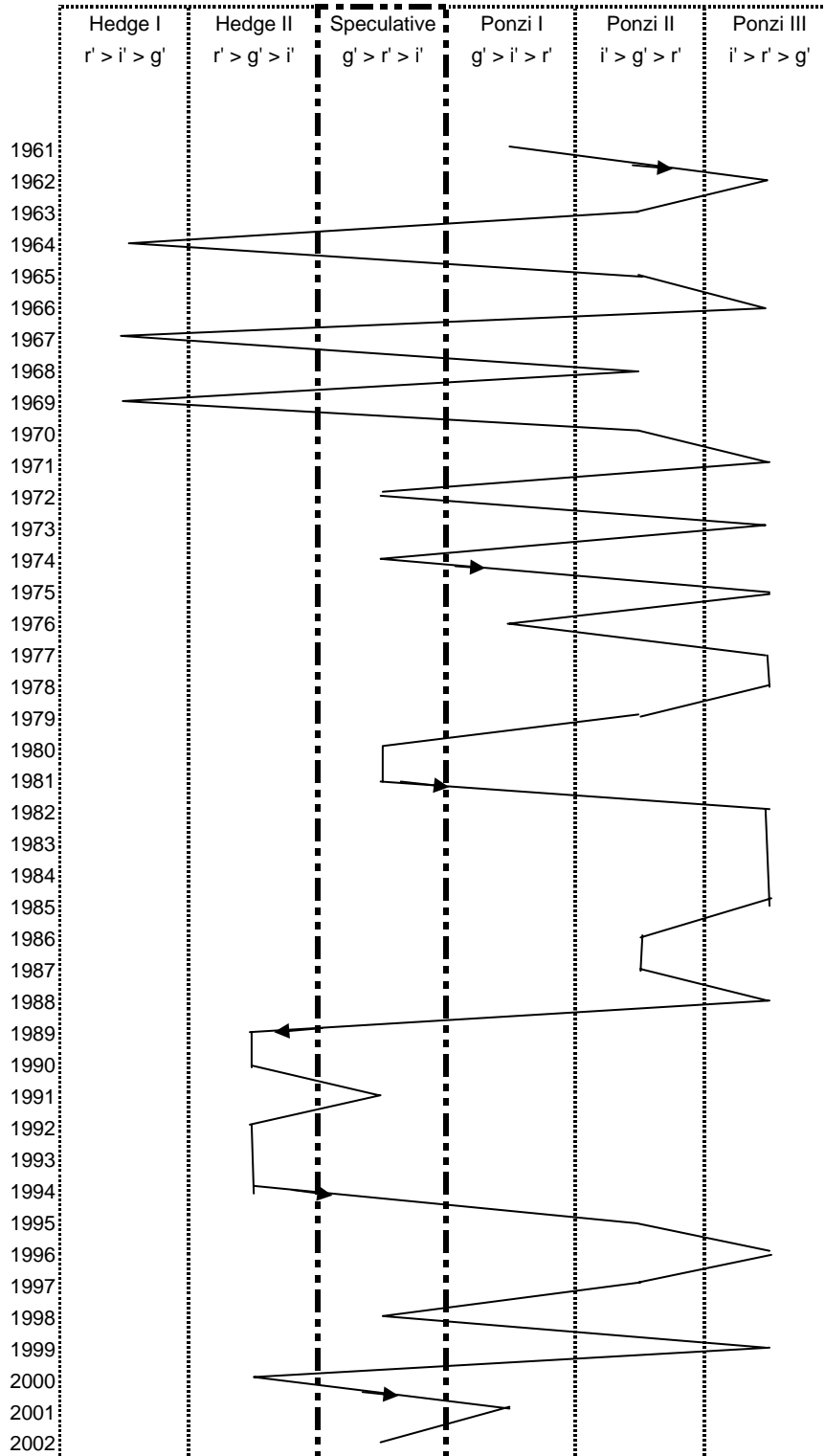Figure 10B Incremental Rates of g', r' and i', 1981-2002

Figure 11 Minskian Dynamics with Incremental Rates

regimes in terms of incremental rates underlines the financial vulnerability of the Mexican economy. Trying to keep low levels of interest and inflation rates through "shorts", the restricted monetary policy has led to financial disintermediation and decreasing rates of investment resulting in the falling of capital accumulation, profit and employment rates. Table 1 shows the falling tendency of capital accumulation and profit rates since 1995.

If this tendency remains during the next years of the Fox administration, then the economy will be into a dangerous process of deterioration of capital accumulation with high likelihood to falling in financial crisis again, which means high financial vulnerability and potential risk of generalized crisis, in a society involved in political turmoil as a result of the new democratic environment.

The falling tendency of g, r and i is very close related with institutional internal and external factors. With liberalization and a growth model based on exports, the Mexican economy is more interconnected with the world economy, and particularly with the U.S. economy, which recession has weakened Mexican export sector. The changing in international price of row materials (basically the oil price) and international financial markets have also a greater impact in the domestic economy by reducing capital accumulation, profit and interest rates. For instance, the low interest rates promoted by Alan Greenspan have collaborate in the low level of interest rates in Mexico, and so in the lowering tendency of i.

On the other hand, domestic, economical and political processes have determined the way in which the financial fragility unfolds. For example, the central bank main proposal, since 1998, has been the reducing of the inflation rate to one digit through an invariable tightened and restrictive monetary policy. The key element of such a policy has been the so-

called monetary "short" cut, which consists in zero-balance target for the accumulated balances of commercial banks. Thus, the central bank makes daily adjustments, to primary money supply in order to match it to its demand. Any liquidity imbalances, resulting from errors in the daily estimation of base demand, are adjusted by means of open-market operations realized by the central institution in the money market. This has been complemented with a policy of floating exchange rate regime, which has meant temporary exchange rate fluctuations. The central bank participates in the foreign exchange market by means of dollar purchases through putting options, and the contingent dollar sales scheme. As a result, the domestic currency has not been depreciated and inflationary pressures have also been controlled. In the fiscal side, the restricted fiscal policy has been maintained to obtain low public deficits and avoid in this way, a "supply shock of finance."

However, such policies have had the "familiar side-effects." The lower rate of investment, depresses aggregate demand and the profit rate and lowers the economy's capacity utilization, which in turn, is accompanied by a rise in unemployment. The new political environment derived from the political change in 2000, when the PRI lost the presidential elections, has deteriorated the economic expectations. Some factors that have increased the economic and political uncertainty are the persistency of the government to increase public incomes through the energy and fiscal reforms with a dividing congress, which has impeded these reforms, and the fact that the credibility of the government has decreased since Fox has not fulfilled his campaign promises. Thus, such conditions have negatively affected the expectations of business investment profitability and, in this way, the level of

investment. INEGI (2004) has published some short run indicators that corroborate such decreasing tendency.

For example, the gross fixed investment indicator falls from 22.4 percent in March 1998 to –0.8 percent in November 2003; the annual unemployment rate increased from 3.16 percent in 1998 to 3.25 percent in 2003. The employment index of the manufacture production sector has also diminished from 4.5 percent in March 1988 to –3.9 in November 2003.

The adversity of the economic tendency toward financial fragility can be solved if policy makers consider into their policy strategies the essential of the financial fragility problem. According to the dynamics of the Foley's model, the fact that the economy moves toward the Ponzi regime is a "temporary" situation that back again into the speculative regime, where "a small open economy with good investment prospects seems likely to find itself." It implies the favorable commitments between borrowers and lenders to tide debt payments over and avoid a financial crisis.

4. Conclusions

We have proved above that the Minskian analysis developed by Taylor-O'Connell (1989) and Foley (2001) provides a powerful analytical tool for understanding the financial crisis in developing countries under conditions of financial liberalization. Both the average and the incremental approaches are complementary. The empirical application of the Minskian model showed that the average rate approach identifies the generalized economic crisis stages like happened in Mexico in 1983, 1986, and 1995 when the Ponzi regime evolved toward financial crises and generalized bankruptcies with falling profit, capital accumulation, and employment

average rates. Whereby, Ponzi regimes are characterized by the so-called "stagflation" phenomena when the economy was at the bottom of the cycle combined with high inflation and interest average rates.

On the other side, the incremental approach of the Minskian analysis showed the volatility of the process. It identifies the path change from the hedge to speculative and Ponzi regimes in years where the Mexican economy presented severe financial problems, like those during the devaluation in 1976, 1982, 1986-87` 1994-95. Hence, the Mexican economy is not the kind of developing country where the financial crisis is an "occasional' crisis, but one where the financial fragility is a structural problem and the trade and financial liberalization increased such fragility, which means no a "casual" but a real potential risk of financial crisis and generalized economic collapse.

The moral of this exercise is that the financial reforms in Mexico could not figure out the financial fragility nor its systemic risk of potential crisis. As this analysis has showed, the new liberalized financial system implies a game with both national and international players. Thus, any solution to create the conditions necessary for a global financial stability implies a set of policies in both local and international levels. At the domestic level and from the financial fragility perspective there are three main lessons.

1. Mexican policy makers should promote increasing capital accumulation and profit rates to revert the tendency of these key variables to decrease since 1995. With higher capital accumulation and profit rates, the likelihood of a generalized collapse in the presence of financial fragility diminishes. 2. In such a process it is important to promote not only financial intermediation but also the monitoring of industrial activities, which should have a very close

linkage with financial intermediaries. 3. Since the financial system is the source of financial stability it needs to be monitored and efficiently regulated by the monetary authority which should prevent bankruptcies and contagiousness.

Furthermore, to promote a reduction of the fragility in the financial system it is necessary that monetary authorities encourage economic growth. Thus, the objectives of financial restructuring must be to maintain the economic functions of financial intermediaries and markets. If the monetary policy carried out by the central bank with the main objective of controlling inflation through the "shorts" has had contractionary side effects, then such policy should be modified. Therefore, to promote economic growth more efficiently and directly under the new globalized environment, Banco the Mexico should modify its strategy: It should use a new monetary strategy to regulate the supply and demand for money and credit by combining both open market operations and a new and broader reserve requirements. The new reserve requirements should apply to all financial institutions' consolidated balance sheets in the financial system, including offshore and foreign currency liabilities. Moreover, any financing alternative should contemplate a more effective strategy of restructuring both fiscal and monetary policies. The fiscal policy based on indirect taxes does not seem to be the correct way because of the intricacy of the political process in the congress to gain approval of such a reform and due to the fact of its negative impact on the level of prices. In summary, the monetary policy should promote a financial system that fosters economic growth; moreover, the monetary authorities should monitor and efficiently regulate the new liberalized financial system to prevent bankruptcies and contagiousness.

Finally, it is also necessary to regulate the financial liberalization process at the international level. Mexican authorities should promote the new architecture of the new globalized international financial system on both lender and borrower sides. As one of the most indebted developing countries, Mexico should encourage an International Organization of Country Debtors (IOCD), whit the main role of organizing all country debtors to get better conditions of indebtedness and payments and avoid overgeared conditions by promoting the fiduciary responsibility of both lenders and borrowers. Such an IOCD can also help deal with international lenders to monitor commitment conditions and avoid any lack of fiduciary responsibility and "sudden increases" in interest rates. Through a fund obtained from a "discount" of each debt contract, the IOCD would help to avoid each country's debt crisis. Such a fund can also be used or invested in international markets of very short terms and the dividend can be used to disburse the stock debt, not the service, of those countries.

Appendix 1

Notes on Data Sources and Constructions of Financial Fragility Variables

The rate of capital accumulation *g*, was obtained by dividing annual real, gross total investment (I) relative to annual, real, net total capital stock (K), base year 1980, both series are in million of Mexican pesos. The result was multiplied by 100 for an expression in terms of a percent.

Total investment (I) - The sources of the gross total investment data series were: INEGI (1995), *Sistema de Cuentas Nacionales* (available on CD), and INEGI (2004) http://www.inegi.gob.mx.

Capital Stock (K) - The data series for annual real net capital stock were adjusted and estimated through linear interpolation of the total investment (I), on the base of the respective data provided by Banco de México (2004), http://www.banxico.org.mx.

The profit rate *r*, was obtained by dividing annual real, operating surplus relative to real net capital stock (K), base year 1980. From 1960 to 1969, the operating surplus was estimated through linear interpolation of the total GDP. From 1970 to 2001, the source of the operating surplus was INEGI (1995), and INEGI (2004). The data for 2002 was estimated as above.

The interest rate *i,* was calculated by dividing annual real, debt service (V) relative to annual, real debt stock (B), base year 1980. The total debt service is the sum of domestic and foreign debt service. Domestic debt service is the result of multiplying the lending rate and total domestic credit, which were obtained from IMF, *International Financial Statistics*, and Banco de México, *Informe Annual,* and Banco de México (2004). Total domestic credit is the sum of claims on Central Government (net), local government, non profit public enterprises, private sector and other banking institutions. Additionally, the foreign debt service and the stock of debt were obtained from The World Bank, *Global Development Finance*, Banco de México*, Informe Annual*, and Banco de México (2004). The data series in dollars were changed to million of Mexican pesos, using the annual average exchange rate.

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