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The Brazilian Stabilization  
Program of 1964: Price guidelines  
cum credit restrictions

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## 1. Introduction

The stabilization program undertaken by the military regime from 1964 to 1967 was the most successful in Brazilian recent history. After an initial period in which the priority was to correct relative prices distortions through the elimination of subsidies to a number of products, inflation was reduced from an annual rate above 100 percent in December of 1964 to below 30 percent one year after. Although part of the success was due to an excellent crop in 1965 – agriculture production increased by 13.8 percent that year the behaviour of industrial prices was also impressive. The annual rate of growth of the Wholesale industrial price went down from above 100 percent in December 1964 to around 30 percent one year after. In terms of unemployment generated by the program, its performance could also be considered acceptable. It is true that for the first time in Brazil's modern history industrial production declined, but it should be mentioned that recession started well before the stabilization program was implemented<sup>1</sup>.

The great majority of economists writing on this stabilization program<sup>2</sup> has pointed out that its success can be almost completely explained by the adoption of a mandatory wage indexation rule which depressed real wages. Moreover, they point out that the substitution of an automatic indexation rule for free negotiation between unions and firms was only possible through its imposition by an authoritarian regime. Thus, there are no "lessons" to be learned from this episode.

We will argue in this essay that the reduction in the real wages brought about by the mentioned indexation scheme was not the most important element for the initial success of the stabilization program. Two reasons can be given in support of this position: first, the new indexation scheme was not generally spread throughout the economy until the second half of 1965. Second, the mentioned reduction in real wages was at the beginning small. We will argue, instead, that it was the introduction of a policy of price guidelines cum credit incentives and/or restrictions in February 1965 that led the rate of growth of industrial prices to start declining. According to this policy, firms were free to choose whether to follow the price guideline established by the government.

Access to credit from public institutions was restricted for firms that decided not to complain with the policy. As the rate of interest charged by the public institutions was usually lower than the one charged by private institutions, firms had a strong incentive to follow the price guideline.

It must be pointed out that we are not neglecting the importance of the shift in the wage indexation from a backwards to a forward-looking scheme. Without this shift the stabilization program would probably have caused a much higher increase in unemployment, as under a regime of backwards indexation real wages tend to increase whenever inflation is reduced. In this respect, it is

<sup>1</sup> Industrial Production fell by 4.7 percent in 1965.

<sup>2</sup> See for instance Lara-Resende (1982), Sochazewski (1980) and Wells (1977).

interesting to note that in Chile the Alessandri stabilization program (1959-61) had adopted a wage indexation scheme very similar to the one carried out in Brazil. The proximity between the two experiments suggests that Brazilian policy-makers were almost certainly inspired by the Chilean case.

The stabilization program implemented in 1964 is better understood if we examine the failed attempt to reduce inflation under President Goulart in 1963. The military paid special attention to avoid repeating its mistakes. We discuss this stabilization program and show that it was characterized by a vigorous attempt to reduce the budget deficit through the elimination of subsidies, a substantial reduction in the amount of government credits to the private sector, and the maintenance of a backwards indexation scheme to readjust wages. The result of this experiment was not only a reduction in the level of activity but a rise in inflation.

It should be clear that we are not denying the obvious fact that real wages were depressed after the military coup. As it was pointed out by Bacha and Taylor (1980), not only did average wages in Brazil fall quite substantially from 1960 to 1970 but income distribution suffered a pronounced deterioration. What we argue is that inflation (industrial prices) started being reduced before the wage indexation scheme adopted by the Government for its employees was extended to all wage readjustment in the economy.

As a final point we should note it is not true that there are no “lessons” to be learned from the stabilization program implemented in Brazil in 1964. The policy of price guidelines cum credit restrictions may be a very useful tool in reducing inflation for a number of countries. The possibility of using a similar policy to reduce inflation in Mexico makes the present essay more actual and relevant.

This essay is organized as follows: in section 2 we discuss wage indexation in Brazil starting in the fifties. In section 3 we examine both the Alessandri experiment in Chile in 1960 with a forward indexation scheme for wage readjustments and the Goulart stabilization program of 1963. Section 4 presents the results of the stabilization program undertaken after the military coup which deposed President Goulart and the usual explanations for its success. In section 5 we discuss the price guideline cum credit restrictions policy and argue that this policy and not the wage policy was the main responsible for the reduction in inflation. We present a model to explain why the stabilization program of 1963 had a stagflationary result and how the price guideline cum credit restriction policy worked. We also give some econometric evidence in support of the model developed. Finally, section 6 concludes the essay.

## 2. Wage Indexation

Before 1965 there was no formal wage indexation rule in Brazil. However, since in the post-

World War II period the average annual inflation rate remained above 15 percent, nominal wages were readjusted from time to time. The informal indexation rule behind each wage increase can be reasonably described as an attempt to raise its purchase power at the moment of the readjustment to the purchasing power level achieved at the moment of the last readjustment. Summing up, one can say that wage readjustments were characterized by a full backwards indexation scheme. Therefore, the evolution of the nominal wage can be approximated by the following equation:

$$w_t - w_{t-1} = p_{t-1} - p_{t-2}, \quad (1)$$

where  $w$  is the logarithm of the nominal wage and  $p$  is the logarithm of the price level.

The period between two wage readjustments shortened as inflation went up during the fifties. While at the beginning of that decade the nominal minimum wage had remained on average constant for 30 months, at the beginning of the sixties the number of months between one readjustment and another was reduced to 12 months.

The shortening of the period between wage readjustments that accompanied the rise of the inflation rate in Brazil seems to be a common characteristic of any inflationary process. Pazos (1972) describes how in Latin America the period between one wage readjustment and another tends to shrink in response to an increase in inflation. As the inflation rate accelerates, workers will demand more frequent wage increases in an attempt to avoid further reductions in their real incomes. In the limit, as price indexes are only available on a monthly (and in some cases weekly) basis, wages end up being indexed to the exchange rate. It is important to note that, as all European hyperinflation experiences of the twenties have shown, the triggering of a hyperinflationary process is usually given by the shortening of all nominal contracts. One could conjecture, therefore, that the possibility of an hyperinflationary spurt triggered by more frequent wage and prices readjustments could not be dismissed in Brazil in 1963.

The major problem of a backwards indexation scheme such as the one informally adopted in Brazil before 1965 is that real wages will tend to increase when inflation is reduced. From equation (1) this can be easily seen by subtracting  $p_t$  from and adding  $p_{t-1}$ , to both sides:

$$w_t - p_t = w_{t-1} - p_{t-1} - [(p_t - p_{t-1}) - (p_{t-1} - p_{t-2})] \quad (2)$$

With this in mind, the stabilization program put forward under the military regime by Finance and Planning Ministers Octavio Bulhões and Roberto Campos (which was called Government

Program for Economic Action, henceforth PAEG)<sup>3</sup> contained a wage indexation proposal with the implicit objective of avoiding a rise in the real wage in case of a decline in the inflation rate. Under this proposal the nominal wage, instead of being readjusted according to its previous real wage peak, would be readjusted in such way as to keep its purchasing power equal to the average real wage in the previous periods. In the proposal there was also the prohibition of more than one wage readjustment within a 12-months interval.

The wage proposal presented in the PAEG was soon after turned into law by a presidential decree in September 1964. Initially, this wage indexation law was restricted to the readjustment of the minimum wage and the wage of all public servants. We can represent it by the following equation:

$$w_t = {}_{t-1}p_t = \frac{1}{2} (w_{t-1} - p_{t-1} + w_{t-2} - p_{t-2}), \quad (3)$$

where  ${}_{t-1}p_t$  is the (log) price level forecasted by the government at time  $t - 1$  for time  $t$  and  $w_t$  is determined at the end of period  $t - 1$ . According to the new indexation rule, the readjustment of the nominal wage would be such that it would make its expected average purchasing power in the coming 12 months equal to the average purchasing power of the previous 24 months. Note, however, that there was no catch-up term in (3) to correct for differences between the government forecast and the actual price level.

While the former (informal) indexation rule, had the shortcoming of increasing real wages whenever inflation declined, the indexation rule adopted by the military government was potentially consistent with the maintenance of a constant real wage under a successful stabilization program. However, the maintenance of a given real wage in a situation of declining inflation under the indexation rule introduced by the PAEG very much depended on the inflation forecast set by the government for the following 12 months. If the government forecasts were consistently lower than the actual inflation real wages would be permanently reduced (and vice-versa).

### 3. Two predecessors of the PAEG: The Alessandri stabilization Program in Chile and the Goulart stabilization program of 1963

In this section we will discuss two stabilization programs which almost certainly must have influenced the design of the PAEG. We start with the Chilean experience in 1960 with forward wage indexation and then discuss the stabilization program undertaken in 1963 under President Goulart.

<sup>3</sup> For a detailed description of this program see Lara-Resende (1982), and Simonsen (1970).

### 3.1. The Alessandri Stabilization Program in Chile: 1959/61

At the end of 1958 Jorge Alessandri was elected president of Chile by a slight margin. At that time the country had a deficit in the Balance of Payments and inflation was on its way up. During his campaign Alessandri strongly advocated the reduction of state intervention in the economy. Once in office Alessandri started pursuing a stabilization cum liberalization program. The budget deficit was reduced through cuts in public expenditure. On the external side a free trade policy was implemented. Tariffs and quotas were lowered and the exchange rate unified. In the financial sector, interest rates were liberalized and reserve requirements reduced.

The most important policy issue brought about by the new administration, or at least the one of most interest to us, was related to the wage readjustment policy. At the end of the fifties the Chilean economy was highly indexed in response to a high inflation rate. Wages of public servants, for instance, were readjusted on average once a year according to the inflation in the period since the last readjustment. There is ample evidence – see Ffrench-Davis (1973) – that wages in the private sector followed a similar readjustment scheme.

Alessandri was one of the first to recognize the problems, which we have discussed in Section 2, associated with a backwards wage indexation scheme. As early as 1955, when he was chairman of the Chamber of Commerce, he pointed out that full indexation with respect to the past inflation was not in the best interest of workers<sup>4</sup>. His position was based on the fact that a full backwards indexation scheme would tend to generate a substantial amount of unemployment under the adoption of any stabilization program because of the induced increase in real wages.

In the first year of the Alessandri administration, however, the wage indexation scheme was kept unchanged. Wages were increased in accordance to the past inflation. It was only in January, 1960 that the wage indexation scheme was modified.

For the first time the wage indexation was not determined by the cumulated inflation since the previous wage readjustment but based upon the expected inflation for the period in which the wage being readjusted would remain unchanged. The objective of the new indexation scheme was not to restore the purchasing power attained at the moment of the last wage readjustment but to keep a constant average real wage. Thus, the implicit wage readjustment rule followed by the Chilean authorities can be reasonably described by equation (3).

As we can see from Table 1, the wage increase in the first quarter of 1960 was 15 percent while the cumulated inflation since the previous wage readjustment reached almost 40 percent. It is important to point out. that the real wage did not fall with the change brought about by Alessandri in

<sup>4</sup> See Ffrench-Davis (1973), p. 205.

the indexation scheme. Indeed, as long as the forecasted inflation utilized by the government to determine the magnitude of the wage increase did not differ very much from actual inflation, the real wage would not be affected

Table 1  
Chile: 1959.1-1960.IV

Year	Exchange Rate Depreciation (%)	CPI Inflation (%)	Wage Increase (%)	Real Wage
1959.I	16.5	10.1	29.5	112.9
II	-1.3	11.6	0.0	100.0
III	0.0	9.0	0.0	91.8
IV	0.0	2.6	0.0	89.5
1960.I	0.0	0.5	15.0	102.3
II	0.0	-0.3	0.0	102.6
III	0.0	3.7	0.0	99.0
IV	0.0	1.0	0.0	98.0

Source: Saez (1982)

### 3.2. The Goulart stabilization program of 1963

In September 1962 Celso Furtado was nominated by president Goulart a 'Minister without portfolio' and made responsible for preparing an economic program to deal with the problems facing the economy and guiding government policy. At the end of the year the program, called Plano Triennial de Desenvolvimento Econômico e Social (Triennial Plan for Economic and Social Development), was submitted to the Congress and put into action soon thereafter.

The diagnostic given in the Triennial Plan to the two most important problems in the economic sphere, namely inflation and the Balance of Payments, was surprisingly orthodox. The budget deficit was identified as the primary source of inflationary pressures and the overvalued exchange rate was considered the main cause for the Balance of Payments disequilibria. The excessive expansionist credit policy was also identified as an additional source of inflationary pressures. The beginning of 1963 was thus characterized by several measures to equilibrate the budget as well as to eliminate the exchange overvaluation. Subsidies to wheat, oil, and public transportation among others were greatly reduced and the exchange rate was depreciated. On the credit side, the expansion of Banco do Brasil loans was limited to 35 percent in 1963, and reserve requirements on demand deposits were raised from 24 to 28 percent.

The immediate consequence of the measures adopted to reduce the fiscal imbalance was an

acceleration of the inflation rate. Besides, and more important, with the maintenance of the previous very low targets for the expansion of the monetary aggregates the degree of liquidity was substantially reduced. Table 2 shows Banco do Brasil's and commercial banks' outstanding loans from the first quarter of 1962 to the last quarter of 1963.

Table 2  
Real outstandings loans to the Private Sector  
(January 1962 = 100)

Year/ Quarter	Banco do Brasil	Commercial Banks
1962.I	100.3	101.8
II	99.0	102.7
III	103.1	104.2
IV	105.0	108.1
1963.I	93.4	82.3
II	89.4	78.6
III	90.2	79.1
IV	95.6	85.9

Obs: We have used the Industrial Wholesale Price as the price deflator.  
Source: Conjuntura Econômica, various issues

With the substantial reduction in liquidity the economy plunged into a recession. Data on industrial consumption of electricity shown in Table 3, which in the absence of quarterly information on industrial production is the best proxy for the level of activity, clearly indicates the slowing down of economic activity brought about by the Triennial Plan.

Table 3  
Industrial Consumption of Electricity at Rio and São Paulo  
(March 62 = 100)

Year	Mar.	Jun.	Sep.	Dec.
1962	100	106	112	111
1963	106	107	108	99

Source: Conjuntura Econômica, April, 1977.

Finally, it is very important to note that inflation accelerated before the Triennial Plan policies started being implemented. The Wholesale industrial price inflation in January 1963, which represented the evolution of prices from mid-December to mid-January, reached 20 percent. Some

authors<sup>5</sup> have pointed out that this huge increase in prices was basically the result of the anticipation by entrepreneurs of the adoption of a price Controls policy.

Under the military regime, as we will see in the next section, special attention was given to avoiding repeating the mistakes made in Triennial Plan, especially with respect to the credit policy. In a situation in which subsidies needed to be reduced, the experience of the Triennial Plan had shown that a policy of imposing strict and low targets for the expansion of credit could have a strong stagflationary result. Special attention was also given to the possibility of speculation by firms on the adoption of a price controls policy. Indeed, in the PAEG there was strong criticism to price control policies in general, and to the ones put forward by the Goulart administration in particular, as a way of reducing inflation

#### 4. Prices and the Government Program for Economic Action (PAEG)

As we have already mentioned, the Goulart administration experienced increasing economic problems. Inflation started accelerating in 1961, and by the end of 1963 it seemed to be out of control. On the external side persistent Balance of Payments deficits implied a steady loss of reserves. Thus, the main preoccupation of the military regime brought to power by the coup which deposed President Goulart was the economy. The response given to these economic problems was the design and implementation of the PAEG.

Under the PAEG the budget deficit was again identified as the major source of inflationary pressures. The initial phase of the stabilization program was then characterized by an attempt to reduce the fiscal deficit by cutting expenditures and, more important, increasing revenues. Subsidies to a number of goods and Services were greatly reduced and the tax system underwent a substantial reformulation. This attempt to equilibrate the budget, as the previous one under President Goulart, also had a pronounced inflationary impact. The annual rate of growth of industrial prices, which had begun to decline at the end of 1963, started increasing in the second quarter of 1964.

A very important element of the PAEG stabilization program was the shift from a backwards to a forward wage and exchange rate indexation scheme. As we have discussed in detail in section 2, in 1965 wage readjustments (initially of public employees but gradually of all workers in the economy) started being made in accordance to the expected inflation. It is difficult not to conclude that the Brazilian policy-makers had the Chilean stabilization program discussed in section 3.1 as their source of inspiration.

It was only in 1965 that the rate of inflation started declining. Part of this decline, as we can see

<sup>5</sup> See Sochaczewski (1980), p. 270.

from Table 4, reflected the slowing down of the rate of growth of agricultural prices brought about by an excellent crop and cannot be attributed directly to the stabilization program but to the weather. However, the behaviour of industrial prices was a clear indication that the PAEG was working. The annual rate of growth of the Wholesale industrial price suffered a substantial decline, going from 101.3 percent in December 1964 to 31.5 percent one year later.

Table 4  
Wholesale Industrial Prices annual rates of growth (%)

Month	1961	1962	1963	1964	1965	1966	1967	1968
Mar.	35.6	44.4	86.9	68.9	86.0	30.4	26.3	28.8
Jun.	44.1	40.7	93.9	76.6	68.8	30.3	26.8	30.2
Sep.	42.8	41.0	90.1	89.2	53.3	32.6	26.2	33.1
Dec.	46.0	46.9	86.1	101.3	31.5	32.0	23.2	34.6

Wholesale Agricultural Prices  
Annual rates of growth (%)

Month	1961	1962	1963	1964	1965	1966	1967	1968
Mar.	22.6	69.5	55.1	109.3	52.0	30.0	37.9	18.0
Jun.	30.9	71.1	60.1	99.2	45.6	45.1	21.4	19.8
Sep.	36.2	59.2	75.6	91.7	37.9	45.9	18.0	16.0
Dec.	53.0	44.0	90.0	86.5	25.2	42.7	21.0	16.7

Source: Conjuntura Econômica, vol. 31, nº 4, april 1977.

Government estimates for the cost of living inflation implicit in the minimum wage readjustments from 1965 to 1967 were systematically biased downwards<sup>6</sup>. Thus, the wage law put forward by the military regime was considered by a number of economists the key element to halt inflation as it led to a reduction in real wages. This is for instance the position sustained by Lara Resende (1982), who argues that inflation in Brazil at the time was caused not by aggregate demand pressures but by a “distributive conflict”. According to him, “the authoritarian government [was able] to solve the distributive impasse through the reduction of the worker’s share on income”<sup>7</sup>. Sochaczewski (1980) also mentions that the wage law was the central point of the PAEG and points out that “the full weight of the stabilization policy fell upon wages”<sup>8</sup>.

<sup>6</sup> The estimate for the inflation rate implicit in the minimum wage readjustment of March of 1965 was 25 percent while the actual increase in the Rio de Janeiro cost of living index was 39.9 percent. In the following two years the Government's forecast for inflation included in the minimum wage readjustment was below the actual inflation.

<sup>7</sup> Lara Resende (1982), p. 802 (my translation). The notion that inflation may be the result of incompatible claims on income by workers, entrepreneurs, and the government was developed by Rowthorn (1977) and applied to the Brazilian case by Lara Resende (1979).

<sup>8</sup> Price Controls were established by the Portaria Interministerial GB71, 02/23/65.

Recently, Dall'Acqua (1985) estimated a univariate representation for industrial and agricultural prices in Brazil for the period February 1953 to February 1965. He pointed out that the forecasts generated by these univariate representations for the following 12 months were systematically greater than the actual values. Dall'Acqua then suggested that it was the wage law imposed by the PAEG (the minimum wage was readjusted in March of 1965 according to this law) that accounted for this.

What is not mentioned by these authors is the fact that, although the wage law was issued in September of 1964 and the minimum wage was readjusted for the first time according to it in March of 1965, its application was not widespread throughout the economy at least until July of 1965. As Simonsen (1970) mentions, before that month Labor Courts usually did not apply the indexation rule described by equation (3) for wage readjustments in case of a dispute between employers and employees. And as Table 4 shows, even disregarding agricultural prices, inflation started declining well before July. Our point is further strengthened if we take into account the existence of a time lag in production.

Another important fact usually disregarded is that the reduction in the product wage brought about by the wage law was initially small. Table 5 shows that the product wage in the industry, taking the minimum wage as a proxy for the evolution. of wages, was in 1965 approximately equal to its 1963 level.

Table 5  
Real Minimum Wage and Real Product Minimum Wage: 1959-68 (1963 = 100)

Year	W/ICV-RJ	W/IPA- IND
1960	101.5	113.6
1961	117.2	122.9
1962	103.5	116.0
1963	100.0	100.0
1964	97.5	104.3
1965	90.4	99.0
1966	83.8	97.2
1967	80.6	97.5
1968	81.6	92.5

W is the minimum wage in Rio de Janeiro, ICV-RJ is the cost of living index in Rio de Janeiro, and IPA-IND is the Wholesale industrial price index.

Source: Conjuntura Econômica, vol. 31, nº. 4, April 1977.

Obs: We took the minimum wage paid each month and deflated it by the cost of living and the Wholesale price industrial price indexes for that month to obtain the reported annual averages figures. Starting in 1963, we included an additional one-month payment made in December.

We have mentioned that inflation was reduced before the wage law introduced by the PAEG had been extended to all wage readjustments. Hence, we must answer the question of what was responsible for the initial effectiveness of the Campos-Bulhões stabilization program. We will argue that, although the change in the wage indexation scheme was a necessary condition to reduce inflation without massive unemployment, the reduction in rate of growth of industrial prices was achieved through the government's adoption of a policy of price guidelines cum credit restrictions. In the next section we will discuss this policy and present a model to illustrate how it works. We finish the section with some econometric evidence to support the position taken here that the policy of price guidelines cum credit incentives (or constraints) was an important element for the success of the PAEG.

## 5. Price Guidelines cum Credit Restrictions

The PAEG can be seen as both a criticism and an alternative to the economic policies of the Goulart administration. The major criticism was directed to what the military regime called "demagogic" policies such as price freezes and unrealistic pricing of goods and Services provided by the government. These policies, according to the diagnostic given by the PAEG, not only introduced serious distortions in relative prices but most often created and/or aggravated budget deficits. Another source of criticism was the excessive participation and intervention of the government in the economy.

In fact, as we have already mentioned, the initial phase of the PAEG (third and fourth quarter of 1964) was characterized by the elimination of price freezes and subsidies to a number of goods and Services.

In view of the general criticism of price control policies, the government's adoption in February of 1965 of a policy of price guidelines, albeit a voluntary scheme, must have been quite unexpected<sup>9</sup>. According to this policy, firms could choose whether to follow the guidelines set by the economic authorities for the evolution of prices. Firms that cooperated were given a number of fiscal and credit benefits. These included exemption from exchange charges on imports of raw materials and equipment, preference in obtaining short-term bank credit, and tax deferrals.

The most important benefit obtained through adherence to the program was preferential consideration for credit from public financial institutions. In a situation in which the amount of credit given by the government was been drastically reduced, non-adherence to the program meant an automatic cut in the access to public funds. This penalty appears more compelling when we note that credit from the government was usually given at a subsidized rate.

<sup>9</sup> It is obvious that our model is compatible with a policy in which firms following the price guidelines established by the government would have access to additional credits at a subsidized interest rate.

In the next sub-section, we develop a model to show how the price guidelines policy we have just described may work in reducing inflation. We assume that the benefits associated with following the government price guidelines are entirely represented by an increase in the amount of subsidized credit available, or alternatively that the sanction to firms setting prices independently is a reduction in subsidized credits. Besides, we consider that the financial market in Brazil at that time was highly segmented and risky. To capture this, we make the interest rate charged by the banking sector a function of the loan size. We also use the model to explain the failure of the Triennial Plan.

### 5.1. A Model for the Goulart stabilization program

We will analyse the short run maximizing behaviour of a firm that takes factor prices and the general price level as given but faces a downward sloping demand curve for its product. In what follows we will draw on the work of Cavallo (1977) and Bruno (1979).

To keep things as simple as possible let us assume that labor is the only flexible factor of production and that the firm's technology is described by the following well-behaved production function:

$$y = f(K)L^{1/\alpha}, \alpha > 1, \quad (4)$$

where  $y$  is the firm's output,  $L$  is the amount of labor (man-hours) employed in production, and  $K$  is the capital stock. As we restrict our analysis to the short-run, we will take the capital stock to be constant. By choosing units we can set  $f(K) = 1$ . Thus, the cost function will simply be given by:

$$c(y) = wy^* \quad (5)$$

If wage payments are made prior to product sale, i.e. there is a time lag between production and sale, the firm will incur an additional cost as it must borrow to finance its wage payments. We assume that this is the case and that the firm can obtain a limited amount of credit ( $C_o$ ) from the government at a subsidized rate of interest  $r_o$ . For additional credit the firm will have to go the banking system or 'curb' market.

Usually, the banking system of a less developed country is highly segmented and risky. To capture this, we will make the rate of interest in the curb market an increasing function of the loan size. In particular, we assume that marginal borrowing costs are given by:

$$(1 + r) = (1 + r_o)[c(y)/c_o]^\beta \quad (6)$$

where  $\beta > 0$  for  $c(y) > c_o$  and  $\beta = 0$  otherwise. In this case, total borrowing costs will be given by:

$$b(y) = [(1 + r_o)(c(y)/c_o)^\beta - 1]c(y) \quad (6')$$

Note that  $b(y)/c(y)$ , which is the average rate of interest paid by the firm, will go up as the firm's output, and thus also demand for credit, increases.

To close the model let us assume that the demand schedule faced by the firm is given by:

$$y = \mu(p/Q)^{-\tau}, \tau > 1, \quad (7)$$

where  $p$  is the price charged by the firm,  $Q$  is the (expected) general price level,  $\tau$  the price elasticity of demand, and  $\mu$  is a shift parameter.

Profit maximization taking into account the existence of costs of borrowing will lead to the following first order condition:

$$MR - b'(y) - c'(y) = 0, \quad (8)$$

where  $MR$  is marginal revenue,  $c'(y)$  is marginal cost and  $b'(y) = db(y)/dy$ . Hence, from equations (5), (6), (7), and the first order condition we obtain the firm's output. In our case this will be given by:

$$y^* = \{[A/(C_o)]^\beta (1 + r_o)(w^{1+\beta}/Q)\}^{-z}, \quad (9)$$

where  $A = \mu^{1/\tau}[\alpha(1 + \beta)]\tau/(\tau - 1)$  and  $z = 1/[(1/\tau) + \alpha(1 + \beta) - 1]$ . The profit earned by the firm is then:

$$\pi(y^*) = \mu^{1/\tau}Q(y^*)^{(1-1/\tau)} - b(y^*) - c(y^*) \quad (10)$$

Substituting (9) into (7) and writing it in rate of growth form we obtain an expression for the rate of price change, which is given by

$$dp/p = \delta(1 + \beta)(dw/w) + (1 - \delta)(dQ/Q) - \delta\beta(dc_o/c_o) + [(1 - \delta)/\tau](d\mu/\mu) \quad (11)$$

where  $\delta = 1/\{1 + \tau[\alpha(1 + \beta) - 1]\} > 0$ . In (11) we have assumed that the subsidized rate of

interest ( $r_o$ ) remains constant. If all firms are alike we will have a symmetrical equilibrium in which  $dQ/Q = dp/p$  and we can rewrite (11) as:

$$dp/p = (1 + \beta)(dw/w) - \beta(dc_o/c_o) + [(1 - \delta)/\delta\tau](d\mu/\mu) \quad (11')$$

With the help of (11') we are able to shed some light into the impact of the Triennial Plan on inflation and production. As we have said before, that program identified the budget deficit as the main source of inflationary pressures and a contractionary fiscal policy started being implemented. Moreover, although there was no explicit intention in the Triennial Plan to apply a credit crunch, the targets set for the credit expansion given by the Monetary Authorities turned out to be excessively low. As Table 2 shows, the real value of outstanding loans from Banco do Brasil to the private sector started declining at the end of 1962.

According to (11'), a reduction in the amount of credit given by the government would lead to an increase in the rate of inflation. Additionally, if the influence of aggregate demand on prices is small and thus the impact of the contractionary fiscal policies brought about by the Triennial Plan on inflation can be disregarded, inflation will unambiguously accelerate. With respect to the level of activity, both the contractionary fiscal policy and the reduction in the amount of subsidized credit will tend to depress it.

Finally, we note that if firms were able to obtain funds in the curb market at a given interest rate, their prices would not be affected by changes in the amount of subsidized credits given by the government. Thus, our result depends on the assumption that firms face an upward sloping supply of funds.

## 5.2. The PAEG Program: Price Guidelines cum Credit Restrictions

Let us assume that the government starts implementing a policy of price guidelines such as the one adopted in Brazil at the beginning of 1955 and discussed previously. As we have mentioned before, firms are free to follow or not the price suggested by the government, which we will denote by  $p_G$ . However, if the price set by a firm is greater than the price suggested by the government, the amount of subsidized credit available to it will be reduced<sup>10</sup>. Thus, in order to decide whether to adhere to the government program, firms will compare the amount of profits accrued when charging  $p_G$  to the amount obtained when receiving a lower  $c_o$ . Note that the government's policy is completely described by three parameters, namely the suggested price ( $p_G$ ), the amount of subsidized credit

<sup>10</sup> See Carneiro (1976), p. 155. According to him at the end of 1965 70 percent of the volume of sales in the industrial sector were carried by firms following the government's price guidelines.

available when charging the suggested price ( $c_o$ ), and the amount of credit available to the firm in case it decides to charge a greater price ( $c_o''$ ). Note also that we have assumed that  $r_o$  remains unchanged.

It is straightforward to show that profits are an increasing function of the amount of subsidized credit made available to firms. Thus, there will be at least one policy, described by a triple ( $p_G, c_o, c_o''$ ), which will induce firms to set prices according to the government guidelines. The policy will be such that it makes the profits earned by the firm when following the price suggested by the government greater than the profits obtained when a lower amount of subsidized credit is available ( $c_o'' < c_o$ ), i.e.,  $\pi(p_G, c_o) > \pi[p^*(c_o'')]$ . It is important to note that if the government tries to reduce inflation “too fast”, establishing an excessively low  $p_G$ , firms will most likely choose not to follow the government guidelines. In this case, the policy will have stagflationary consequences as inflation is raised and output contracted. Another thing that may lead firms not to follow the price set by the government are shifts in their demand schedules. For a given policy ( $p_G, c_o, c_o''$ ), an increase in the parameter  $\mu$  in equation (7) will act in the direction of making more profitable for the firm to determine its price independently.

To derive an expression for the rate of inflation when the government is following a policy such as the one we have just described, we will assume that the amount of subsidized credit available to the firm is a function of both the price it wants to charge and the price suggested by the government. The higher is the difference between the two, the less is the “cheap” credit the firm obtains. In particular, we will assume

$$c_o'' = c_o(p_G/p)^\sigma \quad (12)$$

where  $\sigma > 0$  for  $p > p_G$  and  $\sigma = 0$  for  $p \leq p_G$ . Before proceeding we must note that (12) is at best only an approximation of the price guidelines cum credit restrictions policy. It would have been more realistic to assume that firms with an independent pricing policy would not receive any public credit. We have implicitly made the assumption in (12) that reduction in the amount of “cheap” credit available to the firm is proportional to the ratio  $p_G/p$  in order to be able to get a simple analytical solution for its maximization problem.

It is easy to show that in this case the price charged by firms will evolve according to:

$$dp/p = (1 + \beta)/(1 - \beta\sigma)(dw/w) - \beta\sigma/(1 - \beta\sigma)(dp_G/p_G) + \{1/[\delta'\tau(1 - \beta\sigma) - 1/\tau] - 1/\tau\}(d\mu/\mu) \quad (13)$$

where  $\delta' = [1 + \alpha(1 + \beta)/\tau - \beta\sigma - 1/\tau]$ . In (13) we have assumed that the rate of interest charged by public institutions ( $r_o$ ) remains constant and that all firms are alike and thus in a symmetric

equilibrium  $dQ/Q = dp/p$ .

The impact of the government target rate of inflation ( $dp_G/p_G$ ) on inflation depends on the interest rate elasticity in the ‘curb’ market ( $\beta$ ) and on how sensitive is the amount of cheap credit available to firms to deviations between the price guideline and the price actually charged ( $\sigma$ ). If  $\beta\sigma < 1$  a reduction in the target inflation will lead to a rise in inflation. In case  $\beta\sigma > 1$  reductions in the target inflation would bring the opposite result, namely a fall in inflation. To understand this we simply have to notice that  $\beta$  and  $\sigma$  are the parameters which will give to firms the costs associated with charging a price different from the one suggested by the government. Thus, when  $\beta$  and  $\sigma$  are “high”, the cost associated with not following the price guideline becomes dominant.

Finally, we note that the success of the price guidelines cum credit restrictions policy does not depend on the fact that firms face an upward supply of credit in the ‘curb’ market. Even if firms were able to borrow at a given interest rate, the rate of inflation would be influenced by the target for inflation set by the government.

### 5.3. Performance of the Price Guidelines cum Credit Restrictions Policy

Although prices initially set by the government were calculated assuming an inflation rate of only 25 percent, until the end 1965 the program was a success. Carneiro (1976) mentions that by year’s end the majority of firms in the industrial sector had adhered to the program and were following the government’s price guidelines<sup>11</sup>. The outcome of the program was very much influenced by the substantial reduction in liquidity carried out by the monetary authorities at the end of 1964 and beginning of 1965. Table 6 shows the real value of the outstanding loans to the private sector from the Banco do Brasil and commercial banks during 1965. In that table we also present the rate of interest on the Bills of Exchange, which is the best available measure of the costs of borrowing in the ‘curb’ market.

<sup>11</sup> This is mentioned by Simonsen (1970).

Table 6  
Real Value of Outstanding Loans to the Private Sector and  
Rate of Interest on Exchange Bills (Annual)

Year/Month	Banco do Brasil	Commercial Banks	Interest Rate (%)
1964 (aver)	107.4	104.5	-
1965 Jan	100.0	100.0	48.2
Feb	97.4	99.9	50.9
Mar	90.5	95.8	54.4
Apr	88.1	96.1	47.2
May	86.3	99.9	51.5
Jun	87.0	107.2	55.0
Jul	86.6	111.5	58.4
Aug	90.2	121.0	55.4
Sep	94.5	126.8	57.1
Oct	96.7	130.7	47.1
Nov	98.7	136.0	47.8
Dec	99.1	138.3	47.7
1966 (aver)	-	-	34.3

Obs: We have used the industrial Wholesale price as the price deflator.  
Source: Relatório SUMOC, several issues.

The reduction in liquidity influenced the outcome of the program in two separate ways. First, the fall in real balances brought about by the shift towards a restrictive monetary policy at the end of 1964 had a depressive impact on aggregate demand. This made it more likely that firms would choose to adhere to the government's program. Second, and more important, the drastic reduction in the rediscounting operations carried out by the Banco do Brasil induced commercial banks to curtail their rediscounting operations. In terms of the model presented in the previous sub-section we may represent this by an increase in the interest rate elasticity in the curb market induced by the reduction in the Banco do Brasil's rediscounting operations. In a situation of general lack of liquidity access to credit given by public institutions was indeed a very strong incentive.

In 1966 the government's objective for inflation was even more ambitious than in the previous year. At the beginning of that year prices were set under the assumption of an annual inflation around 10 percent. However, instead of declining to the target as before, the rate of growth of industrial prices remained unchanged at the December 1965 level.

The failure of the program in achieving a reduction in the rate of inflation may be explained by two factors. The first, and more important one, is related to the accentuated expansion of the money supply brought about by foreign reserves gains which occurred in the second half of 1965. This increase in liquidity had an immediate impact on both the amount of credit provided to the private

sector by private financial intermediaries and the rate of interest charged by them. Table 7 shows that the amount of discounted bills by the commercial banks increased dramatically after the second quarter of 1965. Given that at the time data on high-powered money were available with a considerable time delay<sup>12</sup>, it is not difficult to understand why the monetary authorities did not react in the short run to increase reserve requirements<sup>13</sup>. The second factor was the mentioned excessively low target for the rate of inflation.

Table 7

Real Value of Bills Rediscounted by Commercial Banks: 1965 (1964 = 100)

Jan	85.4	Jul	48.2
Feb	72.3	Aug	52.6
Mar	55.2	Sep	69.5
Apr	52.5	Oct	98.6
May	47.5	Nov	117.5
Jun	41.8	Dec	97.4

Obs: We have used the Wholesale industrial price as the price deflator.  
Source: Relatório APEC.

With aggregate demand being stimulated by an expansionary monetary policy and with an excessively low target for inflation it should be no surprise that firms did not follow the price guideline and thus that inflation did not keep falling during 1966.

### 5.3. Econometric Evidence

We have estimated equations (11') and (13) for the periods 1959.III-1964.IV and 1965.I-1966.IV, respectively. The dependent variable is the quarterly rate of growth of the Wholesale industrial price. As there is no quarterly data on wages paid by the industrial sector for that period, we have assumed that its rate of change from one quarter to the next, until the last quarter of 1964, was a function of the rate of change in the cost of living index in the previous quarter. After the last quarter of 1964 we have assumed that the rate of change of wages followed the indexation rule established by the PAEG. For the amount of subsidized credit ( $c_o$ ) we have used the Banco do Brasil outstanding loans to the private sector, deflated by the Wholesale industrial price. The price guidelines are the ones announced by the government for 1965 and 1966 and discussed earlier. Finally, we have assumed that demand is influenced by changes in real balances. Specifically, we have considered the term  $\mu$  in equation (7) to be a (linear) function of the real money stock. Thus, in

<sup>12</sup> At the time reserve requirements were the main instrument the monetary authorities had in hand to control liquidity.

<sup>13</sup> See for instance Sochaczewski (1980), p. 271.

the regressions presented in table 8,  $d\mu/\mu$  is the rate of growth of the real money stock (M1 deflated by the Wholesale industrial price) lagged one period.

Table 8 shows the estimated price equation reduced form for the two periods. Note that all estimated coefficients have the correct sign and are significantly different from zero. Besides, both the Durbin-Watson and the  $Q$  statistics do not indicate the presence of serial correlation among the residuals. The estimate of the coefficient, associated with the evolution of the credit extended by the government ( $dc_o/c_o$ ) indicates that our explanation for the stagflationary impact of the Trienal Plan is warranted. According to the estimate reported in table 8 a 10 percent reduction in real subsidized credit would increase inflation by almost 7 percentage points. The estimate associated with the target inflation ( $dp_G/p_G$ ) indicates that a reduction in that policy instrument would tend to raise inflation. This is due to the fact that fewer firms would follow the government's price guideline. It is in this sense that we can say that if the government tries to reduce inflation too fast the program will not work.

Thus, we can conclude that the estimates we have obtained support the model presented in sections 6.1 and 6.2. The estimates associated with the price guideline and the subsidized credit are both significantly different from zero and thus their influence on prices in Brazil during the sixties should not be neglected.

Table 8

OLS Estimates of the Reduced Form Price Equation for Brazil (1959.III-1964.IV)

$R^2$	.59963344	$R^2$	.55748959
$SSR$	.55589428E-01	$SEE$	.54090289E-01
$DW$	2.15498430		
$Q(11)$	4.39726	Significance Level	.956825

Variable	Coefficient	Standard Error	T-Statistic
$dw/w$	.9712913	.0942012	10.31081
$dc_o/c_o$	-.6508291	.2396200	-2.716089
$d\mu/\mu$	1.038806	.3235573	3.210577

1965.I-1966.IV

$R^2$	.84031733	$R^2$	.77643782
$SSR$	.31021302E-02	$SEE$	.24908353E-01
$DW$	2.24040969		
$Q(11)$	.982775	Significance Level	.912397

Variable	Coefficient	Standard Error	T-Statistic
$dw/w$	3.345793	.5751287	5.817467
$dc_o/c_o$	-4.552280	1.096869	-4.150248
$d\mu/\mu$	.3811144	.1359883	2.802552

Notes:  $R^2$  is  $R^2$  adjusted for degrees of freedom,  $SSR$  is the Sum of Squared Residuals,  $SEE$  is the Standard Error of the Estimate,  $DW$  is the Durbin-Watson statistics, and  $Q()$  is the Box-Pierce statistics.

## 6. Concluding Remarks

In this essay we have pointed out that the policy of price guidelines cum credit restrictions had an important role in the Brazilian stabilization program of 1964. We have argued that, indeed, it was this policy, and not the wage indexation policy, that was mainly responsible for the reduction in the rate of growth of industrial prices. We developed a model based on the work of Cavallo (1977) to explain how these price guidelines may work in inducing firms to follow them. We also estimated a reduced price equation for prices taking into account the government's inflation target as well as the subsidized credit. These regressions provide some empirical support for the model developed in this essay, although, due to the small sample, one should interpret our estimates with caution.

We have also argued that the stabilization program undertaken after the military coup was very much influenced by the Chilean stabilization program under President Alessandri in 1960 and by the failed attempt to reduce inflation in Brazil in 1963. The former almost certainly gave to the Brazilian policy-makers the idea of a forward wage indexation scheme. The latter

influenced as an example of mistakes to be avoided. In particular, special attention was given to avoiding an excessive reduction in liquidity.

As a final comment it is interesting to note that the policy of price guidelines cum credit restrictions applied with success in Brazil could be an important element in the design of a stabilization program for a number of developing countries. The case of Mexico, in which most of the credit to the private sector came from the government, is the most obvious one.

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