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A Structuralist Analysis of Inflation and Stabilization

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Abstract

The objective of the paper is to integrate three factors affecting the determination of the rate of inflation and the level of activity in an economy with a chronic inflationary process: inertial factors, distributive conflict and the level of aggregate demand. We develop a model in which full indexation and conflict could co-exist in equilibrium. This result modifies the conventional (inertialist) notion according to which the presence of distributive conflict is consistent with an inflationary equilibrium situation only if there is imperfect indexation or wages and/or prices.

Resumo

O objetivo deste artigo é integrar três fatores que afetam a taxa de inflação e o nível de atividade em uma economia com um processo inflacionário crônico: fatores inerciais, conflito distributivo e o nível de demanda agregada. Desenvolvemos um modelo em que plena indexação e conflito podem coexistir em equilíbrio. Este resultado modifica a noção convencional (inercialista) de que a presença de conflito distributivo é consistente com uma situação de equilíbrio inflacionário apenas se há indexação incompleta de salários e/ou preços.

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A Structuralist Analysis of Inflation and Stabilization [1]

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1. Introduction

The objective of this chapter is to integrate three factors affecting the determination of the rate of inflation and the level of activity in an economy with a chronic inflationary process: inertial factors, distributive conflict and the level of aggregate demand. We develop a model in which full indexation of wages and prices and conflict over the distribution of income between wages and profits could co-exist even in equilibrium positions.\[2] This conclusion modifies the conventional notion according to which the presence of persistent distributive conflict is consistent with an inflationary equilibrium situation only if there is imperfect indexation of wages and prices.

In order to develop this argument, the chapter is organized as follows. In section 2 we establish the conditions of inflationary and distributive equilibrium. Section 3 is devoted to the discussion of demand equilibrium. In section 4 we present the determination of macroeconomic equilibrium, that is, the simultaneous determination of the rate of inflation, the degree of capacity utilization and the distribution of income. In section 5 the short run dynamics of the model is examined, and compared with the dynamics of the conventional structuralist (Kaleckian) model. Section 6 studies the workings of demand management and incomes policies. In section 7 we illustrate the model with the Brazilian experience between 1977 and 1985. Section 8 concludes the paper with a discussion of stabilization plans in regimes of high and unstable inflation. An appendix examines the stability conditions of the model.

[2] Equilibrium positions are characterized by a stable rate of inflation, degree of utilization and distribution of income between wages and profits.

2. Distributive and Inflationary Equilibrium

In this chapter we take Keynes's view that workers can only negotiate over money wages. The real wage and the share of wages in income depend on the agents' decisions at the aggregate level to allocate their wealth and spend, and the pricing policy of firms. Hence, we develop a model in which unions and firms negotiate the money wage, firms determine the price level given their expectation of the level of demand for their products, and consumers and investors decide on the level of demand. The distribution of income (the share of profits) and the level of activity (the degree of capacity utilization) are endogenously determined.

In this section we develop the notions of inflationary and distributive equilibrium. When the economy is in a situation of equilibrium, both the rate of inflation and the distribution of income between wages and profits remain at stationary levels. We start by studying the formation of money wages, then the formation of prices, and finally the distribution of income.

The rate of change of money wages (w) depends on the past rate of inflation, the degree of mobilization of labour and the expected capacity of firms to mark-up costs. Formally, the wage equation proposed here is as follows:

1. $$w = v(p_{t-1}) + g[h(\ldots);\ f(\ldots)]$$

where v is the indexation factor, p_{t-1} is the rate of inflation in the previous period, h is the (expected) capacity of firms to mark-up costs, and f is the degree of labour mobilization. Funcional g expresses the 'net bargaining power of capitalists and workers' which ultimately determines the size of the deviation of the actual change in money wages in relation to the indexation factor.

In economies where the rate of inflation is chronically high, the rate of wage adjustment is usually anchored by an official rate of indexation set by the government which may be greater or lower than the

rate of inflation in the previous period, that is, in equation 1, $v(p_{t-1}) > p_{t-1}$. According to this formulation, the net bargaining power function (g) measures the effectiveness of the wage policy pursued by the government. When $v(p_{t-1}) = p_{t-1}$, we say that there is complete or full indexation. There are cases in which the government, in order to reduce the rate of inflation, may set the indexation factor smaller than inflation in the previous period. However, the actual movement of money wages depends on the capacity of unions to resist the reduction in wages. [3]

The second factor affecting the rate of change of money wages is the degree of labour mobilization, function f(...) in equation 1. This function depends on the rate of unemployment, the degree of dissatisfaction of workers with the current average real wage, and a set of institutional and political factors. The latter are influenced by the stage of organization of the labour movement, the degree of political repression, and the structure of collective bargaining.

3 Ros, in chapter 2, shows that as inflation accelerates, the adjustment period tends to become shorter which, in turn, puts pressure on the rate of inflation. The endogenous shortening of adjustment periods is an important force in the acceleration of inflation. However, we shall not stress this aspect of the problem.

The greater the rate of open unemployment, the greater the cost of job loss \[4], and the harder it becomes for unions to organize and mobilize workers. The smaller the degree of mobilization, the smaller the power of unions to affect the rate of change of money wages. \[5] In the model, instead of the rate of unemployment, we shall use the degree of capacity utilization to represent the effect of the level of activity on the degree of mobilization. \[6]

A second factor affecting labour mobilization is the degree of dissatisfaction with the current average real wage. The degree of dissatisfaction -- a measure of distributive conflict -- is the difference between the target real wage and the current average wage. Alternatively, the degree of dissatisfaction can be measured by the difference between the actual share of profits and the share of profits which corresponds to the target wage.\[7] The greater the difference between the two, the greater the dissatisfaction and the degree of distributive conflict.

The definition of target wage or target distributive share is rather polemical. According to the 'inertialists', the target wage should

[4] See Schor (1984) and Bowles & Boyer (1988).

[5] The extent to which the rate of open unemployment is a good measure of unions' capacity to mobilize workers depends on the degree of segmentation in the labour market. In the case of a low degree of segmentation, unemployed workers in the formal sector can replace employed workers in the informal sector. Hence the rate of employment (rather than unemployment) in the formal sector becomes the right variable to look at in this case. If, however, the market is highly segmented, workers from one segment cannot or do not move from one segment to the other, and therefore the rate of open unemployment becomes a reasonable measure of the potential influence of the power of unions to affect the money wage.

[6] The rate of capacity utilization is an imperfect substitute for the rateof unemployment. There are sectoral differences between the available supply of labour and capital. There are also differences between the aggregate supply of capital and labour. In the text we ignore these differences, and assume that there is a stable relation between the rate of unemployment and the degree of utilization, and that the economy will simultaneously achieve a situation of full employment and full utilization of capacity. In short, we assume that $z = 1 - u$ where z is the degree of utilization of capacity and u the rate of unemployment.

[7] If the productivity of labour is fixed (as we shall assume), there is a linear and inverse relationship between the real wage and the share of profits in income: $\pi = (1 - \omega b)$ where π is the share of profits, ω the real wage and b the labour:output relation.

be equal to a weighted average of a series of past real wages in which recent wages have a greater weight. In the limit, if the rate of inflation is stable, the target wage will be equal to the current average wage, and inflation will be totally inertial.\[8] From our perspective, the target wage will be different in different economies and, in the same economy, in different periods of time. We assume that the target wage is fixed in the short run but can change in the long run. In this sense, it is a structural variable, affected by economic and historical factors.\[9] In the present discussion, we shall treat the target wage as part of the data.

Institutional and political factors affect the degree of labour mobilization. The organization of the labour movement, the legitimacy of union leaders, the political environment, the structure of capital-labour relation and collective bargaining are all important factors affecting mobilization. In democratic capitalist economies, unemployment is usually the main weapon used to reduce union activism. In Latin American countries, however, authoritarian regimes use political repression as a direct instrument to reduce mobilization. These factors can not be formalized with the same precision as the others, but they should not be neglected.

To sum up the discussion of the determinants of labour mobilization, we may write the function f as follows:

$$2. \qquad f(\ldots) = f(z - \bar{\bar{z}},\ \bar{\pi} - \pi,\ Q)$$

or in linear form:

$$2'. \qquad f(\ldots) = \beta'(z - \bar{\bar{z}}) + \gamma'(\pi - \bar{\pi})$$

where z is the actual degree of capacity utilization, $\bar{\bar{z}}$ is associated with

8 See chapter 2 for a detailed discussion of this point.

9 The target wage in this model plays the same role of the subsistence wage in classical political economy. Changes in the target wage may result from discrete changes in the political arena (the rise of a socialist party to power) or simply increases in productivity.

the 'structural rate of unemployment'[10], π is the actual share of profits in income, and $\pi - \bar{\pi}$ is the degree of dissatisfaction or distributive gap. Q is a vector of political and institutional factors. Both $z - \bar{\bar{z}}$ and $\pi - \bar{\pi}$ affect f positively: when the degree of utilization is too high compared to the structural degree, or the profit share is too high compared with the target share, the capacity of unions to mobilize workers increases. Hence the parameters β' and γ' are positive.

We now turn to the capacity of firms to mark-up costs. It is common in the literature on inflation to assume that firms mark-up changes over direct costs in such way that the average mark-up is virtually constant over time. Here, the actual movement of the mark-up and the share of profits in income will be treated as endogenous variables.

We assume that firms will tend to increase their mark-up over costs as the economy approaches a situation of planned utilization of capacity. When the economy is close to planned capacity, firms do not fear loosing their market shares if they increase prices because other firms in the market will probably increase their prices as well. The extent to which this is true depends very much on the competitive structure of each individual industry.[11] In general, we shall assume that factor h is positivelly affected by the difference between the actual and the planned (or desired) degreee of capacity utilization ($\bar{z}$):

3. $$h(...) = h(z - \bar{z})$$

or, in linear form,

3'. $$h(...) = 1 + \xi\ (z - \bar{z})$$

[10] The structural rate of unemployment is associated with all forms of voluntary unemployment (such as serch) as well as discrepancies between the size and composition of capital and the size and abilities of the available labour force.

[11] The capacity of firms to mark-up costs also depends on structural parameters such as the degree of openness of the economy.

where ξ is a positive parameter. Hence, when the economy is operating at planned capacity ($z = \bar{z}$), firms will fully mark-up costs, that is, $h = 1$.

The greater the capacity of firms to mark-up costs (or the expected capacity), the greater the money wage adjustment firms will be prepared to accept. In a period of high degree of capacity utilization, the capacity to mark-up will be greater than in a period in which the goods market is sluggish, and firms will be more lenient in their negotiation with the unions. We can now go back to the wage equation (equation 1) and write it in its complete form:

1'. $$w - v(p_{t-1}) = g[h(z - \bar{z});\ f(z - \bar{\bar{z}},\ \pi - \bar{\pi},\ Q)]$$

and in linear form:[12]

4. $$w - v(p_{t-1}) = \alpha' + \alpha(z - \bar{z}) + \beta(z - \bar{\bar{z}}) + \gamma(\pi - \bar{\pi})$$

Turning now to the inflation equation, we assume that in fixing the rate of change of their prices, firms fully mark-up the indexation factor (v). The extent to which the rate of inflation is greater or lower than the indexation factor depends on the capacity of firms to mark-up the excess of changes in money wages over and above the indexation factor, and the situation (of excess demand or excess supply) in the goods market. The latter is given by the difference at each point in time between the desired value of investment and the actual volume of saving (both as a proportion of capital) represented respectively by k^i and k^e. Hence in a situation of excess demand, investment exceeds saving, or $k^i - k^e > 0$.

The inflation equation has three components: the indexation factor, the capacity to mark-up, and the excess demand situation in the goods market. Formally, the equation can be written as follows:

12 Parameter α represents the linearization of the functional g(h(...)), and parameters β and γ the linearization of g(f(...)).

$$p - v(p_{t-1}) = h(...)g(...) + j(k^i - k^e)$$

and in linear form:

5. $$p - v(p_{t-1}) =$$

$$= [1 + \xi(z - \bar{z})][\alpha' + \alpha(z-\bar{z}) + \beta(z - \bar{\bar{z}}) + \gamma(\pi - \bar{\pi})] + \mu(k^i - k^e)$$

A few observations on the inflation equation. In the first place, it should be clear that in principle $\bar{z}$ and $\bar{\bar{z}}$ are different. The structural rate of unemployment corresponds to a degree of capacity utilization which has little to do with the desired level of utilization. The labour market may achieve a situation of virtual full employment at 90% of capacity utilization ($\bar{\bar{z}} = .9$), but firms may take as a bench mark a different degree of capacity utilization to change their profit margins, say 80% ($\bar{z} = .8$). This only implies that the level of activity affects the labour and goods markets, and the behaviour of unions and firms, differently.

A second point refers to the difference between the effect of capacity utilization on the capacity to mark-up (h) and the direct effect of excess demand on inflation. The actual mark-up may increase if, even when the economy is operating at very low levels of utilization, firms increase their prices as a response to a situation of excess demand in the goods market. A sudden increase in aggregate demand independently of the degree of utilization, may have two extreme effects: an adjustment through output (or utilization) only, or an adjustment through prices only.[13] A combination of the two effects is also a possibility -- indeed, the possibility considered in the present model.

The response of firms to excess demand (in situations of low capacity utilization) varies from economy to economy, and from sector to sector. In the literature, it is common to assume that as long as there is idle capacity, firms will respond through changes in utilization only. In a typical structuralist model, it is assumed that the excess demand effect

[13] This is an interesting dichotomy but one which has been taken to extremes in recent structuralist analyses. The neglection of price responses may lead to erroneous policy implications, as we shall argue presently.

over prices (μ) is zero, and the h factor is equal to one until the point in which the economy reaches full utilization of capacity.\[14] In addition, it is assumed that money wages remain constant until the moment in which the economy reaches full employment.\[15] Beyond this point inflation will accelerate because money wages will start to grow and the mark-up will increase due to the increase in h. \[16]

Here we shall distinguish three effects. The effect of changes in the rate of unemployment on money wages. The effect on the capacity to mark-up of changes on the relation between the actual and the planned degrees of utilization of capacity. And the direct effect of excess demand on inflation independently of the degree of utilization.\[17] In economies with very high rates of inflation, due to the noise introduced by the dispersion of relative prices, demand curves tend to become rather inelastic, and firms can increase prices without losing customers. In this specific case, it would be unreasonable not to separate the direct effect of excess demand on inflation from the effect of capacity utilization on the mark-up and the effect of the rate of unemployment on money wages. We shall explore the difference between the three effects when we come to the discussion of short run dynamics.

14 The great majority of structuralist models of inflation makes these assumptions. Indeed, they constitute a basic ingredient of the models used in the formulation of the heterodox shocks. An exception to this rule is Taylor (1985) who makes changes in money wages a function of excess demand in the labour market and changes in prices a function of both changes in costs (money wages) and excess demand in the goods market.

15 Implicit in these models is the assumption that $\bar{z} = \bar{\bar{z}}$, that is that the degree of utilization corresponding to the structural rate of unemployment is the same as the one corresponding to the firms' planned degree.

16 See Rowthorn (1981) for a dichotomy of models in which the distinguishing element is the size of h depending on the degree of capacity utilization. For $z < \bar{z}$, all the adjustment goes through changes in utilization, $\bar{h}$ remains fixed and equal to 1, and prices remain constant. When z reaches $\bar{z}$, that is capacity becomes 'fully' utilized, only the mark-up and therefore prices adjust to changes in demand. In Marglin (1984), $z = \bar{z}$, ex-hipothesis, and the combination of excess demand and distributive conflict gives rise to an inflationary process. Dutt's (1987) inflation model assumes that both workers and capitalists have a target distribution of income, and that the level of activity does not affect either money wages or the profit margin. In a sense, it is a pure model of distributive conflict.

17 We are grateful to Stephen Marglin for pointing out the importance of this distinction.

A final point refers to the different responses of oligopolist and competitive sectors to excess demand situations. In oligopolist sectors, the interdependence between the major firms in the industry leads to a response to changes in demand and costs in which the ratio of price to direct costs varies very little over the cycle. The response is well described in structuralist or Kaleckian models in which the excess demand parameter is zero ($\mu = 0$) and the h factor oscillates around 1, that is, is relatively independent of the degre of capacity utilization. This only means that actual profit margins and the share of profits in these sectors are relatively stable over the cycle.

In competitive sectors, interdependence is not such an important factor, and firms will tend to increase their prices if there is excess demand (especially when the level of inventories is low) and to alter the mark-ups as a response to changes in the degree of capacity utilization. In these sectors, both the factor h and the parameter μ oscillate over the cycle, and thus does the actual mark-up and the profit share. In short, both prices (or inflation rates) and distributive variables are more volatile in competitive sectors than in oligopolistic sectors. Given the relative levels of demand and supply, firms in the oligopolist sector can defend themselves against inflationary shocks better than those in the competitive sectors. However, in a process of expansion of demand the relative situation of competitive sectors tends to become better. [18]

The paths of the actual mark-up (τ) and the share of profits in income (π) are given by the following expression: [19]

6. $$\dot{\pi} = (1 - \pi)\,\dot{\tau} = (1 - \pi)(\dot{p} - \dot{w}) =$$

$$\dot{\pi} = (1 - \pi)\{\xi(z - \bar{z})[\alpha' + \alpha(z - \bar{z}) + \beta(z - \bar{\bar{z}}) + \gamma(\pi - \bar{\pi})] + \mu(k^{i} - k^{s})\}$$

[18] In chapter 5 we develop a simple two sector model to examine the path of relative incomes in the labour market and relative prices in the goods market in Brazil between 1983 and 1986.

[19] A dot on the top of a variable indicates its absolute rate of change over time, that is, for variable x, dx/dt where t stands for time.

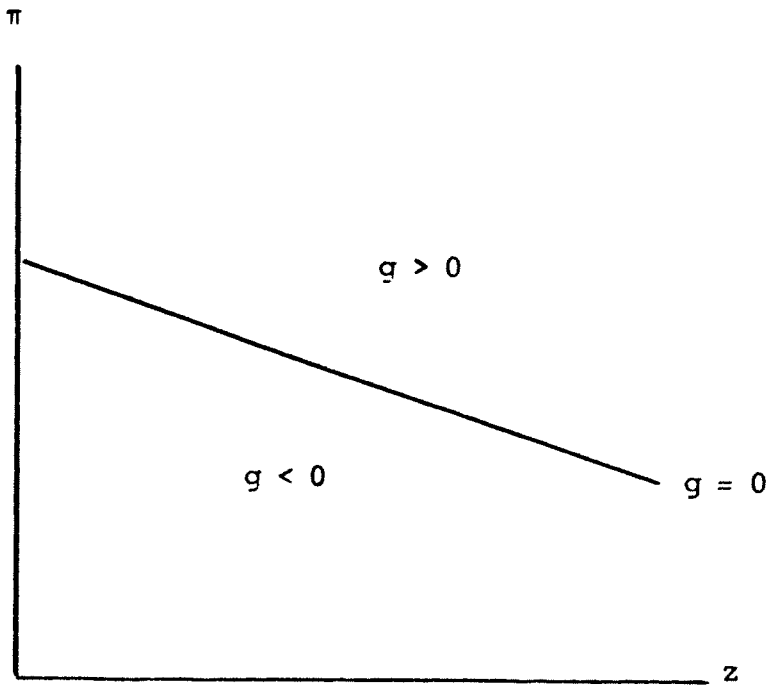
We define inflationary equilibrium as a situation in which the rate of inflation is stable. A condition for inflationary equilibrium in the present model is that the net bargaining power between workers and capitalists is zero ($g = 0$). A second condition refers to the indexation factor. If there is full indexation of wages and prices, that is, $v(p_t) = p_{t-1}$, equilibrium will correspond to a situation of 'pure inertial inflation' in which obviously $p_t = p_{t-1}$. Alternatively, if $v = 0$ -- the system has no indexation mechanisms -- equilibrium will correspond to the situation in which the <u>level</u> of prices is stable. If the indexation factor is smaller than one and greater than zero, the system will gradually converge to the point of price stability. If it is greater than one, inflation will accelerate without limit.

When the net bargaining factor is zero, the following relation will express the inflationary equilibrium condition on the $\langle z,\pi \rangle$ space:

$$7. \qquad g=0 \implies \pi = \frac{\alpha \bar{z} + \beta \bar{\bar{z}} + \gamma \bar{\pi} - \alpha'}{\gamma} - \frac{(\alpha+\beta)}{\gamma} z$$

which implies that the slope of the equilibrium curve is given by the expression:

$$8. \qquad \left. \frac{d\pi}{dz} \right|_{g=0} = - \frac{(\alpha + \beta)}{\gamma}$$



Inflationary Equilibrium
FIGURE 1

Distributive equilibrium is a situation in which the distributive variables assume a stable value, that is, in which $\dot{\pi} = \dot{\tau} = 0$. The locus of points in the $\langle z,\pi \rangle$ space for which the equilibrium condition is satisfied is:

$$9. \qquad \dot{\pi} = 0 \Longrightarrow \left.\frac{d\pi}{dz}\right|_{\dot{\pi}=0} = -\frac{\xi g + \xi (z - \bar{z})(\alpha + \beta) + \mu(k_z^i - k_z^i)}{\xi (z - \bar{z}) + \mu(k_\pi^i - k_\pi^e)}$$

In figure 1 we depict the inflationary equilibrium curve, represented by $g=0$. Notice that above the curve, for a given profit share, the degree of utilization is greater than the one corresponding to $g = 0$, implying a positive net bargaining factor. Thus, above the curve, $g > 0$, and inflation is accelerating.

The path of the share of profits and the slope of the $\dot{\pi} = 0$ curve depend on the value of the net bargaining power (g), the degree of utilization (z) and the partial derivatives of k^{i} and k^{s} with respect to z and π. We shall return to the notion of distributive equilibrium after we discuss the conditions for aggregate demand equilibrium.

3. Aggregate Demand Equilibrium

The equilibrium between income and expenditure, or aggregate demand equilibrium, corresponds to a situation in which saving equals investment. Assuming that the propensity to save out of wages is zero, and out of profits is s, saving as a proportion of capital can be written as follows:

10. $$k^s = \frac{S}{K} = \frac{S}{P}\,\frac{P}{X}\,\frac{X}{K} = s\,\pi\,z$$

where K is the stock of capital, P is the volume of profits and X is the level of output. Thus, saving as a proportion of capital depends on the propensity to save out of profits, the share of profits in output and the degree of capacity utilization. [20]

As for the investment function, we assume that firms will consider two factors in their decision to invest. First, they will invest more the greater the expected profit per unit of output or the expected profit margin; and given the labour:output ratio, the greater the share of profits in output. But not only the profitability per unit of output matters for the decision to invest. For a given profit margin, firms will invest more, the greater the expected degree of capacity utilization. It is the combination of these two factors which determines the rate of profit -- the ultimate determinant of investment. [21] Hence the investment:capital ratio can be written as follows:

11. $$k^i = \frac{I}{K} = k^i\,(z,\pi) \qquad k^i_z > 0 \text{ and } k^i_\pi > 0$$

[20] If we recall that, by definition, the rate of profit (r) is given by $r=\pi z$, it becomes clear that equation 10 is the Cambridge Equation.

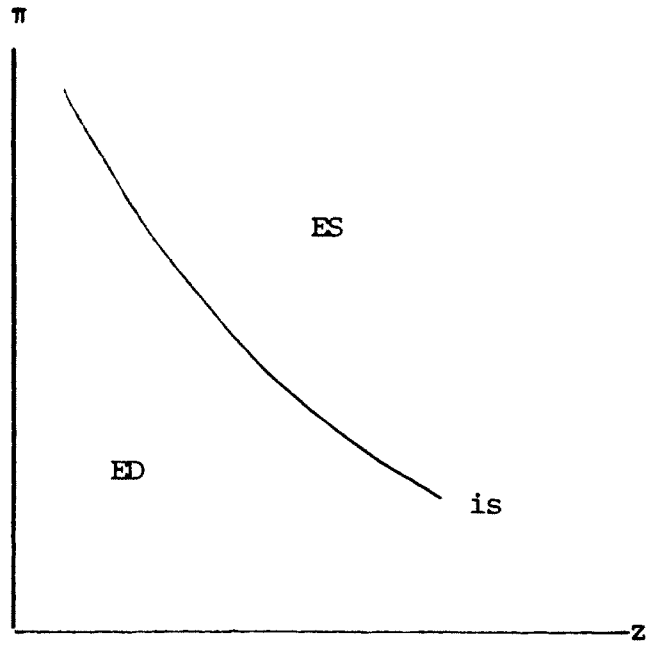
[21] For a discussion of alternative formulations of the investment function, see Steindl (1952), Rowthorn (1981), Taylor (1983, 1988), Dutt (1985, 1987), Marglin (1984), Marglin & Bhaduri (1986, 1988) and Amadeo (1986, 1987).

Demand equilibrium requires the equalization of the k^s and k^i ratios. A family of demand equilibrium curves can be depicted on the $\langle z,\pi \rangle$ space. The position of the curves will depend on the propensity to save out of profits and the exogenous components of aggregate demand such as the government deficit. The slope of the equilibrium demand curve -- referred to in what follows the i=s or is curve -- is given by:

12. $$\left.\frac{d\pi}{dz}\right|_{is} = - \frac{k^i_z - s\pi}{k^i_\pi - sz}$$

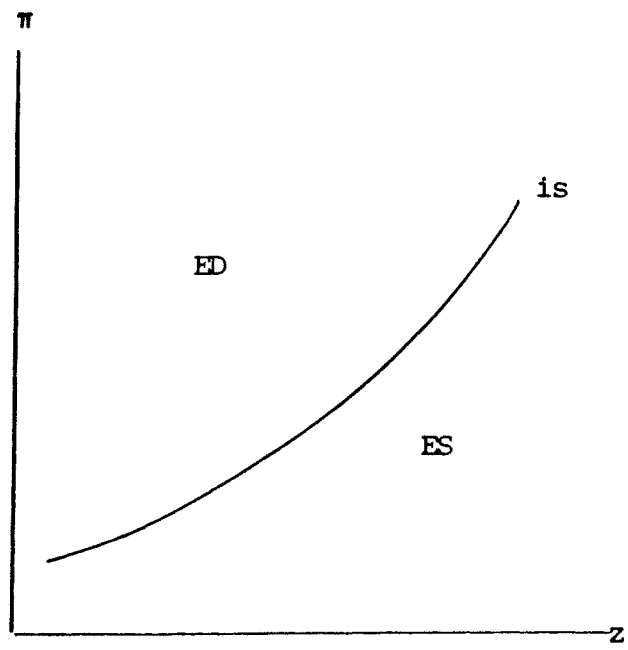
In principle, the slope of this curve can be positive or negative. The conventional stability condition according to which saving is more sensitive than investment to changes in the level of activity or the utilization of capacity, \[22] implies that $s\pi > k^i_s$, that is a positive numerator. However, saving can be more or less sensitive than investment to changes in the share of profits. If investment responds strongly to a change in the share of profits, the denominator in equation 11 may be positive in which case the slope of the demand curve will be positive. An increase in the profit share will be associated with an increase in the degree of capacity utilization. Marglin & Bhaduri refer to this case as the 'exhilirationist case'. If the effect of a change in the distribution of income over consumption is stronger than the effect over investment, the is curve will have a negative slope. This is referred to as the 'stagnationist case'. Figures 2a and 2b depicts the two alternatives.

22 Marglin & Bhaduri (1988) refer to this condition as the Keynesian condition.



Stagnationist Case

FIGURE 2A



Exhilirationist Case

FIGURE 2B

Aggregate Demand Equilibrium

In the stagnationist case, points below the equilibrium curve are associated with situations in which the share of profits is smaller than the equilibrium share, and therefore situations of excess demand. Points above the curve are associated with situations of excess supply. In the exhilirationist case, points above the curve correspond to situations in which the share of profits is too high compared with the equilibrium position, and therefore situations of excess demand. In what follows we shall concentrate on the stagnationist case. [23]

In order to have a dynamic equation for the degree of capacity

23 According to Taylor (1988, p. 8), "the stylized facts suggest that developing economies adjust to changes in the real wage in stagnationist fashion when the level of output is free to vary."

utilization, we must consider the following relationship between capacity utilization, the level of output and the stock of capital:

$$X = z\,K$$

which implies a relation between their proportional rates of change:

$$\frac{\dot{z}}{z} = \frac{\dot{X}}{X} - \frac{\dot{K}}{K}$$

Since we shall focus the analysis on the short-run, we can safely ignore changes in the stock of capital and assume $\dot{K} = 0$. Following Marglin & Bhaduri (1986), we can postulate that changes in output (and given our assumption, capacity utilization) are proportional to the difference between the desired investment and saving ratios:

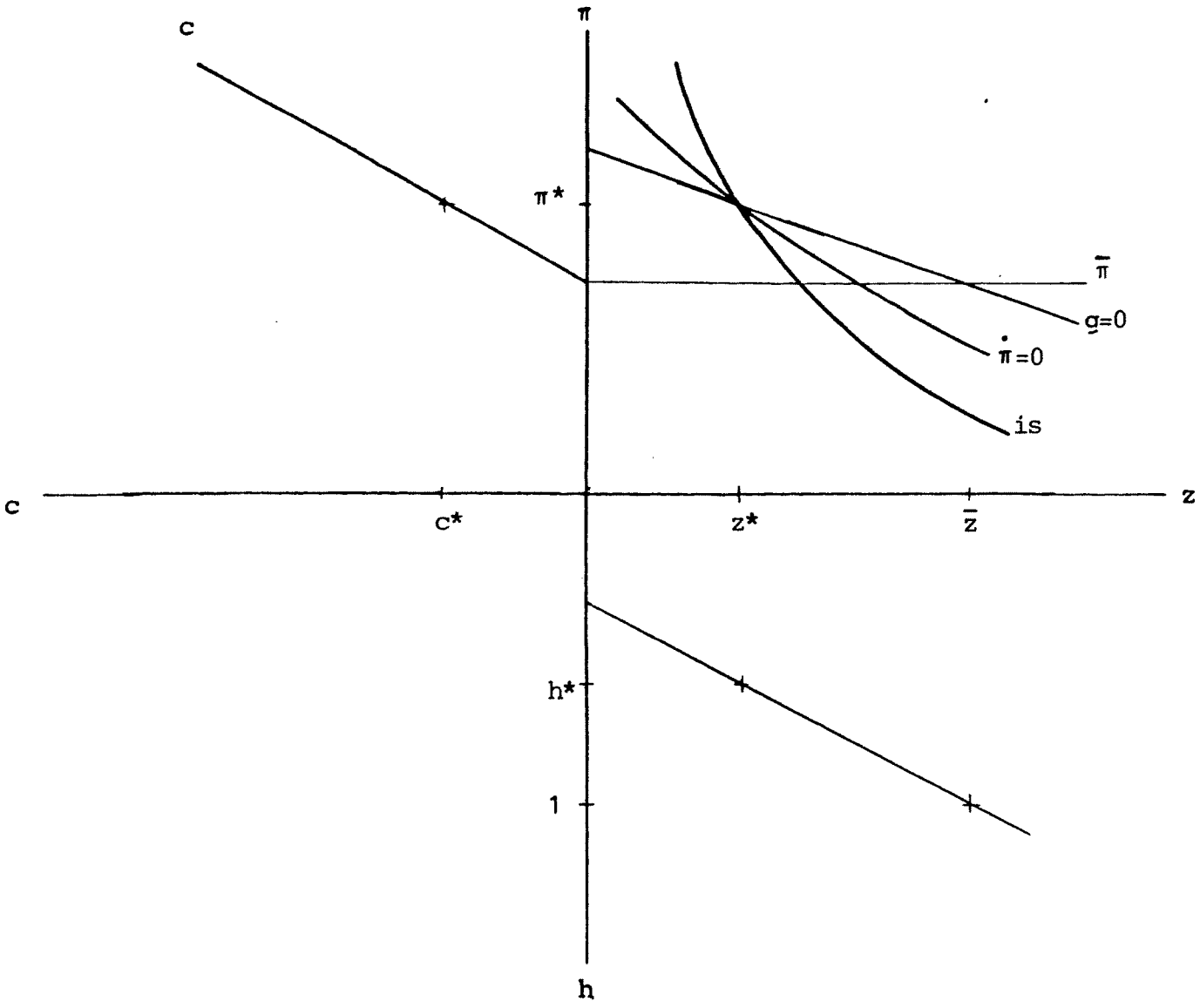
12. $$\dot{z} = \theta\,[k^{i}(\pi, z) - s\pi z]\,z \qquad \theta > 0$$

This equation implies that capacity utilization will be in a position of rest only when the system is on the is curve, that is, when the system is in a situation of demand equilibrium.

4. Macroeconomic Equilibrium

Macroeconomic equilibrium is defined as the situation in which the goods market is in equilibrium (i=s) and the condition for both inflationary and distributive equilibrium hold. Given the datum of the system (propensity to save, animal spirits, government deficit and determinants of the shape of functions f and h), the equilibrium levels of the capacity of firms to mark-up costs (h^*), the degree of labour mobilization (f^*), the share of profits (π^*), and the degree of capacity utilization (z^*) are simultaneously determined. When the system deviates from the equilibrium, the share of profits and the degree of capacity utilization adjust simultaneously.\[24] Figure 3 depicts the equilibrium in the stagnationist case.

24 In general, money wages, prices and capacity utilization adjust to situations of disequilibrium. In the Kaleckian case, the share of profits is given ($h = 1$ and $\mu = 0$), and only capacity utilization adjusts.



Macroeconomic Equilibrium

FIGURE 3

In equilibrium, the rate of inflation as well as the share of profits will be constant. If there is full indexation of wages and prices, the system will be in a situation of pure inertial inflationary equilibrium. Note however that this equilibrium does not imply the absence of conflict. Indeed, the equilibrium share of profits may be greater than

the target share implying the existence of dissatisfaction on the part of workers and distributive conflict. In figure 3, the equilibrium share (π^*) is greater than the target share ($\bar{\pi}$). On the second quadrant the c curve corresponds to the level of conflict as measured by $\pi - \bar{\pi}$. The greater the equilibrium share, the greater the degree of conflict. However, if the system is in equilibrium, the conflict is only latent and does not manifest itself through the acceleration of inflation. That is, at the equilibrium degree of utilization (and corresponding rate of unemployment) unions are unable to translate workers' dissatisfaction with the distribution of income into changes of money wages in relation to the indexation factor.

Also, it should be noted that the equilibrium degree of capacity utilization may be either greater or smaller than the degree which makes the capacity to mark-up (h) equal to one. The equilibrium level of h depends on the relation between z* and $\bar{z}$. In figure 3 the fourth quadrant depicts the h line. For values of z smaller than $\bar{z}$, the capacity to mark-up is smaller than 1, and vice-versa.

When there is exccess demand in the goods market (points to the left of the is curve in both the stagnationist and exhilirationist cases), there will be forces pushing the share of profits upwards. If $z < \bar{z}$, (that is, the capacity to mark-up changes in costs is smaller than one), money wages must be growing in relation to the indexation factor to balance the direct effect of excess demand on prices, and make $\dot{\pi} = 0$. In other words, the net bargaining power g must be positive. On the other hand, when there is excess supply, wages must be falling to make $\dot{\pi} = 0$, implying a negative value of g. Hence, for $z < \bar{z}$, the $\dot{\pi} = 0$ curve slopes downwards.[25]

[25] Following the same reasoning, it can be shown that when $z > \bar{z}$, the $\dot{\pi} = 0$ curve slopes upwards.

5. Short Run Dynamics

The short run dynamics of the model being described here depends crucially on the response of money wages to the difference between the actual and the structural rates of unemployment, the response of the capacity to mark-up to differences between the actual and full (or planned) capacity utilization, and the direct response of inflation to excess demand.

In order to highlight the features of the model, we may compare it with a stylized Kaleckian model. In a Kaleckian model, $\bar{z}$ and $\bar{\bar{z}}$ are very large and seldomly achieved. In practice, it is assumed that money wages do not depend on the rate of unemployment and the capacity to mark-up (h) is equal to one independently of the level of activity -- in terms of the model, these assumptions imply: $\alpha = \beta = 0$. Also, the direct effect of excess demand on inflation is neglected which means that $\mu = 0$. [26] Indeed, in Kaleckian-type models, only capacity utilization responds to excess demand. Given these assumptions, the rate of change of wages and prices are given by:[27]

$$w = p = v(p_{t-1}) + \alpha' + \gamma(\pi - \bar{\pi})$$

Note that if there is full indexation, only one level of the share of profits will be consistent with a situation of inflationary and distributive equilibrium, namely,

$$\pi^* = \bar{\pi} - (\alpha'/\gamma)$$

[26] This seems to be an appropriate model for describing the oligopolist sector when the economy is operating with idle capacity and unemployed workers. But clearly not an adequate model to describr an economy with a reasonably large competitive sector and chronic inflation.

[27] Here is the intrepretation of α' in the price equation: it reflects the ability of firms to completely mark-up costs, and as a result, the ability of workers to increase wages by α'. It could be assumed that $\alpha' = 0$, in which case the price equation would be given by:

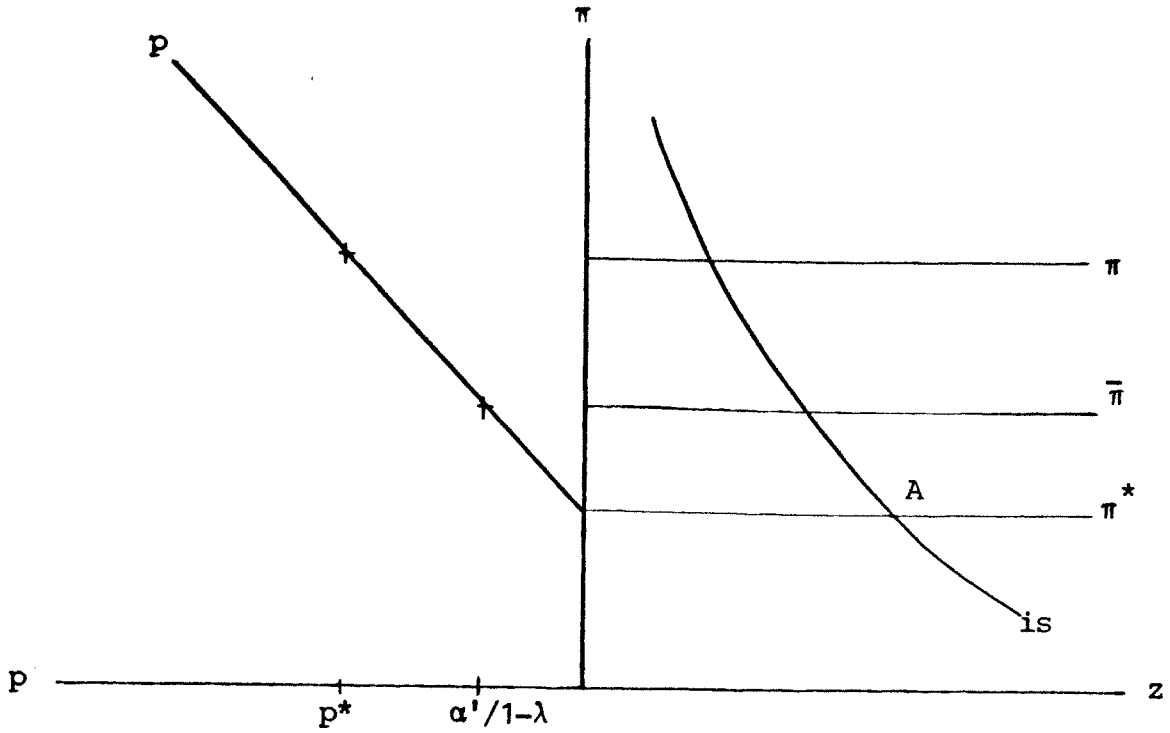
$$p = \gamma\ (\pi - \bar{\pi}),$$

and $p = 0$ when $\pi = \bar{\pi}$.

For any share of profits greater than π^*, inflation will accelerate without limit. Hence, in a Kaleckian model with full indexation, the existence of conflict is inconsistent with a stable rate of inflation. Only if indexation is incomplete, say $v(p_{t-1}) = \lambda\ p_{t-1}$, with $\lambda < 1$, would the system converge to a situation of stable inflation cum conflict. In such case, if capitalists were able to impose a profit share greater than π^*, say π', the equilibrium rate of inflation would be given by:

$$p = \frac{\alpha + \gamma(\pi' - \bar{\pi})}{1 - \lambda}$$

Note that the greater the indexation factor (λ), the greater the rate of inflation. In the limit, when $\lambda = 1$, the rate of inflation will tend to explode if $\pi > \bar{\pi} - (\alpha'/\gamma)$. Hence, in this model, full indexation and conflict cannot co-exist in equilibrium.



The Kaleckian Model

FIGURE 4

In figure 4, we depict the Kaleckian case. The level of prices

will be stabel if π^*; that is, the share of profits should be smaller than the target share to compensate for the effect of α' on inflation. This rate will be greater the greater the indexation factor. On the figure (second quadrant), when $\pi = \pi' > \pi^*$ and $\lambda_1 < \lambda_2$, the equilibrium rate of inflation corresponding to λ_2 will be greater than the rate corresponding to λ_1.

An intermediate model between the Kaleckian model and the one being developed here would still ignore the response of money wages to changes in the rate of unemployment, and the response of the capacity to mark-up to changes in capacity utilization. It would consider however the direct effect of excess demand in the goods market on the rate of inflation ($\mu > 0$). [28] In this model, not only capacity utilization but also the rate of inflation, and hence the actual mark-up and the distribution of income, would respond to changes in excess demand in the goods market.

Our model adds to the one just mentioned the effect of changes in the level of activity on money wages and the capacity to mark-up of firms. Here, both distributive conflict and the rate of unemployment affect labour mobilization. The actual mark-up, in turn, depends on the relation between the current degree of utilization and the planned degree, and the size of excess demand (or supply) in the goods market.

28 **Formally, the model would be described by the following equations:**

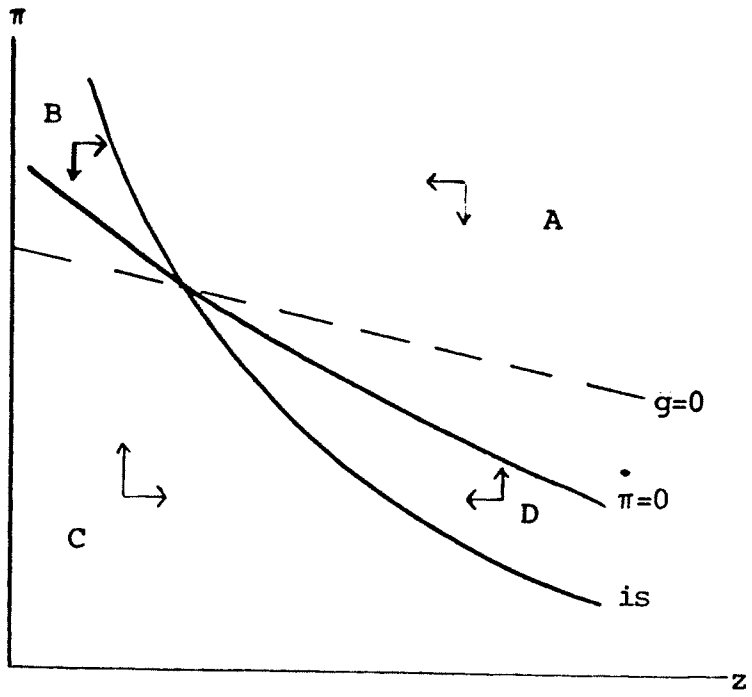
$$w = v + \gamma\ (\pi - \bar{\pi}\ )$$

$$p = v + \gamma(\pi - \bar{\pi}) + \mu[i(\pi\ ,\ z) - s\pi z]$$

$$\dot{\pi} = (i - \pi)\ \{\ \mu\ [i(\pi\ ,\ z) - s\pi z]$$

The $\dot{\pi} = 0$ curve would have its slope given by:

$$\left.\frac{d\pi}{dz}\right|_{\dot{\pi}=0} = -\ \frac{k^i_z - s\pi}{k^i_\pi - sz} = \left.\frac{d\pi}{dz}\right|_{i=e}$$



The Complete Model

FIGURE 5

In figure 5 we depict the stable equilibrium case in the stagnationist model.\[29] In regions A and D, the profit share is too high compared to the share corresponding to the aggregate demand equilibrium curve (i = s), and since the model is stagnationist, there is a tendency for capacity utilization to fall. The opposite is true in regions B and C. In regions A and B, the share of profits is too high compared to the distributive equilibrium curve. Region A correspond to situations of excess supply which tends to reduce the profit margin and profit share.\[30] On the other hand, if the capacity to mark-up is sufficiently small ($z-\bar{z}$ is very negative), the effect of the positive distributive conflict factor implying a positive value for g also leads to a fall in the profit share simply because the increase in money wages are not being completely marked-up.\[31] Similar reasoning aplies to the other regions.

As noted already, in this model, the presence of a conflict gap is not inconsistent with a situation of full indexation and inertial inflationary equilibrium. Contrary to the stylized Kaleckian model, in which money wages are driven by the conflict gap only, here distributive and inflationary equilibrium result from a balance between two forces affecting the bargaining power of unions: the conflict gap and the excess demand situation in the labour market. Hence, assuming complete indexation of wages and prices, depending on the rate of unemployment, <u>any</u> level of the profit share could be consistent with a position of inflationary equilibrium.

The policy implications of this result are quite important. In a Kaleckian model, as long as there is distributive equilibrium, that is, as long as $\pi = \pi^*$, changes in the determinants of aggregate demand will only affect the utilization of capacity. In the complete model presented here, changes in aggregate demand affect the bargaining balance, and hence the

29 We study the stability conditions for both the stagnationist and exhilirationist models in the appendix.

30 This effect comes from the excess demand factor in the price equation.

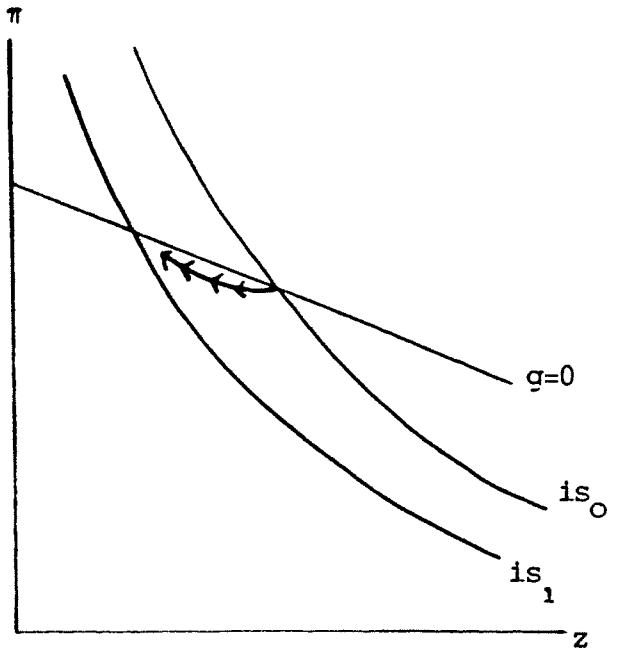
31 If the capacity to mark-up were greater than one, the effect on the actual mark-up would be positive. The net effect over the mark-up would depend on the relative size of the direct excess demand effect on prices and the indirect effect through the increase in wages and the capacity to mark-up.

rate of inflation and the distribution of income. Thus, a policy implication of the Kaleckian model is that demand does not matter, while in the model discussed here, demand may play a pivotal role in stabilization policies.

According to the inertialist approach, if the economy is in a situation of distributive equilibrium and pure inertial inflation, the elimination of the indexation factor and a price freeze will be sufficient to stop inflation, independently of what happens to the level of aggregate demand. According to our model, assuming full indexation the initial situation of equilibrium is only consistent with <u>one</u> level of aggregate demand and capacity utilization. Hence a minor change in demand will be sufficient to throw the economy in a path which is inconsistent with the price freeze. This could be an important factor for understanding the failure of hererodox shocks, specially in the case of Brazil where aggregate demand expanded very much after the plan was launched.

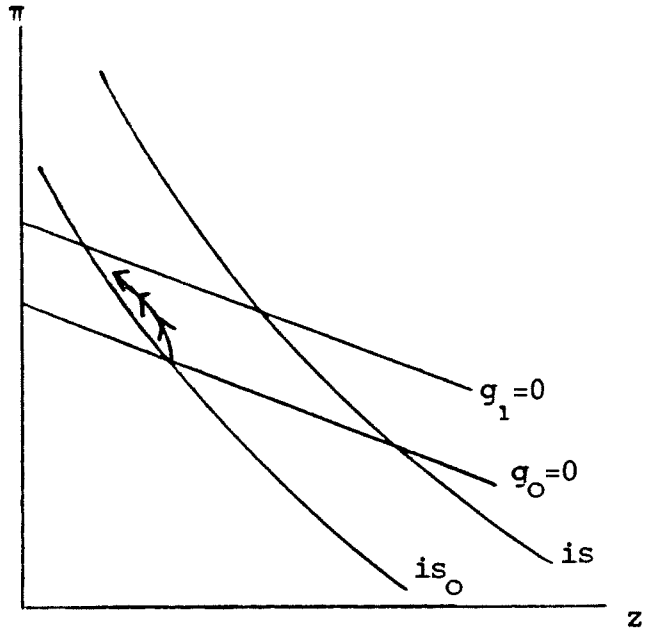
6. Stabilization Policies

Three types of stabilization policies can be studied with the aid of this model: orthodox demand contraction policies, incomes policies, and heterodox shocks. In figure 6.1 we consider the effect of a shift to the left of the i=s curve due to a reduction in the fiscal deficit and/or the availability of credit. A situation of excess supply will be the first effect leading to a reduction in the rate of inflation and the share of profits. In the second phase, capacity utilization will start falling. The reduction in utilization (and employment) will reduce labour mobilization and the capacity of firms to mark-up. However, if $z < \bar{z}$, h will be smaller than one implying that price inflation will fall less than wage inflation, thus leading to an increase in the profit share. Hence demand contraction tends to reduce the rates of inflation, capacity utilization and employment, and increase the profit margin and share.



Restrictive Demand Policy

FIGURE 6.1



Incomes Policy

FIGURE 6.2

An alternative to reduce the rate of inflation is an incomes policy. In an authoritarian political regime one alternative is to increase repression and reduce the capacity to mobilize of labour. This will reduce the value of parameters β and γ, and shift the g = 0 curve to the right. Refer to figure 6.2. If h is smaller than one, wage inflation falls more than price inflation leading to an increase in the share of profits. In a stagnationist model, the increase in the share of profits will lead to a reduction in utilization, and thus in wage and price inflation. The end result will be the same as in the case of a restrictive demand policy.

From the above discussion it becomes clear that it would be rather difficult to implement a negotiated incomes policy in an economy with stagnationist features. Unions would not be content with a plan in which both the real wage and the rate of employment would fall. In an exhilirationist-type economy the real wage and the share of wages in income would still fall but there would be an increase in both capacity utilization and employment. Thus it seems that a successful negotiated incomes policy requires either a strong response of investment to changes in profitability or an active demand policy on the part of the government. In figure 6.2, a shift in the i=s curve to the right could combine a reduction in inflation with an increase in utilization and employment.

A heterodox shock of the type implemented in Brazil and Argentina is based on the assumption that inflation is totally inertial. In terms of this model, this means that the economy is in a situation in which the net bargaining power (function g) between unions and capitalists is zero. If this is actually the case, the simple elimination of the indexation factor (that is, making v = 0) would be sufficient to bring inflation to zero.[32] In this case, there would be no effects on the real variables of the system (the distribution of income and capacity utilization). Hence there would be no need to alter neither the demand variables or the distributive variables of the system. \[33] We shall return to the analysis of heterodox

[32] It should be noted that this conclusion only holds if the shock does not lead to an expansion of aggregate demand. See Amadeo & Camargo (1988a) for an analysis of this point.

[33] In fact, heterodox shocks were followed by price freezes which, in terms of our analysis, implies a shift of the g = 0 curve due to the effect of a reduction in h on the bargaining function.

shocks in the end of this chapter.

7. By Way of Illustration: the Brazilian experience (1979-86)

The stylized story of what happened to the Brazilian economy between 1977 and 1985 serves the purpose of illustrating the model. There are two major forces affecting the economy during this period: the process of political liberalization which gave rise to a new phase in union activism, and the debt crisis which forced the government to follow a 'hard option' path after 1982. The latter conditioned the economic policy of the government, that is, the exchange rate, wage, fiscal and monetary policies.

In broad lines, we can divide the period into three sub-periods. From 1977 to 1979, output grew at an average annual rate of 5%, inflation accelerated from 40 to 50% a year, and the share of wages (of workers in the shop floor) grew around 4.5% in 1977 and 78 and remained practically constant in 1979. The rise in the share of wages (and inflation) can be seen as a result of the first change in the attitude of unions. In terms of our stylized story, in figure 7.1, the economy was moving from point A to point B.

TABLE 1

Industrial Output, Inflation and the Share of Wages in Income
Brazil, 1977-85
(% change, annual)

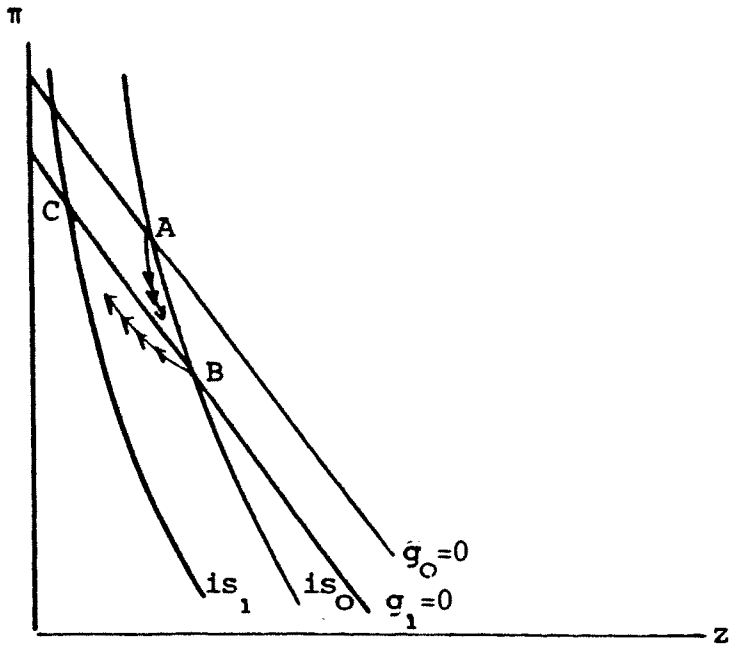
Year	Output level	Price	Share of wages
1977	1.26	39.30	4.13
1978	7.24	36.90	4.80
1979	5.85	51.34	0.55
1980	11.82	101.57	-10.02
1981	-13.17	103.93	10.50
1982	6.19	96.72	- 3.41
1983	- 8.01	161.28	-16.45
1984	7.85	225.82	-16.58
1985	9.97	213.15	8.99

Source: IBGE

The year of 1980 was peculiar: in November of 1979 the Cruzeiro was devaluated in 30% but in the beginning of 1980 the government pre-established the rate of devaluation of the currency for that year in 45%; on the other hand, the wage policy was altered -- wages were adjusted every year up until 1980, and then they started being adjusted to past inflation every six months. \[34] This explains why the share of wages fell in 1980 but recovered in 1981, and the rate of inflation accelerated from the 50% plateau to the 100% plateau.

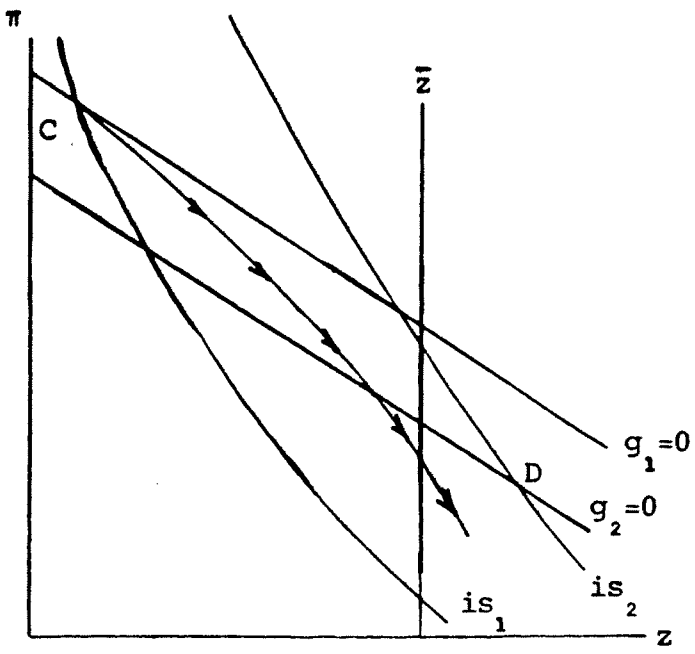
The second period goes from 1981 to 1983. This period was marked by a severe recession due to the adoption of contrationary fiscal and monetary policies. The recession slowed down the rise of labour mobilization, and postponed its major macroeconomic results. The effect of the recession was an unprecedent fall in the level of industrial output and a reduction in the share of wages in income. The rate of inflation remained roughly stable over the period. In 1983 there was a new devaluation of the cruzeiro, but this time the labour movement was quite weak, and the share of wages in income fell considerably (around 16% in 1983 and 1984). The path of the economy between 1981 and 1983 (from B to C) is depicted in figure 7.1.

[34] The change in the period of adjustment can be seen as a response of the government to the demands of the unions. In a sense, the wage policy itself may change as a result of changes in the bargaining power of unions.



Adjustment: 1981-83

FIGURE 7.1



Labour Mobilization and Excess Demand: 1984-1985

FIGURE 7.2

In the third period (1984-5), the growth of exports and a moderate demand policy shifted the i=s curve to the right in figure 7.2. The new political atmosphere created by the first civil government consolidated the rise of the new labour movement. In terms of the model this can be seen as a new displacement of the g = 0 curve to the left, as depicted in figure 7.2. The path taken by the economy depends on the extent to which these two curves shift. In 1984/85, the inflation rate had reached the 220% plateau, output started to recover very quickly, and the share of wages grew arround 9% in 1985 after 4 years of steady decline. The simultaneous movement of curves i = s and g = 0 could take the system to an unstable region as suggested in figure 7.2. Had the system followed the path depicted on the figure, the economy would enter a region of explosive inflation (for z > $\bar{z}$) and falling real wages.

8. Conclusion: stabilization policies in regimes of high inflation

In February 1986, the estimated rate of inflation was around 600%, and the government decided to adopt a heterodox shock, that is, a plan based on the elimination of all types of indexation, and a price freeze. In very simple terms, the problem with stabilization policies in regimes of high (and unstable) inflation is to bring the system back to a 'stable region'. Based on the analysis developed here, it seem clear that this might require a combination of incomes policy and demand management policy. This combination, in turn, may require institutions which make the incomes policy effective and the hardship of demand control acceptable to society.

A heterodox shock is a type of incomes policy. The basic presumption of the inertialist thesis is that the economy is in a situation of distributive and inflationary equilibrium, that is a situation of purely inertial inflation, and neither the $g = 0$ nor the demand equilibrium curves will suffer any significant change after the shock. If these are the actual conditions, inflation is indeed purely neutral in terms of the distribution of income and the level of activity. It can be eliminated with the abolition of the inertial factor and a wage and price control. An important issue in the discussion of heterodox programmes is the initial situation of the economy. If the plan is preceded by a period of high and accelerating inflation, there is a probability that the economy will not be in a position of distributive or inflationary equilibrium. If this is the case, it becomes difficult to control prices and wages. The fact that the economy is not in a position of distributive equilibrium means that the prevailing combination of real wages and degree of utilization of capacity is inconsistent with a freeze.

Like any incomes policy, the sucess of heterodox shocks depends on a certain degree of implicit acquiescence of the major social actors, or the explicit negotiation between them. The greater the degree of acquiescence or negotiation, the greater the credibility of the government implementing the plan. For strategic reasons, heterodox shocks cannot be preceded by negotiations; but its implementation can be immediately

followed by a negotiation like in Israel. \[35]

A negotiation is not always feasible. An adequate institutional structure is required. A structure in which the major social groups are centrally organized and the process of collective bargaining is centralized. A centralized system guarantees that all the major groups are represented in the process of negotiations which, in turn, implies that these groups will fell responsible for the implementation of the programme, and will prevent the operation of free riders. The degree of synchronization of wage adjustments "facilitates the observance by workers of 'fair relativities' which could benefit other groups to the exclusion of the group concerned". \[36] This is true specially in periods of high and unstable inflation in which unions and firms try to defend themselves from the uncertainties of future inflation.

In the absense of these institutions it is very difficult to implement a successful incomes policy. In Brazil these institutions did not exist when the heterodox shock was applied. After 20 years of militar regime, the labour movement was very disorganized and fragmented. There were also political reasons for the absense of negotiations. Entrepreneurs did not really thought of unions as a legitimate actor at the national level. The degree of credibility of the government was quite low which prevented it from calling a negotiation. On the other hand, after years of falling wages, wages were starting to recover, and unions were not very sensitive to an appeal to negotiate.

In Israel the programme was negotiated. After the shock, and some bargaining, a wage agreement was signed between the Histadrut (the strong trade union federation) and employers. This negotiation made unions and entrepreneus responsible for the success of the plan. This obviously reduces the chances of a major group feeling excluded from the programme.

35 However, if the government is legitimate and has a reasonable degree of credibility, a gradual approach based on negotiations rather than a shock may be preferred. In essence, the argument is that through frequent negotiations it is easyer to adjust the plan to unforeseen effects. In Amadeo & Camargo (1988) we develop this argument.

36 Tarantelli , p. 206.

If the social actors are not consulted, every group is a potential free rider.

A third factor affecting the performance of heterodox shocks is the behaviour of demand. In general, a restrictive demand policy could affect the dynamics of the system after the shock, increasing the chances of a soft landing. A certain degree of demand restriction prevents the appearence of inflationary pressures. The importance of demand policies is greater in the case of a non-negotiated programme than in the case of a negotiated programme or in the case in which the distributive equilibrium before the plan was achieved. In the latter two cases the distributive problem is, so to speak, resolved, that is the size of the net bargaining power factor (factor g) is zero or close to zero.

Demand also affects the distribution of income between agents in the competitive and oligopolist sectors due to the different patterns of price and wage formation in these sectors. We have not explored these differences in the present chapter, and will discuss them in detail in chapter 5. It will be shown that these differences add instability to the system, specially in situations of price freeze and excess demand.

Appendix
Stability Conditions

In this appendix we study the stability conditions of the complete model. The two dynamic equations describe, respectively, the path of the share of profits in income and the path of the utilization of capacity:

$$H(\pi,z) = \dot{\pi} = (1-\pi)\{\xi(z-\bar{z})[\alpha' + \alpha(z-\bar{z}) + \beta(z-\bar{\bar{z}}) + \gamma(\pi-\bar{\pi})] + \mu(k^i(\pi,z) - s\pi z)\}$$

$$G(\pi,z) = \dot{z} = \theta[k^i(\pi,z) - s\pi z]z$$

The Jacobian is given by the partial derivatives of H and G with respect to π and z:

$$J = \begin{bmatrix} G_z & G_\pi \\ H_z & H_\pi \end{bmatrix}$$

where, observing that we are analising equilibrium points:

$$G_z = \theta(k^i_z - s\pi)z$$

$$G_\pi = \theta(k^i_\pi - sz)z$$

$$H_z = (1-\pi)[(\alpha+\beta)\xi(z-\bar{z}) + \mu(k^i_z - s\pi)]$$

$$H_\pi = (1-\pi)[\xi\gamma(z-\bar{z}) + \mu(k^i_\pi - sz)]$$

The trace of the Jacobian is given by:

$$T = \theta(k^i_z - s\pi)z + (1-\pi)[\xi\gamma(z-\bar{z}) + \mu(k^i_\pi - sz)]$$

and the determinant by:

$$\Delta = [\gamma(k^i_z - s\pi) - (\alpha+\beta)(k^i_\pi - sz)]\theta z(1-\pi)\xi(z-\bar{z})$$

A summary of the sufficient stability conditions are given on the table belo

Stability Conditions

Model	Condition	Case
Exhilirationist	$z < z'$	stable
	$z' < z < z$	unstable
	$z > \bar{z}$	saddle
Stagnationist	$z < \bar{z}$ and $\left.\frac{d\pi}{dz}\right\|_{i\bullet} < \left.\frac{d\pi}{dz}\right\|_{g=0}$	stable
	$\bar{z} < z < z'$ and $\left.\frac{d\pi}{dz}\right\|_{i\bullet} > \left.\frac{d\pi}{dz}\right\|_{g=0}$	stable
	$z > \bar{z}$ and $\left.\frac{d\pi}{dz}\right\|_{i\bullet} < \left.\frac{d\pi}{dz}\right\|_{g=0}$	saddle
	$z > z'$ and $\left.\frac{d\pi}{dz}\right\|_{i\bullet} > \left.\frac{d\pi}{dz}\right\|_{g=0}$	unstable

where $z' = \bar{z} - \frac{\mu}{\gamma\xi}(k_{\pi}^{i} - sz)$

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