PRICE POLICY EFFICIENCY FOR RICE AND CORN WITHIN A RATIONAL EXPECTATION ECONOMIC MODEL

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ABSTRACT - The performance of the Brazilian Minimum Price Policy from 1985 to 1997 is analyzed within a rational expectation economic model. We examine different patterns of government intervention to support rice and corn market prices at the minimum level established by the government. The results indicate that the policy has not performed well due to either operational difficulties or the existence of other economic policy priorities.

Key words: Rice, corn, minimum prices, rational expectation.

INTRODUCTION

Since the 1980s, the process of economic development in Brazil has changed as a result of internal and external factors. Within Brazil, industrialization through import substitution based on public and external savings has greatly slowed. On the external front, the rapid globalization has led to extensive worldwide commercial and financial integration. In this context, a radical redefinition of the government's economic role is urged so that its entrepreneurial and market intervention functions are abandoned and government efforts are concentrated on public services, such as health, education, and economic regulatory activity.

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Agriculture has been one of the economic sectors mostly affected by the changes in the role of Brazil's government. At the end of the 1980s, public expenditures in the sector were greatly reduced (Barros, Beres & Malheiros, 1993), mainly between 1988 and 1989. During this period, Federal expenditures (including those by public corporations) decreased over 43% through a reduction of resources available for rural credit, supply regulation, and for specific product assistance programs (such as for wheat, cocoa, coffee, sugar and alcohol). At that time, the two key agricultural policy instruments – rural credit and the minimum price policy - were severely affected. Currently, the use of these instruments is restricted to a reduced group of products and producers. Precarious, uncertain times are expected while the new mechanisms for rural financing and risk management are defined.

It is time to reflect on the performance of the Brazilian Government's pricing policy through the '80s and '90s. The objective of this research is to evaluate the policy's efficiency in terms of its ability to support corn and rice market prices, thus to gain from the lessons provided by a three-decade experience.

First of all, a precise concept of price policy efficiency is defined in accordance with available information. As defined in this paper, price policy efficiency is determined by the policy's success in supporting corn and rice prices at or above the minimum level established by government. Possible benefits (or losses) generated by the policy that affect market conditions, reduce (or promote) market risk, and stabilize (or destabilize) market behavior, are not analyzed. Though relevant, such aspects involve analyses that lie beyond the scope of this article.

The adopted concept of efficiency assumes some fundamental pre-conditions: (a) the minimum price announcement is made at the right moment (pre-planting time); (b) strict governmental adherence to the buying and selling rules, (c) availability of public funds compatible with the desired intervention, and (d) use of resources at the proper time (harvest time). A comparison of minimum and market prices is not enough to evaluate the policy's efficiency; it is also necessary to analyze government buy-and-sell movements and consequent public inventory variations, in order to detect the compatibility of inventories with market prices. The analysis is developed for the rice and corn markets, in which Brazilian minimum price policy has been most active over the last 20 years.

In this paper, the Minimum Price Program for rice and corn markets in Brazil is evaluated based on a rational expectation economic model. This model is not econometrically estimated; this is an objective for future research. Following Helmberger & Weaver (1977), available estimates of supply and demand functions are used to simulate prevailing market conditions during the selected crop years.

METHODOLOGY

Economic model

This section presents an economic model representing the competitive, storable agricultural product market. Through use of this model, it is possible to evaluate gains and losses caused by different inventory formation intervention patterns designed to maintain price stability. This model was developed by Helmberger & Weaver (1977) and can also be found in Barros (1987, chapter 5).

Admitting that at any year t the market of any agricultural product not traded externally can be represented by:

$$D_t = \alpha_o - \alpha_1 P_t + u_t \qquad (1)$$

$$S_t = \beta_o + \beta_1 P_t^* + v_t \qquad (2)$$

D_t and S_t are the demanded and supplied quantities; P_t is the market unit price of the product in year t; and P_t^* is the price expected for year t at year t–1 (when the planting decisions are made). D_t must be viewed as the derived demand at the farm level, which is obtained from consumer's demand by properly discounting marketing margins (Barros, 1987, p.67). The parameters α_o, α_1, β_o and β_1 are all positive. The are independent, random variables u_t and v_t have zero expected value and respectively represent shocks to the supply and demand curves. In any year t, the market equilibrium is given by:

$$D_t - S_t - I_{t-1} + I_t = 0 \tag{3}$$

Where I_{t-1} is the carryover (end of the previous period) inventory level and I_t the carryout level in year t. The rational expectation approach supposes that P_t^* is the producer's expected price at the time when they will sell their production. This price equals the equilibrium price expectation. In other words, $P_t^* = E(P_t)$ must satisfy the expected values of (1), (2) and (3), given the information available at year t–1. Thus:

$$P_t^* = [(\alpha_o - \beta_o) - E(I_{t-1}) + E(I_t)] / (\alpha_1 + \beta_1) \tag{4}$$

Particularly when $E(I_{t-1}) = E(I_t) = 0$, the expected price will be a parameter given by:

$$P_t^* = P^* = (\alpha_o - \beta_o) / (\alpha_1 + \beta_1) \tag{5}$$

In order to better understand model implications it is useful to consider two cases:

Case I: $I_{t-1} = 0$. Assuming absence of carryover inventory, $(I_{t-1}) = 0$, it follows that $E(I_t) = 0$ and the expected price will be given by (5). Considering that $I_{t-1} = 0$ and $E(I_s) = 0$ for s≥t, implies that $P_s^* = P^*$ for all s. Assuming now that only $E(I_t) > 0$ and considering (4) and (5), it results that $P_t^* > P^*$. In this case, there would also be a positive expected carryover in (t+1) and $P_{t+1}^* < P^*$, what is not economically consistent with $E(I_t) > 0$ even if storage cost is null. So, it is possible to conclude that when $I = 0$ then $E(I) = 0$ follows, and there would be no reason to expect storage in year t.

Case II: $I_{t-1} > 0$. In this situation:

$$P_t^* = [\alpha_o - \beta_o - I_{t-1} + E(I_t)] / (\alpha_1 + \beta_1) \tag{6}$$

The determination of P_t^* depends on the relationship between I_{t-1} and $E(I_t)$, the observed carryover and the expected carryout level in year t, which depends on the expected demand for and the supply of storage. Demand for storage at year 1 (current period by hypothesis) is defined as the relationship between the sum of storage quantities demanded to be delivered in all subsequent periods and the different alternative prices in year 1. If there is no demand for storage in year 1, the expected price will be P^*.

On the other hand, if there is any demand for storage, the expected future prices will fall below P^* and the observed market price in year 1 will rise. The problem is in evaluating storage demand at different levels of P_1 considering a constant, annual, and per unit storage cost C . Storage from year 1 to 2 is expected if, and only if, $P^* - P_1 > C$. When the expected price in year 2 falls from P^* to P_2^* such that $P_2^* - P_1 = C$, the attractiveness of storage will be eliminated. Thus,

$$I_1^d = i_{12} = E(D_2) - E(S_2) = (\alpha_o - \beta_o) - (\alpha_1 + \beta_1)P_2^*$$

or

$$I_1^d = (\alpha_o - \beta_o) - (\alpha_1 + \beta_1)(P_1 + C) \quad \text{with } P^* - 2C \leq P_1 \leq P^* - C \qquad (7)$$

where I_1^d is the demand for storage in year 1; i_{12} is the demand in year 1 for delivery in year 2 (the only existing demand at that price interval). In the general case, the demand for storage in year 1 may involve planned delivery in n–1 subsequent periods (from period 2 to n):

$$I_1^d = \sum_{j=2}^{n} i_{1j} \qquad \text{for } j = 2,\ldots,n \qquad \text{and}$$

$$I_1^d = (n-1)[(\alpha_o - \beta_o) - (\alpha_1 + \beta_1)P_1] - (\alpha_1 + \beta_1)\, C\, \Sigma_j\, (j-1) \qquad (8)$$

$$P^* - nC \leq P_1 \leq P^* - (n-1)C$$

Therefore, the expected demand for storage in year 1 is a line broken at the points

$$P_1 = P^*, P^* - C, \; P^* - 2C, P^* - 3C, \text{etc.}$$

The expected storage supply is the expected surplus to be stored in year 1 at different alternative levels of P_1. This surplus is obtained by subtracting the expected product demand from the expected available product (expected supply plus carryover inventory).

$$E(I_1^s) = E(S_1) + I_0 - E(D_1)$$

It follows that

$$E(I_1^s) = (\beta_0 - \alpha_0 + I_0) + (\beta_1 + \alpha_1) \quad P_1^* \; P_1^* \leq (\alpha_0/\alpha_1) \qquad (9)$$
$$E(I_1^s) = \beta_0 + \beta_1 P_1^* + I_0 \qquad P_1^* > (\alpha_0/\alpha_1)$$

Equating (8) and (9) gives the values of P_1^* and $E(I_1)$. Note that the values of I_0 have a fundamental role in this analysis. For example, if $I_0 = 0$ (case I), $E(I_1) = 0$, and from the previous arguments, $P_1^* = P^*$. It is possible to show that there is a critical level of carryover inventory (I_{00}) beyond which $E(I_1) > 0$. Recall that the storage demand exists (is positive) only for $P_1 < P^* - C$ or, $I_1^d = 0$ if $I_0 \leq I_{00}$ because $P_1 \geq P^* - C$. To determine the critical inventory level it is necessary to get the value of I_0 so that $P_1^* = P^* - C$. If there is no carryout, the market equilibrium is given by:

$$E(S_1) + I_0 - E(D_1) = 0 \qquad \text{for } P_1 = P^* - C, \qquad \text{which leads}$$

to:

$$I_{00} = (\alpha_1 + \beta_1)\, C \qquad (10)$$

For $I_0 \leq I_{00}$, the expected price in year 1 will be:

$$P_1^* = [\alpha_o - \beta_o - I_0] / (\alpha_1 - \beta_1) \qquad I_0 \leq I_{00} \qquad (11)$$

In reality, only when $I_0 > I_{00}$ is it possible to equate the expected supply and demand for storage to determine the expected price in year 1. The next step is to determine values (prices, produced and consumed quantities, and carryout) at model equilibrium based on I_0, P_1^*, and on the supply and demand shocks (u_1 e v_1). To do this, supply and demand for storage are considered. Note that while the observed demand for storage, based only on future (expected) values, is the same as the expected demand discussed earlier, the (observed) supply for storage takes into consideration new information with respect to year 1.

The supply for storage at year 1 (I_1^s) corresponds to the available surplus (above annual consumption) for storage after production takes place. It relates the surplus quantities to different alternative price levels:

$$I_1^s = Q_{10} - D_1 \qquad P_1 \geq P_{10} \ \text{ e } \ D_1 \geq 0 \qquad (12)$$

where Q_{10} is the available quantity of product at period 1 and P_{10} is the price at which all production would be consumed in the same period 1.

Having obtained P_1*, after considering the value of I_0, its value is substituted into (2) in order to obtain Q_{10}, the value of which is substituted into (1) in order to obtain the value of P_{10}. It follows that, making price equal to P_{10} in (1), Q_{10} is obtained. Thus, (12) can be obtained by subtracting from (1) with price equal to P_1 the same expression (1) with price equal to P_{10}.

$$\begin{aligned} I_1^s &= \alpha_1 \ (P_1 - P_{10}) \qquad & P_{10} \leq P_1 \leq (\alpha_0 + u_1\ ) \,/\, \alpha_1 \qquad (13) \\ I_1^s &= Q_{10} & P_1 > (\alpha_0 + u_1\ ) \,/\, \alpha_1 \end{aligned}$$

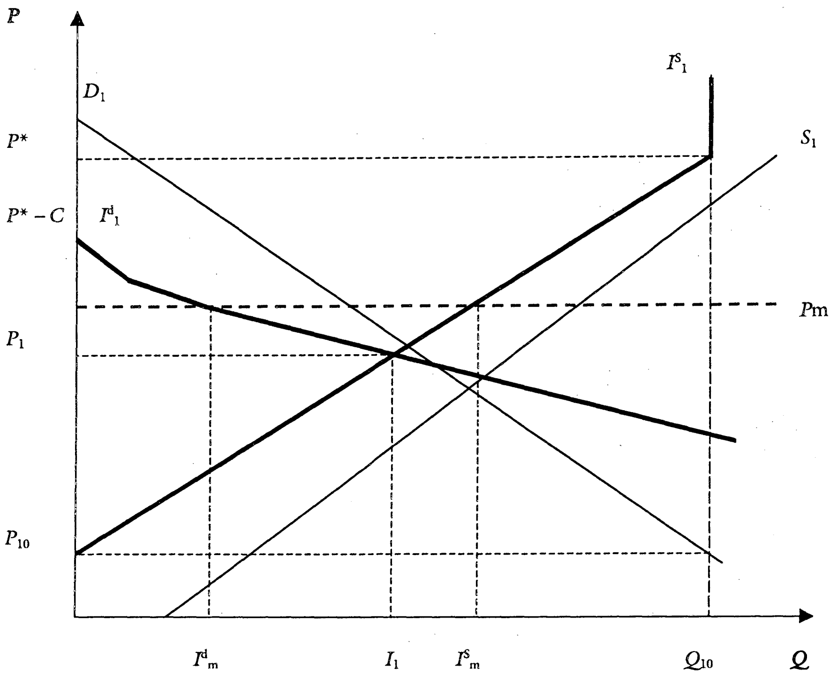
Finally, equating (13) and (8), the equilibrium values for P_1, the carryout inventory level (I_1), and other information of interest is obtained.

Efficiency of the Minimum Price Policy

Based on the model presented above, it is possible to analyze the price policy's efficiency. Figure 1 shows the current demand (D_1) and supply (S_1) curves taking into consideration the shocks that occurred in each curve. In the figure, it is assumed, with no loss of generality that there is no carryover inventory. I^d_1 e I^s_1 are the supply and demand curves for storage and are compatible with the equilibrium price P_1 and carryout inventory of I_1.

Under these conditions, a minimum price established below P_1 will have no efficiency; the price established by the market prevailing. If the minimum price is established above $P^* - C$ there will be no demand for storage by the private sector, with government becoming the only buyer in the market. Finally, if the minimum price is settled between P_1 and $P^* - C$, as the figure shows, the government should buy the difference between the quantity demanded by the private sector (I^d_m) and the quantity supplied for storage given by I^s_m.

Figure 1 – Market equilibrium with storage



Data and procedures

The parameters of the supply and demand functions are calculated for the sample averages from available estimates[3] of rice and corn supply and demand elasticities in Brazil. The Brazilian minimum price program efficiency analysis is made for the agricultural years between 1985 and 1997 and includes scarcity and abundant and normal harvest periods.

The inventory, production, and price data were taken from Companhia Brasileira de Abastecimento (CONAB) and Fundação Getúlio Vargas (FGV). Harvest period prices were estimated prices

[1] Following Helmberger & Weaver (1977).

received by farmers. The rice harvest period lies between March and May; while corn is harvested between April and June.

The clean, dry, bagged product storage cost is based on the "Table of Tariffs for Minimum Price Products – Natural Environment" from CONAB. A 30% additional charge above the basic tariff was applied because these products are destined exclusively for processing. The opportunity cost of inventory holding was based on an estimated real interest rate of 0.5% per month.

The literature contains few Brazilian corn demand and supply price elasticity estimates. Bos (1986) and Sullivan (1989) present the most recent elasticity estimates. Bos gives corn supply elasticity estimates of 0.0 and 0.242 and demand elasticity estimates between 0.0 and –0.237; Sullivan gives 0.5 elasticity of supply estimates and –0.5 elasticity of demand estimates. Sullivan's figures are more recent and were used in this paper.

Estimates of rice demand and supply price elasticities are also relatively scarce. BOS (1986) estimated the rice supply price elasticity over the 1966-83 period as 0.21. Santi et al. (1978) estimated the rice supply price elasticity as 0.30 and the demand price elasticity as –0.31 for the period between 1953 to 1976. The most recent estimate of 0.21 for rice supply elasticity and –0.31 for rice demand elasticity were adopted.

RESULTS

Our price policy analysis covered the years from 1985 to 1997. The economic model allows calculation of the competitive equilibrium inventory and the inventory at the minimum price level. These values must be compared to the observed inventories while taking into consideration purchases made by the Government's AGF instrument (Acquisitions by the Federal Government). It is admitted that the government's policy objective was to guarantee partial rice and corn price stability.

Average price and consumption observed in the five-year period prior to each year analyzed were considered as estimates of the prices

(P^*)[4] and quantities expected by producers. Carryover and critical inventory levels were estimated, and then each year was classified according to the cases theoretically studied. The annual data related to production, apparent consumption, imports, direct Federal Government purchases (AGF), Federal Government loans (EGF), and the relation between minimum and market prices are shown in tables A and B, respectively[5], in the appendix.

Given the elasticity estimates, the parameters of the supply (β_0 and β_1) and demand (α_0 e α_1) functions have been calculated along with the expected price (P^*), storage cost (C), critical inventories (I_{00}), and carryover inventories(I_0) from 1985 to 1997 for the rice and corn markets.

The next step was to calculate the apparent consumption for the previous five years (Q^*) and the supply (v_1) and demand (u_1) shocks from 1985 to 1997. The shocks were represented by the differences between the linear trends for production and consumption and their observed values. With this set of information, the price and inventory values needed to characterize the years in terms of minimum price policy efficiency were calculated. The results are shown in Table 1 for corn and Table 2 for rice.

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[4] Following Helmberger & Weaver (1977).

[5] For further information on market and minimum price evolution see Lima & Barros (1996) for corn and Lopes (1983) and Aguiar (1992) for rice

Table 1 - Equilibrium price (P_l), minimum price (P_m), observed price (P_1), equilibrium inventory (I_l), estimated government inventory at minimum price (I_g) and observed government inventory at minimum price (I_1). Corn market. 1985/1997

Year	P_l [a]	P_1 [a]	P_m [a]	I_l	I_g	Situation [b]	I_1
	(R$/t)	(R$/t)	(R$/t)	(mil t)	(mil t)		(mil t)
1985	350,70	342,81	360,12	0,00	284,80	D	600
1986	359,27	343,55	317,11	0,00	0,00	F	1.600
1987	281,33	206,48	219,86	101,93	0,00	B	2.879
1988	259,83	236,69	230,65	0,00	0,00	E	2.798
1989	252,34	267,87	203,07	186,64	0,00	B	3.080
1990	292,20	188,40	137,63	0,00	0,00	E	1.237
1991	251,97	217,58	141,78	0,00	0,00	E	823
1992	168,28	164,63	190,93	0,00	1.297,04	D	3.489
1993	204,04	175,52	156,03	0,00	0,00	E	3.419
1994	167,80	150,67	133,02	315,39	0,00	B	5.429
1995	134,76	140,04	131,43	1.462,28	0,00	B	8.178
1996	169,69	172,21	110,96	0,00	0,00	E	4.217
1997	134,27	122,72	114,34	0,00	0,00	E	4.254

a. In values of November 1997.

b. Classification in terms of Figure 2.

Table 2 - Equilibrium price (P_l), minimum price (P_m), observed price (P_1), equilibrium inventory (I_l), estimated government inventory at minimum price (I_g) and observed government inventory at minimum price (I_1). Rice market. 1985/1997

Year	P_l [a]	P_1 [a]	P_m [a]	I_l	I_g	Situation [b]	I_1
	(R$/t)	(R$/t)	(R$/t)	(mil t)	(mil t)		(mil t)
1985	695,61	594,04	676,70	0,00	0,00	F	47
1986	582,91	588,25	580,67	0,00	0,00	F	1.688
1987	417,54	334,96	434,37	1.240,25	363,40	A	2.496
1988	293,12	324,74	385,53	2.058,95	2.038,80	A	3.938
1989	298,32	371,70	316,22	2.240,67	665,40	A	4.473
1990	383,71	250,25	216,58	67,38	0,00	B	2.147
1991	298,00	431,39	245,60	363,18	0,00	B	2.219
1992	253,98	254,81	297,12	314,55	732,37	C	1.719
1993	272,51	251,35	263,20	110,44	0,00	B	1.049
1994	256,22	246,72	218,48	273,41	0,00	B	1.573
1995	199,02	248,07	220,87	897,68	715,05	A	2.136
1996	227,60	249,44	195,51	398,59	0,00	B	1.544
1997	250,08	250,71	188,16	0,00	0,00	E	8.23 1

a. In values of November 1997.

b. Classification in terms of Figure 2.

The second column of Tables 1 and 2 show the competitive equilibrium prices for corn and rice after consideration of supply and demand shocks, which can be compared to market and minimum observed prices (columns 3 and 4).

Figures 2A to 2F present several years of rice and corn market situations. Figures 2A to 2C show situations where there would exist equilibrium market price (P_1) and inventory level(I_1). In figures 2D, 2E, and 2F, there would be no equilibrium inventory because the highest price for which demand for storage would exist is lower than the lowest price for which there would be supply to be storage.

For some years, as in Figure 2B, the model estimates equilibrium inventory and price and the minimum price is below the equilibrium price. In this case, the minimum price has no efficiency, and the government should make no purchases of the product. In Figure 2A, the minimum price is above the equilibrium price, so the quantity demanded for storage at minimum price would be I^d_m, the supplied quantity would be I^s_m and the government should buy the difference between them (I_g). Figure 2C shows the case of a minimum price that is above both the equilibrium price and the highest price for storage demand. In this case, the government should buy all the quantity supplied at the minimum price.

Figure 2D shows the case where market equilibrium price does not exist, but at minimum price the supplied quantity would be I^s_m, which corresponds to the volume the government should buy. Figures 2E and 2F show situations where the minimum price would have no effect.

Figure 2 – Possible situations relating minimum and market prices

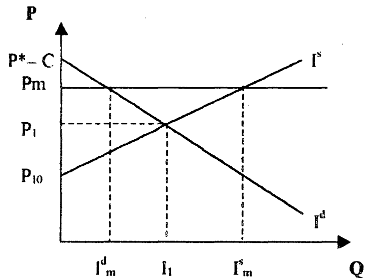

Figure 2A - Situation 1: $P^*–C > Pm > P_1 > P_{10}$; $Ig = I^s_m – I^d_m$

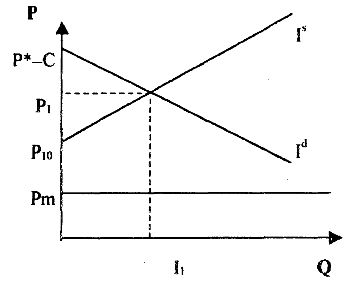

Figure 2B - Situation 2: $P_1 > Pm$; $I_g = 0$

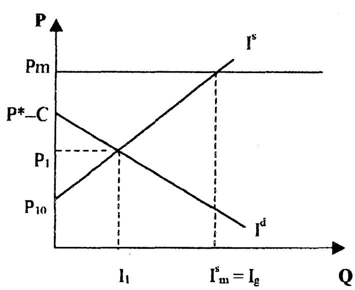

Figure 2C – Situation 3: $Pm > P^*– C > P_1 > P_{10}$

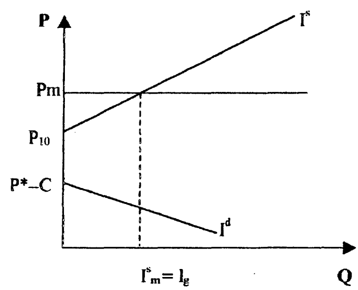

Figure 2D – Situation 4: $Pm > P_{10} > P^*–C$

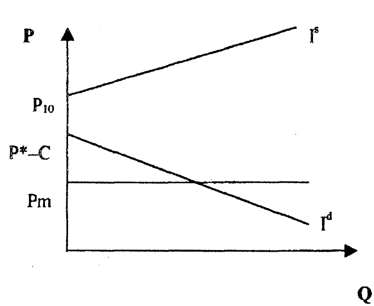

Figure 2E – Situation 5: $P_{10} > P^*–C > Pm$; $I_g = 0$

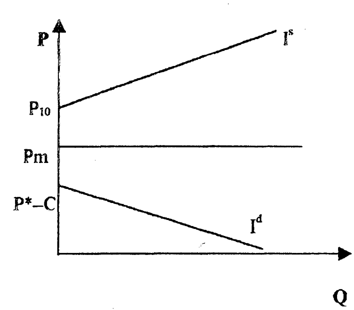

Figure 2F - Situation 6: $P_{10} > Pm > P^*–C$; $I_g = 0$

In the corn market, over the 13 years analyzed, the situations represented in Figures 2A and 2C were not observed, and only in 1985 and 1992 was 2D observed. Situations 2E and 2F occurred in '87, '89, '94, and '95 when the minimum price was set below the market equilibrium price. For rice, situation 2A was detected in 4 years and situation 2C only once (1992).

The minimum price of rice has been above market equilibrium price more often than the price of corn has. It is important to highlight that rice's carryover inventories have been above the critical inventory level during 11 of the 13 years analyzed, while corn carryover inventories have exceeded the critical inventory level in only 1986.

To better understand how the government's minimum price policy has been implemented, a joint analysis of price behavior (estimated and observed market equilibrium price and minimum price) and of the quantity government should (I_g) and did buy (AGF purchases) is necessary.

In the years 1985 and 1987, the government bought quantities of corn and rice above those that the model predicted (including the cases where I_g = zero). At the same time, market prices were below the minimum price during the harvest period. This suggests that government purchases occurred late. This pattern was repeated in 1988 and 1993 for the rice crop only.

In 1985 and 1987 (and 1986 for corn alone), the volume the government bought during the harvest period returned to the market later in the same year, as indicated by the volume bought being larger than the observed carryout inventory. This procedure broke the base of the minimum price policy: the volume that the government purchased (AGF) should have remained out of market until the following agricultural year. Tables A and B indicate that the EGF instrument, used more intensively in the '90s; this could distort the market as many of the loans seems to have been passed to the next year through loan delay.

This result suggests that the private sector was out of the market, leaving the government as the main or possibly the only buyer at the market during harvest periods. The model shows that in many years the government should assume that the necessary commodity quantities will be bought by private sector and should not buy corn and/or rice to guarantee the minimum price paid to producers. But, as government resold its inventories in the same year they were purchased, there was a great risk that the market price would not rise enough to cover storage costs. In the face of this possibility, the private sector wouldn't buy during the harvest period (no demand for storage). The market equilibrium price and quantity predicted by the model would underestimate the necessary volume needed to be purchased to maintain market prices at minimum levels.

In 1992, the government's purchases of rice and corn were smaller than the volume predicted by the model and market prices were below the model's minimum estimated price level. In this year, the volume of EGF rose, indicating that the government intended to substitute AGF with EGF, which would not have the same effect if the minimum price wasn't reached.

In the remaining years, the market price was above the minimum price level; but the government bought larger volumes of corn than the model indicated in 1986, '88, '90, '93, and '97. Market prices in these years was below minimum equilibrium price anticipated by the model, indicating that the private sector stayed out of the market, as mentioned earlier.

In 1989, '95, and '96 for both products and in 1986 and '97 for rice alone, the results show that government bought larger volumes than indicated by the model. Market prices were above both the market equilibrium price indicated by the model and the minimum price – which indicates that government could be competing with the private sector by rising prices above the level at which that sector would buy. In 1991 and 94, the government acted in accordance with the model's predictions (not buying[6] while the market price remained above the minimum price during the harvest periods).

In 1997 government launched its options program to support prices. The volume negotiated in this first application of the new instrument was large enough to indicate that it met with market approval.

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[6] Volume to 100 thousand tones are small enough to be considered as no action from government given that this volume is insignificant in front of Brazilian production of rice and corn.

CONCLUSION

The paper evaluates the performance of Brazil's rice and corn minimum price policy at a time when that policy is going through important changes; changes imposed by the economic and political transformations of the 1990s. There is now an opportunity to reflect on this pricing policy and its efficiency during the 1980s and 1990s. How effective was this policy? What effect will the government's less active role in agricultural markets have?

In general, the Brazilian Government's minimum price program in recent years has failed to maintain market prices at the minimum price level for both operational and political reasons. The operational failures involve program planning. How should the minimum price level for each year be determined? Is this price compatible with the program budget? Will the resources be made available at right moment? Is there the physical infrastructure to transport and store the expected production? Experience shows that government has enormous difficulties appropriately answering these questions.

Other questions are related to program implementation. Government can observe market price behavior but usually cannot act when needed, when the market price is below the minimum level. The government is not agile enough. There is a time gap between detecting the moment to purchase, making resources available, and effectively making the purchase. This time gap should not exist if the market is to be adjusted to meet policy expectations. At the beginning of the marketing year, government should be prepared to act in the market; this rarely happens. The government often does not even have the information necessary to implement its strategy.

One must question how the government can ensure that the minimum price program will not be adversely affected by other macroeconomic or sector policy priorities. Conflicting economic strategies which impact a pricing policy include resources retention, import incentives, and export barriers. Earlier Brazilian "economic plans" have been responsible for disruptive changes in agricultural program rules in general and the price support program in particular.

It is obvious that farmers are not legally entitled to a guaranteed price; they cannot force the government to fulfill its announced goals.

In addition, the problems discussed above not only lead toward specific program failure but also to increasing loss of government credibility; therefore, a loss of other possible program benefits. Over time the government's ability to control future markets, to reduce risk, and to stabilize agricultural income vanishes along with its credibility.

In the context of current global economic integration, unilateral initiatives to implement sector programs without consideration of the new international trade agreements and regulations are, more than ever, doomed to failure. Minimum prices set too high can stimulate imports from competing countries, *i.e.*, governments would have to guarantee elevated prices to both domestic and foreign producers. Global trade liberalization could make commodity exportation (rather than storage) during the harvest and importation after the harvest more attractive. This would break the traditional seasonal pattern of commodity price variation, a fundamental rational for conventional price stabilization programs.

Finally, it is important to draw attention to one difficulty related to the government's move out of agricultural markets. This withdrawal will only be possible if private alternatives can be created that efficiently substitute for the minimum price program in current, futures, and forward markets. If these private initiatives do not work out, producer demands for government price support actions will continue. Though farmers may be a social minority, they are an extremely effective minority in the political arena.

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Table A - CORN. Production, apparent consumption, Carryout, AGF, EGF, Market price/minimum price relation, 1980/1997

Year	Production	Consumption	Imports	AGF	EGF	Market price/.
	(mil t)	(mil t)	(mil t)	(mil t)	(mil t)	Minimum price
1980	19.485	20.600	--	1	1.536	1,63
1981	21.282	21.995	--	64	3.471	1,47
1982	21.603	20.609	--	3.531	3.073	1,05
1983	19.014	19.261	213	1377	2.297	1,17
1984	21.177	19.955	254	470	1.807	1,56
1985	21.174	22.957	262	3.227	1.668	0,95
1986	20.264	21.688	2.424	4.272	1.708	1,08
1987	26.758	26.350	871	7.885	1.840	0,94
1988	25.224	25.320	15	1.659	3.926	1,03
1989	26.267	26.140	155	1.001	3.690	1,32
1990	22.257	24.800	700	455	483	1,37
1991	24.041	25.288	832	0	861	1,53
1992	30.771	28.500	340	365	7.320	0,86
1993	29.207	30.775	1.498	434	5.288	1,12
1994	33.173	32.732	1.569	33	3.216	1,13
1995	37.442	35.678	984	705	5.370	1,07
1996[1]	32.431	36.391	377	504	365	1,55
1997[2]	34.372	37.119	350	2.819	481	1,07

Source: CONAB and FGV.

1. Estimate
2. Projection

Table B - RICE. Production, apparent consumption, Carryout, AGF, EGF, Market price/minimum price relation, 1980/1997

Year	Production	Consumption	Imports	AGF	EGF	Mark. P/MinP[3]
	(mil t)	(mil t)	(mil t)	(mil t)	(mil t)	(average)
1980	9.776	8.700	348	222	1.505	1,39
1981	8.228	9.000	209	800	1.371	1,06
1982	9.155	9.100	203	733	1.751	1,20
1983	8.224	9.150	465	501	2.177	1,17
1984	8.921	9.200	91	665	1.042	1,06
1985	8.760	9.660	500	1.514	1.861	0,88
1986	9.813	10.240	2.074	1.775	3.577	1,01
1987	10.578	10.000	235	2.973	3.139	0,77
1988	11.762	10.500	190	2.215	3.804	0,84
1989	11.092	10.800	252	876	1.912	1,17
1990	7.968	11.000	718	91	354	1,16
1991	9.997	11.220	1.297	1	328	1,76
1992	10.102	11.332	732	82	4.015	0,86
1993	9.903	11.445	881	380	4.217	0,95
1994	10.523	11.560	1.565	4	1.074	1,13
1995	11.237	11.618	978	956	1.566	1,12
1996[1]	10.062	11.711	977	277	179	1,28
1997[2]	9.536	11.804	1.200	106	248	1,33

Source: CONAB/DIPLA and FGV.
(1) Estimate
(2) Projection
(3) Average between two type of Brazilian rice