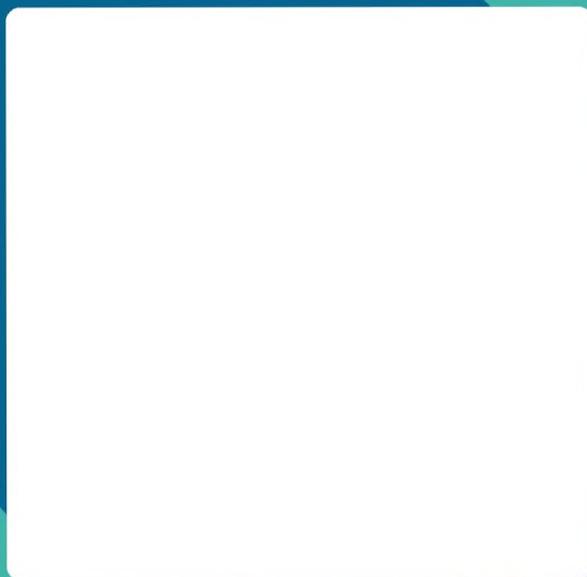**ipea**

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Heterodoxy and Inflation in
Brazil

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HETERODOXY AND INFLATION IN BRAZIL

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SUMMARY

        As the tittle suggests, this paper deals with the
analysis of inflation in Brazil and with the reasons for the
failure of the heterodox policies adopted in the period of 1986
to 1989 to curb inflation. It argues that, contrary to the belief
of the "inertialists", these policies failed not because of
mismanagement of otherwise solid economic policies, but because
of   their   intrinsic .inadequacies. And more,   that   those
inadequacies resulted mostly from the use of unsustainable strong
assumptions than from theoretical misconceptions.

        To that. extent it argues that, had they properly tested
their claims, they would have noted that the monetary policy has
not been necessarily passive; that the monetary expansion does
affect prices; that in spite of the wide use of indexation the
feedback coefficient of inflation has been smaller than one; and
that the interaction of the·monopolistic price policies for the
basic inputs with the widespread indexation has accounted for
most of price increases in Brazil since 1973.

        In view of the characteristics of these issues,   this
paper also discusses, at some length, an often overlooked problem
in macroeconomic models building in Brazil: the need of adapting
them to the influence of the overwhelming presence of the
government in the economy and to the instability of its economic
policies through time.

HETERODOXY AND INFLATION IN BRAZIL

Luiz Zottmann*

I - Introduction

It is known that the SUMMER PLAN[1] as well as its two predecessors, the BRESSER PLAN[2] and the CRUZADO PLAN[3], represented three attempts to innovate the antiinflationary policies in Brazil, both in terms of instruments and of diagnosis of the problem. But, at this time, it is also known that, aside from a short lived relative success during the first moments of the price freeze, neither of these plans were able to stop inflation. In fact, the first two of them led to an intensification of the inflationary forces and to a great deal of

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social unrest and economic disorganization; outcomes that also seem to lie ahead of the current plan.

To many, such poor performances resulted from a combination of unfavorable and unforeseen problems connected with the learning process of heterodox policy packages, with sabotage and with the distributive conflict. To others, as it shall be shown in this paper, these plans failed because of faulty diagnosis that led to incomplete and inconsistent policy packages, whose main characteristics are their strong dependence on price freezes.

With respect to the inflation diagnosis, the contention in this paper is that the problems are more a result of unrealistic strong assumptions than of their theoretical background. Had the inertialists properly tested their claims and they would have seen, for instance, that, in spite of wide use of indexation, inflation in Brazil, at least from 1973 on, has never been inertial (a self perpetuation process), but rather a cyclical process directly connected to the energy price cycles. On the other hand, they could have also realized that the distributive approach to inflation in its narrow version --a capital/labor conflict for larger shares of the internal income-- tends to blur rather than clarify this sociological and political viewpoint . And "last but not least", they could have shown in their own favor that, at least in Brazil --where the overwhelming government intervention into the economic system tends to upset

and to distort the market forces-- sound fiscal and monetary policies are necessary but not sufficient conditions for price stability. To be effective, they should be part of a package that also comprises: a price policy for the public sector committed to efficiency and coherent desinflationary indexation schemes for the exchange rate, wages and interest rates.

Given the wide variety of issues to be tackled and the extreme sensitivity of the empirical evidence concerning these issues to the model specification, this paper is organized to discuss: the model construct (sections II to IV); the econometric work and its results (sections V and VI); the analysis of the inflationary role played over time by each of the variables considered in this study (sections VII and VIII); and a critical appraisal of the heterodox stabilization plans in the light of the empirical evidence presented in the previous sections. Finally, it presents the closing remarks.

II - Indexation and Model Building

From its first explicit inclusion in mathematical models in Brazil by SIMONSEN,M.H.[4] in 1973 (to show, among other things, the theoretical foundations of the gradualist approach to the antiinflationary policy) to the present days, the concept of indexation has gradually gained in importance and connotations.

To such an extent, that it is now being used by scholars like · BRESSER & NAKANO[5] to back the so called inertial theory of inflation and to justify heterodox strategies designed to halt inflation instantaneously.

From one extreme to the other there are, as it should be expected, substantial differences of opinions. The 'inertialists' assume, for instance, that the monetary policy is passive; that the indexation coefficient is equal to one and that indexation rules are universal, homogeneous and unchangeable. Assumptions that conflict with the more traditional approaches to inflation.

In spite of being crucial to the controversy, these hypotheses have never been submitted by the " inertialists " to the test of the empirical evidence. In fact, their model building is such that, for theoretical and practical reasons, these hypotheses are directly built into the mathematical models. That is the case, for instance, of the assumed passive role of the monetary policy, forced into the models through the exclusion of the supply and demand for money from the equation set, a procedure that rules out the possibility of checking an active policy in any direction. As to the assumptions of universal, homogeneous and unchangeable indexation rules --a necessary condition for inertiality--, it is interesting to note that they are, above all, a direct and, in our view, an undesirable consequence of models that, by specifying very simple aggregate

offer functions and the prevalence of full indexation rules in the labor and exchange markets, are ill adapted to the Brazilian case.

Indeed, if instead of offer functions stating simply that prices depend solely on wages, on exchange rates and on a general and constant mark up rule, had the inertialists explicitly contemplated the possibility of differentiated and unstable monopolistic price rules between, for instance, the private and the public sectors --of special importance whenever the latter controls, as in Brazil, the production and/or the commercialization of the basic inputs-- the principles of universal and of homogeneous indexation schemes would hardly prevail. In addition, if in place of behavior functions relating the evolution of nominal wages and exchange rates to past inflation and to special market conditions -- unemployment rate and Balance of Payments conditions-- had they admitted some degree of government intervention in both markets, through specific, explicit, variable and well known official indexation rules, full compensation for past inflation would not be implicitly assumed in their models.

Besides those shortcomings, one additional and important aspect to be noted is the loss of information they imply for the day to day formulation of the economic policy. The main reason for that, at least in Brazil --where the government has overwhelming influence in the market behavior and where the

policy makers do not necessarily back their decisions with respect to wages, and exchange rates, etc. in long run equilibrium conditions--, is that the dynamics of inflation can hardly be captured through stable and well defined relationships, like those of the Phillips Curve, or of inflationary expectations based on past price performances. A much safer procedure is that of leaving the study of the dynamics of inflation to the "a posteriory" analysis of the observed evolution of real wages, exchange rate, etc., case in which one will be in better condition to identify whether or not the Brazilian inflation might be better described as a process of an ever changing nature. .

III -   The Basic Price Equations

The basic model comprises the following four equations, expressed in twelve months percentage changes of the nominal values of their variables:

$$\dot{P}c = \alpha_1 \dot{X}gas + \alpha_2 \dot{X}oc + \alpha_3 \dot{X}od + \alpha_4 \dot{X}tri + \alpha_5 \dot{X}tc + \alpha_6 \dot{X}sal +$$

$$+ \alpha_7 \dot{X}otn \qquad (1)$$

$$\dot{M}d = \dot{y} + \dot{P}c \qquad (2)$$

$$\dot{P} = \beta(\dot{M}s - \dot{M}d) + \dot{P}c \qquad (3)$$

$$\dot{P} = \eta_1 \dot{X}gas + \eta_2 \dot{X}oc + \eta_3 \dot{X}od + \eta_4 \dot{X}tri + \eta_5 \dot{X}tc + \eta_6 \dot{X}sal +$$

$$+ \eta_7 \dot{X}otn + \beta(\dot{M}s - \dot{y}) \qquad (4)$$

where

$$\eta_i = \alpha_i(1 - \beta) \qquad .(5)$$

Equation (1) states that the cost pressures ($\dot{P}c$) are those determined by the government through its price policies for gasoline ($\dot{X}gas$), fuel oil ($\dot{X}oc$), diesel ($\dot{X}od$) and wheat ($\dot{X}tri$), through wages ($\dot{X}sal$) and exchange rate ($\dot{X}tc$) policies, and by the floating interest rate policy for outstanding public financial papers ($\dot{X}otn$). Equation (2) says that the transactional demand for money ($\dot{M}d$) is a function of the production levels ($\dot{y}$) and of the cost pressures defined by equation (1). Finally, equation (3) sets the overall inflation rates ($\dot{P}$) as a function of the cost pressures ($\dot{P}c$) and of the demand pressures generated by the disequilibrium between the effective expansion of the supply ($\dot{M}s$) and the demand for money ($\dot{M}d$). Equation (4) is the reduced form of the model and as such it is the one to be submitted to the econometric tests of stepwise regression analysis.

Though the structural equations are very simple and self-explained relationships, a short presentation of their main assumptions and characteristics seems due. Equation (1) assumes, for instance, an infinite price elasticity of production for its relevant range; an overwhelming influence of the government's wage, exchange rate and interest rate policies in the labor, exchange and money markets, and monopolistic price setting policies in the wheat and oil derivatives markets (largely dependent on imports) by monopolistic state agencies. The money market is assumed to operate only with floating interest rates (based on the monetary correction of the face value of the federal financial public papers), thus leading to the inclusion of the variable financial and/or opportunity costs of capital in equation (1). Equation (2) by its turn assumes that the elasticities of the transactional demand for money for production and cost levels are equal to one. Finally, equation (3) explicitly admits the possibility of cost-push, of demand-pull, of hybrid as well as of repressed inflationary processes - the latter occurring whenever the expansion of the money supply proves to be insufficient to meet the needs. To that effect it is interesting to note that for the case of $\beta < 1$, the model states that cost-push inflation could still prevail even in the case of an absolutely stable level of the nominal money supply .

Regarding the time tag it is important to note its absolute absence from the model. But, contrary to what it might

seem to be the case, such an absence does not indicate that instantaneous reaction of prices to cost and demand pressures were the sole or the main hypothesis. In fact, such an absence is due mainly to the fact that an 'a priory' setting of specific time tags seemed to cause more harm than good. First, in view of the existence of an implicit time lag, of almost thirty days, between inflation of a given month, in one side, and the setting of such a month prevailing wages, exchange and interest rates in the other one. Usually the latter are set by the government in the last days of the previous month or the first days of the month to which they should prevail. Second, because it seemed more appropriated to let the definition of the time tags result from the empirical evidence.

As shown in Table I on page 18, lags up to one month resulted significant for some cost pressures (wages and diesel oil prices) and up to six month for the demand pressures stemming from the desequilibriuns on the money market. The first two, in view of likely influences of existing stocks and of a government sluggishness in adjusting freights and public transportation tariffs. The last ones, for the money supply, as a sign that, in accordance with the best traditions of inflation models, prices do not tend to react instantaneously to excessive demand pressures, but after the evidence of lack of production reaction to such forces.

IV - Simultaneity, Causality, Expectations and Related Matters

One special characteristic of the model used in this study is that of an apparent dangerous combination of simultaneity with the absence of behavior equations for the independent variables of equation (1) and (3). At first sight, it should lead to spurious correlations, multicolinearity, excessive simultaneity and unconvincing causalities. But none of them became a real menace. First because the very high degree of simultaneity of the model, as we have seen, is more apparent than real. Second because of the specification of the model.

Indeed, looking to the questions of spurious correlations and multicolinearity, it is not difficult to note that they were not to be feared in this case, because the equations submitted to the econometric work was set to test the hypothesis of a linear relationship between inflation rates and the rates of change of wages, exchange rate, etc. That is, whether or not trend changes of these variables, rather than their trends, were correlated. Consequently, the possibility of relating inflation to itself was ruled out, and the risks of spurious correlations and of multicolinearity minimized. Not surprisingly, as it will be shown in Section VI, all of its eight independent variables significantly entered the equation with the correct sign and coherent time lags.

As to expectations, to the dynamics of inflation and to their effect on the long run causalities, it is important to note that the absence from the model of behavior equations that could explicitly deal with these questions does not indicate that they were not taken into a due account. As a matter of fact, they were excluded from the equation set for the simple reason that, in this case, the econometric estimation of their parameters is of little help. To the contrary, they could lead to serious problems of interpretation of the results --of which the inertiality of the inflationary process is a good example--, because neither can they be assumed to be constant through time nor can they be said to represent binding constraints for future government decisions. For in this case these behavior equations represent, above all, guidelines for policy decisions and not market conditions.

For a better understanding of this point, let us discuss, for instance, the case of the wage determination process; usually expressed by the following equations, relating the rate of growth of wage rates ($\dot{X}sal$) to past inflation ($\dot{P}t-1$) and to some sort of autonomous increase ($\dot{A}sal$), that, by its turn, is said to be a function of the level of unemployment (Un), of the political power of labor unions (LUP), or of both of these forces:

$$\dot{X}sal_t = c\dot{P}_{t-1} + \dot{A}sal_t \qquad (6)$$

$$\dot{A}sal = f(Un, LUP) \qquad (7)$$

Together, these two equations are viewed as the expression of the demand pressures in the labor market (that are crucial to the Phillips Curve approach). And "c", as well as the coefficients of equation (7), are said to be stable parameters that could be either assumed to be equal to one or estimated through econometric methods.

However, in the present case, these equations command different readings. In fact, they indicate the extent to which the wage rate policy responds to inflation and to the level of unemployment. Therefore "c", as well as the parameters of equation (7), can hardly be assumed to be stable, a fact that aside of having already been shown by SOUZA,J.[6], CARVALHO,L.[7] and BARBOSA,F.H.[8], among others, can be easily confirmed through a simple inspection of Graph X, showing a month to month evolution of the real minimum wage rates from 1973 to 1989, specially when compared to the evolution of the exchange rate, of the ORTNs and of the price of wheat, all in real terms, represented in the three other graphs of the same page 33.

In spite of these arguments, one could still favor the inclusion of these behavior equations in the model, on the grounds that they are essential to express expectations. But here, again, and for a variety of reasons, a better option is to assume that equation (1) represents, simultaneously, both the cost pressures (Pc) and the expected inflation (Pe). Three of

these reasons are: 1) it seems more realistic to assume that prices tend to be more sensitive to businessmen rather than to workers inflationary expectations (after all, they are the ones that do most of the buying and selling); 2) equation (1) comprises not only the labor cost pressures, but also most of the other primary costs for most of the firms, regardless their size, their position in the productive matrix, their capacity to hire economic analysts, etc.; 3) information regarding government decisions with respect to wages, exchange rates, etc. are almost instantaneously passed on to the public by the press.

Aside from the relevance of these arguments, one additional and important point in favor of such a way of expressing price expectations, is that it provides a simple and straightforward explanation for the existence of persistent and unexpected inflationary or desinflationary pressures ($\dot{P} > < \dot{P}e$): the disequilibrium in the money market. A concept to which economic analysts rather than the public in general tends to be acquainted with.

V- Additional Characteristics and Model Implications

Looking now to the equation (4), and the whole model, there are at least four other relevant points to note, of which two are connected with indexation, one to the relations among public deficit, inflation and money supply, and one with the

question of the distributive conflict.

The first of the two points related to indexation is that inflationary inertia can take place only in the case of

$$\sum_{i=1}^{n} \alpha_i = 1 \qquad (8)$$

and provided that all of cost variables are subjected to full and synchronized indexation; that is to say , if

$$\min (\dot{X_i})_t = \dot{P}_{t-1} \qquad (9)$$

a condition that by itself represents a strong and, most of the time, an unsustainable assumption; by reasons that go from the lack of synchronization of the indexation schemes for wages, exchange rate, etc., to the use of partial scale indexation rules (preservation of past average real values instead of peak real values, etc).

The second, is that the indexation policy should be an important part of the antiinflationary strategies and that synchronized and full scale indexation rules should be definitely avoided.

The third additional point to be noted is that the model does not establish any direct connection between inflation and public deficit. And the reasons for that are twofold. First

because, in the Brazilian case, public debt financing has been based on very unstable combinations of several elements, of which three are directly represented in this model: the expansion of money supply; the prices of the oil derivatives, to which quite often the government adds emergential surcharges and/or emergential compulsory loans; and the monetary correction scheme for the federal financial public papers, designed to increase their attractiveness to the public. Second, because it did not seem convenient to limit the concept of money supply to the most traditional and narrow concept - that is to say M1 - , a fact that would force us to include into the model (with no significant gains) alternative behavioral functions for each of the alternative concepts of money supply we wanted to test.

The fourth and final point to be emphasized is related to the question of the distributive conflict and inflation. Indeed, in view of the number and the nature of the independent variables of equation (1) the model allows one to see the distributive conflict as a game with more than just two players - capital and labor. As a matter of fact it brings to scene at least two more active players: the Brazilian government and foreign suppliers, among which the OPEP members.

As a consequence, an eventual reduction of real wages, which is usually taken as an indication of a correspondent capital gain, might also be attributed to an income transfer to foreign suppliers, to government, to state agencies of the energy.

sector, to domestic or foreign wheat producers or, at last, to
.the external trade sector. As a matter of fact, such a real
wages reduction --in this amplified version of the distributive
conflict-- is even consistent with simultaneous reductions of the
real remuneration of capital. All depending, of course, on the
government policies, which should account for the distributive
implications of its action and of the pressures that the labor
unions, the investors in general, bankers and entrepreneurs will
exercise so as to lead the public authorities to back their
economic claims.

VI - The Main Statistical Tests and Results

The data for the stepwise regression analysis covered
the period January 1973/August 1983 --with 132 observations for
each of the nine variables listed in the model-- and included
four alternative options for the dependent variable, three others
for the money supply and two for the wage policy. The options for
the price indexes were the General Price Index (IGP), the
Wholesale Price Index (IPA), the Cost of Living Index for Rio de
Janeiro (ICV-RJ) and the Cost of Construction (ICC), all of them
from Getulio Vargas Foundation. The money supply alternatives
were represented by M1, M2 (M1 + time deposits) and M3 (M2+
savings deposits). The wages rate policy indicators were the
minimum official wage rates (MSALM) and alternatively the

official rate for collective wage adjustments (RSALC).

Further increased by the alternatives provided both by the stepwise estimating procedure and by the choice of equations to be submitted to the econometric work (reduced form or structural equations), these definitional and data set options led to a very large number of testable equations. Of such a universe, Table I presents the parameters and statistics of the twenty-two alternative estimates of equation (4), for the case of the Cost of Living Index (ICV-RJ) that successfully met the significance test - one tail "t" at a .95 level of confidence. A full report on the proceedings and results can be found in ZOTTMANN,L.[9].

Looking first to the coefficient of determination of each of these twenty-two options and to the number and nature of the independent variables, an initial aspect to note is that these alternatives are almost identical in terms of theoretical and practical implications. In fact they differ only with respect to the alternative measurements of money supply, to the indicators of the official wages policy and to their time lags, thus turning the choice of whichever in a matter of practical convenience, free from implication as to the nature of the inflationary process.

Considering the money supply, it is interesting to note that, in the presence of all the seven variables

TABLE I
ICV-RJ REGRESSIONS
PARAMETERS AND STATISTICS

	F.LAMB	(β)	r.RHO	β	β	β	MEAN t-0	MEAN t-1	r_div	M..y t-4	M..y t-8	M..y t-6	M_t.y t-4	M_t.y t-8	M_t.y t-6	M_b.y t-4	M_b.y t-8	M_b.y t-6	ρ
COAL 026-1	.100 (4.65)	.193 (7.14)	.033 (7.82)	.044 (3.68)	.029 (3.49)	.042 (2.81)	.320 (7.84)			.086 (1.92)									.997
.2	.111 (5.17)	.167 (6.75)	.032 (8.14)	.040 (3.49)	.027 (3.18)	.041 (2.97)	.302 (7.56)				.131 (3.07)								.997
.3	.119 (5.44)	.351 (6.41)	.033 (8.12)	.036 (3.11)	.027 (3.36)	.047 (3.23)	.294 (7.35)					.155 (3.51)							.997
.4	.097 (4.31)	.426 (7.52)	.032 (7.21)	.040 (3.26)	.036 (4.31)	.049 (3.24)		.284 (6.25)		.087 (1.84)									.996
.5	.108 (4.81)	.397 (7.12)	.032 (7.54)	.037 (3.06)	.034 (4.19)	.051 (3.40)		.266 (6.56)			.135 (2.99)								.997
.6	.117 (5.11)	.379 (6.73)	.031 (7.56)	.032 (2.69)	.033 (4.11)	.051 (3.66)		.257 (6.38)				.162 (3.51)							.997
COAL 027-1	.106 (4.85)	.365 (6.20)	.035 (7.94)	.047 (4.16)	.029 (3.59)	.034 (3.00)	.318 (7.98)						.085 (2.35)						.996
.2	.115 (5.46)	.331 (5.85)	.016 (8.62)	.043 (3.94)	.028 (3.59)	.050 (3.41)	.300 (7.76)							.124 (3.64)					.997
.3	.118 (5.22)	.321 (5.85)	.016 (8.06)	.038 (3.49)	.029 (3.77)	.059 (4.05)	.284 (7.26)								.145 (4.31)				.997
.4	.099 (4.33)	.411 (6.85)	.013 (7.13)	.044 (3.73)	.037 (4.47)	.052 (3.42)		.283 (6.82)					.071 (1.85)						.996
.5	.109 (4.90)	.334 (6.42)	.035 (7.84)	.040 (3.40)	.036 (4.45)	.058 (3.86)		.262 (6.49)						.119 (3.21)					.997
.6	.114 (5.29)	.351 (6.22)	.035 (8.24)	.035 (3.05)	.036 (4.60)	.068 (4.46)		.245 (6.19)							.149 (4.18)				.997
.7	.141 (5.84)	.297 (4.42)	.029 (6.21)	.022 (1.91)	.034 (4.16)	.076 (5.62)			.345 (7.13)				.086 (2.21)						.997
.8	.148 (6.07)	.269 (4.14)	.031 (6.88)	.020 (1.78)	.034 (4.18)	.061 (6.05)			.322 (6.79)					.124 (3.47)					.997
COAL 028-1	.109 (4.72)	.357 (5.57)	.035 (7.76)	.047 (4.10)	.030 (3.72)	.042 (2.87)	.321 (7.98)									.075 (2.07)			.997
.2	.121 (5.43)	.317 (5.21)	.037 (8.48)	.041 (3.91)	.030 (1.81)	.048 (3.28)	.301 (7.63)										.113 (3.29)		.997
.3	.125 (5.82)	.259 (5.12)	.037 (8.87)	.037 (3.50)	.031	.057 (3.92)	.282 (7.15)											.116 (4.17)	.996
.4	.101 (4.19)	.407 (6.19)	.033 (6.95)	.044 (3.20)	.018 (4.59)	.051 (3.11)		.287 (6.95)								.063 (1.59)			.997
.5	.114 (4.88)	.361 (5.77)	.035 (7.70)	.040 (3.46)	.038 (4.68)	.050 (3.70)		.263 (6.42)									.103 (2.96)		.996
.6	.121 (5.38)	.331 (5.49)	.036 (6.21)	.035 (3.06)	.038 (4.85)	.066 (4.11)		.248 (6.04)										.138 (4.00)	.997
.7	.146 (5.61)	.282 (3.95)	.029 (6.11)	.021 (1.86)	.025 (4.20)	.075 (5.16)			.348 (7.18)							.078 (2.06)			.997
.8	.155 (6.17)	.247 (3.62)	.031 (6.63)	.020 (1.75)	.035 (4.30)	.078 (5.85)			.323 (6.31)									.117 (3.36)	.997

OBS. "t" VALUES IN PARENTHESIS

representing the cost pressures, it significantly enters the equation only if lagged of four to six months, no matter the specific money supply concept one happens to choose. Also, that the size of its coefficients varies according to the time lag. So, the more the price reaction delays to money supply increases the higher it will be. Nevertheless, it will always be relatively weak if compared with those of the cost pressures. In fact, they rank from third to fourth place, always behind the price sensitivity to the floating interest rates and to wages, occasionally in front of the sensitivity to the exchange rates, and always ahead of coefficients for the prices of diesel, gasoline, fuel oil and wheat. That being the case, one can say that from this standpoint, monetary stability is a necessary but not sufficient condition for halting inflation .

In fact, as the very high sensitivity of prices to the floating interest rates indicates (the single highest coefficient), the effects of indexation can be long lasting problems for the policy makers in view of their feedback effects. Nonetheless they do not appear sufficiently strong to create the state of inertia or self-perpetuation of inflation; a situation that requires that the indexed variables coefficients adds to one, a number which is well above the consolidated coefficient for the three variables usually subjected to indexation in Brazil (interest rates, wages and exchange rates). Indeed, they add to something from 0.72 to about 0.85, numbers that are entirely consistent with those estimated by BARBOSA & McNELLIS[10]

more recently, and by SIMONSEN, M. H. back on the seventies. To that effect, and in accordance with this model, the full indexation of prices of energy inputs and wheat should also be a must to the state of inertia.

Incidentally, it is worth noticing that the choice of the wages policy indicators and their respective time tags does have significant effects on the inflation sensitivity to wages and to money expansion. The use of the minimum wages rate policy (MSALM) provides, for instance, greater flexibility to the model for it significantly enters the equations independently of its time tag. On the other hand, when the option is for the collective wages adjustment guidelines (RSALC), the significance of the wages policy is restricted to the hypothesis of lagged reaction, at the additional cost of significance of the six months lag hypothesis for the effects of the money supply expansion, when measured by the M2 and M3. concepts.

In these conditions, an eventual choice of any of the twenty-two alternatives listed in Table I as the most representative specification of equation (4) does not seem to be a highly recommended procedure. Anyhow, for practical purposes one might restrict the universe of the alternatives to a set of just four options, comprising the two extreme concepts of money supply (M1 and M3) and both of the wages policy indicators, as they seem to be sufficiently representative of predictive nuances for all the alternatives. However, for the sake of brevity, the

forthcoming analysis of the predictive capacity of the model and of the inflationary process characteristics, will be restricted first to two alternatives (M1 and M3 in combination with MSALM) and then to just one of them: the M3 option.

VII - The Model Predictive Capacity

Graphs I and II, covering the period January 1973/ May 1989, depict a month to month evolution of the observed and of the estimated twelve month rates of change of the ICV-RJ. Of these 197 observations, the first 132 represent the data set for the regression analysis and the remainder 65 the extrapolation period, that fully encompasses the era of heterodoxy - the CRUZADO, the BRESSER PLAN and the four first months of the ongoing SUMMER PLAN.

From these two graphs, the first and most noticeable aspect is the model's remarkable predictive capacity, to a point of turning the extrapolation period graphically undistinguishable. This characteristic becomes even more important if one considers both the large period already encompassed in the analysis (sixteen to seventeen years) and the several drastic changes that have happened in the antiinflationary policies in the meantime.

GRAPH I
ICV-RJ
12 MONTH GROWTH RATES

OBSERVED
........ESTIMATED OPTION M₁
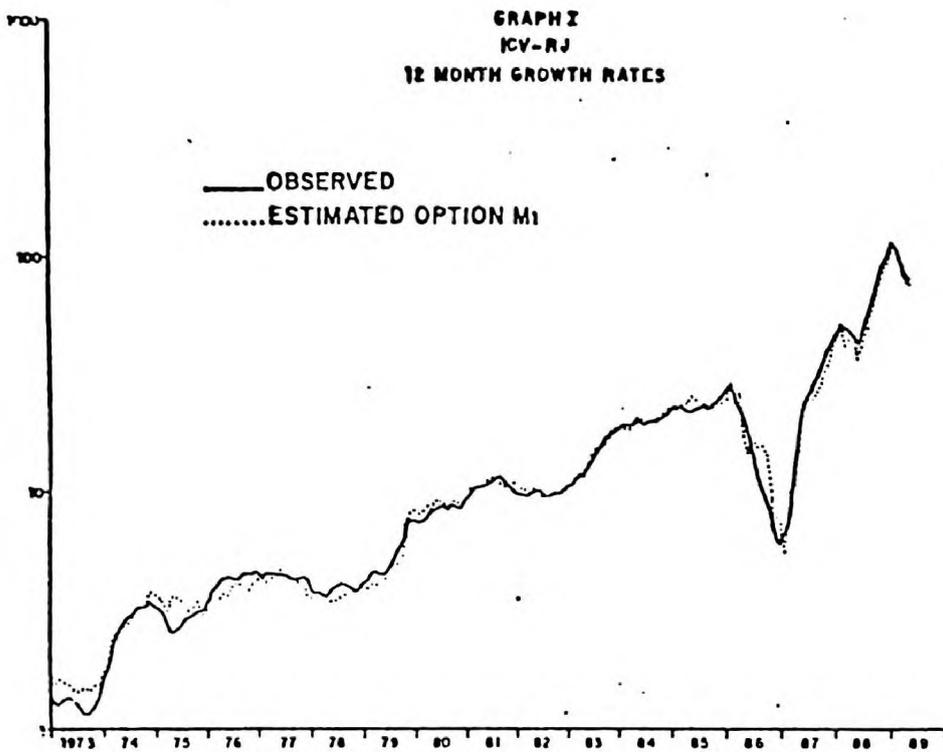
GRAPH II
ICV-RJ
12 MONTH GROWTH RATES

OBSERVED
........ESTIMATED OPTION M₃
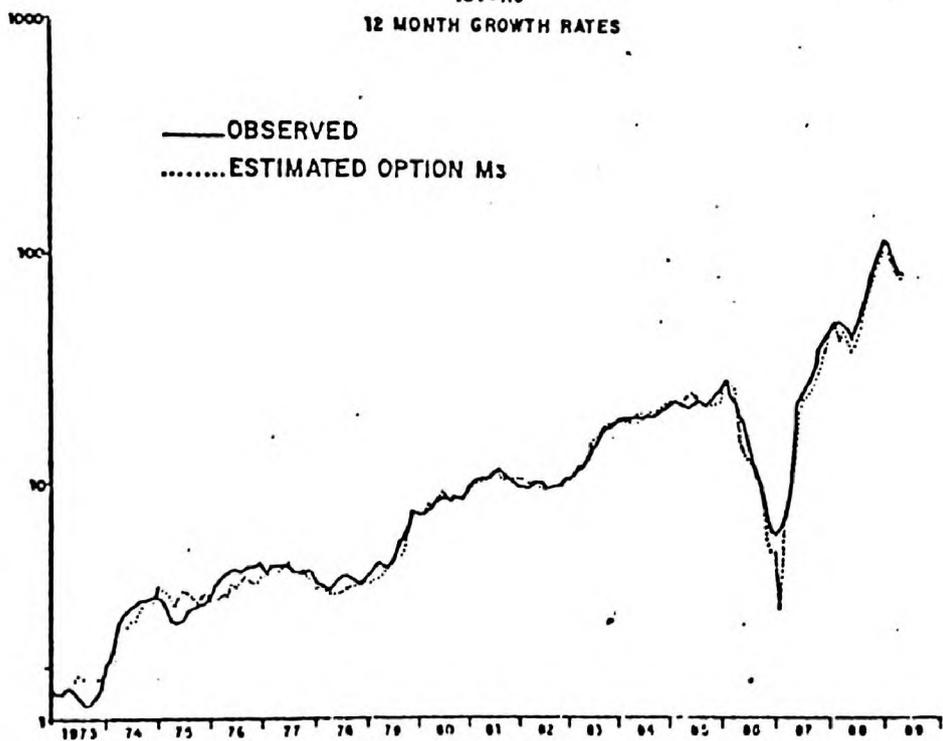
A second and even more striking characteristic of these inflation estimations is that, for all senses and purposes, they do not miss the turning points or trend changes of the observed inflation rates. As a matter of fact, short lived and very small discrepancies can be detected on both graphs only in three occasions: the first two, back in second semester of 1973 and of 1975 (Graphs I and II), and more recently, in the beginning of the second semester of 1986 (Graph I) and in February of 1987 (Graph II) .

It is also important to note that the most pronounced differences between Graphs I and II happened in the period February 1986/February 1987, the exact time span of the CRUZADO PLAN, thus indicating a very different behavior for M1 and M3, a fact that further recommends a constant and close attention to both of these financial aggregates. From that it follows that the inflationary role of the money expansion should never be neglected and that a sound monetary policy should never loose sight of M3, which in Brazil is six times greater than M1.

VIII - Causes and Characteristics of the Inflationary Process

If M3 is actually the relevant concept of the money supply, that the structural equations are the most appropriate way to estimate the importance of the demand-pull and the cost-

push pressures, and resorting again to the graphical analysis, the main characteristics and causes of the Brazilian inflationary process can be summarized as follows.

As indicated by the vertical bars on Graphs III and IV, inflation has progressed in cycles; in a total of at least four of them --three completed and a fourth well under way-- each one corresponding to a specific wave of cost pressures. That is to say, the demand-pull pressures all through the period have not been the determinant forces behind inflation, to a point of being incapable of defining the inflationary trend even in 1973, when they significantly affected the intensity of the estimated inflation rates.

Reinforcing such a conclusion, Graph IV clearly shows that while the trends of inflation are undoubtedly determined by the cycles of the price increases of the oil derivatives and of wheat, its intensity is mostly a function of the cost pressures caused by wages, exchange and floating interest rate changes. This is precisely what should be expected in a chronic and severe inflationary process; case in which the main component of wages, exchange rate and floating interest rates adjustments is likely to be the compensation for past price increases. Notwithstanding, as it is also shown by the occasional and sometimes sudden asymmetric movements of the five curves there pictured, wages, exchange rate and floating interest rates were submitted to exogenous influences, that went from changes in the

GRAPH III

ICV-RJ ESTIMATES

COST + DEMAND PRESSURES
.... COST PRESSURES
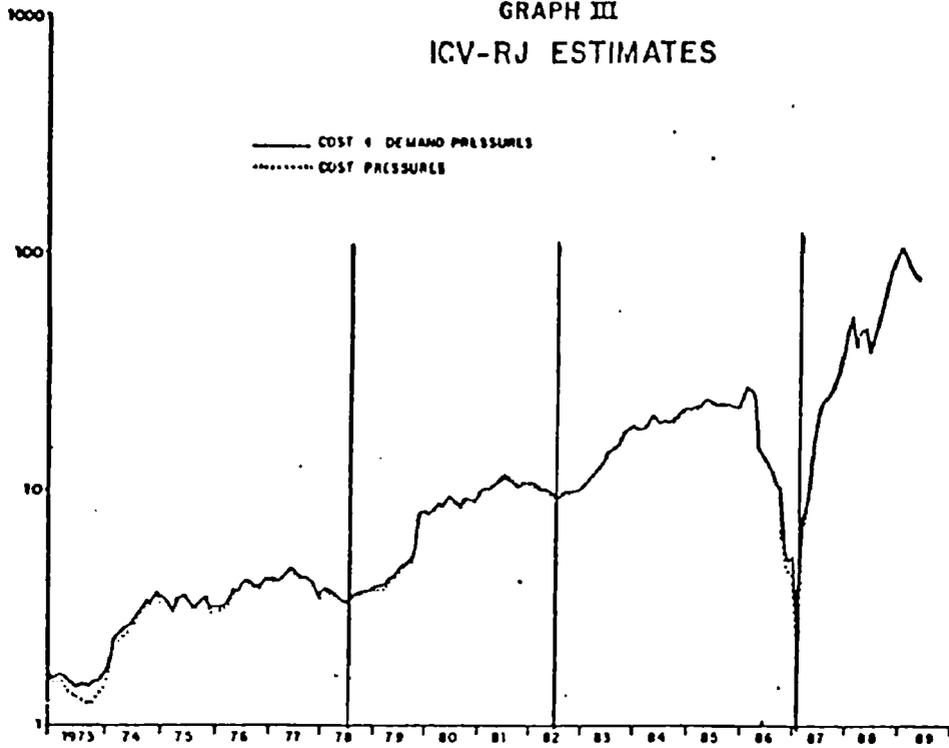
GRAPH IV

COST PRESSURES COMPOSITION

---- OIL DERIVATES
-.-.- OIL DERIVATES + WHEAT
—— OIL DERIVATES + WHEAT + WAGES
.... OIL DERIVATES + WHEAT + WAGES + ORTN
—— OIL DERIVATES + WHEAT + WAGES + ORTN + EXCHANGE RATE
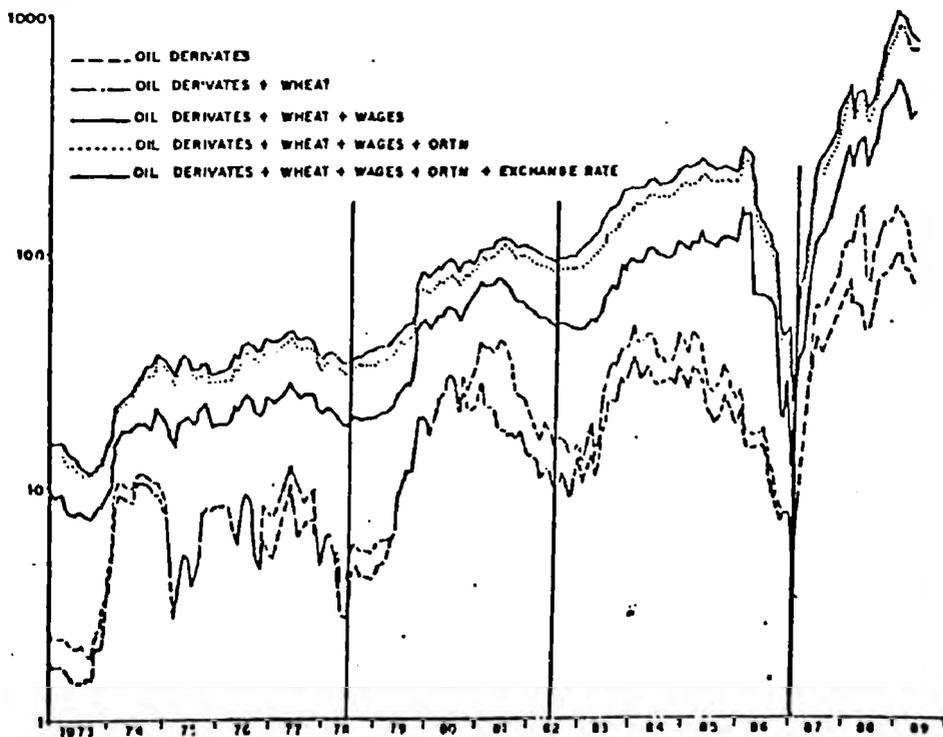
indexation rules to extemporaneous adjustments called forth by specific problems in the Balance of Payments, in the financial savings and with the labor unions.

As a matter of fact, the presence of such exogenous changes was not uncommon and significantly affected the estimated inflation rates. Considering the minimum wages rate, for instance, such changes happened in the beginning of 1974 and through most of the years of 1979, 1984, 1985, 1986 and 1988. From 1984 to 1986 the effects of the government attempts to significantly increase the real level of the minimum wages rate were so strong that, for the first time since 1973, they affected not only the intensity but the trend of inflation. Indeed, by virtue of the increasing pressures caused by wages, the trend of overall cost pressures did not follow the trend change of the cost pressures stemming from the wheat and the oil derivatives prices from its start, back in 1984. In fact, that happened only in 1986, with the overall price freeze adopted in the CRUZADO PLAN. By its turn, the effects of exogenous changes in the exchange rate policies, like the maxidevaluations of 1979 and 1983 and its predetermination during the first semester of 1980, are the main changes in this area whose importance was far less than those caused by the exogenous changes in the wages policy. Finally, the " ins and outs " of the heterodox antiinflationary packages, from 1987 to 1989, accounted for the most significant and less frequent effects of changes in the floating interest rates policy, that in no case affected the

trend of inflation. With respect to the indexation of the interest rate of the public financial papers it is also worth noticing that the referred " ins and outs " varied from the suppression of the month to month indexation (for twelve months) to the now prevailing instantaneous and intra-month compensation for the monthly expected inflation rate.

In short, the model used in this study shows that the Brazilian inflationary story from 1973 on is mainly the story of the combination of its price policies for energy and wheat with indexation. To its understanding it is indispensable the knowledge of the characteristics, purposes, implications and interactions of these price policies with, at least, those for wages, exchange rate and interest rates. This is the subject of the next section.

IX - The Foundations and Implications of the Energy Price Policy.

When it comes to the analysis of the oil derivatives price policies in Brazil from 1973 on, the question of its links with the international oil market behavior comes out naturally. A question that can be answered with the help of Graphs V to VII.

Graph V reflects the evolution of the average nominal dollar price of the imported crude oil. It shows that, while the

GRAPH U
IMPORTED OIL PRICES
AVERAGE USD / BARREL
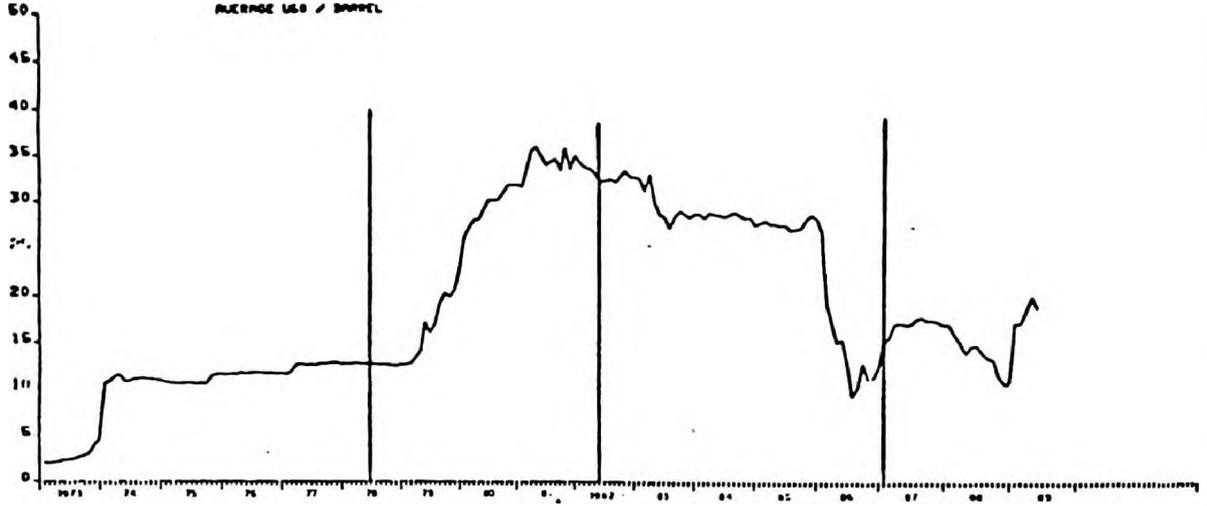
GRAHP UI
OIL DERIVATES REAL PRICES

DEFLATION : ICU-RJ MARCH 1986 = 100
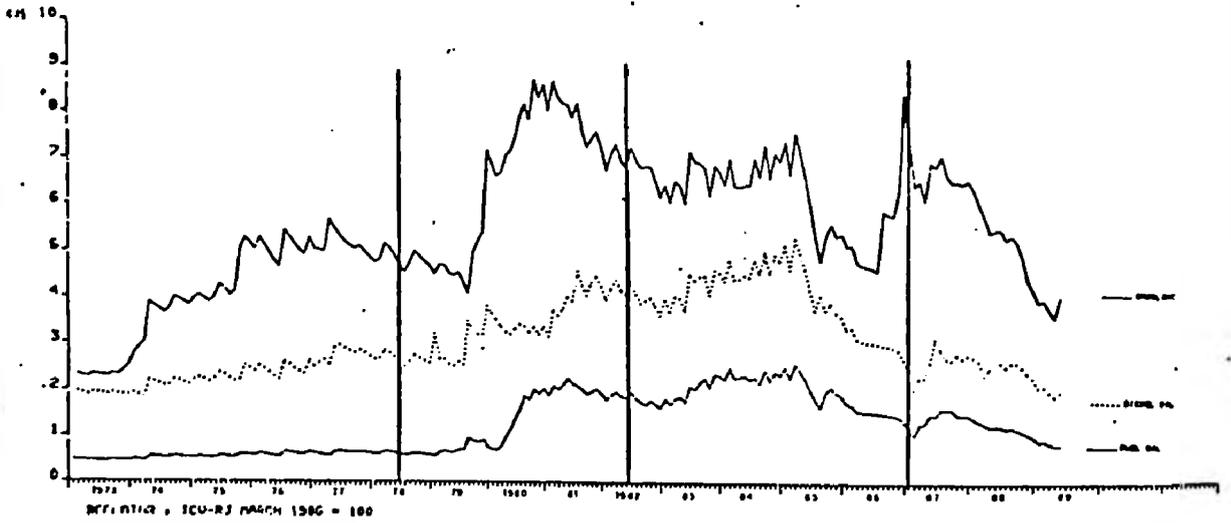
GRAPH UII
OIL DERIVATES NOMINAL PRICES

12 MONTH GROWTH RATES
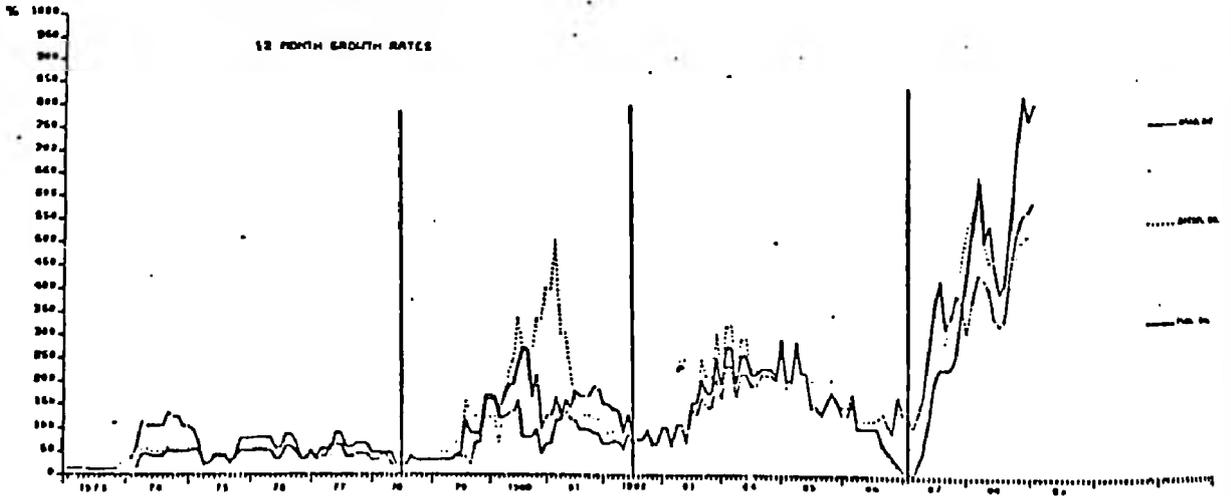
first two cycles can be undoubtedly linked to the international oil crises, the same is not true for the third and fourth cycles. Indeed, the first two cycles coincide with periods of fast increasing international oil prices --a fivefold increase in the first cycle and a twofold rise in the second one. Conversely, the third cycle coincides with a period of a persistent downward trend for the nominal dollar prices of the imported oil, to a point of bringing them to the levels that prevailed by the end of the first cycle and the beginning of the second. The fourth cycle has so far coincided with a period of somewhat low international oil prices levels and of undefined price trends.

That the first two cycles could be directly connected to the international oil crises it is no surprise. What is remarkable to observe in this scenery is: the asymmetry of the internal price increases for the three oil derivatives all through the four cycles (Graph VII); the increasing intensity of such internal price growth rates for each successive cycle; the levels to which the internal absolute real prices of these products were brought to at different times (Graph VI); the persistent increase of the real internal price levels of these products for most of the third cycle (first three years out of four); and the progressive acceleration of rate of the nominal price increases, for a given real price level of these products.

From the above it follows, among other things, that the energy price policy in Brazil tends to respond both to internal and external factors, and that the inflationary strength of such a policy has consistently increased over time. The latter means that, through offsetting nominal increases of the legal wages rate, of the official exchange rate and of the floating interest rates on public financial papers, workers, financial investors and entrepreneurs connected to the external sector have progressively and consistently increased over time their capacity of transferring ahead the burden of the energy price policy, in a clear violation of the most crucial foundations of the energy price policy in Brazil.

Indeed, the energy price policy has been widely used in Brazil as one of the most efficient and socially equitable instruments to provide government with the financial resources to back planned public investments of social and economic interest and to finance public deficits, particularly of the social security system, on the assumption that its adverse income effects, according to VELLOSO,J.P.R.[11], should be felt only by the wealthy segment of the society (specially passenger car owners). This would be a defendable hypothesis if the government, in addition to the indispensable political support, managed to develop and use safeguard instruments fully capable of identifying, of measuring and of neutralizing the spill over, direct and indirect effects of these policies on prices.

Unfortunately, from 1973 on, what we had was a progressive deterioration of the government capability of fulfilling these two conditions, in view of an increasing adverse combination of technical difficulties in defining such safeguard mechanisms with the sectorial needs, leading to discriminatory policies in favor of capital and of the external trade sector. Indeed, during the first of these cycles, through the combination of indexation rules --that attempted to give only partial compensation for past inflation-- with dampening factors designed to account for adverse changes in terms of trade and with the fiscal incentives, the government managed to isolate most of the spill over effects of its energy price policy on prices and to maintain a good proportion of the prevailing political support, specially from the workers.

However, at the beginning of the second cycle, most of the indexation rules were modified so as to give full compensation for past inflation and, in addition, to shorten the time span to correct the nominal remuneration of labor and financial capital, thus reducing almost to zero the possibilities of neutralizing the spill over effects of the energy price policy. With respect to wages, it is worth noticing that, aside from the reduction of the adjustment period from twelve to six months, many other changes were introduced, first in the direction of providing real wages gains (corresponding to 10 % of past inflation) and then, again, in the direction of giving only partial compensation for price increases. Yet, for the

floating interest rates and for the exchange rate, the rules of a month by month compensation were kept, except for a short period in 1980.

The third and the fourth cycles by their turn went even further in this respect, for at this time the indexation policy fluctuated between the extreme positions, that either involved the full compensation of financial investors and exporters (not for past inflation, but rather for the current or expected monthly inflation rates) or the complete elimination of indexation.

Interesting enough, the three heterodox attempts to fight inflation tried to bring back the safeguard mechanisms, specially in the case of wages, whose period of adjustments was also subject to drastic changes. Indeed, in the CRUZADO PLAN the suppression of energy price effects from the wages indexators was object of a government determination, and the exclusion of a full month inflation rate for the wages adjustment a common principle of all of the three heterodox antiinflationary policy packages.

As a result of these decisions, the burden of the energy price policy has fluctuated considerably over time, as it can be seen in the evolution of the legal minimum wages rate level, of the official exchange rate, of the ORTNs and of wheat in real terms, provided by Graphs VIII to XI. Ironically, mostly

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GRAPH VIII

REAL EXCHANGE RATE

cn/us$

GRAPH IX

CRTH - REAL VALUES

CZ$

GRAPH X

REAL MINIMUM WAGE RATE

CZ$

GRAPH XI

WHEAT REAL PRICE

CZ$

* DEFLATOR : ICU-RJ MARCH 1986 = 100
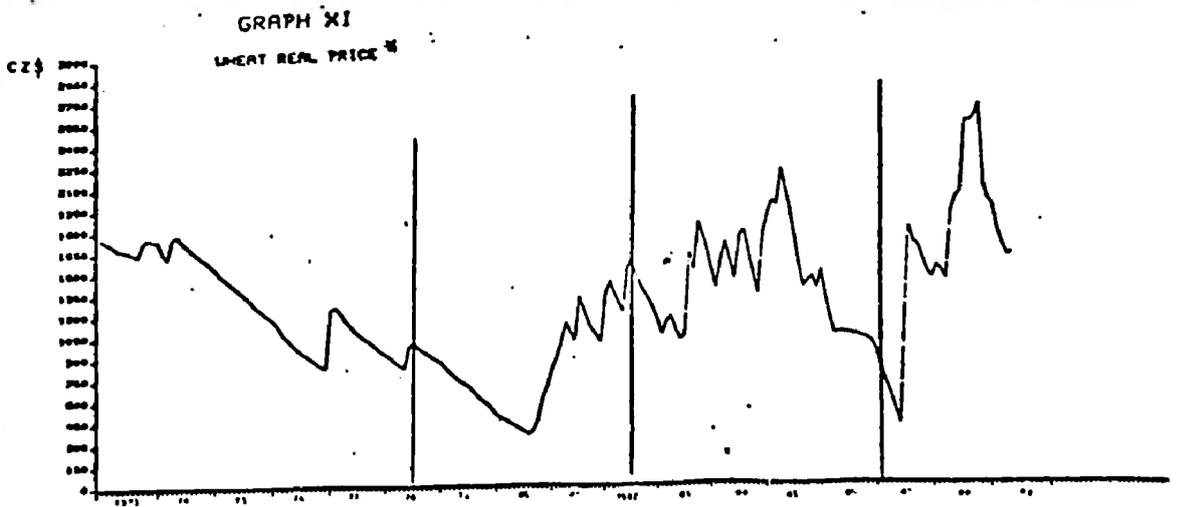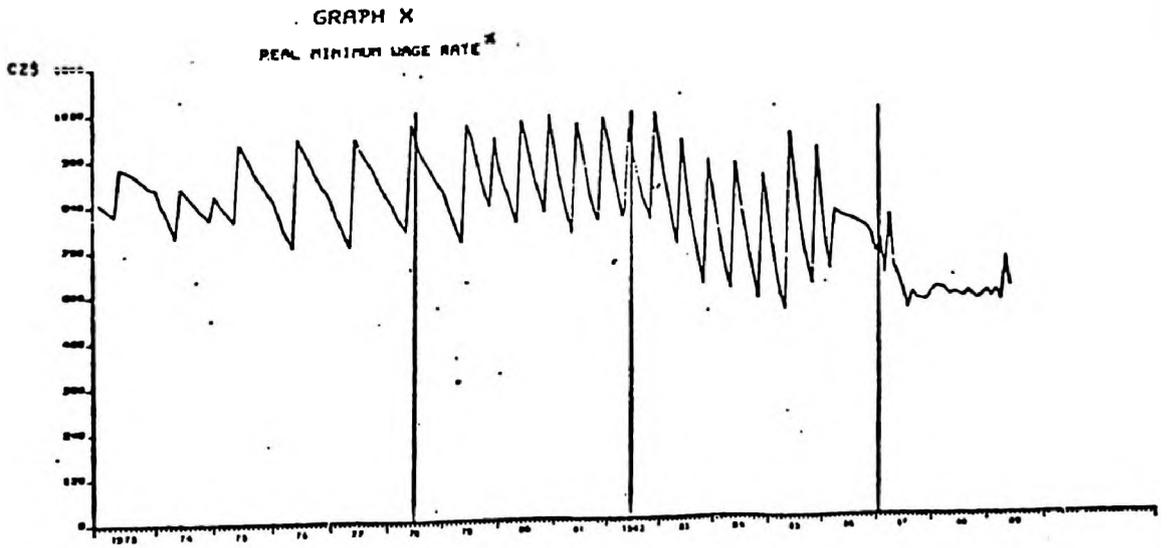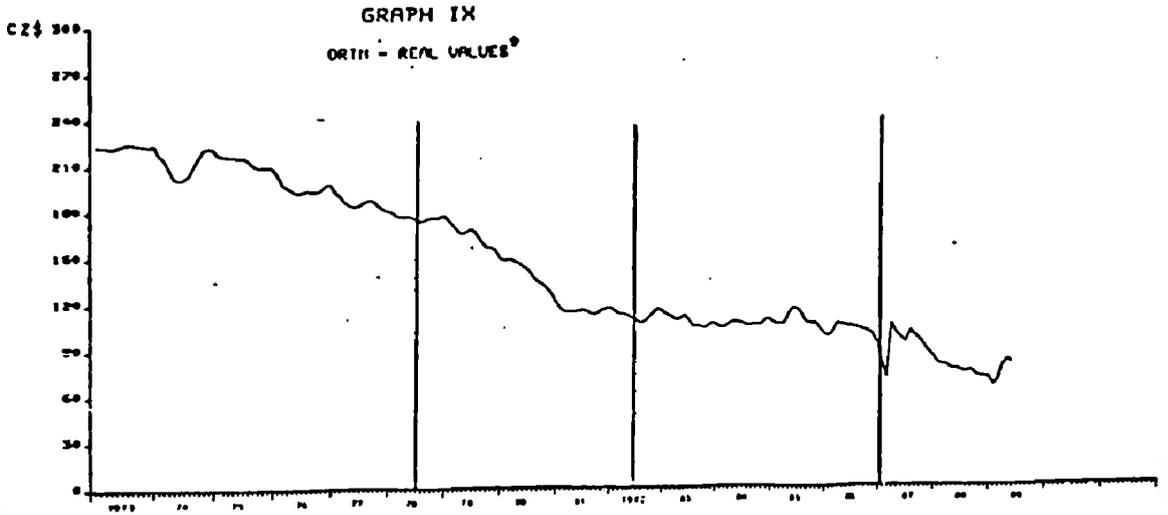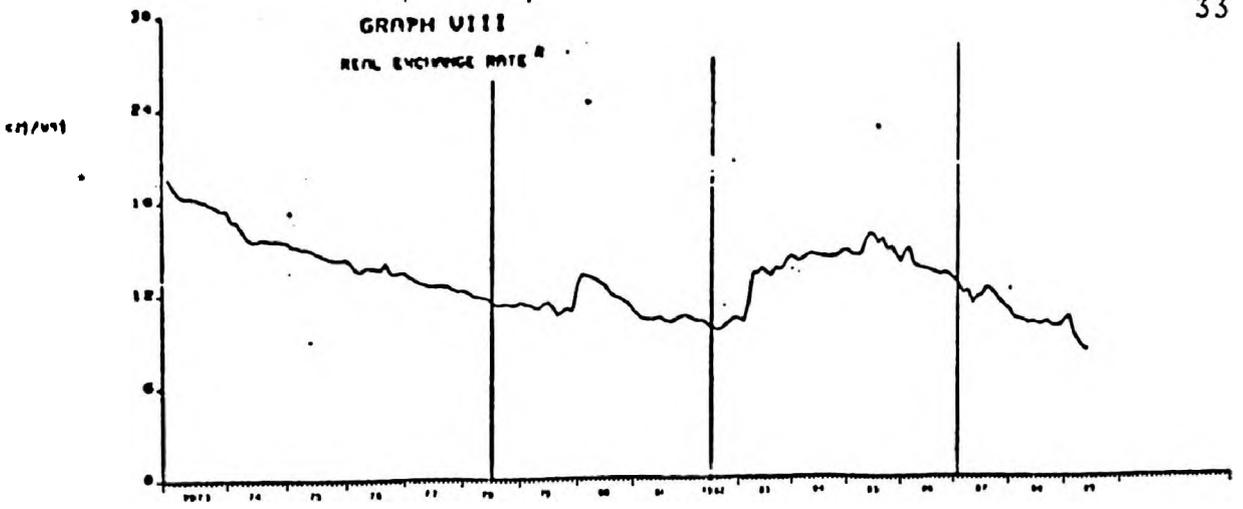
against the interest of the workers, that from the beginning of the third inflationary cycle on were faced with pronounced and consistent loss of real purchasing power; precisely the opposite of what was initially intended with the energy price policy.

X - The Stabilization Plans in the Light of this Study

In addition to its capability of statistically explain -and logically justify the price index behavior from 1973 on, the approach used in this study has also proved to be very helpful in providing a solid explanation for the failure of the heterodox as well as the orthodox stabilization plans adopted from 1973 on.

Essentially they failed for two reasons.

Firstly, and that comes out from the sequence of events described in the previous section, most of the time the energy price policy, as well as its exchange rate and interest rate counterparts, responded more to the interests of economic growth strategies than to the needs of price stabilization policies.

Secondly, there was a systematic underestimation, in the price stabilization programs, of the inflationary role of at least five of the seven independent variables included into the

mathematical model that underlines this study. Namely, the three oil derivatives, wheat prices and the floating interest rates, usually absent from the universe of the cost pressures formally considered in the mathematical models. As a consequence, the day to day government decisions on these variables are frequently either inconsistent with the prevailing inflation diagnosis or intrinsically contradictory.

Yet, most of the unexpected price movements tends to be attributed to odd reasons. It is worth noticing that the failure of the heterodox stabilization plans has been officially attributed to excessive demand pressures, stemming from excessive personal consumption and, more recently, from the public deficit, in spite of the prevailing high degree of idle productive capacity in the economy!

XI - Closing Remarks

As we have seen, the Brazilian inflationary process is a very peculiar one. It can hardly be understood within the limits of the most traditional analytic framework applied to market economies, where the government intervention in the economy does not go much beyond that of a producer of public services and of a regulator of the economic activity. Such being the case, sound fiscal and monetary policies, as they are

normally understood, are necessary, but not a sufficient condition for price stability.

The presence of state monopolies in the energy sector and wheat commercialization, associated to indexation and to price policies designed to perform, in addition to their normal functions, the role of important tax basis, is so strong that special provisions for such questions need to be explicitly considered in the price stabilization strategies if they are to produce effective and long lasting results.

In addition, and in the interest of these more comprehensive strategies, there is the need of an once for all change on the foundations of the price policies of the public sector, that no longer should be thought of as a tax basis for economic growth.

Of course this is not an easy task. However, if properly conceived and practiced, it might turn the pains of a successful stabilization plan bearable even to workers, often the ones that most suffer the effects of the antiinflationary strategies.

Brasília, July 7, 1989.

STATISTICAL APPENDIX

TABLE A-1

Period	Precu Gas NCZ6/1	Preco Ol.G NCZ6/1	Preco Ol.C NCZ6/kg	Preco Trigo NCZ6/t	Raior Sal.Min NCZ6	DTX ou DTX NCZ6	Taxa de Cambio-V NCZ6/US$	D1 NCZ6 mil.	D2 NCZ6 mil.	D3 NCZ6 mil.	Prod. Indust. 1981=100
Jan-72	0,00000066	0,00000056	0,00000014	0,0004838	0,0002250	0,00006152	0,00000565	0,0426	0,0540	0,0547	51,63
Fev	0,00000066	0,00000056	0,00000014	0,0004831	0,0002250	0,00006226	0,00000578	0,0432	0,0560	0,0502	52,75
Mar	0,00000066	0,00000056	0,00000014	0,0004838	0,0002250	0,00006349	0,00000581	0,0453	0,0582	0,0627	54,42
Abr	0,00000066	0,00000056	0,00000014	0,0004838	0,0002250	0,00006381	0,00000584	0,0460	0,0592	0,0641	53,49
Maio	0,00000069	0,00000059	0,00000014	0,0004838	0,0002680	0,00006444	0,00000529	0,0469	0,0606	0,0658	53,48
Jun	0,00000069	0,00000059	0,00000014	0,0004838	0,0002683	0,00006575	0,00000591	0,0497	0,0639	0,0693	61,45
Jul	0,00000069	0,00000059	0,00000014	0,0004838	0,0002683	0,00006693	0,00000594	0,0493	0,0646	0,0706	62,05
Ago	0,00000069	0,00000059	0,00000014	0,0005201	0,0002682	0,00006789	0,00000596	0,0496	0,0656	0,0719	66,59
Set	0,00000072	0,00000061	0,00000014	0,0005564	0,0002628	0,00006846	0,00000601	0,0521	0,0688	0,0755	63,73
Out	0,00000072	0,00000061	0,00000014	0,0005564	0,0002682	0,00006895	0,00000605	0,0539	0,0722	0,0793	67,99
Nov	0,00000072	0,00000061	0,00000014	0,0005564	0,0002683	0,00006961	0,00000611	0,0557	0,0742	0,0816	66,85
Dez	0,00000072	0,00000061	0,00000014	0,0005564	0,0002688	0,00007007	0,00000617	0,0616	0,0808	0,0825	64,62
Jan-73	0,00000075	0,00000064	0,00000015	0,0005564	0,0002688	0,03007078	0,00000622	0,0584	0,0789	0,0870	62,42
Fev	0,00000075	0,00000064	0,00000015	0,0005564	0,0002682	0,00007157	0,00000603	0,0605	0,0814	0,0898	59,66
Mar	0,00000075	0,00000064	0,00000015	0,0005564	0,0002688	0,00007232	0,00000603	0,0623	0,0841	0,0928	63,20
Abr	0,00000075	0,00000064	0,00000015	0,0005564	0,0002688	0,00007319	0,00000610	0,0657	0,0882	0,0975	61,07
Maio	0,00000079	0,00000066	0,00000016	0,0005564	0,0003120	0,00007403	0,00000610	0,0685	0,0923	0,1021	67,37
Jun	0,00000079	0,00000066	0,00000016	0,0005564	0,0003120	0,00007497	0,00000610	0,0737	0,0989	0,1093	70,92
Jul	0,00000079	0,00000066	0,00000016	0,0005564	0,0003120	0,00007580	0,00000613	0,0736	0,0996	0,1107	73,20
Ago	0,00000079	0,00000066	0,00000016	0,0006120	0,0003120	0,00007648	0,00000613	0,0754	0,1028	0,1145	76,12
Set	0,00000081	0,00000068	0,00000016	0,0006120	0,0003120	0,00007712	0,00000616	0,0796	0,1082	0,1204	74,43
Out	0,00000081	0,00000068	0,00000016	0,0006120	0,0003120	0,00007787	0,00000616	0,0820	0,1114	0,1245	82,10
Nov	0,00000089	0,00000068	0,00000016	0,0006120	0,0003120	0,00007840	0,00000616	0,0853	0,1146	0,1282	77,47
Dez	0,00000089	0,00000068	0,00000016	0,0006120	0,0003120	0,00007907	0,00000622	0,0905	0,1196	0,1338	74,62
Jan-74	0,00000103	0,00000073	0,00000018	0,0006120	0,0003120	0,00008062	0,00000634	0,0869	0,1166	0,1317	71,83
Fev	0,00000119	0,00000073	0,00000018	0,0006120	0,0003120	0,00008167	0,00000646	0,0908	0,1214	0,1367	65,07
Mar	0,00000161	0,00000092	0,00000023	0,0006985	0,0003120	0,00008269	0,00000646	0,0939	0,1252	0,1412	73,31
Abr	0,00000161	0,00000092	0,00000023	0,0007340	0,0003120	0,00008373	0,00000656	0,0950	0,1263	0,1434	73,07
Maio	0,00000161	0,00000092	0,00000023	0,0007340	0,0003760	0,00008510	0,00000656	0,0966	0,1290	0,1467	75,55
Jun	0,00000161	0,00000092	0,00000023	0,0007340	0,0003760	0,00008691	0,00000682	0,0988	0,1337	0,1522	72,44
Jul	0,00000161	0,00000092	0,00000023	0,0007340	0,0003760	0,00008980	0,00000639	0,0987	0,1309	0,1513	82,02
Ago	0,00000182	0,00000101	0,00000025	0,0007340	0,0003760	0,00009375	0,00000702	0,1037	0,1365	0,1578	81,60
Set	0,00000182	0,00000101	0,00000025	0,0007340	0,0003760	0,00009822	0,00000713	0,1036	0,1390	0,1614	79,97
Out	0,00000182	0,00000101	0,00000025	0,0007340	0,0003760	0,00010190	0,00000722	0,1062	0,1423	0,1690	84,02
Nov	0,00000182	0,00000101	0,00000025	0,0007340	0,0003760	0,00010410	0,00000735	0,1140	0,1509	0,1786	76,51
Dez	0,00000182	0,00000101	0,00000025	0,0007340	0,0004150	0,00010541	0,00000744	0,1208	0,1588	0,1877	72,96
Jan-75	0,00000202	0,00000113	0,00000027	0,0007340	0,0004150	0,00010676	0,00000755	0,1121	0,1512	0,1833	72,16
Fev	0,00000202	0,00000113	0,00000027	0,0007340	0,0004150	0,00010838	0,00000762	0,1121	0,1520	0,1849	67,69
Mar	0,00000202	0,00000113	0,00000027	0,0007340	0,0004150	0,00011010	0,00000774	0,1166	0,1570	0,1913	73,24
Abr	0,00000202	0,00000113	0,00000027	0,0007340	0,0004150	0,00011225	0,00000785	0,1190	0,1613	0,1968	77,26
Maio	0,00000232	0,00000129	0,00000031	0,0007340	0,0005320	0,00011449	0,00000798	0,1251	0,1698	0,2082	77,44
Jun	0,00000232	0,00000129	0,00000031	0,0007340	0,0005320	0,00011713	0,00000807	0,1331	0,1810	0,2212	84,17
Jul	0,00000232	0,00000129	0,00000031	0,0007340	0,0005320	0,00011927	0,00000813	0,1320	0,1823	0,2262	83,27
Ago	0,00000232	0,00000129	0,00000031	0,0007340	0,0005320	0,00012131	0,00000836	0,1409	0,1940	0,2396	81,71
Set	0,00000257	0,00000140	0,00000034	0,0007340	0,0005320	0,00012320	0,00000852	0,1430	0,2003	0,2482	83,91
Out	0,00000324	0,00000154	0,00000038	0,0007340	0,0005320	0,00012570	0,00000867	0,1460	0,2046	0,2562	86,84
Nov	0,00000324	0,00000154	0,00000038	0,0007340	0,0005320	0,00012443	0,00000890	0,1570	0,2185	0,2712	81,34
Dez	0,00000324	0,00000154	0,00000038	0,0007340	0,0005320	0,00013093	0,00000907	0,1724	0,2345	0,2897	78,76

TABLE A-1 (continuation)

Periodo	Preco Gas NCZ$/l	Preco Ol. D NCZ$/l	Preco Ol. C NCZ$/kg	Preco Trigo NCZ$/t	Maior Sal.Min NCZ$	OTN ou OTR NCZ$	Taxa de Cambio-V NCZ$/US$	A1 NCZ$ mil.	A2 NCZ$ mil.	A3 NCZ$ mil.	Prod. Indust. 1981=100
Jan-76	0,00000363	0,00000173	0,00000044	0,0007340	0,0005329	0,00013334	0,00000925	0,1613	0,2255	0,2440	77,93
Fev	0,00000363	0,00000173	0,00000044	0,0007340	0,0005329	0,00013590	0,00000942	0,1639	0,2289	0,2908	88,12
Mar	0,00000363	0,00000173	0,00000044	0,0007340	0,0005329	0,00013894	0,00000994	0,1660	0,2319	0,2964	85,63
Abr	0,00000363	0,00000173	0,00000044	0,0007340	0,0005329	0,00014224	0,00001037	0,1701	0,2492	0,3116	83,79
Maio	0,00000363	0,00000173	0,00000044	0,0007340	0,0007629	0,00014583	0,00001055	0,1768	0,2509	0,3239	88,46
Jun	0,00000363	0,00000173	0,00000044	0,0007340	0,0007680	0,00015017	0,00001080	0,1928	0,2707	0,3475	91,27
Jul	0,00000434	0,00000207	0,00000053	0,0007340	0,0007680	0,00015460	0,00001096	0,1916	0,2721	0,3578	92,91
Ago	0,00000434	0,00000207	0,00000053	0,0007340	0,0007680	0,00015855	0,00001117	0,1916	0,2708	0,3585	93,82
Set	0,00000434	0,00000207	0,00000053	0,0007340	0,0007629	0,00016297	0,00001137	0,1965	0,2768	0,3684	92,38
Out	0,00000434	0,00000207	0,00000053	0,0007340	0,0007680	0,00016833	0,00001183	0,2052	0,2874	0,3891	95,28
Nov	0,00000434	0,00000207	0,00000053	0,0007340	0,0007680	0,00017440	0,00001246	0,2141	0,2986	0,4015	89,44
Dez	0,00000480	0,00000237	0,00000061	0,0012020	0,0007629	0,00017968	0,00001235	0,2365	0,3218	0,4294	86,98
Jan-77	0,00000480	0,00000237	0,00000061	0,0012020	0,0007629	0,00018365	0,00001259	0,2161	0,3156	0,4263	88,49
Fev	0,00000510	0,00000270	0,00000061	0,0012020	0,0007680	0,00018683	0,00001287	0,2197	0,3135	0,4348	77,97
Mar	0,00000510	0,00000270	0,00000061	0,0012020	0,0007629	0,00019051	0,00001305	0,2270	0,3265	0,4521	91,38
Abr	0,00000600	0,00000270	0,00000061	0,0012020	0,0007680	0,00019483	0,00001337	0,2416	0,3458	0,4782	84,82
Maio	0,00000600	0,00000330	0,00000076	0,0012020	0,0011160	0,00020045	0,00001400	0,2453	0,3546	0,4877	93,55
Jun	0,00000600	0,00000330	0,00000076	0,0012020	0,0011160	0,00020699	0,00001435	0,2605	0,3748	0,5129	93,49
Jul	0,00000600	0,00000330	0,00000076	0,0012020	0,0011160	0,00021380	0,00001456	0,2620	0,3786	0,5349	93,16
Ago	0,00000600	0,00000330	0,00000076	0,0012020	0,0011160	0,00021951	0,00001481	0,2665	0,3915	0,5501	96,93
Set	0,00000630	0,00000350	0,00000081	0,0012020	0,0011160	0,00022401	0,00001502	0,2775	0,4055	0,5694	93,09
Out	0,00000630	0,00000350	0,00000081	0,0012020	0,0011160	0,00022715	0,00001528	0,2873	0,4235	0,5968	95,91
Nov	0,00000630	0,00000350	0,00000081	0,0012020	0,0011160	0,00023030	0,00001554	0,2944	0,4378	0,6119	92,97
Dez	0,00000630	0,00000350	0,00000081	0,0012020	0,0011160	0,00023374	0,00001605	0,3252	0,4763	0,6536	88,54
Jan-78	0,00000630	0,00000350	0,00000081	0,0012020	0,0011160	0,00023832	0,00001625	0,3030	0,4648	0,6475	86,15
Fev	0,00000730	0,00000400	0,00000094	0,0012020	0,0011160	0,00024335	0,00001650	0,3105	0,4742	0,6557	81,72
Mar	0,00000730	0,00000400	0,00000094	0,0012020	0,0011160	0,00024899	0,00001695	0,3195	0,4907	0,6716	93,92
Abr	0,00000730	0,00000400	0,00000094	0,0012020	0,0011160	0,00025541	0,00001727	0,3341	0,5097	0,7101	90,69
Maio	0,00000730	0,00000400	0,00000094	0,0015626	0,0015600	0,00026287	0,00001770	0,3380	0,5228	0,7262	95,93
Jun	0,00000730	0,00000400	0,00000094	0,0015626	0,0015600	0,00027028	0,00001803	0,3604	0,5519	0,7646	96,68
Jul	0,00000730	0,00000400	0,00000094	0,0015626	0,0015600	0,00027904	0,00001841	0,3623	0,5614	0,7973	98,13
Ago	0,00000840	0,00000460	0,00000107	0,0015626	0,0015600	0,00028758	0,00001885	0,3745	0,5834	0,8261	105,34
Set	0,00000840	0,00000460	0,00000107	0,0015626	0,0015600	0,00029557	0,00001925	0,3915	0,6055	0,8573	99,82
Out	0,00000840	0,00000460	0,00000107	0,0015626	0,0015600	0,00030329	0,00001964	0,4049	0,6225	0,8967	106,22
Nov	0,00000840	0,00000460	0,00000107	0,0015626	0,0015600	0,00031049	0,00002005	0,4210	0,6538	0,9324	99,68
Dez	0,00000840	0,00000460	0,00000107	0,0015626	0,0015600	0,00031844	0,00002092	0,4627	0,7111	0,9998	94,15
Jan-79	0,00000840	0,00000460	0,00000107	0,0015626	0,0015600	0,00032682	0,00002179	0,4359	0,6930	1,0457	95,28
Fev	0,00000960	0,00000540	0,00000140	0,0015626	0,0015600	0,00033420	0,00002225	0,4658	0,7351	1,0515	89,28
Mar	0,00000960	0,00000540	0,00000140	0,0015626	0,0015600	0,00034197	0,00002313	0,4640	0,7507	1,0784	99,15
Abr	0,00000960	0,00000540	0,00000140	0,0015626	0,0015600	0,00035051	0,00002379	0,4760	0,7794	1,1274	95,54
Maio	0,00001020	0,00000580	0,00000160	0,0015626	0,0022680	0,00036344	0,00002566	0,4916	0,7997	1,1543	103,89
Jun	0,00001020	0,00000580	0,00000160	0,0015626	0,0022690	0,00037754	0,00002566	0,5305	0,8568	1,2255	103,83
Jul	0,00001020	0,00000870	0,00000240	0,0015626	0,0022650	0,00039010	0,00002612	0,5476	0,8763	1,2900	105,47
Ago	0,00001020	0,00000870	0,00000240	0,0015626	0,0022680	0,00040071	0,00002770	0,5593	0,8982	1,3244	112,01
Set	0,00001430	0,00000870	0,00000240	0,0015626	0,0022680	0,00041224	0,00002983	0,6031	0,9509	1,3935	103,04
Out	0,00001430	0,00000870	0,00000240	0,0015626	0,0022680	0,00042840	0,00003042	0,6257	0,9921	1,4808	115,42
Nov	0,00002260	0,00001290	0,00000240	0,0015626	0,0029328	0,00044847	0,00003204	0,6750	1,0625	1,5408	106,16
Dez	0,00002260	0,00001290	0,00000240	0,0015626	0,0029328	0,00046071	0,00004253	0,8031	1,2479	1,7714	98,10

TABLE A-3 (continuation)

Periodo	Preco Gas NCZ$/l	Preco Ol. D NCZ$/l	Preco Ol. C NCZ$/kg	Preco Trigo NCZ$/t	Maior Sal.Min NCZ$	OTN av OTN NCZ$	Taxa de Cambio-V NCZ$/US$	M1 NCZ$ mil.	M2 NCZ$ mil.	M3 NCZ$ mil.	Prod. Indust. 1981=100
Jan-80	0,000023	0,000012	0,000002	0,001563	0,002933	0,000488	0,000044	0,7376	1,2528	1,8466	101,47
Fev	0,000023	0,000012	0,000002	0,001563	0,002933	0,000508	0,000045	0,7667	1,3533	1,9112	99,32
Mar	0,000026	0,000012	0,000004	0,001563	0,002933	0,000527	0,000047	0,7912	1,3500	1,9853	107,78
Abr	0,000028	0,000013	0,000005	0,001563	0,002933	0,000547	0,000049	0,8656	1,4358	2,1453	101,97
Maio	0,000030	0,000014	0,000006	0,001563	0,004150	0,000567	0,000051	0,9101	1,4934	2,2206	112,10
Jun	0,000035	0,000015	0,000007	0,001563	0,004150	0,000586	0,000052	0,9878	1,5869	2,3467	113,77
Jul	0,000038	0,000016	0,000009	0,001563	0,004150	0,000605	0,000054	0,9670	1,5874	2,3948	119,33
Ago	0,000038	0,000016	0,000009	0,001746	0,004150	0,000624	0,000056	1,0155	1,6284	2,4664	117,93
Set	0,000038	0,000016	0,000009	0,002193	0,004150	0,000644	0,000058	1,0519	1,6836	2,5516	121,14
Out	0,000045	0,000017	0,000011	0,003117	0,004150	0,000664	0,000061	1,1000	1,7506	2,6829	123,44
Nov	0,000045	0,000017	0,000011	0,003750	0,005789	0,000685	0,000063	1,1975	1,8693	2,8141	116,46
Dez	0,000051	0,000020	0,000012	0,004885	0,005789	0,000707	0,000066	1,3670	2,0675	3,0522	104,17
Jan-81	0,000051	0,000020	0,000012	0,005673	0,005788	0,000739	0,000068	1,2334	1,9815	3,0920	101,54
Fev	0,000060	0,000026	0,000015	0,006858	0,005788	0,000775	0,000072	1,2897	2,0824	3,2350	100,97
Mar	0,000060	0,000026	0,000015	0,008226	0,005788	0,000826	0,000077	1,2565	2,0564	3,3853	101,99
Abr	0,000066	0,000033	0,000018	0,008226	0,005788	0,000878	0,000081	1,3633	2,2639	3,4926	95,30
Maio	0,000066	0,000033	0,000012	0,008226	0,008465	0,000931	0,000086	1,4241	2,3981	3,8694	98,62
Jun	0,000075	0,000042	0,000018	0,011310	0,008465	0,000986	0,000091	1,5501	2,6299	4,1343	102,71
Jul	0,000075	0,000042	0,000020	0,011310	0,008465	0,001046	0,000097	1,5486	2,7323	4,5707	106,62
Ago	0,000075	0,000042	0,000020	0,011310	0,008465	0,001108	0,000103	1,6174	2,8212	4,7744	103,60
Set	0,000075	0,000042	0,000020	0,011310	0,008465	0,001173	0,000109	1,6872	3,0326	5,0226	100,83
Out	0,000085	0,000050	0,000023	0,011310	0,008465	0,001239	0,000115	1,8919	3,3529	5,6528	103,26
Nov	0,000085	0,000050	0,000023	0,011310	0,011928	0,001310	0,000121	2,0632	3,6141	5,9770	96,58
Dez	0,000085	0,000050	0,000023	0,015907	0,011928	0,001382	0,000128	2,5585	4,2315	6,7164	88,07
Jan-82	0,000085	0,000050	0,000023	0,018096	0,011928	0,001454	0,000134	2,35	4,15	7,03	85,35
Fev	0,000104	0,000062	0,000028	0,018096	0,011928	0,001527	0,000141	2,39	4,30	7,24	84,73
Mar	0,000104	0,000062	0,000028	0,018096	0,011928	0,001603	0,000142	2,35	4,39	7,52	100,80
Abr	0,000104	0,000062	0,000028	0,018096	0,011928	0,001683	0,000156	2,51	4,74	8,10	94,74
Maio	0,000125	0,000075	0,000034	0,024517	0,016608	0,001776	0,000164	2,66	5,10	8,63	100,55
Jun	0,000125	0,000075	0,000034	0,027144	0,016608	0,001873	0,000173	2,86	5,52	9,28	105,81
Jul	0,000132	0,000075	0,000034	0,027144	0,016608	0,001976	0,000183	2,99	5,77	10,01	109,48
Ago	0,000132	0,000075	0,000034	0,027144	0,016608	0,002095	0,000194	3,01	5,97	10,34	112,15
Set	0,000144	0,000084	0,000038	0,027144	0,016608	0,002242	0,000207	3,16	6,22	10,91	108,64
Out	0,000144	0,000084	0,000038	0,027144	0,016608	0,002399	0,000222	3,41	6,65	11,76	105,93
Nov	0,000144	0,000084	0,000038	0,027144	0,023568	0,002566	0,000237	3,70	7,06	12,48	99,17
Dez	0,000167	0,000102	0,000047	0,027144	0,023568	0,002733	0,000253	4,22	7,78	13,59	89,08
Jan-83	0,000167	0,000102	0,000047	0,027144	0,023568	0,002911	0,000275	4,15	7,88	14,38	82,51
Fev	0,000167	0,000102	0,000047	0,031508	0,023568	0,003086	0,000301	4,21	8,23	14,02	79,71
Mar	0,000210	0,000130	0,000061	0,035290	0,023568	0,003292	0,000418	4,14	8,55	15,54	94,33
Abr	0,000210	0,000130	0,000061	0,035290	0,023568	0,003589	0,000455	4,47	9,32	17,36	85,46
Maio	0,000210	0,000130	0,000061	0,035290	0,034776	0,003912	0,000494	4,61	9,97	18,16	94,71
Jun	0,000303	0,000191	0,000029	0,039995	0,034776	0,004225	0,000543	5,20	10,85	19,44	95,64
Jul	0,000303	0,000191	0,000089	0,070580	0,034776	0,004554	0,000612	5,23	11,31	21,35	96,20
Ago	0,000353	0,000232	0,000118	0,070580	0,034776	0,004964	0,000671	5,49	12,06	23,97	104,44
Set	0,000353	0,000232	0,000118	0,095169	0,034776	0,005386	0,000738	6,12	13,38	26,76	101,43
Out	0,000353	0,000232	0,000118	0,098812	0,034776	0,005897	0,000842	6,63	14,66	29,80	102,51
Nov	0,000445	0,000300	0,000153	0,098812	0,057120	0,006470	0,000914	7,02	16,00	32,04	98,47
Dez	0,000445	0,000300	0,000153	0,098812	0,057120	0,007013	0,000984	8,23	18,31	36,47	89,17

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TABLE A-1 (continuation)

Periodo	Preco Gas RCZ0/l	Preco Ol. D RCZ0/l	Preco Ol. C RCZ0/kg	Preco Trigo RCZ0/t	Maior Sal.Min RCZ0	OTN ou BTN RCZ0	Taxa de Cambio-V RCZ0/US$	M1 RCZ0 mil.	M2 RCZ0 mil.	M3 RCZ0 mil.	Prod. Indust. 1981=100
Jan-84	0,0004	0,0004	0,0002	0,0988	0,0571	0,0075	0,0011	8,06	19,21	39,01	84,65
Fev	0,0006	0,0004	0,0002	0,1245	0,0571	0,0083	0,0012	8,21	21,02	42,06	84,61
Mar	0,0006	0,0004	0,0002	0,1482	0,0571	0,0093	0,0013	8,92	23,78	48,37	91,07
Abr	0,0007	0,0005	0,0002	0,1482	0,0571	0,0102	0,0015	10,27	27,02	54,21	88,01
Maio	0,0007	0,0005	0,0002	0,1482	0,0972	0,0111	0,0016	10,75	29,51	58,75	104,39
Jun	0,0009	0,0006	0,0003	0,1986	0,0972	0,0121	0,0017	12,95	33,04	64,54	103,60
Jul	0,0009	0,0006	0,0003	0,2238	0,0972	0,0133	0,0019	14,17	36,42	71,99	107,36
Ago	0,0011	0,0008	0,0004	0,2238	0,0972	0,0146	0,0021	15,32	39,95	79,99	110,48
Set	0,0011	0,0008	0,0004	0,2238	0,0972	0,0162	0,0023	17,40	44,30	88,72	104,49
Out	0,0011	0,0008	0,0004	0,2238	0,0972	0,0179	0,0026	18,19	49,25	100,17	113,53
Nov	0,0014	0,0010	0,0005	0,3245	0,1666	0,0201	0,0029	21,23	54,31	111,93	105,30
Dez	0,0017	0,0012	0,0006	0,3842	0,1666	0,0221	0,0032	27,70	66,95	129,46	94,50
Jan-85	0,0017	0,0012	0,0006	0,4273	0,1666	0,0244	0,0036	24,94	70,96	141,87	97,38
Fev	0,0017	0,0012	0,0006	0,5063	0,1666	0,0275	0,0040	28,13	79,00	160,27	90,27
Mar	0,0022	0,0015	0,0007	0,6328	0,1666	0,0303	0,0045	30,99	88,06	176,87	100,76
Abr	0,0022	0,0015	0,0007	0,6328	0,1666	0,0342	0,0050	34,32	96,18	197,04	90,73
Maio	0,0022	0,0015	0,0007	0,6328	0,3331	0,0382	0,0055	37,21	106,93	216,90	102,13
Jun	0,0022	0,0015	0,0007	0,6328	0,3331	0,0420	0,0060	44,27	124,95	246,07	105,79
Jul	0,0022	0,0015	0,0007	0,6328	0,3331	0,0459	0,0064	49,10	137,13	265,89	117,06
Ago	0,0026	0,0018	0,0010	0,6328	0,3331	0,0494	0,0070	56,03	154,19	288,73	119,50
Set	0,0029	0,0020	0,0011	0,7119	0,3331	0,0534	0,0078	65,01	169,24	321,05	117,40
Out	0,0031	0,0022	0,0012	0,7910	0,3331	0,0583	0,0085	67,51	183,86	352,39	128,39
Nov	0,0036	0,0024	0,0013	0,8359	0,6010	0,0635	0,0094	83,92	203,44	394,12	115,92
Dez	0,0042	0,0027	0,0014	1,0600	0,6010	0,0706	0,0105	101,90	261,14	470,78	106,07
Jan-86	0,0042	0,0027	0,0014	1,0600	0,6010	0,0800	0,0113	102,14	271,20	536,34	108,65
Fev	0,0048	0,0031	0,0016	1,0600	0,8040	0,0930	0,0130	116,54	322,46	634,30	102,04
Mar	0,0048	0,0031	0,0016	1,0600	0,8040	0,1064	0,0138	210,01	414,51	715,07	104,46
Abr	0,0048	0,0031	0,0016	1,0600	0,8040	0,1064	0,0138	250,48	448,28	731,87	109,11
Maio	0,0048	0,0031	0,0016	1,0600	0,8040	0,1064	0,0138	288,89	482,00	765,02	114,00
Jun	0,0048	0,0031	0,0016	1,0600	0,8040	0,1064	0,0138	334,09	530,75	819,41	121,14
Jul	0,0049	0,0031	0,0016	1,0600	0,8040	0,1064	0,0138	333,31	542,69	837,58	131,29
Ago	0,0061	0,0031	0,0016	1,0600	0,8040	0,1064	0,0138	356,19	595,59	895,57	130,41
Set	0,0061	0,0031	0,0016	1,0600	0,8040	0,1064	0,0138	375,91	642,82	955,11	137,39
Out	0,0061	0,0031	0,0016	1,0600	0,8040	0,1064	0,0140	403,24	711,07	1026,78	143,28
Nov	0,0071	0,0031	0,0016	1,0600	0,8040	0,1064	0,0141	421,92	759,91	1077,20	126,50
Dez	0,0098	0,0031	0,0016	1,0600	0,8040	0,1064	0,0146	455,48	746,82	1076,67	113,98
Jan-87	0,0098	0,0031	0,0016	1,0600	0,9648	0,1064	0,0157	356,06	725,20	1094,55	116,03
Fev	0,0098	0,0031	0,0016	1,0600	0,9648	0,1064	0,0181	377,48	788,09	1249,55	115,99
Mar	0,0113	0,0040	0,0022	1,0600	1,3684	0,1816	0,0210	424,99	823,90	1491,09	120,21
Abr	0,0133	0,0048	0,0027	1,0600	1,3684	0,2080	0,0237	357,72	794,68	1480,81	119,15
Maio	0,0182	0,0069	0,0039	1,0600	1,6416	0,2516	0,0308	361,15	876,91	1741,03	120,47
Jun	0,0228	0,0093	0,0049	3,7800	1,9699	0,3105	0,0395	475,17	1018,82	2100,19	123,43
Jul	0,0258	0,0104	0,0058	6,5000	1,9699	0,3665	0,0449	522,63	1163,80	2446,02	122,78
Ago	0,0258	0,0104	0,0062	6,5000	2,2699	0,3777	0,0471	573,54	1215,67	2580,37	123,87
Set	0,0275	0,0104	0,0068	6,9739	2,4000	0,4017	0,0499	622,89	1245,43	2710,63	129,43
Out	0,0305	0,0112	0,0077	7,2983	2,6400	0,4245	0,0534	695,78	1331,79	2903,73	132,01
Nov	0,0344	0,0144	0,0090	7,8200	3,0000	0,4635	0,0593	792,06	1549,96	3262,70	123,56
Dez	0,0406	0,0171	0,0102	8,7975	3,6000	0,5230	0,0675	1035,92	1997,00	4058,86	109,45

TABLE A-1 (continuation)

Periodo	Preco Gas NCZ$/l	Preco Ol. D NCZ$/l	Preco Ol. C NCZ$/kg	Preco Trigo NCZ$/t	Maior Sal.Min NCZ$	OTN ov OTN NCZ$	Taxa de Cambio-V NCZ$/US$	A1 NCZ$ mil.	A2 NCZ$ mil.	A3 NCZ$ mil.	Prod. Indust. 1981=100
Jan-88	0,0475	0,0204	0,0106	11,3400	4,5000	0,5969	0,9777	929,46	2932,98	6610,35	105,30
Fev	0,0531	0,0233	0,0119	13,0410	5,2000	0,6955	0,0900	1026,33	2306,60	5477,62	105,94
Mar	0,0602	0,0246	0,0135	14,8000	6,2400	0,8204	0,1072	1178,12	2694,67	6598,25	119,01
Abr	0,0681	0,0314	0,0156	23,6000	7,2600	0,9518	0,1257	1325,02	3056,40	7632,56	109,22
Maio	0,0818	0,0384	0,0186	29,6000	8,7120	1,1353	0,1506	1580,51	3655,97	9300,50	113,30
Jun	0,0985	0,0469	0,0223	36,4000	10,3000	1,3370	0,1783	1844,03	4423,94	10006,00	125,30
Jul	0,1144	0,0546	0,0258	55,0020	12,4400	1,5903	0,2150	2915,45	5916,62	12903,25	125,25
Ago	0,1415	0,0670	0,0322	66,6500	15,5520	1,9025	0,2674	2235,66	5902,09	15903,27	133,26
Set	0,1725	0,0858	0,0309	84,6460	18,7000	2,3921	0,3262	2893,89	7464,53	19764,62	128,07
Out	0,2068	0,1050	0,0473	110,6000	23,7000	2,9664	0,4117	3711,12	NA	24413,22	121,93
Nov	0,2348	0,1270	0,0568	110,6000	30,0000	3,7747	0,5262	4554,00	NA	30920,18	114,72
Dez	0,2860	0,1570	0,0693	134,6823	40,6250	4,7909	0,7000	6958,16	NA	40965,49	NA
Jan-89	0,3730	0,1993	0,0877	183,3946	54,3740	6,1760	1,0000	8144,56	NA	48031,97	NA
Fev *	0,4280	0,2260	0,0993	188,7800	63,9000	7,3393	1,0000	8566,29	NA	NA	NA
Mar *	0,4280	0,2260	0,0993	188,7800	63,9000	8,8371	1,0000	NA	NA	NA	NA
Abr *	0,4280	0,2260	0,0993	188,7800	81,6000	9,8552	1,0000	NA	NA	NA	NA
Maio *	0,5500	0,2700	0,1140	217,1000	81,4000	11,8407	1,1200	NA	NA	NA	NA
Jun	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Jul	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ago	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Set	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Out	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nov	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dez	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sources: Min. do Trabalho, Min. das Minas e Energia,
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* - BRTN extinguish Jan.89 - estimated values

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