

Quality of Public Distribution System

Why It Matters

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This paper argues that price formation in foodgrains markets cannot be fully understood without reference to consumer switches between the open market and the public distribution system (PDS) induced by quality differences. This is an important aspect of the food economy, for an evaluation of state intervention must consider not only the welfare of its targeted beneficiaries but also the welfare of households without access to the PDS but who may nevertheless be affected if the working of the PDS has a bearing on the open market.

ACCORDING to case studies [for example, Indrakant 1995, Nair and Sivanandan 1995] and anecdotal accounts some consumers prefer grain from private retail outlets rather than from the public distribution system (PDS). The sizeable literature that has grown around the subject of evaluating the PDS has, however, largely ignored this issue. Our objective in this paper is to remedy the neglect. First, we address the question of whether indeed it is correct that consumers perceive the quality of grain available in the PDS to be lower than that of grain from competing private sources. The technical issue here is how the hypothesis of quality differences can be tested on the basis of aggregate data alone. Second, even if quality differentials exist, how do they matter? The implications for policy form the second part of the paper. As we shall argue, quality differentials can adversely affect the living conditions of the poor. In addition, they also constrain the prospects of containing the budgetary subsidy on food. Restoring efficiency to the PDS restores equity as well as fiscal balance.

Evidence of Quality Differences

Let us consider the consequences for open market prices following a hike in the issue price. Suppose, for the moment, that the grain supply through the ration shop is identical to the supply in the market. Then, an increase in issue price ought to decrease the open market price of grain. The reasoning is as follows. So long as the issue price is less than the open market price, consumers would demand grain in the open market only after exhausting their ration entitlement. Now the open market demand under rationing would depend, among other variables, upon the implicit subsidy received on the ration purchases. A small increase in the issue

price, by reducing the subsidy, produces an income effect which lowers the demand for grain in the open market and hence the market price.

How does this prediction square with the data? To answer this question, we analyse the relationship between the open market price and the issue price of wheat. The data employed are monthly averages of wheat prices between May 1971 and April 1994. Within this period, consisting of 273 months, the issue price of wheat was changed, in all instances upwards, in only 13 months. The results are presented in Table 1. Column (Ia) of this table contains estimates from a regression of the change in open market prices on the change in issue prices. In column (Ib), the lagged change in open market prices is introduced as an additional regressor to take account of possible autocorrelation in the dependent variable. In these columns, we choose only those data points relating to instances when the issue price increased. In columns (IIa) and (IIb) we also report estimates for the entire sample period, i.e., inclusive of data points when the issue price has not been changed. As in the case of the first set of estimates, (IIb) is different from (IIa) because of a lagged price term.

As can be seen, the estimates in Table 1 provide firm evidence of a positive relationship between the issue price and the market price of grain, a result which is robust to the choice of sample and regressors. The data therefore contradict the prediction that an increase in the issue price would lead to a decrease in the open market price. The supposition that there is no quality difference between the PDS and open market grain, upon which the prediction was based, cannot therefore be true.

To explain the observed relationship between the issue price and the market price, we must allow for the possibility that goods supplied in the two markets are not the same.

Consider therefore a model where consumers perceive the quality of PDS grain to be lower than the quality of the grain available from the market. We can imagine that, in addition to the sale price (i.e., the issue price) the cost to a consumer of buying a unit of grain from the PDS also includes a money value of quality difference. Quality here refers not just to intrinsic grain characteristics but also to attributes of the retailing mechanism. The unobserved private costs therefore include the costs of transacting in the PDS. Field studies of the PDS show that these costs are not insignificant [Nair and Sivanandan 1995 and Indrakant 1995]. Transactions cost arises because of the location of PDS shops, uncertain supply, waiting time in queues and the use of incorrect weights and measures. As the perception of intrinsic quality difference as well as the costs of transacting are individual specific, the costs of buying grain from the PDS also differ among consumers. Clearly, of those consumers with access to the PDS, only those whose cost of buying grain from the PDS is lower than the open market price would purchase grain from the PDS. Others whose private costs are higher would prefer to buy from the open market.

Consider now an increase in the issue price. This has two effects on the demand for open market grain. First, the increase in the issue price pushes the costs of PDS grain above the open market price for some consumers. These consumers switch their demand to the open market. This is the switchover effect, due to substitution. Second, for consumers who remain in the PDS, their open market demand decreases due to the income effect from a lower implicit subsidy. Since the switchover effect and the income effect are in opposite directions, the aggregate demand for open market grain and the open market price increase whenever the switchover effect is stronger

than the income effect. We can infer, therefore, that in the wheat market, where the open market price has been demonstrated to be positively associated with the issue price, the switchover effect is larger than the income effect.

Can the existence of the switchover effect be shown directly? Since information on open market sales is not available, a straightforward exercise of relating open market demand to the issue price is not possible. Some researchers have regarded the decline in PDS offtake that follows a rise in issue price as evidence that consumers view PDS grain and open market grain as substitutes [Radhakrishna and Rao 1994]. To see why this is incorrect, consider the implications for PDS sales of an increase in issue price. Once again there are two effects. The switchover effect leads to a decline in the offtake as some consumers exit from the PDS. However, in addition, PDS sales may also decline because consumers who do not exit may purchase less grain because the reduction in subsidy makes them poorer. An inverse relationship between PDS sales and the issue price is therefore not conclusive about the existence of a switchover effect as such a relationship could be due to the income effect alone.

Switchover effects can, however, be investigated by looking at the relation between PDS offtake and the open market price. If the open market price increases (issue price remaining constant), aggregate PDS offtake increases too as some consumers switch back into the PDS. On the other hand, there is no change in demand for PDS grain from those consumers already buying from the PDS. Hence the entire change in offtake would be evidence of a switchover effect.¹ Indeed, since issue prices change only infrequently while market prices vary continuously due to seasonal and annual factors, most of the observed changes in offtake must be due to consumer switches² between the open market and the PDS.

Table 2 presents the seasonal distribution of PDS offtake for wheat for the years 1988-89, 1989-90 and 1990-91. These are years in the recent past during which the issue price remained unaltered and for which we have data on the seasonal distribution of PDS offtake. As is well known wheat prices are at a seasonal low in April and then rise steadily to peak in March of the next calendar year. Corresponding to that it can be seen that the PDS offtake is minimum in the first quarter (when the difference between the issue price and the open market price is at its smallest) and then rises as the gap between the market price and the issue price widens. Clearly, the observed changes in offtake are entirely due to consumers switching into the

PDS from the open market.³ A formal econometric analysis is not presented here. Readers are directed to the estimates in Balakrishnan and Ramaswami (1995b) which support the positive association between the PDS offtake and the open market price seen in Table 2.

II Why Quality Matters

In our view, evidence of perceived quality differences implies an inefficiency in the public distribution of grain as it exists in India today. Before we proceed to speak of the implications of these differentials we deal with two issues: the precise relationship of quality differentials to the operation of the public distribution system and the validity of the potential argument that quality differential may reflect an optimal intervention.

Why is PDS grain of lower quality? We believe that the lower quality of PDS wheat is evidence of inefficiencies in the operation of the public sector. As far as we are aware, there is no deliberate policy on the part of the government to procure inferior grain. In the case of wheat, government purchases take place at market prices⁴ which means that private traders acquire comparable quality grain at the same prices as the government.⁵ At the point of sale, however, consumers do not regard the grain from the two sources as identical. Even when the issue price is below the market price, some consumers (with access to the PDS) prefer to buy from the market. And the number of such consumers increases as the issue price increases. Relative to the grain in the open market, consumers demand a discount on their purchases from the PDS which represents their valuation of the cost of transacting in the PDS. The appearance of quality differentials at the retail outlets must then be due to inefficiencies in the marketing chain, such as bad purchase decisions, lack of care in storage and handling, and indifferent service at the ration shops. Whatever the reason, compared to private

trade, the state apparatus produces a lower value of output for comparable input levels.⁶

We now consider the second issue which is the argument that the differential quality

TABLE 2: SEASONAL DISTRIBUTION OF PDS OFFTAKE OF WHEAT

1988/9	WP	IP	PDS
Quarter I	259.03	204	1673
Quarter II	274.23	204	1912
Quarter III	307.17	204	1969
Quarter IV	323.40	204	2113
1989/90			
Quarter I	278.22	204	1401
Quarter II	288.41	204	1853
Quarter III	289.05	204	1886
Quarter IV	276.31	204	1818
1990/91			
Quarter I	286.5	234	1258
Quarter II	309.42	234	1503
Quarter III	330.43	234	1842
Quarter IV	392.82	234	2409

Notes: Quarter I refers to the months April to June and so on. WP is a three month average of the wholesale price index of wheat (1970/71 = 100). IP is the prevailing issue price (rupees per quintal). PDS is a three months aggregate of wheat offtake from the public distribution ('000 tonnes).

TABLE 3: CENTRAL ISSUE PRICE (Rs per quintal)

Month	Rice		Wheat
	Common	Superfine	
January 1991	289	370	234
February 1991	377	458	280
January 1993	437	518	330
February 1994	537	648	402

Source: Economic Survey, 1993-94.

TABLE 4: FOOD SUBSIDY ('000 crore)

Year	Current Prices
1989-90	2476
1990-91	2450
1991-92	2850
1992-93	2800
1993-94	5537
1994-95	5100
1995-96	5250

Source: Ministry of Finance, Union Budget Documents, Finance Accounts.

TABLE 1: RELATIONSHIP BETWEEN ISSUE PRICE AND OPEN MARKET PRICE OF WHEAT

Var/Reg	Ia	Ib	IIa	IIb
Constant	-4.73 (-1.06)	-4.46 (-0.90)	1.01 (1.71)	0.52 (0.93)
Δp_t	0.66 (4.73)	0.65 (3.50)	0.52 (6.05)	0.48 (5.99)
Δp_{t-1}		0.08 (0.17)		0.32 (5.94)
R^2	.67	.67	.12	.22
N	13	13	273	273

Notes: The dependent variable is Δp_t ; 'P' is the market price and 'ip' is the issue price; all variables are in logarithms; monthly data for the period May 1971 to April 1994 has been used; 'I' is based on observations corresponding to the months in which a change in the issue price has occurred, while 'II' is based on the entire sample period.

may be an optimal arrangement. The literature on the targeting of benefits has long advocated policies that induce self selection. In the context of the public distribution system, we have by now become used to seeing the proposal that the PDS focus on inferior grains. Could it be then that the government is pursuing, albeit unwittingly, the right course of action by supplying a lower quality of grain? Such an interpretation would be unjustified for several reasons. Theoretically, the argument for quality difference between the publicly provided private good and that available in the private sector is that by inducing high income households to opt out of the public scheme, the universal public provision of a private good redistributes income from the rich to the poor even when the scheme is financed by lump sum taxation [Besley and Coate 1991]. The argument applies in greatest force, though, to indivisible goods where the individual either purchases from the public sector or the private sector but not from both. Here, on the other hand, since many households supplement their ration quota by purchases from the open market, their welfare depends on the open market price too and hence on the quality difference. Secondly, since the PDS is not universal in its coverage of the poor, self-selection operates only within the groups with access to the PDS and not to the entire population. There would still be significant number of poor households solely dependent upon the open market who must pay a higher price for grain whenever higher income groups exit from the PDS as the price differential exceeds the perceived quality differential. Thirdly, the fact that lower quality is produced by inefficiency of the state marketing system, means that the loss in quality must be reckoned as a dead-weight loss which further limits the gain of redistribution due to self-selection. In sum, while a PDS that provides for self-selection is desirable, inefficiency in distribution seems a poor way of attaining it.

Finally, we turn to the most important concern of this paper, the implications of the inefficiency represented by quality differentials. These relate to concerns of equity and of macro-economic stability represented by fiscal balances.

Essentially, the finding of a positive relationship between the issue price and the open market price means that changes in the issue price matter not only to consumers who purchase their grain from the PDS but also to those consumers who buy grain from the open market and their welfare is therefore worsened by sharp increases in issue price. An indication of the quantitative significance of such effects is provided by the finding of Dev and Suryanarayana (1991) that "at the all-India level, the dependence of the

poor on the public distribution system in rural areas for rice, wheat, edible oils, coal and standard cloth is less than 16 per cent". Clearly, then it is inadequate to view the equity effects of a subsidised system of public grain sales solely in terms of the benefits of those with access to the PDS.

In this context, the role of quality differentials needs to be understood. As noted by us, in the absence of quality differentials an increase in the issue price would actually decrease market prices. It is the existence of quality differentials on the other hand that reverses this relationship as we have observed from our econometric exercise. As the strength of the switchover effect would vary inversely with the quality of PDS grain relative to that supplied in the open market, the extent of the increase in market prices following upon the hike in the issue price is inversely related to the quality of the grain supplied through the PDS. Better management of the PDS leading to an improvement in quality is, therefore, desirable not only in itself but also because it can moderate switches-out of the PDS which have a direct effect on open market prices.

Our analysis has a direct bearing on some of the questions raised in connection with

the economic reforms currently underway in India. The official point of view is that "while the PDS has to be continued to help the poor, the burden of subsidy on the central budget has also to be restricted".⁷ Efforts to contain the budgetary subsidy on food were particularly prominent in the early years of the reform process when the issue prices of wheat and rice were substantially raised (Table 3). Yet, the desired impact on the budgetary subsidy never materialised (Table 4). As is well known, the change in issue prices was accompanied by an increase in the stock of foodgrains with the government which resulted in higher expenses in the form of carrying costs and interest charges. The rise in stocks was itself in large part due to a fall in PDS offtake as the rise in issue price led consumers to switch out of the PDS. This means that in the presence of quality difference, the impact of a hike in issue price on the food subsidy would always be limited and perhaps even perverse/ For the government the dilemma is as follows; either the government accommodates consumer valuations by keeping issue prices sufficiently below market prices or it can ignore these valuations, but at the cost of carrying larger stocks. Either way, the scope for reducing the food

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subsidy is constrained by quality differentials between the grain supplied through the PDS and in the open market.

III Conclusions

A striking feature of the food economy of India is that even with market intervention in the form of a public distribution system, the open market remains the principal source of supply to many households in the economy. The network of public grain sales does not cover all households and even for households with access to subsidised grain there are quota restrictions which would imply that a portion of the demand must be satisfied from outside the PDS. As a consequence, an evaluation of state intervention must consider not only the welfare of its targeted beneficiaries but also the welfare of households without access to the PDS but who may nonetheless be affected if the workings of the PDS have a bearing on the open market. This aspect of the food economy, which has received insufficient attention in the past, is our major point of departure from the existing literature on the PDS and foodgrain markets.

The principal contribution of this paper is that it identifies consumer perceptions of a quality difference between the grain from the PDS and the grain from private retail sources as a significant mechanism of price transmission from the PDS to the open market. Although consumer preference for open market grain is widely acknowledged, this feature has not been incorporated in the existing models of foodgrains markets. Similarly, while the inefficiency of state institutions like the FCI has not escaped comment, the literature has seen it as an independent problem rather than as central to the workings of foodgrains markets. This paper, on the other hand, has argued that price formation in foodgrains markets cannot be fully understood without reference to consumer switches between the open market and PDS induced by quality differences.

Finally, we wish to point to a wider implication of the existence of quality differentials in the context of the public provision of private goods, of which the PDS is only an instance. Note that we are saying that, in the presence of quality differentials, consumers demand a discount on their potential purchases of the good of lower quality. As stated earlier, the discount represents their valuation of the loss in quality, defined more generally to include transactions costs often associated with public provision. This has immediate consequences for the supply side. Private suppliers of the same good can now charge

a premium with only minor improvements in quality. We see many instances of this, ranging from secondary education to health services, in the Indian economy. The potential role of government in disciplining private suppliers and, as a consequence, raising consumer welfare is now apparent. An improvement in the quality of public intervention is the instrument.

Notes

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- 1 For details see Balakrishnan and Ramaswami (1995b).
- 2 Of course, to the extent that the demand for foodgrains is a function of other variables such as income and relative prices any changes in these variables would also matter.
- 3 Allocation of supplies, on the other hand, was found not to be responsive to the seasonal price movements. We can be sure, therefore, that the observed changes in offtake reflect changes in demand.
- 4 This is documented in Balakrishnan and Ramaswami (1995a). It has also been noted by others including Dantwala (1993) and Krishna and Chhibber (1983).
- 5 If this is not so, t. c. if the grain purchased by private traders is of higher quality than grain bought by government, it means one of two things. It could be that the government and private traders purchase at the same prices but the government makes bad purchase decisions which is itself indicative of inefficiency on the part of the government. The other possibility is that although the government makes correct purchase decisions and although its purchases are at market prices, it buys up all the lower quality grain so that private traders deal only in higher quality grain acquired at high prices. The evidence against such an outcome is considerable. Note that since the government offers only one purchase price, its grain purchases must be of the same quality given efficient purchase decisions. Among other things, this means that annual fluctuations in procurement (which are considerable) exactly mirror fluctuations in production of lower quality grain. The available evidence, on the other hand, confirms the anecdotal accounts of competition for grain supplies between private trade and the government [Balakrishnan and Ramaswami 1995a; Ramaswami 1995].
- 6 In the case of rice, the government purchases the grain at below market prices by a levy imposed on rice mills. It would be surprising

if the rice mills did not try to sell their lower quality stocks to the government, saving the better quality rice for the open market. This leads us to conjecture that quality differences between open market and PDS rice may be even more severe than in the case of wheat.

7 *Economic Survey, 1992-93.*

8 On the other hand, an increase in issue price can have dramatic impacts on the composition of food subsidy. Between 1990-91 and 1995-96, the share of the food subsidy financing food distribution and income transfer programmes fell from 70 per cent to less than 40 per cent. In 1994-95, as much as 60 per cent of the food subsidy in 1994-95 went to finance the buffer stock, sales on the open market, or export [World Bank 1996].

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