

**ECONOMIC GROWTH AND INFLATION IN BRAZIL IN THE 1970s:
A POST KEYNESIAN INTERPRETATION**

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ABSTRACT

ECONOMIC GROWTH AND INFLATION IN BRAZIL IN THE 1970s: A POST-KEYNESIAN INTERPRETATION

The Brazilian economy in the 1970s experienced high rates of growth of aggregate output and high rates of inflation. To understand this phenomenon, it is necessary to study how behaviour and strategies are formed in an environment of price instability. The post Keynesian theoretical framework provides the tools required for this analysis as it incorporates the study of decision-making under non-probabilistic uncertainty.

The empirical analysis shows that the remarkable performance of the Brazilian economy in the 1970s resulted from the effective economic policy management of the government. The foreign sector provided the resources for expansion, but at a cost of increasing the degree of vulnerability of the economy to external shocks. The empirical analysis, which demonstrates the merits of the post Keynesian methodology, is developed in two stages. The first identifies the special characteristics of the Brazilian economic environment and how portfolios changed according to the different phases of growth (1968-73, 1974-79 and 1980-82). The analysis brings out the continuities of each phase and shows that the presence of the State became stronger, as the degree of uncertainty in the economy increased. In the second stage a recursive econometric model is developed to simulate the behaviour of industrial prices and output. The main conclusions are reinforced by the results of the model.

To my family

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INTRODUCTION

Economic growth in the Brazilian economy in the seventies was quite intense, and so was inflation. Our proposal in this work is to discuss the environment where inflation and growth could coexist for over a decade. The performance of the economy in the eighties changed dramatically: as inflationary disequilibria intensified, problems in balance of payments emerged and stagnation ensued. In the last decade the average rate of industrial growth was 0.4 %, much less than the 8.0% of the seventies, and, as we write, no recovery is yet on sight.

Until the mid-sixties, analyses of the performance of the Brazilian economy tended to emphasize a tendency to the exhaustion of the process of industrialization through import substitution. As a result, stagnation was expected to prevail when that exhaustion was reached. The recovery in the end of the sixties gave birth to new approaches to the functioning of the Brazilian economy (the most representative of which are examined in chapter 1). These approaches, however, did not provide a comprehensive view of the development process of the seventies.

This thesis makes an attempt to discuss this process in a more complete way, establishing the appropriate connections between relevant facts. It is our aim to set the grounds for the future development of a comprehensive macroeconomic model, which will allow us to describe the forces which contributed to growth to be sustained, and the ways they interacted. Our model in this thesis is not intended to be exhaustive or definitive, but to open a new way to research, to a different approach to modelling, an instrument still not much used in Brazil, and to address one crucial question: how could high inflation and sustained growth coexist for so long.

It is a well known principle of economics that inflation would not be a problem if it was neutral with respect to relative prices in the broadest sense, that is, including the relative price of labour and output, and intertemporal prices. It is also well known that it rarely is neutral. Be it because of price rigidities, differences in speeds of information transmission, or because of the existence of contractual commitments, it

is an established empirical fact that inflation affects relative prices, and thereby blurs the basis for the economic calculus necessary to prospective decision-making. The experience of countries like Brazil, however, seemed to point to different possibilities. To identify them is one of the goals of our investigation.

The theoretical approach of our research is the post Keynesian theory, given its emphasis on the instability of capitalism, on the relevance of expectations and uncertainty, and on the strategic role of investment and financial and monetary variables.

Theoretical discussions laying the foundations of our model take place in chapters 2 and 3. In chapter 4 we present the development of the basic theory for an economy with price instability. In chapter 5 we develop some observations about the interaction between micro and macro issues suggested by our approach.

In order to translate the theoretical principles into an empirical model it is necessary to describe the reality to be studied. In chapter 6 we present the main features of the Brazilian economy over the period of study, aiming: (a) - to explain fluctuations in aggregate output, that is to say, to identify the restrictions to growth and how economic policy promoted the necessary adaptations; (b) - to explain how problems were perceived and how plans were prepared and which were the channels of information and decision as well as of coordination of these decisions and (c) - to assess the effect of inflation on the conditions of production and investment in the Brazilian economy in the seventies.

In chapter 7 we present our model, estimating the equations and discussing its main results. In chapter 8 we extend the model, performing a simulation exercise.

In the final chapter we make a summary of the main propositions and results of our work, and we point out some of the future developments to be pursued in line with the orientation of this research.

CHAPTER 1
THE DEVELOPMENT OF THE BRAZILIAN ECONOMY
IN THE SEVENTIES: MAIN INTERPRETATIONS

A. INTRODUCTION

It is our aim in this initial chapter to discuss some of the main interpretations about the Brazilian development in the seventies. The process of industrialization in that period was marked by deep changes in the industrial structure, with the consolidation of a quite sophisticated industrial park. However, industrial growth had not been smooth. From 1968 to 1973, industry led the growth of the economy, expanding at an average rate of over 10% a year. Consumer durables and capital goods were the most dynamic sectors, expanding at an average rate of around 20% a year. This spectacular performance defied interpretations presented since the late fifties about the future of Brazilian industry, which claimed that it would face stagnation after the end of the accelerated period of import substitution of that decade.¹

After the first oil shock in 1974, the tempo of growth decelerated, coming closer to its historical rate. Industrial policy then was oriented to forward promoting import substitution for some basic inputs, in particular energy inputs, and capital goods and equipment. As established in the Second Development Plan (II PND), the main goal was to achieve the full potential of development for the period of 1975-79, which meant keeping growth rates of GNP around 10% a year and industrial growth rate around 12% a year. Such expectation was highly optimistic given that in 1973 industry was working close to its full capacity, and on the other hand, the oil shock had a negative impact on entrepreneurial expectations. From 1974 to 1977, growth rates of industry were positive and fluctuated in response to short run measures of economic policy. From 1978 to 1980 they were stabilized around 8%. The second oil shock and the sharp increase in the international interest rate then changed dramatically the conditions of development, and in the middle of 1980 growth rates decelerated again, becoming negative in 1981 and 1982.

High rates of inflation had been permanent along the seventies. During the period of accelerated growth, inflation rates were decreasing. After the first oil shock they reached a higher level and by the end of the decade, when real product growth rate started to decrease, inflation accelerated again. An important characteristic of the development of the Brazilian economy in the seventies is the sustaining of growth in an environment of permanent inflation. In our task to discuss the recent process of industrialization in Brazil we shall start by discussing four different interpretations about the reasons why GDP fluctuated during the seventies.

B. MAIN INTERPRETATIONS ABOUT GROWTH IN THE SEVENTIES

Emphasis on External Conditions

This interpretation was offered in works by Malan and Bonelli, among others. In their view, one should distinguish two phases in the period of accelerated growth between 1967 and 1973: the first (1967-69), led by the expansion of durable consumer goods output, was the recovery period; the second (1970-73), led by capital and intermediate goods industries, was the phase of sustained growth.

During the recovery period, idle capacity, available in industry, had been reduced, as economic policy was directed to adjust the structure of supply to demand. In this sense, the introduction of new instruments of consumer credit, expanding the domestic market for consumer goods, gave an important incentive to the manufacturing sector. Also, the acceleration in the growth rates in the construction and manufacturing industries increased substantially the creation of skilled jobs, with higher levels of remuneration. The state-owned enterprises were also increasing the number of qualified jobs, increasing the number of well-paid technocrats. Combined with this movement in the labour market, governmental wage policy promoted income concentration, strengthening the differentiation of consumption patterns of the higher middle class. The authors emphasized additionally the importance of the increasing foreign indebtedness, in making feasible the emergence of a structure of supply with a high import coefficient, adequate to satisfy the more sophisticated demand of newly

privileged groups.

In the second phase, that of sustained growth, the main source of growth in industry was the demand for investment goods, since the degree of utilization in industry was now very high (see Table 7-4). The supply of funds to investment, external to the firm, originated mainly in public financial intermediaries.

The first oil shock in 1973 coincided with the deceleration of the growth rate of the industrial sector which, in 1972, had already reached high levels of capacity utilization, according to the authors. The reduced margins of idle capacity, suggested that the deceleration in the growth rate of real output would have been inevitable, and in this sense, the increase in the oil price and of some basic raw materials, as well as the difficulty in obtaining external loans to finance balance of payments deficits, helped to change a situation that could not have continued indefinitely anyway.

The cyclical pattern of industry behaviour during the 1968-73 period could be described by comparing the evolution of actual and potential production, the latter being defined as the maximum that would be possible to attain if all equipment available were being used. So, the same evidence used to explain the recuperation of the economy at the end of the sixties, that is to say, favourable supply conditions which eased growth in the industry, was recalled to explain the deceleration in the growth rate of the economy after 1973 - the narrowing of the difference between the effective and potential output. Potential output would work as a "ceiling" that would establish the limit to growth in the short run, interrupting the preceding explosive process of growth.

Following the potential output analysis, in the next phase, growth rates would be less than in the previous period, and the gap between potential and effective output would increase. Current production would decelerate, but still, for a period of time, investment in increasing productive capacity would continue, because of the lag in investment decisions, based on optimistic expectations about the future. (Malan and Bonelli, 1976)

In the view of Malan and Bonelli, the Brazilian economy reached in 1972-73 a "ceiling" which limited its capacity to grow in the subsequent period. The concept of ceiling, as used by these authors, is referred to Hicks (1978). It is represented by the full employment of production resources in the short run which imposes an upper limit to economic expansion, and explains cyclical reversion in the growth rate of real output.² It is important to note that this argument is derived from a mechanistic model of growth, that is to say, where the conditions of reproduction are fixed and are repeated period after period. In the real world, we may ask if this definition of ceiling is not too severe. In 1973 the oil shock took the world by surprise and we may suggest that the sudden change in the terms of trade imposed a short-run "ceiling" to growth. Actually, in latter works, the authors, when explaining the further development of the Brazilian industry after the first oil shock, seemed to lay more emphasis on external conditions.

Indeed, they recognize that after 1973 and until 1979, when the rhythm of growth slowed down, liquidity remained plentiful in the international financial market and this worked in favour of the sustaining of the rates of growth of industry. According to Malan and Bonelli (1982), the economic policy adopted after the first oil shock was an attempt of structural adjustment through external indebtedness. The proposal of the Second National Development Plan, of substituting imports of capital goods and primary inputs, aimed to reduce external dependence of the economy in those items and change the role of foreign indebtedness:³

The difference from the 1968-73 period, when foreign indebtedness represented a choice and had a crucial role in the strategy of growth, foreign indebtedness in the 1974-79 period represented a way to defer in time the cost of the structural adjustment required, sustaining the growth rates of consumption and investment (public and private). (Malan and Bonelli, 1982, p. 14.)

However, by increasing the external debt (it increased from US\$ 12.6 billions in 1973 to US\$ 43.5 billions in 1978), this strategy of growth increased also the degree of vulnerability of the economy to changes in the international interest rate, given that almost 70% of the foreign debt in 1975 had been contracted at floating interest rates.

In this context, the second oil shock and the sharp increase in the interest rate after 1979 (due to the change in the American monetary policy) changed dramatically the external situation of the country. The world recession of 1980-82 and the sudden contraction in the international market of credit in the second semester of 1982, led the Brazilian economy nearly to a collapse that year.

Fluctuations in the growth rate of Brazilian industry during the period of 1974-80 were affected by short run monetary and fiscal policies. In two years - 1975 and 1977 - the rate of industrial growth was below 4% (see Table 7-5) and the general level of liquidity of the economy was contracted aiming at reducing the pace of inflation. While fighting inflation was considered to be the main target of economic policy, industrial production still presented positive rates of growth. After 1980, when balance of payments became the main constraint to growth, the need to increase the commercial surpluses was pursued through a decrease in the level of activity. The recession of the eighties was, according to the authors, a consequence of the structural limits that the Brazilian economy was facing because of the difficulties in the balance of payments:

Domestic equilibrium cannot be restored - if it one day could - because of the foreign restriction. The high and generalized (and not planned) idleness of the equipment that can be observed in the industry will not be occupied (given that the increase in the level of internal activity represents a reduction in the commercial surplus) until the industry can produce domestically the imported raw materials and equipment, and it reduces the external dependence of imported oil, besides the expansion in the exports. (Malan and Bonelli, 1982, p. 30.)

In sum, the reversion in the rate of growth in 1973-4 was mostly explained by the limit imposed by potential output. The deepening of the strategy of foreign indebtedness after 1974 was seen as a political option to avoid the adjustments required in the economy. According to Malan and Bonelli,

The impressive new investment boom of the mid and late seventies was only possible, without an upsurge in inflation, through the mechanism of spiralling external indebtedness. (Malan and Bonelli, 1990, p. 61.)

The second oil shock in 1979 left no choice to the government but to accept a severe recession.⁴ The interpretation of Malan and Bonelli gives more attention to short run economic policies, not explaining how productive sectors react to new stimulus to growth. That is to say, how a change in the direction of the economic policy affected investment decisions and, given that, how the economy found new sources of growth.

The Emphasis on the Long Run Strategy

The official interpretation about the difficulties faced by the Brazilian economy after the first oil shock was in terms of a short lived problem in the balance of payments. The events of 1973-4 were interpreted by the Brazilian government as some kind of transitory turbulence. If international liquidity remained abundant, current account deficits could be financed, increasing the external debt. For this reason, the military government that was in power in 1974 proposed to implement a gradual adaptation to the new international situation. According to the then Minister of Planning, Joao Paulo dos Reis Velloso, the new government had to choose between a deep recession to overcome the balance of payments problem or to adopt a gradualistic adjustment.

The choice was made to follow the gradualistic adjustment taking advantage of the availability of international liquidity. A very ambitious development plan was launched, the Second National Plan of Development, aiming to substitute imports not only of oil, but also of other raw materials and capital goods:

The following was the strategy proposed:

- to increase exports at an annual rate of 20% and to diversify the items exported;
- to increase the ratio of production of oil to domestic consumption;
- to substitute for imports of basic inputs such as petrochemicals, steel products, fertilizers, paper and cellulose, and wheat;
- to substitute for imports in the production of capital goods. (Velloso, 1977, p. 117.)

The intensification of the process of foreign indebtedness,⁵ to complement domestic

saving in this new development effort, was an essential element in the strategy of the Second National Development Plan. According to Velloso,

During the adjustment period, when current account deficits will have to be financed by foreign indebtedness, it will be necessary to find new ways to increase the flow of direct investment from the developed countries to the underdeveloped areas and to expand the long term finance instruments. (ibid., p. 65.)

Velloso recognized that the degree of uncertainty in the economy was increased after the first oil shock, and so the government adopted a posture of "alert gradualism", that is to say, working to reduce the degree of uncertainty in the economy, guiding investment decisions to the new priority areas:

In relation to basic inputs and capital goods the problem was how to stimulate the entrepreneur, mainly the national entrepreneur, to commit large amounts of resources in ambitious investment projects in a world in recession and with the difficulties in the domestic front. The answer to those problems was to direct all governmental incentives to those sectors and so in 1975 and 1976 the government fixed in 20% a year the monetary correction charged over long term loans provided by the National Development Bank (BNDE).(ibid., p. 124.)

The counterpart of this posture was the narrowing of the room for manoeuvre of the short run economic policy. On one hand, it was committed to avoiding a recession, which would threaten the implementation of the Second National Development Plan; on the other, it should also avoid the overheating of aggregate demand that would put undue pressure on inflation and the balance of payments.⁶

According to Velloso, until 1978 the Brazilian economy would be in the phase of "growth in an intermediate zone", and it should "progressively accelerate". This would occur according to the pace in which the difficulties in the balance of payments would have been overcome, through an increase in exports and a decrease in the degree of dependence on imports of basic inputs and capital goods. Inflation also should be controlled to allow for the strategy to work adequately.

One general widespread criticism of the governmental interpretation about the

behaviour of the economy was the excessive emphasis on the external oil shock to explain the deceleration in the rate of growth of the economy after 1973. No emphasis was given to the endogenous causes of the deceleration. In contrast, that is the starting point of a popular interpretation during the seventies: the proposition that Brazilian capitalism had advanced enough to generate its own periods of expansion and crisis.

The Stagnationists

This line of interpretation resumes the tradition of the structuralist school of the fifties.⁷ For the structuralists, late comer economies in the industrialized world would suffer strong pressures for stagnation in the long run as the process of industrialization would not enlarge the size of domestic market to cope with the dimension of the industrial park (see note 1). In a paper first published in 1963 about the process of industrialization in Brazil in the fifties, Tavares described:

The development process of the Brazilian economy, besides resulting in an increasing social inequality...threatens the dynamics of the capitalistic sector, because the absolute growth of domestic market that might occur in the capitalistic sector is not enough to assure acceleration and the sustaining of recent development of industry...(Tavares, 1973, p. 113.)

For the group of economists following this reasoning, most of them from the University of Campinas, the deceleration of industrial growth was seen as an indication of an economic crisis, which was caused by the contradictions of the process of capital accumulation led by the consumer durables industry.

The recovery of this sector in the end of the sixties was eased by the availability of idle capacity and by the increase in the degree of indebtedness of households. However, growth led by this industry brings about problems of "dynamic realization", that is to say, the expansion of this sector generates a potential capacity of accumulation that is much superior to its capacity of generating demand for its production. As a result, growth could not be sustained, as it would be if the leading sector were the capital goods sector.

In this sense, the authors pointed out that the recovery process of the economy ultimately led to the deceleration in growth. Although in the early seventies, the capital goods industry grew at a much higher rate than the consumer durable industry (see Table 7-5, for 1972 onwards), the recovery of that sector came after the upsurge of the consumer durable sectors, and this difference in timing would have provoked the deceleration of the rates of growth of the whole industry after 1973.⁸

Three reasons were raised to explain why recovery of the Brazilian capital goods industry in the seventies would not sustain, in the long run, the demand for consumer durables. One was the limited employment opportunities generated by the expansion of this sector. Another reason was related to the difficulties in expanding this sector due to lack of long term finance.⁹ However, the most important reason identified was the failure of the Second National Development Plan in reaching its objectives. This plan to succeed would require that foreign, private and public resources should be joined to expand the capital goods industry. The emphasis of the argument is on the lack of political strength of the government to reconcile economic interests. The failure of the Second National Development Plan was linked to " ... the inability in adjusting the interests of the state enterprise, the national enterprise and the international enterprise." (Mello and Belluzzo, 1977, p. 26.)¹⁰

In short, the main explanation for economic fluctuations should be sought in the dynamics of capital accumulation of the productive sectors and their forward and backward linkages.¹¹ In this context, the main reason why the Brazilian economy fell into a "crisis" after the first oil shock was that the rate of capital accumulation of the sector which led growth (consumer durable) was superior to the growth rate of its demand, provoking a "realization crisis".

The increase in foreign indebtedness after the first oil shock was an argument to reinforce the point that the external shock did not cause the reversion of the rates of growth. No emphasis was given to changes in the international environment and no distinction was made between the characteristics of the indebtedness before and after the oil shock. According to Tavares, it was the perspective of gains that guided the flow of foreign capital to the country. So,

... since 1971, when foreign indebtedness accelerated, there had not been any refusal of the foreign loans, despite the growing deficits of the current accountsThe increased indebtedness [after 1974], different from the period of accelerated growth, was mainly due to the financial accounts: to refinance old debts and, since 1976, to keep high the level of foreign reserves. (Tavares, 1978, p. 125.)¹²

A pertinent question to follow from this interpretation is whether it would be possible for the capital goods industry to lead the process of capital accumulation in a late comer economy allowing thereby for sustainable growth.

Given the conditions of a late industrialization process, no matter how modern and international that [economy] may be, the low absolute and relative size of the capital goods sector (and not the fact that it is technologically dependent), inhibits self sustained growth "a la Tugan-Baranowsky", that is to say, prevents that the Brazilian miracle to be similar to the so called Japanese and German miracles. (Tavares, 1978, p. 77.)¹³

Following the argument, the authors of this school describe the dynamics of accumulation in the capital goods sector. According to them, its rhythm of growth is determined not only by the growth of the whole economy, but also by its own capacity of expansion.¹⁴ In the Brazilian case, after 1973, this capacity was limited because private enterprises were not willing to invest, due to the emergence of unplanned idle capacity in the economy. Despite the strong participation of public investment in capital formation, private investment, because it is more volatile, determined the cyclical movement of the economy.

The Brazilian economy, given its industrial structure, would be susceptible to cyclical movements with short periods of expansion and explosive rates, followed by economic crisis and long recessive periods. Campinas's interpretation, in this sense, is deterministic. No emphasis is given to inflation and balance of payments constraints in explaining short run fluctuations.

Emphasis on the Institutional Structure

An interesting interpretation of the process of development in the seventies is given by Adroaldo Moura e Silva. His analysis emphasises the way in which financial resources were organized to explain the process of development of the Brazilian economy (1978, p. 10).

The period of accelerated growth (1968-73) and the next (from 1974 onwards) should be understood as the result of economic reforms introduced during the sixties and early seventies. Those reforms aimed to speed up the rate of growth of the economy and, to this end, to increase financial intermediation in the economy.

This was the main feature to distinguish the period of rapid growth after 1968 from the previous one of the fifties and early sixties. The "development effort" of the fifties was limited by the poor instruments of finance, which did not work to balance resources among economic units with surplus and deficits. There were no organized capital markets, the fiscal system was too rigid and did not provide enough receipts to finance governmental expenditure and so the main source of finance of investments became the primary expansion of means of payment. This process led to an acceleration of inflation which ultimately impaired the process of growth.¹⁵

The recovery of the economy at the end of the sixties occurred in a context of institutional reform which allowed for the expansion of the financial activity and stimulated the absorption of foreign resources. The reforms, which encompassed the fiscal system, the financial system and the system of price controls (including the policy of mini-devaluations of the exchange rate), were all part of the major strategy to finance growth.

The main target of those reforms was to promote the expansion and diversification of the financial system in an inflationary environment. This was achieved through the creation of fiscal and investment funds, and instruments of compulsory savings and of a new instrument of voluntary savings ("caderneta de poupanca"). Also it was introduced a regulation to allow private financial institutions and enterprises to borrow money in the international financial market.

The greatest innovation, however, was the introduction of an automatic mechanism of readjustment of contracts - monetary correction - according to a given index of inflation. This instrument "creates and establishes a new unit of account - called the UPC [Capital Pattern Unit] - to correct money values of contracts, substituting the legal currency, the cruzeiro." (Silva, 1978, p. 28.) It is through this mechanism of real remuneration of assets that an attempt to develop a capital market in an environment of permanent inflation was made.

The Brazilian financial system operated with three sort of contracts:

- contracts agreed in real terms, automatically readjusted by the index of monetary correction,
- contracts agreed in nominal terms (cruzeiros), with interest rates administered by the Central Bank and keeping a relation with the rate of inflation, and
- contracts in foreign currency, mainly the US dollar, not under the discretionary power of the Central Bank.

Although voluntary savings had been stimulated by the monetary correction mechanism, financial private institutions refused to borrow with the monetary correction clause as they claimed that the risks of insolvency were too high in an economy with permanent inflation and suffering inflationary shocks. So, the great expansion in the financial intermediation that happened during the period of accelerated growth was followed by a process of centralization in the hands of the State of financial intermediation, as only the State operated with contracts in real terms.

When inflation rates jumped to a higher level, after the first oil shock, there was a preference by savers to demand contracts agreed in real terms and debtors to demand contracts in nominal terms:

To a sharp increase in the rate of inflation, it follows a sharp increase in the expected rate of conversion between the UPC and the cruzeiro in the future. This, on its turn, provokes wide movements of financial resources between institutions and instruments of attracting savings, at a speed that can put on risk

the liquidity of the financial institutions that operate in the cruzeiro market and of the enterprises that have their debts in real terms. (Silva, 1978, p. 40.)

As the market was segmented, that is to say, private agencies operated with nominal contracts and the State with real contracts, an acceleration of inflation led to a scarcity of resources in the private sector and to excess supplies in the State sector.

The increase in domestic interest rates in response to a greater demand for nominal loans, operated as an incentive to absorb foreign resources, what, at last, also put pressure on the primary expansion of the means of payment.

This mechanism, in periods when inflation rates were increasing, had an inhibiting effect over productive investment, establishing a too high floor for the remuneration of savings, when compared with the marginal efficiency of capital. This seemed to have happened after 1973, when inflationary pressures accelerated, and expectations about the future became more uncertain. Also working to discourage long term commitment of resources was the high degree of indebtedness of the firms after 1973,¹⁶ as a result of the increase in investment in fixed assets during the period of accelerated growth.

According to the author, what was going to characterize a situation of economic crisis after 1974 was the combination of two factors: on one hand the change in the economic policy in an environment of reversion of expectations, and, on the other, the increase in financial speculation, associated with the increase in the expansion of the external debt and in the form of organizing the domestic financial system.

In short, the organization of the financial system increased the instability of the economy as inflation rates accelerated, and this contributed to inhibit productive investment. The change in economic policy in 1974 increased uncertainty as it led to a state of "paralysis of decision".

Silva's interpretation recognized the importance of the financial system in explaining the cyclical movements of the economy: he did not emphasise, however, the

interrelation among productive sectors, nor with the financial sector. So, although the author identified a decrease in the marginal efficiency of investment in 1974, growth was expressive until the end of the seventies. Which were the sources of growth is a matter not answered by the author. To continue with Silva's interpretation it would be necessary a study about the motivations that guided investment after 1973, as well as the financing conditions of those investments.

Silva agrees with Campinas's interpretation, that the period after 1973 was characterized by an economic crisis. This point of view suggests that the previous period corresponded to a "normal" performance. We should argue that what happened before 1973 was the coincidence of accelerationist elements together with a favourable external environment and should not be considered as a "normal" rhythm of growth. The average growth rate observed from 1974 to 1980 was around 8%, which had been the historical rate since the War. After 1981, when there was an absolute decline in production, it would be more appropriate to use the term "crisis" to describe the economic performance.

C. A SUMMING UP

We did not intend to be exhaustive in this survey of interpretations about the development of the Brazilian economy in the seventies. We aimed to compare well known analyses of the period to highlight the main facts that were singled out as determinants of the economic fluctuations.

Although there is a consensus about when the rates of growth reverted, there is no consensus about the causes of the change. The diversity in the explanations offered above suggests that there is still some light to be shed on the process of industrial development in the seventies.

The above analysis points out the following arguments to explain fluctuations of the growth rate in the seventies:

- the relevance of the international environment (Malan and Bonelli);

- the role of economic policies in guiding investment decisions (the "official" interpretation);

- the role of sectoral interrelations in explaining the timing, the direction and the intensity of the cyclical movements (Campinas group) and

- the role of financial institutions in stimulating the process of expansion (Silva).

The missing link in the analysis of the performance of the industry in the last decade is, according to our view, the interrelation between micro and macro elements which will explain adequately economic fluctuation in the seventies.

The vigorous performance of the Brazilian economy had always impressed economists. However, little is known about the main agent to stimulate this growth, that is to say, the industrial enterprise. There is little statistical information about enterprises and more rare still are researches about productive investments. So the process of investment decision has not been studied and its motivations identified.

Furthermore, it is very important also to analyse the integration between real and financial spheres to gain an appropriate understanding of the cyclical behaviour of the economy. This can be done through investment and pricing decision analysis in an environment of uncertainty.

The power of the financial institutions in amplifying crisis in modern capitalist economies is related to the increase in the degree of uncertainty that the operation of financial institutions provokes. The role of these institutions is to intermediate financial assets among economic agents, balancing their accounts. When doing so the circulation of resources is accelerated but also risks are increased. During periods of optimistic expectations, entrepreneurs manage to borrow more easily and, in this way, financial institutions reinforce the increasing movement of output. When expectations are less optimistic, on the other hand, entrepreneurs are less willing to invest in production and

more inclined to invest in financial assets. So, the causes of instability should be searched not only on the real side of the economy, but also on the financial side.

A study of this nature needs the elaboration of an analytical conception appropriate to the Brazilian economy. Here we should not only consider variables common to studies of profitability of investment projects, but also the degree of confidence of the entrepreneur about the future of its business. To consider this variable implies that the analysis has to move from the conventional flow of information considered in general equilibrium theories. In this context it is important to establish the economic relations that are relevant to be analysed in an economy like Brazil's, where the presence of the State and the presence of international capital are important and where there are recurrent problems of balance of payments.

NOTES TO CHAPTER 1

1 - The thesis about the stagnation of growth is based on the hypothesis of the narrowing of the markets as a result of the inequalities in income distribution. There would be several causes for the stagnation in economies which are late comers in the industrialized world. Wells (1977, pp. 162 and following) commenting on the import substitution strategy lists the reasons for stagnation which we summarize below:

a. the nature and the rhythm of the evolution of the industrial structure is determined by external restrictions and by the consumption demand of the upper social economic class. Because of that, the main stimulus to growth comes from the local production of goods previously imported,

b. initially, high industrial growth rates are easily reached because of the lack of competitiveness of imports and the existence of a restrained demand. Other stimuli to growth, such as the increase in demand of final intermediate goods as a result of the industrialization process, are ignored,

c. the main barrier to expand the market is the high degree of inequality in income distribution. In oligopolized sectors, working with modern techniques and paying low wages, increases in productivity are not passed to final consumers,

d. the growth in production can only be sustained with the introduction of new goods and through differentiation. The reduced size of the market inhibits this process and represents a barrier to the continuity of growth,

e. the State is seen as an independent agent which exerts an important role to stimulate new sectors through the manipulation of tariffs, exchange rate, and so on,

f. industrial growth cannot be sustained because the process of import substitution leads to balance of payment problems.

2 - According to Hicks:

For output cannot rise above the full employment ceiling; and we have granted that it may remain for considerable periods on, or nearly on, the ceiling, without inflation (the Keynesian boggy) necessarily getting out of hand. (Hicks, 1978, p. 167.)

3 - In 1974, 70% of the Brazilian imports was composed of capital goods and raw materials - exclusive of oil (Malan and Bonelli, 1982).

4 - According to Bonelli and Silva:

One perceives two different periods in the Brazilian economy, after the first oil crisis: 1975-80 and 1981 until nowadays... . Despite this difference in performance, the period since the end of the sixties until the beginning of the eighties presented a common trace: the huge increase in the international liquidity, because of the balance of payments deficits of the United States and, after 1973-4, the recycling of the petrodollars. This expansion in liquidity allowed for great increases in loans and financing of several countries, among them Brazil, making possible the finance of increasing deficits in current account and the accumulation of international reserves. (Bonelli and Silva, 1984, p. 2.)

5 - The Minister of Finance during the 1974-79 government, Mario Henrique Simonsen, employed the expression "Brazilian Model of Growth" to explain the process of development of the economy, taking advantage of the international situation of high liquidity. So, according to his view, the recuperation of the economy was based on the combination to "saving and market"

...the first requirement to sustain an accelerated rate of growth which is supposed to last is the sustaining of a high rate of saving that allows to finance necessary investments to the economic growth of the country; the second is an active and expanding market, that is able to keep the interest in new investments and in increasing production. (Simonsen and Campos, 1976, p. 10.)

To sustain a growth rate around 10% a year, foreign capital was welcome to complement the financing of domestic investment. To keep in balance foreign accounts it was necessary a policy of massive incentive to exports and to keep a high level of international reserves as a safe guard against sudden movements in the international environment. For an explanation about the process of controlling the external debt in this strategy see Lira (1970).

6 - The stop-and-go policy, characteristic of the 1974-79 period, was interpreted by Fishlow (1980) as indicating a lack of strategy that would treat adequately the foreign crisis and domestic imbalances.

7 - This line of interpretation rejects the concept of a "ceiling" that imposes an upper limit to growth, as

... capitalism, by its own nature, expands continuously its resources, through its capacity to promote technological progress, and also through the continuous expansion of its markets, incorporating unceasingly all the economies in the world. (Mello and Belluzzo, 1977, p. 25.)

8 - According to Mello and Belluzzo:

The rate of accumulation in the industry of production goods started to

accelerate after 1970, reaching its highest point in 1973. However, the rate of expansion of the durable sector in 1972 started to show signals of deceleration.

The decline in the rate of accumulation in the durable sector affected the others sectors in 1973... (Mello and Belluzzo, 1977, p. 25.)

Tavares explains the deceleration as

The study carried on by FINEP indicates an acceleration in the industrial rate of capital accumulation in all sectors from 1970 to 1973, and that resulted in high rates of growth in the capital goods sector followed by an increase (although at less speed) in the imports of capital goods. But the average real rate of growth of production during the period surmounted slightly the global rate of accumulation of the new productive capacity. That is to say, it has produced a dynamic intra-industry equilibrium that is undone in 1973, when the investment rate accelerates more. (Tavares, 1978, p. 89.)

It should be noticed also that this quite ingenious interpretation is a modified version of the theory of crisis provoked by the unbalance between the productive sectors, leading to problems of scarcity and excess of productive capacity.

9 - According to Mello and Belluzzo:

To carry on projects in the basic industry (siderurgy, great structures, etc...) a big concentration of capital would be necessary besides great amounts of foreign investment. In relation to the first point, it should be noticed the inefficiency of the private financial system that was adjusted to follow and support the development of the durable industry. There was still the alternative of concentrating resources through the public financial system and put them at disposition of the firms in the basic industry. This alternative was put on the Second Development Plan, but it failed. (Mello and Belluzzo, 1977, p. 24.)

10 - See also Lessa, 1978.

11 - The concept of leadership, according to Tavares, is given by

...the dynamic effects that a great amount of investments carried over a small number of sectors can have in terms of reaction over its own rate of intra-sectoral expansion of the industry and of the widening of the productive base. (Tavares, 1978, p. 70.)

12 - This interpretation compares the international situation during the seventies with the fifties. According to Tavares,

...the interest of the private multinational enterprises prevails in the rules of external financing. The break in the negotiations with the IMF and the BIRD during the 1959-61 period did not determine any change in the inflow of foreign investment and private loans. Only the threat of a change in the rules of the game in relation to the foreign capital (and not only the economic crisis of 1963), determined an interruption in the absorption of foreign capital and an increase in the outflow of capital in an amount superior to the inversion of profits. It stopped also the negotiations to refinancing the external debt that had started again in 1961-2. (Tavares, 1978, pp. 124-5.)

13 - To understand why this weight is relatively small, it is necessary to consider that Brazil is a late comer in the industrialized world, that is to say, the industrialization process in Brazil started when the rest of the world had already passed its competitive phase and was in its monopolistic phase.

The essential aspect of this process [of concentration of capital] is the formation of a productive base (capital goods sector) considering a technically advanced profile guaranteeing physical autonomy to the capital accumulation, and this is reached through a quick centralization of capital. (Coutinho and Reichstul, 1977, p. 57.)

In the Brazilian case, the development of this centralization process faced strong difficulties as a consequence of the links of the private bank system and the commercial capital with the export sector. So,

... the investment in basic industries represented a permanent problem to the industrial development of Brazil since the thirties, because of the nature of these investments, the size of the scale of production and the interdependence among the sectors, which required the concentration of great sums of capital to acquire the technology in a context of social capitalist formation still being generated. (ibid., 1977, p. 61.)

It is in the expansive phase of 1956-62 that the capital goods sector started to be built, but it had a dimension that was not enough to allow for "...the movement of the economy to be endogenous."(id., p. 67.)

14 - This point is contested by Bonelli and Facanha (1978) when they say
...the capital goods demand is the result of the aggregate demand and so in the long run it cannot perform the role that sometimes is attributed to it that is to accelerate the expansion of the Brazilian economy. (Bonelli and Facanha, 1978, p. 369.)

15 - Tavares describes how the system starts presenting problems:

Inflation as a mechanism of financing tend to exhaust its potentialities. Above

a certain level that will vary according to the defensive capacity of the economic and social sectors, the inflationary spiral starts to take the shape of chain-reaction, determined by the articulation of the expectations of all economic and social agents, which start to anticipate and forecast sympathetically the inflationary environment. (Tavares, 1973, p. 131.)

- 16 - ...between 1969 and 1975 the volume of borrowed capital passed from 45% to 57% of the total passive of the industrial sector. Decomposing this relation it is noticed that, during the same period, long term finance moved from 23% to 33% of the total borrowed capital. (Silva, 1979, p. 90.)

CHAPTER 2
THE BEHAVIOUR OF FIRMS IN A MONETARY ECONOMY I:
PRODUCTION AND PRICING DECISIONS

A. INTRODUCTION: A MONETARY PRODUCTION ECONOMY

In a 1938 letter to Harrod, Keynes stressed the point "about economics being a moral science". For Keynes, this meant that economics should deal with "introspection, values, ..., motives, expectations, psychological uncertainties." In a very expressive analogy with physics, Keynes added:

It is as though the fall of the apple to the ground depended on the apple's motives, or whether it is worth while falling to the ground, and whether the ground wanted the apple to fall, and on mistaken calculations on the part of the apple as to how far it was from the centre of the earth. (Keynes, 1973, vol. 14, p. 300.)

Many decades later, Sir John Hicks stated, "Economics is specially concerned with the consequences that follow from decisions" (Hicks, 1979, p. 5). Most economic theories, however, do not allow any space for the study of decision in a substantive sense. They deal with what Shackle called "engine":

a structure of precise design and dimensions, whose movements, that is, the succession of states it will be in at a succession of dates, if started off from a given state with a push of given strength, are determined by that structure. (Shackle, 1965, pp. 62-3.)

Here is not the place to develop the methodological debate on the nature of uncertainty and the freedom of economic agents from behavioural iron-laws. For our present purpose, one could be satisfied to stress the deeply unstable nature of the Brazilian economy since the 1960's to point out that under rapidly changing circumstances, agents are burdened with increased uncertainties, and are led to take decisions based on little or no objective information.

An important distinguishing feature of a monetary economy is, precisely, the substantive role given to decision-making under fundamental (non-probabilistic)

uncertainty. In this economy, decisions informed by uncertain expectations are causes of changes and not just passive transmission belts, transporting commands from environment data to individual agents. In a modern monetary economy, moreover, decisions made by entrepreneurs or firms, those who organize and carry on productive and trade activities, are strategically important to the determination of its dynamics. For this reason we shall take the behaviour of firms as the starting point of this study.

But a firm does not exist in a vacuum. In order to discuss the behaviour of the firm, we shall first define the main features of the environment where the firm works. Our starting point is the concept of a monetary economy as proposed by Keynes.¹

A monetary economy is not just an economy where money is used. Keynes defined, for instance, a neutral economy as one:

in which the factors are hired by entrepreneurs for money but where there is a mechanism of some kind to ensure that the exchange value of the money incomes of the factors is always equal in the aggregate to the proportion of current output which would have been the factor's share in a co-operative economy,... (Keynes, 1979, vol. 29, p. 78, his emphasis.)

In a monetary (entrepreneur) economy,² in contrast, "the entrepreneurs hire the factors for money but without such a mechanism as the above." (ibid., p. 78.) These economies are inclined to suffer from fluctuations in effective demand (ibid., p. 80) because agents may decide to hold money instead of buying goods. This happens because:

- a. the future is uncertain, and agents enter into forward money contractual commitments to try to control it in some degree

- b. a system of contractual commitments requires the existence of a standard measure for accepted obligations (money-of-account), and so, as stated by Keynes,

...the fact that contracts are fixed, and wages are usually somewhat stable, in terms of money unquestionably plays a large part in attracting to money so high a liquidity-premium. The convenience of holding assets in the same

standard as that in which future liabilities may fall due and in a standard in terms of which the future cost of living is expected to be relatively stable, is obvious. (Keynes, 1936, pp. 236-7.)³

c. therefore, "the possession of actual money lulls our disquietude" (Keynes, 1973, vol. 14, p. 116.),

.... the money in terms of which the factors of production are remunerated will "keep" more readily than the output which they are being remunerated to produce, so that the need of entrepreneurs to sell, if they are to avoid a running loss is more pressing than the need of the recipients of income to spend. This is the case because it is a characteristic of finished goods, which are neither consumed nor used but carried in stock, that they incur substantial carrying charges for storage, risk and deterioration, so that they are yielding a negative return for so long as they are held; whereas such expenses are reduced to a minimum approaching zero in the case of money. (Keynes, 1979, vol. 29, p. 86.)

d. And finally:

It is of the essence of an entrepreneur economy that the thing (or things) in terms of which the factors of production are rewarded can be spent on something which is not current output to the production of which current output cannot be diverted (except on a limited scale), and the exchange value of which is not fixed in terms of an article of current output to which production can be diverted without limit. (ibid., p. 85.)

As a consequence, aggregate demand may fall short of potential aggregate supply because part of it may be "deviated" to irreproducible money. In other words, aggregate demand may be "deficient". A monetary economy is characterized by production being carried out with the aim of making money profits:

An entrepreneur is interested, not in the amount of product, but in the amount of money which will fall to his share. He will increase his output if by so doing he expects to increase his money profit, even though this profit represents a smaller quantity of product than before.

The explanation of this is evident. The employment of factors of production to increase output involves the entrepreneur in the disbursement, not of product, but of money. (Keynes, 1979, vol. 29, p. 82, his emphasis.)

Two assumptions are involved here: one is the special role entrepreneurs play in a monetary economy, the other is that money is not neutral.

Under the assumption that decisions about production will only be made if a money profit is expected,⁴ the behaviour of a capitalist firm is an important element in explaining macroeconomic movements of the economy. This importance is increased when we emphasize another assumption of the concept of monetary economy, that is, that decisions are made under uncertainty.

Uncertainty and Money

By uncertainty it is understood that the future is unknown and unknowable. Rational agents have to imagine scenarios, choose one of them and act accordingly. Once a plan is implemented, it cannot be costlessly reversed. As a consequence, a decision to produce and to invest embodies a speculative feature because production takes time.

As Keynes put it

With the development of international trade, involving great distances between the place of original production and the place of final consumption, with the increased complication of the technical process of manufacture, and with the seasons governing the date of supply of farm products, there must be a considerable interval of time between the dates when effort is expended and the date when the commodity finally yields up its usefulness. During this interval the business world is entering into liabilities in terms of money - borrowing money and paying out in money for wages and other expenses of production - in the expectation of recouping this outlay by disposing of the product for money at a later date. That is to say, the business world as a whole must always be in a position where it stands to gain by a rise of price and to lose by a fall of price. Whether it likes it or not, the technique of production under a regime of money- contract forces the business world always to carry a big speculative position; and if they are reluctant to carry this position, the productive process must be brought to a standstill. (Keynes, 1981, vol. 19, pp. 113-4, his emphasis.)

In decisions where the commitment of resources for a long period of time is involved, expectations about the unknown future are the main or the only guide. Under this view, one cannot expect that the firm will follow a unique path of growth determined

by the amount and quality of resources under its control, but its evolution over time will reflect decisions and evaluations made under uncertainty. Decisions made today are based on expectations about the future and rely on the inherited resources from the past.⁵ If plans are implemented on the basis of those expectations, their adequacy will only show up in the future.

In the concept of monetary economy, the emphasis is laid on how the firm perceives its environment and how it reacts to changes in it. The rationality of the behaviour of the firm in this case will be subordinated to the personal view of the entrepreneur who is responsible for decisions concerning its development. In a word, in a monetary economy a relevant issue is to discuss how the firm plans its strategy of growth in historical time.

Since uncertainty is considered, another feature to distinguish the concept of a monetary economy is the role played by money. Money in Keynes's theory is not only used "for purposes of a transitory convenience" (Keynes, 1979, vol. 29, p. 67) but, being the most liquid asset, it can be desired by itself. According to the definition of uncertainty,⁶ when future expectations are pessimistic, the desire for liquidity is increased, implying that production factors can rest idle.⁷

In a monetary economy the growth of the firm involves two sorts of decisions. One is when and how much to invest in fixed assets, the other one is how to finance (how much funds will be generated internally and how much will be obtainable externally) the investment. The first set of decisions (that depends on the strategy set by the firm) depends on how entrepreneurs see the future of business; the second set of decisions depends also on how the firm interacts with other economic agents.

The study of the behaviour of the firm in a monetary economy is based on the assumption that the firm will maximize its growth rate (Penrose, 1980), based on the expectations of entrepreneurs about the future. As the future is uncertain, money is the safest asset to hold when expectations become pessimistic. An increase in the degree of uncertainty means that liquidity will be desired, and so expenditures on less liquid assets, such as fixed capital assets, may be postponed. (Cf. Keynes, 1936, pp. 160-1.)

Considering this framework, an adequate theory of the behaviour of the firm is necessary, as the aggregate result of individual decisions made under uncertainty explains the global movements of the economy. In what follows, we will first discuss the firm operating in a non-inflationary economy. Our interest here is to characterize its behaviour under uncertainty, and we will be dealing with its decisions on pricing, investment and finance in this and in the next chapter. Afterwards we will discuss how its behaviour changes in an environment of price instability, as inflation increases uncertainty to the economy.

B. THE FIRM IN A NON-INFLATIONARY ECONOMY

In our approach, " [t]he concept of the firm is that of a centre of policy-making, of decision or policy-revision, and of management or policy execution." (Shackle, 1970, p. 20.) The main objective of the firm is to produce in order to increase its money profits, increasing its potential growth rate.

In a post Keynesian view, the firm is approached as an institution that controls productive assets and which, in order to bring them into operation or to expand its productive capacity, can issue claims to absorb resources from the community. This institution thus has a double feature - it not only transforms real resources, but also deals with financial resources. This dual characteristic of the firm is of great importance in the study of its behaviour because it is the efficient administration of both aspects that assures its long run survival. The aim of this institution is to survive which, in a competitive world, means to grow and to expand.

Defining the firm in this way implies that its interaction with the external environment in its many aspects should be the main focus of attention if we are to describe its actual, ex-post path of growth. The motivation of the firm is to increase its long term profits and its financial and investment decisions will be taken to achieve this aim.

This kind of assumption is useful because it allows us to consider a firm operating in several markets, that is, a multiplant, diversified firm.⁸ It also allows us to conceive the firm as an institution that allocates its funds between productive assets and

financial assets and absorbs funds from other agents. As we are dealing with firms operating in modern capitalist economies endowed with sophisticated financial institutions and markets, the diversified application of resources in the short run seems to be a reasonable assumption. However, we assume that productive activities and investment in activities that sustain market shares in an imperfectly competitive world (such as investment in advertising, product differentiation and so on) are the main concerns of the firm.

In a world where time is explicitly considered, decisions are made under uncertain conditions, and under uncertainty the possibility that mistakes will occur is taken into account. This means that historical, irreversible time is being considered. Past actions cannot be changed and present decisions and future courses of action are conditioned by these actions.

The implementation of economic decisions must follow a given sequence of events, because productive activity is a sequence of time-ordered processes which takes time to unfold. So, under uncertainty, decisions are taken involving the commitment of resources through time, and no result can be known beforehand. When views about the present and the future change, they may lead to a change of behaviour, whose speed and success are conditioned by the past commitments.

In face of these possible commitments in an uncertain world, money plays a special role as an instrument postponing the commitment of resources in production and investment in fixed assets, thereby affecting production and employment. As Keynes put it in the introduction to the General Theory: "A monetary economy, we shall find, is essentially one in which changing views about the future are capable of influencing the quantity of employment and not merely its direction" (Keynes, 1936, p. vii).

Despite its deleterious effects, however, uncertainty does not lead modern economies to a standstill. In the real world, some institutions are created to work towards decreasing the degree of uncertainty and so stimulating production and growth. In a monetary economy, the main instrument reducing uncertainty in production is the existence of money contracts that fix, for a period of time, production costs.

Money Contracts

The distinguishing feature of production in a monetary economy is the existence of a network of forward money contracts sustaining activity (Davidson, 1978). This is so because the firm, as a productive unit, has to acquire raw materials and basic inputs in order to begin its productive process. In the same way, it employs workers and advances payment. But since production takes time, entrepreneurs commit themselves with debts before knowing their receipts. Firms buy inputs, raw materials and labour on the basis of forward money contracts, which allow them to know the amount of money paid or to be paid at a future date as production expenses beforehand. So, the existence of monetary contracts on the side of the production costs gives a certain stability to the productive process and the longer the terms of the contract, the greater will be the stability of the productive process related to cost.⁹

The way in which payments of debts and inflows of receipts are coordinated will determine the efficiency of the productive process itself. Contracts, according to Davidson (1978), can be classified in two elementary categories: forward and spot. The difference between them is their duration. In forward contracts, prices and payments take place in the future, and in spot contracts the transaction is carried on without any lag of time. In a world where the future is unknown, forward contracts are the most important institution to help entrepreneurs to plan the firm's strategy.¹⁰ Among forward contracts money wage contracts are the most relevant to guarantee some cost stability.

As Davidson and Kregel put it:

Since production takes time, entrepreneurs are always entering into forward contracts to assure the future costs of inputs, and in a non integrated production chain, into sales contracts to assure prices and revenues in the future. In fact, one may look upon the private institution of contracts as the way free enterprise markets attempt to assure wage and price controls. (Davidson and Kregel, 1980, p. 143.)

Contracts also reduce uncertainty in a monetary economy because they are spread throughout the economy linking economic agents. The existence of contracts sets some

"rules of the game" and, as far as they are operational, they provide "a foundation for a conventional belief in the stability of the state of expectations." (ibid., p. 142.) Also, contracts are expected to last through time and so they reinforce future expectations and "views" of the past.

Finally, as a consequence of the general acceptability of money contracts, risks are shared by economic agents, also contributing to dilute uncertainty.

Yet, however much money contracts can reduce uncertainty for the firm, they cannot eliminate it as it is on the side of demand that the unknown mainly lies. Once costs are known, entrepreneurs must decide how much to produce and how much to charge for their production according to their expectations about the behaviour of demand. Expectations and evaluations thus play an important role in decisions about production.

Expectations and Decisions

In a monetary economy, entrepreneurs have to rely heavily on their expectations about the future behaviour of demand because information from the market cannot be complete.¹¹ Kregel points out that the reason for this is that "producers can't know what consumers will want to buy in the future because consumers themselves don't know" (Kregel, 1980, p. 37).¹² So there cannot be future markets for consumer goods. Spot markets will provide information to producers only when consumption expenditures take place and so entrepreneurs, before putting their goods on sale, can only estimate how much of it will be sold.

This emphasis on the role of expectations as distinct from the actual environment as such is considered by Penrose, when she says:

Although the "objective" productive opportunity of a firm is limited by what the firm is able to accomplish the "subjective" productive opportunity is a question of what it thinks it can accomplish. "Expectations" and not "objective facts" are the immediate determinants of a firm's behaviour...(Penrose, 1980, p. 41.)

In another passage:

The environment has been treated [in her study] not as an objective "fact" but rather as an "image" in the entrepreneur's mind; the justification for this procedure is the assumption that it is not the environment "as such", but rather the environment as the entrepreneur sees it, that is relevant for his actions. (ibid., p. 215.)

So, in this sense, the ability of the "managerial team" to take advantage of the perceived productive opportunities offered by the external environment is a crucial element responsible for the development of the firm. In Penrose's view, the experience and personal knowledge of the ruling team are seen as part of the internal resources firms can rely on.

Short and Long Period Expectations

So far we have mentioned expectations without making any distinction between short period and long period expectations. According to Keynes (1936, chapter 5), short period expectations are concerned with the price to be charged when production is out in the market. Before the productive process begins, entrepreneurs have an expectation about how much consumers will be willing to pay for their products. Long period expectations are concerned with the returns that are expected when additional capacity is being established.¹³

Keynes's definition of short and long term expectations were centered around price-expectations because of his implicit competitive assumption. A more general formulation would consider expectations as to the demand curve for the good and not only of demand price.

Keynes did not establish a stable relationship between facts and the state of expectation. Expectations - especially long term expectations - in his view are largely an autonomous variable, being responsible for changes in the economic system. Short period expectations play a more passive role in Keynes's framework since they guide actions based on habits and conventional behaviour.¹⁴

An important, but generally overlooked, variable to be considered when discussing expectations in Keynes is the state of confidence. As Keynes put it: "It would be foolish, in forming our expectations, to attach great weight to matters which are very much uncertain" (Keynes, 1936, p. 148), and so it is the degree of confidence in expectations that also determines the effort that will be made to implement decisions to produce and invest.

There are several ways in which the relation between short and long period expectations can be studied. For our particular purpose - the analysis of the growth of the firm under uncertainty - we are interested in discussing how funds are obtained in the short term to finance investment plans.

Funds for investment can be obtained internally to the firm or by appealing to capital markets. Internal funds are equal to retained profits, which depend, given costs, on the revenues earned by the firm. The firm has, then, to make decisions as to the level of output to produce and, if competition is not perfect, the price to charge. We shall discuss first how production decisions are made and in the next chapter how investment decisions are carried over.

C. PRODUCTION DECISIONS

Decisions about production involve the consideration of short periods of time¹⁵ and so entrepreneurs make these decisions on the basis of their short term market expectations.

In Keynes's General Theory, in a competitive framework entrepreneurs decide about

a certain amount to produce and if expectations are not fulfilled prices will change in order to adjust supply and demand (Cf. Amadeo, 1986). According to Keynes:

It follows that in a given situation of technique, resources and factor cost per unit of employment, the amount of employment, both in each individual firm and industry in the aggregate, depends on the amount of the proceeds which the entrepreneurs expect to receive from the corresponding output. For entrepreneurs will endeavour to fix the amount of employment at the level which they expect to maximise the excess of the proceeds over the factor cost. (Keynes, 1936, pp. 24-5.)

The process of adjustment between planned supply and realized demand involves changes in the level of working capital. Keynes defines working capital as:

I define working capital as being the aggregate of goods (and the cost of working capital as the cost of the aggregate of goods) in course of production, manufacture, transport and retailing, including such minimum stocks, whether of raw materials or of finished products, as are required to avoid risks of interruption of process or to tide over seasonal irregularities (e.g. intervals between harvests or fluctuations of individual harvests about the mean). (Keynes, 1971, vol. 6, pp. 104-5, his emphasis.)

It is clear then that an increase in production will mean an increase in investment in working capital and vice-versa. If demand does not behave as expected, the investment in working capital will offset its changes at first and amplify them afterwards.

Besides defining working capital, Keynes defines liquid capital which is the surplus stock over the working capital. Actually, it is the liquid capital which fluctuates when demand expectations are disappointed. This means that before prices change to adjust supply and demand, the level of working capital (including liquid capital) changes and only in the following production period will decisions about the amount to be supplied be reviewed.

When stocks are in excess, they put pressure on prices to fall and the reason for that is the carrying cost of keeping stocks above the desired level. According to Keynes, excess stocks imply that forward prices must be higher than spot prices to cover these costs. If forward prices are given (e.g., anchored to the flow supply price of the good),

the spot price has to fall to induce the curtailment of production. In the same way, if stocks are less than desired, the spot price must be increased to stimulate an increase in production. In a normal situation, spot prices are higher than forward price (and that is called backwardation) and the reason is that the former "includes remuneration for the risk of price fluctuations during the period of production, whilst the forward price excludes it." (ibid., p. 128.)

So, the level of stocks will change when expectations about the future behaviour of prices in relation to present prices change. When an inflationary process is under way stocks will be accumulated as the expectation is that future prices will be higher, stimulating speculative retention of stocks.

To sum up, for Keynes, production decisions are made and prices are expected to fluctuate to adequate supply and demand. When miscalculations occur, changes in stocks affect prices and changes in prices affect profits and so expectations. It is implicitly assumed that markets operate in a regime of perfect competition. When we consider, however, markets of imperfect competition, then the best assumption to be made may be that prices are given and output fluctuates.

D. PRICING DECISIONS

In modern post Keynesian theory, pricing decisions are linked to investment. This is so because the resources for the expansion of the firm must be met through profits - one of the components of price - which are expected to finance that part of the firm's investment that is internally funded and also to secure the means of discharging debts contracted of that part which is externally funded. Short run profits are also used to repay debts which may have been incurred to finance long term investment. As Minsky points out:

Current profits provide the cash flow that enable business to meet financial commitments that are embodied in debt even as expected profits determine the ability of business to issue debt to both finance expenditures and roll over maturing debt. (Minsky, 1982, p. xx.)

One criterion that can be used to characterize pricing behaviour is given by Davidson (1978). Davidson identifies two types of pricing behaviour according to the degree of information entrepreneurs have about the market. When entrepreneurs produce in anticipation of the market, which means that the level of demand is not known beforehand, it may be costly for the firm to try to find out which combination of volume of production and unit price will maximize its revenue. In such cases entrepreneurs may choose a "target return on standard volume" as a pricing procedure; that is mark-up pricing. In cases where the firm "produces to order", a profit maximizing behaviour may be a more rational procedure as revenues can be estimated more accurately. Both kinds of behaviour are unlikely to occur in their pure form in the real world. As Davidson points out:

...entrepreneurs operate in a shadowy world of intuition, order taking, bunch processing, etc. and are likely to exhibit aspects of both types of behaviour - although as a stylised fact - the neo-keynesian mode [that is mark-up pricing] appears more realistic" (Davidson, 1978, p. 39N.)

If we accept the generality of the mark-up method to obtain a "target return on standard volume", the question then arises of what determines this target. In the recent literature about pricing models, increasing emphasis is being given to the necessity of funds for expansion as the main motivation of the firm in setting its price (see Harcourt and Kenyon, 1976). This means that the firm will, through pricing, seek to increase its cash flow to support its investment goals. According to Eichner, for instance,

...a change in the industry price level is held to be a function, cost remaining constant, of a change in the rate of growth of investment relative to the rate of growth of internal funds generation. (Eichner, 1976, p. 2.)

In this sense, a pricing decision embodies the decision about the rate at which the firm will grow in the long run. We shall assume that the firm will try to grow at the highest rate possible or, at least, that it will try to maintain its participation in the market.

We can state more clearly the link between pricing and finance. In the analytical perspective which we are adopting here, the price set by the firm is identified as a

strategic price in opposition to the idea of a competitive price (Shapiro, 1981). The idea of strategic price incorporates the financing aspect of price and lays emphasis on the limits of setting higher prices in competitive markets. Entrepreneurs would like to charge higher prices in order to finance their accumulation; however, the higher the current price, the lower will barriers to entry be in their markets. In a dynamic setting, this is the dilemma which entrepreneurs must face. Eichner establishes the following comparison between increasing the price and the risk it involves:

Whether additional internal funds are needed will depend on the prospective return from the investment of those funds relative to the real costs incurred should the industry price be increased. (Eichner, 1976, p. 4.)¹⁶

According to Sylos-Labini (1969), entrepreneurs when setting prices are more influenced by the reactions of their rivals than by the behaviour of consumers. In the market, firms that are price leaders should not raise their prices to high levels, even if the demand curve permits it (inelastic demand), because this would induce new firms to enter, or existing firms to expand capacity. The dilemma here is restated in terms of the relatively limited range of decisions leading firms have when fixing their prices. This dilemma can also be put in terms of the "implicit" cost firms incur when choosing to increase the rate of internal accumulation through pricing.¹⁷

The pricing decision will vary also according to the degree of maturity of the market. In mature markets, a small number of firms dominate, and their productive power exceeds the size or the capacity of the market to grow. This is a consequence of competition which has eliminated marginal firms in a process characterised by the growth of productivity and the increase in productive capacity. Once this phase is over, the competitive aspect of price is suppressed as the logic of interfirm competition assumes other forms (such as product differentiation) and the surviving firms can take advantage of their position. As stated by Ong :

[the firm] now enjoys a higher more secure rate of return, reaping productivity gains through higher mark ups. Its expandable supply of funds underwrites further improvement of its "internal resources", which may result in the destabilization of the mature industry itself, the invasion of other markets, or the development of new industries. (Ong, 1981, p. 113.)

Target pricing policy is the typical behaviour for firms operating in such markets and, according to Ong, this means that there is among firms a sympathetic move when fixing their prices. The basis of this behaviour is the "common recognition" of the necessity to increase internal funds in order to finance product development and of the capacity of the market to absorb an increase in price without damaging sales.

In spite of the stronger financial position that mature markets offer to the firm, the slower growth of these markets limits the growth of the firm.¹⁸ Diversification is the most common way firms grow and, in our context, this means that they will allocate their internal resources from mature markets to new markets, where price competition plays a more important role.¹⁹

In new, emergent markets, firms which aim to conquer the market will attempt to fix the price of a new commodity in such a way that their rivals are excluded in the long run (the exclusion price in Sylos-Labini's terminology). So, as Levine notes, the aim of the firm is not to maximize profit over current production, but to "build a market position which can be realized as a stream of profit in the future." (Levine, 1981, p. 186.) In an initial phase of investment, the new commodity may represent a net drain of resources for the firm as its cost of production may exceed its revenues. But the aim is to change this situation as soon as possible and to transform the price of the new commodity into a price which fulfils both conditions of "growth financing" and "market development", to use Levine's terminology.

Besides the internal accumulation of funds through pricing to finance investment plans, the firm can obtain external resources to complement its internal funds. The extent to which the firm will combine the alternative sources of finance will depend on its evaluations of the costs incurred with each source. We have already seen that internal funds obtained through pricing present a risk for the firm of losing market share. But besides its own revenues the firm may obtain funds through borrowing and issuing shares.

Borrowing means that the firm incurs debt commitments, running the risk of becoming insolvent. The explicit cost of this choice is the interest rate. The issuing of shares, on

the other hand, implies the commitment to pay dividends and implicitly carries the risk of the managerial team losing control of the firm.

To sum up, the firm, seen as a whole, will act in several markets with different degrees of maturity, and its success will depend on how efficiently it takes advantage of the conditions of each market to strengthen its financial position and to preserve or increase its market dominance.²⁰ Choices and decisions are unavoidable because in order to survive in the long run, the firm must expand its capacity.

E. A SUMMING UP

Keynes's concept of a monetary production economy is our starting point to describe the environment where decisions are made. The main feature of Keynes's concept is his emphasis on uncertainty and on the role of money. According to Kregel,

...Keynes' explanation of the "rational" response to uncertainty is the use of money as a store of value, the price of money being determined by the effect of uncertainty on liquidity preference and the decisions to hold positions in all other goods then determining their prices so as to bring their rates of return into equality with the money rate of interest. (Kregel, 1987, p. 520.)

In an environment where decisions are made under uncertainty, expectations are the only guide to decisions. Short and long period expectations are distinguished and the latter are assumed to be autonomous in relation to the former. Short period expectations guide production and pricing decisions, long period expectations guide investment decisions.

The firm, as a unit of decision making, is defined as an institution with double feature: to transform real resources and to deal with financial resources. In a competitive environment the main goal of the firm is to expand in order to survive in the long run.

Internal accumulation of funds is linked, in the post Keynesian view, with pricing decisions. Mark-up pricing is assumed to be the most common practice in modern capitalist economies. Price leaders will set their prices according to the degree of maturity of their markets and the reactions of the rivals.

NOTES TO CHAPTER 2

- 1 - The introduction of a money, in terms of which loans and contracts with a time element can be expressed, is what really changes the economic status of a primitive society. (Keynes, 1982, vol. 28, p. 255, our emphasis.)

A modern economy is based on profits. A stable and reliable money-of-account is a condition for the possibility of rational calculation by private agents in such an economy.

- 2 - Keynes developed his concept of monetary economy between the publication of A Treatise on Money and The General Theory. It has received many names such as entrepreneur economy, monetary production economy and, in the GT, monetary economy. See Collected Writings of John Maynard Keynes, vols. 13, 14, and 29.

- 3 - According to Keynes,

Money of account, namely that in which debts and prices and general purchasing power are expressed, is the primary concept of a theory of money...Money itself, namely that by delivery of which debt contracts and price contracts are discharged, and in the shape of which a store of general purchasing power is held, derives its character from its relationship to the money of account, since the debts and prices must first have been expressed in terms of the latter. (Keynes, 1971, vol. 6, p. 1, his emphasis.)

- 4 - In Keynes's words,

The firm is dealing throughout in terms of sums of money. It has no object in the world except to end up with more money than it started with. That is the essential characteristic of an entrepreneur economy. (Keynes, 1979, vol. 29, p.89.)

- 5 - On that matter, Shackle comments:

Keynes's work has no place for any visible, explicit and precise determination of the present by the past. The present has a legacy from the past, in the form of a given assemblage of equipment in the broadest sense, and a given assemblage of people with various skills and tastes and various shares in the total property of the society. Above all, however, these people have expectations whose fragmentary basis of news shifts and dissolves from hour to hour and allows their calculations only the most ephemeral validity. It is the variously imagined and enigmatic future which governs the "present"

momentary equilibrium. (Shackle, 1965, pp. 185-6, his emphasis.)

6 - As Keynes defines uncertainty:

By "uncertain" knowledge, let me explain, I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty, nor is the prospect of a victory bond being drawn. Or, again, the expectation of life is only slightly uncertain. The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention, or the position of private wealth owners in the social system in 1970. About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know. (Keynes, 1973, vol. 14, pp. 113-4.)

7 - According to Dillard :

Money affects production directly because, if businessmen cannot convert current real output into money, the means of production will be withheld and wage earners will suffer unemployment. (Dillard, 1984, p. 423.)

8 - We could at this point mention that strategy is taken to refer not only to strictly productive activities but also to administrative methods. Chandler (1962), for instance, describes that in a multiplant diversified firm some decisions are decentralized while others are undertaken by a central administration. His point is that "structure follows strategy", meaning that the growth path of the firm creates a unique organizational structure which is established by its entrepreneurs to cope with the administrative problems presented by expansion. In the long run, the administrative structure of the firm is a result of the different strategies adopted. Chandler exemplifies the transformations required in the structure of the firm according to some strategies as follows:

Expansion of volume led to the creation of an administrative office to handle one function in one local area. Growth through geographical dispersion brought the need for a departmental structure and headquarters to administer several local field units. The decision to expand into new types of functions called for the building of a central office and a multidepartmental structure, while the developing of new lines of products or continued growth on a national or international scale brought the formation of the multidivisional structure with a general office to administer the different divisions. (Chandler, 1962, p. 14, his emphasis.)

Penrose also shares this idea:

....growth is not for long, if ever, simply a question of producing more of the

same product on a larger scale; it involves innovation, changing techniques of distribution, and changing organization of production and management. (Penrose, 1980, p. 161.)

For simplification in our work we shall assume that all decisions will be undertaken by a single administrative unit as this assumption does not interfere with our discussion.

9 - As Davidson and Kregel put it:

Serial forward contracting through time is the most important institution yet devised for dealing with an uncertain future in a market economy. These contracts permit time consuming economic activities to be undertaken even though all economic agents recognize that errors and inconsistencies are human frailties that no market mechanism can completely abolish. (Davidson and Kregel, 1980, p. 138.)

10 - Except for production to order, however, which applies only to a relatively small group of products of final demand, mainly capital goods.

11 - For an interesting discussion about decision making under uncertainty in Keynes, see Carvalho (1988).

12 - In Keynes's words:

Similarly it is natural to suppose that the act of an individual, by which he enriches himself without apparently taking anything from anyone else, must also enrich the community as a whole ...

Those who think in this way are deceived nevertheless, by an optical illusion, which makes two essentially different activities appear to be the same. They are fallaciously supposing that there is a nexus which unites decisions to abstain from present consumption with decisions to provide for future consumption; whereas the motives which determine the latter are not linked, in any simple way with the motives which determine the former. (Keynes, 1936, pp. 20-1.)

13 - Keynes's definition of the marginal efficiency of capital, for instance, also emphasizes the role of expectations:

The reader should note that the marginal efficiency of capital is here defined in terms of the expectation of yield and of the current supply price of the capital-asset. It depends on the rate of return expected to be obtainable on money if it were invested in a newly produced asset, not on the historical result of what an investment has yielded on its original cost if we look back on its

record after its life is over. (Keynes, 1936, p. 136, his emphasis.)

14 - We can compare the distinction between long and short period expectations with the difference established by Kornai between standard and fundamental decision processes:

Standard decision processes are repeated periodically or almost periodically, employ algorithms composed of a few simple steps and require little information. Fundamental decision processes do not occur regularly, involve algorithms composed of many and frequently complicated steps, and require a great deal of information. (Kornai, 1971, p. 117.)

15 - In chapter 5 of his General Theory Keynes employs the term daily to represent short period of time. As he said :

Daily here stands for the shortest interval after which the firm is free to revise its decision as to how much employment to offer. It is, so to speak, the minimum effective unit of economic time. (Keynes, 1936, p. 47, his emphasis.)

16 - Eichner quotes three sources of problems which will restrain the pricing power of the megacorp: the substitution effect, the entry factor and government intervention (Eichner, 1976, chapter 3).

17 - Non-leader firms are supposed to produce with higher costs than leader firms, and once the price is set by leader firms, their profit margins will depend on the price behaviour of the leaders. Sylos-Labini distinguishes two types of behaviour price leaders may follow: (a) - the price leader, in order to avoid the entrance of new firms in the market, may set an "exclusion price" which denies potential new entrants a minimum rate of profit or (b) - the price leader may set a price aiming to eliminate existing firms in the market. In this case, the "elimination price" would be set at a level below the average cost of the firm.

18 - The firm will maintain its participation in mature markets if it grows at the same rate of the market. If its rate of growth is greater, then its participation will increase. As Steindl (1976) points out, in this case, the firm's potential capacity for growth may increase because it dominates new techniques of production which allow it to reduce its costs in relation to its rivals. If this tendency is very pronounced, then an "absolute concentration" will occur as some smaller and less efficient firms will be eliminated. But if such technical innovation does not occur and if the firm refuses to adopt an aggressive policy to dominate the market, it must look for outlets elsewhere in order to continue growing.

19 - This does not mean that the firm, once established in a mature market will stop investing in it. To maintain its market position it is necessary to fully exploit its opportunities and in order to do this the firm must continue to invest in its development. The basis for entry of new competitors is the existence of opportunities that are not fully exploited.

20 - Depending on the degree of maturity of each market, changes in costs of production will have different impacts over the firm's receipts. In new emergent markets, where the position of the firm is not yet well established, an increase in costs may not be passed on via higher prices while in mature markets it will probably be. In case of a decrease in costs, firms seeking to develop their markets will probably use this opportunity to lower their prices to widen their market. In a mature market, the result could be the maintenance of price and consequently an increase in the profits of the firm.

CHAPTER 3
THE BEHAVIOUR OF FIRMS
IN A MONETARY PRODUCTION ECONOMY II: INVESTMENT DECISIONS

A. INTRODUCTION: MOTIVATION TO INVEST

A firm accumulates assets to increase its capacity to create and control wealth. To maximize its earning capabilities the firm will achieve a collection of assets, some of which are immaterial, like the "goodwill" of customers, the rest being objects that serve as tools for the firm's activities of production and distribution.

Keynesian theory gives much stress to decisions to accumulate fixed-capital assets, that is durable plant and equipment. The main feature of these assets is their long economic life, that allows them to survive many production periods. For this reason, the decision to purchase such kind of asset cannot be based just on expectation of gain in the immediate future. On the contrary, the decision to invest in fixed assets is based on long period expectations.¹

This starting point has two main implications in Keynes's investment theory: one is that personal interpretation predominates over current data when investment decisions are made, and the other is the independence of long period expectations from short period expectations, as assumed in the General Theory.

The first point is related to the role of the entrepreneur's choice in a monetary economy. Data about present conditions (or the past) may not be sufficient to determine future conditions if innovations of any kind are possible. In this case, the decision-maker has to imagine future possibilities in order to choose a plan. Imagination, by definition, is a personal attribute.

The second point is related to "the nature of long-term expectations that ... cannot be checked at short intervals in the light of realised results." (Keynes, 1936, p. 51.) So, Keynes's emphasis on the role of long term expectations in an uncertain world, means that they are not verifiable: "the factor of current long term expectations cannot be

even approximately eliminated or replaced by realised results." (ibid., p. 51.) In that sense, he attached more importance to the "state of confidence in long term expectations" as the relevant variable to sustain investment decisions, rather than to objective long period conditions, that are unknowable to the decision maker at the moment of decision. This emphasis, as mentioned in the latter chapter, is fundamental in Keynes's investment theory, and as we shall see, it leads to another relevant concept - the convention - which anchors some long term decisions.

The choice as to which type of investment available resources should be allocated (if in investments to increase productive capacity or product differentiation and so on) depends on the firm's evaluation of prospective yields. In an uncertain world the choice to invest resources in less liquid assets will show a high degree of confidence in the future and vice-versa. As money and financial assets in a monetary economy are viewed as assets that compete with fixed assets for the available resources, the timing of investment in capital assets will depend on the state of expectations. So, expectations about the profitability of investing in fixed assets and the preference for liquidity guide the implementation of investment plans.

Where and how to invest are crucial decisions for the future of the firm, and as the future is uncertain the outcome of an investment decision cannot be predicted with precision.² As Shackle describes,

The success of the investment may set the firm on the road to a vast expansion, or its failure may ruin the firm. These results are not reversible. The firm has a personal identity, large-scale events which happen to it are, from its viewpoint, each essentially unique. (Shackle, 1970, p. 109.)

The "managerial team" has a special role in the process of expansion, since it is responsible for the firm's growth path. Its capacity to operate in several markets and to accumulate financial resources to make investment plans possible defines the limits to the growth of the firm.³

The task of the "managerial team" when implementing investment plans involves the promotion of changes in the administrative structure of the firm that are required to

carry out these plans. The dimension of the challenge posed by investment decisions therefore involves not only dealing with uncertainties of the future, but also with the ability to organize the firm efficiently (Chandler, 1962).

The firm, given its inherited resources, will choose its growth path according to the way the external environment is perceived. It can either invest in its own market in order to maintain its position against competitive pressure, or it can invest in new markets through vertical integration or diversification of its line of production. The competitive pressure will in great part determine the choice of the investment plan.

In order to make explicit which variables are considered when investment decisions are undertaken, competitive pressure can be seen as a guidance to investment outlays. Which elements are taken into account when an investment plan is decided depends on the subjective view of the managerial team, and on what factors motivate investment.

According to Keynes (1936, chapter 12), investment in fixed assets is decided by comparing interest rates and a schedule of marginal efficiency of capital. The marginal efficiency of capital is a relation between the supply price of a fixed asset and its prospective yield. Prospective yields depend on expectations of returns and the stronger the degree of confidence sustaining those expectations, the greater the resources applied in fixed assets will be.

In chapter 11 of the General Theory, Keynes explains that investments are made until the point in which the marginal efficiency of capital becomes equal to the rate of interest.⁴

Now it is obvious that the actual rate of current investment will be pushed to the point where there is no longer any class of capital-asset which the marginal efficiency exceeds the current rate of interest. In other words, the rate of investment will be pushed to the point on the investment demand-schedule where the marginal efficiency of capital in general is equal to the market rate of interest. (Keynes. 1936, pp. 136-7.)

This interpretation suggests two alternative (but not excluding) ways of analysing the inducement to invest in fixed assets. One interpretation is that investment in fixed assets competes with investment in more liquid assets and so the expected rate of return of the former should be compared with the rate of return offered by other assets. Investment in fixed asset would be carried out if its expected rate of return proves to be greater than that of other assets.

Another interpretation is that if investment is to be debt financed, then the expected rate of return should be greater than, or at least equal to, the rate of interest due to be paid. These interpretations stress an important characteristics of Keynes's investment theory: the investment decision is an asset choice. In an uncertain world, it is the degree of confidence in long term expectations that guides an investment decision with long period of maturation. Also, the possibility of debt financing new investment, reinforces the interrelation between financial and "real" worlds, meaning that what happens in one affects the other.

Both the expectations of returns and the state of confidence are rather autonomous influences.⁵ Current events do not determine either one of them,⁶ however, short run occurrences may influence the implementation of long period decisions (see discussion below). Joan Robinson noted that as present conditions are not sufficient to determine investment decisions, specific strategies that will be adopted by economic agents in the short period will not be necessarily related to long period expected values:

Long-period changes are going on in short-period situations. Changes in output, employment and prices, taking place with a given stock of capital, are short-period changes; while changes in the stock of capital, the labour force and the techniques of production are long-period changes... A given short-period situation contains within itself a tendency to long-period change. (Robinson, 1969, p. 180.)

Besides expectations, other variables influence investment decisions such as the availability of resources to grow.

B. INTERNAL AND EXTERNAL RESOURCES

Following Penrose (1980), we shall point out two sources of internal resources which influence investment decisions in the expansion of productive capacity: internal savings and operational facilities acquired through the ordinary functioning of the firm.

Kalecki (1971, chapter 10), among other authors, regards gross savings of firms as being "closely related to "internal" accumulation of capital." (Kalecki, 1971, p. 111.)

In his words:

There will be a tendency to use these [internal] savings for investment and, in addition, investment may be financed by new outside funds on the strength of the accumulation of entrepreneurial capital. (ibid., p. 111.)

Additional to that, firms may diversify their production to enter new markets, that is to say, firms may expand their activities through diversification. Penrose suggests that idle resources within the firm provide strong incentives to expansion and diversification. In her view, it is not always possible for the firm to use all its resources to full capacity. On one hand, the resources the firm needs to produce are "a bundle of possible services" which, in general, "are only obtained in discrete amounts." (Penrose, 1980, p. 67.) As the firm will always try to use its resources in the most profitable way:

It follows, therefore, that as long as expansion can provide a way of using the services of its resources more profitably than they are being used, a firm has an incentive to expand or alternatively, so long as any resources are not used fully in current operations there is an incentive for a firm to find a way of using them more fully. (ibid., p. 67.)

On the other hand, as the firm employs a variety of indivisible resources:

...capable of rendering not only different amounts, but also different kinds of services, a combination that achieves the full utilisation of all of them may perform call for an output much larger and more varied than can be organized

by the firm in any given period of time. (ibid., p. 69, her emphasis.)

The conclusion is that the full use of resources may require some diversification of activities and Penrose recognizes that:

by-products and certain other types of potential joint-products have in fact provided an important basis for expansion for some firms, once the energies of management could be released from the task of expanding the firm's primary lines. (ibid.,p. 71.)

External resources influence investment decisions through changes in the degree of indebtedness of the firm. Steindl (1976), based on Kalecki's principle of increasing risk, assumes that "external savings" available to the firm will only be used to increase productive capacity if they can be combined with internal funds in a proportion acceptable to the firm. If this proportion is not considered "safe", even internal funds will not be used for investment of fixed assets.

The firm under continuous competitive pressure will always have an incentive to grow. In an economy working on a monetary contractual basis, the investment decision will involve two sorts of appraisals.

First, entrepreneurs, considering their inherited resources and their perception of the external environment, will make their investment plans based on long term expectations of profitable returns. The value of a long term expectation is independent of short term expectations, but falsification of short term expectations may reduce the confidence with which the long term expectation is held and result in some investment not being undertaken. Short term occurrences may then affect the rhythm in which investment is implemented, because they affect the liquidity position of the firm after it honours its existing liabilities.

Another way of establishing the distinction between short and long run expectations is comparing the decision making process of ergodic and non-ergodic phenomena. According to Davidson (1987), in the real world,

The problem facing every economic decision maker is to guess whether (a) the

phenomenon involved is currently being governed by distribution functions which are sufficiently time invariant as to be presumed ergodic - at least for the relevant future, or (b) nonergodic circumstances are involved.

In non-ergodic circumstances

the calculation of either time and/or space averages based on past data cannot provide a statistically reliable estimate of either (1) the current space average or (2) any time or space averages that will be observed over future calendar time.

In this sense, in non-ergodic systems there is no learning from experiences, and that is the case of investment decisions in illiquid assets. Once an investment plan in fixed capital is implemented, it cannot be costlessly reversed. Debts, however, have to be honoured anyway out of current cash flow. Thus the wisdom of an investment plan does have a connection with short period outcomes.¹

Second, as Steindl observes, the firm will choose a desirable degree of indebtedness which, in our view, will also be the result of the subjective view of the future. If expectations about the behaviour of demand for the new products being introduced are optimistic, then a greater degree of indebtedness will be accepted. The following discussion deals with this subject in greater detail.

C. THE ISSUANCE OF LIABILITIES

It is not only the overall indebtedness that counts. The firm must also ensure the contracted profiles of inflows and outflows of cash that are compatible in order to keep a desired level of liquidity. In this sense, the nature of the investments is important as well as the nature of its liabilities.

It is within this context that an investment decision should be considered as a portfolio choice. As we are assuming that investment decisions are taken based on entrepreneurs' long term expectations about an uncertain future, this implies that in the short run entrepreneurs may not always be interested in committing their financial

resources in productive activities. This is so because in the short run interruptions or delays in the implementation of investment plans might occur due to the cyclical recurrence of increased uncertainty. The existence of a sophisticated financial market in operation in the economy offers alternatives of financial investment which can divert funds from fixed assets into liquid assets.

On the other hand, the postponement allowed by financial investments may give the firm the interval of time necessary to rethink its plans and reorient its activities. Given the assumption that the firm is working in an environment where time is unidirectional (historical time), when the firm decides to implement an investment plan which had been postponed, the environment will have changed. But if the firm is to continue to exist as a productive firm, investment in productive activities cannot be postponed indefinitely.

Once we see investment in fixed assets as one of the options entrepreneurs have to accumulate wealth, short run interruptions and delays in investment plans (or the opposite, an acceleration and an increase in investment outlays, via disinvestment in liquid assets) are related to the degree of confidence entrepreneurs have in the decisions made in the past.

In an uncertain world, financing behaviour determines the timing of investment. In this context, the financial conditions that lead to an investment decision are the most relevant variable to be taken into account as they are the means through which investment plans become real. So, once we consider the necessity of external finance to complement internal funds, the external conditions in which the new money is borrowed can work either as a stimulus or disincentive to investment in fixed assets (see appendix).

D. BORROWING NEEDS

We turn now to the different alternatives available to the firm to finance its investment plans in production. The firm can ^{sell} all the resources it will need to implement the

investment project of investment or it can resort to external sources for these resources.

In the first case, the "accumulation strategy" will involve changing the composition of its portfolio assets through the allocation of resources from financial assets to the new project. The risk incurred by the firm with this type of financing is due to the fact that financial assets are subject to market vicissitudes. If the market value of its financial assets declines, the firm becomes more vulnerable as its expected cash flow may not be enough to meet debt commitments incurred in the past. Also it should be recalled that if the firm chooses to postpone investment because short run investment alternatives offer better returns, this may imply that the original plan of investment will never be implemented. The reason is that, as we have already seen above, the environment is changing all the time and this may lead firms to re-evaluate their past decisions.

The firm may also expect to meet part of its debt commitments with cash flow generated by the new project. As soon as units of fixed capital begin to operate, the firm thus will be able to rely on an additional source of income.

If the firm chooses to place new shares then it must consider the effect that this will have on the value of its shares. If the ratio of equity to capital is high an additional share issue may reduce the value of the securities. If, on the other hand, this ratio is low and the prospective yield of capital is high, then the market may well absorb the additional securities without a fall in its value. When the expected profitability of the new capital fails to meet expectations, the price of the share will move accordingly. The advantage to the firm of financing new capital in this way is that it can increase its "outside savings" without increasing its indebtedness. However, it makes the firm more vulnerable to the action of take-overs and presents a risk to the "managerial team" of losing control of the firm.⁸

In order to increase its accumulation ratio, the firm may also borrow money from banks and other financial institutions (firms can use their "borrowing power", according to Minsky's terminology (Minsky, 1975, p. 120). The ability of the firm to

debt finance its new investment plans depends upon the expectations about the profitability of the new project and on the lenders' evaluation of risks and margins of safety. This profitability can be measured in terms of the future cash flows that will be generated and which are expected to be large enough so that debts issued today can be repaid or refinanced in the future.

Issuing new debts is a decision to commit future and uncertain receipts against a certain amount of payments to be undertaken during a given period of time. It involves a great deal of confidence on the part of both borrowers and lenders about the future of business. The borrower's risk in this kind of finance is greater than in the other two described previously since, in an uncertain future, cash flow may not be large enough to meet debt commitments. The redemption of debts assumed by the firm requires that prices and output perform as expected.

The lender's risk is expressed by the terms at which financial contracts are agreed. According to Minsky,

...higher interest rates, shorter terms to maturity, a requirement to pledge specific assets as collateral, and restrictions on dividend payouts and further borrowing are some of them [lender's risk]. (Minsky, 1975, p. 110.)

When the firm decides to resort to debt finance, its liability structure is subjected to evaluation by lenders. Given the uncertainty which surrounds plans for the future, this evaluation is strongly influenced by the subjective views of banks and financial institutions. These are more inclined to accept a higher degree of indebtedness when expectations about the future are optimistic and a lower degree of indebtedness and tougher contractual conditions when expectations are pessimistic.

Thus in an uncertain world, the limit to debt financing of investment - the acceptable debt-equity ratio - is subjectively determined and depends, in general, on the overall view of the economy held by firms and financial institutions and, in particular, on the estimation of the chances of the business succeeding in the relevant period.

In the real world, a realistic assumption is that the firm will choose a portfolio strategy to finance the new acquisition of fixed assets which combines internal and external funds: the firm will have saved part of the money it will need and it will borrow the rest.

E. PORTFOLIO POSTURES

During the implementation of investment plans the need for finance will vary, which means that the balance sheet of the firm will reflect the time structure of its investment plans. The pace of investment will be a result of the availability and the cost of external funds to the firm, which changes according to the relations between the market demand for finance relative to the available supply, and of the confirmation or disappointment of expectations as to the generation of internal funds.

The expansion of the firm also depends on its ability to manage its financial resources in order to meet its cash obligations. The evolution of the firm creates thus not only a given administrative structure as pointed out before, but also a financial structure, and both represent the inherited resources with which it must deal with in the present and in the future.

According to Minsky (1982), the key variable in the analysis of the balance sheet of the firm is the profile of its cash receipts vis-à-vis its cash payments commitments during the relevant period of time. The gross capital income - defined as the residual income out of its total receipts after payments for current labour and purchase of inputs - indicates the resources available to the firm to meet its interest payments, and income taxes and to remunerate its owners.

The distribution of the gross capital income among the re-payment and servicing of debts, income tax and the "surplus" of the entrepreneur defines, according to Minsky, three different postures of the firm in relation to its portfolio strategy: hedge, speculative and Ponzi.

Hedging behaviour means that expected cash flows exceed payments on debts on every period. It is a posture characterized by conservative assumptions related to the margins of safety,⁹ and so a hedging financial unit will maintain an

excess of cash receipts over contractual payment commitments in each period, an excess of the value of capital assets over debt and the holding of cash or liquid assets. (Minsky, 1982, p. 26.)

A hedger's financial needs are provided at the beginning of the relevant period making them independent of future changes in financial markets as long as the expectations about the asset-earnings are not disappointed.

A unit becomes speculative when, for some periods, its cash payment commitments exceeds its expected receipts, meaning that the unit will face a deficit in its cash flows which needs to be refinanced. What causes the cash flow deficits to appear is that a speculative unit finances its long term asset position by short run liabilities; that is to say, the cash payments commitments of its short run indebtedness are bigger than the expected receipts due to this debt.

Insofar as its receipts are enough to pay the interest due to its debts, the unit may be able to refinance its position without increasing its debt, if adverse changes in financial markets do not take place. In the retention period as a whole, the unit must become solvent as in later periods cash surpluses are expected to more than compensate the earlier deficits.

Finally, a unit is characterized as Ponzi when in some near term periods its net receipts are not enough to pay even its cash commitments due to interest payments. In order to face its commitments, the unit must borrow, increasing its outstanding debt when no new asset is being acquired. The finance of a Ponzi unit is supplied only if it is expected that, in the end, net income (cash receipts minus cash payments) will compensate the increased value of debt. The Ponzi posture is an extreme case of speculation. Both strategies, contrarily to hedging, imply vulnerability to changes as to the availability and terms of finance.

Each of those postures defines a particular path of growth for the firm as it leads to a more or less solid financial situation, which will enable more or less ambitious expansion plans. The point to emphasise is that the inherited experience of a firm, which is the subjective element that will guide decisions about expansion plans in the future, is the result of decisions made in the past of where to invest and how to finance the investment. During the course of implementation of the investment plans, changes in external environment (such as a decline in the determinants of profit or a change in the financial conditions) will affect the firm in different forms and degrees, according to the structure of its liabilities and its flow of income. As described by Minsky,

a decline in expected gross capital income, or a rise in the income protection required for hedge financing can make hedge units speculative units; and a decline in expected gross capital income, a rise in the income protection required for speculative financing or a rise in financing costs can make speculative units Ponzi units. (Minsky, 1982, p. 29.)

Through this channel, short period events may affect the implementation of long period plans since its timing may be affected.

F. A SUMMING UP

The discussion in chapters 2 and 3 has identified the variables we must study in order to understand the process of growth of the firm. We have focused our attention on the fact that in an uncertain world, expectations play an important role when decisions about production and investment are made.

In spite of dealing with different problems, decisions about production and investment are interrelated because, in our view, once time is being explicitly considered, long period decisions have to be translated into short period procedures.

This interrelation can be seen in two aspects. One is that the short run performance of the firm influences its long run results. As the future is uncertain, expectations are volatile and subject to change. If, in the present, decisions made in the past prove to

be wrong, entrepreneurs may have to revise their plans of growth.

Another aspect of this interrelation is seen through the financing of growth. As we are working in an economy with forward money contracts, entrepreneurs are always committing resources today against uncertain gains in the future. The existence of money contracts gives some stability to the functioning of the economy, as costs - production and financial costs - are known beforehand. However, it is only the evolution of the firm over time that will allow those contracts to be honoured through the generation of enough cash flow in the short run to fulfil debt commitments and to initiate new projects. In this sense we discussed pricing as part of the strategy of growth.

If the strategy of financing investment plans involves debt commitments, the liability structure of the firm will be subject to evaluation by lenders, amplifying the risks incurred by the firm. Since banks and financial institutions make their decisions based also on subjective views, the acceptable degree of indebtedness of the firm as well as the terms of the contracts, will vary over time. It is for this reason that the finance of investment plans, in great part, determines their timing.

In a world where contracts are made on money terms, investment decisions can be regarded as an element of a portfolio strategy. Firms will hold assets in the expectation that they will generate cash flow in the future. The cash flow of financial assets are stated in the contract, while the cash flow of fixed assets will depend on their use in production. The commitment of resources to plans to expand productive capacity shows the degree of confidence the firm has in the future.

The problem of growth, as it involves a large amount of resources (physical and financial) for a long period of time is a crucial one for the firm in a competitive environment.

It is in this context that we can say that the administrative and financial structure of the firm are the result of its strategy of growth. The execution of investment plans not only involves dealing with considerable resources, but also poses new administrative

problems that require innovative solutions. On the other hand, the ability of the firm to fulfil the financial requirements in the markets where it operates and where it intends to operate will also determine its rhythm of expansion.

We suggested that several variables could be identified as guiding investment decisions: expectations about prospective yields, internal savings and unexploited internal facilities to diversify the production line and finally the conditions to debt finance new investment plans. In all cases we stressed the importance of the subjective evaluation of the "managerial team", as they are responsible for the main decisions concerning the growth of the firm.

The firm described above must be treated as a "living institution" with a unique growth path which is translated into its administrative and financial structures. The limits to its growth, as stated by Penrose (1980), are given by its capacity to take advantage of opportunities offered by the external environment. A "sustainable" growth, as suggested by Marris (1964), will only be reached if the firm can grow with all its resources in equilibrium:

We are concerned, of course, mainly with what we have described as "sustainable" growth, that is to say with growth which is consistent with the firm's continuing on a financial basis such that the same rate can be maintained indefinitely or at least until there is some change in the data. (Marris, 1964, p. 118.)

Finally, it should be added that in a monetary economy endowed with a sophisticated financial system firms incur in debt financing when implementing investment plans. According to Minsky the firm may adopt one of the three portfolio strategies - hedge, speculative or Ponzi - to meet cash obligations. The difference among the financial postures the firm can adopt refers to the degree of vulnerability it becomes exposed to when financial conditions change (see appendix). In an uncertain world, where decisions are taken based on subjective evaluations and conventions, it will be the interrelation among economic agents - mainly among productive units and financial institutions - that will explain the movements of aggregate output.

NOTES TO CHAPTER 3

1 - As noted by Shackle (1970, chapter 5), investment decision is a "crucial decision" in the sense that it cannot be repeated and its sequel is too complex to be generalized.

2 - About the fragile character of long term expectations, Keynes comments:

We are merely reminding ourselves that human decisions affecting the future, whether personal or political, or economic, cannot depend on strict mathematical expectations, since the basis for making such calculations does not exist; and that it is our innate urge to activity which makes the wheels go round, our rational selves choosing between the alternatives as best we are able, calculating where we can, but often falling back for our motive on whim or sentiment or chance. (Keynes, 1936, pp. 162-3.)

3 - According to Penrose,

...the services from "inherited" managerial resources control the amount of new managerial resources that can be absorbed, they create a fundamental and inescapable limit to the amount of expansion a firm can undertake at any time. (Penrose, 1980, p. 48.)

4 - Minsky (1975, chapter 5) calls attention to the fact that Keynes considered the marginal efficiency of capital and the capitalization rate method equivalent to relate the cash flow of capital asset to the supply schedule for newly produced capital assets. Minsky points out, however, that the marginal efficiency of capital method

led to an undue emphasis upon the interest rate, which to Keynes was always an attribute of money loans, as the tune caller and to a ready acceptance of the proposition that the marginal efficiency of capital schedule was not essentially different from the negatively sloped investment schedules that were drawn by classical economists. (Minsky, 1975, p. 99.)

Minsky in this sense prefers the capitalization rate approach as

the capitalizing formula is a more natural format for the introduction of uncertainty and risk preference of asset holders into the determination of investment. (ibid. pp. 99-100.)

5 - The independence of short and long period expectations can be illustrated by the fact that the long period is not reached through a succession of short periods. In this sense Keynes suggests that a long run equilibrium situation might not exist.

I should, I think, be prepared to argue that, in a world ruled by uncertainty with an uncertain future linked to an actual present, a final position of equilibrium, such as one deals with in static economics, does not properly

exist. (Keynes, 1979, vol. 29, p. 222.)

We should also quote the following passage where Keynes identifies ambiguities in Marshall's definition of the long period:

The first suggestion conveyed by the term "long-period" is that it relates to a position towards which forces spring up to influence the short period position whenever the latter has diverged from it. The second suggestion conveyed is that the long-period position differs from short-period positions in being a stable position capable *cet.par.* of being sustained, whilst short-period positions are *cet.par.* unstable and cannot be sustained. The third suggestion is that the long-period position is, in some sense, an optimum or ideal position from the point of view of production, i.e. a position in which the forces of production are disposed and utilised to their best possible advantage. (*ibid.*, p. 54.)

Carvalho proposes that the first suggestion would fit Keynes's view of the long period as it appears in chapter 17 of The General Theory. According to Carvalho,

the divergence refers to the market values of assets and is reflected in the relation between their spot and forward prices that induces changes in their available stocks. What matters in this discussion is how the stocks of the various assets, including real capital assets, are changed and Keynes did not take his model to show any long-period equilibrium prices of assets. All that was introduced was the divergence to show how changes in the economy are induced by it. (Carvalho, 1989, pp. 14-5.)

For a discussion about the relation between short and long run analyses in post Keynesian authors, see Carvalho (1984-85).

6 - Kregel shows that Keynes uses three methodological approaches in different works with three different assumptions about the relation between the behaviour of long period and short period expectations. When describing the third approach - the model of shifting equilibrium where the short and long term expectations are interdependent - Kregel observes the complexity of Keynes's theory:

In such a world [which uncertainty is an integral part] expectations are not always realised and actual proceeds may not be what had been expected. Entrepreneurs observe their errors through changes in desired inventories, or changes in order books, and responses are made as the general state of expectations interacts with present realisations. The system will be shifting along the aggregate supply and demand curves at the same time as these curves will themselves be shifting their positions as the system reacts to disappointments of the two types of expectations. The extreme complexity of such a situation explains why Keynes was willing to "tame" this system, first making assumptions that allowed the definition of functions that he knew did not exist through their entire range, expressly in order to give force to the theory of effective demand. (Kregel, 1976, p. 216.)

7 - See, for example, Robinson (1959a), discussing the impact of changes in the interest rate over investment plans.

8 - Eichner has the opinion that "megacorp-price-leader" does not rely heavily on external funds to finance investment. One of the reasons for that is

The reliance on financial intermediaries which the floating of a new securities issue entails will pose a certain risk to the control of the megacorp by the incumbent executive group. Any subsequent failure to meet additional obligations, implicit as well as explicit, which the megacorp incurs of increasing its outstanding fixed interest and equity debt could lead to the replacement of the executive group. (Eichner, 1976, p.87.)

9 - As pointed out by Minsky, in relation to the margins of safety:

one way to treat this is to assume that the owners of the capital assets, the bankers, and the owners of the debt assume there is a lower limit of the gross capital income which is virtually certain and that financing decisions and capitalized values are based upon this lower limit to earnings which are deemed to be virtually certain. (Minsky, 1982, p. 25.)

APPENDIX TO CHAPTER 3

A further step in discussing Keynes's investment theory is given by Minsky when he describes the three financial postures a firm, engaged in debt financing new investment, may assume: hedge, speculative and Ponzi. This appendix exploits some details of the definition of the three postures to allow for a graphic analysis. Also the effect of inflation in these financial postures is discussed.

Cash Commitment, Gross Capital Income and Surplus

Let us define the contractual cash payment commitment CC as given by

$$CC = I + PP \quad (1)$$

where I and PP are total values of interest and principal respectively, due to one or more lenders under specific contracts at the end of a period.

The Gross Capital Income Q at the end of a period is given by

$$Q = T - (C + i) \quad (2)$$

where

T is the total amount of receipts;

C represents the costs (which includes wages and purchases of input and services);

i is the interest on the borrowing which finances working capital.

The Gross Surplus P at the end of each period is given by

$$P = Q - CC \quad (3)$$

The surplus represents the resource in cash available to the firm to remunerate its owners, to increase its accumulation fund and to meet the income taxes. As assumed by Godley and Cripps (1983), the working capital is financed by borrowing. In this case, the total receipts T in equation (2) include the borrowing which finances inventories.¹

Equations (1) to (3) involve quantities which represent values in cash and if the firm faces deficit (instead of surplus) it means that its liabilities will have to be met by an increase in its degree of indebtedness (or a sell out of some of its assets).

So, there are two different dimensions to the financing problem. One is the problem of setting up a new business (or expanding an old one), which represents the investment made by the producer (and it involves the payment of the commitment CC). The other one is the problem of keeping the business running once it has been established. The latter represents the finance of working capital by borrowing (the interest i in equation 2). Actually, the problem of the finance of working capital is less relevant for the definition of the financial postures of a firm than the problem of financing long lived assets. It is through them that the financial postures described by Minsky are defined.

Financial Postures

A firm engaged in debt financing new investment in fixed capital may experience periods in which CC is greater than the cash inflow Q , as shown in the Figure A1.3-1.² If we assume that the difference between CC and Q is met by refinancing (usually at a higher rate of interest), then the new terms of finance may cause an increase of CC in subsequent periods (see the initial periods between a and b in the Figure A1.3-1, for instance) and, in this case, the firm should increase its cash inflow in order to keep its liquidity (i.e. to restore the convergence of Q and CC in the graph). The firm may also sell out assets in order to reduce the burden of increasing indebtedness and it is its ability in doing so that will define how quickly it will restore the convergence of Q and CC .

The region delimited by the points a and b in the Figure A1.3-1 corresponds to a situation of a deficit in the cash flow. The point b may be seen as a stability point,

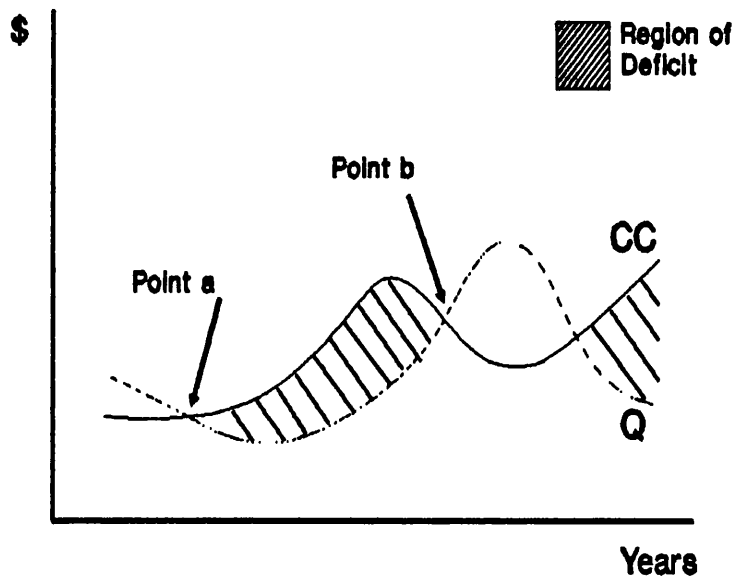


Figure A1.3-1 Contractual Cash Payment Commitment CC vs Cash Inflow Q

since it marks the beginning of a period in which the firm restores its profitability and starts accumulating capital again. If point b is not reached, then the firm will be increasing its indebtedness continuously to meet past commitments (Q and CC diverge and $Q < CC$). To the left of point a the firm is also generating enough surplus to face debt commitments and accumulate capital. The financing posture of a firm depends strongly on the terms of the financial contract.

Minsky defines financial postures that the firm may follow according to the relation between the profile of cash inflow and cash commitments along the time. In his words:

A hedge financing posture can be described by the excess of cash receipts over contractual payment commitments in each period, an excess of the value of capital assets over debt and the holding of cash or liquid assets.

A hedge financing unit is not directly susceptible to adverse effects from changes in financial markets. The only way a hedge financing unit can go

bankrupt is if its revenues fall short of its out of pocket costs and commitments. (Minsky, 1982, p. 26.)

A unit speculates when for some periods the cash payment commitments on debts exceed the expected gross capital income....

The liability structure of a speculative unit leads to a series of cash payments and the operations of the unit will lead to a series of cash receipts. The sum of the payment commitments is less than the sum of the cash receipts but in some periods the payment commitments are larger than the expected cash receipts: there are deficits. These "deficits" periods are typically closer in time from the "today" at which the balance sheet is being characterized; the deficits for the speculative unit are mainly because the unit has engaged in short term financing so that the principal of debts falling due exceeds the recapture of capital-asset commitments in these early periods...

Higher interest rates lower the present value of all cash receipts, however the decline is proportionately greater for the receipts more distant in time. Thus a dated set of cash flows which yields a positive excess of asset values over the value of debts at low interest rates may yield a negative excess at high interest rates: a present value reversal, from positive to negative present values, can occur for speculative financing relation and not for hedge financing units.(Minsky, 1982, pp. 26-7.)

Ponzi units are speculative units with the special characteristic that for some if not all near term periods cash payment commitments to pay interest are not covered by the income portion of the expected excess of receipts over current labor and material costs. These units must borrow in order to pay the interest on their outstanding debt: their outstanding debt grows even if no new income yielding assets are acquired...

An extreme example of Ponzi finance is borrowing to hold assets which yield no or little income in the expectation that at some date the market value of the object held will yield enough to clear debt and leave a sizeable gain. (ibid., p. 28.)

Financial postures that are the result of decisions about how to finance the expansion of business should be referred to the total number of periods to which the new capital equipment is going to be economically productive. In order to represent graphically the profile of gross capital income and the cash payments let us introduce a new variable L that will stand for the life time of the investment project that is being debt financed.

The three financial postures shown in the Figure A1.3-2 can be defined as follows:

Hedge: $Q \geq CC$ all the time.

Speculative: $Q < CC$ for some periods and stability points occur before the life-time of the capital equipment L (beyond which a new investment is certainly required).

Ponzi: $Q < CC$ It is a divergent speculative structure in which no stability points occur before the life-time L and CC never ends.

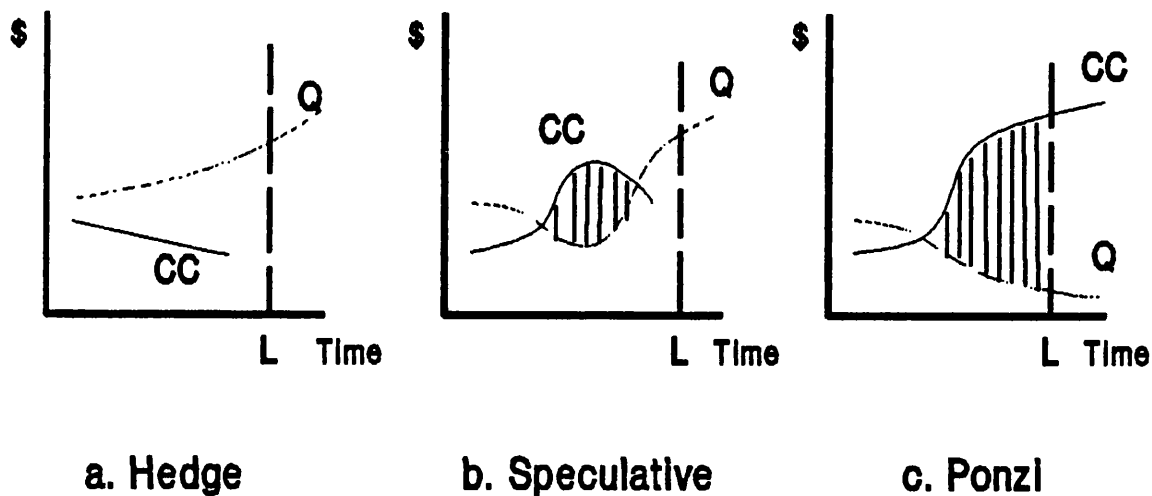


Figure A1.3-2 Types of Financial Postures (Q = gross capital income; CC = contractual cash payment commitment)

The Ponzi Unit and the Problem of Borrowing Capacity

The key principle underlying speculative and Ponzi financing structures is that the borrowing capacity of the firm should not be lost, otherwise the firm may face insolvency.

Ponzi financing is the ante-room of insolvency. However, this may not be the case as far as the firm maintains its borrowing capacity. In some cases borrowing capacity can

be seen as a concept that acts on the ground of political influence. For instance, governments may sustain firms in Ponzi financing for the political or strategic importance of the business.

Financial Postures and Inflation

In an inflationary environment, the following characteristic of debt financing structures can be identified: the inflationary burden increases in real terms the commitments paid to compensate the loss imposed by inflation in the purchasing power of money and it is equivalent to an earlier amortization of the outstanding debt.

The effect of the inflationary burden (also called front-load by Bain, 1981) is revealed examining the curve of real CC³ instead of the curve of nominal CC (Figure A1.3-3).⁴ The real CC takes into account the fact that the value of the money is declining over the periods of time.

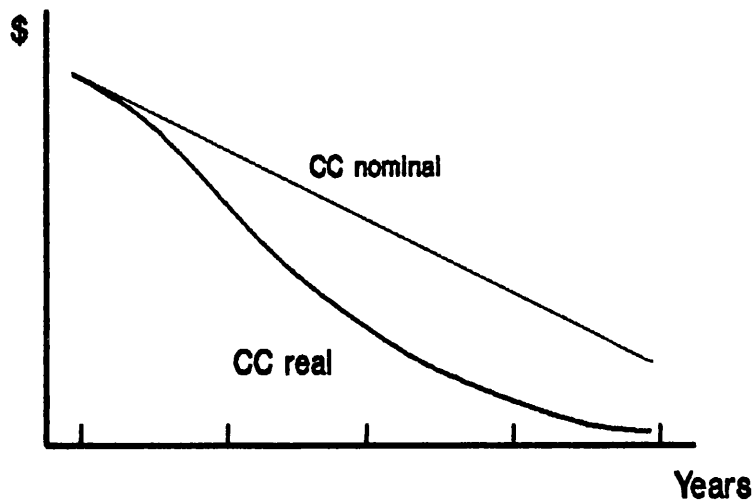


Figure A1.3-3 The Effect of the Inflationary Burden in the Commitments

Indeed, the value of the real CC in the first period represents a much harder commitment to be met by the producer than those required at the final periods. As a

consequence,

For an investment project to be viable, either it must begin to produce cash very early in its life, or alternatively the investor must have sufficient spare income from his other activities to service debt until the project matures. Front-loading is therefore a deterrent to long-term investment in projects which yield a relatively low return sustained for many years, or for which the period until the project matures is lengthy. (Bain 1981, p. 260.)

The Investment Decision and the Financial Posture

The above discussion stresses the importance of the current cash flow to validate decisions made in the past. That is an important aspect of the investment decision because it well illustrates the links between the short and the long period.

Although decisions to invest in fixed assets are not determined by short term results or routines, once they are made up their implementation depends on how accurate what was expected prove to be true in practice. In this sense the short period limits how fast investment projects have to be met.

Another feature of this relation between short and long period is that the short period is being constantly changed by actions and decisions taken today and so its links with the long period are being constantly recreated.

The Keynesian theory of investment decision is a guide to understanding how entrepreneurs make their choice about what sort of asset to acquire and how to finance the acquisition. The Keynesian theory of investment is a theory of asset choice and so expected returns over time have to be (at least) equal to the value of the asset today. The relevance of Minsky's analysis of the financial postures to the Keynesian decision theory is then clear: it offers an important tool to analyse how investment plans come into existence.⁵

NOTES TO THE APPENDIX OF THE CHAPTER 3

1 - In practice, the amount of new money the producer has to borrow in each period to finance inventories is not got by an ordinary bank loan. The producer usually gets this money by selling credit certificates to a bank. In this case, the bank buys these certificates by a reduced price, what makes the transaction equivalent to an ordinary borrowing with interests. Alternatively, the producer can finance inventories directly with the suppliers.

2 - Strictly speaking, CC and Q are not continuous functions (as presented in the Figure A1.3-1) but a set of discrete points calculated at the end of each period of time. However, continuous curves fitting these points provide a valuable analytical tool.

3 - The real CC for the period j is given by

$$\text{real CC}_j = \text{nominal CC}_j / (1 + p)^j$$

where p is the inflation rate.

4 - The precise formula for the calculation of the nominal interest rate is given by Godley and Cripps (1983, pp. 191).

5 - It is worth pointing out that Keynes did not mention how investments in capital assets are carried out. Chick (1983) calls attention to some aspects that are left out of consideration in Keynes's theory of investment decision:

It is worth pointing out that neither depreciation nor borrowing costs are included in the calculation of mec. Only the costs directly associated with buying and operating the equipment are included. The need to provide for replacement or repayment is implicit in the comparison of mec with r. Also implicit is the assumption that as profits accrue they are either invested in financial assets (at the current interest rate) until they are required, at time n, to finance replacement, or they are used to amortise the loan. (Chick, 1983, p.121.)

Following this, Chick presents numerical examples exploring various situations in which an investment will yield equivalent returns. In the case that a capital asset is bought with a loan which is amortised continuously (Table 6.2, p. 122) we can identify a hedge posture of financing (in which $Q = CC$).

CHAPTER 4
THE BEHAVIOUR OF THE FIRM
IN A MONETARY PRODUCTION ECONOMY WITH PRICE INSTABILITY

A. INTRODUCTION

Our aim in this chapter is to study the behaviour of the firm in an environment of price instability. The fundamental difference between an economy where prices are rising and one in which prices are stable is that the degree of uncertainty surrounding decisions of the firm in the former situation is greater.

In order to discuss how the firm survives and grows with inflation, we shall discuss the subject considering how relevant decisions for the firm are made up under inflation.

B. INFLATION AND UNCERTAINTY

The main problem caused by inflation is disorganization of the system of relative prices, including intertemporal prices. As Moore describes the phenomenon:

Inflation is characterized by a general and widely diffused rise in prices and costs. However, all prices and factors affecting prices do not begin to rise or fall at the same time. In part, this is due to the existence of more or less regular sequences in the movement of different prices. Prices in some markets almost always begin to rise more promptly than in other markets. Similarly, some prices typically begin to fall sooner than others. (Moore, 1983, p. 176.)¹

An unstable system of relative prices means that the price system ceases to be a reliable indicator of relative scarcity of goods and services. That is the main reason why uncertainty is increased under inflation.

The impact of the disorganization of the price system on the decision process of the firm is reflected in several ways. Firstly, with inflation, both costs estimates and

revenues expectations become more difficult to form.

In a non-inflationary economy the main source of uncertainty is related to the fulfilment of expectations about the behaviour of demand. With inflation, besides that, firms run a greater risk when deciding how much to produce or invest as relative prices of inputs and outputs may turn against output, or the price of some products may increase less than others. Moreover, cost uncertainty under inflation is increased also by the inability of the cost accounting system to reflect the loss in the purchasing power of money revenues. The appraisal of long lived assets and the calculation of adequate reserves for depreciation can be blurred as inflation may confuse what is money profit and what is user cost.² As Keynes puts the question:

For a time at least, rising prices may delude entrepreneurs into increasing employment beyond the level which maximises their individual profits measured in terms of the product. For they are so accustomed to regard rising sale-proceeds in terms of money as a signal for expanding production, that they may continue to do so when this policy has in fact ceased to be to their best advantage; ie they may underestimate their marginal user cost in the new price environment. (Keynes, 1936, p. 290.)

The result is that with inflation the firm can have the value of its capital asset eroded, losing position in the market and having its profit rate decreased through the reduction in the capacity of generating real profits.

Secondly, in a non-inflationary economy the existence of money contracts plays the important role of reducing uncertainty for the firm, by allowing costs to be fixed for the period of production. With inflation, contracts signed in the past under the expectation of price stability may not be honoured. This risk is less relevant in an environment of price stability as expectations about the future behaviour of prices are anchored in the existence of forward money contracts.

Inflation, however, causes a reduction in the real value of money payments fixed in contracts. We might assume then that contracts will only be honoured if the cost of breaking them is higher than the cost of keeping them up to the end, the latter being represented by the erosion of money values. This cost is higher, the higher is the rate

of inflation and the longer is the duration of the contract. Therefore, recontracting becomes an efficient way of avoiding the accumulation of losses. Shorter term contracts are, then, signed to maximise the possibility of recontracting, reducing the duration of the periods in which firms are protected against uncertainty.

A third difficulty that an inflationary environment presents for the firm is how to establish a criterion to guide the allocation of resources. Let us recall that in a monetary economy, firms plan to produce and invest with the aim of making money profits. Under competition entrepreneurs seek for markets where a better rate of return for their capital can be obtained, and so some form of evaluation of these opportunities is necessary. In the same way, assets are chosen to be purchased according to their profitability and, in an uncertain world, also according to their liquidity. Price instability blurs economic estimates because of the increased difficulty of comparing investment opportunities with different time profiles and because it makes the commitment of resources for long periods of time more risky.

Finally, estimates about the potentiality of the market to absorb the firm's production also turns out to be much harder to predict under inflation. Since the purchasing power of incomes is changing, the size of the markets is also changing, adding another source of uncertainty to the decisions of the firm.

To sum up, under inflation, because not all prices move at the same time and at the same rate, firms when fixing prices and making economic estimates cannot rely confidently on the information content given by current relative prices. The difference in the rate of change of prices reflect the different economic power agents have when bargaining to keep the purchasing power of their income. In terms of firms this means that income is redistributed from less dynamic to more dynamic businesses.

C. INFLATION AND EXPECTATIONS

Since the degree of uncertainty is increased under inflation, expectations are strongly influenced by it. In order to discuss the impact inflation has on the formation of

expectations, we shall make a distinction between two different inflationary environments - one where inflation is a short-lived phenomenon and another one where inflation is expected to be a permanent phenomenon.

Let us assume, as Leijonhufvud (1981) does, that it is possible to define a "fully-coordinated" time-path for the economy. If disturbances do not occur the economy will follow its equilibrium time path. If, however, exogeneous shocks take place the behaviour of the economy will depend on its disturbance-reactive projections that define the stability of its equilibrium path.

Two different possibilities can be postulated in terms of shock-absorption properties of the system depending on the size of shocks to which the economy is subject. In one case, shocks potentially cause the economy to deviate from its equilibrium time-path, but then "trigger immediate deviation-counteracting feedback control mechanisms." (Leijonhufvud, 1981, p. 108.) In the second case, in opposition, when a large shock hits the economy, the system does not show any tendency to return to the "ideal path". In the description of the author:

The system is likely to behave differently for large than for moderate displacements from the "full coordination" time path. Within some range from the path (referred to as "the corridor" for brevity), the system's homeostatic mechanisms work well, and deviation-counteracting tendencies increase in strength. Outside that range these tendencies become weaker as the system becomes increasingly subject to "effective demand failures". (ibid., p. 110.)

The analogy with different inflationary environments can be made. Since decisions are made under uncertainty the degree of stability of prices is an important element of the overall stability conditions of the economy. In an environment of price stability, when an inflationary shock first occurs, the expectations of economic agents may be that inflation will be fought and a new pattern of price stability will be later established. Calculations and decisions, in this sense, might not be affected in relation to long period commitments of resources. Short term decisions might be postponed awaiting a new definition of the price system.

If the inflationary pressure persists, however, then economic agents will also postpone long period commitments of resources in fixed assets, affecting the equilibrium path of the economy itself. Employing Leijonhufvud's terminology, the "corridor", in this case, will be narrower or nonexistent.

One of the main elements to define the "width" of the "corridor" is the elasticity of expectations. When expectations about the future tend to vary little or slowly in response to an inflationary shock, then it might be supposed that economic agents will be working within the limits of the "corridor". In this case, it can be said that expectations are inelastic in relation to variations in the level of prices.

On the other hand, when expectations become elastic to unexpected changes in prices, then inflation becomes a strong element to disorganize the economic system. The economy in this case amplifies inflationary shocks because inflationary expectations are incorporated in economic decisions. The result is that the economic system is driven far away from the "corridor" as disappointed expectations affect future decisions.

To sum up, the relation between inflation and expectation defines a threshold of inflation rates that are relevant to be considered in the study of decisions made under inflation and the overall stability of the economy. For a small shock, when expectations are inelastic, future inflation rates following the shock are expected to be low or diminishing and not permanent. With elastic expectations, future inflation rates are expected to be high or accelerating, making up a permanent process. In the latter, the apparatus of social organisation begins to fall to pieces increasing uncertainty. Investment decisions are changed or postponed, contracts are shortened, speculation is stimulated and the economy gets farther and farther from its equilibrium time-path, in an explosive fashion.

D. PRICING UNDER INFLATION

As we saw in chapter 2 above, the pricing policy of firms follows their need for internal funds to finance their investments.

In environments of rising prices mark-up behaviour is marked by the easiness with which firms quickly update the prices of their products when costs rise. Let us consider Sylos-Labini's (1969) formula:

$$p = v + qv$$

where:

v represents the direct costs which account for the average costs of raw materials, energy, and wages (adjusted for productivity), and

qv accounts for the overheads (on a standard volume of production) and an acceptable margin of profit per unit of output.

Let us recall that the dilemma faced by the firm when fixing prices for its products is to set prices that would cover its operational costs, improve or maintain its market position and generate additional resources to finance future expansion of productive capacity.

Under inflation the task of fixing prices becomes more difficult as relative prices are changing and so to keep the purchasing power of the firm's revenues is more difficult. When costs change and firms are working below full capacity, prices tend to change less than proportionally to the increase in costs - in other words, the mark-up tends to change in the short run to accommodate the change in costs.³

There are several explanations of this behaviour. Sylos-Labini points out three reasons. The first one is based on the observation that changes in prices will occur mainly when costs change for all firms. If, to the contrary, only some firms change their prices when their costs go up, they may attract competitors to their markets if their profit rate becomes higher than in other markets. Thus competition among firms works as a constraint to price increase, when increase in cost is not widely spread in the industry.⁴

When the impact of rising costs occurs through an increase in the price of the raw materials, domestic or imported, the tendency is, according to Sylos-Labini, that firms fully shift the increase in costs to prices, as it is expected that all firms will be affected by the increase in costs. Moreover, the room for manoeuvre of each firm to increase productivity in order to offset the cost increase is limited. So, when the cost of raw materials goes up, prices are expected to be increased in the same proportion.

When labour costs go up the price may or may not increase and if it is increased probably it will be in less proportion than cost. According to Sylos-Labini's assumptions the differences in cost structures among firms within an industry determine that firms can react differently to a labour cost increase. Bigger firms, for instance, can offset the increase in labour cost by increasing labour productivity and so they may keep their prices unchanged. Even if the increase in productivity does not fully compensate for the cost increase, big firms may choose not to increase price in order not to inhibit demand. The decision to stimulate a growing demand is another important explanation of price stability in the short term, while direct costs show an increase.⁵

Sylos-Labini adds a third reason why prices are kept unchanged in the face of an increase in direct costs: external competition. In an open economy, if domestic prices are raised, firms run the risk of facing external competition. The rules in an open economy are the same as those in a closed economy: direct costs increases that affect all firms - domestically and abroad - are fully shifted into prices, but direct costs increases that affect firms in a differential way are only partially shifted to prices.⁶

It is implicit in Sylos-Labini's assumption that inflation is a short-lived phenomenon and the choice faced by the firm when the inflationary process arises is how to vary its prices in order not to impair the finance of its investment plans and not to lose market shares.

Eichner (1976, 1974, 1973), as mentioned in chapter 2, points out three factors that will work against the firm when it decides to increase its mark-up in order to increase the rhythm of its internal accumulation of funds (external borrowing will be examined

in next section).

The first of these factors, which Sylos-Labini has also stressed, is the entry factor. Under cost pressures, according to Sylos-Labini, if the firm does not reduce its mark-up, this will mean that the volume of the surplus will be increased and so the profit rate. Higher profit rates reduce the entry barrier. This is a phenomenon however that will work in the long run, according to Eichner, and so the firm may take advantage for a period of time of its leadership position in the market.

Another factor working against the firm is the substitution effect. Eichner also emphasises that this takes time to affect the firm and so:

Even taken together, the substitution effect and the entry factor are likely to be of negligible impact in the time period immediately following an increase in the margin above costs. This is because most oligopolistic industries, as already pointed out, find themselves operating along the inelastic portion of their short-run demand curve and because, furthermore, the entry of new firms into an industry has a long lead time. As the industry price leader peers further into the future, however, the substitution effect and the entry factor are likely to seem more significant. (Eichner, 1973, p.1191.)

Finally Eichner mentions the possibility of provoking a "meaningful government intervention" such as price controls that will also work as a constraint to the pricing policy of the firm.

It is implicitly assumed throughout this discussion that we are dealing with inflationary pressures rather than inflationary processes. Both Eichner and Sylos-Labini are concerned with the ways the economy absorbs shocks, while keeping its equilibrium unchanged. The shocks, as we saw above, that can be absorbed more or less easily, have to be few in number and small in intensity, so as to keep the economy within the "corridor".

It is, however, reasonable to assume that increases in productivity to offset cost pressures are a limited process when inflation is not a short-lived phenomenon. We might suppose that in an environment of permanent inflation, a logical behaviour of

the firm would be to anticipate future changes in costs, in order to try to maintain the purchasing power of its income. This is done by adding another element in the pricing decision mechanism: inflationary expectations (Frenkel, 1979).

E. PRICING UNDER PERMANENT INFLATION

Moderate inflation can improve the firm's income because it reduces contractual commitments. Permanent and high rates of inflation, however, have a deleterious effect over the functioning of the economic system as it increases social conflict provoking a chain of reactions among economic agents aiming to protect their incomes. The result of this is that the terms of contracts are reduced and uncertainty about monetary costs the firm will have to pay in the future is increased as relative prices between inputs and outputs can turn against the firm, if they are not correctly foreseen. In this sense, when inflationary expectations are added to the pricing model above this implies that the mark-up will be increased to cope with rising expected costs. That is to say that if $v(t+1)$ is expected to be greater than $v(t)$, q will be increased to incorporate the amount that will be necessary to cover additional payments of the variable costs in $(t+1)$. The pricing rule then becomes:⁷

$$P(t) = v(t) + q^*v(t), \text{ where}$$

$$q^* = q[(v^*(t+1))], \quad q' > 0, \text{ and}$$

$v^*(t+1)$ being the expected cost of variable inputs in time $t+1$

Once inflationary expectations are included in the pricing decision, the role of the firm in the inflationary process becomes active, as the firm becomes an agent pushing prices up. In order to keep the purchasing power of its internal resources in the long run, the firm will try to guess what the future rate of inflation will be, based on the expectations of the entrepreneur.⁸

Frenkel distinguishes two different patterns of inflation rates that affect the behaviour of the entrepreneur: one in which rates are high and stable and another in which rates are high and variable.

An environment of a stable rate of inflation is similar to one of price stability (Frenkel,

1979, p.28), as the mark-ups are due to be stable. With inflation, however, mark-ups shall be higher as they shall include the percentage increase in costs that firms expect to incur because of inflation.

When inflation rates are variable, however, uncertainty is much increased and volatile inflationary expectations are considered in the decision making process. Without inflation, uncertainty involved in the production process is about the behaviour of demand, with inflation, uncertainty is extended to the behaviour of costs as well. Stable inflation may still keep the economy within the "corridor", once agents devise means to deal with a constant (and expected) rate of deterioration of the purchasing power of money, while high and unstable inflation may take the economy to the space of elastic expectations.

Frenkel defines two sort of risks involved in the pricing decision that operate in the economy with permanent high inflation. With no inflation or stable rates of inflation the main risk involved in pricing is the "income risk" or the risk of actual demand being less than expected at the chosen prices.

With price instability, that is to say, high and variable rates of inflation, Frenkel points out another sort of risk - "capital risk" - that emerges from the fact that costs can be underestimated. When inflation is high and unstable, the "guess work" to be made by the firm is more difficult, and so estimates about the future behaviour of costs will carry an upward bias in order to protect the firm's future revenues. "Capital risk", which is more likely to occur than the "income risk", is present because the firm may underestimate its costs. Even if it succeeds in selling all its production, its revenues may not be enough to cover its replacement costs.

When price instability is added to ordinary demand instability, the extra uncertainty may affect firm's investment plans. An increase in price much above the average will bring into action the effects pointed out by Eichner, that under a situation of chronic inflation firms will shorten their time horizon. In Keynesian language, high and variable rates of inflation, by increasing uncertainty, weaken the degree of confidence

in expectations, making them more elastic and therefore the whole system more unstable.

We can now describe how inflation affects pricing decisions of the firm employing the concepts of risk described by Frenkel and the concept of expectations described by Leijonhufvud. When inflation is a short-lived phenomenon, although uncertainty is increased during the inflationary process, it is not expected to impair long period decisions. It is supposed that the adjustment mechanisms proposed by Sylos-Labini and Eichner work and so economic agents work inside the "corridor".

When inflation has become a permanent phenomenon, then the impact it will have on decisions depends on its behaviour. High but stable rates of inflation have the impact on the formation of expectations of narrowing the "corridor", thereby making the economic system more sensitive to inflationary shocks. The stability of the rates of inflation, on the other hand, allows entrepreneurs to carry on their plans (of short and long periods) once the rate of increase in prices is considered to be predictable. The risks incurred by entrepreneurs are restricted to those of "income risk".

High and unstable rates of inflation affect the formation of expectations in the short and long periods, taking the economic system out of the "corridor". "Capital" and "income" risks are present in such a situation as prices are getting out of control.

F. FINANCE UNDER INFLATION

Another important issue concerning decisions by the firm in inflationary environments is how the firm chooses to compose its portfolio and how inflation affects its decision about how to finance its investment plans. With inflation, as in an environment with price stability, an increase in uncertainty means that assets that are more liquid are preferred.

Inflation affects investment decisions in fixed assets in two ways. On one hand, the financial structure of the firm is affected. As we saw in chapter 3, the margins of

safety of the degree of indebtedness acceptable by the firm follow a subjective criteria that changes according to the historical moment. An environment of price instability strongly contributes to changes in the views about the safety of long term commitments of resources.

On the other hand, estimates about the marginal efficiency of capital are also affected. Let us recall Keynes's definition of marginal efficiency of capital:

The reader should note that the marginal efficiency of capital is here defined in terms of the expectation of yield and of the current supply price of the capital-asset" (Keynes, 1936, p. 136, his emphasis.)

In this sense, an increase in uncertainty will lead entrepreneurs to embody a greater allowance in their estimates to cope with future inflation.

Given these elements, the decision to invest in fixed assets and to debt finance investment assumes a more speculative character under inflation. As we saw above, the increase in uncertainty tends to penalize long term commitment of resources and, in this sense, short term assets are preferred.

A consequence of this phenomenon is that financial markets tend to move towards short term contracts, and the shrinkage of financial markets has an impact on the debt structure of firms, pushing them towards more speculative positions. The increased demand for short term assets tend to increase the spot price of these items, among which we find the price of liquid capital. The persistence of inflation puts pressure on these assets that will negatively affect production costs.

Let us recall that the firm invests in fixed assets based on its profit expectations, but it is its current profits and how much finance can be obtained that determine the implementation of investment plans. As Sylos-Labini (1974) points out, both current and expected profits depend on the behaviour of prices and costs, and so with price instability, investment plans become more uncertain.

Let us make the same distinction between the rates of inflation we made before. When

inflation is a short-lived phenomenon the firm will be in a position of taking advantage when it anticipates its investment plans. This is so because if costs are expected to be increased in the near future the logical behaviour would be to increase spending now, at a lower cost. On the other hand, if expectations are not jeopardized by inflationary expectations, then time-consuming investments are not postponed. Even if the cost of external borrowing is increased in the short run, as prices are expected to become stable in the near future, investment and production plans will be carried on. However, economic agents that are speculative or Ponzi will be affected by higher financial costs.

When inflation becomes a permanent phenomenon, however, then investment plans can be jeopardized as the risk that the cash flow of the firm falls short of covering current expenses is increased. Such a situation arises when prices charged by the firm are readjusted by less than the average increase in costs. As pointed out by Minsky (1986), in a modern capitalist economy where monetary contracts rule the daily life of the firm, not only relative prices matter, but also absolute prices. Put in another words, with permanent inflation if cost changes are not accurately anticipated, the cash flow of the firm will not cover its current expenses. Even hedge units can become speculative or Ponzi in consequence of inflationary shocks if their revenue expectations are miscalculated or just disappointed.

A more uncertain situation arises when inflation is a permanent phenomenon but presents variable rates. In such a case, decisions to invest in fixed assets will be impaired, given that the degree of uncertainty about the future behaviour of prices and costs make them too unpredictable. The degree of confidence in expectations is reduced and so long term commitment of resources is discouraged. As Frenkel (1979) points out, when inflationary rates are unstable, inflationary expectations among the firms that are price leaders embody great dispersion, and so when these firms are setting their prices, they will allow for their increased uncertainty, pushing prices up. A logical result of this behaviour is that the duration of time for which prices are set and contracts signed becomes shorter, and the rhythm of inflation is increased.

In terms of financial assets and debt commitments only short term contracts will

survive and it will be virtually impossible for firms to keep a hedge position.

To sum up, an environment of permanent inflation works against decisions to invest in fixed assets as these sorts of investment imply the commitment of resources for a long period of time and under inflation the future presents a higher degree of uncertainty. The increased uncertainty works in favour of the acquisition of more liquid assets instead of less liquid ones in order that portfolios can be kept more flexible.

G. INFLATION AND INDEXATION

Indexation of contracts is a mechanism devised to protect contractual incomes from the erosion of the purchasing power of money caused by inflation. Let us consider then whether indexation reduces the uncertainties of price instability, and to which extent in an indexed economy the growth of the firm will be stimulated.

Indexation has been introduced only in economies where inflation is a chronic phenomenon and it is aimed to provide economic agents with an insurance against changes in relative prices induced by inflation. However, one point to be stressed is that in an indexed economy not all prices can be indexed, and so some price instability still remains, because those prices which are not indexed will be heavily influenced by inflationary expectations.

Wages and debt contracts are the main sort of indexed money contracts and as far as indexation is "fair", that is, it fully restores the purchasing power of the contracts, economic groups that are protected by them will keep their relative position in the economy.

Firms are not protected by indexation because their main source of revenues - sales proceeds - is not indexed. But they may have to accept indexed contracts as part of their production costs. If inflation and inflationary expectations are high, the existence of indexed debt contracts works as another element to increase uncertainty.

Let us recall that under price stability the existence of money contracts is an element to decrease the degree of uncertainty as they allow costs to be fixed for a period of time. With indexation this advantage is eliminated as indexation will guarantee that costs are readjusted by the average increase of prices, while there is no guarantee that the cash inflow of the firms will increase at the same rate. Fisher (1931), in spite of supporting indexation, saw this point:

A business man's profits constitute a narrow margin between receipts and expenses. If receipts and expenses could both be reckoned in the tabular standard, his profits would be more stable than if both were reckoned in money. But if he should pay some of his expenses, such as interest and wages, on a tabular basis, while his receipts remained on the gold basis, his profits would fluctuate far more than if both sides, or all items of the accounts, were in gold. (Fisher, 1931, p.336.)⁹

So, as revenues are not indexed, uncertainty is increased, meaning that expectations become sensitive to prospective changes in prices.

The greater impact of indexation of debts is on the balance sheet of the firms that tend to become more vulnerable to inflationary shocks. With indexation, the firm faces an additional uncertainty about what the money value of the service of its debts will be when they have to be settled. It might be expected then that firms will try to avoid to accept indexed debt contracts.¹⁰

Another important influence of indexation that should be mentioned is that with the coexistence of non-indexed assets and indexed assets, rising inflationary expectations set a floor to the expectations of money returns to be achieved by the former. This must be so in order that non-indexed assets can compete with indexed ones (considering differences in liquidity and risks). In such conditions, changes in inflationary expectations will affect transactions with non-indexed assets.¹¹

In sum, indexation does not necessarily diminish the degree of uncertainty in a monetary economy. On the contrary, it may actually increase it (if inflation rates are stable, indexation may reduce uncertainty, although the degree of vulnerability of the

price system to shocks is also increased). This is so both because not all prices can be indexed and so those agents that are not protected by indexation will work under greater uncertainty. Also, with indexation of assets, inflationary expectations will affect prospective yields of non-indexed assets - among which we have fixed capital assets. In an indexed economy other instruments have to be put into play in order to offset the negative effects of indexation.

NOTES TO CHAPTER 4

1 - Fisher quotes three reasons to explain price dispersion:

(1) many prices are restrained by previous contract, by legal prohibition, or by force of custom. (2) Some prices are intimately related to the money metal. (3) Each individual price is subject to special variation under the influence of its particular supply and demand. (Fisher, 1931, p. 197.)

2. See Harcourt (1982a, 1982b, 1982c). It should also be remarked that this problem is particularly important for fiscal policy in order to determine what is profit for taxation and what is not.

3. One might suppose that the firm in order to protect its income under inflation would shift the full increase in its costs to customers and maintain its mark-up unchanged. Acting in this way the behaviour of the firm would aim to keep the purchasing power of its revenues and so the accumulation of funds for expansion would grow accordingly allowing investment plans to be carried on. However, empirical evidences do not support this assumption. Eichner express the opinion that big firms do not shift into prices cost changes:

Yet if the average corporate levy is not lowered - perhaps less frequently but still, over time, to the same extent that it is raised - the margin above costs will necessarily grow larger. This apparent implication of the model is, however, inconsistent with the historical evidence. While the margin above costs has over time varied in oligopolistic industries, there is no reason to believe that it has increased secularly. It is for this reason that any simplistic theory of inflation based on the argument that megacorps merely exploit their market power to push prices upward, cannot withstand critical scrutiny. (Eichner, 1976, p. 103.)

In the pricing literature of the 60's and 70's great emphasis was given to increases in wages above productivity as the main source of upward pressure upon production costs. The evidence about whether costs pressures were fully passed on prices showed that for developed countries, that was not always the case. Sylos-Labini (1974, 1979), empirically showed that in an open economy, short run changes in direct costs (particularly labour costs) are only partially shifted to prices, meaning that when cost increases, price increases less than proportionally (that is the mark-up is reduced), and vice and versa.

4 - The relevant change in cost to be considered to affect market price is the direct cost (mainly changes in labour productivity and changes in variable costs). Changes in indirect costs do not affect so widely - according to Sylos-Labini (1974) - the cost structure of firms as changes in direct costs do. A study about the price formation in

the Brazilian industry in the 1969-77 period is found in Calabi (1982). His findings point, among other conclusions, to a contra-cyclical response of mark-ups to the expansion of revenues.

5 - Smaller firms, on the other hand, must manage to improve their productivity, otherwise they will be eliminated of the market. The belief that bigger firms are more efficient than smaller ones is implicit here and if in some markets bigger firms may not be the most efficient, their accumulation power, considering all the markets where they are, allow them to support higher production costs without changing their prices or changing them less than proportionately.

6 - We are not analysing the case when direct costs go down because our concern is with inflation. Given the discretionary power of the big firms they can administrate their prices in such a way that when direct costs diminish, they can reduce prices less than proportionally. This means that the mark-up and current profits will be increased.

7 - In practical terms the firm when fixing its price may make its calculations considering an estimated level of costs that embodies its inflationary expectations. It is irrelevant to know if the final price of a product went up more than proportionally than the average due to an overestimation in the direct cost or to a higher mark-up. What is to be emphasized is that when inflationary expectations are explicitly considered to cover expected higher costs, the inflationary process may be getting out of control.

8 - We should say something about the demand pulled inflationary process. Firms are expected to pass fully on price pressures of cost when a demand pulled process takes place. The expansion of the market allows the firm to charge a higher price for its products without running the risk of losing market share.

In the short run the persistence of demand pressure will stimulate the firm to increase its mark-up, increasing consequently its rhythm of accumulation of internal funds. Once the firm increases its mark-up it becomes an active agent pulling up the inflationary process and while demand pressure persists the inflationary process will be cumulative.

A demand pulled inflationary process is a result of an accelerated rhythm of economic growth. Its duration depends on the availability of money that will provide the resources that will feed the inflationary process. According to Sylos-Labini, a demand pulled inflation is caused by the decision of private firms and or government to spend more, when the resources are near or have already reached full employment, and the banking system is willing to finance the private and public sector by increasing the money supply.

The firm will also be a source of inflationary pressure when it decides to increase its

rate of accumulation by increasing its mark-up. This occurs when the firm believes that the market demand for its products has changed sufficiently so to allow an increase in the mark-up. This kind of behaviour, however, will not generate a cumulative inflationary pressure in the economy providing that the higher mark-up is kept fixed. Only if this behaviour provokes a reaction of firms in other markets will the inflationary process persist.

As far as the growth of the firm is concerned, the demand pulled process will increase the rate of accumulation of capital, but as the increase in price becomes generalized throughout the economy, the firm will face higher costs as well. The growth process of the firm will be affected by this sort of inflation when its costs increase at a higher rate than its revenues.

9 - Weintraub also calls attention to this point:

Yet the lack of enthusiasm for indexed contracts is obvious and basic for the very function of contractual agreements is to obviate uncertainty about future dollar payments or commitments: businessmen want to know their obligatory cash flow of payments in advance; lenders also want to anticipate their money flows with exactitude in money terms. Indexation would endow contractual payment uncertainty as a fact of life. It would be hard to persuade businessmen whose prices have fallen, or have lagged behind the average, that their payment commitments must be honored according to average results, rather than conforming to their individual experience. (Weintraub, 1978, p. 159, his emphasis.)

10 - Unless the firms do not have any choice as to demand new credits or rolling over old ones. Minsky has observed that indebted firms have interest-inelastic demand curves for finance (Minsky, 1982, p. 29). In this case, indexed bonds may be issued by firms if they cannot place non-indexed bonds in the market.

11 - For a discussion about inflation and indexation for assets, see Carvalho (1986).

CHAPTER 5 MACROECONOMIC ISSUES OF A MONETARY PRODUCTION ECONOMY

A. INTRODUCTION

In chapters 2, 3 and 4 we discussed the behaviour of the firm concerning its short and long term decisions. Our task now is to deal with some issues that are raised when we move from the microeconomic level to the aggregate of the economic system. Mainly our concern will be with the accommodation in the macroeconomic level of the actions of individual agents.

Two main aspects have to be considered. One concerns the interaction between the firm and its environment which limits present choices of courses of action and supplies elements on which firms form expectations about the future. The other one, as proposed by post Keynesian theory, deals with the interaction of firms with other firms and other economic agents, including banks and the State. The success of plans depends not only on the appropriateness of a firm's decision or on the accuracy with which it interprets the data supplied by the environment, but also on the decisions and behaviours of other economic agents. In this context macroeconomic theory has to provide the tools necessary to explain the outcomes of plans and behaviours of individual agents, decided in a condition of mutual ignorance.

The assumption of uncertainty in the post Keynesian model does not imply the absence of rules of economic behaviour or of established standards of rational economic behaviour. On the contrary, in a world of uncertainty, institutions, rules and conventions emerge to support decisions. As Davidson writes

When civilized people think they face an uncertain (non-ergodic) future, they try to form sensible expectations which rely on the existence of social institutions that have evolved (e.g. contracts and money) to permit humans to cope with the unknowable. (Davidson, 1987, p. 149, his emphasis.)

Also, as noted by Dow, post Keynesians try to combine the acknowledgement of individual freedom from deterministic rules with the recognition that in reality there are standards of behaviour that have their origin in society rather than in the individual itself:

Given the social conditioning involved both in individuals' motivation, and in their expectations formation, Keynes's use of psychology was not individualistic. By taking account of the diversity and creativity of individual behaviour, Keynes did not opt for the atomism of individualistic psychology, rather he opted for a combination of individualistic and social psychology. (Dow, 1985, p. 100.)

Macroeconomics emerges as a field of study when it is recognized that the logic of aggregate behaviour is not simply given by the sum of individual actions. It assumes that there is a logic of a system's behaviour that both transcends and limits the possible courses of actions of its elements. In other words, macroeconomics is created when "fallacies of composition" are identified and shown to be theoretically significant.¹

Fallacies of composition emerge from the fact that external restrictions on individual choices and actions are, in many cases, endogenous to an aggregate approach of the economy. Budget constraints, size of markets, for example, are given to an individual decision-maker but are really determined by the action of agents as a whole.

B. MACROECONOMICS AND MICROECONOMICS

The best known fallacies of composition in macroeconomics are those related to the effects of an increase in the propensity to save on the rate of capital accumulation and of a reduction in money wages on the level of employment.

In the first case, it can be shown that an act of saving unaccompanied by an act of new investment rather than stimulating capital accumulation is more likely to lead to a reduction in the level of employment. While it is reasonable to suppose that an

individual can get wealthier by saving increasing proportions of his income, if everybody does the same the society will end up impoverished: aggregate demand will be reduced, and employment will fall.

Keynes emphasized that it is possible for an individual to increase his saving by buying either a newly created asset or an old asset. For investment to take place, it is necessary that a real new asset to be created,¹ and this is what really counts for capital accumulation. Otherwise, the savings of that individual equals the dissaving of somebody else who is selling an old asset.

This happens because income is created when saleable production takes place. If savings increase beyond the non-consumable share of production, markets will shrink and with it, aggregate income, forcing some people to dissave. Therefore, if it is possible for any individual to save as much as he wants from its income,² for the economy as a whole it is not possible to save more than is being invested. An increase in the propensity to save, without an increase in net investment, then, can only be equivalent to the losses of firms with unsold production or unused capacity.

Something similar takes place in the second fallacy. As emphasized by both Keynes and Kalecki, a reduction in the money wages of the workers of a given firm may improve the latter's profitability. However, a general reduction of money wages will lead to a contraction of aggregate demand. Prices will go down, and profits will be reduced.³

What these cases point to is the necessity to verify the implicit requirements for a given plan, at the macro level, to be successful. Aggregate results must be explainable in terms of the decisions and acts of the agents that actually caused them. On the other hand, atomistic individualism misses the essential point that goals and methods are not only historically and institutionally specific, but also that there are restrictions on individual behaviour explainable only at the macro level.

To the well known fallacies of composition mentioned above we add another one. As we proposed before, profits are the goal and fuel of economic expansion in a monetary

economy, in which production is organised by private firms. Profits, however, depend directly on income distribution and so, on what accrues to firms to accumulate. Income distribution, therefore, is a subject that requires an integrate micro-macro treatment. In the remainder of this chapter we will attack this question, examining the macro-restrictions on the formation and accumulation of profits by firms.

C. THE PROFITS OF A FIRM AND AGGREGATE PROFITS

Growth is explained in the concept of monetary economy as the result of accumulation decisions made by a particular social group, capitalists. Therefore, as classical political economy has stressed, income distribution and growth are essentially connected subjects. On the other hand, income distribution, particularly the share of income retained by firms depends, as post Keynesians have emphasized, on the profile of aggregate demand.⁴

It was proposed earlier that firms set profit targets when making their pricing decisions aiming to generate internal funds for expansion. Those profits are attained when firms are successful in selling the volumes they expected. Thus, the confirmation or disappointment of profits expectations (and, with these of planned forms of financing investment) depends on correctly estimating the behaviour of sales during the relevant period.

For an individual firm to see its sales plans confirmed it is sufficient that its own demand be sustained. But the demand for any specific good or service depends on its buyers being able to implement their purchase plans of which that good or service is an element. In a specific market, of course, it may be largely a question of chance how many buyers a firm attracts. The deeper in detail one delves, the more arbitrary becomes the distribution of demand. In what follows, we will assume that the demand for each market is related in a stable way to aggregate demand, given the relevant income-elasticities, and that the distribution of demand within a given market is such as to keep market shares constant (Pasinetti, 1981). On these assumptions, then, both aggregate and individual profits are dependent on the level of aggregate demand.⁵

Kalecki has shown, using national accounting identities, that, on the assumption that workers consume all their income, aggregate profits are equal to capitalists consumption plus private investment plus budget deficit of the public sector and plus the balance of external transactions (Kalecki, 1971, chapter 8).

For a closed economy without government then, the confirmation of profit expectations by firms depends, at least partially, on the consumption expenditures of capitalists and on the investment expenditures of firms themselves. There is then a complex interconnection between the micro and the macro levels of analysis at this point: firms form, at the micro level, expectations of sales to obtain target profits; the confirmation of these expectations depends, on the other hand, on the firms themselves spending the amount necessary to validate the sales expectations.

In equilibrium therefore, expectations have to be such as to induce the right amount of expenditure that will validate them. Out-of-equilibrium positions can then be described as being those on which expenditures that are induced by expectations are not those necessary to validate the original sales expectations. In this case, the amount of profits generated by the multiplication of unit profit (profit per unit sold) for the number of items sold, will not be what firms expected.

The point is that aggregate profits are generated by aggregate demand, not by the mark-up decision of the firm. Pricing determines the distribution among firms of aggregate profits, but not their generation.⁶

The actual generation of profits, thus depends on there taking place enough acts of spending on consumption goods and on investments goods. As long as the marginal propensity to consume is smaller than one, growth becomes a condition of survival of firms also in this sense.

If firms entertain optimistic expectations as to the possibility of earning profits from their activities they will issue liabilities to absorb funds and extend their scale of operations. This introduces a crucial requirement of stability operating in the economy related to the validation of expectations. Capitalist firms issue liabilities on the

expectation of future cash inflows. If these flows do not materialize, insolvency may follow.⁷

In sum, for firms to be able to obtain the receipts that will allow them to validate their debts and to earn the profits they expected it is necessary that the right volume and structure of aggregate demand to be generated. We can consider, with Keynes and Kalecki, that consumption expenditures are induced by income. This means that, in a closed economy without government, aggregate profits depend on investment. If investments are not realized, not only some firms have losses but also, through the financial linkages, suppliers of funds are hurt.⁸

In this sense, in a study of growth strategies and performance, a crucial step must be watched: it relates to the discussion of the behaviour of aggregate demand, its volume and elements.

Investment expenditures perform a strategic role, then, because on them depends the validation of profit expectations by firms, but also because they are autonomous with respect to current income. In Keynesian theory, to be autonomous means that investment decisions are independent of current income, both because investment is induced by expectations of future profits and because it is sustained largely by discretionary funds, accumulated assets and external funds obtained from credit institutions. According to Keynes (1973, vol. 14, pp. 215-23), banks perform a crucial role in making investments possible.⁹ It is to this that we turn now.

D. THE ROLE OF BANKS

Banks and other financial institutions are connected to fluctuations in output and employment as they "hold the key position" to stimulate business. For Keynes credit is a necessary condition, although not the only one, for firms to implement their production and investment plans, as it creates the purchasing power firms need to start their activities. In his words,

The demand for liquidity can be divided between what we may call the active demand which depends on the actual and planned scales of activity, and the inactive demand which depends on the state of confidence of the inactive holder of claims and assets; whilst the supply depends on the terms on which the banks are prepared to become more or less liquid. In a given state of expectation both the active and the passive demands depend on the rate of interest. So sometimes does the supply; but not necessarily, for the banking system may aim at the quantitative regulation of money without much regard to the rate. (Keynes, 1973, vol 14, pp. 221-2.)

When defining "active and inactive" demands for money Keynes introduces a fourth motive (besides the transaction, precautionary and speculative motives as defined in The General Theory, chapter 15), the "finance" motive, which allows him to discuss the role of the banking system in generating liquidity. It is also through this discussion that Keynes makes his position clear about the dissociation between changes in the level of current activity and the level of ex ante savings, that is to say, the process of financing investment decisions.¹⁰ According to his view, the interregnum between the decision to invest and its achievement is bridged by "Credit, in the sense of "finance", [which] looks after a flow of investment. It is a revolving fund which can be used over and over again." (Keynes, 1973, vol. 14, p. 209.)

In this sense, "In order that the entrepreneur may feel himself sufficiently liquid to be able to embark on the transaction [a new investment], someone else has to agree to become, for the time being at least, more unliquid than before" (ibid., p. 218), and so banks and other financial institutions are in a position of regulating the pace of new investment.¹¹

In considering the supply of finance Keynes writes,

The entrepreneur when he decides to invest has to be satisfied on two points: firstly, that he can obtain sufficient short-term finance during the period of producing the investment; and secondly, that he can eventually fund his short-term obligations by a long-term issue on satisfactory conditions.

Thus the terms of supply of the finance required by ex ante investment depend on the existing state of liquidity preferences (together with some element of forecast on the part of the entrepreneur as to the terms on which he can fund his finance when the time comes), in conjunction with the supply of money as governed by the policy of the banking system. (ibid., p. 217, his emphasis.)

To the need for funding we will return later in this chapter. To provide finance, according to Keynes, is a function of banks. Banking institutions fix their policy of lending money according to, at least, two main factors. One is the amount of reserves in cash thought to be "safe" in relation to their liabilities. The second factor is that banks will provide loans depending on the margins of safety they can guarantee for their application.

Banks cannot know how their loan is being used, and so this is a sort of risk always involved in the operation. But the main risk incurred by banks is about the liquidity of their loan. As Keynes puts it "A loan may be liquid from the point of view of an individual banker, because he knows he can get his money back if he wants, although the proceeds of it are being employed in fixed forms." (Keynes, 1973, vol. 13 , p. 7.)

Uncertainty about future prospective yields may erode the safety margins, causing a contraction in the supply of loans. Banks, then, in order to avoid a depreciation valuation of the market value of their assets, will try to recover their position, and a way of doing this is by refusing to provide new loans, either absolutely or, more likely, in relative terms, raising interest rates or safety margins requirements. So, although banks can create credit, there is a limit to the process given by their own liquidity preference.¹²

To take bank's liquidity preference into account also implies that credit is not offered in a indiscriminate way; customers are selected according to the evaluation by the bank of the future profitability of the business or, secondarily, the liquidity of the assets it can offer as collateral. Moreover, the disposition to expand or contract credit depends on expectations about the performance of the whole economy.

This arguing about the position of banks to expand credit at their will suggests that the supply of money, is, at least in part, endogeneously created (Chick, 1983, chapter 12).¹³ So, being firms, banks¹⁴ make up their decisions based on expectations and the assumption that money is endogeneously created becomes an additional element to amplify the potential instability of the economic system¹⁵ (see sections below).

E. AGGREGATE PROFITS AND THE VALIDATION OF DEBTS

Since decisions are made under uncertainty, entrepreneurs must take risks when engaged in productive activity. Firms will try to bring risks to a minimum by gathering as much information as they can from their environment. As in a monetary production economy information about the behaviour of the markets is never complete, the spaces left unfilled are to be completed by "figments of imagination" (Shackle, 1979). Stability of business will then depend on the degree of confidence entrepreneurs attach to their choices, and confidence is built based on the validation of previous plans and expectations.

Two sorts of risks are actually incurred by entrepreneurs when deciding to invest. The first deals with the behaviour of their markets that will or will not allow them to validate their production and pricing decisions. Another one deals with the validation of their debts, that is to say, with the ability of the firm to keep the value of its assets balanced with that of their liabilities.

The way that this balance can be assured is through the maintenance of an equilibrated cash flow along the periods. That is to say that the extent to which firms will be able to keep their business running in equilibrium will depend at first instance, on their ability to generate a cash inflow that is enough to meet their debt commitments, and, on a second instance, on their ability to keep their borrowing capacity in the financial market.¹⁶ At each moment in time the degree of vulnerability of the business will be given by the financial situation of the firm that will allow it to have more or less room for manoeuvre and keep its commitments updated in case production or sales expectations are disappointed.¹⁷

So, the point is that in a monetary production economy even if individual profit expectations are not promptly validated by demand, firms may survive as long as the financial system is able to meet their demands for cash. This sustains Minsky's assumption that the financial system in modern capitalist economies amplifies the movements of aggregate output as it provides resources to firms to produce and invest. As Minsky puts it "A fundamental attribute of our economy is that the ownership of

assets is typically financed by debts and debts imply in payment commitments." (Minsky, 1986, p. 42.)

At the macro-level then, the extension to which aggregate profits are sufficient to validate aggregate debts is a crucial factor to give stability to the economic growth process.

Minsky postulates that capitalist economies are unstable in their nature. Uncertainty about the unknown future is the ground for instability. But what allows uncertainty to spread over the economic system, generating instability is the financial links economic agents establishes among themselves. Since investment in long lived assets relies on external finance to be carried out, a synchronization between payment of debts and receipts of income must occur to keep the functioning of the system in a smooth basis.

All this means that when discussing macroeconomic stability, one should pay attention not only to indebtedness, but also to the temporal profile of debt payment commitments for they are crucial to determine the nature of financial pressures a firm may suffer. At the firm level the financial postures that may be adopted - hedge, speculative or Ponzi - determine the health of the business. In the macro-level, "The mixture of hedge, speculative and Ponzi finance in an economy is a major determinant of its stability." (Minsky, 1986, p. 209.)

The changes in the aggregate temporal profiles of payments is at the root of the financial fragility and instability post Keynesian economists attribute to modern capitalism.

F. FINANCIAL INSTABILITY

In a period of prosperity the degree of confidence attached to expectations is increased as decisions undertaken in the past prove to be correct. Entrepreneurs become more willing to take risks as they wish to expand their business. More ambitious investment

projects are pursued. Financial institutions in such a context play their role of supporting this greater ambition of the private sector by expanding the supply of credit.

A period of prosperity may begin with hedge units being dominant, and so liquidity is plentiful as the asset structure is heavily weighted by money or liquid assets and the quasi-rents yield by current expenditure on capital assets are high. The degree of indebtedness is low as the debt commitments are low in relation to the expected yields of capital assets. The interest rate structure is such that it encourages investment in fixed assets as "short term interest rates on secure instruments will be significantly lower than the yield from owning capital." (Minsky, 1986, p. 211.) The confirmation of expectations about sales revenues and the robustness of the balance sheet of firms encourage them to take more ambitious plans of investment.

On the other hand,

In a world dominated by hedge finance, profit opportunities exist for both borrowing units and banks to shift to a greater use of short-term debt to finance positions in capital assets and long-term debt. (ibid., p. 211.)

The passage from a situation where hedge units dominate to a situation where speculative units dominate occurs then because capitalists and bankers are seeking for more profit opportunities to be exploited.

As far as this process of "money now in exchange for money later" continues the margins of safety involved in financial contracts, that is to say, the proportion of money and other easily negotiable financial instruments to the necessity of cash to fulfill contracts obligations, are being reduced. According to Minsky

Investment activity is usually financed by short term debt. Thus when an investment boom takes place in the context of an enlarged need to refinance maturing debt, the demand "curve" for short term debt increases (shifts to the right) and becomes steeper (less elastic). (Minsky, 1982, p. xvii.)

The inelasticity of the demand for funds is due to occur because investment in capital

assets is a time-consuming activity, and before an investment project is completed, it has no value as determined by the future streams of profits.

Because of that, a rigidity in the demand for funds¹⁸ is likely to occur and so an increase in the cost of finance, that is to say, an increase in the interest rates diminishes (or even eliminate) the margins of safety.

As a boom develops, the supply curve of finance then becomes less elastic. But, while an investment boom is taking place, further credit can be found, however, at a higher cost. An increase in the cost of finance leads firms to commit larger portions of their expected cash flow to debt servicing. This means that portfolios become more speculative and more fragile.¹⁹

As long as profits are rising, increasing indebtedness will be stimulated and lower margins of safety will be accepted. For speculative finance to continue it must be expected that financial resources will remain available, so firms engaged in speculative and Ponzi finance can refinance their debts.

As far as a general degree of confidence in the future is maintained, individual agents will keep their expectations high. How much can be borrowed at the financial markets depend on how much financial institutions are willing to lend, according to their view about the safety of businesses.

This trend changes when the degree of confidence on the ongoing situation decreases. In general this means a decline in the net expected cash inflow and eventually a short fall of cash and an increase in demand for liquid assets (liquidity preference rises). Minsky describes the situation as follows:

A boom, once started, lives a precarious life. It depends upon realization of optimistic expectations about yields so that capital gains accrue to investors in debts and shares as well as to investors in capital assets. From a multitude of possible causes - rising wages or production costs, feedbacks from rising interest rates to the value of older long term debt, the high cost of refunding previous debt - a large number of units can be forced to try to raise cash at the same time by taking advantage of the liquidity that some of their assets are

presumed to have, i e, by attempting to sell "liquid assets". Furthermore, for some units the burden of debt in the form of cash commitments can become so large that they are forced to sell or pledge capital assets to acquire cash to meet debt commitments. (Minsky, 1975, p. 115.)²⁰

An unexpected shortfall of cash, an increase in the interest rate (and so an increase in the supply price of output and a decrease in the demand price for investment), together with a change in the degree of confidence on the future behaviour of business will make speculative units review their desirable degree of indebtedness. As Dow writes, "Mistaken expectations are costly when financing is highly geared." (Dow, 1986-87, p. 246.) This will lead firms with high indebtedness to reduce their investment expenditure in an attempt to reduce their dependence on external finance.

This attempt by individual firms to improve their degree of indebtedness may, as suggested by Steindl,

not put matters right. Assuming that outside savings are relatively inelastic, the further drop in the accumulation of real capital will not be accompanied by a corresponding drop in the accumulation of outside savings, and consequently internal accumulation must drop more than total capital accumulation, and the entrepreneurs will find that their relative indebtedness (gearing ratio) continues to grow. In other words, the impact of any reduction in investment owing to the inelasticity of outside saving, must be mainly on internal accumulation. (Steindl, 1976, p. 114.)

So, a reduction in the rate of investment of individual firms slows down the growth of aggregate demand which implies a slower growth of aggregate profits.

Furthermore, a shortfall of profits in face of the needs for cash to validate debts and a decrease in confidence in business, increases furthermore the cost of additional debt (as demand for liquidity increases) and the weight of speculative and Ponzi units in the economic system. The consequence of portfolios becoming more speculative is that the economic system becomes more vulnerable to shocks or to the disappointment of expectations: these will have an amplified negative effect on further economic decisions. This is an environment propitious to a recession or depression.²¹

For the same reason that a situation where hedge units dominate will gradually lead to a situation where speculative and Ponzi units are dominant, in the aftermath of a financial crisis a more conservative financial structure will emerge. Firms and banks as well as other financial institutions will try to avoid (for a while) speculative practices, and so portfolios will be reconstructed with less risky assets. Margins of safety will improve and liquidity will be higher again.

To sum up, in modern capitalist economies, endowed with a sophisticated financial market, the disappointment or confirmation of expectations about profits will affect the functioning of the system depending on the degree of indebtedness of economic units. When hedgers are predominant a stimulus to become more speculative is given by competitive pressure. Financial institutions play their role increasing credit and this process is due to have an end when the degree of confidence becomes threatened. As Minsky expresses this point:

Because of speculation and the endogenous evolution of monetary and financial practices, a capital-using capitalist economy exhibits a diversity of behavioural patterns. In particular, financial instability - both upward into a euphoric boom and downward into a deep debt-deflation depression - is an endogenous phenomena. (Minsky, 1977, p. 307.)

The path of growth to be followed by the system as a whole will then depend on how financial institutions and economic policy makers react to changes in the degree of confidence. The dynamics of the system depends then not only on how much entrepreneurs decide to spend in new capital equipment, but also on how they finance new investment plans. In other words, it is not only the rate of investment that matters, but also how portfolios change to accommodate different rates of growth of aggregate demand.

One should notice that the preceding discussion, based on the well-known concepts proposed by Minsky, suggests an approach alternative to Keynes's distinction between finance and funding, referred to in section D. Instead of two clearcut, sequentially defined procedures as suggested by Keynes in an approach that sharply distinguishes the role of banks from that of other financial institutions, Minsky opts for a more general, perhaps, approach in which many types of financial procedures are possible.

While, admittedly, Keynes's own proposal was more adequate to British institutions, Minsky's approach allows to discuss other cases as well, including, as will be seen later, the case of Brazil.

G. FINANCIAL INSTABILITY AND INFLATION

With inflation the degree of vulnerability of the economic system is increased. Inflation makes relative prices more unstable, when it is a primary requirement of capitalism to have a reliable price system. As Keynes once said "The individualistic capitalism of today... presumes a stable measuring-rod of value, and cannot be efficient - perhaps cannot survive - without one." (Keynes, 1972, vol. 9, p. 75, his emphasis.)²²

We saw in chapter 4 that stable and to a certain extent predictable inflation rates do not turn the economic system unstable as far as inflationary expectations remain inelastic to variations in price level. Instability arises when expectations become elastic in relation to changes in prices and as a result past "conventions" cease to hold.

Moreover, if inflation is a prolonged phenomenon then economic agents are likely to adjust their behaviour to the new environment. Capitalist firms facing inflation may become more speculative in relation to the future as now "playing the inflation right is vital" (Leijonhufvud, 1981, p. 248.)

A consequence of such change is that firms which are more efficient in "guessing" how relative prices will behave in the future will be in a better position in relation to the others. Income then is constantly redistributed in favour of those who show more accuracy in their forecasts.²³

The same reasoning is true to different classes of economic agents, meaning that inflation is the result of a social conflict over income shares (Weintraub, 1978, chapter 9). Considering the equation of Weintraub $P = k(w/A)$,²⁴ exogenous alterations in money wage rate (w), would lead prices (P) to increase, and so (if velocity does not change and output is not to be reduced), in the quantity of money required for

transactions. Accommodations in the mark-up (k) and in the increase in productivity (A) would decrease the need for money. However, the point to be highlighted is that, in a monetary economy endowed with a sophisticated financial market, wage contracts are financed by the banks.

So, given that inflation is a form of social conflict, the assumptions that money is endogeneously created and the consideration that money contracts are the core of a modern monetary production economy, lead to the suggestion that the fuel for social conflict is supplied, at least partially, by the financial markets. It is through the credit markets that the process of monetary accommodation to higher nominal costs occurs. Increases in production costs will lead directly to an increase in the quantity of bank credit demanded and to a corresponding increase in the quantity of bank deposits and in the money stock.²⁵ It is in this sense that Minsky writes:

In a world with intertemporal contracts denominated in money, the path of money wages and prices determines whether such contracts are fulfilled. If money wages and prices change by the same percentage, the "real " wages of neoclassical theory do not change - but the cash flows available to meet payment commitments do. Nominal magnitudes matter. (Minsky, 1986, p. 257.)

It is up to the banking system and other financial institutions to accommodate the increasing demand for loans given that these institutions are in a central position in the liquidity creating process. They will do that but according to their discretionary power, and, although the result may be credit expansion, the conditions in which new debt contracts are made will be different.²⁶

The developments in the financial markets will be towards increase in the interest rate, which will raise cash flow commitments without necessarily increasing prospective receipts in the same proportion. That is to say that firms may be forced into more speculative portfolio positions.

Another characteristic of inflationary environments is the shortening of periods of contracts that makes a hedge financing strategy virtually impossible to be followed. Firms when debt-financing long-lived assets in an inflationary environment will always be in a speculative or Ponzi position as they expect that their future revenues will be

enough to cover their increasing financial costs (since they will be using short term credit to finance long term positions). Moreover, as we said before, loans are agreed based on margins of safety that may increase more than proportionally to the revenue of the firms.

Finally, with inflation, not only are more conservative financial postures difficult to hold, but also more speculative postures by credit suppliers are stimulated. In the same way that contracts are shortened, the allocation of resources in short term assets is also stimulated to keep portfolios more flexible.

Real liquid capital suffers great capital value appreciation during periods of inflation as the expectation is that forward prices will be higher than spot prices. This stimulates the speculative holding of commodities and as a consequence, production costs are penalized. In the aggregate, the increasing weight of speculative and Ponzi units in the economic system reduces its ability to absorb shocks and it becomes more vulnerable to being driven away from the "corridor".

So, inflation increases the degree of instability in the economic system shortening the period over which commitments are made. Moreover, a prolonged period of inflation leads to misallocations of resources as a consequence of the changes in the price system.

H. A SUMMING UP

In this chapter we turned our attention to some issues trespassing the borders between micro and macroeconomic analysis. Our concern was not to develop the microfoundations of macroeconomics or even the macrofoundations of microeconomics, but of searching the mutual influences of both fields, using microeconomics to shed light on motives, choices and strategies and macroeconomics to understand possibilities, constraints, and actual developments.

Macroeconomic theory becomes a relevant subject of study when it is understood that

aggregate results are different from the sum of individual actions. Under the non-probabilistic uncertainty assumption the validation of individual expectations is not a priori secured, not even in the average, and some accommodation of plans at the macro level must probably take place. The study of this process of accommodation is on the core of macrodynamics.

It is the emphasis on the study of the interaction of decisions made under uncertainty that leads post Keynesian theory to be concerned with processes rather than with states. Economic agents in a world where only the present exists and the future is to be created have to accommodate plans when expectations change.

Different forms of accommodation may follow, specially in a monetary economy where money can be used to postpone the commitment of resources. This means that in a post Keynesian approach the role of the observer is to study past behaviours, to analyse how institutions and rules are organized to deal with uncertainty, to classify new possibilities of developments and describe possible future scenarios. It is in this sense that Shackle sees that "the results attained by economic theory are largely classificatory." (Shackle, 1969, p. 291.)

The main variable to explain growth is the rate of investment in fixed assets and, as investment plans and strategies are set up by individual firms, post Keynesian theory pays particular attention to the links between capitalist firms and other economic agents (in special banks and financial institutions) and capitalist firms among themselves.

Investment decisions are made up based on expectations and their validation depends on the behaviour of aggregate demand, that is, on aggregate expenditures in consumption and investment. Given Kalecki's division of National Income into profits and wages, and the assumption that workers expend all their income in workers consumer goods and capitalists' income is expended on capitalist consumer goods and investment, it follows that the investment rate (whether measured against total national income or viewed as the percentage change over time) also determines income distribution. So, economic growth and income distribution are linked to one another

through the rate of investment.

Investment expenditures made up by individual capitalists will determine how fast the economic system will grow, but for post Keynesian theory it is also relevant to discuss the path of growth, that is to say, how stable it is. This discussion touches another crossing between micro and macroeconomic - how investment in fixed assets is financed. The interrelation between firms and financial institutions is expressed on the conditions in which finance on fixed assets is agreed. According to Minsky,

Financial markets and banking affect investment because the current value of capital assets and thus the demand price for investment output are determined in financial markets, because the amount of investment that will be financed depends upon banking processes and because the supply price of investment depends upon the costs of finance. (Minsky, 1986, p. 227.)

Capitalist firms issue liabilities on the expectation of future cash inflows. Banks, because they can create money, have the flexibility of accommodating the demand for funds by firms. Bankers, like businessmen, are subject to the same expectational climate to make up their decisions and as they are profit seeking institution, modern capitalist economies tend to be unstable.²⁷

A period of high expectations and high liquidity is propitious for more aggressive financing practices to develop. This will lead to more speculative financing, that is to say, to the use of short-term debts to finance long term positions. Margins of safety deteriorate and changes in expectations will lead to new demands for funds being rejected. A phase of more conservative financial practices then follows. So, banking practices can be "highly disruptive", but in economic systems with long-lived capital assets they are needed to sustain its dynamics.

Instability, although inherent to modern capitalist economies endowed with sophisticated financial markets, is heightened in a scenario of permanent inflation. In this case hedge postures do not hold and speculative and Ponzi units are always dominant. Because conventions on which business practices are based change frequently, long term positions are virtually impossible to hold. Money contracts are shortened as a defence against losses in the purchasing power of money and short term

assets are preferred. In a word, under permanent inflation the economic system is more vulnerable to changes in the expectational climate and consequently more easily driven away from the "corridor".

Up to this point our theoretical discussion aimed to prepare the field for the development of a post Keynesian model for the Brazilian economy in the following chapters. We shall start discussing the environment in the seventies in the Brazilian industry in order to develop in the next two chapters, a model for the Brazilian economy.

NOTES TO CHAPTER 5

1 - According to Dow,

The fallacy of composition is a central feature of any discussion of microfoundations; according to this fallacy, individual actions, if common to a large number of individuals, will generate an outcome different from what was intended by each. (Dow, 1985, p. 82.)

2 - According to Chick, for the economy as a whole it may be better to eliminate the propensity to save function and keep the concept only in the micro level where such a choice is possible (Chick, 1983, chapter 9).

3 - See Keynes, 1936, chapter 2 and Kalecki, 1971, chapter 14.

4 - Theories have emphasized alternatively either micro or macro determinants of income distribution. Post Keynesian models characteristically start from macro requirements for equilibrium. Kaldor proposes an integration of a macrodeterminant of profits, namely private investments and a microeconomic adjustment mechanism through changes in profit margins (Kaldor, 1960). Robinson (1969), also emphasizes the macrodeterminant aspects. In contrast, theories based on market power tend to privilege the power of firms in "exploiting" the market. Minsky and Ferri (1984) have successfully identified the necessity of working with both mechanisms at the same time. The authors build a formal model to perform "an exercise in integrating a market process explanation of price movements, with the constraints upon prices and employment that reflect the aggregate characteristics of the economy." (Minsky and Ferri, 1984, p. 498.)

5 - The assumption of given market shares may be seen as a variant of the procedure of Keynes in the General Theory, who assumes a fixed production structure.

6 - Minsky express this point as follows:

The distribution of cash flows among firms - which can be viewed as the outcome of a competition among capitals for profits - depends upon the behaviour examined in microeconomic analysis, but the macroeconomic state of the economy determines the totality of such cash flows. That is the individual prices, outputs, and allocations are determined under conditions that reflect the macroeconomic state of the economy. Even relative prices, the main province of neoclassical theory, are not independent of how total demand is divided among investment, consumption, and government; they are not set by technology and preferences alone. (Minsky, 1986, pp. 142-3.)

7 - This point will be explored further below. Insolvency, nevertheless, need not be the only possible outcome. Steindl (1976, pp. 112-4) described an adjustment of

balance sheet on the liabilities side that may be necessary when expectations of cash inflows are disappointed. An increase in indebtedness may avoid the curtailment of the firm's current expenditures. The same factor, however, may depress plans for future expenditures.

8 - If short term expectations, as proposed by Keynes, which inform production (and employment) decisions are strongly influenced by current results, deficiencies of effective demand may not only create cash flow problems for firms, but also affect the amount of employment offered in the next period. In the concept of monetary economy, effective demand failures, in Leijonhufvud's terminology, are due to occur because:

The system will register, he [Keynes] argued, only those demand signals that can be backed by ready purchasing power. But transactors who in a disequilibrium state find themselves unable to realize their desired sales will not acquire the money with which to "back" what would otherwise be their "desired" demand. (Leijonhufvud, 1981, p. 332.)

9 - Chick (1986) describes the evolution of the banking system, connecting its behaviour with changes in the theory of saving, investment and interest rate.

10 - After the publishing of The General Theory Keynes wrote two articles where he made clear his point about the irrelevance of ex ante saving in financing investment. These articles are reprinted in volume 14 of his Collected Writings (pp. 201-223). Recently Asimakopulos (1983), discussed Keynes's (and Kalecki's) position, arguing that the multiplier process would not be enough to restore banking liquidity, and so an increase in the propensity to save would be necessary to induce long term financing. For the debate that followed Asimakopulos article see, Kregel (1984-85), Snippe (1985), Kregel (1986), Asimakopulos (1986), Davidson (1986), Terzi (1986) and see also Davidson (1978, chapter 12), Davidson (1982, chapter 3), Amadeo and Franco (1989) and Wray (1988).

11 - As Kregel puts it:

It is the banking system which must allow its balance sheet to adjust by fully satisfying the additional demand for cash at the prevailing rate of interest. (Kregel, 1984-85, p. 149.)

12 - Keynes, when explaining a process of over investment, expressed this idea:

But the important point is that if in any year the amount invested exceeds the amount saved, this establishes a scale of investment from which there must necessarily be a reaction. If the proportion advanced by bankers against fixed security increases, for the scale of investment thus established to be maintained it is necessary not merely that the proportion should be maintained at this higher level, but that it should be raised still further. A mere maintenance of the proportion at the same figure as the previous year does not permit a new

investment to exceed new saving. Even if the new proportion is not itself incautious, a point must soon come when further increases are impossible...

Three pages latter:

Let me summarise my argument so far. What precipitates a reduction of banking facilities and a crisis is not lack of money, that is to say of gold coins, but lack of free, uninvested capital. (Keynes, 1973, vol. 13, p. 9 and p. 12.)

On Keynes's answer to Ohlin's arguments about the role of ex ante saving he suggests that Kalecki's increasing risk theory would apply to explain "the limit to the extent of the commitments which the market would agree to enter into in advance." (Keynes, 1973, vol. 14, p. 208.) On liquidity preference of banks see also Dow and Dow (1989).

13 - An interesting discussion about the relevance of liquidity for the determination of aggregate demand is in Chick (1979, chapter 4). For extreme views of endogeneity, that are not required for the argument above, see Kaldor (1982), Lavoie (1984), Moore (1988), and Rogers (1989).

14 - According to Davidson the nature of banking operations is speculative as "Commercial banks are always borrowing short to lend long" (Davidson, 1978, p. 419).

15 - Anything that increases the elasticity of the credit system increases potential instability. This potential instability is further increased by the role of the Central Bank in modern capitalist economies. The Central Bank, acting as a lender of last resort,

buys, stands ready to buy, or accepts as collateral financial assets that otherwise are not marketable; it thereby substitutes, or stands ready to substitute, its own riskless liabilities for assets at risk in various portfolios. (Minsky, 1986, p. 38.)

This implies that risks are socialized to avoid a financial crisis, but it has a cost. Instability increases because the Central Bank's behaviour validates past mistakes and so it may stimulate risk-taking finance in the future.

16 - We are calling borrowing capacity the ability the firm has to get loans when it needs them. Minsky explains that:

When a shortfall of current profits occurs, the source of the funds needed to fulfil commitments is either cash on hand, borrowing or the sale of assets.

Broadly speaking, it is the banking system that makes it possible for business to fulfill payment commitments in the absence of sufficient current profits. (Minsky, 1986, p. 165.)

17 - When the firm adopts a defensive financial strategy, that is to say hedging

finance, it does not eliminate risk as uncertainty about sales revenues cannot be suppressed (the exception is for firms who produce to order). In this sense, Carvalho (1986, chapter 5) says that a "true hedger" cannot exist in a monetary production economy as this would imply that the behaviour of demand is known beforehand.

18 - According to Minsky,

If the rise in interest rates is extreme, the present value of investment good as a capital asset can fall below the supply price of the investment good as current output. Such a present value reversal, if it occurs, will bring investment activity to a halt. If the interest rate increases are sharp and are accompanied by declining estimates of the profitability of projects, even investment projects under way will be abandoned. (Minsky, 1986, p. 195.)

19 - A conclusion from Minsky is:

The evolution of financial markets which facilitates the use of short term debt tends to build liability structures which can be sustained only if total investment increases at a rate that cannot for long be sustained. (Minsky, 1982, p. 41.)

20 - In another passage Minsky describes the end of a period of boom like:

As a boom develops households, firms, and financial institutions are forced to undertake ever more adventuresome position-making activity. When the limit of their ability to borrow from one to repay another is reached, the option is to either sell out some position or to bring to a halt, or slow down, asset acquisition. For operating firms this involves a reduction in the leverage used in financing new investment. (Minsky, 1975, p. 124.)

21 - A depression could ensue if the crisis led to some heavy debt-deflation, that is, the attempts by debtors to liquidate assets to make cash, creating buyers markets and falling asset prices. Minsky, based on Fisher (1933), gives two reasons why a debt deflation process follows a crisis. One is that the "borrower risk is so great that investment is less than internal funds can finance" (Minsky, 1975, p. 126) and in the other case "the demand price of capital assets is below the supply price of capital assets [and] investment in this case will tend to zero" (ibid. p. 126). For some historical description of financial crises along Minskyian lines, see Kindleberger (1978).

22 - Stable prices does not mean that prices are invariable. It implies that the perception of economic agents is of a stable price level meaning that price level increases moderately or suffers variations that are small and short-lived.

23 - Hicks calls attention to the costs of these changes in behaviour for the efficient functioning of the economy. See Hicks (1977, chapter 4).

24 - Weintraub's equation is very simple to derive. Consider that $PQ = kW$, that is to say, the price level of all goods sold (P), multiplied by their quantities (Q), is a multiple (k) of the total payroll (W). Dividing both sides by Q, we get $P = k.(W/Q)$. But W is given by wN , that is the wage rate times total employment. Substituting in the equation, we have $P = kwN/Q$. N/Q is the inverse of the average productivity of labour A. Therefore $P = k w/A$. Weintraub assumes, based on empirical generalization, that k is constant.

25 - In an indexed economy, with indexed public debt the increase in money supply becomes automatic, pegged to the rate of inflation that adjusts the service of public debt, both in its interest rate and in its redemption value.

26 - Gedeon (1985-86, p. 212) raises this point.

27 - A high level of prospective profits and a high degree of confidence in these prospects promote enterprise and, at the same time, ease the supply of finance:

Thus the supply of finance cannot be regarded as a rigid bottleneck limiting the rate of investment, but must be treated rather as an element in the general atmosphere encouraging or retarding accumulation. (Robinson, 1959b, p. 21.)

CHAPTER 6
INFLATION AND GROWTH: MAIN ISSUES IN A POST KEYNESIAN
INTERPRETATION OF THE BRAZILIAN DEVELOPMENT IN THE 1970's

A. INTRODUCTION

Our task in this and in the following chapters will be to set out a post Keynesian interpretation of the principles which governed growth of the Brazilian economy in the seventies. Post Keynesian theory encompasses social and institutional relations in its analysis. Those elements are important in an environment where decisions are made under non-probabilistic uncertainty, and, as we saw in the last chapter, that is how, in post Keynesian theory, the connection between micro and macro economic analysis is tackled.

In chapters 2, 3, 4 and 5 we developed the analytical framework that will guide our empirical study of the Brazilian economy in the seventies. First we shall survey Brazil's economic performance in the seventies, highlighting the main structural characteristics of the functioning of the economy. As we saw in the first chapter of this research, available interpretations about the performance of the Brazilian economy during the last decade did not explain adequately the vitality of the Brazilian economy despite permanent and high rates of inflation. Our aim in this chapter will be to build the bridge between relevant aspects of the theory and the empirical work that will be to developed in this and in the following chapters.

Inflation has been a common phenomenon in modern capitalist economies and so habits and behaviours¹ have been adapted to deal with this extra source of uncertainty. Actually, it is because economic agents develop defensive strategies against inflation, that an inflationary shock is easily propagated through the economy. In this sense it is understood that modern capitalist economies can suffer from rising prices and stagnant production as a result of the increased uncertainty surrounding decisions.²

The Brazilian economy has presented a trend towards price increases since price statistics became available,³ but it had also shown a quite remarkable performance in

terms of rate of growth of aggregate output. During the seventies, the period of our analysis, the Brazilian economy presented rapid rates of growth with two-digit rates of inflation. On average, during the decade, the rate of growth of industrial output was 8% while average rate of inflation was around 30%.

The coexistence of sustained growth and persistent inflation is only possible when the environment is modified to allow agents to make relevant decisions under such circumstances. In this chapter we shall, at first, identify three distinctive phases of growth and, afterwards, discuss the main characteristics of these periods. In the last section we shall comment on the behaviour of firms in the period.

B. THE MAIN CHARACTERISTICS OF THE SEVENTIES: THE PHASES OF EXPANSION

Permanent inflation and balance of payments constraints have been recurrent problems of the Brazilian economy since the War. The process of industrialization in the fifties aimed chiefly at the domestic market and, as exports were led by primary products, balance of payments constraints were avoided by the absorption of foreign capital. Annual inflation rates in the 1940s and 1950s oscillated between 10 and 20%, but at the end of the fifties they jumped to 40% and reached 100% a year in 1964. Permanent inflation inhibited the development of a domestic financial system, preventing the provision of enough financial resources and the development of adequate instruments of intermediation of these resources. This deficiency was identified as a bottleneck to the development of Brazilian capitalism (see, for example, ECLA, 1971).

In the late sixties, economic reforms were introduced aiming mostly to develop domestic financial market. The most significant of the reforms introduced was the institution of monetary correction (indexation) to preserve the money value of contracts.

During the seventies, the financial problem was handled in a special way. The

increasing availability of financial resources, provided mainly by international private financial institutions in the late sixties, allowed Brazil, as well as other developing countries, to use foreign indebtedness to speed up the rate of growth of aggregate output.⁴ This new source of international finance was available, although at progressively worsening terms until 1982, when private international financial institutions stopped lending to highly indebted countries. So, the choice of 1968-82 as our period of analysis is based on the assumption that the policy of external indebtedness characterizes a special stage of the Brazilian economic development: this period comprises the beginning and the end of a strategy of development.

In the Figure 6-1 and the Tables 6-1 and 6-2 we identify three phases of growth during the 1968-82 period: 1968-73, 1974-79 and 1980-82. These phases are identified according to the behaviour of the rate of inflation, the rate of growth of real output and current transaction accounts. It is clear that the delimitation of the phases, as shown in the graphs, are strongly influenced by the external shocks of 1973 (sharp rise in the oil price) and 1979 (sharp rise in the oil price and in the international interest rate). Further discussion of the characteristics of each phase follows the presentation of the data.

The first period of our analysis is exceptional in modern Brazilian economic history. Aggregate and industrial output grew at the highest rates ever achieved and inflation rates declined. Investment and consumption expanded rapidly; those were the years known as the economic "miracle". On the external front the commodity trade and the movement of capital performed favourably.

The first oil shock marked the end of the "miracle" and inflation jumped to a higher level, although it was still kept under control until 1978. Changes in the composition of industrial output started to take place during the second phase (1974-79) as the result of incentives to substitute imports in the capital goods and intermediate industries. Although the rates of growth of industrial output decelerated, they were still close to the historical trend (about 8%).

Table 6-1 Inflation and Real Growth of Output - Annual Rates (per cent)

Years	Industrial price index	Real industrial output	Real GDP
1968	24.2	15.9	11.2
1969	14.5	10.8	10.0
1970	19.0	11.0	8.8
1971	17.2	11.3	11.3
1972	15.2	14.0	12.1
1973	14.9	16.6	14.0
1974	29.4	7.8	9.0
1975	29.2	3.8	5.2
1976	35.8	11.9	9.8
1977	39.2	2.2	4.6
1978	35.4	6.1	4.8
1979	55.6	7.0	7.2
1980	103.7	9.2	9.1
1981	109.7	-11.2	-3.0
1982	99.9	-0.1	0.9

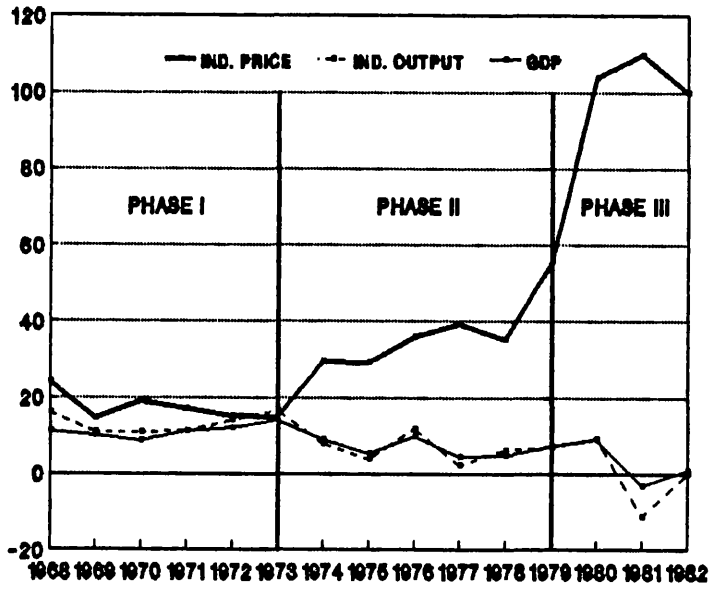
Source: Fundacao Getulio Vargas and Central Bank Bulletin, several issues.

Table 6-2 Foreign Transactions (US\$ millions)

Year	Current Transactions	Trade Balance
1968	-452	26
1969	-253	318
1970	-622	232
1971	-1307	-363
1972	-1489	-244
1973	-1688	7
1974	-7122	-4690
1975	-6712	-3499
1976	-5977	-2147
1977	-3873	140
1978	-6990	-1024
1979	-10478	-2717
1980	-12807	-2823
1981	-11717	1213
1982	-16279	778

Source: Fundacao Getulio Vargas and Central Bank Bulletin, several issues.

INDUSTRIAL PRICE, INDUSTRIAL OUTPUT, GDP



FOREIGN TRANSACTIONS

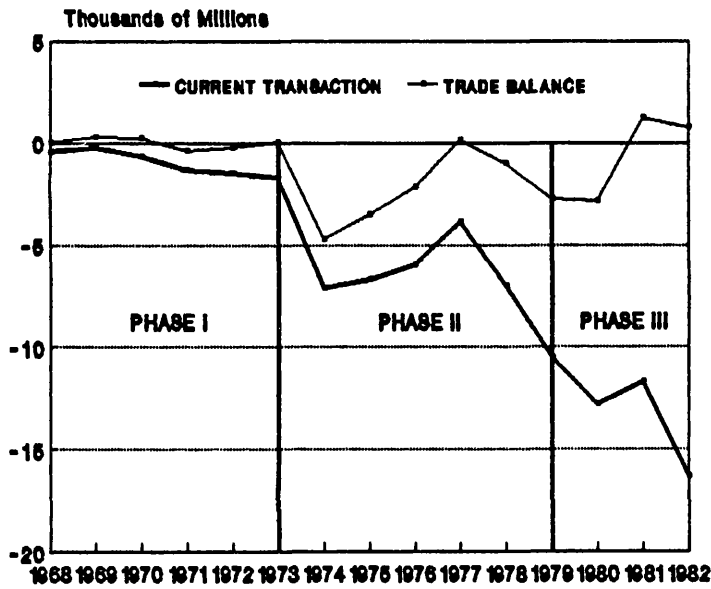


Figure 6-1 Main Macroeconomic Indicators and the Phases of Growth

The second oil shock and the sharp increase in external interest rates at the end of 1979 had a strong negative impact on the foreign accounts, as the burden of servicing the external debt became very heavy. Rates of growth of output decreased and became negative in the early eighties, and inflation rates accelerated and jumped to a three-digit level. So, a distinguishing characteristic of this period is high and accelerating inflation rates.

So, although over the 1968-82 period the average rates of growth of GDP was close to its historical trend, it fluctuated substantially (the averages for the 1968-73, 1974-79 and 1980-82 periods were 11.1%, 7.0% and 3.2%, respectively). Inflation rates were high during the whole period: the average of the annual rates was 44%, substantially higher than the rates experienced during the forties (13%) and fifties (18%). The rate was highly variable (the average rates for the three periods was 19.6%, 38.9% and 101.8%, respectively).

The instability in those rates during the periods identified was connected with the balance of payments performance. In that sense the Brazilian experience in the seventies showed (as in the past) that there is a strong relation between external disequilibrium and the inflationary process. Periods of acceleration of inflation (1974, 1979-80) coincided with problems in the balance of payments; however, the impact on the rate of growth of the economy was distinct in each case.

In addition to the policy of foreign indebtedness, which marks the limit of our period of study, the starting point of our analysis is also marked by the implementation of institutional reforms in domestic financial market, in the fiscal system and in the wages and exchange rate policies. In that sense, we can say that the recovery of economic growth in the late sixties was the result of the coincidence of favourable internal and external conditions.

Our task in analysing the evolution of the economy in each of the sub-periods identified above will be to explain how each period led to the next, that is to say, how economic conditions that emerged in the late sixties evolved from one period to the other, showing the changes in behaviour of economic agents. Of remarkable

importance in that evolution is the way in which the foreign indebtedness policy was perceived during the decade, that is to say, how its perception by policy makers changed after each external shock.

C. THE FINANCE OF GROWTH IN THE SEVENTIES

The strategy of foreign indebtedness

An implicit assumption in the strategy of growth cum debt⁵ is that domestic savings are insufficient to finance the high rates of investment needed to keep high rates of growth. External savings are then welcome to complement internal savings. But as we saw in the last chapter, according to post Keynesian theory, aggregate savings are a residual rather than a potential obstacle to growth. When we come to discuss the problem of growth in an open economy, where external finance is available to balance the needs of countries with deficits in their balance of payments, we should add a further qualification to the idea that saving can be a constraint to growth.

In the real world, it is conceivable for a country, during a period of time, to face a situation in which it has to deviate from its growth path because of an inability to change its productive structure fast enough to avoid bottlenecks in the foreign sector, that is to say, the country may have a rigid import structure and may not be able to generate enough export revenues to cover its import needs. In this case, as pointed out by Chenery and Strout,

the import limit reflects the inability of the economy to provide the composition of output - from domestic sources plus imports -that is required by its level of income, rate of investment, and pattern of consumer demand. In cases of acute shortages of imported goods, the economy will be unable to transform potential savings into investment because of insufficient supplies of investment goods. (Chenery and Strout, 1966, p. 682.)

The possibility of appealing to external finance has two implications. On the one hand the inflow of external resources allows the country to raise its rate of investment, increasing the supply of capital goods and raw materials imported. On the other hand,

external finance helps to relieve the immediate burden of foreign financial commitments, which the economy is not yet able to cover with its export revenues. In either case external finance offsets current transactions deficits.⁶

In the situations above, external finance contributes to increase domestic growth, and so the increase in the current transactions deficits occurs simultaneously with the sustaining or increasing of aggregate demand. There are, however, situations when current transactions deficits can increase, but these increases will not mean that potential growth is stimulated. Current transactions deficits can increase due to a deterioration of the terms of trade, or due to changes in the terms of foreign loans. In these cases, the increased need for external finance would not be translated into an increase in the potential growth of output. In such cases, the concept of external saving would be inadequate, as it would not express a contribution to the increase in the productive potential of the country.

When current transactions deficits increase, more external finance is demanded and, if it is not available, adjustments have to occur in the aggregate expenditure of the country: either imports have to be reduced, with consequences to the level of internal activity, and/or exports have to increase substantially to cope with external financial situation. Here also, according to the structure of exports, an increase in its volume can imply in a reallocation of resources away from domestic consumption.

So, the point to stress is that an increase in current transaction deficits cannot be taken as a measure of increasing absorption of external savings (in the sense that they are a contribution to the increase in the productive capacity of the country), as the increase can be due to a deterioration in the terms of trade and/or changes in the terms of finance of the foreign loans. In that sense, a limiting factor to domestic growth can be scarcity of international liquidity, and not external saving.

The cycle of indebtedness, as described in models of growth cum debt, establishes stages which the economy is expected to proceed until it is able to reverse the process of indebtedness, and the foreign debt should start to decline.⁷

This cycle is assumed to take a long time to be completed and it is presumed that in the stages when the economy is increasing its indebtedness, and later when it is rolling over its debt, the supply of foreign resources will continue to flow to allow the process to last. The performance of the international financial market in the late seventies and in the eighties was not in accord to what is required by the theory,⁸ and the decrease in the availability of external loans to highly indebted countries was an important fact to explain the decline in the rate of growth of the Brazilian economy.

But in the late sixties and earlier seventies, international liquidity was plentiful and international trade was developing at an accelerated rate. The strategy of foreign indebtedness that started being implemented then was also followed by changes in the domestic environment in order to improve conditions for the economy to recover from the crisis in the mid-sixties. In the following two sections we shall describe the foreign accounts and to comment the main institutional changes in the economy and economic policy in the seventies.

The 1968-73 Period

In the late sixties the Brazilian economic authorities, committed to the strategy of accelerating the rate of increase of GNP, adopted a policy of increasing foreign indebtedness to speed up domestic growth. The main concern was then perceived to be the efficient management of the foreign debt (such as spreading over time the payment of amortizations) and attracting a continuous stream of foreign capital. Two instruments (present during the whole 1968-82 period) complemented the policy of foreign indebtedness: the introduction of a system of flexible exchange rates and a system of incentives to export. The exchange rate policy aimed to maintain constant the real value of the currency, devaluating it according to domestic and American inflation. Fiscal and credit incentives to export started being introduced in 1964, aimed specially at manufactured goods. As can be seen in Tables 6-3, 6-4 and 6-5, exports grew substantially during the period, partly in response to these incentives.

During the 1968-73 period, as far as the foreign accounts were concerned, the inflow of foreign resources was far in excess of the need to finance the foreign exchange gap

and to service the debt. As a consequence, its role was to increase reserves as can be seen in Table 6-3.

Table 6-3 Balance of Payments
US\$ millions

	1968	1969	1970	1971	1972	1973
1.f.ex.gap	-258	-4	-179	-831	-893	-958
trade bal.	26	318	232	-363	-244	7
exp.	1881	2311	2739	2882	3991	6199
imp.	-1855	-1993	-2507	-3245	-4235	-6192
non fac.s.	-284	-322	-411	-468	-649	-965
2.f.ser.	-44	-45	-51	-70	-81	-44
3.f.cap.	-172	-235	-413	-420	-520	-713
n.int.	-144	-182	-234	-302	-359	-515
4.n.trans.	22	31	21	14	5	27
5.c.a.(1to4)	-452	-253	-622	-1307	-1489	-1688
6.n.mov.cap.	555	822	1060	1846	3492	3512
7.er.om.	-73	-20	107	-9	436	355
8.ch.res.	30	549	545	530	2439	2179

Source: Central Bank, annual report, several issues.

Notes: Non-factor services (non fac.s.) includes: travel, transportation, insurance, governmental transactions and others;

Factor services (f.ser.) includes: technical assistance, management fees and royalties; equipment rentals; industrial projects, models and designs; copyrights; personal income; banking fees; film rentals; commissions and agents fees; subscriptions to newspapers and magazines and others;

Factor services of capital (f.cap.) includes: interest, profits and dividends. Other Abbreviations in the table are: (n.int.) net interest, (n.trans.) net transfers, (c.a.) current account, (n.mov.cap.) net movement of capital, (er.om) errors and omissions, (ch.res.) change reserves.

As many authors pointed out (Pereira, 1974; Castro and Pires e Souza, 1985, Langoni, 1985), foreign indebtedness in this first stage cannot be seen as independent of the supply of loans. Since 1967 firms and financial institutions could borrow money from abroad⁹ and the differential in cost between domestic and foreign loans encouraged external borrowing. Pereira (1974) and Suzigan et. al., (1972) have emphasized that as financial resources were plentiful, consumption and investment could expand simultaneously without constraints.¹⁰ In fact, that was part of the answer

for the economic "miracle".

the 1974-79 period

After the first oil shock the policy of foreign indebtedness deepened. The foreign exchange gap increased substantially, as well as the degree of foreign indebtedness (during this period total external debt increased from US\$ 12.6 billion at the end of 1973 to US\$ 49.9 billion by the end of 1979). It should be noticed that great part of this debt was contracted with floating interest rates. Until 1977 the foreign exchange gap was decreasing as the trade account showed a steady improvement, in spite of the deterioration in the terms of exchange in the 3 years that followed the oil shock and the world recession. Imports over the period were concentrated in essential goods as part of the strategy of industrialization via import substituting process (see below). This suggests that foreign resources during this period were in great part committed to servicing the debt and forming reserves (in 1976, 1977 and 1978).

Considering, however, as Castro and Pires de Souza (1985, pp. 124-5) do, the effect of the world inflation on the devaluation of the external debt in real terms, and the low level of the international interest rates until 1979, the real burden of the debt was much reduced. In these terms, external indebtedness during this period contributed positively to sustain the level of activity.

In 1978 and 1979 the exchange gap and the current transactions deficit increased again, in part due to the deterioration in the terms of exchange and in 1979 also to the sharp increase in international interest rates, which led to a decrease in the level of reserves. As we shall see, after 1979 the increase in the current transactions deficits became mostly a financial problem and so the process of indebtedness did not contribute any longer to the sustaining of the level of activity.

It is during this period that the policy of import substitution was implemented (the II PND). During 1974-5, financial conditions in the international market were tight and so governmental action was aggressive to stimulate investment in priority areas. State-owned enterprises were strongly stimulated to invest and to borrow abroad (the share

of the public sector in the foreign indebtedness increased over the period, reaching over 68% in 1979), and a policy of credit subsidies to private enterprises started being implemented. In 1975 economic performance was quite below the average of the previous period, but in 1976 the economy grew at a rate close to the years of the "miracle".

Table 6-4 Balance of Payments
US\$ Millions

	1974	1975	1976	1977	1978	1979
1.f.ex.gap	-6134	-4882	-3510	-975	-2316	-4373
trade b.	-4690	-3499	-2147	140	-1024	-2717
exp.	7951	8670	10130	12139	12659	15244
imp.	-12641	-12169	-12277	-11999	-13683	-17961
nonf.s.	-1444	-1383	-1363	-1115	-1292	-1656
2.f.ser.	-88	-132	-211	-346	-513	-661
3.f.cap.	-901	-1698	-2256	-2558	-4232	-5461
n.int.	-652	-1463	-1810	-2103	-2696	-4104
4.n.trans.	1	0	4	6	71	17
5.c.a(1to4)	-7122	-6712	-5977	-3873	-6990	-10478
6.n.mov.cap.	6254	6161	6651	4863	11891	6194
7.er.omis.	-68	-399	518	-369	-639	1066
8.ch.res.	-936	-950	1192	630	4262	-3218

Source: Banco Central do Brasil, annual report, several issues.
See note to Table 6-3.

From 1976 to 1978, when finance conditions in the international market eased, economic policy in Brazil assumed a stop-and-go character to keep inflation under control. The control of the indebtedness process was made through a strict rule over imports, a liberalization of domestic interest rates and controls over domestic lending in order to attract foreign resources.

During the second semester of 1979, changes in the international financial market put in evidence the degree of vulnerability of Brazilian external accounts. The restrictive character of the credit policy of advanced countries, specially the United States,

provoked a sharp rise in the international interest rate (it reached 20% in April 1980). This was followed by a change in the private banks lending policy, expressed mostly in the shortening of the period of loans (6 to 7 years in average, while since 1974 disequilibria in the external accounts were financed for 10 years average at a spread between 0.5 and 0.75%), and in the slow rhythm in which new loans were agreed.

The situation of the balance of payments was worsened also by the deterioration in the trade balance, following the new increase in the price of oil. In December of 1979, for the first time in our period of study, a maxi-devaluation of 30% of the currency was announced.¹¹

The main point to emphasize in the 1974-79 period is that, in spite of the world recession in 1974-5, the Brazilian economic authorities launched a policy of sustaining aggregate demand and, associated to that, a policy of industrialization and increased indebtedness. The counterpart of this policy was that external accounts became extremely vulnerable to external shocks, and so, the strategy initiated in 1974 could be followed only while international finance was available. The rapid change that occurred in 1979 and the acceleration of inflation caused tensions and introduced new sources of uncertainties in the economy; the degree of confidence in the future was strongly affected after 1979.

The 1980-82 Period

Following the dramatic change in the international financial market and the increase in the oil price in 1979, GNP growth rate in the 1980-82 period was constrained by the problems in the balance of payments. For this reason, during this period, the increase in the external debt was followed by a decrease in the domestic level of activity. The distinctive characteristic of this period is that the international interest rates were high in nominal and in real terms, and so the burden of the external debt was much increased when compared with the previous period. The weight of the expenditure with interest paid increased from 31% in 1980 to 56% in 1982 in relation to exports.

At the beginning of 1980, a recession was avoided through "ad hoc" policies, but as the external situation of the country deteriorated rapidly (loss of reserves and difficulty in borrowing abroad), a recessive policy was implemented in order to "adjust" the economy to the foreign restriction.

Due in great part to the contractionist policy, the foreign exchange gap decreased significantly in 1981 and 1982 as the trade balance showed a surplus in these two years. Although the terms of exchange deteriorated after the oil shock, exports had a good performance. Imports, on the other hand, declined little. They had been controlled since after the first oil shock and the increase in the oil price after 1979 elevated the participation of oil in the total import bill from 30% in 1978 to 50% in 1981, although oil imports had declined 5% in quantity.

Table 6-5 Balance of Payments
US\$ millions

	1980	1981	1982
1. foreign exchange gap	-5027	-679	-1622
trade balance	-2823	1213	778
exports	20132	23293	20175
imports	22955	22080	19397
non-fact. service	-2204	-1892	-2400
2. factor service	-916	-945	-1172
3. factor of capital	-7032	-10290	-13478
net interest	-6311	-9179	-11357
4. net transfers	168	197	-7
5. net balance (1 to 4)	-12807	-11717	-16279
6. net movment of capital	9679	12917	7867
7. errors and omissions	-344	-578	-544
8. change reserves	-3472	622	-8956

Source: Central Bank, annual report, several issues. See note to Table 6-3.

The foreign indebtedness policy in this last phase differed quite distinctively from the other phases. Now, given the rigidity of the trade balance and the domestic recession, borrowing abroad aimed to service the debt. The balance of payments problem was basically a financial problem. Although that might be quite clear now, at that time, a recession was seen as necessary, by the economic authorities, to increase trade surplus,

and so contribute to reduce current transaction deficits (interpreted as "the contribution of the rest of the world to domestic development"). When the international private financial market collapsed after September of 1982, the situation for highly indebted countries changed dramatically. Now even with recession there were severe restrictions in obtaining foreign loans.

To sum up, the 1968-82 period is characterized by the strategy of growth cum debt. This strategy presumes that international financial markets will continue to lend according to the needs of the indebted country. In that sense, countries which desire to increase their growth rate can borrow abroad to complement their domestic savings (the contribution of the foreign savings measured through the current transaction deficits). If the terms of trade and the finance condition are favourable to the country, then an increase in current transaction deficits will mean the absorption of foreign savings. In the 1968-73 period current transaction deficits increased and the economy grew at the highest rate ever. From 1974 to 1979, although terms of trade had deteriorated, the devaluation of the foreign debt until 1977-78 allowed the country to finance its policy of import substitution. From 1980 to 1982, current transaction deficits were the result of the deterioration of the terms of trade and the worsening of the finance condition and so increasing indebtedness was followed by a domestic recession.

D. INSTITUTIONAL REFORMS IN THE SEVENTIES

Institutional reforms started being introduced with the new military government that seized power in March, 1964. In November of 1964 an economic plan to fight inflation - PAEG (Plano de Acao Para o Governo 1964-66) - was made public. According to that plan, the causes of the economic recession of that time were the acceleration of the rate of inflation and the reduction of the import capacity of the country. The external constraint was tackled with the renegotiation of the external debt and an immediate loan by IMF. To fight inflation a gradualistic stabilization program was proposed; price stability should be achieved in three years time. The official diagnosis was of a demand push process and so fiscal and monetary policies were used

to fight it. Aggregate demand was restrained by increasing taxes, reduced governmental expenditure, restrained money wage increases and reduced credit. In fact, in 1967 the rate of inflation fell to 22.5% (from 93.3% in 1964) and the rate of real GDP was 4.8% (against 2.9% in 1964, although still below its historical level).

The diagnosis of inflation changed with the new military government which took power in 1967, and this change of view led to a more expansive economic policy (which was supported by the policy of foreign indebtedness) and resulted in an acceleration of internal production and the stabilisation of inflation (Fishlow, 1972). The new Minister of Finance - Delfim Neto - publicly declared that a 15% rate of inflation was bearable. High operating costs, due to low level of capacity utilization, were seen then as the main cause of inflation. With much idle capacity in industry, there was room to grow with declining inflation.

Combined with this view, several economic reforms were taking shape that set new rules for further development. A national wage policy started being defined in 1964, introducing some sort of indexation to past inflation. Trade unions were controlled by the government and until the early seventies the readjustment of wages had constantly underestimated actual inflation. The financial system¹² was re-organized with the creation of investment banks to provide long term credit to the private sector and credit societies to provide credit to consumers.¹³ Fiscal reform aimed to revive the market for federal public debt that in 1963 was stagnant.¹⁴ In July 1964 the government created Readjustable Obligations of the National Treasury (ORTN), that is a public bond with a monetary correction clause.¹⁵

These bonds were very well accepted by private investors since they carried an insurance against inflation. The functioning of a market for federal public debt also represented an improvement over the previous situation, when budgetary deficits were mainly financed by primary emission of money. After 1968 the government organized the open market in order to establish an instrument of monetary control.

The introduction of monetary correction was not intended to be restricted to the fiscal system¹⁶ and public debt. Officials understood monetary correction also as a device to

neutralize the effects of inflation on savings and to allow the development of a long term capital market. For these purposes it should be extended to private financial markets. The inefficiency of the private Brazilian financial system (that is to say, its incapacity to provide long term credit and its high operational costs) was detected as one of the obstacles to sustained growth. Firms, because of inflation and fiscal disadvantages for internal accumulation, were stimulated to live on short term loans¹⁷, which tended to make them more vulnerable to disappointments of demand.

Additionally, interest rates charged¹⁸ were considered to be high and it was assumed that they could be brought down if contracts with monetary correction clauses were to be introduced. The widespread application of indexation in financial contracts were seen as a way of strengthening the financial structure in an inflationary environment. As described by the Ministry of Finance during the 1964-66 period:

I see no difficulty - provided the downward trend in the depreciation of money is firm - in accepting a correction in the value of the principal at the end of the term of a loan. Bankers receiving a time deposit of a minimum of 180 days could pay the depositor a reasonable interest plus a sum corresponding to the monetary depreciation occurring during the time of the deposit. In this way the current system of 18 to 22 percent yields for lenders, which result in more than 25 percent costs to the borrower, would cease. The borrower, in turn, would accept a readjustment of the principal at the expiration of loans of more than 90 days. (Bulhoes, 1969, p. 169.)

It seems it was not well perceived that once state indexed assets were introduced, offering a protection against inflationary erosion, there was some sort of state guarantee to offer positive real yields, given the expected rate of inflation. The structure of interest rates is thus affected, with assets without indexation having their interest rates increased to compete with indexed bonds.¹⁹

The private financial system did not accept to work with monetary correction clauses; private financial institutions continued to lend without indexation and to operate with short term loans.²⁰

The argument that indexation of assets would help to develop a long term financial market was not convincing, given the risks involved for lenders and borrowers. Private

agents feared not being able to honour their debts if their expectations of cash inflows were disappointed. As a consequence, in Brazil, long term finance is only offered by the State, and, in consequence, financial intermediation became largely concentrated in the hands of the State,²¹ which operates with both indexed and non-indexed assets. This is a potentially destabilizing situation for the following reasons:

1. If the government sustains the price of indexed bonds, when inflation is accelerating, it creates future fiscal tensions in the sense that the burden of the budgetary deficit is increasing. In the future, if the fiscal situation gets out of control, it can face a Ponzi finance posture in the sense that it will have to sell bonds to pay the interest on outstanding debt, or cut expenditure.

2. It may set too high a floor for interest rate and discourage investment in fixed assets.

3. Monetary policy loses room for manoeuvre because if monetary authorities do not accommodate liquidity pressures, then these pressures become a major source of uncertainty in the system. Indexation spreads the pressure throughout the economy through increased prices, and to avoid a liquidity crisis, monetary authorities may be forced to accommodate an increasing demand for money.

Since indexed assets had been introduced, the structure of assets in the economy changed in favour of them as inflation accelerated, as shown by Table 6.6.

Table 6-6 Structure of Financial Assets held by the Public
Per cent of Total Holdings

	1969	1973	1974	1978	1979	1982
Nominal Assets	78	60	58	54	55	40
of which M1	63	43	43	31	33	18
Indexed Assets	22	40	42	46	45	60

Source: Central Bank, Annual Report, several issues.

The increase in the participation of indexed over non-indexed assets has two main implications. One is that it reduces the percentage of bank deposits in total liabilities; this decrease is offset by the increase in the participation of foreign liabilities and funds obtained from the monetary authorities. This movement can be illustrated in the Table 6-7, for commercial banks.

Table 6-7 Commercial Banks
Percentual Composition of Liabilities

	1967	1970	1973	1975	1977	1978
Sight/time deposits	77.7	63.5	58.9	54.2	45.7	43.0
Debt with Cen. Bank and refinancing	4.3	9.3	10.4	19.2	20.7	19.3
External liab.	1.7	11.0	14.0	11.6	17.5	21.8
Others	16.3	16.2	16.7	15.0	16.1	15.9
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: World Bank, 1985, p. 57.

The other one is that an acceleration in the rates of inflation turns it more attractive to issue liabilities denominated in money values instead of issuing indexed liabilities. This leads to a situation in which there will be an excess of supply of funds in the indexed financial sector and an excess of demand in the nominal sector. As a consequence, there will tend to be an increase in the participation of public financial institutions in total supply of loans (Table 6-8).

Table 6-8 Sources of Loans to the Private Sector
Per cent of Total Loans

	1973	1974	1979	1981
Public Institutions	44.8	51.0	55.6	55.0
Private Institutions	55.2	49.0	44.4	45.0

Source: Central Bank, annual report, several issues.

What this meant was that as inflation rates accelerated, the State became increasingly a financial intermediary, absorbing money from the public, with the sale of indexed bonds, and transferring resources back to the private sector, at lower effective rates of interest. As pointed out by Silva (1979) this has been a major source of fiscal imbalances in Brazil. Federal debt increased from 6.4% of GDP in 1974 to 10.3% in 1982, although since 1973 budget accounts showed surpluses.^{22 23}

After the first oil shock this role of the government as a financial intermediary became even more important. Since then policy makers had to deal with two problems which were absent during the period of boom: accelerating rates of inflation and external disequilibrium (which we already discussed). It is in this environment that the new strategy of growth proposed by the new government in 1974 - the Second National Development Plan (II PND) - should be considered.

That strategy implied that the process of increasing indebtedness of the government was much reinforced by special lending programmes by the monetary authorities, and by state financial intermediaries to induce private investors to accept the proposition of the Plan.²⁴ As long as inflation was accelerating, financial disequilibria were increased: the volume of subsidies increased proportionally to inflation.

The National Development Bank (BNDE) exerted an important role in this period, allocating resources to investment in the priority areas.²⁵ In Table 6-9 the evolution of approvals from the BNDE is shown.

In 1974 the commitments of the bank increased substantially, and they kept growing until 1976 at a rate above inflation. Following the extraordinary expansion of GDP in 1976 and the sharp acceleration in the rate of inflation, the government attempted to implement restrictive monetary and fiscal policies in 1977. For that end the government successfully controlled the lending programmes of official financial institutions, including BNDE. In 1978 there was a recuperation compared to 1977, and this is the last year in the series to present a substantial expansion in the amount of commitments in real terms. After 1979 the government started a plan of cuts in public expenses affecting the policy of lending of the bank. In 1982 the volume of approvals

became negative in real terms compared with the year before.

Table 6-9 BNDE System*
Approvals of Projects

years	Cr\$ billion	Per cent change over previous year	Rate of inflation
1968	1.0	31.6	24.2
1969	1.2	20.0	20.7
1970	1.9	58.3	19.8
1971	3.3	73.7	20.4
1972	4.9	48.5	17.3
1973	7.5	53.1	14.9
1974	20.3	170.6	28.7
1975	37.7	85.7	27.9
1976	70.3	86.5	41.2
1977	45.6	-35.1	42.7
1978	153.4	236.4	38.7
1979	136.0	-11.3	53.9
1980	305.9	124.9	100.2
1981	717.3	134.5	109.9
1982	843.9	17.6	95.4

Source: BNDE, annual report, several issues, and Fundacao Getulio Vargas, *Conjuntura Economica*, column 2 for the rate of inflation, several issues.

* includes all subsidiaries.

The strategy of growth after 1974 also led to a segmentation in the supply of credit and to a widening of the range of interest rates charged for different sorts of applications. According to an estimate of the World Bank (1985) only 20% of total credit in 1978 was freely negotiated in the market and the differences in the interest rates charged amounted to 70%. In such circumstances, restrictive monetary policies tended to have little impact over monetary expansion. Additional to that, as inflation accelerated and remained at high levels, treasury bills (sold in the open market) tended to be used as a near-money (because of their high degree of liquidity), meaning that open market operations also had little impact as an instrument controlling liquidity.

From 1974 to 1978 the short run economic policy assumed a stop-go character,

adversely affecting the growth of industry. Inflation rates were kept under control, although showing a great resistance to decline. The narrowing of the room for manoeuvre of short-run economic instruments was felt more clearly after 1979 with the acceleration of inflation. The annual report of the Central Bank states:

In 1979, the monetary authorities faced great difficulties in controlling monetary expansion because of the following factors:

- a) increased demand for official resources caused by the elevation of the amount of indirect subsidies (through credit), as inflation rates accelerated; thus the differential between inflation and the financial costs to activities considered to be priorities by the government (agriculture, energy and exports) increased;
- b) elevation of the amount of direct subsidies to wheat, sugar among others;
- c) the burden of the public debt not covered by fiscal budget;
- d) increased deficit of the public sector, including state-owned enterprises.

(Central Bank Annual Report, 1984, p. 33.)

To fight inflation, the government established since the end of 1979 a strict control over its expenses, including current expenses, investments and transfers. On the other hand, the fiscal burden was increasing. In relation to state enterprises, in 1979 a special institution was created to control them (SEST - Secretaria de Controle das Empresas Estatais). Also bank credit was restricted, raising interest rates dramatically.

But it was the second external shock that imposed a new adjustment effort on the economy, in the sense that now the need to service the external debt determined the direction of short run economic policy.

To encourage foreign indebtedness in a situation of high uncertainty, state enterprises were encouraged to borrow abroad by progressive limitation of their access to domestic credit.²⁶ Also, as part of the policy to fight inflation, the tariffs of public services lagged behind inflation, which reduced their capacity to autofinance. The unfavourable conditions in which state enterprises had to borrow led them to accumulate losses that had to be covered by transfers of resources from the government.²⁷ This process of increasing public indebtedness of state-owned

enterprises became the main determinant of the increase in public debt in the eighties.

To conclude, financial structures in countries with high inflation and indexation tend to become dominated by the State, forcing private issuers to match the money returns on government-issued bonds. Indexation of public debt is likely to aggravate fiscal imbalances when inflation rates accelerate and the service of the debt narrows policy choices. In Brazil, this process of concentration of resources within the State was much enlarged by the governmental effort to implement the strategy of growth proposed in the II PND. An inevitable consequence of this process was the increase in public indebtedness. Indexation, on the other hand, worked to perpetuate inflation, because it increased costs for all sectors when pressures to raise prices emerged.

So, in Brazil, the coexistence of private and public financial intermediaries in an environment of permanent inflation led to the former being merely intermediaries of funds supplied by the public sector and borrowed abroad. In short, all the expansion and diversification of the private financial system in the seventies (it increased its participation in GDP from 4.3% in 1973 to 7.0% in 1982, according to World Bank (1985)) did not turn the private financial system into an authentic intermediary between savers and investors.

Finally, the strategy of the II PND assumed that overabundance of foreign resources would be a permanent characteristic of the international financial market. As the burden of the external debt increased and external credit became scarce, to avoid balance of payment constraints, the economic policy at the end of the decade aimed to overcome the difficulties of the process of indebtedness. In such circumstances, the State took responsibility for the foreign debt, and its increase became related to the increase of public indebtedness.

E. THE BEHAVIOUR OF INDUSTRIAL FIRMS IN THE SEVENTIES

In this section we shall explore for some years (for which information is available) data about the behaviour of firms in the seventies. It is our aim to look at the

behaviour of indebtedness of firms in the seventies and analyse it against the general cyclical pattern of development of the economy. Because data covering this period does not come from a unique source, the methodologies are not comparable and so we are restricted to commenting items of the aggregate balance sheet of firms. The first set of data (Tables 6-10 and 6-11) is based on a sample of over 5000 industrial firms (corresponding to more than 80% of revenues of industry), obtained from income tax statements.

As we saw above, the 1969-75 period comprises the phase of accelerated growth (1968-73) and the beginning of the following period (1974-79) when the economy grew at rates closer to its historical trend. In both sub-periods indicated in the Table, assets expanded at 50.0%, discounted for inflation. The composition of assets however, shows one significant difference.

Table 6-10 Manufacturing Industry
Structure of assets and liabilities
Per cent and rates of real growth
(end of the year)

	1969	1972	1975	Rates of real growth	
				69-72	72-75
Assets	100.0	100.0	100.0	50.2	50.2
fixed (net)	39.0	35.8	33.3	37.8	40.1
current	53.4	54.6	57.8	53.6	58.8
financial	7.6	9.6	8.9	89.0	38.6
Liabilities	100.0	100.0	100.0	50.2	50.2
own capital	54.4	50.8	43.1	40.3	27.5
current	22.1	25.3	32.2	71.9	91.2
others	23.5	23.9	24.7	52.8	55.2

Source: Calabi, et. al, (1981), p. 199.

Notes: Fixed assets includes machinery, equipments, buildings, land, monetary correction less depreciation;

Current assets includes stocks, credit to clients, difered expenditures;

Financial assets includes loans to owners, financial applications, fiscal incentives, investment in bonds and shares;

Own capital includes capital, reserves and profits;

Current liabilities includes bank and other financial institution loans;

Others includes fiscal obligations, wages and suppliers debts.

From 1969-72 the increase in financial assets is very expressive; this is explained by the fact that during the late sixties reforms in the financial market enlarged the options of financial assets available to investors. So its expressive rate of growth (89.0%) is justified by the introduction of innovations in the financial market. In the period shown it is clear that the predominance of current assets increased over the years. The expansion of current assets is explained by the increase in the financing of clients in the first sub-period and in the increase of investment in stocks in the second period (Calabi et. al. 1981, p. 202).

On the side of the liabilities, from one sub-period to the next, there is a clear trend towards increasing indebtedness through the decrease in the percentage of own capital in total liabilities and an increase in loans and debt financing. The movement toward debt-financing coincides with the change of state of the economy from a period of recovery in the late sixties, to a phase of acceleration of growth in the early seventies. Recovery in the late sixties started with a low degree of indebtedness of firms, and was facilitated by the existence of idle capacity in industry. Also, as Minsky points out, a period of recession is followed by a period when firms adopt more conservative financial practices; conforming to this pattern, firms in the first sub-period employed more internal funds to finance expansion.

As the degree of confidence in the future improved, firms moved to more speculative practices in the subsequent sub-period. An important element facilitating the accumulation of funds in the late sixties was the introduction of a national wage policy, which aimed to regulate wage readjustments of all workers according to inflation (see chapter 7). Until 1974 indexation rules underestimated the actual rate of inflation, which contributed to increasing profit margins.

After the period of recovery growth was sustained (1970-73) by private investment and by the expansion of the demand for durable goods. Domestic demand for durable consumer goods increased substantially in the early seventies following the introduction of consumer credit. Private investment on the other hand was facilitated by the availability of foreign loans. So, as the degree of confidence in the future improved, investment in fixed assets increased and so debt financing. Although the first oil shock meant an abrupt change in expectations, data for 1975 do not show a

severe interruption of plans for development.

Table 6-11 below indicates how profits behaved. In the first sub-period (1969-72), total profit increased more than financial costs. In the second sub-period (1972-75), although gross profits increased relatively to revenues, financial costs rose as a proportion of gross profits. Profits net of financial costs fell in relation to revenues from 10% in 1972 to 8.6% in 1975. Thus we can infer that the commitment of resources to providing finance out of gross profits was expanding during the period, specially over the 1972-75 period.

Table 6-11 Manufacturing Industry Profits and Financial Costs Ratios

	Per cent			Real rate of growth of numerator	
	1969	1972	1975	1972	1975
Total profit*/ revenue	12.7	13.5	14.1	47.6	59.0
financial cost/ total profit*	29.1	27.4	39.0	39.0	126.3

Source: Calabi, et. al.(1981, p. 210.)

* total profit = net profit + depreciation + financial costs.

The first oil shock reached the economy in a period of accelerated growth with portfolios moving towards more speculative positions. A decision to restrain the economy at that stage would certainly generate a wave of bankruptcies. The policy of attempting to maintain the rate of growth while avoiding potential balance of payments constraints by switching to an import substitution strategy (based on the exploitation of market opportunities in the production of intermediate inputs and producers' goods), signalled new areas of investment and worked as a guide to investment decisions. Foreign indebtedness was seen as a way of promoting structural change in the economy and, as pointed out by Castro and Pires e Souza (1985, p. 126), foreign

indebtedness during this period occurred simultaneously with the concentration of imports in items essential to the sustaining of growth. In the second phase of growth (1974-79) a remarkable difference from the first period was, then, the decisive intervention of the government in supporting a programme of investment to sustain aggregate demand (and so preserving portfolios). The private sector responded to the incentives of the plan,²⁸ which explains the good performance of the intermediate goods sector during this period. Its rate of increase was above the average of manufacturing industry (see Table 7-5).

So, another difference from the previous one is which sectors led growth in industry. In this sense, durable consumer goods, that had expanded at 25% in 1973, grew on average around 6% in the 1974-79 period. Consumer credit had been much restrained in this second phase as a result of the change in priorities of growth.

Brazilian policy-makers publicly assumed that Brazil would continue to perform as in the 1968-73 period, and the Second National Development Plan forecasted that GNP would grow at a compound rate of 10% through 1978 and inflation rates should be around 15% a year. The new Finance Minister declared that the country would remain "an island of prosperity and economic development in a depressed world economy". Although those estimates were unrealistic, they worked to stimulate the private sector to support the new strategy of growth.²⁹ State enterprises became an important element to implement the new strategy, and they increased their participation in aggregate investment. Table 6-12 below shows that from 1974 to 1981 investment of state enterprises increased substantially and this movement was followed by an increase in the degree of indebtedness of those firms.³⁰

The next available set of data on the structure of liabilities and assets of industrial firms is for the last phase of our study, and it comprises big firms only (around 150). The years of 1978 and 1979 were still years of growth, although inflation rates accelerated in 1979. The year of 1980 was a special one because the rate of growth was still high with a three-digit rate of inflation and acute problems of balance of payments. It represented a transition for the years of recession that followed. In that year the government tried to reverse inflationary expectations, which were much

augmented after the sharp increase in the international interest rate and in the oil price, by pre-fixing the rate of variation of monetary correction of bonds and the rate of change of the exchange rate well below expected (and actual) inflation. The impact on inflation was null and the economy still expanded at close to its historical rate.

Table 6-12 Gross Capital Formation of State Enterprises/GDP
Per cent

year	%	year	%
1970	2.6	1976	6.4
1971	2.1	1977	6.1
1972	3.5	1978	7.8
1973	2.1	1979	12.5
1974	4.0	1980	7.9
1975	4.5	1981	5.0

Source: Correa do Lago et. al. (1984, p. 94.)

As we saw in the later section, after the second external shock, the disequilibria that were accumulated in the economy since 1974 left little room for manoeuvre, and in the early eighties the economy dived into a deep recession, with high rates of inflation. One peculiarity of the economic situation in the eighties was that, although financial assets in a recession should yield decreasing returns, in the Brazilian case this did not happen. Because of the need to absorb foreign resources, and the need to finance public debt, returns were preserved. In that sense, firms had a defensive instrument, to preserve their revenues in a situation of accelerating inflation.

The structure of assets from 1978 to 1982 changed significantly, as can be seen in Table 6-13 below. Current assets started decreasing after 1980, following the decrease in activity (from 1978 to 1982 the average real rate of growth of GDP was 3.6%). In 1980, after the decision of the government to pre-fix monetary correction and the percentage change in the exchange rate for the year (as a new strategy to fight inflation, see chapter 7), the formation of speculative stocks was stimulated and so the percentage of current assets over the total was the highest compared with preceding

years.

Table 6-13 Structure of Assets and Liabilities, Manufacturing Industry
Per cent of total

	1978	1979	1980	1981	1982
Assets	100.0	100.0	100.0	100.0	100.0
fixed	46.4	45.2	42.4	46.1	47.7
current	42.5	43.1	45.1	40.2	37.5
financial	11.1	11.7	12.5	13.7	14.8
Liabilities	100.0	100.0	100.0	100.0	100.0
own capital	45.7	41.2	39.3	41.3	42.3
current	30.7	32.1	30.2	30.6	34.1
others	23.6	26.7	30.5	28.1	23.6

Source: Almeida (1985, p. 12 and p. 16.)

The percentage of fixed assets over the five years period was still high, suggesting that big firms, during the recession years (1981-82), concentrated their investment in increasing productivity and modernization. Financial assets increased their participation which may imply that the strategy of adjustment of firms to the recession of the early eighties was to compensate the decrease in operational revenues (due to the decrease in the level of activity and acceleration of inflation) with an increase in revenues obtained through financial operations.

On the side of the liabilities during 1978 and 1979 the participation of own capital decreased and the participation of current obligations increased, in particular in 1979 when interest rates increased sharply. In 1980, following the decision to pre-fix monetary correction and the exchange rate, indebtedness was encouraged and so the decrease in the item own capital persisted, but as financial costs were reduced in real terms, current liabilities decreased as well. After 1980 the strategy of the firms might have changed towards a decrease in the degree of indebtedness (the item own capital increased), as expectations about the future became more pessimistic, and interest rates raised again.

In sum, the years 1978 and 1979 represented a continuity of the strategy of growth initiated in 1974. In 1980 expectations changed, given the sharp increase in the international rate of interest and the high level of foreign indebtedness of the country. A recession was then the only way to avoid a balance of payment crisis. The main items of the balance sheet of firms showed that the decrease in current assets was offset by an increase in financial and, because our sample comprises big firms, fixed assets as well. The degree of indebtedness increased mainly because of the increase in interest rates after 1979, although the strategy of firms were to adjust to the new environment through a decrease in the dependence on borrowed capital.

Table 6-14 Manufacturing Industry Profit and Financial Cost Ratios
Per cent

	1979	1980	1981	1982
total profits*/ revenues	15.0	15.5	16.3	18.1
financial costs/ total profit	80.0	59.6	89.9	89.5

Source: Almeida (1985, p. 20.)

* total profit = operational and non operational profit + financial costs.

The evolution of profits is shown in Table 6-14 above. Due to an alteration in tax legislation after 1978, we excluded this year of the table because it does not compare with the rest of the period. Although profits increased their participation over revenues, they increased less than the cost of finance. The decrease in the percentage of the cost of finance over profits from 1979 to 1980 was due to the impact of the pre-fixation of monetary correction in writing off debt of the firms. In 1981 and 1982 the burden of the indebtedness was increased reaching almost 90% of total profit.

Comparing both sets of data (Tables 6-10 and 6-13), we can see that expansion in the seventies was financed by the increasing appeal to loans. Considering the firm, the impact of debt financing to expand its activity was two fold: on one hand it allowed

the firm to grow at a higher rate than it would be possible if it had to depend only on internal accumulation; on the other hand the cost of indebtedness represented a reduction in the internal accumulation of funds. In this sense, we suggested that the increase in the cost of finance in the 1969-75 period corresponded to an increase in the degree of indebtedness due to an acceleration in the rate of investment in the economy. In the period of 1978-82, on the other hand, the increase in the cost of finance followed the change in the terms of finance as the interest rate increased substantially, following international movements, and the decrease in the pace of investment (see Table 7.1). As the evidence we have for the 1978-82 period comprises only big firms, what we could suggest was that their adjustment strategy for the recession years was to cut down their degree of indebtedness, allocate resources to the financial market thus increasing their non-operational revenue, and invest in modernization to cut down costs.

F. A SUMMING UP

Keynes observed, after defining a monetary (entrepreneur) production economy, that "[it] is obvious on these definitions that it is an entrepreneur economy that we actually live today."(Keynes, 1979, vol. 29, p. 78.) In this chapter, we presented some of the main features of the recent operation of the Brazilian economy, understood as a particular empirical counterpart of the concept of monetary economy.

In an entrepreneur economy, decisions to produce and to invest are made by capitalist firms, oriented by their profit expectations, which are formed under fundamental (non-probabilistic) uncertainty. Firms commit themselves to forward contractual obligations in advance of actually receiving sales proceeds. To be safe against market disappointments, firms are not only careful in the selection of commitments they accept, but are also inclined to keep liquid assets in their portfolio to guarantee the possibility of liquidating debts in case of need. The balance sheet of firms, thus, at any given moment, will record their choices as to how to carry wealth overtime and obligations they accept to sustain their positions in the particular set of assets they choose.

The social and institutional organization is, for this reason, crucial because it determines the environment where the firm makes its strategic choices and gives the possibilities to cope with disappointments. Institutions and practices that allow firms to accept safer commitments and to socialize uncertainty are instrumental to increase the range of growth possibilities open to firms in an economy whose essence may be identified as a monetary economy.

Our description of the Brazilian development process during the seventies was oriented by the conceptual priorities set by the notion of monetary economy. The Brazilian economy has been marked by three peculiarities in the post-war period: the importance of the State, particularly the Federal Government, in orienting the process of economic growth; the crucial role assumed by foreign capital in providing funds for the growth process; the persistence of substantial inflationary pressures.

The leadership role of the State has been manifold. The Federal Government selected sectors to receive fiscal and credit stimuli. It has also, through the action of large state-owned firms, intervened directly in the economy, signalling not only general targets of growth but actually informing where and how much private entrepreneurs should invest to obtain maximum profits. Strong and clear actions by the State were characteristic of the first phase of heavy industrialization in the fifties, and even more so in the seventies. It was the State, not the market, the main source of information to orient private investors' expectations in the modern Brazilian economy.

The importance of foreign capital is directly connected to the low degree of institutional development of Brazilian capital markets, caused, among other reasons, by the persistence of high inflation rates and the attempts of policy-makers to control interest rates. Foreign capital has been the only source of funds for investment, besides the funds offered by the State, that were usually directed to specific areas.

The recent economic history of Brazil can be understood as a succession of patterns combining trends in the balance of payments, the action of the State and inflation. Private decision has been mostly adaptive in this context, since the instruments at the disposal of the Federal Government were, at least until the early eighties,

overwhelming.

As a matter of fact, as we have argued in this chapter, we can see the period covered by this study as constituted by three sub-periods: 1. 1968-73, when the State was in the zenith of its political and economic power, the external situation was marked by the abundance of funds and inflation was low; 2. 1974-79, when the first oil shock was met by a still strong State, which appealed to still abundant external funds to keep high rates of growth despite rising inflationary pressures; 3. 1980-82, when the second oil shock disorganized the economy, and the drying up of the supply of foreign funds worsened the economic situation of the country. The State was encumbered by fiscal imbalances caused by keeping a speculative strategy (in the sense of Minsky) amidst an unfavourable environment and by accelerating inflation that eroded its capability of raising resources.

We tried to show that the State tried to cope with the deteriorating situation in the mid-seventies by promoting institutional reforms destined to make living with inflation easier. This strategy, however, created more instability in the economy. When foreign support has ceased and the State lost its capacity to lead, the Brazilian economy ended its long ascending trend and submerged into a stagflation that still lasts. The increased uncertainties in the post oil-shock period induced firms to search for more defensive strategies, favouring financial placements or real-estate speculation rather than productive investments. The failure of the State in issuing credible signals about desired future developments has paralysed private entrepreneurs not used to look for information anywhere else.

In the following chapter we will model this performance to reflect the combined influence of these three environmental forces acting on expectations formation and the implementation of plans.

NOTES TO CHAPTER 6

1 - A description of the inflationary process given by Bronfenbrenner and Holzman stresses the role of behaviours in the evolution of inflation:

Our definitions of inflation imply that an inflationary process occurs when active claims for shares in the real national product, expressed either in terms of expenditure or income-demands, exceed the amount that is produced. Inflation continues until these conflicting claims are somehow reduced or otherwise reconciled. The speed of the inflation that follows an initial inflationary shock (excess demand or excess claims on income) depends upon the reactions of various income and spending groups in the economy to that shock. If there are few reactions, and if these are delayed or not very vigorous, inflation will proceed slowly and will not go much beyond the initial shock. If, on the other hand, reactions and successive "reactions to reactions" are numerous, rapid, and vigorous, the resulting inflation can be explosive. (Bronfenbrenner and Holzman, 1963, pp. 639- 40.)

2 - This relation between instability and the tendency of prices to increase can be illustrated by Laidler and Parkin in their survey about inflation when they conclude that the "analysis of the inflationary process must involve the study of the whole economic system and not just of one or two markets in isolation." (Laidler and Parkin, 1975, p. 796.)

3 - Simonsen makes the following remark about this:

One of the curious aspects of the Brazilian economic history is the upward trend in prices recorded ever since the first years of the Empire. Probably because of the chronic tendency toward budgetary deficits, Brazil did not experience price cycles similar to those of the United States, where long periods of inflation alternated with long periods of price declines. Brazilian history records some years of deflation, but never a long period of falling prices. (Simonsen, 1969, pp. 134-5.)

It should also be mentioned that given this reality of permanent instability in the price system, the debate about growth and inflation is an old one in Latin America and gathered most attention during the fifties and sixties. The discussions were led by two "schools of thought" - monetarists and structuralists - that disagreed about the role of inflation in promoting growth. As once put by Seers, the controversy about inflation and growth

is not just a technical issue in economic theory. At the heart of the controversy between "monetarists" and "structuralists" are two different ways of looking at economic development, in fact two completely different attitudes toward the nature of social change, two different sets of value judgments about the purposes of economic activity and the ends of economic policy, and two

incompatible views on what is politically possible. (Seers, 1961, p. 89.)

In short, monetarists believed that price stability is a necessary pre-requisite for sustained growth and the structuralists advocated that rapid growth brings some imbalances and maladjustments that are reflected in price increases. To favour an economic policy to restrain price increases is to cause unemployment and stagnation. As Sir Roy Harrod once commented, "I can only conclude by stressing that the greatest crime to which the free world is prone is to reduce demand below the growth potential of the economy in order to combat wage-price spiralling". (Harrod, 1961, p. 420.)

The cause of inflation for the structuralists was the existence of major bottlenecks in the economy and so a long term solution to fight inflation would be to promote development plans to overcome these bottlenecks. One of the main bottlenecks identified was the foreign exchange constraint that results from the weakness of export markets and the inelasticity of the import structure due to an import substitution industrialization strategy. According to Seers, during the process of import-substitution one persistent pressure towards price increases is the "pressure ... maintained on the exchange rate, and periodic devaluation is likely, particularly since import and exchange control are not effective." (Seers, 1962, p. 179). However, the industrialization strategy should bring some reward as "It is true that in the end, by the time a country is making its own equipment, import substitution will bring some reduction in the propensity to import, but this may not be achieved for two or three decades." (ibid., p. 179.)

There are several surveys about the controversy. We quote, for example, Foxley, (1981), Kirkpatrick and Nixson (1976) and Thorp (1971), and specially Hirshman (1981).

4 - As was said by a former Central Bank Chairman, "Until 1967, the Brazilian economy developed without foreign indebtedness, not as the result of a deliberate choice, but because there were limitations to the sources of foreign finance." (Langoni, 1985, p 5.)

5 - For interpretations about the recent Brazilian development based on the two gap model see Bacha (1977) and (1982). In Bacha (1989) the model is extended to include the fiscal gap. See also Batista (1986).

6 - We can describe these two aspects of external savings by using the balance of payment identity. Let us define foreign savings as equal to the balance of trade (X-M) plus non-factor services (NFS):

$$(X - M) + NFS$$

When the expression is negative the country is absorbing external savings and when it is positive it is transferring resources abroad.

From the balance of payments accounts we have that the current transactions accounts

(CC) can be defined as (ignoring transfers):

$$CC = (X - M) + NFS - IPD$$

where IPD accounts for the net income sent abroad as payment of interest, profits and dividends, and factor service. The finance of the current transaction deficit has to be met through the flow of international capital. That is the identity of the balance of payments:

$$X - M + NFS - IPD = (DI + F - A + L) + R'$$

where DI = direct investment

F = net finance

A = amortization

L = net loans

R' = variation in the position of reserves

7 - In an initial stage the role of foreign financial resources would be to cover the saving gap and to service the debt. Foreign debt should then increase at a higher rate than the interest rate. In a next stage, when investment is being covered by domestic savings, foreign loans would be demanded to service the debt. As far as savings are in excess to investment, more resources are transferred abroad and this should slow the rate of increase of foreign debt that would then increase at a lower rate than the interest rate. In a later stage the amount of resources sent abroad should be enough to pay off debt commitments and foreign debt begins to decline. For expositions about the indebtedness cycle, see, for instance, Avramovic (1964), Kindleberger (1968) and Batista (1989).

8 - As remarked by Castro and Pires e Souza, what in the theory of the dynamics of indebtedness was considered to be an exception in the real world turned out to be the rule. Some examples of situations that became "rule" are: the erosion of the capacity to fulfil debt commitments due to deterioration in the terms of trade, raising interests above the rate of return of debt financed investments and shortages in the supply of funds to the indebted country (Castro and Pires e Souza, 1985, p 106).

9 - Firms can borrow money abroad via "Lei 4131" of 1962 and financial institutions can borrow through "Resolucao 63" and "Resolucao 64" of 1967, of the Central Bank.

10 - Pereira (1974) makes the point that given the inability of the domestic financial market to provide adequate medium and long term finance, external savings had an inhibiting effect on potential domestic savings. Foreign resources in the amount absorbed during the 1968-73 period, might well have had an impact of substituting for potential domestic saving instead of complementing it.

11 - This devaluation was announced followed by other economic measures which in fact neutralized its impact. For the exports of industrialized products, fiscal subsidies were eliminated and for exports of agricultural products they were taxed in 30% in

average. For the imports the compulsory deposit in cruzeiros over its value for one year (that had been established in 1975) was eliminated. The impact over the value in cruzeiros of the external debt was also neutralized because the government guaranteed that the money borrowed abroad would be protected against rapid devaluation (Resolucao 230 and 432 of 1979 of Banco Central). According to Castro and Pires e Souza (1985, p. 50), the economic measures undertaken in 1979 by the new finance minister (A. Delfin Neto), were quite inconsistent with their objectives.

12 - For a description of these reforms see World Bank (1985, chapter 2).

13 - The reforms also tried to stimulate a stock market. Still today this market is not well developed and firms are considered to be too "closed". In this sense we shall not consider the stock market as a serious alternative to internal finance.

14 - There were two reasons for that. One was the acceleration in inflation that caused a rapid decrease in the real average return on this type of security as the interest paid by the government was no longer suitable. The second reason was that the risk was increased because of the decline in liquidity of the bonds, resulting from the size of the deficits faced by the Treasury.

15 - According to Ferreira:

The Monetary Authorities decided to issue indexed bonds (ORTN), in 1964, with the objective of achieving at the same time opportunities for the placement of savings that were looking for adequate returns and liquidity, and the formation of secondary reserves of commercial banks. (Ferreira, 1973, p. 13.)

16 - As governmental deficits were identified as the main cause of inflation a fiscal reform was implemented aiming to reduce, and eventually to eliminate, budgetary deficits. The system of tax collection was improved and, to discourage delays in tax payment, outstanding balances owned to the Treasury were indexed to keep their real value. Personal taxation became more comprehensive and corporate tax was modified to eliminate taxes on capital gains due to inflation. Also tax legislation was reformed to permit depreciation allowances to be linked to current replacement cost of fixed capital. These last two measures aimed to strengthen private enterprise, inducing investment in fixed and working capital by putting a realistic price on these assets. Also a more realistic price policy was established for public services; prices were readjusted according to inflation and wages of the civil servants were restrained. The success of the reforms was to reduce the budgetary deficit; it fell from 5.3% of GDP in 1963 to 1.8% in 1965, and was virtually eliminated in 1973.

17 - It was widely believed in the early sixties that firms got used to depending on short term finance (see Bulhoes, 1969).

18 - Although the interest rate was fixed at a maximum level of 12% annual rate by the usury law, banks had several ways of bypassing this law, charging "on the outside" (cf. Simonsen, 1969).

19 - Because of indexation, interest rates in Brazil could not follow the movement in the international financial markets when interest rates decreased in real terms: Libor fell from 8.7% in 1974 to 2.3% in 1975. (World Bank, 1985, p. 60).

20 - It should also be mentioned that the fiscal reforms initiated in the mid sixties in order to increase revenue and public sector savings introduced welfare funds that were converted into mechanisms of forced savings. In 1966 the Redundancy Payment Fund (FGTS) and in 1970 the Program of Social Integration (PIS) and the Public Employees Financial Reserve (PASEP) bore monetary correction and interest fixed at 3% per year. The FGTS is financed by an 8% contribution of the employer payroll and PIS is based on the amount of taxes paid and revenue from sales. The PASEP fund is similar to PIS for the civil servants. PIS-PASEP balances were applied in the newly established National Housing Bank (BNH). In 1974 the resources from PIS and PASEP were transferred to the National Development Bank (BNDE) to finance the second National Development Plan (II PND).

21 - The World Bank Report on the Brazilian financial system points out that in 1978 the direct loans of the three public institutions - monetary authorities, BNDE and BNH - represented 30% of total loans, and resources re-lent through other financial institutions amounted to 21%. In total, 51% of loans derived directly from public funds (World Bank, 1985, p. 13). It should be added also that public funds have specific destinations and there is a great diversity in the interest rates charged according to destination. As pointed out by the report, as credit subsidies were given in terms of fixed nominal interest rates, when inflation accelerated, the burden of these subsidies increased substantially.

22 - In Brazil, interest payments were not accounted for in the fiscal budget, but in the monetary budget. It should be mentioned that although the participation of the public debt in the GNP is not very high, the rate of increase after 1980 was quite accelerated. According to Munhoz (1984, p. 51), from 1981 to 1983 the public debt increased in real terms 168% .

23 - An estimate of the amount of subsidy to credit is presented in World Bank (1985). For 1978 the report reaches at 5.5% of GDP or 54.4% of the federal government revenue as dedicated to subsidies. One third of all credit to private sector was subsidized.

24 - One result of this effort of the government to induce investment is pointed out by Trebat in the passage below :

What is important for the reader to realize is the vastly reduced scope by the late 1970s and early 1980s for the play of pure price signals in determining the allocation of private investment in Brazil. Profitable investments in Brazil depended to a high degree upon the ability of the investors to take advantage of one government incentive program or another. Such government policies in a labour-surplus economy acted to reduce the price of capital for private investors and to encourage capital use rather than the creation of employment.

More importantly, the plethora of incentive programs allowed the government a very important control of private as well as direct government investment in Brazil. This made the government a much more important factor in capital formation than a study of fiscal budget and the public enterprise sector would reveal. (Trobat, 1983, pp. 118-9.)

25 - The government created three new agencies, subordinated to BNDE, specialising in supplying credit to the chosen sectors: FIBASE, to finance primary industries; IBRASA, to finance intermediate industries; and EMBRAMEC, to finance the capital goods industry.

26 - For an analysis of the the consequences of the large use of the state enterprise as instrument of economic policy, see Werneck (1985).

27 - The variation of current expenditure over operational revenues of the main non-financial state enterprises from 1981-84 is shown below:

Per cent				
	Wages and Social Obligations	Financial Costs	Other	Total
1981	17.0	11.8	70.4	99.2
1982	18.5	17.6	67.6	102.7
1983	14.8	19.1	69.9	103.8
1984	13.2	18.0	69.2	✓ 100.4

Source: Correa do Lago et al.(1984, p. 87.)

28 - This opinion is contested by Lessa (1978), as we have already mentioned in chapter 1. The development of the economy in the eighties, however, showed that the program of import substitution initiated after 1974 allowed the country to produce comfortable surpluses in the trade balance. In that sense, in 1984, when the deficit in current transaction was eliminated, the trade surplus amounted to US\$ 13 billions and GDP increased around 6% in real terms. That result, as pointed out initially by Castro and Pires de Souza (1985) was only possible given the choice made in 1974 with the launching of the Second National Development Plan.

29 - It should be noted that the Second National Development Plan had been highly criticized because of the ambition of its targets and the sort of investment prioritized, in particular the nuclear program (see, for example, Lessa, 1978).

30 - According to Correa do Lago et. al (1984, p. 79), 39% of the finance of investment of state enterprises depended on loans in 1976-7 and in 1978-80 this dependence increases to 62%.

CHAPTER 7 A POST KEYNESIAN MODEL FOR THE BRAZILIAN ECONOMY

A. INTRODUCTION

Our aim in this chapter is to construct a simple macroeconomic model which captures as far as possible the ingredients that explain the behaviour of industrial prices and output in the seventies. This is a specifically post Keynesian model because it tries to capture at least some of the essential features and characteristic processes of monetary or entrepreneurial economics, in the sense developed in chapters 2 to 5.

A monetary economy is a form of social organization of production activities in which, in contrast to cooperative economies, production is carried out by firms whose objective is to obtain money profits. Lacking central coordination mechanisms such as an auctioneer or a planning board, in a monetary economy firms have to make production and investment decisions by themselves, oriented by expectations that are largely uncertain, especially those related to investments. To reduce and socialize uncertainty, agents develop a system of forward money contracts that serve to restrict future possible events to a manageable set. The existence of such a system of contracts gives new roles to money, making it, as Davidson (1978) put it, a "liquidity time-machine".

Three features of such economies need to be emphasized in order to build appropriate models. Firstly, firms are actually institutions that transform money into more money. The essential "production function" has money as input and output. This implies that the financial relations through which a firm obtains money as an input is an essential element of post Keynesian models, as much as are the market conditions that allow it to sell its products. Secondly, in order to obtain money as an output, firms have to have productive facilities to produce saleable goods. These productive facilities are usually long-lived, making of investment a decision which requires looking far into the future. As a result, investment becomes a discretionary expenditure, logically autonomous with respect to current business conditions. Post Keynesian models

characteristically recognize the discretionary nature of investment expenditures and the need to treat carefully both its immediate determinants and the features of the environment that may influence its realization.

A third post Keynesian relation refers to prices as sources of internal finance for firms, the need for funds becoming the main determinant of the mark-up over costs.

These three elements are contemplated in the model that follows, both in the choice of processes to be estimated and in the general form they assume . Its post Keynesian affiliation, however, is not given merely by the specific functions that were estimated. In some cases, a similar functional specification could suit other theoretical approaches as well. The model presented is post Keynesian, nevertheless, because its general structure derives from asking some fundamental questions related to economic behaviour under uncertainty and the implications of the irreversibility of time.

Some specifications were chosen, within the general conception, to capture some specific characteristics of the Brazilian economy. In particular, the use of a modified accelerator mechanism in the investment function attempts to account for the strong relationship between the State and the private sector in Brazil.

Finally, one should mention the importance, in determining the theoretical affiliation of the model that follows, of the qualitative factors that are considered, if not in the functions themselves, in the interpretations of their results.

In a more general sense, our model conforms to the criterion listed by Davidson (1982, pp.9-18) that identify post Keynesian economics: (a) the conception of economic processes moving irreversibly through real time; (b) the emphasis on the role of expectations in an uncertain world; (c) the acknowledgment of the importance of institutions; (d) the relevance of income distribution; (e) the distinction between physical and financial capital; and (f) the emphasis on income effects, among which the multiplier stands as the most important. All these concerns are present, be it in our empirical model or in the qualitative factors we take into account in the interpretation of our results.

The design of the model, of course, was also influenced by specific of the economy of Brazil, and in this sense we shall keep in mind the main characteristics of the Brazilian economy discussed in previous chapters and which we can summarize as follows:

- a. the Brazilian economy is a rather closed economy (the weight of exports in explaining total demand for manufacturing goods in the seventies is low - in spite of its increase during the decade; on average it represents around 7% of the National Income);
- b. the State has a tradition of either directly operating in areas where the private initiative is absent, through the creation of state-owned enterprises, or of providing long term finance to the private sector;
- c. high rates of inflation are a constant phenomenon;
- d. indexation became a widespread practice in financial contracts as inflation rates rose in the early sixties;
- e. foreign indebtedness increased significantly during the period selected for this research.

Lack or inadequacy of data for the period selected prevented us from estimating a complete model that could express all the fundamental processes in operation in a monetary production economy. In particular, the determination of monetary variables could not be estimated.

Our model aims to show that, using a post Keynesian framework, we are able to describe the channels through which the main hypothesis of our research, that is that favourable conditions in the external sector and a global strategy of growth set by the government to allow for economic growth and inflation to be reconciled, can be established. After describing the main features of the model and defining the set of

equations in this chapter, a simulation exercise is done in the next chapter comparing the predicted values with the observed data.

We describe the equations and present the main results of our model in the sections below. The tables with the basic data used in the regressions, as well as the definitions employed, are in appendix 1. In the appendix 2 we estimated our equations using the two-stage least squares method. In chapter 8 we run the results of the equations of our model and produce the simulated result for both aggregate and industrial output and the industrial price level.

Our model is restricted to the manufacturing and mining sectors, the most dynamic in the Brazilian economy, and ones for which basic statistical information is available for the whole of the decade. We work with annual data taking 1968-82 as our period of analysis when the strategy of growth cum debt was pursued. Since we are interested in explaining the main fluctuations of aggregate output and price we do not disaggregate data for different classes of industry.

B. THE GENERAL PRINCIPLES OF THE MODEL

Disequilibrium Analysis

Following a post Keynesian methodology, we are ultimately concerned with the analysis of the economy in disequilibrium. According to Eichner and Kregel, disequilibrium configurations should be handled considering the distinction between long and short period analysis:

...long-period analysis, focusing on the determinants of the warranted growth rate; and the short-period analysis, focusing on cyclical deviations in the actual rate relative to the warranted rate. (Eichner and Kregel, 1975, p. 1296.)

In methodological terms, this means "that deviations cannot be understood except with respect to some reference growth path" (ibid., p. 1296). The following quote from Eichner made by Arestis, in his tribute to Eichner (Arestis, 1989), points out the relevance of this interrelationship between cyclical and secular behaviour:

It is a premise of the theoretical approach underlying this textbook that any such cyclical behaviour can be understood only in relation to the secular growth rate from which it represents a deviation. The analysis of the economy's cyclical behaviour must therefore proceed hand-in-hand with an analysis of the trend. Indeed, the two are interdependent - the cyclical movements influencing the trend and the trend, in turn, defining the cyclical movements. The two together, trend and cycle, constitute the economy's macrodynamic behaviour (Eichner, 1987. p.3.)

However, as stated by Arestis (1989), Eichner's model suffered the limitation of the trend values being determined exogenously. In fact, this is a sort of inconsistency in his model. As noticed by Arestis (1989): "An endogenous explanation of the trends would have completed the simultaneous study of the macrodynamics of the US economy from a post-Keynesian perspective" (p. 21). Eichner's model is short period analysis, for that was the stage of development in which Eichner left it (Arestis, 1989).

There is another problem with the trend. The secular behaviour of variables of post Keynesian models is normally captured by exponential trends. However, as noticed by Forman and Eichner:

In some cases, because of the nature of the variables itself, it is more appropriate to examine the deviation, not from an exponential growth trend but rather from either the mean value of the variable over the entire period (when there is no discernible trend) or the linear trend of the variable ... (Eichner and Forman, 1981, p.118n.)

Trend forms other than exponential cause serious practical problems in running an econometric model. Also, breaks in the trend over the simulation period (e.g. a different exponential trend for each decade) are cumbersome (Arestis, et. al. 1985-86, p. 177).

As far as our model is concerned, it is a short period one, as our interest is in explaining fluctuations of aggregate output and prices during the seventies. We shall specify our variables in terms of deviations from an estimated "trend", although we do not consider appropriate to refer to this trend as a secular path of growth of the economy, since our model works with only 15 observations and over only one decade. We assert that the question is to set up an appropriate reference to maintain the spirit of disequilibrium analysis. The nature of the variables, in the Brazilian case, allows us to adopt the hypothesis of an exponential reference. In short period models we focus our analysis on the behaviour of the cyclical deviations.

Cyclical Deviations

As stated above, we follow Eichner in specifying our variables as deviations (or fluctuations) of actual growth rates from secular rates of growth, captured by exponential trends (see appendix 1).¹ In this sense, our estimations measure the deviation of the variables in percentage points in relation to a secular trend of growth.²

So, the deviation (denoted by #) of the actual growth rate from the growth reference rate is given by:

$$x\# = x' - x_s'$$

where

$$x_i' = (x_i - x_{i-1})/x_{i-1}$$

is the growth rate in the year i.

If the trend is an exponential curve, i.e.

$$x_s = a.e^{bt}$$

then its growth rate should be a constant, i.e.

$$x_s' = b$$

Fluctuations and Expectations

Following Minsky, we understand that modern capitalist economies are unstable by their very nature and this instability assumes the form of cyclical fluctuations (chapter 5). The wave-like form of these fluctuations and their periodicity will depend on how economic agents in the aggregate adapt their plans to changes in the environment.

The fact that normal path of an economy is cyclical implies that the various markets and institutions are subject to stresses and strains (Mitchell, 1913). As a result the opportunities open to agents change as such an economy transits through time. (Ferri and Minsky, 1989, p. 138.)

Institutional arrangements will play an important role in the explanation of how the economic system moves from one stage in the cycle to the next.

Although we are assuming that mechanisms and rules explain the way the economic system adapts to fluctuations, we do not assume that fluctuations are the result of entirely endogenous forces in operation within the economic system. Cyclical movements in this sense are not predictable, because they are not based on pre-determined mechanistic forces. In a world of uncertainty as described in the previous chapters, expectations guide decisions and long term expectations, as described by Keynes in the chapter 5 of the GT, are largely unpredictable. In a Keynesian world, that is a non-ergodic world, there are no inevitable, pre-defined paths for the economy. Because long term expectations are independent from short term results, they are exogeneous to the economic system, and therefore they are the ultimate source of explanation of changes in the direction and intensity of growth. In that sense, we consider that each cycle will have its own individuality since it is the adaptation of capitalist economies to exogeneous forces that determines the way shocks are

propagated and absorbed in the system and the way wave-like movements are formed (Schumpeter, 1939).

Notwithstanding the emphasis we give to the role of expectations in explaining fluctuations, our model employs the multiplier-accelerator mechanism; that is, it assumes that cycles are an endogenous process. The apparent contradiction disappears if we remember that this post Keynesian model, as most other models, establishes behavioural relations for private agents. Developed capitalist economies are characterized by different combinations of public and private economic activity. In Brazil, the State is clearly dominant for the reasons given in the preceding chapter. Private agents mostly adapt to State plans and policies. This adaptive kind of behaviour can be modelled through a multiplier-accelerator mechanism in the aggregate, even though a sectoral analysis would probably identify many sectors on which creative, rather than adaptive behaviour is observed.³ Therefore, we can take the private sector decisions as reactions to government policies, which is more determinate and easily identifiable than expectations per se.

The Basic Methodology

We discuss our equations by presenting the results of the regressions, at first without dummy variables, and then with dummy variables. These dummy variables aim to allow for effects which cannot be captured by our explanatory variables. In most cases the dummy variable is employed for one year only, which stresses its character of explaining unexpected changes in economic policy and/or unpredictable reactions of economic agents.

We have identified the period of our analysis as one of extended growth - 1968-1979 - followed by a recession - 1980-82. As we saw in the previous chapter, three different stages of development of aggregate output and price behaviour are identified - 1968-73, 1974-79 and 1980-82 - and it is our aim to specify the appropriate relationships that will explain the outcomes of each phase, and their connections.

C. THE STRUCTURE OF THE MODEL

As it was said above, an important feature of the post Keynesian theoretical framework is to focus attention on the process of growth rather than on states of static equilibrium. In terms of econometric models, processes of change can only be made explicit through the specification of a causal chain (see, for example, Malinvaud, 1980, chapter 2) where cause and effect relationships are established. In order to meet that requirement we have built a recursive system of equations where one explanatory relation for each current endogeneous variable is provided. To solve the system the result obtained in one equation is used to estimate the next one following the causal chain, link by link from one period to the next (chapter 8).

Another characteristic of recursive systems is that they are dynamic by their very nature. In this sense, our model is in contrast with interdependent systems of equations which are static or static dynamic, depending on whether or not lagged variables are included (see, Wold, 1964, chapter 1).⁴ Essential to the definition of the recursion process is the adequate specification of the time lags, which should be made clear when defining the causal chain.

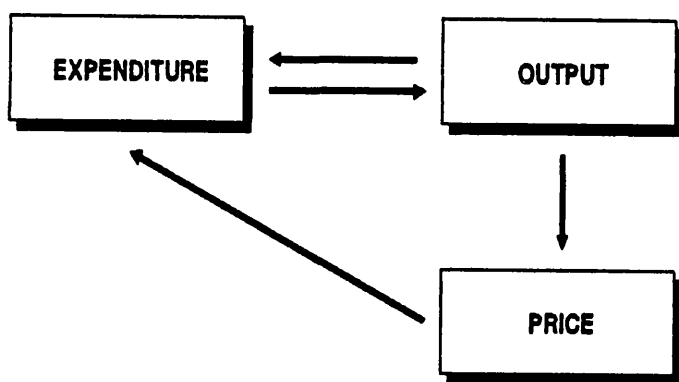


Figure 7-1 The Proposed Model with 3 Blocks of Equations

Following Eichner, we conceive our model in blocks of equations (three), where none of the blocks is independent, as each depends on variables contained in the others to be solved. A simplified view of our model can be seen in the Figure 7-1.

As Eichner (1979b, p. 53) points out, one way of establishing the theoretical lineage of a model is to see which set of equations - or blocks - are used and what are the linkages between them. Given the primary role of discretionary expenditure in explaining cyclical fluctuations, the causal relations of a post Keynesian model must start with the definition of a block for discretionary expenditure. In our case, discretionary expenditure is restricted to the industrial sector and embraces only investment in fixed assets. The relevance of investment in fixed assets in the post Keynesian framework is explained in two ways.

Because investment decisions depend on expectations, they are volatile and change according to the way environment is perceived by economic agents. Changes in investment explain changes in aggregate output, via the multiplier. On the other hand, the level of investment is dependent on the level of aggregate demand, via the accelerator effect. That is the conventional accelerator-multiplier model that leads to cyclical fluctuations and is represented by the connections between the expenditure and output blocks.

Additionally, investment in fixed assets means not only demand for productive resources but also demand for additional funds. It is the accommodation of these different demands by the productive and financial structure of the economy that will condition the way expansion takes place. It is through the demand for funds for investment that post Keynesian theory establishes a powerful link between micro and macroeconomic spheres. Accumulation of funds for investment internal to the firm depends on its pricing policy and so that justifies the connection between the expenditure block and the price block. Changes in the mark-up then are related to the rate of investment and the degree of liquidity of firms.⁵

Output and price blocks are connected given the assumption that in modern market economies big firms have enough market power to set prices, and they will do so according to their expected target return over a standard level of production.

Flow Diagram and Equations

Figure 7-2 presents the causal relations of our model giving more details of it for the Brazilian economy. The set of equations of the model is as follows:

BLOCK 1: Industrial Expenditure

$$(Eq.1.1) \quad A\# = A (GDP\#, F\#_{-1}, \langle FL' \rangle)$$

$$(Eq.1.2) \quad F\# = VA\# - W\#$$

BLOCK 2: Output

$$(Eq.2.1) \quad GDP\# = GDP (A\#_{-1})$$

$$(Eq.2.2) \quad G\# = G (GDP\#)$$

$$(Eq.2.3) \quad VA\# = G\# + P\#$$

BLOCK 3: Price

$$(Eq.3.1) \quad P\# = P (w', Pm', G'_{-1})$$

$$(Eq.3.2) \quad w' = w (P'_{-1}, G'_{-1})$$

$$(Eq.3.3) \quad W\# = w\# + \langle T\# \rangle$$

$$(Eq.3.4) \quad Pm' = Pm (P'_{-1}, \langle PM' \rangle)$$

where

A = Industrial Investment at constant prices

GDP = Gross Domestic Product in real terms

F = Industrial Gross Surplus

FL = Foreign Loans in US\$ deflated by import price index

VA = Value Added of Industry

G = Industrial Output in real terms

P = Industrial Price index

W = Wage Bill of Industry

w = Wage Rate

T = Industrial Employment

P_m = Index Price for Domestic Raw Materials

PM = Average Value of Imported Raw Materials

and

' denotes first difference

denotes cyclical deviation

<> denotes exogenous variable

-1 denotes lagged.

Our main hypothesis is that the dynamism of the Brazilian industry in the seventies is explained by the internal mechanisms that allowed relevant decisions to be carried out. In the more detailed diagram of the Figure 7-2, we highlight two essential aspects of our model: the impact of the foreign sector and the mechanism of indexation. The foreign sector is represented through two exogenous variables (FL and PM). The mechanism of indexation of wages and the exchange rate is represented by the arrows linking P and w and P_m. In our view, it was the availability of foreign funds and the control of the inflationary process, although at high rates, that set the basic rules that kept the economy expanding. The indexation mechanism allowed new rules of contracting to be developed, and while inflationary expectations were under control, and the economy could be kept inside "the corridor", positive rates of growth could be sustained.⁶

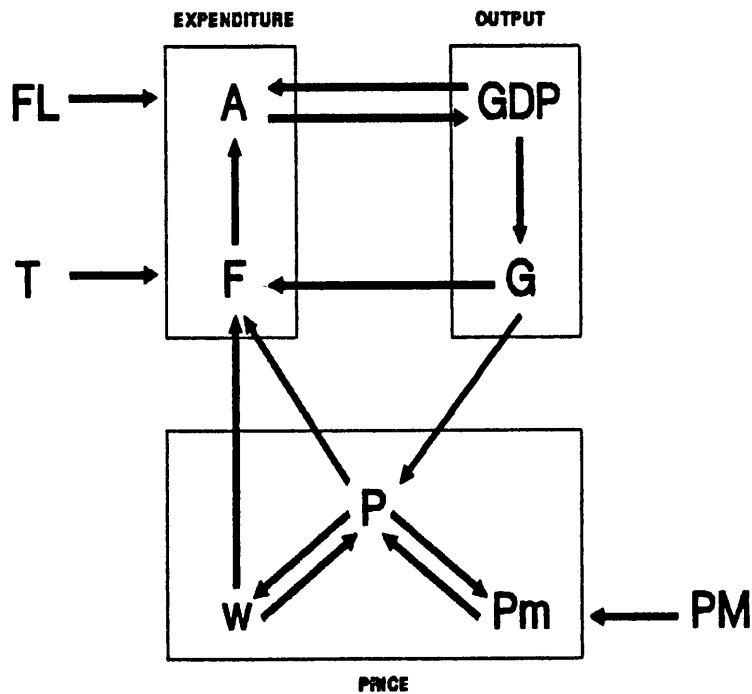


Figure 7-2 Flow Diagram of the Proposed Model

The speeding up of the rate of growth of the economy at the beginning of the decade followed the strategy of "growth cum debt" initiated in the end of the sixties. As the strategy deepened, it made the economy more vulnerable to external shocks. There is a consensus among Brazilian economists nowadays that the economy was able to sustain positive rates of growth due to the availability of foreign loans, and the government's action in outlining new options of growth through the Second Development Plan. For these reasons, the first oil shock did not impair growth and the process of foreign borrowing allowed the country to complete its industrialization process. After the second oil shock and the sharp increase in international interest rates, however, the balance of payments situation became critical and economic policy changed in order to promote internal adjustment to external payments disequilibria. The Brazilian economy then fell into a deep recession, and in this sense, in Brazil, the "liquidity pressure" is strongly linked to the availability of foreign resources to service the external debt and to allow for new credit to be domestically absorbed.

Price behaviour is dominated by the indexation mechanism in wages and in the exchange rate. This mechanism reinforces inflationary trends given that an initial

inflationary shock tends to be perpetuated as this defensive mechanism operates. Although indexation had been introduced in an attempt to reduce uncertainty in economic decisions, once inflation rates start rising its actual effect is to increase uncertainty about the future. Instability arises because expectations become elastic and so it is more difficult to hold the economy inside the corridor.

During the 1970s, inflation tended to accelerate after the external shocks of 1973 and 1978 and so, as expected, defensive indexation mechanisms shifted past inflationary pressures forward, contributing to the instability of the economic system. A consequence of the intensification of inflation was to inhibit projects with long lead times, such as investment in fixed assets. Increasing instability in relative prices brought investment decisions to a standstill, with direct consequences for the rate of growth of the aggregate output.

D. BLOCK 1: INDUSTRIAL EXPENDITURE

Real Expenditure in Fixed Assets in Industry

In the Keynesian tradition, investment in fixed assets is the most important component of aggregate expenditure in explaining fluctuations in aggregate output, given its autonomous nature with respect to current conditions and its long lasting impact on the productive structure. Post Keynesians emphasize changes in discretionary expenditures (which also include expenditures in productive assets and durable goods purchased by households, government and the rest-of-the-world sectors), and their impact on the financial structure, as fundamental causes of short period cyclical movements. In describing our model, we begin with the behaviour of industrial expenditures in fixed assets in real terms deflated by the industrial price index.

The Behaviour of Industrial Investment in the 1970s

During the 1970s, the ratio of real gross fixed investment (GFI) to Gross Domestic Product (GDP) increased steadily up to 1975, when it started to decline reaching a point in 1981 below its 1970 level (Table 7-1).

Table 7-1 GFI/GDP

year	%	year	%	year	%
1970	20.3	1974	24.1	1978	22.7
1971	21.0	1975	25.1	1979	22.1
1972	21.9	1976	24.5	1980	22.0
1973	23.2	1977	23.0	1981	19.8
				1982	18.5

Source: FGV - National Accounts at Constant Prices, 1987.

This behaviour is related to the different phases of development of the Brazilian economy in the seventies. The beginning of the decade is the period of rapid expansion when consumption and investment are both increasing. The rate of increase in investment is, however, higher than consumption, which raises its share in total output. The adjustment of the economy in the aftermath of the first oil shock, reduces the rate of increase of aggregate investment, although it is kept still high. It is only at the beginning of the eighties that Capital Formation shows a negative rate of expansion, following the slowing down of the economy. It is clear then that there is a strong correlation between the rate of investment and economic growth, as shown in Table 7-2.

Related to the phases of growth is the composition of expenditures in fixed assets by the industrial sector, as shown in Table 7-3. Starting in the late sixties and during the seventies, the composition of outlays did not change much: over 70% of the investment demand in this period was directed to equipment and machinery. After 1974 there was a move towards an increase in demand for domestic machinery at the expense of imported equipment, as a result of the more rigorous control over imports imposed by the central government. At the beginning of the eighties, following the decrease in real investment outlays, investment in dwellings, new buildings and land gained ground in relation to the other items. This evidence seems to suggest that the change in perspectives regarding the future of the economy shifted decisions towards

more conservative forms of investment, more adequate to conserve wealth than to increase productive capacity.

The General Form of Equation Estimation

In our model, the basic statistics to estimate the behaviour of discretionary expenditure cover only net expenditure in fixed assets by the industrial sector.⁷ Private and state owned enterprises are both considered without distinction.⁸

Our initial equation simulates the behaviour of industrial expenditure, and its generalized form is, following Eichner, given below:

$$A\#(i) = \alpha GDP\#(i) + \Sigma \Phi_n X_n$$

The first relation in the first term of the equation establishes that the short period deviations in the rate of change in expenditure in fixed assets from its trend will be taken as dependent on the deviation in the rate of change of GDP. The second term of the equation represents the other effects which will be specified according to the goodness-of-fit in relation to the regression.

The Accelerator Effect⁹

The first relation

$$A = \alpha GDP$$

where α is the accelerator, establishes a relationship between the level of aggregate output and the desired level of productive capacity. That is, decisions to invest are related to effective demand and are translated into decisions to change productive capacity according to a desired or planned level of capacity utilization.¹⁰

Table 7-2 Average Rates of Real Growth for GKF and GDP

	GDP	GKF
1970/73	12.5	17.7
1974/79	6.8	6.3
1980/82	3.0	-3.4

Source: FGV - National Accounts, 1987.

Table 7-3 Composition of Industrial Investment

	vehicles, machinery, equipment			dwellings, new buildings and land
	imported	domestic	used	
1968	0.19	0.41	0.10	0.30
1969	0.21	0.41	0.09	0.30
1970	0.21	0.52	0.05	0.23
1971	n.a	n.a	n.a	n.a
1972	0.22	0.50	0.04	0.24
1973	0.19	0.49	0.04	0.28
aver.	0.20	0.47	0.06	0.27
1974	0.19	0.46	0.06	0.29
1975	0.18	0.49	0.04	0.29
1976	0.19	0.49	0.07	0.26
1977	0.14	0.53	0.06	0.27
1978	0.14	0.55	0.05	0.26
1979	0.16	0.50	0.07	0.27
aver.	0.17	0.50	0.06	0.27
1980	n.a.	0.61*	0.04	0.35
1981	0.07	0.43	0.03	0.47
1982	0.12	0.45	0.06	0.37
aver.	0.56	0.04	0.40	

Source: IBGE, Industrial Census and Annual Industrial Surveys, several years. No survey was undertaken in 1971.

* includes imported equipment and machinery.

In the Brazilian model, the accelerator effect provides a strong explanation of the behaviour of the aggregate investment of the industry, as we can see from the regression results below. Our interpretation here is that the accelerator effect works well for two main reasons. One reason is that we are using aggregate data for the whole industry, and at this level, mutually offsetting effects in terms of decisions to invest among the industrial sectors might be at work. The period we are studying is marked by structural changes in the industry, and so the impact of this compensation effect is reinforced.

Another reason springs from the basic assumption for the functioning of the accelerator mechanism which is that the behaviour of demand is an important element influencing investment decisions. In the 1970s, the government was committed to maintaining high, sustained rates of growth of aggregate output. Apart from the years of 1981-82, this continued growth might have had a powerful positive influence in keeping the state of long term expectations optimistic, allowing us to consider these expectations to be stable or constant in the aggregate.¹¹ In other words, we are assuming that autonomous investment did not differ in behaviour from induced investment, because the state of long term expectations was kept stable by the strong commitment of the State in favour of growth. Actually, the point to be stressed here is the peculiarity of the Brazilian economy, where the State plays a strategic role signaling to the private sector priority areas where to invest. As long as the government was able to launch new investment plans and sustain the credibility in those plans, growth rates could be supported at high levels.

With the assumption that long term expectations are backed by observed economic growth, we can identify during the seventies three distinct moments in the operation of the accelerator mechanism. First, during the years of rapid growth, the degree of capacity utilization increased continuously, and investment expanded rapidly in response to demand (around 30% in real terms up to 1973, see Table 7-4). Those were the years of the so called Brazilian "economic miracle". Capacity utilization approached its maximum level and changes in demand were met through increases in investment. In 1973, the manufacturing industry reached the highest rate of capacity

utilization of the period. During this phase the government could sustain an expansive economic policy.

The period in-between the external shocks suggests a different interpretation. Now the lower degree of capacity utilization should weaken the accelerator effect. However, as we are assuming that decisions to alter productive capacity are linked to effective demand, the degree of capacity utilization that matters is the desired or planned one according to an expected level of activity for the economy. On the other hand, a large share of the investment realized in this period was of direct or indirect responsibility of the State. The investment decision in this case is taken with a view to the trend in demand and is much less sensitive to factors such as current levels of capacity utilization.

The decision to sustain the level of aggregate demand through the launching of the Second Development Plan in 1974 by the government then can explain why, although technical capacity utilization was not so high as before, investment demand continued to expand because expectations were kept high. The suggested interpretation here is that firms adapted their expectations to the new environment and to the new role of the State, that changed from a guarantor of effective demand to that of a direct investor, inducing the private sector to realize complementary investment. During this phase, again, the government could sustain investment plans and maintain their credibility.

The second external shock contracted aggregate demand and generated heavy uncertainties with the result that the demand for investment declined. In that later stage, the mechanism of the accelerator amplified the current fall, once expectations could no longer be sustained. After 1979 the credibility of expansionary economic plans was difficult to sustain, given the worsening of the balance of payments accounts and the acceleration of inflation. Even the return to government of the same economic staff of the period of the "economic miracle" (the Minister of Planning was Delfin Neto), was not enough to hold expectations high.

Table 7-4 Growth Rates of Real Industrial Investment in Fixed Assets (inv %) and Annual Capacity Utilization (CU%)

	Inv.	CU	Inv.	CU	Inv.	CU		
1968	29.5	83.0	1973	29.3	90.5	1978	0	83.7
1969	25.9	85.0	1974	15.3	88.0	1979	0	83.6
1970	25.9	85.8	1975	3.3	87.0	1980	-7.2	83.8
1971	28.7	86.8	1976	40.8	88.5	1981	-5.3	78.0
1972	53.6	87.8	1977	-5.3	83.3	1982	-21.3	75.8

Source: Table A1.7-1 in the appendix and FGV, Conjuntura Economica, several issues.

The Other Factors

We add other factors to our regression to modify the accelerator mechanism:

$$A\#(i) = \alpha GDP\#(i) + \beta F\#(i-1) + \Gamma FL'(i) \quad (\text{Eq.1.1})$$

These factors represent the role of the availability of liquidity in explaining investment decisions by the firms. It is through these elements that the important link between microeconomic decisions and macroeconomic results is acknowledged and processed. Data limitations (flow of funds accounts are unavailable) prevent us from examining in greater detail that relation. However, in our model we define the variable F which represents a rough estimate of internal funds available to firms. Actually, it measures a proxy of the gross capital income from which firms must meet their cash commitments. It indicates a potential capability to accumulate funds.

The F variable is specified in terms of the deviation from the trend and is measured in nominal terms. It is obtained from blocks 2 and 3 of the model and is expressed in the following identity (and hence there is no trend adjustment made for this variable)

$$F\#(i) = VA\#(i) - W\#(i) \quad (\text{Eq.1.2})$$

which is the second equation of this block.

F# is the difference between nominal value added of industry - VA# - as defined in block 2, and the wage bill also specified in terms of deviation from the trend (block 3). Because it is linked with the other two blocks, it plays a central role in the causal chain of the model.

The significance of specifying this variable in nominal terms is the attempt to account for Eichner's proposition that firms set prices in order to gather funds for future investment, under the expectation of future equipment prices. In inflationary economies, such as Brazil, price expectations are dispersed, making any ex-post price index a poor approximation to price expectations.

The fact that Brazil is characterised by permanent inflation strengthens the argument for including nominal funds in the regression, as firms face the additional risk of becoming illiquid because of a sudden, unpredictable, change in relative prices. Moreover, if inflation rates are not stable and debt contracts are adjusted according to inflation, the risks that unexpected changes in inflation may increase commitments more than proportionally to revenues is much more concrete.¹²

As we saw in the previous chapter, speculative finance posture seems to be dominant in Brazilian industry. An environment of permanent inflation makes hedge postures almost impossible to maintain, except for those units with access to public sources of funds.

In the graphs of the Figures 7-3, 7-4 and 7-5, we show the relation between nominal expenditure in fixed assets E (obtained from Table A.1 in the appendix 1 to this chapter) and nominal funds F (obtained from Table A.3 in the appendix 1 to this chapter), for each of the three sub-periods (phases) of our analysis. In those graphs, the vertical axis is an index of the nominal values of each year with relation to 1967 (unit value).

We shall see that the evolution of E and F follows closely Minsky's assumption about the behaviour of firms along the economic cycle. The amount of nominal expenditures¹³ is always above the volume of nominal funds, the only exceptions being 1968 and

1982. The year of 1968 is the first year of the recovery process, and growth starts through the utilization of available idle capacity. The rate of expenditure accelerates more rapidly than the rate of increase in nominal funds after 1970, and this gap reaches its widest level in 1973. The interpretation here is that an optimistic climate for investment stimulated more speculative practices and increasing indebtedness by firms. During the second stage of development, the gap between funds and expenditure narrows down in contrast with the previous period, but it is still remarkable. Entering the third stage, this tendency continues but with the rate of nominal expenditure decreasing and reaching the funds curve in 1982, when industry experiences its second year of negative growth.¹³

The variable F# alone was significant in the regression of A#, which appears to indicate that the availability of internal funds is important in explaining investment

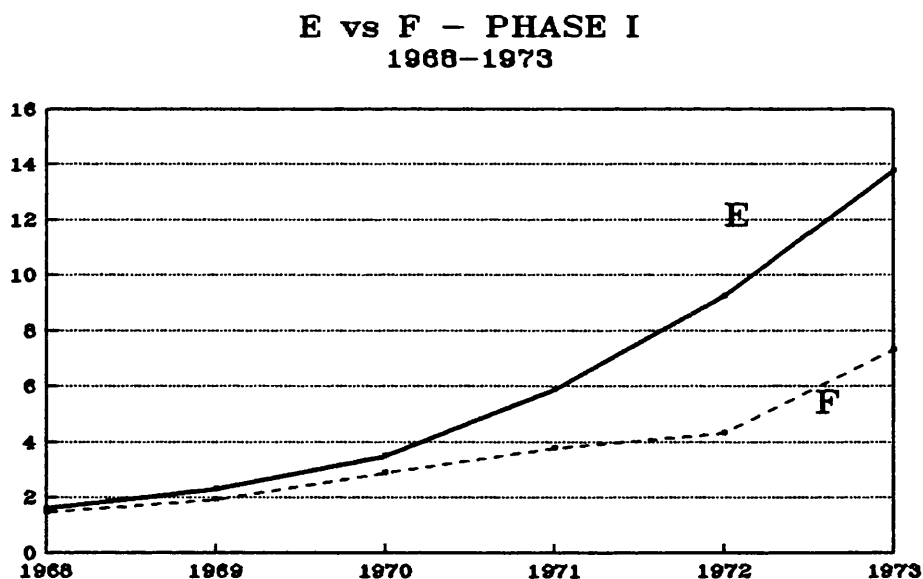


Figure 7-3 Nominal Expenditure in Fixed Assets (E) vs Nominal Funds (F) for the phase I

E vs F - PHASE II
1974-1979

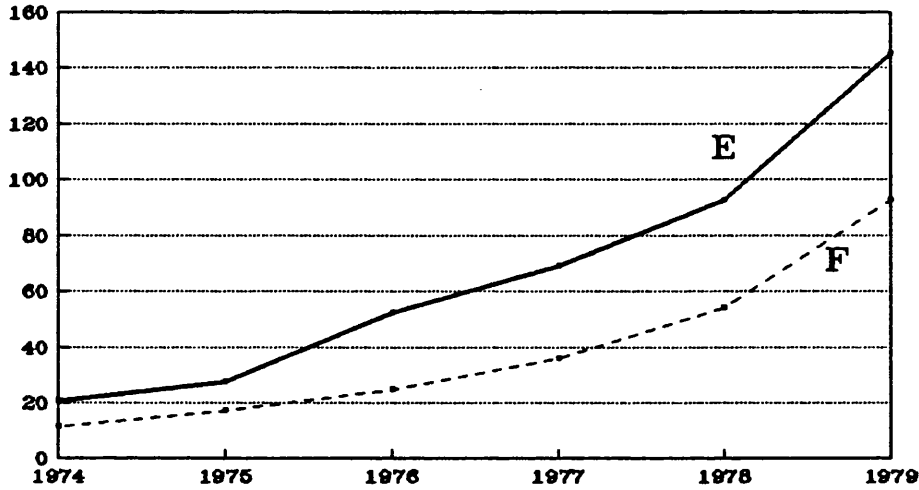


Figure 7-4 Nominal Expenditure in Fixed Assets (E) vs Nominal Funds (F) for the phase II

E vs F - PHASE III
1980-1982

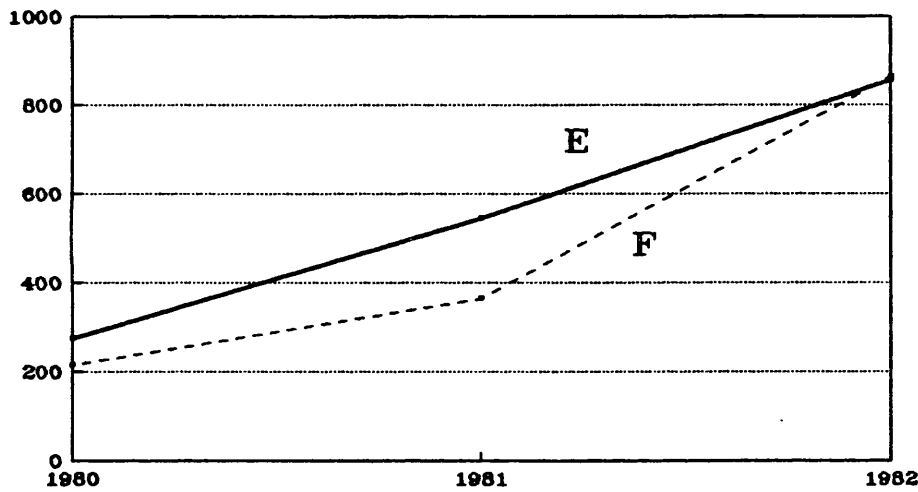


Figure 7-5 Nominal Expenditure in Fixed Assets (E) vs Nominal Funds (F) for the phase III

expenditures. It should also be noted that the variable is regressed lagged one period, suggesting that during most of the period firms were accumulating internal funds to assure themselves of the availability of finance.

The next variable to be considered is the rate of increase in the inflow of foreign loans (suppliers credit and cash loans) measured in real terms - FL' - (deflated by the imports price index). This variable is introduced exogeneously to the model, and it is used to consider external shocks. As we saw in chapter 6 we are assuming that foreign loans are an important source of finance to complement domestic funds for investment.¹⁴ This variable can be understood as a way of easing the liquidity pressure of domestic financial markets. Since it also represents purchasing power over imported products, it is specified in real terms.

As we saw in chapter 6, in Tables 6-3, 6-4, and 6-5, the net inflow of capital exceeded the financing requirements of current transactions deficits (except for the years of 1974, 1975, 1979, 1980 and 1982), which in the Brazilian case are traditionally negative due to the services account which has always showed a deficit.

In the period of accelerated growth, the inflow of external financial resources enabled consumption and investment expenditures to expand simultaneously. After 1973, the cost of local borrowing rose more rapidly than that of loans denominated in foreign currency, encouraging foreign capital inflows. After 1979, the policy of attracting foreign capital was intensified in order to cover trade and non factor capital service deficits and debt service payments. Capital inflows were induced by reducing the domestic real supply of credit and by the imposition of severe restrictions on domestic commercial bank lending, except on foreign borrowing. These efforts were made to use the capital inflows to close deficits in current transactions. Nevertheless in these years the ratio foreign loans/net investment is reduced, a tendency that is continued in the years following 1982. The significance of foreign loans in explaining industrial investment only reinforces the thesis that at least for the period 1974-79 foreign indebtedness was used to overcome the structural dependence of the industrial sector on the imports of raw materials and intermediate products.

The Results of the Regression of A#

Our regression with no dummies gives the following result, with the t value between brackets (with the t statistics significant at 15%, for 11 degrees of freedom):¹⁵

$$A\# = 3.359482GDP\# + 0.220986F\#(-1) + 0.220312FL'$$

(6.12)
(1.66)
(3.43)

R^2 adj. = 0.82
DW = 1.86

where the value of DW does not show evidence of autocorrelation among the residuals at 1%. The graph of A# is shown in the Figure 7-6.

Our regression does not describe well two of the years, 1978 and 1980, in our period of analysis. In 1978, the inflow of foreign capital was extremely high, reflecting the strategy adopted that year by the government to take advantage of the exceptional conditions of liquidity in the international financial markets. The surplus registered on the capital account (Table 6-4) was higher than needed to finance the current transaction deficit and so the level of foreign reserves reached its highest point in our period of study (US\$ 12 million).

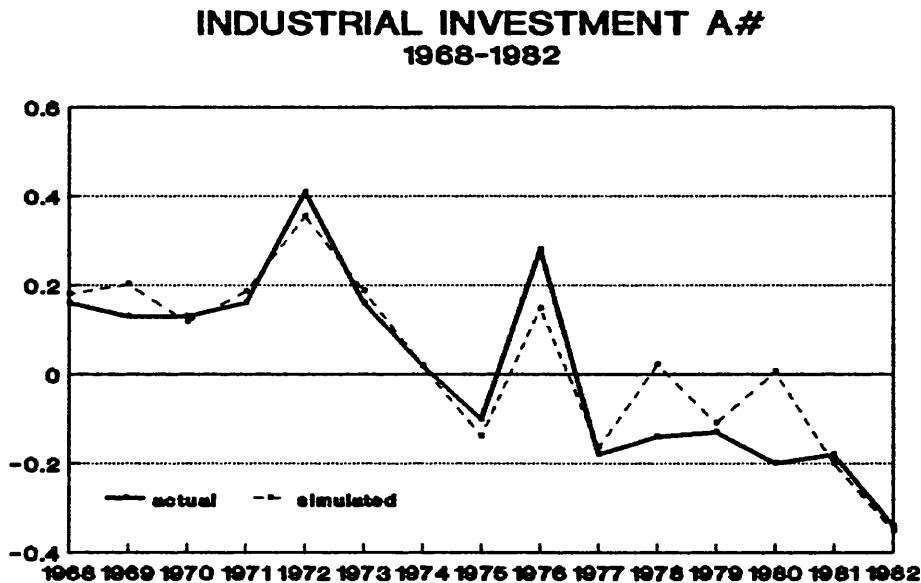


Figure 7-6 Industrial Investment A# (1968-1982) with no Dummies

In order to offset the inflationary impact of this higher reserve level on the domestic economy, the government decided in June 1978 to freeze the amount of the foreign loans convertible into cruzeiros at first for a period of 30 days, and later on for 120 and 150 days. Thus our regression registers the impact of the high level of inflow of foreign loans which, however, did not represent an easing of liquidity in the domestic financial market in 1978.

The year of 1980 was exceptional in our period of analysis, given the dramatic changes occurred in the external front at the end of 1979. As we saw in earlier chapters, 1980 is a turning-point in terms of strategy of growth for the Brazilian economy. Special policy measures were introduced during 1980 that might have affected investment outlays unfavourably, although the economy presented a still high rate of expansion.

These were the pre-determination in January of the percentage change of monetary correction (45%) and exchange rate correction (40%) for the year. These measures also were meant to reduce uncertainty about the cost of foreign borrowing as they followed the 30% maxi-devaluation of the cruzeiro in December 1979, the first maxi devaluation since the beginning of our period of study. Although these measures might have had a positive impact on the balance sheet of firms, writing off their debts, they did not contribute to create positive expectations about the future. The increased difficulty in borrowing in foreign markets¹⁶ and the sudden shift in economic policy to adjust the economy to the new external situation worked to aggravate inflationary expectations. As a result of these measures, inflation rates did not decline in 1980 and the economy showed quite a high rate of growth (7.2%). Financial assets earned negative real yields and preferences moved towards speculative purchase of physical assets.

Given the special significance on the formation of expectations that the economic measures adopted in 1980 exerted, we introduced a dummy variable (D80) in our regression only for this year, although the gaps show \hat{y} in the regression above between the observed and the simulated values for 1978 and 1980 are similar

The result of the regression of A# with the dummy variable (shown in the Figure 7-7) is as follows:

$$A\# = 3.470733GDP\# + 0.262319F\#(-1) + 0.194699FL' - 0.213454D80$$

(8.08)
(2.50)
(3.84)
(-2.96)

R^2 adj.= 0.88
DW = 1.83

where the t statistics is significant at 5% (for 10 degrees of freedom) and the value of DW does not show evidence of autocorrelation among the residuals at 1%.

To sum up, the regression coefficients of our equation are all significant and have the expected sign. The accelerator effect mostly explains the behaviour of investment, but the other factors are also significant in explaining it. The dummy variable was introduced to compensate for the change in expectations about investment.

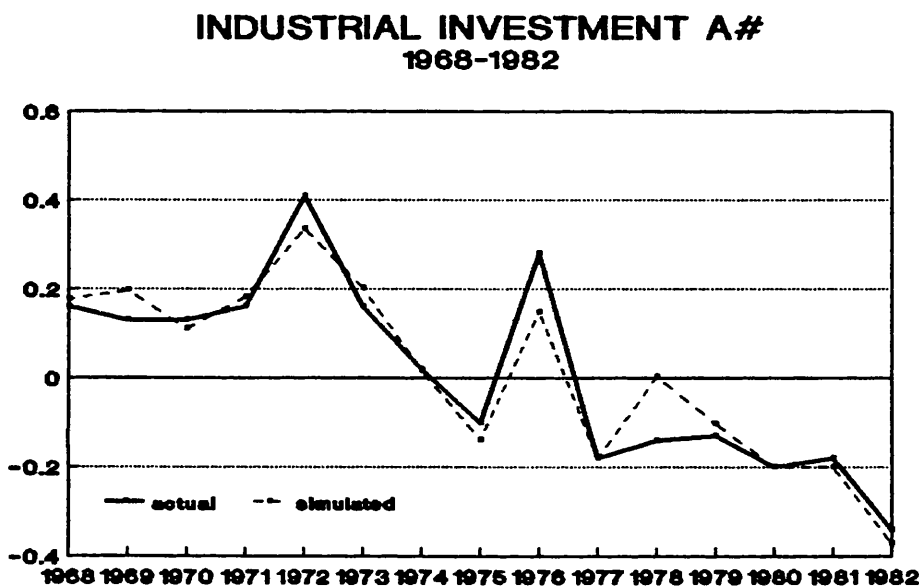


Figure 7-7 Industrial Investment A# (1968-1982) with a dummy variable

E. BLOCK 2: Output

The Real Output (GDP)

Over the fifteen years that comprise our study, industrial growth showed three well-defined patterns (Table 7-5). The first six years registered the highest rates ever reached by the Brazilian economy and industry. In 1972 and in 1973, the first two years for which information is available, durable consumer goods and capital goods output expanded at extraordinary rates of over 20% a year.

Table 7-5 Real Growth Rates of Industrial Output
Per cent

	GDP	Total Ind.	Industrial Output				
			Consumer Goods		Capital Goods	Intermediate Goods	
			Total	dur.			non dur.
1968	11.2	15.9					
1969	10.0	10.8					
1970	8.8	11.0					
1971	11.3	11.3					
1972	12.2	14.0	11.8	23.2	9.4	25.7	14.8
1973	13.6	16.6	13.8	25.9	11.2	27.7	18.3
1974	9.0	7.8	4.7	8.3	3.9	22.3	9.3
1975	5.4	3.8	1.7	-4.2	3.0	4.7	6.4
1976	9.7	11.9	11.4	12.8	11.1	18.9	12.7
1977	4.6	2.2	0.3	-0.1	0.3	-4.5	7.5
1978	5.0	6.1	8.1	17.0	6.5	6.1	6.8
1979	7.3	7.0	5.1	7.5	4.7	5.7	9.2
1980	9.3	9.2	6.0	10.7	5.2	6.6	8.3
1981	-2.9	-11.2	-6.0	-27.2	-2.2	-18.7	10.5
1982	1.0	-0.1	2.7	8.0	1.8	-10.8	0.4

Source: IBGE- Indicadores Conjunturais da Industria, several issues and FGV, National Accounts.

The rates of growth of aggregate and industrial output in the years following the first external shock of 1973-74 were lower than those of the boom years, but they were still positive and actually close to the historical trend (8%). Their oscillations reflected the impact of short run economic policies that tried to keep inflation and the balance of payments under control, and at the same time avoid a recession. Intermediate goods and capital goods were the segment of industry that achieved the highest average rates of growth in this period as a result of import controls and the incentives given by the government to expand capacity in these sectors (Second Development Plan).

The second external shock, comprising sharp increases in oil prices and in international interest rates, changed the situation dramatically. The high cost of borrowing in the external financial markets and debt service requirements led to a change of economic policy that induced a recession. In 1980, the rates of growth of industry and GDP were high and positive, but in 1981 for the first time they were negative and output failed to recover in 1982. This year marks the end of a cycle in the Brazilian economy of growth with increasing foreign indebtedness.

In the first equation of this block we estimate fluctuations of Gross Domestic Product in real terms in relation to its historical trend as a function of the impact of the multiplier. Our equation then shows how discretionary changes in expenditure affect production. Assuming that there is a lag¹⁷ of one period before the impact on GDP, we can write a general equation:

$$GDP\#(i) = k.I\#(i-1)$$

where,

$$I\#(i) = \text{discretionary expenditures in real terms.}$$

The behaviour of the GDP equation then is explained through fluctuations of discretionary expenditures. This is the key variable to explain the dynamics of short term fluctuations of income in relation to its secular rate of growth. As we are dealing with only one sector of the economy, we shall assume that

$$I\#(i-1) = A\#(i-1)$$

where,

A = discretionary expenditure of the industrial sector in real terms, as obtained in block 1.¹⁸

And so,

$$\text{GDP}\#(i) = k.A\#(I-1) \quad (\text{Eq.2.1})$$

The Results of the Regression of GDP#

The estimated equation with no dummies is as follows (t statistics significant at 2%, for 13 degrees of freedom):

$$\text{GDP}\# = 0.118187A\#(-1) \quad (2.29)$$

$$R^2 \text{ adj} = 0.27 \quad \text{DW} = 1.71$$

where the value of DW does not reject the null hypothesis at 1%. The graph of GDP# is shown in the Figure 7-8.

The low coefficient for R^2 in this equation is in part a consequence of other discretionary expenditures not being taken into account in our regression.

Also it should be noticed that the years 1975, 1976 and 1977 and the three final years are not described in an entirely satisfactory way by the explanatory variable in our regression.

In 1975 and 1976 governmental policy was committed to the proposals of the Second Development Plan and so economic measures were taken to induce private investors to follow the plan (in particular the decision to pre-fix monetary correction charged over long term loans provided by the National Development Bank, see chapter 1). In 1976, in response to the incentives of the previous year, the industrial growth rate reached 12% and inflation rates accelerated again. Following this unexpected response of the economy, in 1977 economic policy aimed to reduce the industrial rate of

REAL OUTPUT GDP #
1968-1982

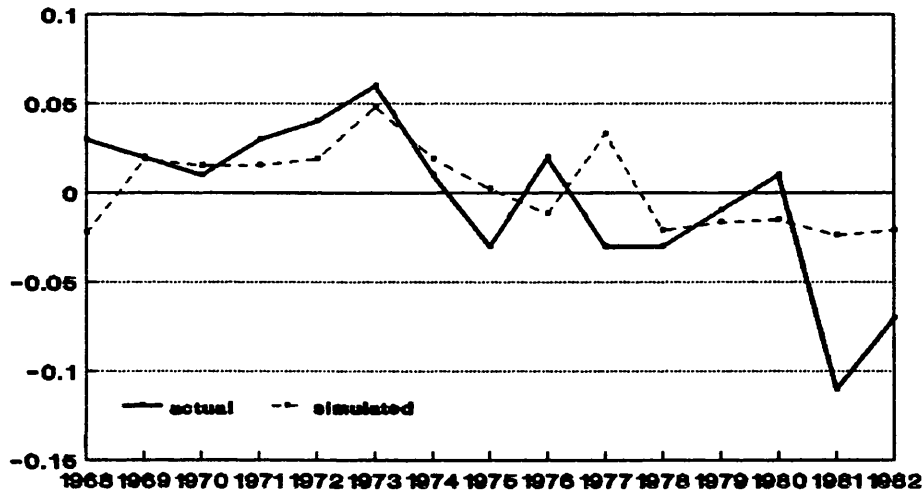


Figure 7-8 Real Output GDP# (1968-1982) with no dummies

REAL OUTPUT GDP #
1968-1982

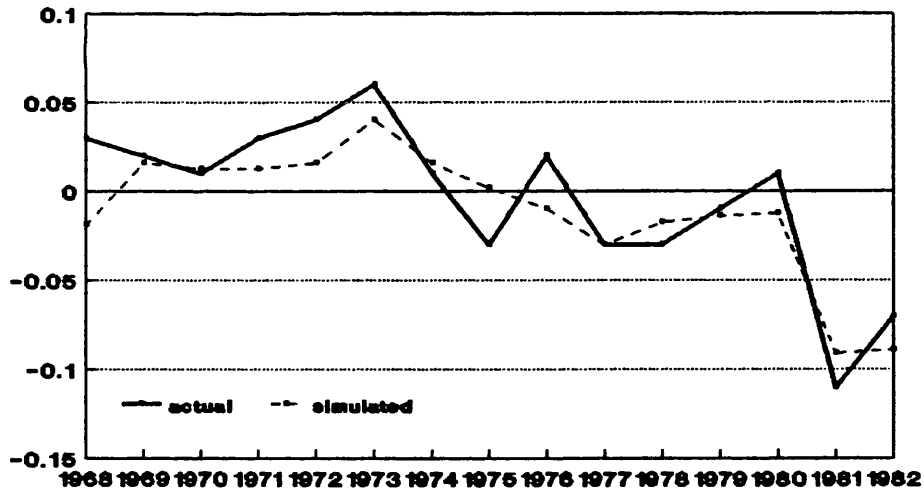


Figure 7-9 Real Output GDP# (1968-1982) with Dummies

growth, which fell to 2%.¹⁹ Substantial cuts in public investment were made (see Table 6-9) and restrictive monetary and credit policies were adopted to control both the current account deficit and inflation. Although the general guidelines of economic policy did not change during 1977, some adjustments were made in order to avoid foreign sector constraints, such as the increase in commercial bank reserve requirements to 40% of demand deposits, the lifting of controls on interest rates, and the introduction of restrictions on consumer credit. Indeed, the trade balance in 1977 showed a small surplus (US\$ 140 millions), for the first time since the first oil shock. Inflation, however, did not decline and there was even a slight increase in the rate of industrial price inflation (36% at the end of 1976 against a 39% increase in 1977).

The beginning of the eighties is marked by significant changes in economic policy that followed the second external shock in 1979. Since the policy of foreign indebtedness started, policymakers were concerned mainly to manage the profile of the debt service in order to keep contractual payments well distributed over time and to exert control over the costs of servicing it, and, particularly, over the spreads paid. Following the second oil shock in 1979, and despite the rising tendency of the international interest rates, which increased from an annual average of 6.4% in 1977 to 9.4% in 1978, 12.0% in 1979 and 13% in 1980, it was believed that an excess of liquidity in the international market would allow the policy of external borrowing to continue. In 1979, and again in 1980, the current deficit was not covered by the inflow of foreign capital (except for 1981, see Table 6-5), leading to a reduction in the the level of reserves.

Nevertheless, only in 1981 could a change in the attitude of the Brazilian government with respect to the debt problem be detected. The reluctance of the international private banks to increase the level of lending to highly indebted countries during 1980²⁰ was accompanied by an increasing pressure on those countries to use the IMF resources. Although the Brazilian government did not follow this option before the end of 1982, it is significant that in 1981, for the first time, the government elaborated a detailed document ("Politica do Setor Externo", Conselho Monetario Nacional, session of 21-01-81) where targets were established and commitments were made to overcome balance of payment constraints. In this sense, these two years represent a significant

modification in terms of global economic policy in relation to the previous years (1980, as we saw before, can be seen as a transitional year).

Together with restrictive monetary and fiscal policies in the short run, other longer term measures were proposed. In order to reduce current account deficits, trade surpluses were to be generated through a more aggressive export policy (diversification of markets and products), and lower imports via slower economic growth. New priority sectors were established, notably energy and agriculture, and the exchange rate policy also was modified with the decision to keep the cruzeiro undervalued in relation to the dollar.

To account for these changes in policy, we added two dummy variables one for the year of 1977 and the other one to the pair of years 1981-82, and reestimated the equation. Our new equation is as follows (t statistics significant ^{at} 2%, for 11 degrees of freedom):

$$\begin{aligned} \text{GDP\#} &= 0.097895\text{A\#}(-1) - 0.057411\text{D77} - 0.0714\text{D81-82} \\ &\quad (2.54) \qquad \qquad (-2.17) \qquad \qquad (-3.84) \\ \text{R}^2 \text{ adj.} &= 0.71 \qquad \qquad \qquad \text{DW} = 1.78 \end{aligned}$$

where the value of DW does not reject the null hypothesis at 1%. The graph of GDP# for this case is shown in the Figure 7-9.

The negative signs of the coefficients of the dummies variables are consistent with their impact over aggregate output.

To sum up, we can improve the result obtained in the regression by the introduction of dummy variables, and in doing so we strengthen the explanatory effect of A(-1)#. The dummy for the period 1981-82 expresses the dramatic change from the pattern of growth that prevailed in the seventies. The dummy for 1977 represents a fine tuning in short run economic policy to adjust the development of the economy to the foreign and domestic constraints.

The Industrial Output

The second equation of this block

$$G\#(i) = \pi GDP\#(i) \quad (\text{Eq.2.2})$$

estimates industrial output as dependent on Gross Domestic Product. This equation expresses an empirical observation: manufacturing and mining industries accounted for around 30% of GDP in the 1970s.

The Result of the Regression of G#

The estimation of the deviation of the industrial output is as follows (with the t statistics significant at 0.05%, for 13 degrees of freedom):

$$\begin{aligned} G\# &= 1.544803GDP\# \\ &\quad (15.04) \\ R^2 \text{ adj.} &= 0.94 \quad \quad DW = 2.05 \end{aligned}$$

where the value of DW does not reject the null hypothesis at 1%. The graph of G# is presented in the Figure 7-10.

The Value Added of Industry

The third equation of this block,

$$VA\#(i) = P\#(i) + G\#(i) \quad (\text{Eq.2.3})$$

is an identity. Industrial value added is calculated through the estimates of G#, as above, and P# from the next block.

INDUSTRIAL OUTPUT G# 1968-1982

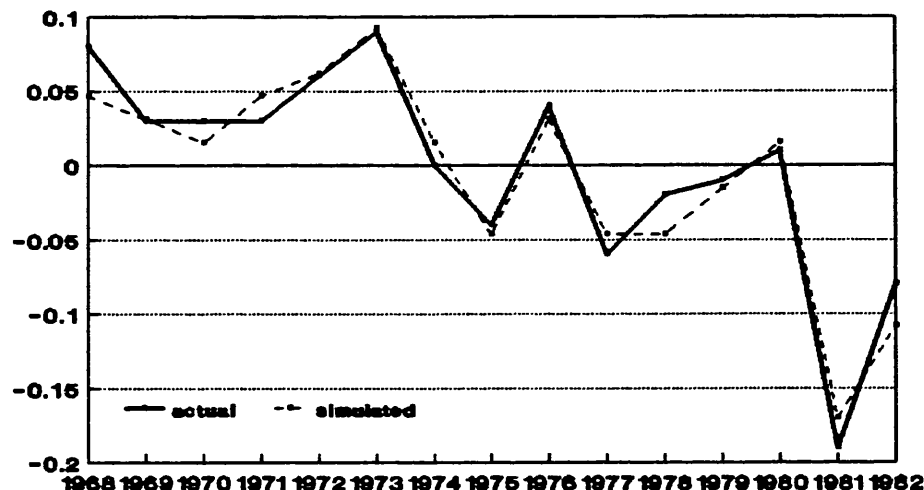


Figure 7-10 Industrial Output G# (1968-1982) with no dummies

F. BLOCK 3: Price

The Industrial Price

Following the pattern of growth of real output, the behaviour of industrial prices also showed three well defined phases (Table 6-1). During the period of rapid growth, rates of increase in industrial prices were falling. The second stage is marked by an acceleration in the rates of inflation following the first oil shock. Rates jumped to a higher level in 1974, but remained around 35% in the following years, with the exception of 1979 when rates accelerated again. Growth and inflation were still coexistent during this second stage. In the third stage, with another sharp increase in oil prices, inflation rates reached a new level (over 100%) and the changes in the international environment (recession in the United States, high rates of interest, sharp increase in the price of imported oil) and the response to them by the government led the economy into a recession.

Thus in the Brazilian experience, where price instability is a constant reality, there is no unique relation between growth and inflation. During this period, the three patterns of behaviour were strongly conditioned by the behaviour of imported prices of raw materials. This is a consequence of the significant weight of raw materials in direct production cost, as we can see in the Table 7-6 below.

Table 7-6 Composition of Direct Cost in Industry
Percentage of Nominal Output

year	Wage Bill (1)	Operational Costs		Direct Costs (4)=(1)+(3)	W.Bill/ D.Cost (5)=(1)/(4)	Raw Mat/ D.Cost (6)=(2)/(4)
		Raw Mat (2)	Total (3)			
1968	0.16	0.46	0.50	0.66	0.24	0.76
1969	0.16	0.47	0.50	0.66	0.24	0.76
1970	0.14	0.50	0.54	0.68	0.21	0.79
1972	0.15	0.51	0.55	0.70	0.21	0.79
1973	0.13	0.53	0.57	0.70	0.19	0.81
1974	0.12	0.56	0.60	0.72	0.17	0.83
1975	0.11	0.57	0.60	0.71	0.15	0.85
1976	0.13	0.55	0.59	0.72	0.18	0.82
1977	0.14	0.55	0.59	0.73	0.19	0.81
1978	0.14	0.55	0.59	0.73	0.19	0.81
1979	0.14	0.54	0.58	0.72	0.19	0.81
1980	0.11	0.56	0.59	0.70	0.16	0.84
1981	0.15	0.52	0.58	0.73	0.21	0.79
1982	0.13	0.51	0.56	0.69	0.19	0.81
average					0.19	0.81

Source: Industrial Census, 1970, 1975, 1980 and Annual Industrial Survey for the other years. For 1971 there was no annual survey.

The price equation in our model assumes mark-up pricing as the dominant procedure followed by firms in the industrial sector. In addition we shall assume that mark-ups are constant, given the following:

- during the period of economic boom, when demand was expanding fast and wages were controlled by the government and with no significant pressures on costs, mark-ups were unlikely to be changing.

- after the first inflationary shock, when demand was sustained, the shock was followed by the acceleration of inflation, which suggests therefore that mark-ups were supported.

- after the second oil shock, when inflationary expectations were augmented with the virtually full indexation of the economy, cost pressures were automatically passed on to prices, either through official indices of correction or through informal indexation. In that environment, mark-ups also were likely to be constant (or increasing) given that costs were rigid downwards or were increasing, as in the case of imported goods.

Taxation is not incorporated in our pricing equation as we are dealing with only one aggregate sector in our model.

The deduction of our equation for industrial prices is as follows:

$$P = v + q.v \quad (1)$$

where

P = price of industrial output (Cr\$/unit)

v = unit cost of industrial product

q = gross margin of profit

$$v = \frac{w.L + P_m.M}{Y} \quad (2)$$

where

Y = total amount of product generated by the industrial sector (units)

w = average nominal wages (Cr\$/worker)

L = total number of workers (workers)

M = total amount of raw material (quantity)

P_m = unit price of raw material (Cr\$/quantity)

Equation (2) can be presented as:

$$v = \frac{L.w}{Y} + \frac{M.P_m}{Y} \quad (3)$$

where

L/Y represents the amount of labour necessary to produce one unit of industrial product

and

M/Y represents the amount of raw material used to produce one unit of industrial product.

These values are considered constants, i.e.,

$$L/Y = \text{constant} \quad (4)$$

$$M/Y = \text{constant}$$

This assumption implies to disconsider changes in productivity, introduction of new technology and the creation of new products or, to put it in other words, they are assumed to have local effects that are offset in the aggregate. In any case, given the chronically high rates of inflation observed in Brazil, effects like these are dominated by nominal changes in the prices of factors.

Writing,

$$P = v (1 + q) \quad (5)$$

the variation of P (first difference) is:

$$P' = (1 + q)' + v' \quad (6)$$

The variation of v' is:

$$v' = \frac{1}{v} \frac{dv}{dt} = \frac{1}{\frac{L.w}{Y} + \frac{M.Pm}{Y}} \left[\frac{L}{Y} \frac{dw}{dt} + w \frac{d(L/Y)}{dt} + \frac{M}{Y} \frac{dPm}{dt} + Pm \frac{d(M/Y)}{dt} \right] =$$

$$= \frac{1}{L.w + M.Pm} \left[L \frac{dw}{dt} + M \frac{dPm}{dt} \right] \quad (7)$$

Multiplying (7) by w.Pm:

$$v' = \frac{1}{L.w + M.Pm} \left[\frac{L.w.Pm}{Pm} \left(\frac{1}{w} \frac{dw}{dt} \right) + \frac{M.Pm.w}{w} \left(\frac{1}{Pm} \frac{dPm}{dt} \right) \right] =$$

$$= \frac{1}{L.w + M.Pm} \left[L.w.w' + M.Pm.Pm' \right] \quad (8)$$

that is:

$$v' = a.w' + b.Pm' \quad (9)$$

where:

$$a = \frac{L.w}{L.w + M.Pm} \quad (10)$$

is the ratio of labour cost to total cost of production

$$b = \frac{M.Pm}{L.w + M.Pm} \quad (11)$$

is the ratio of raw material cost to total cost of production.

So, from equations 6 and 9 we have:

$$P' = (1 + q)' + a.w' + b.Pm'$$

Let us assume also that the industry incurs decreasing costs, that is to say, a decreasing demand will increase production costs more than proportionately and vice-versa. We represent the behaviour of demand by the variable G - industrial output - and we add it, lagged one period (with a negative sign), to the equation of changes in prices:

$$P' = (1 + q)' + a.w' + b.Pm' - \sigma.G'(-1) \quad (12)$$

The deviation of the growth rate P' from the trend growth rate P_s' is:

$$P\# = P' - P_s' \quad (13)$$

where P_s' is constant for an exponential curve, i.e.:

$$P_s' = c \quad \text{and} \quad c > 0 \quad (14)$$

In this case, from equations 12 and 13, we have:

$$P\# = -c + (1 + q)' + a.w' + b.Pm' - \sigma.G'(-1) \quad (15)$$

If $(1 + q)' = 0$, then

$$P\# = -c + a.w' + b.Pm' - \sigma.G'(-1) \quad (\text{Eq.3.1})$$

The coefficients of equation (15) have the following properties which should be satisfied by any regression:

- (i) the intercept c gives the constant trend growth rate;
- (ii) $a + b = 1$;
- (iii) $\sigma > 0$.

The Result of the Regression of P#

Our estimated equation with no dummies is as follows (t statistics significant at 1%, for 11 degrees of freedom):

$$P\# = -0.3432 + 0.118782w' + 0.933943Pm' - 0.501908G'(-1)$$

(-15.31)	(2.86)	(20.80)	(-3.70)
R ² adj.= 0.99		DW= 2.22	

where the value of DW does not reject the null hypothesis at 1%. The graph of P# is presented in the Figure 7-11.

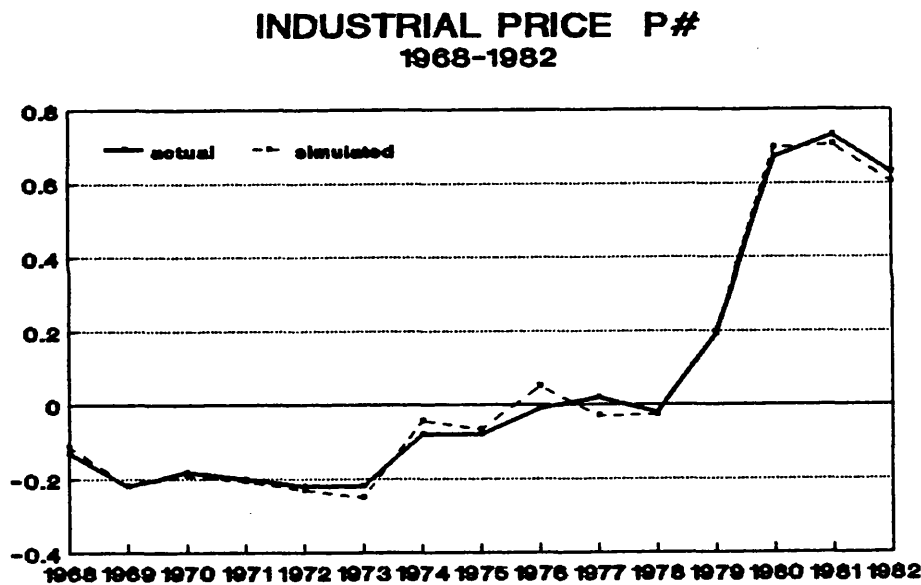


Figure 7-11 Industrial Price P# (1968-1982) with no dummies

The coefficients obtained in our equation for a (i.e. 0.12) and b (i.e. 0.93) - the average weight for the whole period of labour and raw material, respectively - are not far from the coefficients estimated from the observed data (0.19 and 0.81 respectively in average, according to Table 7-6 above). As we mentioned before, these coefficients show the importance of raw material prices in the determination of changes in industrial prices.

The intercept reached in the regression is close to the secular rate of industrial price inflation (37%, see appendix 1) over the 15 year period.

The Wage Equation

The next equation in this block estimates changes in the wage rate for the industrial sector (Eq.3.2). Wage indexation was introduced in Brazil in 1965 and its rules changed in 1968, 1974 and 1979.²¹ From 1965 through 1979, the wage laws established that nominal wages should be fixed for periods of 12 months and after 1979 adjustments were made every 6 months. Before 1979, the wage laws had a binding effect in all collective wage negotiations, leaving no degree of freedom for bargaining between employees and employers.

Let us assume that the industrial wage in period (i) varies according to:

$$w'(i) = R'(i) + S'(i)$$

where,

w = average nominal wage

R = recomposition of the purchasing power

S = overtime work

Indexation of wages is represented by:

$$R'(i) = \Omega Pc'(i-1)$$

where,

Pc(i) = consumer price index

Ω = degree of indexation

assuming that Pc(i)'can be represented by P'(i), where P(i) is the index of industrial price then,

$$R'(i) = \Omega P'(i-1)$$

Let us assume next that overtime work is determined by industrial output growth:

$$S'(i) = \delta G'(i-1)$$

where,

$G(i)$ = real industrial output

We can then write:

$$w'(i) = \Omega P'(i-1) + \delta G'(i-1) \quad (\text{Eq.3.2})$$

The Results of the Regression of w'

Our estimated equation with no dummies is as follows (with the t statistics significant at 2%, for 13 degrees of freedom):

$$w' = 1.042559P'(-1) + 1.336038G'(-1)$$

(9.74) (2.71)

R^2 adj.= 0.91 DW= 2.56

where the value of DW does not reject the null hypothesis at 1%. The graph of w' is shown in the Figure 7-12.

We observe in the graph that although the general behaviour of wages is well described by the model, it does not capture the peaks and the valleys. As we mentioned before, the periodicity with which wages were to be adjusted varied during the fifteen years of our study (see also note 21). From 1968 until 1979 wages were allowed to change once a year. At the end of 1979, adjustments became twice yearly. Also, the formula used to make the adjustments changed in various ways, as well as the indices used in the formula to measure the change in prices. The main point to emphasize, however, is that wages did not exert pressure

INDUSTRIAL WAGE w' 1968-1982

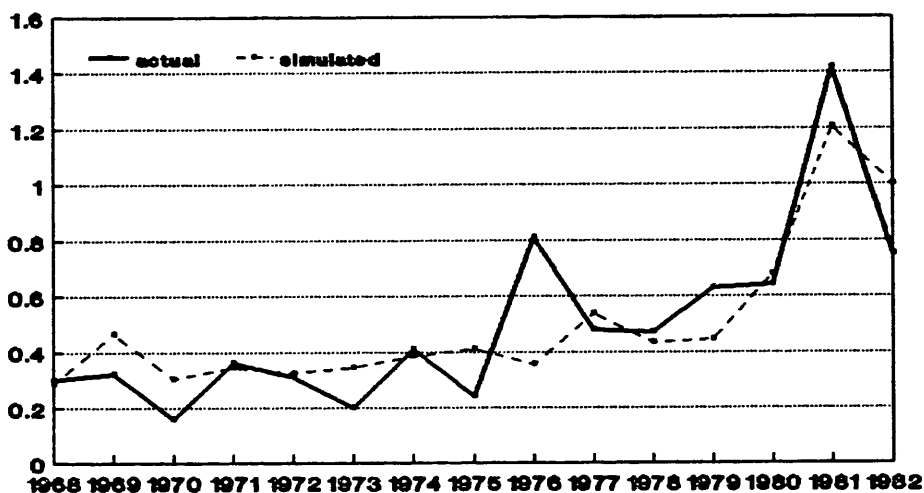


Figure 7-12 Industrial Wage w' (1968-1982) with no dummies

on costs in this period, as they were regulated by governmental policy and trade unions were controlled.²²

The coefficient of $P'(-1)$ is close to unity which means that, on average for the period, wages were fully indexed according to the previous change in industrial price. The coefficient higher than unity for G' stands for the higher remuneration per hour of work in over-time shifts. In the industrial sector over-time work is a common practice.

The year of 1976 shows the greatest discrepancy between the observed and the simulated result. As seen before that year is marked by an expressive increase in the industrial growth rate, much above governmental expectations.

For 1976, the average nominal wage in industry increased substantially, mainly for two reasons: it accompanied the great dynamism shown by industrial production in that year, and it reflected the impact of the change in the Wage Policy in 1975 (Law no. 6 147, 29.11.74). Indeed, the Central Bank Annual Report for 1975 observed that the

change in wage policy had a greater impact after the 4th quarter of 1975 as collective wage agreements of important professional categories were decided in that period of the year (Central Bank, 1976, p. 25). We introduce a dummy variable for that year in the equation below (with the t statistics significant at 1%, for 12 degrees of freedom):

$$w' = 1.007577P'(-1) + 1.278053G'(-1) + 0.466681D76$$

(12.36)
(3.44)
(3.29)

R^2 adj.= 0.95
DW = 2.27

where the value of DW does not reject the null hypothesis at 1%. The graph of w' for this case is presented in the Figure 7-13.

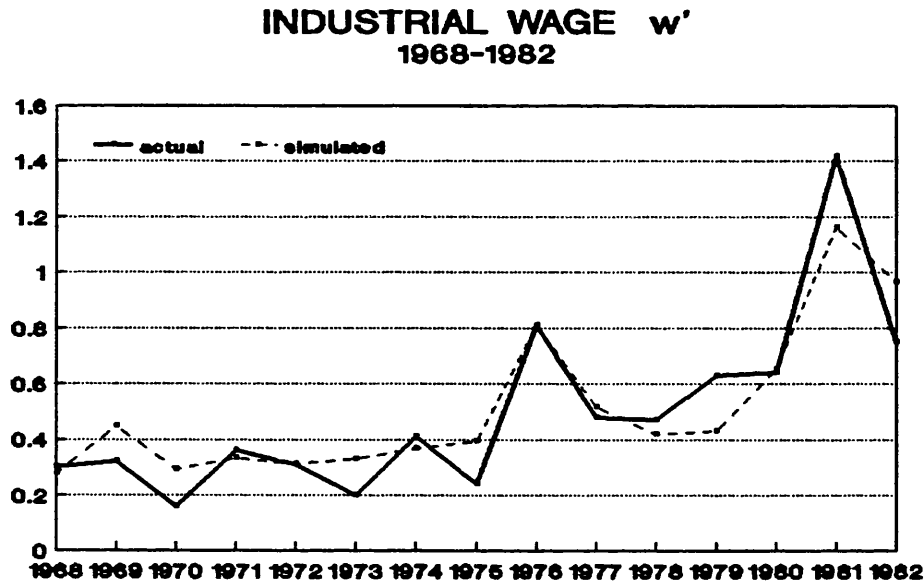


Figure 7-13 Industrial Wage w' (1968-1982) with a dummy variable

The Wage Bill of Industry

The next equation in this block is an identity. From the estimation of the nominal wage rate we estimate the Wage Bill - W - adding the exogeneous variable T (number of workers in industry). This equation is written in terms of deviation in relation to a trend, and the result will be used in the first block to estimate internal funds for firms.

$$W\# = w\# + T\# \quad (\text{Eq.3.3})$$

The Price of Raw Materials Equation

The last equation to be estimated in our model is the change in price for domestic raw materials.

Let us assume that the price of raw materials in cruzeiros changes in accordance with a function of the price of the imported raw material:

$$P_m = r.f(PM)$$

where,

P_m = price of raw materials in cruzeiros (Cr\$/quantity)

r = exchange rate (Cr\$/US\$)

PM = price of raw materials in dollars (US\$/quantity)

As far as period (i) is concerned, we assume that the variation of P_m is as follows:

$$P_m'(i) = r'(i) + \tau.PM'(i)$$

where τ adjusts the variation of the price of imported raw materials.

As the exchange rate is indexed:

$$r'(i) = \mu.P'(i-1)$$

where,

$P'(i)$ = variation in industrial prices

μ = degree of indexation of the exchange rate

Then:

$$Pm'(i) = \mu.P'(i-1) + \tau.PM'(i) \quad (\text{Eq.3.4})$$

The Results of the Regression of Pm'

The regressed equation with no dummy is as follows (with the t statistics significant at 1%, for 13 degrees of freedom):

$$Pm' = 0.955359P(-1)' + 0.230668PM'$$

(11.82) (2.60)

R^2 adj.= 0.92 DW= 1.60

where the value of DW does not reject the null hypothesis at 1%. The graph of Pm' is presented in the Figure 7-14.

The coefficient of P' is less than unity meaning that indexation of the exchange rate was not, on average, full during the period. An estimate of the degree of indexation (the variation in the exchange rate compared with the variation of industrial prices (lagged) - the μ in the equation) - results on average in a coefficient of 0.84, as shown in the Table 7-7.

We added two dummy variables in the equation above, one for 1979 and another one for 1980, to deal with the significant changes in the rules of indexation of the exchange rate. The result of the regression with the dummy variables is as follows (with the t statistics significant at 5%, for 11 degrees of freedom):

$$Pm' = 0.871454P'(-1) + 0.1452PM' + 0.178527D79 + 0.51229D80$$

(25.92)

(3.95)

(2.99)

(8.19)

R² adj.= 0.99

DW = 1.83

where the value of DW does not reject the null hypothesis at 1%. The graph of Pm' for this case is shown in the Figure 7-15.

The variable D79 stands for the first and only maxi devaluation of the cruzeiro in the period 1968-82. The cruzeiro was devalued by 30% in December 10th, 1979, due to the deterioration of the trade balance that followed the second oil shock. The positive sign of the variable is consistent with that measure.

Table 7-7 Rate of Change of Exchange Rate and Industrial Prices
Per cent

	r'	P'-1	r'/P'-1
	(1)	(2)	(3)
1968	0.09	0.25	0.36
1969	0.20	0.24	0.83
1970	0.13	0.15	0.87
1971	0.15	0.19	0.79
1972	0.13	0.17	0.76
1973	0.03	0.15	0.20
1974	0.11	0.15	0.73
1975	0.20	0.29	0.69
1976	0.31	0.29	1.07
1977	0.33	0.36	0.92
1978	0.28	0.39	0.72
1979	0.49	0.35	1.40
1980	0.96	0.56	1.71
1981	0.77	1.04	0.74
1982	0.93	1.10	0.85
aver.			0.84

Sources : FGV - Conjuntura Economica, column 27 and Annual Report of Central Bank, several years. Exchange rate calculated from the average rate for sell.

**PRICE OF RAW MATERIALS Pm'
1968-1982**

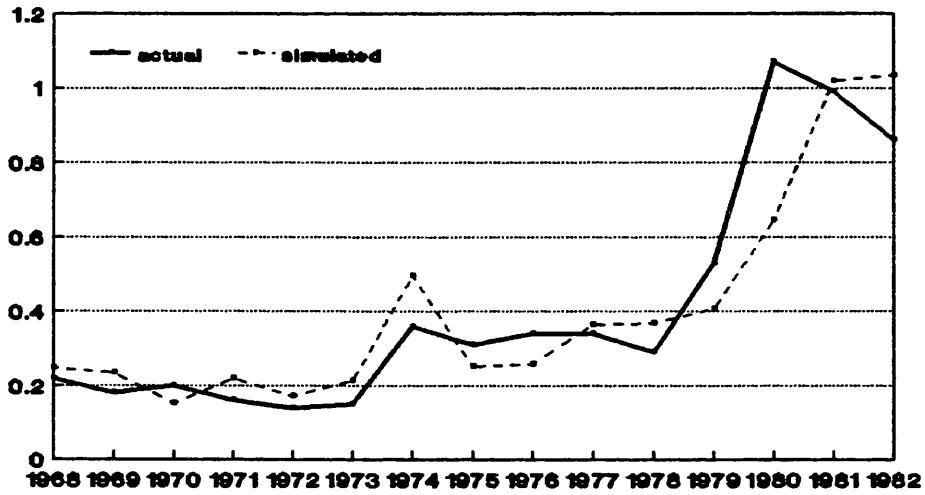


Figure 7-14 Price of Raw Materials Pm' (1968-1982) with no dummies

**PRICE OF RAW MATERIALS Pm'
1968-1982**

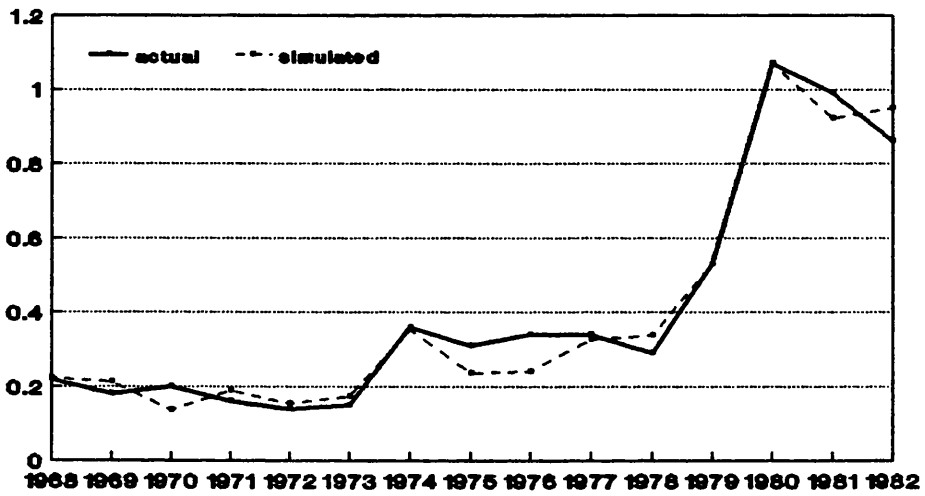


Figure 7-15 Price of Raw Materials Pm' (1968-1982) with dummies

The variable D80 stands for the exceptional decision to pre-determine the depreciation of the exchange rate at 40% at the beginning of the year. As we noted above, this policy was intended to reduce uncertainty on the external front after the maxi devaluation of 1979, and to reverse high inflationary expectations in 1980. The commitment to a pre-determined rate, however, could not be maintained, and by the fourth quarter of the year the accumulated devaluation of the cruzeiro largely exceeded the 40% target. At the end of the year the difference between the internal and external (American) inflation had reached 96.9%, while exchange rate depreciation was only 54.0% (December 80/December 79). Consequently, the impact of the maxi devaluation in 1979 on the trade balance was rapidly dissipated.

G. A SUMMING UP

With the equations above we identified the basic relations that will allow us to simulate the growth path of output and industrial price in the seventies. The meaning of our model is then to reveal the main characteristics of the period we are studying concerning growth and inflation.

The model should enable us to demonstrate which were the basic elements that kept favourable conditions to growth. In Brazil in the seventies, following the tradition since the Second World War,²³ the roles of the State and of the foreign sector in the process of industrialization were dominant. The State not only performs the traditional role of influencing the level of aggregate demand, but also plays an important part signalling to private business new areas of development. As it was once said, the State plays the role of the Schumpeterian innovating entrepreneur (Schumpeter, 1968, p. 262). In addition to that, in a country where prices historically present a rising trend, private capital markets are atrophied and finance is only supplied by the State. The relevance of the foreign sector to the Brazilian industry, on its turn, is given by the latter's dependence on imported materials. It is in this sense that we say that the environment where private decisions are made up is defined and limited by the behaviour of the State and the foreign sector.

The foreign sector is represented in our model through the variable FL measured in real terms to give an account of the purchasing power in US\$ dollars of the foreign loans supplied by private financial institutions, and through the variable PM which represents the cost of imported raw materials. During the seventies the growth rate of the economy was speeded up through foreign indebtedness and because of that the degree of vulnerability of the economy to foreign shocks was much increased. As foreign indebtedness increased, ^{the} international financial position of the country moved towards more speculative postures and after the second external shock the economy was in a Ponzi situation. These variables are exogenous and account for how the foreign environment affected ^{the} domestic economy.

The influence of the government in guiding economic decisions is represented by dummy variables which take into account special measures of economic policy and changes in the state of expectations.

The behaviour of investment is satisfactorily explained by the accelerator effect and by the availability of funds to invest. Internal funds are a measure of the room for manoeuvre firms have to expand their capacity. Accumulation of internal funds is linked to pricing decisions and this link is made explicit through deterministic relations. The assumption about external funds represented by foreign loans is that these resources allowed for the imports of capital goods and equipments.

Our model confirmed the leadership of the industrial sector in pushing growth during the seventies, as discretionary expenditures of the industrial sector are relevant to explain the movements in GDP (although our variable to represent discretionary expenditures captures only investment in fixed assets).

The price equation assumes mark-up pricing, with constant mark-ups. The explanation of the components of cost that determine the final price is dominated by the rules of indexation. Wages, following the National Wage Policy, are indexed to past inflation and there is no wage bargain pressure in the period of our analysis as trade unions were weak. The price of raw materials is influenced by the price of imported raw material and the exchange rate is also indexed to past inflation. Given the weight of

raw materials in the cost structure of firms, the price equation is highly influenced by the impact of foreign shocks and how they are spread overtime through indexation.

The functioning of the model and the meaning of the simulations is presented in the next chapter.

1 - Eichner justifies this procedure:

Conceptually this [the way variables are specified in the post Keynesian model] makes it possible to distinguish the factors that influence the secular movement of the economy from those factors that influence the cyclical and, at the same time, to integrate the two sets of factors within a single model. Econometrically, the specification of variables in terms of the difference between the actual and the secular rates of growth should reduce the extent to which the common trend factor gives rise to spurious correlation. (Eichner, 1979b, p. 55.)

As we are restricting our model to the short period, we are not dealing with the integration of the two sets of factors mentioned by Eichner.

2 - Our de-trending procedure was, to a large extent, dictated by the data limitations we had to face. The period for which adequate data for the manufacturing industry was available covers roughly the period of one full cycle, from recovery to recession. For this reason, we have no evidence as to the true shape of the trendline. Therefore, we have worked more with a reference than a real trend. For simplicity we have adopted the exponential component of the curves as a reference to the deviations. For three reasons, we assume the trend to be an exponential function:

- a. The period ends with a much higher level of output than it began. After 1982 the economy has stagnated but it has not dived into a downward path that could annul past growth;
- b. Since the end of the Second World War the Brazilian economy, as a whole, has grown at a roughly constant rate around 8% a year, in a process that can be safely characterized as exponential;
- c. Exponential trendlines are very convenient for econometric work.

Also we are not considering the question of "variable trend". In this regard, Stock and Watson (1988) present the formulation of a variable trend as a stochastic one, in which the trend deviates from its average by some unforecastable random amount. In this formulation, changes in the trend in one period provides a new base from which growth will occur in the next. Actually the way we "de-trended" the series is a step simpler than the one proposed by Eichner. In Eichner's formulation the growth rates used are "cyclically filtered", meaning that

all cyclical fluctuations have been eliminated from the denominator (by taking the estimated trend value as the divisor, or scaling factor, applied to the quarter-to-quarter change), thereby restricting the cyclical fluctuations entirely to the numerator of the growth rates. (Eichner and Forman, 1981, p. 118.)

In our case, because we are working with only 15 observations, this procedure was not followed. The Eichner and Forman model covers several cycles which allows them to

observe the shape of the underlying trends. This, as mentioned, has not been our case.

3 - This point is also made by Carvalho and Oliveira (1990).

4 - Arestis and Hadjimatheou recognize that

a more fundamental issue in relation to the specification problem arises from the fact that most of the relationships derived in economic theory are steady-state or equilibrium paths. Given, however, that economic processes unfold over real time, and that deviations from equilibrium paths are the norm rather than the exception, equilibrium forms are clearly unsuitable for explaining dynamic adjustments and systems in disequilibrium: model specifications should therefore incorporate adjustment mechanisms and movements of variables between equilibrium positions. (Arestis and Hadjimatheou, 1982, pp. 8-9).

Later in the chapter the authors remark, "equations incorporating adjustment processes are very often based on ad hoc rationalisations" (p. 12). In the case of causal chain systems lag structures are determined a priori, and are essential to describe the dynamic of the system.

5 - In Eichner's model there are two additional blocks that explain the credit availability process that enable firms "to bridge the gap between their desired level of discretionary spending and the current rate of cash inflow" (1979b, p.40). The liquidity pressure that demand for funds derived from increased discretionary expenditure puts on the financial structure is simulated through the cash-flow feedback effect (block 3) and from the determination of the degree of liquidity pressure and long-term interest rates (block 5). Lack of data (flow of funds accounts) did not allow us to follow similar procedure. For the UK economy some developments of a post Keynesian model have been made by Arestis et. al. (1985-86), Arestis (1986) and Arestis (1987-88).

6 - Carvalho, when discussing the concept of high inflation, states that while the economy is "...being able to grow, a High Inflation regime will define an equilibrium." (Carvalho, 1990, p. 17.) In this context, indexation is an important instrument to organize the social conflict. However, high inflation equilibrium is unstable as

...contractual incomes are adjusted for past inflation but flow supply prices are formed according to expectations of future inflation, If reasons emerge to expect a future acceleration of inflation the regime may crumble. (ibid., pp. 17-8.)

7 - Continuous surveys that bring information about investment are the Annual Inquiries that update the Census and the Industrial Census. They cover only outlays in fixed capital, and they are the only comprehensive source of data for demand of investment by the industry. It should be mentioned that investment data from the Census and Annual Inquiries are not employed in the National Account estimates of Gross Capital Formation (which estimation is made via the apparent consumption of

capital goods) as it is considered to be underestimated. This argument is based on the lack of control over new plants that are being created which may not be included in those surveys before some periods. A rough comparison between the Gross Capital Formation for the whole economy estimated from FGV and the gross investment expenditure in fixed assets for the Mining and Manufacturing sectors derived from the Census shows that the latter is around 20% of the former along the decade. For our purpose, as we are interested in an indication of changes in investment over the years, and not on an estimate of the level of expenditure, the Census and Annual Inquiries data seemed to be appropriate.

8 - The state owned enterprises should have a distinct treatment from private owned companies as the logic of their behaviour is different. However, there is no continuous information about investment of state owned enterprises along the period of our analysis, and so no attempt to consider them separately from the private owned companies was made. An estimate of the importance of these enterprises in the manufacturing sector is given by Villela (1984, p. 25), where he estimated the weight of the state owned companies belonging to the Federal government (the most significant) in relation to the total of the Manufacturing industry as 20.8% of the total sales revenues and 6.5% of total employment in 1982. In the Mining sector the presence of the state owned enterprises is much greater, but the weight of the Mining sector in relation to the Manufacturing sector is less than 3% in terms of added value along the decade (it was 2.8% in 1970, 2.4% in 1975 and 2.2% in 1980).

An estimate of the participation of the main federal public enterprises in the Gross Capital Formation of the Economy (FGV data) based on financial reports from these enterprise was made by a special report of the World Bank and FGV, for 1981:

	Cr\$ millions	%
Eletrobras	273,453	24.0
Siderbras *	260,723	22.9
Telebras	128,031	11.3
RFFSA *	114,290	10.0
ACESITA *	2,320	0.2
Itaipu	117,069	10.3
Petrobras *	155,795	13.7
CVRD *	75,385	6.6
Nuclebras	7,876	0.7
Portobras	3,014	0.3
TOTAL	1,137,956	100.0
Gross Cap.Form.	5,151,056	
% of Public Enterp.		22.1

Source: FGV and World Bank (1985, p. 35.)

* sectors which are covered by the Census and Annual Inquiry, totaling 53.4% of the total estimate.

It should be remarked that statistics for the public enterprises started being produced at the end of the decade by "SEST" - a special agency created in 1979 to control the expenditure of the state owned enterprises.

9 - The accelerator effect in a simple formulation can be expressed as:

$K^*(t) = cY(t)$, where K^* is the desired stock of capital and Y is the output. From this follows that $I(t) = \dot{K}^*(t) = cY(t)$, meaning that changes in output will produce a change in the stock of capital. This implies that the level of aggregate income affects the dimension of the stock of capital needed, and so it affects decisions that lead to an increase in the stock of capital via investment. Its functioning presumes several hypotheses which are very abstract. Capacity is assumed to be fully occupied, expectations are supposed to be static, that is to say, the output in the future is expected to be equal or proportional to its current level, and the inducement of liquid investment via the adjustment of the stock of capital also assumes that the capital-output relation does not vary. The main criticism of the accelerator effect, however, is related to the readiness with which it is assumed to work. In the terminology of Meyer and Kuh (1959, chapter 2) it presumes entrepreneurs reacting like a thermostat, that is to say, when technical capacity is overutilized, they decide to counterbalance the deficiency. The introduction of lags in the process of adjustment of the stock of capital turns its understanding very difficult. For example, to which period the desired stock of capital is referred to? Projects of investment that are long lasting can conflict with new decisions to invest turning more difficult the identification of which would be the appropriate stock of capital, and so on (see Matthews, 1964, chapter 3). Hicks, without introducing lags, argues that the accelerator effect does not operate instantaneously because:

There is a most important distinction between the induced investment which is allowed for in the determination of the equilibrium path, and that which arises in the process of equilibration. The former is a technical necessity; it arises out of permanent factors in the technique of production, such as are expressible in a capital-output ratio. The latter is much more "psychological" in character. It depends, first of all, on the amount of initial divergence from the equilibrium path; and this, though (as we have seen) it is partly a matter of technology, is mainly a matter of the way the change in demand is interpreted, of the way it is read, of the expectations which it engenders. As soon as there is a gap - as soon as actual stock falls, significantly, below desired stock - the deficiency must somehow, sooner or later, be made up. But how quickly it has to be made up depends upon the degree of discomfort which businesses experience when they are out of stock equilibrium. (Hicks, 1985, p. 116.)

Another qualification introduced on the accelerator effect is found by Steindl when he considers as one of the factors to influence decisions to invest the desired degree of capacity utilization. According to this author, "the degree of utilisation of capacity may have a positive or a negative influence on investment, according to whether utilisation is high or low." (Steindl, 1976, p. 112.) In this sense he considers the

accelerator effect, modified by other elements, in his explanation of the behaviour of the demand for investment in capitalist economies.

So, it can be said that although the accelerator mechanism is subject to many restrictions, it should be considered that the forces which the formulae take into account are relevant in explaining fluctuations in aggregate output. To say that in other words, the way the mechanism works seems to be too far from reality, but the elements involved in the mechanism seem to be quite appropriate.

10 - According to Eichner (1987, pp. 505-525), in modern capitalist economies it is the practice of big firms to add continuously to their productive capacity according to what is perceived to be the secular growth of sales. That is to say that for the oligopolistic sector as a whole the determinants of investment are given by the behaviour of the sales for the industry. Fluctuations in output, following fluctuations in sales beyond a certain point, will result in an undesired level of capacity utilization, inducing firms to reconsider their capital spending plans. These considerations lead Eichner to conclude that accelerator models of investment are quite adequate to explain investment demand functions.

11 - Also it should be added that an assumption of Eichner's model which reinforces the functioning of the accelerator effect is that industry is mature and dominated by oligopolistic firms. In an environment dominated by big firms, the degree of autonomy of investment decisions in relation to current events would be lower than assumed in the long term expectations hypothesis of Keynes. An evidence of the degree of firm concentration in the Brazilian industry for 1974 that does not differ much from the North American industry can be found in Feijo (1980).

12 - See the discussion in the appendix to chapter 3 about the front loading effect.

13 - The values of E and F are shown below (1967 = 1)

year	E	F	year	E	F	year	E	F
1967	1.00	1.00	1973	13.76	7.31	1979	144.97	92.52
1968	1.61	1.46	1974	20.50	11.42	1980	274.14	215.05
1969	2.28	1.90	1975	27.36	17.09	1981	544.33	364.90
1970	3.46	2.85	1976	52.34	24.50	1982	855.90	863.50
1971	5.86	3.76	1977	69.04	35.08			
1972	9.23	4.29	1978	92.70	53.94			

Source: Table A1.7-1 and A1.7-3 from appendix 1.

14 - Private and state owned enterprises and financial institutions largely used foreign indebtedness during the seventies.

15 - It should be noticed that we lose one degree of freedom because we are working

with deviated values.

16 - The difficulties in absorbing foreign loans to service the foreign debt in 1980 induced the government to attract foreign loans making domestic lending scarce (through the imposition of a 45% limit of the expansion of credit with resources from the domestic market) and costly (through the increase in taxation over financial transactions).

17 - Hicks (1974, chapter 1) has developed a theoretical model of the multiplier where stock/flow relationships cause a lag to appear between the discretionary expenditure and its impact on income. In his words:

...the multiplier is not instantaneous; it takes time to operate.(...) As Kahn had shown, this process is a convergent process, but it is a process - it cannot take place all at once. (Hicks, 1974, p. 10.)

18 - This is a strong assumption as we are leaving aside quite a lot of other sources of discretionary expenditure (householders demand for durables consumption goods and dwellings, other sources of discretionary expenditure made by firms like investment in research and developments, advertisement and so on), and government expenditures. The main reason for that is lack of statistics that cover this sort of spending focusing on the demand approach.

19 - The decision to fix monetary correction at 20% on long term loans of the National Development Bank (the difference between this rate and the effective rate would be financed at the end of the contract) aiming to reduce the impact of raising inflation on the cost of finance and so to consolidate the implementation of the Second Development Plan, was much restricted in 1977 and 1978. In 1977 the concession was allowed mainly to small firms in the North and Northeast regions of the country, and in 1978 the index of monetary correction to be applied was reviewed to 70% of the actual index of monetary correction.

As further evidence of the decrease in the level of activity in 1977 the reduction in the value of the investment projects to get the approval of the Council of Industrial Development (CDI) which entitles firms (private and state owned) to import capital goods and to apply for loans from the Development Banks in the country. As we can see on the Table below, 1977 showed the lowest rate of the decade (excluding 1980):

**VALUE OF LICENSED PROJECTS
REAL RATE OF GROWTH %**

1971	59.0	1976	325.2
1972	256.9	1977	35.5
1973	148.7	1978	80.9
1974	110.7	1979	59.4
1975	52.3	1980	-71.9

Source: Conselho de Desenvolvimento Industrial, Annual Reports
Deflator - General Price Index, FGV, column 2

20 - In April, in Basel, the meeting of the governors of the Central Banks of the group of 10 developed European countries decided to exert more strict control over Commercial Banks activities on the Euromarket. See IMF, Annual Report, 1980, p.78.

21 - During the period of the first wage law (1965-1968), nominal wages should be adjusted considering their average purchasing power over the last 24 months plus an allowance for productivity gain. The procedure of the adjustment would consider an expected inflation rate decreed by the government which was underestimated as well as the productivity gain. For the three years for which the law was imposed the average wage in industry in real terms decreased 25% (according to Simonsen, 1983).

The change that was introduced in 1968 established that nominal wages would be adjusted considering the average purchasing power of the last 12 months and that a correction should be made in order to consider the values of the past wages that would have prevailed if inflation rates had been properly foreseen. That formula prevailed up to 1974 when the acceleration of inflation brought into discussion the 1968 formula. After 1974 full compensation for past underestimation of inflation was introduced. The 1979 revision, besides reducing the interval between adjustments, determined that the productivity coefficient would be freely bargained and the indexation degree was made a function of the wage level measured in minimum wage untis. Up to three minimum wages, nominal wages should increase 1.1 times the cost of living (plus productivity). From three to ten minimum wages full indexation would apply and to higher wages fractional indexation.

22 - Camargo and Landau (1983) in a study about changes in prices from 1974 to 1981 did not identify the change in the Wage Policy after 1979 as an element pushing the inflationary process. See also Macedo (1983). For econometric models explaining the dynamics of prices and wages in the Brazilian economy in the seventies see, for example, Modiano (1983 and 1985a and b) and Lopes (1982). In Frenkel (1980) there is a survey about this subject for Latin America.

23 - In the mid 1950s industrialization became a prime goal of the government and sectoral planning started being applied. In 1941 the first State Owned enterprise was created -Companhia Siderurgica Nacional - to establish an integrated steel sector. The long cycle of expansion of the industry that started after the War lasted up to the early

1960's. The instruments of economic policy used as incentive to the import substitution process (the import-licensing system from the late 1940s to 1952 and the multiple exchange rate system after 1953 and up to 1964, basically) resulted in a quite successful way of providing a rather sophisticated industrial basis for a late comer like Brazil. The intensity of the industrialization process, however, was followed by an acceleration in the inflation rates and when inflation got worse, social unrest and political instability followed.

Basic Tables and Definitions

Table A1.7-1 Industrial Investment in Fixed Assets (A)

Cr\$ million

Year	Current Value	1967 Price A	Real Rate of Growth A'
1966	1,469	1,836	
1967	1,731	1,731	-0.06
1968	2,783	2,244	0.30
1969	3,952	2,783	0.24
1970	5,995	3,547	0.28
1971	9,050	4,570	0.29
1972	15,982	7,010	0.53
1973	23,823	9,093	0.30
1974	35,489	10,469	0.15
1975	47,367	10,814	0.03
1976	90,605	15,228	0.41
1977	119,514	14,434	-0.05
1978	160,465	14,314	-0.01
1979	250,946	14,389	0.01
1980	474,531	13,360	-0.07
1981	942,242	12,651	-0.05
1982	1,481,527	9,950	-0.21

Source: Industrial Census, 1970, 1975, 1980, and Industrial Annual Survey for other years.

For the year of 1971, when there was no Annual Survey, the value of investment was estimated as 6% (the average of the participation in the period 1968-73) of the estimated Nominal Gross Value of Production that year (see note on Table A1.7-3).

Industrial Investment for Manufacturing and Mining Industries encompasses: acquisition by the productive establishment of new machines and equipment (when imported, even if used, are considered as new in the country), acquisition of used machines and equipment, acquisition of motor vehicles, spending in constructions and installations. It excludes the sell out of machines and equipment to other establishments and the ones that have been withdrawn as obsolete or useless.

Table A1.7-2 Suppliers Credit and Cash Loans (FL)

US\$ million

Year	Current Value	Imports Price Index	Constant Dollar of 1967 FL	Real Rate of Growth FL'
1967	0,530	100	0,530	
1968	0,726	103	0,705	0.33
1969	1,053	101	1,043	0.48
1970	1,449	103	1,407	0.35
1971	2,037	107	1,904	0.35
1972	4,300	114	3,772	0.98
1973	4,616	143	3,228	-0.14
1974	7,123	221	3,223	0
1975	6,148	228	2,696	0.16
1976	8,054	233	3,457	0.28
1977	8,568	242	3,540	0.02
1978	14,400	259	5,560	0.57
1979	11,813	310	3,811	-0.31
1980	12,318	397	3,103	-0.19
1981	17,750	441	4,025	0.30
1982	14,882	423	3,518	-0.13

Source: Central Bank Annual Report, from 1968 to 1982.

Table A1.7-3 Nominal Funds for Industry (VA, W, F)

Cr\$ million

Year	Gross Value of Prod. (1)	Value Added (2) VA	Wage Bill (3) W	Funds (4)=(2)-(3) F	WageBill/ V.Added (5)=(3)/(2)
1966	31,196	16,425	4,770	11,655	0.29
1967	38,639	19,731	6,390	13,341	0.32
1968	56,090	28,271	8,757	19,514	0.31
1969	73,992	36,992	11,618	25,374	0.31
1970	116,392	53,867	15,821	38,046	0.29
1971	155,972	72,185	21,599	50,585	0.30
1972	188,941	85,440	28,273	57,167	0.33
1973	322,593	139,699	42,146	97,553	0.30
1974	533,595	214,759	62,352	152,407	0.29
1975	787,979	311,397	83,400	227,997	0.28
1976	1,184,712	483,873	157,160	326,713	0.32
1977	1,763,644	716,452	239,284	477,168	0.33
1978	2,638,842	1,089,107	369,527	719,580	0.34
1979	4,365,029	1,850,470	616,112	1,234,358	0.33
1980	9,580,024	3,951,676	1,082,668	2,869,008	0.27
1981	17,769,966	7,551,445	2,683,332	4,868,113	0.36
1982	37,203,934	16,279,430	4,759,724	11,519,706	0.29

Source: Industrial Census 1970, 1975 and 1980 and Annual Surveys for the other years.

For the year of 1971 Value Added was estimated as the 1970 nominal value expanded by the rate of increase in industrial prices (20.4%) and the rate of increase in physical production (11.3%). The Wage Bill was estimated as 14% (1970 participation) of the Gross Value of Production, which was estimated in the same way as the Value Added.

Gross Value of Production represents the total value of sales of goods by the establishment, including the goods transferred to others establishments. Value Added is obtained subtracting from the Gross Value of Production the amount spend with raw materials, packing, energy and services contracted to others. The Wage Bill includes all payments made in the year to employees including all contributions to the Social Security.

Table A1.7-4 Index of Real Output (GDP, G)

Year	GDP	Rate of Growth GDP'	Industrial Production	Rate of Growth G'
1967	1.00	0.05	1.00	0.02
1968	1.11	0.11	1.16	0.16
1969	1.22	0.10	1.28	0.11
1970	1.33	0.09	1.43	0.11
1971	1.48	0.11	1.59	0.11
1972	1.66	0.12	1.81	0.14
1973	1.89	0.14	2.11	0.17
1974	2.06	0.09	2.27	0.08
1975	2.17	0.05	2.36	0.04
1976	2.38	0.10	2.64	0.12
1977	2.49	0.05	2.70	0.02
1978	2.61	0.05	2.86	0.06
1979	2.80	0.07	3.06	0.07
1980	3.06	0.09	3.35	0.09
1981	2.97	-0.03	2.97	-0.11
1982	3.00	0.01	2.97	0

Source: FGV, National Accounts for GDP. From 1967 to 1970, *Conjuntura Economica* of December, 1979. From 1971 onwards, *Conjuntura Economica* of May, 1987. For Industrial Output from 1967 to 1972, see Wells, 1977, p. 63. From 1973 onwards, IBGE, *Indicadores Conjunturais da Industria*, several issues.

The index of Industrial Output for Manufacturing and Mining Industries is obtained through a monthly survey of physical production for a smaller sample of establishments than the Annual Surveys for industry. Its results are considered to be quite reliable and they are used in the estimation of the GDP.

Table A1.7-5 Prices Index (P, Pm, PM)

Year	Wholesale Ind.Price	Rate of Growth P'	Domestic Raw Material	Rate of Growth Pm'	Imported Material	Raw) Rate Growth PM'
1967	1.00	0.25	1.00	0.23	1.00	
1968	1.24	0.24	1.22	0.22	1.04	0.04
1969	1.42	0.15	1.44	0.18	1.06	0.02
1970	1.69	0.19	1.73	0.20	1.10	0.04
1971	1.98	0.17	2.00	0.16	1.28	0.16
1972	2.28	0.15	2.28	0.14	1.33	0.04
1973	2.62	0.15	2.63	0.15	1.73	0.30
1974	3.39	0.29	3.57	0.36	4.38	1.53
1975	4.38	0.29	4.68	0.31	3.90	-0.11
1976	5.95	0.36	6.27	0.34	3.59	-0.08
1977	8.28	0.39	8.40	0.34	3.91	0.09
1978	11.21	0.35	10.84	0.29	3.83	-0.02
1979	17.44	0.56	16.59	0.53	5.06	0.32
1980	35.52	1.04	34.34	1.07	.49	0.48
1981	74.48	1.10	68.33	0.99	8.31	0.11
1982	148.89	1.00	127.09	0.86	7.73	-0.07

Source: FGV, Conjuntura Economica, several issues, column 27 for the Wholesale Industrial Price in the concept of total supply (domestic production + imports) and column 9 for the price of domestic raw materials (excluding food) in the concept of domestic supply (domestic production - exports + imports).

For imported raw materials the basic data is from Banco Central, Boletim Mensal, separata of August 1984, and it has been elaborated by us. The imported raw material price index represents the average value FOB (US\$/Ton) of imported raw materials (fuels and lubricants, fertilizers, organic chemical products, grain, cast iron and steel, non ferrous metals, inorganic chemical products, artificial plastics, rubber, paper, poster paper and cardboard).

Table A1.7-6 Industrial Employment and Wage Rate (T, w)

Year	Number of workers in 31.12	Rate of Growth T'	Nominal Wage Rate Cr\$	Rate of Growth w'
1966	1 933 868		206	
1967	1 947 422	0.01	273	0.33
1968	2 075 541	0.07	352	0.29
1969	2 096 955	0.01	462	0.31
1970	2 509 615	0.20	525	0.14
1971	2 520 782*	0	857	0.63
1972	2 531 948	0	931	0.09
1973	3 271 250	0.29	1,074	0.15
1974	3 460 081**	0.06	1,502	0.40
1975	3 850 872	0.11	1,805	0.20
1976	4 133 516**	0.07	3,168	0.76
1977	4 317 528**	0.04	4,618	0.46
1978	4 598 097**	0.07	6,697	0.45
1979	4 780 310**	0.04	10,740	0.60
1980	5 374 225	0.12	16,788	0.56
1981	5 050 568	-0.06	44,274	1.64
1982	5 159 679	0.02	76,874	0.74

Source: For the number of workers, IBGE, Industrial Census for 1970, 1975 and 1980 and Industrial Annual Survey for the other years. The Wage Rate is our elaboration.

* estimated as the average of 1970/72. The data for 1972 is apparently too low.

** number of workers in 30.06.

The number of workers comprehends all workers, including the ones in part time jobs and owners.

The Wage Rate represents an average of the gross monthly wage and has been obtained dividing the Wage Bill of the year (Table A1.7-3 data in Cr\$) by 12 and then by the number of workers.

Data Used in the Regressions and Exponential Adjustments

Table A1.7-7 A#, GDP#, G#, P#, W# and T# (1967-1982)

Year	A#	GDP#	G#	P#	W#	T#
1967	-0.19	-0.06				
1968	0.16	0.03	0.08	-0.13	-0.18	-0.01
1969	0.13	0.02	0.03	-0.22	-0.22	-0.07
1970	0.13	0.01	0.03	-0.18	-0.19	0.12
1971	0.16	0.03	0.03	-0.20	-0.19	-0.08
1972	0.41	0.04	0.06	-0.22	-0.24	-0.08
1973	0.16	0.06	0.09	-0.22	-0.06	0.21
1974	0.02	0.01	0.0	-0.08	-0.07	-0.02
1975	-0.10	-0.03	-0.04	-0.08	-0.21	0.03
1976	0.28	0.02	0.04	-0.01	0.33	-0.01
1977	-0.18	-0.03	-0.06	0.02	-0.03	-0.04
1978	-0.14	-0.03	-0.02	-0.02	-0.01	-0.01
1979	-0.13	-0.01	-0.01	0.19	0.12	-0.04
1980	-0.20	0.01	0.01	0.67	0.21	0.04
1981	-0.18	-0.11	-0.19	0.73	0.93	-0.14
1982	-0.34	-0.07	-0.08	0.63	0.22	-0.06

Table A1.7-8 VA#, F# and w# (1967-1982)

year	VA# (G# + P#)	F# (VA# - W#)	w# (W# - T#)
1967	-0.18	0.03	
1968	-0.05	0.13	-0.17
1969	-0.19	0.03	-0.15
1970	-0.15	0.04	-0.31
1971	-0.17	0.02	-0.11
1972	-0.16	0.08	-0.16
1973	-0.13	-0.07	-0.27
1974	-0.08	-0.01	-0.05
1975	-0.12	0.09	-0.24
1976	0.03	-0.30	0.34
1977	-0.04	-0.01	0.01
1978	-0.04	-0.03	0.0
1979	0.18	0.06	0.16
1980	0.68	0.47	0.17
1981	0.54	-0.39	1.07
1982	0.55	0.33	0.28

Exponential Equations of Adjustment

The exponential curve is

$$x_s = a.e^{bt}$$

which can also be presented as

$$\ln x_s = \ln a + b.t$$

or

$$x_s = \exp(\ln a + b.t)$$

The results of the adjustment are presented below in the form

$$x_s = \exp(\ln a + b.t);$$

as follows:

$$A_s = \exp (0.58728 + 0.121877 t);$$

$$GDP_s = \exp (0.111073 + 0.0752426 t);$$

$$G_s = \exp (0.197263 + 0.0732963 t);$$

$$P_s = \exp (-0.650795 + 0.317312 t);$$

$$W_s = \exp (-0.558382 + 0.440609 t);$$

$$T_s = \exp (0.0104751 + 0.0732237 t);$$

The growth rate (i.e. the first difference) of an exponential curve x is b . That is:

$$x' = \frac{1}{x} \frac{dx}{dt} = \frac{1}{a \cdot e^{bt}} \cdot a \cdot e^{bt} \cdot b = b$$

However, in practice, we do not use this value.

The analytical equation of an endogenous variable is not known. Therefore, we adopt an approximation to the first difference, i.e.

$$x' = \frac{1}{x_1} (x_2 - x_1)$$

for a unit time interval ($\Delta t = 1$). Hence, we use the same method of calculating the growth rate for both the variable and the reference. In this case, the growth rate of the exponential curve should be as follows:

$$x'_s = \frac{1}{a \cdot e^{b \cdot t_1}} \cdot (a \cdot e^{b \cdot t_2} - a \cdot e^{b \cdot t_1}) = \frac{e^{b \cdot t_2}}{e^{b \cdot t_1}} - 1 = e^{b \cdot \Delta t} - 1 = e^b - 1$$

When $b < 1$, which is true in our case,

$e^b - 1$ is approximately equal to b

because:

$$e^b = 1 + b + \frac{b^2}{2!} + \frac{b^3}{3!} + \dots$$

In fact, at the limit, the value $(x_2 - x_1)/\Delta t$ should be equal to the value of the derivative dx/dt at x_1 .

The values adopted for x_s' are as follows:

$$A_s' = 0.13$$

$$GDP_s' = 0.08$$

$$G_s' = 0.08$$

$$P_s' = 0.37$$

$$W_s' = 0.55$$

$$T_s' = 0.08$$

which are obtained by rounding up the results of the expression $e^b - 1$, i.e.

$$e^{0.121877} - 1 = 0.1296152 \quad \rightarrow \quad 0.13 \quad \text{for} \quad A_s'$$

$$e^{0.0752426} - 1 = 0.07814575 \quad \rightarrow \quad 0.08 \quad \text{for} \quad GDP_s'$$

$$e^{0.0732963} - 1 = 0.07604933 \quad \rightarrow \quad 0.08 \quad \text{for} \quad G_s'$$

$$e^{0.317312} - 1 = 0.373431 \quad \rightarrow \quad 0.37 \quad \text{for} \quad P_s'$$

$$e^{0.440609} - 1 = 0.553653 \quad \rightarrow \quad 0.55 \quad \text{for} \quad W_s'$$

$$e^{0.0732237} - 1 = 0.07597041 \quad \rightarrow \quad 0.08 \quad \text{for} \quad T_s'$$

APPENDIX 2 TO CHAPTER 7 TWO-STAGE LEAST SQUARES METHOD

OLS Estimation in Recursive Models

Recursive models are simultaneous equations models for which ordinary least squares (OLS) estimation is valid. However, the application of the two-stage least squares method (2SLS) to estimate the parameters of our recursive model seems to be a good test of robustness. This appendix presents the results of this estimation.

The simultaneous equations

The left-hand side of the following 12 equations represent the set of endogenous variables of our model:

I) Behavioral Equations

$$(1) \quad A\# = \beta_{11}GDP\# + \beta_{12}F\#(-1) + \beta_{13}\langle FL' \rangle$$

$$(2) \quad GDP\# = \beta_{21}A\#(-1)$$

$$(3) \quad G\# = \beta_{31}GDP\#$$

$$(4) \quad P\# = \beta_{40} + \beta_{41}w' + \beta_{42}Pm' + \beta_{43}G'(-1)$$

$$(5) \quad w' = \beta_{51}P'(-1) + \beta_{52}G'(-1)$$

$$(6) \quad Pm' = \beta_{61}P'(-1) + \beta_{62}\langle PM' \rangle$$

II) Identities

a) Definitions

$$(7) \quad F\# \quad = \text{VA}\# - W \#$$

$$(8) \quad \text{VA}\# \quad = G\# + P\#$$

$$(9) \quad W \# \quad = w\# + \langle T\# \rangle$$

b) Transformations

$$(10) \quad P' \quad = P\# + \alpha_{Ps}$$

$$(11) \quad G' \quad = G\# + \alpha_{Gs}$$

$$(12) \quad w\# \quad = w' - \alpha_{ws}$$

In these equations, α_{Ps} , α_{Gs} and α_{ws} are constants and $\langle \dots \rangle$ denotes an exogenous variable.

Stage 1

In the first stage of the 2SLS method, we estimate the reduced-form equations by OLS and obtain the predicted behavioral variables (y^\wedge), that is:

$$A\#^\wedge \quad = f(\Gamma)$$

$$\text{GDP}\#^\wedge \quad = f(\Gamma)$$

$$G\#^\wedge \quad = f(\Gamma)$$

$$P\#^\wedge \quad = f(\Gamma)$$

$$w'^{\wedge} = f(\Gamma)$$

$$Pm'^{\wedge} = f(\Gamma)$$

where Γ is the union of the exogenous variables with the lagged endogenous variables as follows:

$$\Gamma = \{ \langle FL' \rangle, \langle PM' \rangle, \langle T\# \rangle, F\#(-1), A\#(-1), G'(-1), P'(-1) \}$$

The results of this stage, which are used in the next stage, are shown in the Tables A2.7-1, A2.7-2 and A2.7-3.

Table A2.7-1 Model Fitting Results for: GDP#

Independent variable	coefficient	std. error	t-value	sig.level
$\langle FL' \rangle$	0.040851	0.030659	1.3324	0.2194
$\langle PM' \rangle$	0.011741	0.029233	0.4016	0.6985
$\langle T\# \rangle$	0.206157	0.127668	1.6148	0.1450
F#(-1)	-0.040591	0.061426	-0.6608	0.5273
A#(-1)	-0.021984	0.08805	-0.2497	0.8091
G'(-1)	0.136158	0.215636	0.6314	0.5454
P'(-1)	-0.061675	0.027026	-2.2820	0.0519

R-SQ. (ADJ.) = 0.4460 SE= 0.033227 MAE= 0.023344 DurbWat= 2.294
15 observations fitted

Table A2.7-2 Model Fitting Results for: w'

Independent variable	coefficient	std. error	t-value	sig.level
$\langle FL' \rangle$	-0.021774	0.167549	-0.1300	0.8998
$\langle PM' \rangle$	0.031444	0.159756	0.1968	0.8489
$\langle T\# \rangle$	-0.468881	0.697702	-0.6720	0.5205
F#(-1)	0.273306	0.335693	0.8142	0.4391
A#(-1)	-0.491352	0.48119	-1.0211	0.3371
G'(-1)	1.866758	1.178446	1.5841	0.1518
P'(-1)	0.912287	0.147699	6.1767	0.0003

R-SQ. (ADJ.) = 0.9113 SE= 0.181584 MAE= 0.087779 DurbWat= 1.935
15 observations fitted

Table A2.7-3 Model Fitting Results for: Pm'

Independent variable	coefficient	std. error	t-value	sig.level
<FL'>	-0.172649	0.125605	-1.3745	0.2065
<PM'>	0.107346	0.119763	0.8963	0.3962
<T#>	0.454054	0.523039	0.8681	0.4106
F#(-1)	-0.055368	0.251656	-0.2200	0.8314
A#(-1)	-0.699225	0.360729	-1.9384	0.0886
G'(-1)	1.569754	0.883435	1.7769	0.1135
P'(-1)	0.848042	0.110724	7.6591	0.0001

R-SQ. (ADJ.) = 0.9331 SE= 0.136126 MAE= 0.070928 DurbWat= 2.125
 15 observations fitted

Stage 2

In the second stage of the 2SLS method, we replace the right-hand side endogenous variables of the behavioral equations by the predicted variables (y^{\wedge}) and estimate each equation by the OLS method, that is:

$$A\# = \beta_{11}GDP\#\wedge + \beta_{12}F\#(-1) + \beta_{13}\langle FL' \rangle$$

$$GDP\# = \beta_{21}A\#(-1)$$

$$G\# = \beta_{31}GDP\#\wedge$$

$$P\# = \beta_{40} + \beta_{41}w'\wedge + \beta_{42}Pm'\wedge + \beta_{43}G'(-1)$$

$$w' = \beta_{51}P'(-1) + \beta_{52}G'(-1)$$

$$Pm' = \beta_{61}P'(-1) + \beta_{62}\langle PM' \rangle$$

Only three equations (A#, G# and P#) need to be evaluated by the 2SLS method in

the second stage. Furthermore, only the following predicted variables need to be imported from the first stage: $GDP\hat{\#}$, $w\hat{\#}$ and $Pm\hat{\#}$.

The parameters β_{ij} are presented in the Tables A2.7-4, A2.7-5 and A2.7-6 with a comparison between 2SLS and OLS.

Table A2.7-4 Model Fitting Results for: A#

Independent variable	2SLS	OLS
$GDP\hat{\#}$	3.40766	3.359482
$F\hat{\#}(-1)$	0.221708	0.220986
$\langle FL\hat{\#} \rangle$	0.21947	0.22031

Table A2.7-5 Model fitting results for: G#

Independent variable	2SLS	OLS
$GDP\hat{\#}$	1.519688	1.544803

Table A2.7-6 Model fitting results for: P#

Independent variable	2SLS	OLS
CONSTANT	-0.373418	-0.3432
$w\hat{\#}$	0.152251	0.118782
$Pm\hat{\#}$	0.937629	0.933943
$G\hat{\#}(-1)$	-0.390051	-0.501908

The actual and simulated values for A#, G# and P# are presented in the Table A2.7-7.

Table A2.7-7 The Results from the 2SLS Method

Year	A#		G#		P#	
	Actual	Simulated	Actual	Simulated	Actual	Simulated
1968	0.16	0.086411	0.08	0.0032709	-0.13	-0.027956
1969	0.13	0.146439	0.03	0.0054727	-0.22	-0.150882
1970	0.13	0.223714	0.03	0.0625454	-0.18	-0.189393
1971	0.16	0.080439	0.03	-0.0023384	-0.20	-0.210351
1972	0.41	0.301892	0.06	0.0367372	-0.22	-0.367465
1973	0.16	0.118705	0.09	0.0587304	-0.22	-0.213195
1974	0.02	0.076690	0.00	0.0411220	-0.08	0.036999
1975	-0.10	-0.066876	-0.04	-0.0131753	-0.08	0.017694
1976	0.28	0.062810	0.04	-0.0082927	-0.01	-0.034023
1977	-0.18	-0.083301	-0.06	-0.0094448	0.02	-0.082656
1978	-0.14	0.136584	-0.02	0.0061113	-0.02	0.049945
1979	-0.13	-0.164221	-0.01	-0.0399289	0.19	0.208804
1980	-0.20	-0.091317	0.01	-0.0280601	0.67	0.435777
1981	-0.18	-0.108989	-0.19	-0.1244382	0.73	0.774603
1982	-0.34	-0.392838	-0.08	-0.1239067	0.63	0.632099

The graphs of A#, G# and P# are shown in the Figures A2.7-1, A2.7-2 and A2.7-3.

Estimations of R^2 for the final stage of the 2SLS method require measures based on the squared correlation or the residual sum of square (Maddala, 1988, p.307). These values of R^2 might reveal something wrong - perhaps an equation which is not identified. However, this is not the case for our recursive model, because its particular triangular pattern satisfies the rank condition for identification. A description of the necessary and sufficient conditions for identification (rank condition) can be found in (Maddala, 1988, p.301). Furthermore, the comparison between the values obtained by the two methods (2SLS and OLS) reveals no need for this sort of analysis.

The robustness of the model is also confirmed by the graphs of A#, G# and P#, which are similar to the ones obtained by OLS, as shown in the Figures A2.7-1, A2.7-2 and A2.7-3.

REAL INVESTMENT A#
2SLS Method

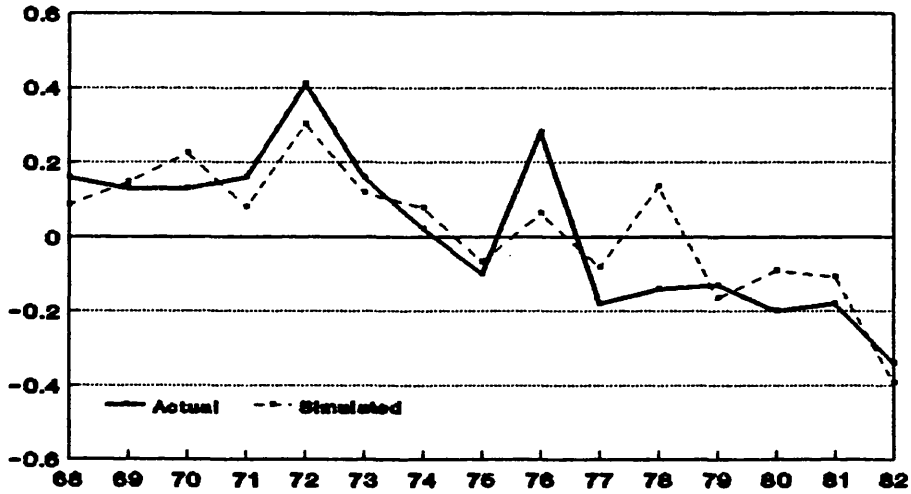


Figure A2.7-1 Real Investment A# (2SLS Method)

INDUSTRIAL OUTPUT G#
2SLS Method

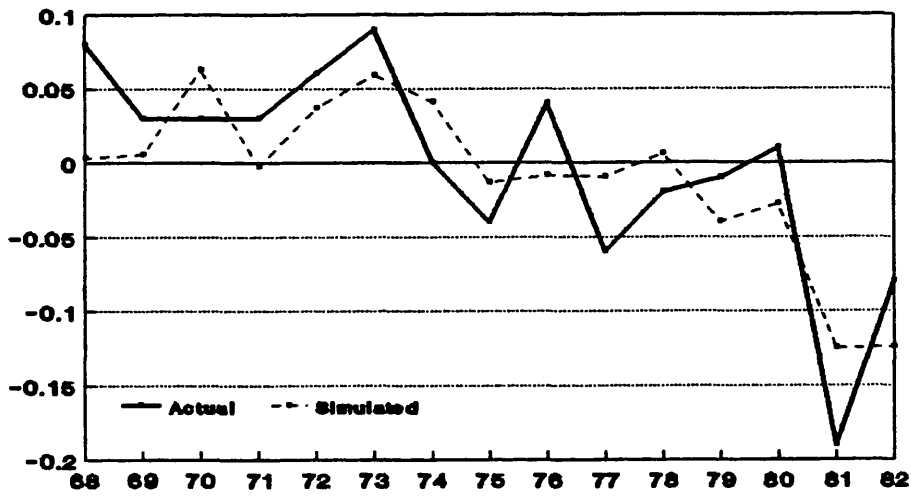


Figure A2.7-2 Industrial Output G# (2SLS Method)

INDUSTRIAL PRICE P#
2SLS Method

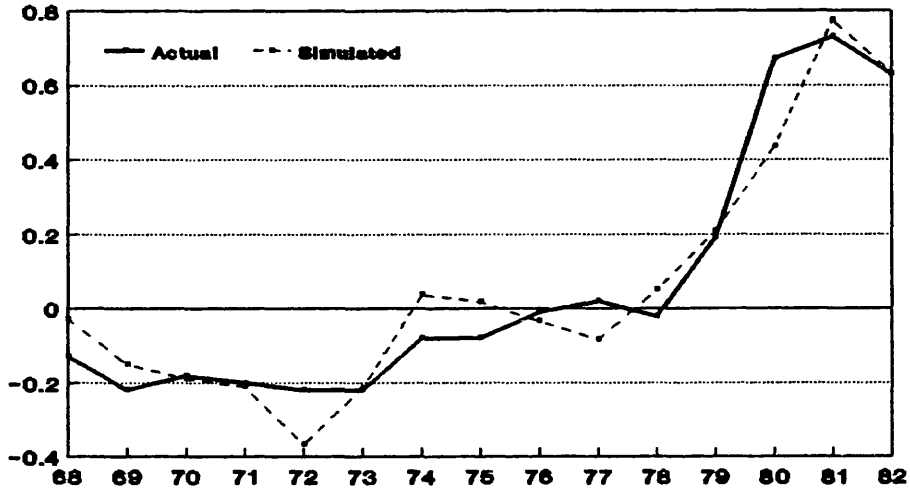


Figure A2.7-3 Industrial Price P# (2SLS Method)

CHAPTER 8 CAUSALITY AND SIMULATION

A. INTRODUCTION

As we said in the previous chapter, our interest in specifying our model is to define a causal chain that will make explicit the relations of cause and effect among its variables. In doing so we are following Keynes's concern with the "nature of economic thinking". In his words,

The object of our analysis is, not to provide a machine, or method of blind manipulation, which will furnish an infallible answer, but to provide ourselves with an organised and orderly method of thinking out particular problems; and, after we have reached a provisional conclusion by isolating the complicating factors one by one, we then have to go back on ourselves and allow, as well as we can, for the probable interactions of the factors amongst themselves. (Keynes, 1936, p. 297.)¹

The description above is very close to what a causal model proposes. As described by Malinvaud

A model is said to be "recursive" if there exists an ordering of the endogenous variables and an ordering of the equations such that the i th equation can be considered to describe the determination of the value of the i th endogenous variable during period t as a function of the predetermined variables and of the endogenous variables of index less than i . A model is said to be "interdependent" if it is not recursive. (Malinvaud, 1980, p. 56.)

In this chapter we shall present the simulation results of the model.² We shall do this first by describing, through diagrams, the causal chain developed for the Brazilian economy in the seventies. Next, we shall present a simulation experiment (according to Theil, 1971, p. 482) to test how well our model faces in reproducing the fluctuations observed in the seventies. The statistical requirements to build a causal model (that allow us to apply the ordinary least square method to estimate the regressions) are presented in the appendix 1 to this chapter. The description of the recursive program used to run the model is in appendix 2.

B. THE CAUSAL CHAIN

The strength of a causal model is in that the relationships established can be represented by a direct chain.

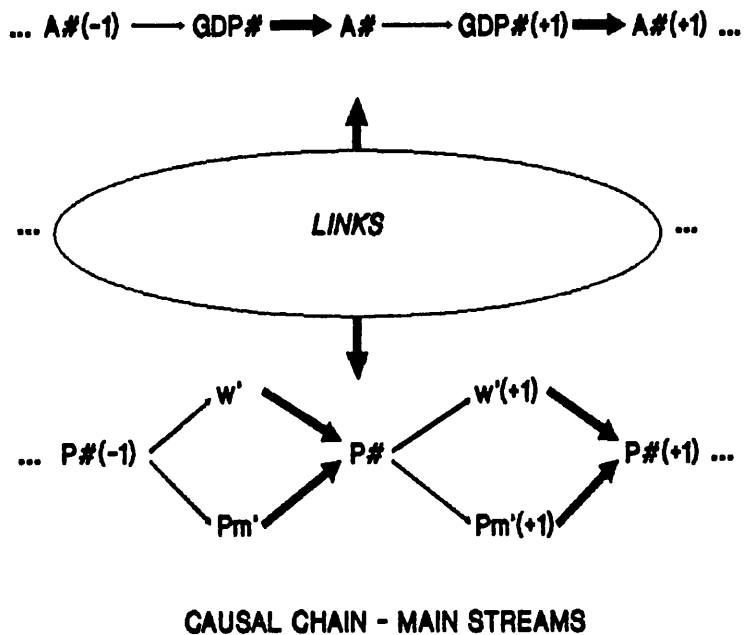


Figure 8-1 The Main Parts of the Causal Chain

In the diagram of the Figure 8-1 we separate the two main parts of the causal chain: the upper part shows the accelerator-multiplier mechanism through which we simulate the evolution of $GDP\#$ and $G\#$. In the bottom part we show the mechanism of indexation explaining changes in prices $P\#$.

The full view of the model is presented in the diagram of the Figure 8-2. This global view allows us to show, besides the causal chain, the connection between the micro and the macro spheres and the impact of the exogeneous variables.

The main force explaining the process of growth is represented at the upper part of the figure and is given by the multiplier-accelerator interaction. The multiplier effect triggers the mechanism of growth and the accelerator mechanism feeds the process, explaining changes in investment. The variable F (internal funds for investment), obtained through deterministic relations, establishes the links between the upper part of the diagram (Figure 8-2) - which reveals the macrodynamics of the growth process and the lower part of the diagram - which shows the dynamics of the price movements.

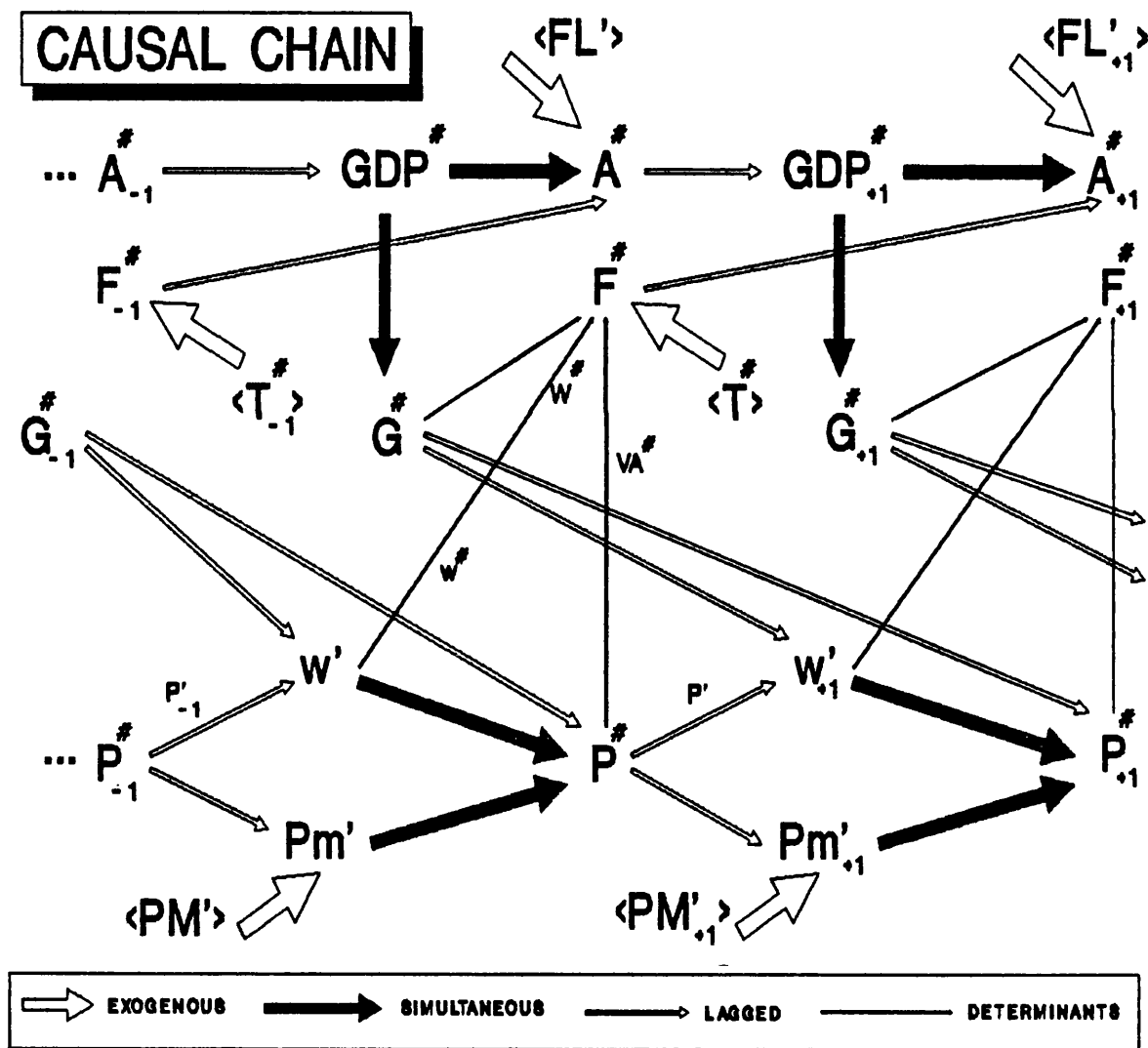


Figure 8-2 The Causal Chain

The main variable to explain fluctuations in the rate of growth of aggregate output is discretionary expenditure. The main item to constitute this sort of expenditure is industrial investment in fixed assets which is considered in the model. Investment in fixed assets depends on the behaviour of aggregate demand (accelerator effect) and on the availability of funds to finance investment. In the model the availability of internal funds is expressed by an indication of gross accumulation of capital.

Price changes are explained by the indexation of wages and of the exchange rate - which tends to perpetuate the impact of external shocks in the price system - and through changes in output, which represents the market power of firms in maintaining the purchasing power of their revenue. The acceleration of inflation was caused by external shocks, after which internal mechanisms maintained inflation at high rates. The mechanism of indexation is present in the model in the reconstitution of the purchasing power of wages³ (degree of indexation is 1.04, see the equation of the w' in chapter 7) and in the indexation of the exchange rate (degree of indexation is 0.96, see equation of P_m' in chapter 7). The role of the price of raw materials in explaining changes in the industrial price is quite high (coefficient 0.93, that is the participation of the price of raw material in total direct costs, see equation of $P_{\#}$ in chapter 7).

The dynamics of the Brazilian economy in the seventies showed that the first external shock did not impair growth, although it accelerated inflation, and growth rates were sustained by the strategic plans of investment, heavily subsidised, launched by the government. The presence of the government in sustaining growth implied that interest rates, as a guide to investment decisions, was not important during the period.⁴ In sum, the model establishes the relations among the variables that made possible growth in an environment of high instability in the price system.

The exogeneous variables (FL' , PM' and $T_{\#}$), that Eichner called inputs, are the forces that affect the dynamic adjustment process. In our model the $T_{\#}$ variable has very little impact on the dynamics of the model, as it enters only to compose an identity relation.

C. THE SIMULATION

As we said in the beginning of the chapter our aim with the model is also to simulate the behaviour of the industrial output and its price level in the seventies. So our model produces three outputs: GDP#, G# and P#. We obtain them taking the observed 1968 values of the variables A, P, G and F (see the diagram of the Figure 8-2) as initial conditions. The time path of all endogeneous variables is traced, year by year, until 1982.

As we saw in the preceding chapter, we use dummy variables to take into account the effect of unexpected changes in economic policy. All the dummies, except one (the 1981-82 in the GDP equation, but the argument is the same), are used for one year, reinforcing the exceptional character of the phenomena that they represent.

The graphs below show the goodness-of-fit of our results. As mentioned by Eichner (1981) the adherence of the actual data and the simulated one is a stringent test to show the accuracy of the model.

We present 6 graphs. Three of them represent regressions without dummy variables and the other ones represent regressions with dummy variables. Here again, when comparing the results with and without dummies variables, we stress the role of the dummies to take into account facts that cannot be described by variables.

The Results of the Model

In the results with dummy variables, our model shows that we are able to track the turning points reasonably well, as the major movements are captured in the simulation. The price simulation shows an almost complete adherence of the simulated values all over the period.

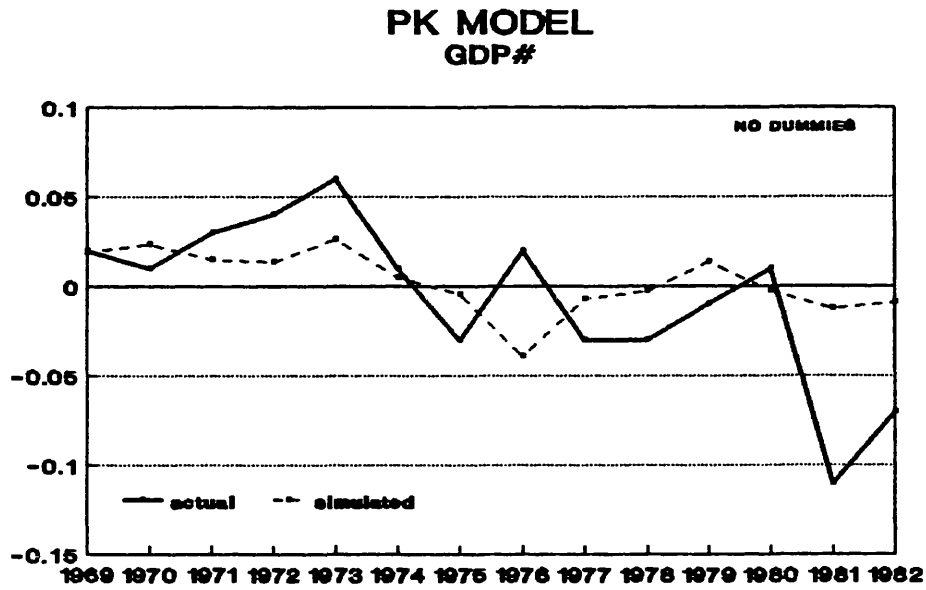


Figure 8-3 The Simulation of GDP# by the Model (no dummies)

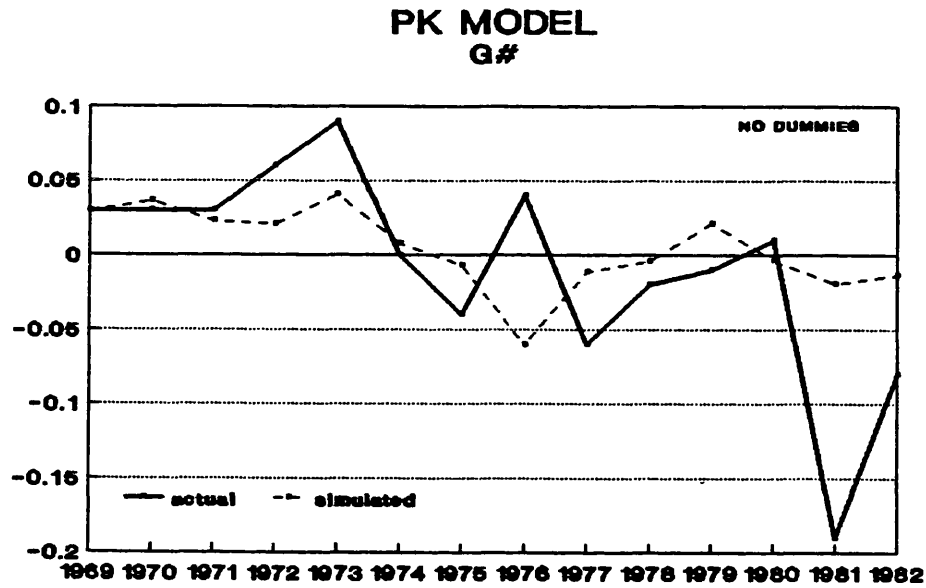


Figure 8-4 The Simulation of G# by the Model (no dummies)

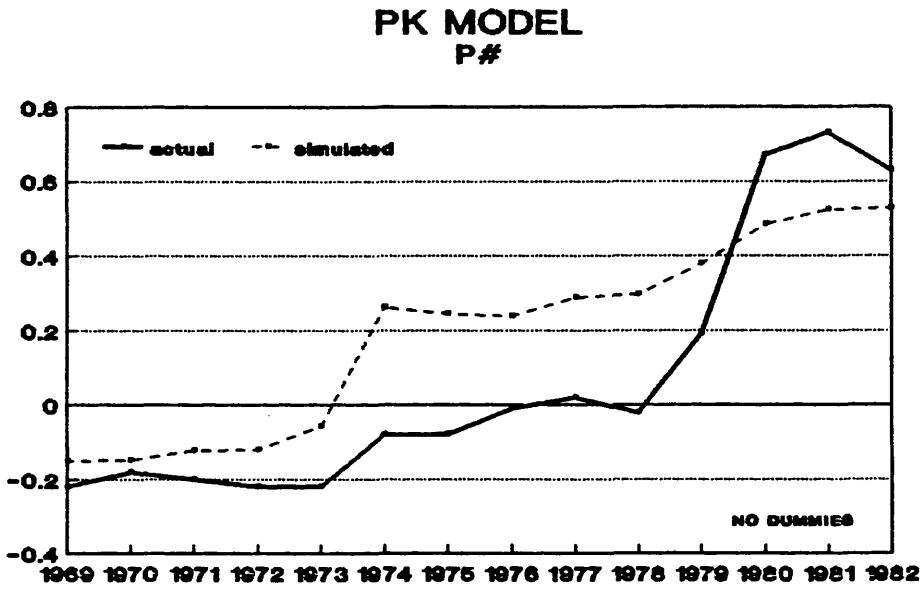


Figure 8-5 The Simulation of P# by the Model (no dummies)

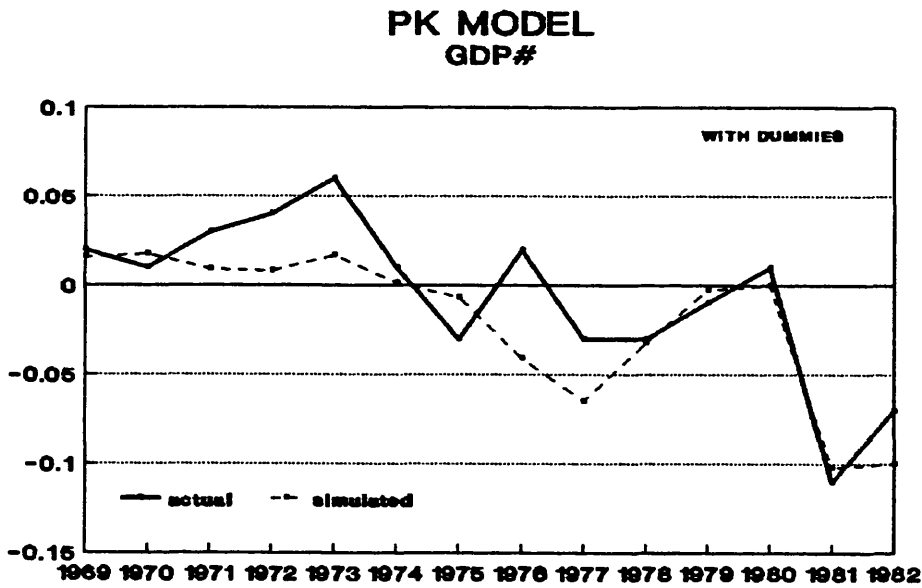


Figure 8-6 The Simulation of GDP# by the Model (with dummies)

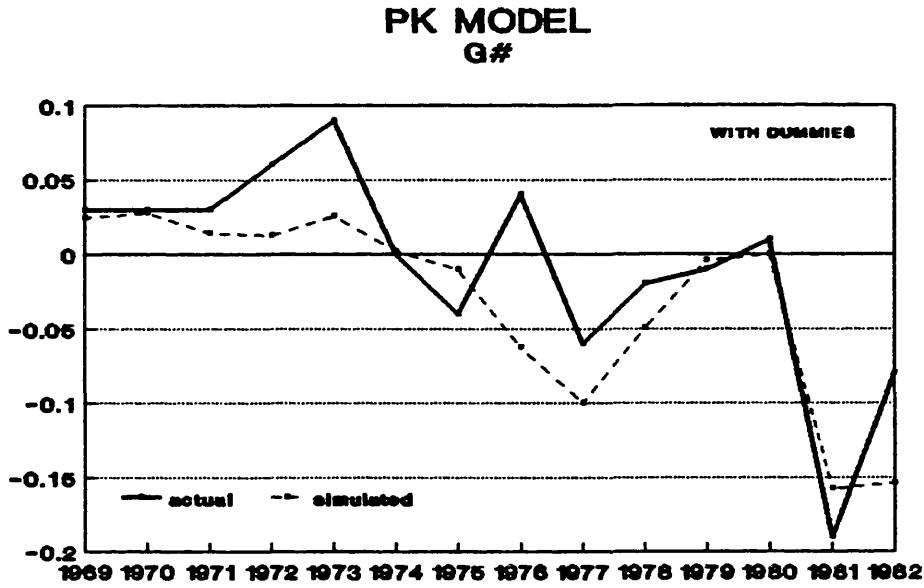


Figure 8-7 The Simulation of G# by the Model (with dummies)

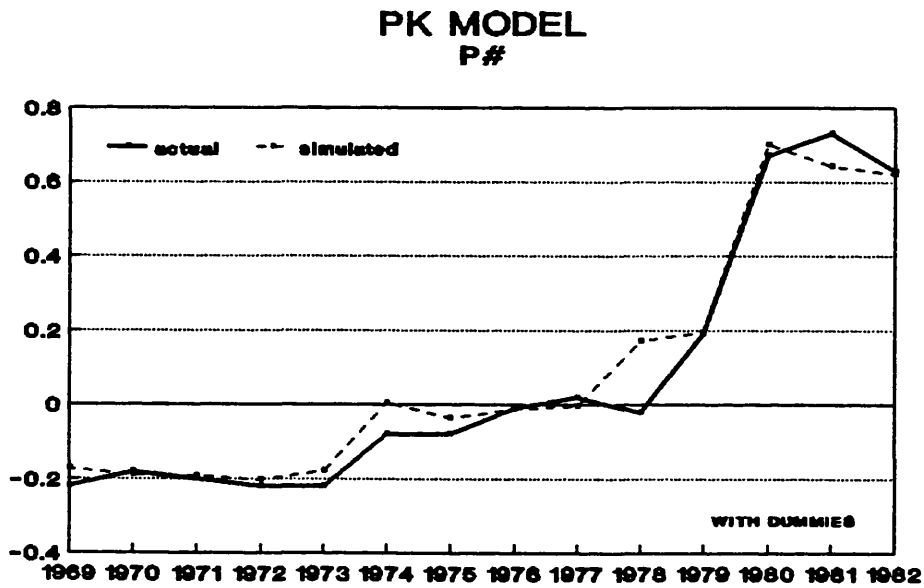


Figure 8-8 The Simulation of P# by the Model (with dummies)

The exercise without dummies shows a quite interesting result. During the phase of sustained growth - 1969-79 - inflation would have been higher than it actually was, when governmental intervention aimed at keeping growth took place. This probably reflects the efficacy of price controls, on one hand, and the delay in changing indexation rules in the face of increased inflationary pressures.

After the second oil shock the opposite happens, that is, inflation would have been lower than it was. By the end of 1979, the Federal Government decreed an exchange devaluation of 30%, which created expectations of rising inflation, and thus, we can suggest that the impact of inflationary expectations was much exacerbated by the change in the policy guidelines in 1980, as described in chapter 6. Changes in expectations formation from the first period to the second would, then, generally account for the deviations of the simulated path with respect to the actual behaviour of prices.

Output, on the other hand, would have expanded less than it did during the 1971-76, but it would have increased more afterwards. From 1969 to 1973, the Federal Government employed all available instruments to intensify economic growth, that was seen as legitimising the claims to superior efficiency made by military rulers. Even after the first oil shock, attempts to make of Brazil an important regional power, led to the adoption of import substitution plans that created new stimulus to growth, even though the need to control inflation imposed a stop and go pattern to policy.

In contrast, with no intervention in the economy, after 1979, growth would have accelerated again and rates would have been higher than those observed in the period of the "economic miracle". So, if there had been no alteration in the financial conditions in the foreign markets, that led to changes in the economic policy, the performance of the economy in terms of the rates of growth of aggregate output would have been better than in the beginning of the seventies. The sensitiveness of the Brazilian economy to the foreign sector is highlighted by this result.

Combining the results for real output and the behaviour of prices, the seventies seemed to have been a decade committed to growth, in the sense that high rates of inflation

could be reconciled to high and sustained rates of expansion of the aggregate output.

We can see that the incidence of dummy variables is concentrated in the final years of our period. The years of 1979-80 can be seen as a transition in the sense that changes in the foreign environment induced changes in the strategy of guiding the economy. The 1981-82 period represented a new way of dealing with the balance of payment problem, and a reversion in the general state of expectations about perspectives of growth in the short run.

D. A SUMMING UP

The aim of this exercise is to test the robustness of our model and to exploit the role of the dummies employed in the regressions of chapter 7.

As we have seen in the preceding chapters, Keynes and post Keynesians reject approaches that are based on deterministic views of economics. For this reason, Keynes had a negative opinion about econometric models which aim at forecasting. In his words,

Economics is a science of thinking in terms of models joined to the art of choosing models which are relevant to the contemporary world. It is compelled to be this, because, unlike the typical natural science, the material to which it is applied is, in too many respects, not homogeneous through time. (Keynes, 1973, vol. 14, p. 296.)

Our exercise is restricted to simulating growth for the period of our study. Still following Keynes's warnings about the use of econometric models as an instrument to understand reality, we define a causal model where relations of cause and effect are clearly stated.⁵

Post Keynesian theory emphasizes the role of expectations to guide decisions under uncertainty. It is only possible to translate into a formal model the rules and conventions which give confidence to decisions, if they are stable. The role of the dummy variables is, in this sense, to capture changes in the state of confidence on

expectations.

In a word, our model aims to describe the dynamics of growth and the dynamics of inflation in the Brazilian economy in the seventies, establishing the relations among the variables that made possible growth in an environment of high instability in the price system.

NOTES TO CHAPTER 8

1 - Keynes went on criticizing what he calls a "great fault of symbolic pseudo-mathematical methods of formalising a system of economic analysis, ...,that they expressly assume strict independence between the factors involved and lose all their cogency and authority if this hypothesis is disallowed." (Keynes, 1936, p. 297.)

Pasinetti (1974, chapter 2) argues that the well defined results reached by Keynes in the General Theory are obliterated by the imposition of interdependencies that transform causal relations in the General Theory in a system of simultaneous equations. That is the case of the reinterpretation of Keynes's theory proposed by Sir John Hicks in his classical article of 1937.

2 - In Eichner's words:

(1) In a dynamic simulation the predicted values of certain explanatory variables (those which are endogenous to, and therefore determined in, other parts of the model) are used rather than the historically observed values for the same variables; in consequence, any errors in prediction are likely to be compounded through the simulation exercise, thereby making the errors more readily apparent when the simulated values are compared with the historically observed time series. (2) With the simulation exercise based on the predicted values generated by other equations in the model, the interrelationships among variables - some of which may not be recognized in advance - become crucial; in consequence, the simulation exercise may lead to improbable results because certain of the linkages between variables were not fully appreciated or even taken into account in originally specifying the model. (Eichner and Forman, 1981, pp. 127-28.)

3 - It should be noticed that we do not use the Phillips curve to exploit the behaviour of inflation because in our case indexation has a major effect over nominal wages increase.

4 - It should also be noted that in our model we are working with investment in manufacturing industry which, according to Keynes (1971, vol. 6, p. 326), should not suffer strong influence from the long run interest rate as the time horizon is not very long and uncertainty very high.

5 - For a discussion about the Tinbergen and Keynes debate over econometric methods applied to economics see Boianovsky and Henriques (1989).

APPENDIX 1 TO CHAPTER 8

In order to build a causal (recursive) model, first we have to establish that there is no interdependence among the endogeneous variables. So, if each equation exhibits a unilateral causal dependence, we shall be able to write the matrix of the coefficients b_{ij} of the endogeneous variables in a triangular form. That is to say:

$$(1) \quad b_{ij} = 0 \quad \text{for all} \quad j > i$$

Also two other conditions have to be satisfied by the causal model: any error u_i must show no serial correlation (i.e. no autocorrelation), nor must they be correlated with previous or concomitant values of another error u_j . Strictly speaking these conditions are as follows:

$$(2) \quad \text{cov}(u_{it}, u_{i,t-k}) = 0 \quad \text{for all} \quad i, j \quad \text{and all} \quad k > 0,$$

$$(3) \quad \text{cov}(u_{it}, u_{jt}) = 0 \quad \text{for all} \quad j \text{ not equal to } i.$$

where $\text{cov}()$ denotes covariance.

The correlation between u_{it} and $u_{j,t-k}$ is called autocorrelation of order k . In the present model, the autocorrelation condition (2) is reduced to the test for the presence of first-order correlation:

$$k = 1$$

Furthermore, it is adopted the commonly used statistic for this purpose, i.e. the Durbin-Watson statistic. The Durbin-Watson statistic for the equations of the model is commented upon in Chapter 7.

The third condition is satisfied by the covariance matrix of the residuals which should be diagonal.

Given our set of regressions, with dummies:

block 1 : $A\# = 3.470733GDP\# + 0.262319F\#(-1) + 0.194699FL' - 0.213454D80$
 $F\# = VA\# - W\#$

block 2 : $GDP\# = 0.097895A\#(-1) - 0.057411D77 - 0.0714D81-82$
 $G\# = 1.544803GDP\#$
 $VA\# = G\# + P\#$

block 3 : $P\# = -0.3432 + 0.11878w' + 0.933943P'm - 0.501908G'(-1)$
 $w' = 1.007577P'(-1) + 1.278053G'(-1) + 0.466681D76$
 $W\# = w\# + T\#$
 $Pm' = 0.871454P'(-1) + 0.1452PM' + 0.178527D79 + 0.51229D80$

We can write the matrix of our coefficients in a triangular form:

$$\begin{bmatrix} 1 & & & & & \\ b_{21} & 1 & & & & \\ b_{31} & 0 & 1 & & & \\ 0 & 0 & 0 & 1 & & \\ 0 & 0 & 0 & 0 & 1 & \\ 0 & 0 & 0 & b_{64} & b_{65} & 1 \end{bmatrix} \begin{bmatrix} GDP\# \\ A\# \\ G\# \\ w' \\ Pm' \\ P\# \end{bmatrix} + \begin{bmatrix} d_{11} & 0 & 0 & 0 \\ 0 & d_{22} & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & d_{43} & d_{44} \\ 0 & 0 & d_{53} & 0 \\ 0 & 0 & 0 & d_{64} \end{bmatrix} \begin{bmatrix} A_{-1}^{\#} \\ F_{-1}^{\#} \\ P'_{-1} \\ G'_{-1} \end{bmatrix} +$$

$$+ \begin{bmatrix} 0 & 0 & 0 \\ 0 & c_{32} & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & c_{53} \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} 0 \\ FL' \\ PM' \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \beta_6 \end{bmatrix} - \begin{bmatrix} u_1 \\ u_2 \\ u_3 \\ u_4 \\ u_5 \\ u_6 \end{bmatrix}$$

and

$$\begin{pmatrix} F_{-1}^{\#} \\ P_{-1}^{\#} \\ G_{-1}^{\#} \end{pmatrix} + \begin{bmatrix} -1 & -1 & 1 & 1 \\ 0 & -1 & 0 & 0 \\ -1 & 0 & 0 & 0 \end{bmatrix} \begin{pmatrix} G_{-1}^{\#} \\ P_{-1}^{\#} \\ w_{-1}^{\#} \\ T_{-1}^{\#} \end{pmatrix} + \begin{pmatrix} -w_s^{\#} \\ -P_s^{\#} \\ -G_s^{\#} \end{pmatrix} - \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$$

The covariance matrix for the cases with and without dummies are presented in the Tables A1.8-1 and A1.8-2.

Table A1.8-1 Covariance Matrix of Residuals (with dummies)

	A#	GDP#	G#	P#	w'	Pm'
A#	0.00392	0.00029	-0.00014	-0.00058	-0.00070	0.00181
GDP#		0.00044	0.00011	-0.00013	-0.00029	-0.00031
G#			0.00028	-0.00006	-0.00074	-0.00021
P#				0.00080	-0.00044	-0.00055
w'					0.01658	0.00157
Pm'						0.00258

Table A1.8-2 Covariance Matrix of Residuals (without dummies)

	A#	GDP#	G#	P#	w'	Pm'
A#	0.00666	-0.00032	-0.00006	-0.00027	0.00461	-0.00418
GDP#		0.00141	0.00020	-0.00063	0.00116	0.00165
G#			0.00028	-0.00006	-0.00051	-0.00026
P#				0.00080	-0.00254	-0.00152
w'					0.03193	0.00538
Pm'						0.01968

As supplementary information, the correlation matrix is presented in the Tables A1.8-3 and A1.8-4.

Table A1.8-3 Correlation Matrix of Residuals (with dummies)

	A#	GDP#	G#	P#	w'	Pm'
A#	1.0	0.222895	-0.131222	-0.326307	-0.0867679	0.569437
GDP#		1.0	0.301817	-0.216357	-0.109572	-0.28996
G#			1.0	-0.128971	-0.341907	-0.241081
P#				1.0	-0.121324	-0.379945
w'					1.0	0.2394
Pm'						1.0

Table A1.8-4 Correlation Matrix of Residuals (without dummies)

	A#	GDP#	G#	P#	w'	Pm'
A#	1.0	-0.105443	-0.0451547	-0.116225	0.315956	-0.364639
GDP#		1.0	0.312991	-0.588562	0.172165	0.312122
G#			1.0	-0.128971	-0.168395	-0.1115
P#				1.0	-0.503003	-0.38370
w'					1.0	0.2145
Pm'						1.0

APPENDIX 2 TO CHAPTER 8

```

/*****
PKEYNES - POSKEYNESIAN MODEL                               Version 1.0
(c) Carmem Feijo, Oct.1988

```

NOTATION

Functions: name(year)

Values: name[year]

Names: _c Cyclical variation _r Rate
 _s Secular trend v simulated Value
 _f First difference av Actual Value
 _e Exogenous

Examples: the function "A_c(i)" and the actual value for year 5 "avA_c[5]"

```

*****/

```

```

/*----- INTERNAL DEFINITIONS -----*/

```

```

#include <stdio.h>

```

```

#include <stdlib.h>

```

```

#define var double

```

```

#define EMPTY -9E15

```

```

/*-----*/

```

```

#define LIFE 30                   /* Maximum number of years */

```

```

char *title= "Brazilian Industrial Growth under Uncertainty and High Inflation";

```

```

char *subt= "(1968 - 1982)       MODEL WITH NO DUMMIES AT ALL";

```

```

int base = 1968;                 /* Starting year */

```

```

int year = 1982;                /* Final year */

```

```

/* MAIN VARIABLES */

```

```

var A_c(),    vA_c[LIFE+1];       /* Real Investment A# */

```

```

var Gdp_c(), vGdp_c[LIFE+1];     /* Real Total Output GDP# */

```

```

var F_c(),   vF_c[LIFE+1];       /* F# */

```

```

var P_c(),   vP_c[LIFE+1];       /* Industrial Price P# */

```

```

var P_f(),   vP_f[LIFE+1];       /* Industrial Price P' */

```

```

var W_f(),   vW_f[LIFE+1];       /* Average Industrial wage w' */

```

```

var W_c(),   vW_c[LIFE+1];       /* Average Industrial wage w# */

```

```

var G_f(),   vG_f[LIFE+1];       /* Real Industrial Output G' */

```

```

var G_c(),   vG_c[LIFE+1];       /* Real Industrial Output G# */

```

```

var Pm_f(),  vPm_f[LIFE+1];      /* Price of Raw Material Pm' */

```

```

var VTI_c(), vVTI_c[LIFE+1];     /* VA# */

```

```

var WT_c(),  vWT_c[LIFE+1];      /* Total Industrial Wage Bill WT# */

```

```

/* EXOGENOUS VARIABLES */

```

```

var FL_fe[LIFE+1];               /* FL' */

```

```

var IndPM_fe[LIFE+1];            /* PM' */

```

```

var T_ce[LIFE+1];                /* T# */

```

```

/* SECULAR TREND CONSTANTS */

```

```

var G_s;                         /* G trend */

```

```

var P_s;                         /* P trend */

```

```

var W_s;                         /* W trend */

```



```

/* DUMMY VARIABLES */
var d76[LIFE+1];      /* dummy 1976 */
var d77[LIFE+1];      /* dummy 1977 */
var d79[LIFE+1];      /* dummy 1979 */
var d80[LIFE+1];      /* dummy 1980 */
var d12[LIFE+1];      /* dummy 1981-82 */

/* VARIABLES WITH ACTUAL VALUES */
var avGdp_c[LIFE+1];  /* Actual GDP# */
var avG_c[LIFE+1];    /* Actual G# */
var avP_c[LIFE+1];    /* Actual P# */
var avW_c[LIFE+1];    /* Actual w# */

main()
{ int i;

  i = initialize();
  /* Base Values */
  vA_c[1] = 0.16;      /* A# 1968 */
  vP_f[1] = 0.24;      /* P' 1968 */
  vG_f[1] = 0.16;      /* G' 1968 */
  vF_c[1] = 0.13;      /* F# 1968 */
  /* Secular Trends */
  G_s = 0.08;          /* G trend */
  P_s = 0.37;          /* P trend */
  W_s = 0.47;          /* W trend */
  /* CAUTION: Data Files should have exactly 2 blanks between columns */
  /* Read Files with Exogenous Variables */
  readf(FL_fe,"FL.DAT");
  readf(IndPM_fe,"INDPM.DAT");
  readf(T_ce,"T.DAT");
  /* Read Files with Dummy Variables */
  readf(d76,"D76.DAT");
  readf(d77,"D77.DAT");
  readf(d79,"D79.DAT");
  readf(d80,"D80.DAT");
  readf(d12,"D12.DAT");
  /* Read Files with Actual Values */
  readf(avGdp_c,"GDP.ACT");
  readf(avG_c,"G.ACT");
  readf(avP_c,"P.ACT");
  readf(avW_c,"W.ACT");
  /* Start from the First Main Equation */
  A_c(i);
  /* Output of the Model */
  Gdp_c(i);
  G_c(i);
  P_c(i);
  W_c(i);
  /* Write Results into Files (Actual and Simulated) */
  writef("GDP.SIM", avGdp_c, vGdp_c);
  writef("G.SIM", avG_c, vG_c);
  writef("P.SIM", avP_c, vP_c);
  writef("W.SIM", avW_c, vW_c);
}

setup()
{

```

```

set( vA_c );
set( vGdp_c );
set( vF_c );
set( vP_c );
set( vP_f );
set( vW_f );
set( vW_c );
set( vG_f );
set( vG_c );
set( vPm_f );
set( vVTI_c );
set( vWT_c );
}

#define V vA_c[i]

var A_c(i) /* Real Discretionary Investment A# */
int i;
{ return test(V) ? V : ( V = /* EQUATION 1 */
3.359482*Gdp_c(i) + 0.220986*F_c(i-1) + 0.22031*FL_fe[i]
);}

#define V vGdp_c[i]

var Gdp_c(i) /* Real Total Output Gdp# */
int i;
{ return test(V) ? V : ( V = /* EQUATION 2 */
0.118187*A_c(i-1)
);}

#define V vP_f[i]

var P_f(i) /* Industrial Price P' */
int i;
{ return test(V) ? V : ( V = /* EQUATION 3 (Transformation) */
P_c(i) + P_s
);}

#define V vP_c[i]

var P_c(i) /* Industrial Price P# */
int i;
{ return test(V) ? V : ( V = /* EQUATION 4 */
-0.3432 + 0.118782*W_f(i) + 0.933943*Pm_f(i) - 0.501908*G_f(i-1)
);}

#define V vW_f[i]

var W_f(i) /* Average Industrial Wage W' */
int i;
{ return test(V) ? V : ( V = /* EQUATION 5 */
1.042559*P_f(i-1) + 1.336038*G_f(i-1)
);}

#define V vG_f[i]

var G_f(i) /* Real Industrial Output G' */
int i;
{ return test(V) ? V : ( V = /* EQUATION 6 (Transformation) */

```

```

G_c(i) + G_s
);}

#define V  vG_c[i]

var G_c(i)          /* Real Industrial Output G# */
int i;
{ return test(V) ? V : ( V =      /* EQUATION 7 */
1.5444803*Gdp_c(i)
);}

#define V  vPm_f[i]

var Pm_f(i)        /* Price of Raw Material Pm' */
int i;
{ return test(V) ? V : ( V =      /* EQUATION 8 */
0.955359*P_f(i-1) + 0.230668*IndPM_fe[i]
);}

#define V  vF_c[i]

var F_c(i)         /* F# */
int i;
{ return test(V) ? V : ( V =      /* EQUATION 9 (Definition) */
VTI_c(i) - WT_c(i)
);}

#define V  vVTI_c[i]

var VTI_c(i)       /* VTI# */
int i;
{ return test(V) ? V : ( V =      /* EQUATION 10 (Definition) */
G_c(i) + P_c(i)
);}

#define V  vWT_c[i]

var WT_c(i)        /* Industrial Wage Bill WT# */
int i;
{ return test(V) ? V : ( V =      /* EQUATION 11 (Definition) */
W_c(i) + T_ce[i]
);}

#define V  vW_c[i]

var W_c(i)         /* Average Industrial Wage W# */
int i;
{ return test(V) ? V : ( V =      /* EQUATION 12 (Transformation) */
W_f(i) - W_s
);}

/*----- INTERNAL FUNCTIONS -----*/
initialize()
{ char c;

/* Print Header */
system("cls");
printf("-----\n");
printf("PKYNES - POSKEYNESIAN MODEL          Version 1.0\n");
}

```

```

printf("(c) Carmem Feijo, Oct.1988\n");
printf("-----\n\n");
/* Print Title and Subtitle */
printf("%s\n%s\n", title,subt);
/* Initial Calculations */
setup();
/* Pause */
printf("BASE = %d\nYEAR = %d\n",base,year);
printf("Continue ? (y/n) ");
c = getch();
c = toupper(c);
if(c == 'N')
    exit(0);
printf("\n");
return (year - base + 1);
}

set(a)
var a[];
{ int i;
  for(i = LIFE; i > 0; a[i--] = EMPTY)
    ;
}

readf(a,c)
var a[];
char *c;
{
  FILE *s1;
  char buf[80];
  int i = 1, d;
  float aux;

  if((s1 = fopen(c,"r")) == NULL)
    printf("*** ERROR: File %s cannot be open\n",c);
  fscanf(s1,"%s",buf); /* read name of the file */
  printf("Reading file %s\n",buf);
  while(!feof(s1))
  { fscanf(s1,"%d %f", &d, &aux);
    a[i++] = aux;
  }
  fclose(s1);
}

writef(c,a,sim)
char *c;
var a[];
var sim[];
{
  FILE *s;
  int n, i;

  printf("\nWriting file %s\n",c);
  s = fopen(c,"a");
  fprintf(s,"%s (Year Actual Simulated)\n", c);
  i = 2;
  n = year - base;
  while(n--)
  { fprintf(s,"%d %f %f\n",base+i-1,a[i],sim[i]);

```

```
    i++;  
  }  
  fclose(s);  
}
```

```
test(d)  
var d;  
{ return (d != EMPTY) ? 1 : 0; }
```

CHAPTER 9

CONCLUSIONS

A. THE THEORETICAL BACKGROUND

This thesis is about the Brazilian development in the seventies, which conciliated high growth and permanent inflation. The thesis has two parts: (a) a theoretical approach which emphasizes the relation between microeconomic behaviour and macroeconomic performance; (b) a recursive model which allowed us to describe how the Brazilian economy performed year after year, from 1968 to 1982. The choice of the period of the study was due to its being a complete cycle of development of the economy, from recovery to recession, which conformed to a strategy of growth based on the State leadership and increasing foreign indebtedness.

In the first chapter we started with a discussion of the main interpretations of the Brazilian development in the seventies. We called attention to the fact that all of them are partial in their emphasis, lacking a global and integrated view of how the Brazilian economy, as a capitalist economy, operates. In contrast, the aim of our proposed interpretation is to integrate these partial explanations into an approach in which micro and macro elements are combined to explain the coexistence of intense growth with high inflation. In order to do so, it was necessary to start with the behaviour of the firm, to understand how its decisions are made and how it interacts with other agents.

In chapters 2 and 3 we described the behaviour of the firm, by defining first the environment where it operates. We presented the concept of a monetary production economy, proposed by Keynes, emphasizing the following aspects: production and accumulation processes are performed by firms with a view to earn money profits from the sale of goods and services; the dependence on markets makes the outcome of these processes uncertain; firms enter into forward money contractual commitments to reduce the uncertainties they suffer; money's property of liquidating debts makes it money an asset in addition to being a means of exchange; the possibility of accumulating money instead of reproducible forms of wealth makes it possible for

monetary economies to face effective demand failures.

On the characterization of the firm we would stress the following aspects: capitalist firms produce when they expect money profits to accrue; the firm has a dual characteri^{ti}c: it produces goods and services and in order to produce it accepts obligations for money payments. It is the management of the flow of receipts and payments that set the path of growth of the firm.

Following Keynes we distinguished between short and long term expectations. Short run expectations guide production decisions. In oligopolistic markets, firms set their prices according to their expectations of returns on a standard volume of production, through mark-up pricing. The choice of volume of production depends on the pattern of demand and the degree of competitiveness of the market. Mature markets, with few competitors, allow for firms to set their mark-ups aiming to increase their internal accumulation of funds.

Investment decisions are guided by long term expectations. When investment decisions are made two sorts of choices take place: which assets to buy and how to finance them. Investment in a long lived illiquid fixed asset, for instance, implies the commitment of financial resources for a long period of time. The choice about how to finance an investment defines the financial posture of the firm, in the sense of Minsky. The differences among the postures are related to the degree of vulnerability of the firm to changes in the conditions to honour debt commitments. Once an investment plan in fixed capital is implemented, it cannot be costlessly reversed. Debts, however, have to be honoured anyway. Short term outcomes may then affect the rhythm in which investment is implemented because they affect the possibilities that are left to the firm after it honoured its dated liabilities.

The firm's gross profit - cash flow generated to pay off debt commitments - depends on the demand for its products, but the demand for specific goods and services depends on the aggregate demand. For a closed economy without government, the confirmation of profit expectations depends on the consumption expenditures of capitalists and on the investment expenditures of firms themselves. But consumption

itself largely depends on current profits so investment is left as the ultimate determinant of aggregate demand.

Investment in fixed assets is the most volatile component of aggregate demand and so it is its behaviour which determines the latter's fluctuations. We established these connections between micro and macro variables in chapter 5. Aggregate investment, being autonomous with respect to current income, depends on decisions taken by individual firms based on each one's expectations of future net cash inflows. To this end they issue liabilities on the expectation that these obligations will be paid off from its net receipts. Banks perform a crucial role in making investment possible because the availability of finance depends on them.

In chapter 4 we dealt with inflationary environments, where uncertainty is increased, because relative prices lose their information content, both spatially and intertemporally. Moreover, in an environment of permanent inflation, firms have to adapt to it, by working with indexed contracts. In such circumstances, mark-up pricing works as a mechanism for firms to shift cost pressures to prices.

When inflation rates are high and stable, mark-ups are higher but also stable. When inflation rates are high and unstable, mark-ups become flexible upwards as they include the increase in direct costs that are expected to result from the increase in prices of labour and raw materials.

Two risks are involved in the pricing decision when inflation is high and permanent; the income risk, that is, if the actual demand is less than expected at the chosen prices, and the capital risk that emerges if costs are underestimated and, even if the firm succeeds in selling all its production, its revenues may not be enough to cover its replacement costs.

Indexation and mark-up pricing in a situation of high and unstable rates of inflation do not allow to distinguish between real movements from inflationary movements. The firm's strategic price becomes more difficult to administer and pricing decisions of the firms will carry an upward bias in order to protect the firm's future revenue.

Indexation in this sense does not reduce uncertainty in the economy, as the flow supply prices are not indexed. The internal generation of funds for accumulation and the sustaining of financial position in debt commitments are more uncertain, and debt structures are avoided because of the front loading effect. Permanently high and unstable rates of inflation reduce the degree of confidence in expectations, making them more elastic and the economic system more unstable. Long term commitment of resources is discouraged.

The Brazilian economy in the seventies could sustain high rates of expansion and high inflation because the environment was modified to allow agents to make relevant decisions under such circumstances.

B. EMPIRICAL FINDINGS

Our research pointed out the important role of the State in promoting the development in the Brazilian economy in the seventies. The special role of the State in the post Keynesian theory is connected by Davidson to uncertainty:

If economists recognize that nonergodicity is a prevalent property in many economic situations, then it will be obvious that policies must adapt to changes in circumstances over time, and there can be a role for government in improving the economic performance of markets. This governmental role is to develop, where possible, adaptable economic institutions which attempt to reduce uncertainties by controlling the economic environment so as to limit future time outcomes to those that are closely compatible with full employment and reasonable price stability. (Davidson, 1982-83, p. 197.)

The Brazilian economy in the seventies performed well, reconciling growth and price instability, as long as government supported development strategies. These strategies were eased by the availability of external funds for developing countries, which allowed Brazil to increase its foreign indebtedness. This special feature of the role of the State in promoting economic development, which is discussed mostly in chapter 6, is a consequence of inflation being a permanent phenomenon in Brazil. In our

empirical study we identified three phases of expansion:

The first phase is characterized by accelerated growth and decreasing rates of inflation (1968-73), when plans could be sustained and portfolios moved towards speculative positions. During this phase the policy of foreign indebtedness allowed consumption and investment to grow simultaneously. Also, institutional reforms were introduced - the most significant of them was the creation of indexed money contracts - aiming to conciliate growth and inflation. The degree of confidence in future expectations could be defined as high and the upward cyclical movement takes place.

The next phase, of sustained growth and high rates of inflation (1974-79), follows the first oil shock and international liquidity becomes more difficult. Stop and go policies were applied to fight rising inflation, and although growth rates of real output decelerated compared with the first phase, the State, with the launching of the second National Development Plan (II PND), sustains growth rates around 7%. This phase characterizes a period when strategies of financing investment in fixed assets become more speculative. The private sector is induced to participate in the II PND, through the creation of fiscal and monetary incentives to invest in priority areas. Indexation of contracts became a universal practice to protect economic agents from the erosion of their purchasing power and portfolios became more speculative.

The third phase follows the second oil shock and the sharp increase in international interest rates. Domestic inflation reaches the 3 digit level and in 1981 and 1982 real output decreased. The year of 1980 is a transition from the phases of positive growth and inflation to the recession years in the early eighties. Firms' portfolios become still more speculative, with financial costs increasing substantially.

The choice of our period of study (1968-82) is thus delimited by a complete cycle of economic expansion. After 1982, difficulties in the foreign financial markets reduced substantially the room for manoeuvre of economic policy, which had to satisfy the requirements of international bankers.

Given these periods, we analysed the effort of the State to keep the economy inside

the "corridor". During the seventies, as we saw, inflation tended to accelerate after the external shocks and so, as expected, defensive mechanisms projecting into the future past inflationary pressures contributed to make the economic system more unstable. A consequence of the intensification of inflation was to inhibit time-consuming activities, primarily investment in fixed assets. Increasing instability in relative prices led to a standstill in investment decisions at the beginning of the eighties, with consequences to the aggregate rate of growth of output.

Mark-up pricing as a defensive mechanism to maintain the purchasing power of firm's revenues worked to propagate inflationary waves. In the Brazilian economy another mechanism to reinforce inflationary trends is the indexation of wages, exchange rates and some financial assets. In such an environment an initial inflationary shock tends to be perpetuated as long as the defensive mechanisms are in operation. Although indexation had been introduced aiming to reduce uncertainty in economic decisions, once inflation rates were accelerating its actual effect was to increase uncertainty as to the future. As the State is the only agent to issue indexed assets, when inflation accelerated Public Finance assumed a Ponzi profile.

Based on post Keynesian principles discussed in the theoretical chapters of this thesis, we developed an econometric model aiming to establish the relevant relations that explain the evolution of output and inflation in the seventies. Our model pertains the economy, as it operated inside the corridor, while shocks could be absorbed and growth could be sustained. We explored this model in two forms: one estimating the equations and discussing the meaning of the findings, another through a simulation exercise, where the findings of the regressions were used in a recursive structure to track aggregate output and price. The simulated performance follows closely the actual results. The use of dummy variables helped to illustrate the effect of changes in expectations and political economic guidance on the final results.

In sum, our results, despite the simplicity of the model and the small number of observations, showed that the Eichnerian specifications devised for a developed economy are very robust in describing an economy in upheaval like the Brazilian economy. The model allowed us to give an interpretation of the Brazilian growth path

in the seventies which is integrated with the main aspects of the post Keynesian considerations.

The strategy of growth cum debt could be followed while international liquidity was plentiful and that allowed for growth to continue and the inflationary process to be under control, although at high rates. The first oil shock marked the end of the "miracle" and inflation jumped to a higher level, although it was still kept under control. Changes in the composition of industrial output started to take place during the second phase of our study (1974-79) as the result of incentives to substitute imports in the capital goods and intermediate industries. The degree of foreign indebtedness increased to make the finance of the Second Development Plan feasible. Notwithstanding, rates of growth of industrial output decelerated compared with the first phase, ^{but} they were still close to the historical trend. The second external shock had a strong negative impact on the foreign accounts, as the burden of servicing the external debt became very heavy. Positive growth could not be sustained any longer. So the role of the external liquidity allied to the special role of the State along the seventies are crucial to explain the Brazilian economic performance in the seventies.

This thesis is offered as an initial effort to model the behaviour of the Brazilian economy along post Keynesian lines. As such, it was not intended to be the final word on the subject, but, on the contrary, an invitation to others to proceed with this endeavour, specially by investigating more deeply some important questions among which we would like to single out:

- the special role of the State in Brazil, ^{this} demands a special study, where its entrepreneurial and traditional functions can be distinguished, as well as having its mechanisms of decision and financing identified;
- the dynamics of price formation, wages, interest rate and the exchange rate in an economy under permanent inflation;
- a detailed study about the relation between monetary variables and Public Finance

in this kind of economy; and finally,

- the treatment of expectations, in order to make its role more explicit and to advance the formulation of a more complex theory of investment.

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