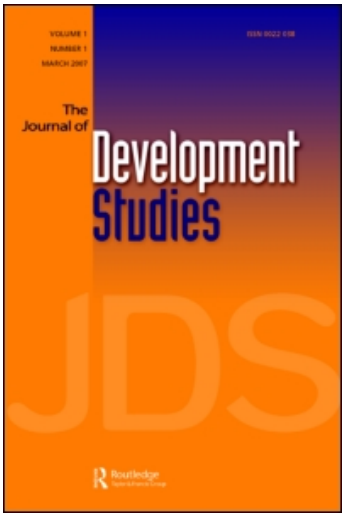
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# India's Public Distribution System: Utilisation and Impact

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# India's Public Distribution System: Utilisation and Impact

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ABSTRACT *This article studies the effectiveness of India's Public Distribution System (PDS) as a food security intervention, using field survey data collected by the author in Rajasthan. Utilisation is low, and many households purchase wheat from the market at higher prices before exhausting PDS quotas. This 'puzzle of under-purchase' is analysed by extending the dual-pricing model to account for supply-side (for example, diversion) and demand-side (for example, transaction costs) constraints. Primary and secondary data as well as field observations suggest that under-purchase is mainly due to supply constraints. I also find that the PDS affects the composition (away from more nutritious 'coarse cereals'), rather than level, of cereal consumption.*

## I. Introduction

The Public Distribution System (PDS) in India is an important public intervention for enhancing food security. The PDS provides subsidised food grains (and other essential commodities) through a network of 'fair price shops'. Until 1992 access to the PDS was, at least in theory if not in practice, universal. Corruption and high operational costs were among the reasons that were used to justify the move to the Revamped Public Distribution System (based on a principle of geographic targeting) in tribal, arid, hill and remote areas in 1992 and then to a Targeted Public Distribution System (TPDS) in 1997. Under the TPDS, households were classified as Above Poverty Line (APL) or Below Poverty Line (BPL), based on the economic status of households. BPL households continued to receive subsidised food grains through the TPDS whereas subsidies for APL households have been gradually phased out.

The impact of these changes can be evaluated on several criteria including selection into or exclusion from the TPDS, utilisation of PDS quotas, effect on the consumption patterns and so on. Correct identification could mean that the

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programme may have improved in terms of better targeted subsidies. Access to cheap food grain could make a more diversified and nutritious diet affordable for poor households. Much depends, however, on the actual functioning of the PDS on the ground.

My fieldwork, conducted in Rajasthan, presented an intriguing picture of the PDS. PDS grain was not much cheaper than market grain of similar quality. Further, in Rajasthan wheat is supplied through the PDS, but in six out of eight sample villages, the staple was maize or pearl millets ('coarse cereals'). Yet, people were desperate to have access to the PDS. Those who had APL cards complained bitterly at being left out. Those with BPL cards made repeated trips to ration shops that were often quite far and queued in order to enjoy this small subsidy. In spite of this, they rarely got their full entitlement of 35kg. Having spent some time at ration shops, I noticed that they were often cheated by their PDS dealer. Those who were aware of being cheated often complained to me, but did not protest in front of the PDS dealer.[1]

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This article presents evidence related to the utilisation and impact of the PDS in Rajasthan. I find that though BPL cards have generally been given to the poorer households in the sample, utilisation is low. Among those who have access to the TPDS, one-third of the sample households do not utilise their quota at all and another half do not utilise their quota fully. Further, many of these households purchase the same items from the market at higher prices. This puzzle of 'under-purchase' (purchasing less than one's entitlement and yet purchasing from the market at a higher price) from the PDS is examined using a 'dual-pricing' model.

The dual-pricing model provides a framework within which government intervention in the wheat market and its associated problems can be analysed. However, in order to account for under-purchase from the PDS and related patterns, the standard dual-pricing model needs to be extended to take into account additional factors such as transaction costs, uncertainty, and quality variations. Possible reasons for under-purchase from PDS in Rajasthan are examined in this extended framework.

There could be various reasons for low utilisation levels. Demand-side bottlenecks include cash-flow problems (that is, households may not have cash when foodgrain is available in government ration shops), inappropriate foodgrains being supplied through the PDS, and so on. There are also supply-side constraints in the form of diversion to the open market or just irregular functioning of ration shops. Various aspects of the survey data, including the responsiveness of PDS purchases to market prices, support the supply hypothesis – that is, households just buy what is supplied to them. This is further corroborated by secondary data on diversion and field observations. I estimate the extent of fraudulent diversion of PDS foodgrains for sale in the open market, using official data on offtake and National Sample Survey data on PDS purchase. I also present insights from field observations on how and why diversion takes place.

The article also examines the impact of the PDS on consumption patterns. While the PDS does not have much impact on the *level* of cereal consumption, it seems to affect the *composition* of cereal consumption. Specifically, the TPDS tilts cereal consumption of households towards wheat (which is sold at a subsidised price

through the TPDS), away from coarse cereals. This is possibly a matter of concern, since coarse cereals are generally more nutritious than wheat.

## II. The Data

The field survey used in this article was part of a larger study aimed at studying the government's interventions for food security during a severe and prolonged drought in Rajasthan (see Khera (2006) for details). Data were collected from a random sample of 388 households in eight villages by means of a household and a village questionnaire. Apart from the background characteristics of the households and individuals, the household questionnaire also included data on the severity of the drought, coping strategies, the public distribution system, and food-for-work programmes. As I lived in the sample village or a neighbouring village during the fieldwork, data collection was supplemented by group discussions and informal discussions with various people in the villages, including village level functionaries. The village questionnaire was used to gather information on public (and other) amenities in the village and included a section for the PDS dealer.

Since the survey could not cover large parts of the state it was carried out in four districts, purposely selected to reflect regional variations. The sample districts were Barmer, Bikaner, Jaipur and Udaipur. These districts not only give a fair geographic spread, but also reflect agro-climatic variations and differing levels of development in different parts of Rajasthan.

Within each district, two villages were selected at random, using probability proportional to size sampling (after excluding villages with a population below 800 or above 1,500).[2] The sample villages are Biramsar, Dulmera Station, Baasri Jogiyan, Sukaliya Morda, Kharad and Badli and Biroti.[3] From these a random sample of 400 households was chosen from the voter list of the village prepared by the district authorities.

There were two rounds of fieldwork. The 'baseline' survey was conducted in May–December 2002 in all but one village (fieldwork in the remaining village was completed in February 2003). The 'main' survey was conducted in August–November 2003. The reference period for this round was from August 2002 to July 2003 (that is, the previous 12 months).[4]

## III. PDS: Targeting and Utilisation

Starting with a short discussion on who has access to the PDS, this section takes a look at the pattern of purchase of PDS grain by households that do have access. The distribution of ration cards is based on official guidelines issued in 1997. These guidelines had two sections. The first section pertains to those assets and consumer durables, the ownership of which automatically disqualifies households from eligibility for BPL cards. These include television sets, refrigerators, fans, two- or four-wheelers, threshers, tractors, power tillers and more than five acres of operational landholdings. Families in which someone has a regular (salaried) job or who live in *pukka* houses are also automatically disqualified. The second section of the questionnaire is for those households that have not been eliminated by the first set of criteria. This section of the questionnaire looks at their consumption expenditures.

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*Access*

Table 1 summarises the main characteristics of the sample households, by type of ration card possessed. APL households comprised the largest category, accounting for two-thirds of the sample households. The APL households in my sample were not purchasing any foodgrain from the PDS as the APL prices were higher than market prices. Just over one-third of the sample households were classified as BPL. Another 4 per cent had Antyodaya or Annapoorna cards. Antyodaya households are 'the poorest of the poor' (this was initially a sub-category of the BPL category). They are entitled to 35kg of grain per month, at Rs2/kg for wheat (and Rs3/kg for rice). BPL households get 35kg per month at Rs4.60/kg. Annapoorna card holders are entitled to 10kg of grain per month free of cost. These cards are meant for persons who are eligible for old-age pension but are not actually receiving one. The term 'BPL$^{+}$' will be used from time to time to refer to the combined category of BPL, Antyodaya and Annapoorna cardholders. This corresponds to the set of households that are effectively included in the PDS.

In my sample, BPL households are generally poorer than APL households (see Table 1). For instance, average land owned by BPL households is less than average land owned by APL households (especially for irrigated land). Sixty per cent of

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**Table 1.** Household characteristics, by type of ration card

| | APL | BPL | Antyodaya |
|---|---|---|---|
| Total number of households[a] (Proportion of households) | 228 (61.6) | 128 (34.3) | 13 (3.5) |
| Average Predicted MPCE (Rs.) | 504.2 | 430.4 | 485.2 |
| Proportion (%) below poverty line in terms of predicted MPCE[b] | 14.0 (207) | 35.7 (112) | 14.2 (7) |
| Average household size | 7.6 | 6.8 | 5.8 |
| Average land owned (bighas), 2001 | 13.1 | 7.1 | 3.1 |
| Irrigated | 2.6 | 0.4 | 0.1 |
| Unirrigated | 10.4 | 6.6 | 3.0 |
| Number of livestock owned, 2001 (cows, buffaloes, sheep and goats) | 14 | 8 | 6 |
| Type of housing | | | |
| Pukka | 18.9 | 7.8 | 7.7 |
| Semi-pukka | 39.9 | 17.2 | 30.8 |
| Kachha | 40.8 | 75 | 61.5 |
| Number of households | | | |
| Scheduled Tribe | 19 | 38 | 6 |
| Scheduled Caste | 49 | 19 | 2 |
| Other Backward Castes | 121 | 34 | 4 |
| General Castes | 39 | 37 | 1 |

*Notes*: [a]Out of 388 sample households information on type of ration card possessed was not available for nine households, not clear for six households. Four households with Annapoorna cards have not been reported in the table. These tabulations are based on information regarding type of ration card possessed in 2002. [b]Figures in brackets indicate the number of observations on which the proportions are based. For each ration card type, the proportion of households with a predicted Monthly Per Capita Expenditure (MPCE) of less than the poverty line, Rs344, has been reported.

BPL$^+$ households owned less than five acres of land, whereas only 4 per cent owned 25 acres. Similarly, 30 per cent of BPL$^+$ households were Scheduled Tribe (ST) households. Since STs comprised only 17 per cent of all households, they were 'over-represented' among BPL$^+$ cardholders, in the factual sense that their share of BPL$^+$ cards was higher than their share in the population. The data point to an 'over-representation' of disadvantaged groups in the BPL$^+$ category: those with little land, low levels of education, a low standard of living, etc., are more likely to be included in the PDS.

To supplement the other markers of sustained economic disadvantage mentioned above, we have also attempted to devise an indicator of economic status independent of the drought conditions that prevailed at the time of the survey. A two-stage procedure is used for this purpose. The first step involves identifying the correlates of monthly per capita expenditure (MPCE) based on household-level data from the fifty-fifth round of the National Sample Survey (NSS) pertaining to 1999–2000. Using ordinary least squares (OLS), we can estimate the coefficients for the predictors of MPCE (household characteristics such as land owned, education, gender of household head, etc.). The second stage combines these estimated coefficients with the characteristics of the sample households to calculate their 'predicted MPCE'.[5] As Table 1 shows, predicted MPCE is lower for BPL households (Rs 430) than for APL households (Rs 504), confirming that BPL households are generally poorer than APL households. Given that inclusion and exclusion errors in the selection of BPL households has been a concern, the findings here are significant. The data here suggest that the selection of households may not be as faulty as has been claimed in many non-governmental organisation (NGO) and media reports.[6]

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*Utilisation*

To what extent do BPL$^+$ families utilise their PDS quota? Sample data show that many BPL$^+$ households do not buy their entire quota of grain. On average, BPL$^+$ households bought 12.6kg of wheat from the PDS each month, as opposed to their full entitlements of 35kg per month. Many of the households that did not purchase their full quota were purchasing substantial quantities of grain from the open market, at prices higher than the official PDS price. This pattern does not fit in the 'dual pricing' models commonly used to analyse the PDS. Section 2 focuses on possible reasons for the co-existence of under-purchase from the PDS with market purchases.

In this section, we look at the utilisation of the PDS both in terms of the proportion of BPL$^+$ households buying from the PDS and in terms of average purchases by BPL$^+$ households. We shall also examine the impact of the PDS on the level and composition of foodgrain consumption.

We start with a comparison of the level, and composition, of cereal consumption among BPL$^+$ and APL households. Average per capita consumption (kg) of foodgrains per month is not very different for BPL$^+$ and APL households (see Table 2a). It is 17.9kg for BPL$^+$ households and only 300 grams less (17.6kg) for APL households.

Further, on average, BPL$^+$ households consume 10.5kg of coarse cereals per capita per month whereas APL households consume 11.0kg of coarse cereals

per capita per month. In the case of wheat alone, $BPL^+$ households consume 7.4kg per capita per month and APL households consume slightly less, 6.6kg per capita per month. The share of wheat in total cereal consumption among $BPL^+$ households (41 per cent) is higher than the share of wheat for APL households (38 per cent). This is true for each of the survey districts (see Table 2a). To the extent that households with $BPL^+$ cards are actually the poorer households, one would expect their consumption of coarse cereals to be greater than that of APL households (since coarse cereals are 'inferior goods' in India). This is not the case. The PDS seems to be increasing the total cereal consumption of $BPL^+$ households only marginally, while shifting cereal consumption away from coarse cereals towards wheat (more on this in section 3).

Moving on to utilisation levels of PDS quota, we find that $BPL^+$ households were purchasing only 37 per cent of their entitlement on average. Each $BPL^+$ household is entitled to 35kg per month but the average monthly purchase was only 13kg in 2002–2003. Table 2b tabulates the proportion of households that buy the entire share of PDS wheat, none of their PDS quota and those that buy some share of their PDS quota.

Table 2b shows that only 13 per cent of $BPL^+$ households used their entire PDS quota of wheat in 2002–2003. Not a single one of these was a ST household. More than one-third of all $BPL^+$ households bought nothing from the PDS. More than half of such households (i.e. not buying at all from the PDS in 2003) were Scheduled Caste (SC) households; more than half were small and marginal farmers. The remaining 50 per cent of $BPL^+$ households bought something from the PDS but less than their full quota.

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**Table 2a.** Consumption of cereals (kg/capita/month)

| | $BPL^+$ households | | APL households | |
|---|---|---|---|---|
| | All cereals | Wheat[1] | All cereals | Wheat |
| Barmer | 22.3 | 5.0 (52) | 25.8 | 3.3 |
| Bikaner | 17.9 | 12.7 (34) | 15.6 | 8.4 |
| Jaipur | 15.9 | 10.4 (−) | 15.6 | 7.5 |
| Udaipur | 15.1 | 6.6 (49) | 13.3 | 4.8 |
| All districts | 17.9 | 7.4 (45) | 17.6 | 6.6 |

*Note*: [1]Figure in brackets gives the share of total wheat consumption that is bought from the PDS.

**Table 2b.** Distribution of $BPL^+$ households, by use of PDS

| Purchase from PDS | 2001 | 2003 |
|---|---|---|
| Bought nothing from PDS (Z=0) | 13.8 | 36.1 |
| Bought *something* from PDS (Z>0 & Z<Z*) | 56.6 | 50.7 |
| Bought full PDS quota (Z=Z*) | 29.7 | 13.0 |

Among households that do not purchase their full PDS quota, 16 (that is, 24%) were buying wheat from the market (see Table 2c). This indicates that some households do not exhaust their entire PDS quota and instead buy some part of their wheat requirements from the market. Per household average monthly consumption of wheat among these households (41kg) exceeds what they are eligible to buy from the PDS. Among those who do not buy at all from the PDS, again, many are buying from the market. In short, there is a puzzle ('under-purchase' of PDS wheat) as to why many households forego some of their PDS wheat, even though they buy wheat on the market at higher prices. We examine utilisation by BPL households in a multivariate framework below.

### *Dual Pricing Model and its Predictions*

This section examines the puzzle of the 'under-purchase' of PDS wheat using the dual-pricing model. The simplest model of the PDS is the standard 'dual pricing' model. This has been depicted in Figure 1. Wheat is measured on the vertical axis

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**Table 2c.** PDS purchases (z) and market purchases ($x_0$), 2002–2003

| | z=0 | 0<z<35 | z=35 | Total |
|---|---|---|---|---|
| $x_0=0$ | 30 | 50 | 12 | 92 |
| $x_0>0$ | 17 | 16 (24.2) | 5 | 38 |
| Total | 47 | 66 | 17 (13.0) | 130 |

*Note*: $x_0$ denotes the market purchase of wheat and z denotes purchase of PDS wheat. Each entry indicates the number of households in the relevant purchase category.

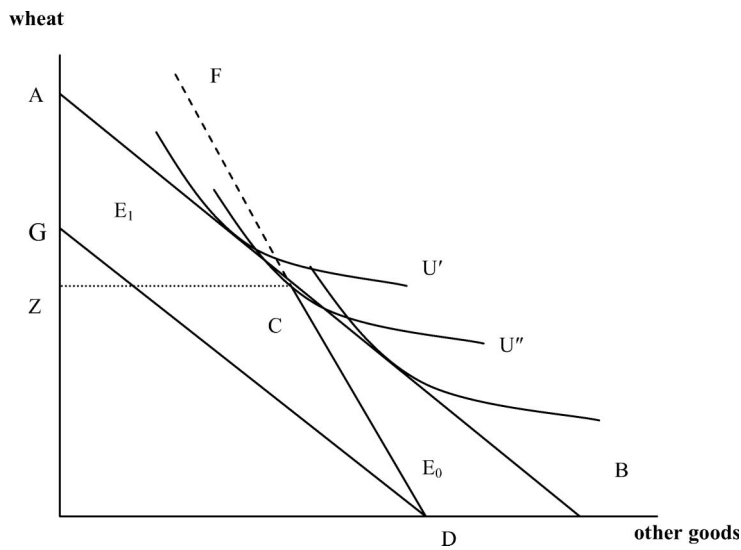



**Figure 1.** Dual pricing model (standard model).

and other goods on the horizontal axis. In the absence of any subsidy, the budget constraint would be DG. If the government provides wheat at a subsidised price (say q) up to a certain quantity (say z*), the slope of the budget constraint (from D) is initially steeper, up to C, where there is a kink; thereafter the slope of the budget constraint is given by the market price (say $p_0$).

If 'resale' of the subsidised commodity is possible and costless, the effective budget constraint is AB. The household would face exactly the same budget constraint if it enjoyed an income transfer equivalent to (B-D) and had to buy all its wheat from the open market. In other words, the PDS is equivalent to an implicit transfer of (B-D) and it is easy to show that B-D = ($p_0$-q).z* (the difference between market price and subsidised price, multiplied by maximum quantity).

If resale is not possible, the same reasoning applies provided that the utility-maximising choice involves consuming more than z*. Indeed, if the household wants to consume more than z*, the no-resale constraint is not binding since the household has no reason to sell something it wants to consume. The choice made when the household faces the kinked budget constraint ACD is exactly the same as the choice it would make if it faced the budget constraint AB (which applies when resale is allowed); and this choice involves no resale. Therefore, here again the PDS boils down to an implicit income transfer equal to B-D. It is only when resale is not possible and the utility-maximising consumption of wheat is less than (or equal to) z* that the PDS ceases to work as a straightforward, implicit income transfer.

Formalising this argument based on the revealed preference approach, Deaton (1984) shows that under the 'no resale' assumption a household buys:

a) less than its quota if

$$g(x, q, p) < z*$$

b) from the open market (in addition to the PDS quota) if

$$g(x + (p_0 - q)z*, p_0, p) > z*$$

and

c) exactly its quota if

$$g(x + (p_0 - q)z*, p_0, p) \leq z* \leq g(x, q, p)$$

where z*, q and $p_0$ are as before, p is the price of the non-food good and g is the Marshallian demand function for wheat.[7]

This model, however, does not explain why some households buy wheat from the open market even when they are not using their full PDS quota. It also overlooks some important features of the PDS in Rajasthan (or for that matter in most of India). These include: (1) transaction costs (for example, repeated trips to the ration shop); (2) diversion of wheat by the dealers for sale in the open market; (3) quality

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differences between PDS and open-market wheat; and (4) liquidity constraints (associated with the fact that the PDS quota has to be bought in a single instalment).[8] Bringing these considerations in the model, aside from making it more realistic, can help to explain the co-existence of PDS 'under-purchase' with market purchases.

Transaction costs are the result of uncertainty regarding when PDS dealers will lift their quota, the commodity that will be supplied, frequency of supplies, and lack of awareness regarding entitlements under the PDS. For instance, villagers living in far-flung hamlets cannot find out beforehand whether the PDS shop will be open on any particular day, and whether the commodity they want to purchase will be available. Several trips (and consequent loss of wages) may be required to the ration shop before they can actually purchase wheat. Distance to the PDS shop also increases transaction costs.

The liquidity constraint is yet another problem that villagers faced in purchasing the full quota. The total cost of a month's PDS quota is Rs161 which can be difficult to arrange at short notice. Given that the entire quota has to be bought in one 'instalment', villagers often forego some part of their quota.

To capture some of these factors, the basic utility-maximisation problem of the dual-pricing model can be extended as follows:

Max $U(x_0 + z, x)$

s.t. (1) $m \geq px + p_0x_0 + (q + c).z$ (budget constraint)
(2) $z \geq 0$ (non-negative PDS purchases)
(3) $z \leq (1-\alpha).z^*$ (quantity constraint on PDS purchases)
(4) $x_0 \geq 0$ (no resale)

where $x_0$ and x denote market purchases of food and non-food commodities (respectively); $p_0$ and p are the corresponding prices; q is the official issue price of PDS wheat; c is the 'transaction cost' (per unit) associated with PDS purchases; z* is the official PDS entitlement; z denotes actual purchases from the PDS; m is lump-sum income; and $\alpha$ is the proportion of PDS wheat 'diverted' to the open market by the ration dealer. The simpler model considered earlier can be seen as a special case of this extended model, where $c = 0$ and $\alpha = 0$.

Diagrammatically, transaction costs (captured in the parameter c) lead to an anti-clockwise 'swing' the lower portion of the budget constraint (CD in Figure 1), making it flatter, with D remaining where it is and C moving horizontally to the left. 'Diversion' (captured in the parameter $\alpha$) effectively lowers z*. For the time being, c and $\alpha$ are treated as exogenous. This seems appropriate when we consider the consumption decisions of a particular household. Later on, we shall discuss how c and $\alpha$ might vary across households, or in response to market prices and other variables.

There are three possible outcomes:

$$(\mathbf{A}) \quad \mathbf{z = 0} \qquad \text{(no PDS purchase)}.$$

This is always the case when $q + c > p_0$, that is, transaction costs are such that PDS wheat is effectively more expensive than open-market purchase. In this case,

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consumers have no reason to buy from the PDS. If $q + c < p_0$, this outcome can arise only if $\alpha = 1$ or $x_0 = z = 0$ (no consumption of wheat at all). Both are unlikely.

$$(\mathbf{B}) \quad \mathbf{z} = \mathbf{z}* \qquad \text{(full PDS purchase)}$$

This requires $q + c \leq p_0$ (PDS cost no higher than market cost) and $\alpha = 0$ (no diversion). These conditions, however, are not sufficient, since a household may choose not to buy the full PDS quota even if the PDS price is lower than the market price. In that case, however, it would not purchase from the market ($x_0 = 0$).

$$(\mathbf{C}) \quad 0 < \mathbf{z} < \mathbf{z}* \qquad \text{(partial PDS purchase)}$$

This, in turn, can happen in two ways:

$$\begin{array}{ll} \text{(C1)} & \alpha > 0,\ z = (1\text{-}\alpha).z^* \text{ and } x_0 \geq 0 \qquad \text{(quantity constraint on PDS)} \\ \text{(C2)} & \alpha \geq 0,\ z < (1\text{-}\alpha).z^* \text{ and } x_0 = 0 \qquad \text{(voluntary under-purchase).} \end{array}$$

Thus, in this extended model, under-purchase may happen for two reasons. First, the household may face a quantity constraint, because the dealer is diverting some of the wheat for open-market sale. Second, the household may not be interested in purchasing the full quota, for example, because cheaper cereal substitutes (such as bajra) are available on the market.

In the first case, the household may or may not purchase wheat from the market. In the second case, there are no open-market purchases. In other words, in this extended model the only way to explain the co-existence of PDS under-purchase and open-market purchases is by invoking the notion of diversion-driven quantity constraint in the PDS.

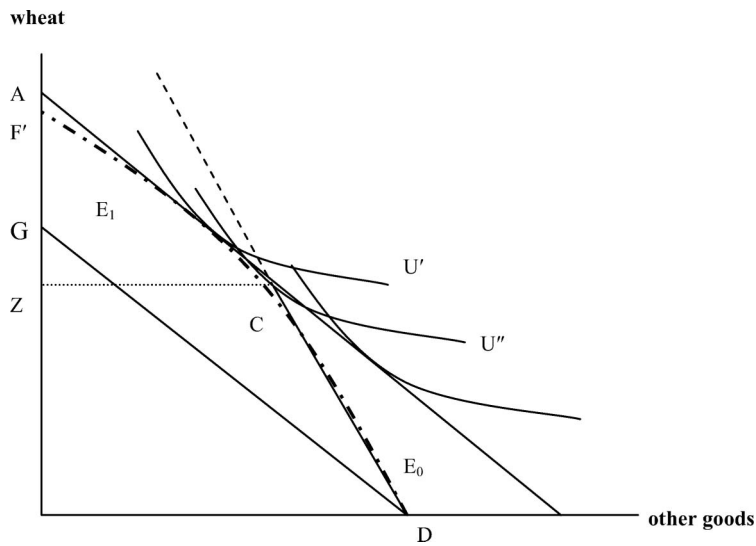



**Figure 2.** Dual pricing model (with non-linear transaction costs).

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Note, however, that non-linear transaction costs can also explain this 'puzzle'. Indeed, if c rises with the quantity purchased (instead of being constant), the consumer is likely to buy from the PDS up to the point where $q + c = p_0$, and beyond that, to buy from the open market. This situation is illustrated in Figure 2. Suppose a card holder gets only 20kg on her first visit to the ration shop and getting the remaining quota of wheat requires a second trip. Such additional trips amount to raising the transaction costs.

The next question is whether it is possible to distinguish empirically between C1 and C2, that is, whether 'partial purchase' from the PDS is due to quantity constraints or voluntary under-purchase. If transaction costs are linear (c is constant), the obvious way to distinguish between the two is to check whether or not $x_0 = 0$, that is, whether partial PDS purchase co-exists with market purchases. However, if transaction costs are non-linear (a plausible hypothesis), this 'test' breaks down. An alternative approach is explored in the next section.

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## IV. Data Analysis and Results

Using a multivariate framework, we explore two questions in the following sections. One, what effect does the PDS have on the level and composition of cereal consumption, and two, what accounts for under-purchase of PDS wheat.

### *Variables Used in the Analysis*

Table 3 lists the variables used in the analysis: consumption and purchase of cereals, prices and household characteristics. As we saw earlier, the average per capita consumption of all cereals and wheat for all households and BPL households is very similar. Market prices of cereals were collected during both field surveys. This is a *village* level variable and is assumed to be constant across households in a village. The difference between the market price and the PDS price of wheat ('diff') was small – Rs1.1/kg on average.

Land owned by the household (in *bighas*), and 'predicted' MPCE (discussed earlier) have been included as measures of economic status of the household. Besides this, the type of housing has also been included as a marker of wealth – the proportion of households living in concrete houses ('pukka'), semi-pukka and mud houses ('kachha').

The proportion of households in which any member had a 'regular' job ('reget') is very small in the sample – only 5 per cent. Further, the years of education of the most educated member of the household ('mosteduc') has also been included on the right hand side. As Table 3 reports, the mean of 'mosteduc' is six years. Finally there are four caste dummies: Scheduled Castes ('SC'), Scheduled Tribes ('ST'), Jats and other backward castes ('OBC').

### *Level and Composition of Cereal Consumption*

Patterns of PDS purchases and cereal consumption were discussed above. We noted for instance that per-capita cereal consumption is approximately 2 per cent higher

**Table 3.** Variables: Definition and mean

| Variable | Definition and unit of measurement | Mean | |
|---|---|---|---|
| | | All households | BPL households |
| Per capita cereal consumption | Per capita consumption of *all* cereals (kg/month/person) | 17.6 | 17.9 |
| Per capita wheat consumption | Per capita consumption of wheat (kg/month/person) | 6.9 | 7.0 |
| PDS purchase of wheat ('WPDS03') | Monthly purchase of wheat from PDS (kg/month/household) | 4.7 | 12.6 |
| Price difference ('diff') | Difference between market price of wheat and PDS price of wheat | – | 1.1 |
| Predicted MPCE (mpce2) | Calculated using NSS 55th round data | 475.1 | 430.4 |
| Land ('land') | Land owned, in bighas | 26.4 | 17.9 |
| Type of house ('htype') | =1 for pukka homes<br>=2 for semi-pukka<br>=3 for kachha homes | 2.4 | 2.6 |
| Years of education ('mosteduc') | Years of education of that member of the household with most education | 6.0 | 4.7 |
| 'Regular' employment ('Reget') | =1 if any member of the household has a regular job; 0 otherwise | 4.9 | 3.1 |
| Scheduled Castes ('SC') | Dummy, =1 for Scheduled castes; 0 otherwise | 18.9 | 14.8 |
| Scheduled Tribes ('ST') | Dummy, =1 for Scheduled castes; 0 otherwise | 16.8 | 29.7 |
| Other backward castes ('OBC') | Dummy, =1 for Other backward castes; 0 otherwise | 33.2 | 25.0 |
| Jats ('Jats') | Dummy, =1 for Jats; 0 otherwise | 9.8 | 1.6 |

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for $BPL^+$ households than for other households. It is worth taking a closer look at what influences the total consumption of cereals. In particular we are interested in the question of whether access to the PDS has a statistically significant impact on the level or composition of cereal consumption.

Table 4 presents OLS regressions of per capita cereal consumption, and per capita wheat consumption, on various household and village characteristics. The dependent variable is per-capita cereal consumption, in the first two columns, and per-capita wheat consumption, in the last two. On the right hand side, we have included village and caste dummies, predicted MPCE, and education level of the most educated person in the family. In columns (a) and (c) we have added a dummy variable for possession of a $BPL^+$ card, and in columns (b) and (d), the actual purchase of PDS wheat.

In columns (b) and (d), PDS purchases are treated as 'exogenous' as far as households are concerned. This is consistent with the supply hypothesis, but not with

**Table 4.** Per capita consumption of cereals and wheat

| | OLS: Per capita consumption (kg/month) of | | | |
|---|---|---|---|---|
| | Cereals | | Wheat | |
| | (a) | (b) | (c) | (d) |
| BPL | 0.56 | – | 3.186*** | – |
| | (0.50) | | (3.55) | |
| Wheat from PDS (Wpds03) | – | 0.042 | – | 0.107*** |
| | | (0.90) | | (2.6) |
| Years of education (mosteduc) | −0.785*** | −0.781*** | −0.244*** | −0.300*** |
| | (−6.39) | (−6.03) | (−2.58) | (−2.89) |
| Land (in bighas) | 0.013 | 0.016 | −0.021*** | −0.194* |
| | (0.84) | (0.99) | (−2.10) | (−1.89) |
| Predicted MPCE (mpce2) | 0.025*** | 0.025*** | 0.014*** | 0.014*** |
| | (7.76) | (7.49) | (6.46) | (5.87) |
| Scheduled Castes (SC) | 1.295 | 0.704 | −0.067 | −0.692 |
| | (0.98) | (0.52) | (−0.07) | (−0.67) |
| Scheduled Tribes (ST) | −1.584 | −1.887 | −0.684 | −0.214 |
| | (−0.91) | (−1.06) | (−0.65) | (−0.19) |
| Other OBCs (newobc) | 2.448* | 2.351* | 1.81* | 1.52 |
| | (1.80) | (1.73) | (1.69) | (1.39) |
| Jat | 3.047* | 2.756* | 0.841 | 0.204 |
| (jat) | (1.90) | (1.76) | (0.63) | (0.16) |
| Village dummies | | | | |
| Negative and significant | Biroti, Baasri, Biram, Morda, Dulmera, Badli | Biroti, Baasri, Morda, Dulmera, Badli | – | – |
| Positive and significant | – | – | Biroti, Biram, Baasri, Morda, Dulmera | Biroti, Biram, Baasri, Morda, Dulmera |
| Constant | 12.72*** | 12.75*** | −4.12** | −2.42 |
| | (5.38) | (5.82) | (−2.59) | (−1.62) |
| Observations | 326 | 320 | 326 | 320 |
| F-stat | 10.64 | 9.29 | 14.03 | 11.88 |
| R-squared | 0.41 | 0.40 | 0.32 | 0.30 |

*Notes*: * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent. Absolute value of t statistics, based on robust SE, in parentheses.
*Note on variables*: 'BPL' is a dummy variable that takes the value 1 if the household has a BPL ration card; wpds03 refers to the purchase of PDS wheat in 2002–2003; mpce2 refers to the 'predicted' monthly per capita consumption expenditure. Other variables are defined as in Table 3.

the demand hypothesis (see next section), and the results should be interpreted in this light.

Considering 'cereal consumption' first, the regressions indicate that predicted MPCE is significant in increasing per capita cereal consumption. Even if we control

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for occupation (using occupation dummies), ownership of land, the influence of predicted monthly per capita expenditure remains positive and significant.

On the other hand, higher levels of education appear to be associated with *lower* levels of cereal consumption. This could be on account of two reasons. First, better-educated individuals may have less energy-intensive occupations and therefore consume less. For instance, educated persons are more likely to have access to regular employment where one would expect lower levels of physical activity. However, when occupational dummies are included, none of them are significant whereas education remains negative and significant.

Second, it is possible that education leads to a 'diversification' of diets away from cereals towards more nutritious foods such as vegetables, dairy products, etc. Unfortunately it is not possible to test this hypothesis with the available data, since I did not collect much information on non-cereal consumption.

The most interesting findings however emerge from comparing the first two columns in Table 4 with the last two columns. Comparing columns (a) and (c) to start with, we find that the possession of a BPL card boosts per-capita *wheat* consumption, but not per-capita *cereal* consumption. This suggests that access to the PDS 'tilts' cereal consumption away from coarse cereals towards wheat, without raising the level of cereal consumption. The same pattern emerges from a comparison of columns (b) and (d): higher PDS purchases are associated with higher levels of wheat consumption, but not cereal consumption. This is disturbing because it suggests that access to the PDS squeezes consumption of coarse cereals which have a better nutritional content than fine cereals such as wheat and rice.[9]

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### *Under-purchase and Quantity Constraints*

In Section 2 we distinguished between two possible reasons for PDS under-purchase. First, under-purchase may be voluntary, and therefore driven by demand factors such as high transaction costs, the availability of coarse cereals, and so on. Second, PDS under-purchase may be due to supply-driven quantity constraints: households just buy whatever is made available to them at the ration shop. For convenience we shall refer to these as the 'demand hypothesis' and 'supply hypothesis', respectively.

One way of distinguishing between these hypotheses is to focus on the relation between PDS purchases and the market price of wheat. If under-purchase is demand-driven, we would expect that household characteristics matter, and also a positive relation between market price and PDS purchases: the more expensive wheat is on the open market, the stronger the incentive to 'switch' from market purchases to PDS purchases. On the other hand, if PDS purchases are supply-driven, two opposing effects operate as far as price responsiveness is concerned – the higher the market price of wheat, the larger the profits PDS dealers can make by diverting PDS wheat to the open market. However, when price difference increases there is also more incentive for households to demand their rations.

Panel 1 of Table 5 reports the OLS coefficients of a regression of per capita wheat consumption (for all households and for BPL households only) on demand side variables. Suppose that the reason for under-purchase is that households are indifferent at the margin between PDS wheat and coarse cereals (such as bajra) that are available on the market at a lower price. We would then expect that income

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**Table 5.** Demand-driven 'under-purchase'

| | OLS: Per capita consumption of wheat (kg/month) | | Wheat purchase from PDS (monthly/hh) BPL households | | | | |
|---|---|---|---|---|---|---|---|
| | Panel 1 | | Panel 2 | | Panel 3: Quantile regressions | | |
| | All households | BPL households | OLS | Tobit | 25th quantile | 50th quantile | 75th quantile |
| Price difference ('diff') | – | – | 17.03*** | 29.3*** | 1.69 | 17.93 | 32.77*** |
| | | | (2.41) | (2.23) | (0.19) | (1.40) | (2.30) |
| Squared price difference ('diff_sq') | – | – | −5.87*** | −11.05*** | −0.86 | −5.67 | −10.39*** |
| | | | (2.71) | (2.44) | (0.34) | (1.47) | (2.22) |
| Predicted MPCE (mpce2) | 0.01*** | 0.02*** | 0.01 | 0.01 | 0.0 | 0.02 | 0.01 |
| | (4.71) | (5.30) | (0.79) | (0.71) | (0.0) | (1.22) | (0.35) |
| Years of education ('mosteduc') | −0.34*** | −0.32*** | 0.22 | 0.42 | 0.02 | 0.30 | 0.26 |
| | (3.36) | (2.66) | (0.60) | (0.79) | (0.04) | (0.70) | (0.47) |
| Land (in bighas) | −0.03*** | −0.04*** | −0.04 | −0.09 | 0.0 | −0.07 | −0.11 |
| | (4.30) | (2.76) | (0.72) | (1.21) | (0.06) | (0.57) | (0.87) |
| Scheduled Castes (SC) | −0.53 | 0.11 | −2.48 | −5.49 | −0.11 | −0.81 | 2.04 |
| | (0.55) | (0.08) | (0.65) | (−1.02) | (0.02) | (0.10) | (0.35) |
| Scheduled Tribes (ST) | −1.78** | −1.52 | −4.86* | −8.20 | −0.49 | −3.85 | −3.69 |
| | (2.07) | (1.30) | (1.67) | (1.50) | (0.13) | (0.82) | (0.65) |
| Type of house ('htype') | −2.15*** | −3.29*** | −5.32*** | −7.26*** | −2.69 | −6.08 | −8.03*** |
| | (3.94) | (4.51) | (2.74) | (−2.61) | (0.97) | (1.45) | (2.56) |
| 'Regular' employment ('Reget') | 6.50** | 0.75 | −10.27* | −16.84 | 0.60 | −19.16* | −11.47 |
| | (2.20) | (0.48) | (1.67) | (−1.26) | (0.08) | (1.70) | (0.88) |
| Constant | 10.91*** | 16.84*** | 14.87* | 11.45 | 7.89 | 10.02 | 19.22 |
| | (8.27) | (7.79) | (1.66) | (0.87) | (0.90) | (0.55) | (1.32) |
| Observations | 372 | 122 | 98 | 98 | 98 | | |
| F statistic/Pseudo-$R^2$ | 8.20 | 0.19 | 3.86 | 24.35 | 0.02 | 0.17 | 0.24 |

*Notes*: Absolute value of t statistics, based on robust SE, in parentheses. * significant at 10 per cent; ** significant at 5 per cent; *** significant at 1 per cent.

*Note on variables*: 'Diff' is the difference between market price and PDS price of wheat ($p_0$-q); 'mosteduc' refers to the years of education of the most educated household member; 'land' refers to the land owned (in bighas) by the household; 'SC', 'ST' are dummy variables that take the value 1 if the household is a 'Scheduled Caste' or 'Scheduled Tribe' respectively; 'htype' refers to the type of housing; 'regular' is a dummy variable that takes the value 1 if a household member has a regular job.

increases are associated with an increase in PDS purchases, as households switch from coarse cereals (considered 'inferior goods' in India) to wheat. However, as Panel 1 of Table 5 indicates, even though *wheat consumption* does respond to household characteristics such as education, land ownership, caste, and various indicators of economic status, *PDS purchases* do not (Panel 2).

In Panel 2 of Table 5, we look at PDS purchase (z) of wheat by BPL households, using OLS and Tobit regressions. The reason for using a Tobit regression is that the observations on the dependent variable, z, are censored.[10] The first important point to note about the results in Panel 2 is that the coefficient on none of the demand side variables (except type of housing) is significant. The only other coefficients that are significant in these regressions are the price variables ('diff' and 'diff_sq'), which are positive and negative respectively (discussed below).

In the last three columns of Table 5 (Panel 3), I report the results of a quantile regression of PDS purchase on the same demand side variables. The purpose of these regressions is to look at what affects PDS purchase at different parts of its distribution. For the 25th quantile, the results show that none of the coefficients are significant – z is independent of household characteristics and price differences. The price coefficients for the median regression are similar to the OLS regression (which is around the mean). However, in the median regression this result is not significant. It is only in the regression on the 75th percentile that the price difference is significant.

Consider the coefficients of 'diff' and 'diff_sq'. The coefficient on 'diff' is positive and significant, but negative and significant on 'diff_sq'. This means that up to a point, as the difference between PDS and market price increases, z increases. Thereafter PDS purchase decline with rising differences. Using the OLS estimates, the stationary point is at Rs2.89 (and at Rs2.63 in the case of the Tobit coefficients).

These findings should be interpreted in the light of the fact that two opposite effects mentioned earlier: when PDS prices are much lower than market prices it means, on the one hand, that 'diverting' wheat from the PDS to the open market is particularly lucrative for PDS dealers. On the other hand, it is also means that BPL households have a strong incentive to ensure that they get their full rations. As it turns out, PDS purchases by BPL households decline when the price differences are 'large', suggesting that for large price differences the first factor dominates. This is probably a reflection of the poor bargaining power that BPL households in Rajasthan have vis-à-vis the ration dealers when the incentive to cheat increases. In such situations it is plausible that many BPL households just buy whatever the dealers give them, not protesting for fear of jeopardising future transactions with the same PDS dealer. In other words, this means that the 'supply hypothesis' holds for BPL households in Rajasthan.

The results in Table 5 suggest that (a) household characteristics do not matter, as far z is concerned and (b) to the extent that z responds to the difference between market and PDS price of wheat, it initially increases with price difference, but then has a negative relationship with the price difference.

Finally, it should be noted that even though a clear conceptual distinction can be made between the demand hypothesis and the supply hypothesis, in practice a combination of the two is likely to be at work. For instance, consider the fact that ST

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households are consistently found to buy less wheat from the PDS than other households. Within the 'supply hypothesis' framework, this could be interpreted as a reflection of the fact that ST households are particularly easy to cheat. But the same finding can also be interpreted in the 'demand hypothesis' framework, for example, in terms of the fact that ST households have a higher propensity to consume coarse cereals than other households (partly as a matter of food habits and partly because they often grow coarse cereals). In practice both factors are likely to be at work. In this case, the two hypotheses are consistent with, and indeed reinforce, each other. Though it is hard to go any further in disentangling the demand and supply effects with the given data, the result that PDS purchase responds to price and not household characteristics combined with the sign on the price variable suggests that the supply hypothesis holds. Further evidence from secondary data (the extent of diversion of PDS grain) and from field observations (how and why ration dealers divert the grain) on the supply hypothesis is presented below.

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*Corruption*

Returning to the supply hypothesis, the extent of 'diversion' of PDS grain can be scrutinised from secondary data. There is evidence at the aggregate level that what consumers buy from the PDS is much less than what is officially supplied to them by the central government.

The Ministry of Food and Consumer Affairs publishes monthly data on 'offtake' of wheat and rice under the PDS. The term 'offtake' refers to the actual amount delivered by the Food Corporation of India to state governments for the purpose of distribution through the PDS.

On the other hand, the NSS provides us with information on the quantities of PDS wheat and rice that are actually purchased by households. Using NSS data on per-capita monthly purchase of wheat and rice from the PDS, we can calculate the aggregate purchase of PDS foodgrain in each state. This total purchase can be compared with the corresponding 'offtake' figure for that state.[11] If there is no siphoning off, purchase figures should match 'offtake' figures. The difference between offtake and purchase gives us an estimate of the 'diversion' of PDS foodgrains to the open market.[12]

Table 6 reports the estimated proportions of wheat and rice that were 'diverted' from the PDS in 2001–2002, in each major state and for the country as a whole. It turns out that two-fifths of the official PDS offtake failed to reach the consumers in 2001–2002. There is, however, a sharp contrast between rice and wheat in this respect. Less than one-fifth (18.2%) of PDS rice was diverted, compared with more than two-thirds (67%) of PDS wheat. This is associated with a clear north–south divide in the performance of the PDS. In the primarily 'rice-eating' southern states, the proportion of foodgrain diverted ranged between 11 and 48 per cent. 'Wheat-eating' states are concentrated in the northern region, where diversion of foodgrain ranged between 43 and 88 per cent.

The greater overall diversion of wheat than rice can be interpreted in two ways: one, that wheat is more profitable to divert than rice, or two, that there are other factors associated with regional characteristics which reduce the probability of

**Table 6.** Diversion of PDS grain, 2001–2002

| | Estimated proportion of grain 'stolen' from the PDS (%) | | |
|---|---|---|---|
| | Rice | Wheat | Total |
| Andhra Pradesh | 12 | n/a[a] | 11 |
| Orissa | 21 | n/a[a] | 21 |
| Gujarat | 36 | 27 | 30 |
| Himachal Pradesh | 26 | 44 | 31 |
| Chhattisgarh | 46 | 33 | 43 |
| Madhya Pradesh | 51 | 46 | 47 |
| Karnataka | 47 | 54 | 48 |
| Maharashtra | 40 | 53 | 48 |
| J&K | 54 | 79 | 61 |
| Delhi | 72 | 65 | 67 |
| West Bengal | 42 | 84 | 67 |
| Uttar Pradesh | 77 | 67 | 70 |
| Assam | 69 | 98 | 75 |
| Rajasthan | n/a[a] | 76 | 76 |
| Jharkhand | 72 | 83 | 79 |
| Bihar | 77 | 92 | 88 |
| INDIA | 18[b] | 67 | 39[b] |

*Notes*: [a]Not applicable (zero or negligible offtake). [b]Lower bound: some underestimation is involved due to lack of data on 'local procurement' of rice (outside the FCI system) in Tamil Nadu and a few other states.
*Source*: Unpublished calculations by Drèze and Khera (2005). These estimates are obtained by 'matching' official data on PDS offtake from the Food Corporation of India (FCI) with National Sample Survey (NSS) data on household purchases from the public distribution system.

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diversion of rice. In a given state, the diversion of rice is actually higher than that of wheat in several cases (for example, Chhattisgarh, Madhya Pradesh and Uttar Pradesh). This suggests that the contrasts are essentially inter-state rather than grain-specific. Many southern states provide an additional subsidy (over and above the subsidy provided by the central government) on PDS grain.[13] So far as the profitability of diversion is concerned, there are two factors which pull in opposite directions. The larger subsidy increases the incentives for ration dealers to indulge in black-marketing, but it also increases the incentives for PDS consumers to make sure that they get their share of PDS grain. What seems to be happening is that in the southern states the latter force is stronger, that is, consumers are more vociferous and unwilling to let go of their share of PDS benefits.[14]

Yet another fact to keep in mind is that the southern states generally have higher levels of government accountability as well as a better record of implementing development programmes and welfare schemes. It is possible that the general social, cultural and other conditions that have created these relatively favourable standards of governance in the southern states have also enabled them to run the PDS more effectively, and in particular, to avoid large-scale corruption.

As part of my fieldwork, I interviewed the ration dealers in the sample villages. These interviews led to interesting insights into the supply side of the PDS. After a

brief description of how foodgrains are diverted by ration shop owners, I discuss the problems faced by them in running the ration shop honestly.[15]

Ration dealers employ a simple mechanism for siphoning off PDS grain: irrespective of the actual quantity sold, in the official records the full quota (35kg) is recorded as being sold. The dealer either gets someone else to sign for them in the register or coerces the ration card holder to sign or card holders who are illiterate are just asked to put their thumbprint on these falsified records.

The wheat that is thus siphoned off from the month's PDS quota, is either sold in Udaipur or in Gujarat where it fetches Rs6.50 per kg (as opposed to the government price of Rs4.60 per kg). The ration dealer gets PDS wheat for Rs4.53 per kg. By diverting PDS wheat to the open market, the dealer makes up for the meagre commission of 7 paise per kg. Thus, the dealer makes Rs1.97 per kg of PDS wheat and Rs4.50 per kg of Antyodaya wheat.[16] With 35 Antyodaya cardholder in his panchayat, the dealer can earn Rs2362.5 (15kg from each Antyodaya household gives him 525kg to divert to the open market). In addition, the dealer has 200 BPL cardholders. This means that approximately 30 quintals of BPL wheat are siphoned off, earning him a profit of Rs5910. Transporting the wheat to Gujarat (just across the border), costs Rs300 per small truck. This gives a total of Rs7972.5 net of the transport costs, from the black market.

However, the ration dealers are not entirely to blame. In Table 7 below, I have tried to reconstruct the balance sheet of this ration dealer from whom we got detailed information on costs and income from the ration shop. The last row of Table 7 shows that if the dealer were to run the shop honestly he would make just over Rs100 per month. Note that this 'balance sheet' does not include some other costs incurred

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**Table 7.** Balance sheet of a ration dealer in Rajasthan

| | Rate | Total |
|---|---|---|
| (a) Costs | | |
| Labour (at most 2 labourers for 4 days) | Rs 50/day | Rs 400.0 |
| Rent for shop | Rs 200/month | Rs 200.0 |
| Loading and unloading | | |
| Wheat | Rs 2/sack | Rs 200.0 |
| Sugar | Rs 5/sack | Rs 60.0 |
| Transport (Bribe to the transporter) | Rs 16/km | Rs 160.0 |
| TOTAL | | Rs 1020.0 |
| (b) Income | | |
| Earning from commission | | |
| Wheat | Rs 0.07/kg | Rs 390.0 |
| Sugar | Rs 0.08/kg | Rs 96.0 |
| Kerosene | Rs 0.11/litre | Rs 292.6 |
| Sale of | | |
| 50kg sacks | Rs 3.00/katta | Rs 300.0 |
| 100kg sacks | Rs 10.00/bori | Rs 60.0 |
| TOTAL | | Rs 1138.6 |
| NET INCOME (a-b) | | Rs 118.6 |

*Note*: [i]The dealer is paid only Rs8–9/km for transport whereas the actual cost is close to Rs25/km. See Khera (2006)

by the ration dealer (such as the bribes that have to be paid to various officials in the Food Corporation of India (FCI) storage from where the grain is lifted).

Part of the reason for such low incomes is the very low commission income that dealers earn. Their main source of legitimate income is the sale of the gunny bags in which the wheat and sugar are supplied. Sugar is supplied in 'boris' (100kg gunny bags), whereas wheat is supplied in 'kattas' (50kg gunny bags). These sell for Rs10 and Rs3 respectively.

The main problems mentioned by dealers include: one, low commissions and volume. Commissions paid to dealers are very small (for example, it was 7 paise per kg of wheat). Further, the introduction of the TPDS has meant that the volume handled by ration dealers has shrunk by approximately 70 per cent. Two, corruption: at every step ration dealers have to pay some speed money – getting a license (for example, one dealer claimed having paid Rs1300 unofficially), having the supplies released from godowns. Most dealers complained that they are also cheated in weights – for every drum of 220 litres, they receive only 215 litres. Sacks of wheat are sometimes made wet so that they weigh more than the actual weight. Three, delays and uncertainty: one ration dealer deposited money for wheat in July but had not received the supply of wheat till early October. If the quota is not lifted by a particular date, he is fined Rs300. On the other hand, supplies to the godown are irregular and there is no mechanism for informing him when supplies arrive. Four, transportation losses: loss of grain and sugar in transport are not compensated for. Sacks of wheat and sugar arrive torn and leaking. Five, the 'door to door' delivery system: officially, the government is supposed to bear the transportation cost. However, in practice, dealers also end up paying transporters some money. This is partly because the government does not have adequate trucks for the supplies. The supplies of each rationed good may have to be lifted from a different place. Dealers have to spend a considerable amount following up on supplies (four trips each costing Rs30 in one case).

To some extent at least, however, these bribes are extracted from the PDS dealers because it is known that dealers will 'recover' these eventually.

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## V. Conclusion

This article sheds light on various aspects of the working of the Targeted Public Distribution System in Rajasthan. I find that access to the PDS is limited: only about one-third of the households have access to the PDS. Though there are conceptual problems (such as uniform criteria for the entire country and a static view of a household's economic status) with the official criteria used for the selection of BPL households, I find that those who have BPL cards are among the poorer households in the sample.

Turning to 'utilisation' of PDS quotas the picture is not so bright. Among those who have access to the PDS (the '$BPL^{+}$' households), *utilisation levels are low*. Utilisation is low both in terms of the proportion of households actually buying some grain from the PDS and also in terms of the quantity of grain they buy. Only 13 per cent of BPL households in my sample were purchasing their full quota of grain. Worse, nearly one-third of the BPL households did not buy any grain from the PDS. Among those who did purchase grain from the PDS, the average monthly

purchase was only 12.6kg, compared with a monthly entitlement of 35kg. In other words, BPL$^+$ households were buying less than half of what they are entitled to, even when they were buying.

Given that PDS prices are lower than market prices, one would expect that the PDS quota would be exhausted before buying costlier open market wheat. A somewhat counter-intuitive finding is that some households forego some share of their entitlement and buy from the open market instead. We have distinguished between two possible reasons for 'under-purchase' of PDS grain: the demand hypothesis and the supply hypothesis respectively. One way of distinguishing between these two hypotheses is to look at the relation between market price and PDS purchases. Operating within the limitations of econometric analysis, we find that PDS purchase *is* sensitive to market price of wheat. There is an interesting relationship between market price of wheat and purchase of wheat from the PDS – so long as the difference between the market and the PDS price is less than Rs2.6–2.9/kg, BPL households buy more as the market price increases. Increase in the difference beyond this, reduces what BPL households buy indicating that the supply-hypothesis holds.

We also looked at evidence of corruption in the public distribution system from secondary data. At the all-India level, 67 per cent of wheat is siphoned off to the open market. The levels of diversion of PDS grain are generally much higher in north India than in south India. As the discussion in Section 3 shows, ration dealers are not entirely to blame: commissions are low, corruption at a higher level is rampant and the costs of running ration shops end up exceeding revenues generated. Thus, corruption has become a requirement of economic survival for the PDS dealers.

I also explore the effect of access to the PDS on the level and composition of cereals of sample households. I find that access to the PDS does not have a statistically significant effect on total cereal consumption. However, access to the PDS significantly increases wheat consumption. It is not surprising that access to subsidised wheat increases its share in the total cereal consumption. However, it is disturbing that the increase in the share of wheat in total cereal consumption is coming at the cost of coarse cereals. This is disturbing because coarse cereals are typically more nutritious than wheat.

The TPDS in Rajasthan leaves much to be desired in terms of access, and whether the poor are able to utilise their quotas. However, the record of the PDS is not uniformly poor so as to warrant a junking of the entire system. As mentioned earlier, the PDS performs better in some of the southern states. Though BPL households *in Rajasthan* may not gain much from the PDS, the situation is quite different in other states. These regional variations need to be probed further. Further, several field-based studies have observed that Antyodaya households appear to be more successful in 'demanding' their PDS entitlements than BPL households, even though the incentive to divert wheat from the Antyodaya quota is higher (and these households often do not have much bargaining power).[17] This is reflected even in my sample: the average purchase of PDS wheat by Antyodaya households in the sample is 20.3kg compared with just 12.6kg for BPL households.

The recently elected government proposes to enact at Right to Food law in India. As the PDS is likely to form the backbone of such a law, understanding the contrasts

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within the PDS, including the seemingly better performance of the Antyodaya programme, assumes immediate relevance.

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## Notes

1. As a result, I was 'requested' by ration dealers to stop my fieldwork and leave the village on two occasions.
2. A simple random sample of villages, irrespective of size, would give rise to bias in the estimates of population characteristics. To get unbiased sample estimates for the population, employing probability proportional to size sampling is recommended (see Deaton 1997: 15). Tiny (population below 800) and large villages (above 1,500) were avoided to facilitate the fieldwork.
3. Birothi was the last accessible village on the road to the initial sample village which was inaccessible due to flooding of the river. It is a replacement village.
4. Fieldwork was conducted to collect data on employment programmes and the PDS. The reference period for data collection was based on the employment cycle of employment programmes. Consumption data used in this article are from the main survey. Since there were only 16 households less in the main survey compared to the baseline survey, issues related to attrition are ignored.
5. This approach assumes that the relationship estimated for Rajasthan as a whole using NSS data also holds, approximately at least, in the sample villages. 'Predicted MPCE', estimated in this way, is at best a statistical proxy for actual MPCE, and should be interpreted as such. Note that the predicted MPCE is the pre-drought figure, unaffected by transfers to households during the drought.
6. Some studies have highlighted the conceptual problems with selection criteria (see Indrakant, 2000; Swaminathan and Mishra, 2001; Hirway, 2003; Khera, 2008) raising concerns regarding targeting errors.
7. See Deaton (1984) for a proof based on the revealed preference approach.
8. A fifth important feature of the PDS is uncertainty, for example, regarding opening hours of the ration shop, the price that is likely to be charged, the quality of PDS wheat and so on. To some extent these can be viewed as transaction costs.
9. See Gopalan et al. (1982) for further details.
10. The results of a Heckman two-step regression, to account for the fact that the sub-sample of BPL households may not be a random sample, are not reported here for two reasons. First, the results are similar to the OLS and Tobit results, and second, this procedure is not recommended in the case of small samples (see Wooldridge, 2002; Kennedy, 2003: 291).
11. Since offtake figures are available on a monthly basis, aggregate offtake can be calculated for the same reference period as in the NSS data.
12. The difference between offtake and purchase can only be accounted for by diversion and spoilage because ration shops are not allowed to maintain stocks.
13. For instance, in Andhra Pradesh the government provides rice to all PDS cardholders at Rs5.50 per kg which is below the central issue prices of Rs5.65 for BPL cardholders and Rs8.30 for APL cardholders. Instead of providing 35kg per family per month, in Andhra Pradesh the entitlements are 4kg per person per month.

14. See Nag (1988) and Drèze (2004) for some independent evidence of this point.
15. I have relied on interviews with the ration shop owners in sample and non-sample villages. Another telling fact is that I was 'requested' by ration dealers to leave the village in two instances during fieldwork.
16. There is no commission for Antyodaya wheat.
17. See Drèze (2002), and Jain and Shah (2005).

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