

ECONOMETRIC ANALYSIS OF THE IMPACT OF DOMESTIC RICE PROCUREMENT POLICY ON PRODUCER PRICE: THE CASE OF RICE IN BANGLADESH

Analisis Ekonometrik atas Dampak Kebijakan Pembelian Beras Domestik terhadap Harga Produser : Kasus Beras di Bangladesh

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ABSTRAK

Tulisan ini mempelajari secara teoritis dan praktek dari dampak kebijakan pemerintah terhadap penetapan harga gabah pada tingkat petani di Bangladesh. Pada dasarnya, kebijakan ini berupaya mencapai produksi beras dan gandum pada level harga yang ditetapkan dalam upaya memproteksi pendapatan petani dengan menstabilkan harga-harga pangan dan menyediakan pangan untuk kelompok-kelompok konsumen tertentu baik pada kondisi normal maupun tidak. Studi ini melakukan analisis ekonometrik yang menggunakan data series sepanjang 25 tahun yang dikumpulkan dari instansi pemerintah dan swasta. Hasil empirik menunjukkan bahwa petani padi tidak memperoleh keuntungan dari kebijakan ini, bahkan dalam jangka pendek sekalipun, karena adanya kesalahan potensial dari model teoritis dan pelaksanaannya. Dampaknya, intervensi pemerintah dalam upaya menjamin ketahanan pangan di masa mendatang perlu dikaji ulang untuk menetapkan target-target yang obyektif.

Kata kunci : *ketahanan pangan, kebijakan harga, kesejahteraan petani, stabilitas harga*

ABSTRACT

This paper investigates the theoretical and practical impacts of the government procurement policy on rice producer price in Bangladesh agriculture. The policy, basically, aims at procuring a targeted amount of rice and wheat at predetermined prices in order to protect the producers' income by stabilizing food prices and to provide foods to specified target-groups of consumers in course of normal time as well as in emergency period. The study conducted econometric analyses with twenty five years data collected from various government and private sources. The empirical finding of the study indicates that the rice producers are unlikely benefited from this policy even in the short run because of the potential caveats in the theoretical model and in its implementation. In effect, government intervention in terms of procuring food-stuffs deserves further review in order to reach its targeted objectives.

Key words : *rice procurement, price policy, producer welfare, price stability*

INTRODUCTION

Rice is a basic necessity of the Asians particularly of traditional Bengali life and rice producers, in these areas, play the central role to ensure the adequate 'production and availability' of food commodities (NFPCSP 2007). Rice constitutes more than one-third of total consumer expenditure and a large share of income and employment opportunities (Rahman and Mahmud 1988). Rice market behavior is, thus, a major policy concern in Bangladesh, which has a long history of food deprivation and famine. One important policy debate surrounds the role of pricing policy in mediating the alleged conflicts between producers' incentives and the food entitlement of the poor (NFRCS 2007, Sen 1982, Tarrant 1982, Clay 1981). However, Bangladesh has made substantial progress in terms of ensuring rice yield (BARC 1999, Dey et al. 1996) and availability of food grain especially rice (NFRCS 2007). Yet, there have been further issues involved in the debate on an optimum price policy, because the price received by farmers is restricted by various deficiencies of infrastructure and market imperfection (MoA 2006, Fan *et al.* 2002, Ahmed and Hossain 1990). Thus, the rice procurement scheme is nowadays suffering from many institutional setbacks, which limit its effectiveness in providing adequate incentive to producers in Bangladesh agriculture.

The public food distribution system of Bangladesh has a long history of evolution. It was first introduced in 1943 in the undivided Bengal in the wake of an unprecedented famine which has caused a death toll of nearly half a million people (Sen 1982). And since the mid-1970s it has undergone important changes. Particularly, since the early 1980s, it has witnessed a massive transformation. The government is committed to reduce the food subsidy and to limit it eventually to needy population groups through target-group-oriented distribution such as relief operations and feeding programs. The government is also proposing to increasingly rely on open market sales (OMSs) as a stabilization instrument along with domestic stocking or procurement as a means for providing support prices to food grains growers. This represents a major policy shift towards more market oriented implementation instruments. Open market sales (OMSs) are undertaken when the market price goes above the procurement price by 15 percent in the case of rice and by 20 percent in the case of wheat (Rahman and Mahmud 1988).

The channel of OMSs is intended to provide a mechanism for releasing food grains at appropriate times in order to dampen seasonal or speculative price upswings. However, the present policy reform is pursued to reorient the procurement system more towards a price target rather than a quantity target, so as to make it complementary for price stabilization. The above reforms have still to go a long way if their objectives are to be achieved. Experts say that to have a substantial impact on the harvest price and consumer welfare, food stocking must be on a sufficiently large scale in relation to the market arrivals of grains (Rahman and Mahmud 1988). Evidently, the food grains procurement system

suffers from myriads of controversies which surround mainly on its effectiveness in providing a support price to growers as well as enough welfare to poor consumers of the country.

The food procurement policy essentially predetermines and declares the prices of procuring agricultural food commodities beforehand, which are actually lower than free market prices. In some countries such as India, Ethiopia, Sri Lanka, the system imposes a levy or quota on agricultural producers or millers or traders and those agents are then compelled to sell their quotas to government at a prefixed price. Farmers are then permitted to dispose the above quota marketable surplus, if it exists, in the open market. In Bangladesh, this procurement program is no more compulsory and this situation is existed since 1983.

As is mentioned earlier, one of the prime objectives of the procurement policy initiative through government intervention was to ensure the agricultural price stability that could further share its role in enhancing overall economic development. The effectiveness of such intervention policies has been a focus of controversy in economics literature from a long time the genre of which, surprisingly, dates back into the antiquity of Socrates discourse evident in Plato's *Statesman*. According to Datwala (1967) and Mellor (1968), the policy proves to be beneficial to farmers, which intuitively supports the Sen's (1982, p. 459) thesis that says: "Food security cannot be built without public policy." On the other hand, Schultz (1964, 1978) opposes this view. His argument is that this government intervention causes severe distortions in the incentive system of agriculture and it acts as a bottleneck to the development of agricultural sector. Similarly, Tweeten (1989, p. 1103) argues: "Most developing nations cannot afford to solve the food price dilemma by distorting prices to producers." Besides, Gunjal's (1994) observation based on empirical review in Indian agriculture is that the farmers are unlikely to benefit from this procurement policy even in the short run because of the potential inadequacy of the theoretical model used to justify the positive effects, imperfect market mechanism in developing countries and others.

The prime intent of this paper is, therefore, to examine the theoretical effects of the procurement policy of agricultural commodities such as rice in this case study and collate them to the field level observations particularly on current rice procurement scheme in Bangladesh in order to see whether it renders positive price incentives to the producers.

METHODOLOGY

Theoretical Framework

The model involves a system that disaggregates and separates the consumers into two groups as depicted in Figure 1. One market is portrayed as

controlled market intended for the poor. It is characterized by more elastic demand (D_p). The remaining is an open or free market for the rich characterized by more inelastic demand (D_r). The aggregate demand (D) and the given short run and long run supply curve (S_s and S_l respectively) result in an equilibrium price P_e . Now assume that the price in the controlled market is set at P_g that is below the equilibrium price. At P_g an additional quantity of Q_{pe} to Q_{pg} will be demanded. If that same quantity is taken out of the free market that is Q_{re} to Q_{rg} , the open market price will rise more than proportionately. This is explained by the relatively high inelastic demand in that market. As a result, the weighted average price (P_w) received by producers in the short run will be higher than P_e i.e. the price without this government intervention. This is basically the Dantwala-Mellor theory (Gunjal 1990). This is the basic food policy framework based on which the procurement policy is implemented.

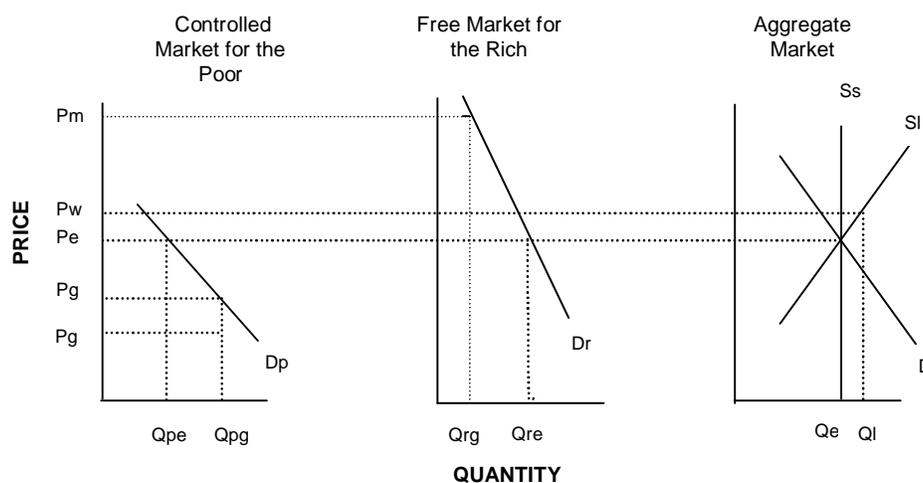


Figure 1: Procurement Scheme Model (Adapted from Hayami *et al.*, 1982)

In practice, separating the “poor” consumer market from the “rich” consumer market is difficult. India has some had some success in this by making this scheme more self-targeting. Self-targeting is done by providing poor quality commodities, involving excessive delays and/or long lines, etc. (Gunjal 1990). The following section presents some arguments to show that even in the case of “effective implementation” the scheme does not necessarily prove to be beneficial to the farmers.

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Limitations in the System

Gunjal (1990) identified at least three main reasons why this two tier pricing system does not work as postulated by the theory even in the case of "effective implementation" of the scheme. The reasons are limitation or flaws in the theory, imperfect market mechanism and inability to benefit from the higher free market prices.

a. Limitation in the Theory

Suppose for example, the government stocking price was determined at a level such as P_g' , below the P_g (see in Figure 1). But the quantity stocked through the procurement program and thus available for distribution at this subsidized price is still Q_{pg} . This means, excess demand exists at this price but the free market price (P_m) remains the same. In this case, the weighted average price received by the farmers is not P_w , but is much lower. Thus the above theory does not work for prices below the equilibrium price of P_g

It is the investigator's contention that in most of the cases the price set by the government is likely to be below P_g . The stocking prices are based on factors such as the average cost of production and a few other national goals (Gunjal 1990). In reality, the stocking prices are determined by the political process of negotiation involving the price commission and the government at various stages (Sarma 1988). These may have little to do with the disaggregated demand functions for the goods under consideration. In addition, the fact that the OMSs have a very limited quantity to sell, as evidenced by their limited business hours, lack of goods and long queues in general, imply that excess demand may exist at these low prices. If the above two conditions hold, then the low stocking prices amount to a tax on agriculture and subsidy to poor consumers.

b. Imperfect Market Mechanism

The above model for the case of effective implementation is based on the assumption that the two markets are closely related and an efficient market mechanism exists in order for the reduction in supply through the government procurement activity in the higher free market prices. It is likely in most developing countries, due to lack of transportation, communication and market competition such as limited number of traders in general, the price transmission may not work as assumed in the model.

c. Inability of Producers to Get Benefit from the Higher Free Market Prices

This argument is related with price seasonality. Most farmers sell their marketable surplus at harvest time when the market prices are the lowest. This happens when the merchants buy grain and other commodities from producers.

During the off season, the free market prices are high but producers generally have very little marketable surplus to sell. This is especially true for small peasants' holdings. Hence, it is possible that even if the market mechanism worked as expected it is the middlemen in the market channel and not necessarily the producer who are supposed to get benefits from the higher prices. This would be particularly true in remote rural areas. It is not surprising, therefore, that these policies are unpopular with producers.

Implication for the Long Run

As the model presumes the free market price in the long run can be above or below the equilibrium price, P_e . In response to the short run weighted price of P_w higher than P_e , as shown in Figure 1, producers will produce an excess quantity of Q_e to Q_l the next year. This will bring the free market price P_m and hence P_w down. In fact, the market price and the weighted average price received by the farmers will oscillate in a cobweb fashion. This implies that the stocking and two-tier price scheme has a potential in the long run to decrease the price and output stability in food sector of the economy.

Empirical Model

The study employed secondary data from various sources of the government of Bangladesh such as the Ministry of Foods and Bangladesh Bureau of Statistics. An econometric model involving multiple regression has been used for this study in order to detect the variables that influence the real weighted average price received by the producers. Five independent variables are identified that can have influences on the dependent variable real weighted average price received by the producers. The total number of observations collected is of 25 years starting from 1980/81 to 2004/05. The model is constructed as follows:

$$Y_{it} = f(X1_{it}, X2_{it}, X3_{it}, X4_{jt-1}, X5_{it})$$

In regression equation, it takes the form as:

$$Y_{it} = \alpha_0 + \alpha_1 X1_{it} + \alpha_2 X2_{it} + \alpha_3 X3_{it} + \alpha_4 X4_{jt-1} + \alpha_5 X5_{it} + U_{it}$$

Where,

- Y = Real weighted average of the government price (P_g) and the open market price (P_m). The weights are the relative shares of the quantities sold to government and to the open market respectively. The nominal figures are deflated by the CPI of base year, 1985-86=100.
- X1 = Quantity procured by the Government with six months lag behind the open market price
- X2 = Total population

- X3 = Real per capita income
- X4 = Real price of wheat as a consumption substitute commodity
- X5 = Rice yield
- β_1, \dots, β_5 = Parameters to be estimated
- i = Rice commodity
- j = Wheat commodity
- t = Time (1.....25 years)
- U = Disturbance term

For analyzing data, the study employed the statistical tools of the SPSS in order for getting the sophisticated result.

RESULTS AND DISCUSSION

Having run the above regression equation, the following estimated values are obtained:

Table 1. Results of Regression

Variables	Betas	Computed t	Significance
Quantity of rice procured (X1)	-2.93	-3.043	.007**
Total Population (X2)	-0.36	-1.415	.173
Real Per Capita Income (X3)	-0.154	-0.712	.485
Real Price of Wheat (X4)	0.53	4.190	.000***
Rice Yield (X5)	0.145	1.278	.216

$R^2 = 89\%$; Adj. $R^2 = 86\%$; *** $p < .001$; ** $p < .01$; * $p < .05$

Quantity of rice procured and real price of wheat as the real price of consumer substitute were found to be statistically significant and those are, respectively, negatively and positively related to real weighted average price. The result shows that both factors are the most important components that influence real weighted average price received by the farmers. The quantity of rice procurement influences the real weighted average price negatively. This result implies that under the existing situation of rice procurement the more the quantity of procurement is, the less the farmers' benefit is. This means that the farmers are not getting any benefit from the present government intervention in the rice procurement scheme, which has been followed for a long period of time in Bangladesh. If the real weighted average price is not influenced positively, the real income would be affected worse. Thus, evidently the rice producers' welfare is at stake. This outcome is supported by the study of Gunjal (1994) that was

investigated in the context of Indian agriculture and of Rahman and Mahmud (1988) that was done in the case of Bangladesh Agriculture. According to Rahman and Mahmud (1988, p. 202), "the welfare loss of the producers on average was 15.67 percent." Nevertheless, the result obtained here in this study is intuitively supports the opponents of the government intervention in the procurement of food commodities in the developing countries. The factors such as total population, real per capita income and rice yield exhibited no significant result. This statistical outcome indicates that these variables do not deserve any more attention in the attempt to improve the benefit of the rice producers in Bangladesh.

Table 2. ANOVA for Regression

Sources of Variation	Sum of Square	Degrees of Freedom	Mean Square	Computed F
Regression	146,086	5	29,217	30.531***
Residual	18,182	19	.504	
Total	164,268	24	,957	

*** p < .001; Predictors: (Constant), X1, X2, X3, X4, X5; Dependent Variable: Y

The result is also congruent to the evidence of existing rice procurement condition of Bangladesh. There is evidence that the rice procurement target appears frequently to be failed and the target cannot be met. The reason, according to the present study's outcome, is that the producers do not get any incentive to sell their products to the procurement scheme, because real income obtained by them is not better than the selling their products to the open market. So, they are more prone to sell their rice and other food products to the free market where their benefit gets well off. Thus, the rice procurement target would not be fulfilled unless the price of procurement is not increased more than that of the existing one. This observation implies that rice procurement price should have to be at least equal to the open market price that could nudge up the real income of the rice producers as well as they would be more willing to sell their rice and other products to the procurement scheme of the government. Otherwise, the present precarious predicament would persist and aggravate the rice producers overall incentives and the further development of agriculture sector as well. This implies that market integration is the solution for improving the producers' welfare rather than the fragmented market structure.

CONCLUSIONS AND RECOMMENDATIONS

The main conclusion from the above discussion is that due to the theoretical flaws, underdeveloped nature of the market, communication

infrastructure and lower rice procurement price than the open market price, rice producers are unlikely to benefit from the existing procurement policy of Bangladesh. The low price offered by the procurement center to peasant producers is tantamount to a tax on agriculture. In the long term, the producer price on the average would not be higher than the equilibrium price level. In effect, the lower price of rice procurement will influence the producers' price expectation that will affect the future supply response negatively. Consequently, rice market price could be unstable that could affect producers' income adversely. On the basis of these given points, the recommendation of this study is to explore the possibility of raising the rice procurement price equal to the open market price (in effect market integration rather than differentiated market) and to improve the condition of market along with the communication and institutional infrastructure in order to improve the efficiency and equity of food sector and to achieve the goal of national food security as a whole.

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