

# Rural Poverty and the Public Distribution System

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This article presents estimates of the impact of the public distribution system on rural poverty, using National Sample Survey data for 2009-10 and official poverty lines. At the all-India level, the PDS is estimated to reduce the poverty-gap index of rural poverty by 18% to 22%. The corresponding figures are much larger for states with a well-functioning PDS, e.g., 61% to 83% in Tamil Nadu and 39% to 57% in Chhattisgarh.

This article is a follow-up of earlier writings where we have tried to draw attention to the growing importance of the public distribution system (PDS) as a means of income support and social protection in rural India (Drèze and Khera 2010, 2012; Khera 2011a, 2011b and Drèze 2013). With market prices of PDS commodities (mainly wheat and rice) going up year after year, and issue prices being kept unchanged or even reduced in some states, the implicit value of PDS entitlements has substantially increased. Further, the functioning of the PDS has improved in many states in recent years. For the first time, the PDS is having a substantial impact on rural poverty, as shown below using National Sample Survey (NSS) data for 2009-10 (66th round).

## 1 The PDS as an Implicit Transfer

The simplest way of assessing the impact of the PDS on rural poverty is to look at it as an implicit income transfer. The PDS is not, in fact, just an implicit income transfer, but this aspect of it is a good place to start. The implicit income transfer for a particular household (say  $h$ ) can be calculated as:

$$T^h \equiv Q^h \cdot (p - q) \quad \dots(1)$$

where  $Q^h$  is the quantity of the subsidised commodity being provided,  $p$  is its market price, and  $q$  is the PDS issue price. This formula is appropriate if the household concerned consumes *more* than  $Q^h$ , a reasonable assumption since the PDS covers only a fraction of most people's foodgrain requirements. Under this assumption,  $T^h$  simply measures the amount of money saved by household  $h$  when it buys  $Q^h$  from the PDS at a price ( $q$ ) lower than the market price ( $p$ ). If several commodities are supplied through the PDS, the total implicit transfer can be calculated in the same way by aggregating over commodities.

This implicit transfer can be added to the conventional measure of monthly per capita expenditure (MPCE) available from NSS data, and then poverty estimates with and without the implicit transfer can be compared. This is, briefly, the basis of the poverty comparisons presented here. Before we proceed, however, a few clarifications are due.

## 2 Illustration: Chhattisgarh

To keep things simple, we begin by presenting these calculations for a single state: Chhattisgarh, where the PDS functions relatively well, with standard entitlements of 35 kg of rice per household per month at a symbolic price (Rs 2/kg or 1/kg for most eligible households, depending on the type of ration card). This is equivalent, roughly speaking, to the earnings of

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one week of work under the National Rural Employment Guarantee Act (NREGA) every month, without having to work.<sup>1</sup> In 2009-10, about 73% of rural households in Chhattisgarh were buying foodgrains from the PDS according to NSS data.

As always, there is an element of arbitrariness in the choice of the poverty line, and as discussed further on, the results are sensitive to this choice. For presentational convenience (more precisely, for the purpose of consistency with the interstate comparisons presented below), we use the Planning Commission's all-India rural poverty line of Rs 673 per person per month at 2009-10 prices in this illustrative exercise. Using this poverty line, the headcount ratio in Chhattisgarh was 63.8 in 2009-10 based on the conventional MPCE measure (Table 1). When we add the implicit PDS transfer, however, the headcount ratio drops to 52.9% – a proportionate reduction of 17%. The proportionate reduction in the “poverty-gap index” (a distribution-sensitive poverty measure, more appropriate for this purpose) is much larger – 39%.

**Table 1: Rural Poverty and the PDS in Chhattisgarh (2009-10)**

Proportion of households with positive PDS purchases (%)	73
Average implicit subsidy <sup>a</sup> (Rs/month/capita)	70.6 (106.6)
Headcount ratio <sup>b</sup>	
Without implicit subsidy	63.8
With implicit subsidy	52.9
Percentage reduction	17
Poverty-gap index <sup>b</sup>	
Without implicit subsidy	16.3
With implicit subsidy	9.9
Percentage reduction	39

MPCE = Monthly average per capita expenditure.

a The average is taken over all households. In brackets, average over households with positive PDS purchases (of wheat or rice) in 2009-10.

b Based on the all-India “Tendulkar poverty line” for rural areas (Rs 673/month in 2009-10). Source: Authors' calculations from NSS data (66th round, “mixed reference period”).

For further details, see Table 3.

Thus, in a state like Chhattisgarh, where the system functions relatively well, the PDS clearly has a substantial impact on rural poverty, at least in terms of conventional poverty measures, especially distribution-sensitive measures such as the poverty-gap index. As we shall see, this also applies to other states with a relatively effective PDS, such as Tamil Nadu and Andhra Pradesh. As one might expect, it does not apply to states such as Bihar where the PDS is still in bad shape. The contrast between Bihar and Chhattisgarh is illustrated in Table 2, based on the findings of the PDS Survey 2011, reported in more detail elsewhere.<sup>2</sup>

One interesting aspect of this contrast relates to the extent of hunger, in terms of the frequency of skipping meals. The proportion of below poverty line (BPL) households who had to skip meals sometime during the three months preceding the survey was as high as 70% in Bihar, but only 17% in Chhattisgarh. This is quite striking considering that the levels of rural poverty are much the same in both states, in terms of standard poverty indicators (according to Planning Commission estimates, the headcount ratio of rural poverty in 2009-10 was 56% in Chhattisgarh and 55% in Bihar).<sup>3</sup> This contrast highlights not only the substantial impact of the PDS on rural poverty in states with a well-functioning PDS but also

the misleading nature of official poverty estimates that effectively ignore the PDS factor.

### 3 Poverty Lines and the PDS

At this point, a sceptical reader may object that this line of analysis is misleading, on the grounds that the PDS factor is *already* taken into account in official poverty estimates, by suitable construction of price indexes. The claim is that state-specific poverty lines are set by deflating the national poverty line by an appropriate price index (reflecting consumer prices in the concerned state), and that if price indexes are correctly designed, they would take into account the relatively low-cost of living in states where consumers enjoy PDS subsidies. Adding these subsidies again to the MPCE estimates (as we have done in the preceding section) would be double-counting – so goes the argument.

We submit that this argument is unconvincing for two reasons. First, it is very doubtful that price indexes adequately capture PDS subsidies. Second, even if they do, the price-index approach would fail to capture the *distributional* aspects of PDS subsidies.

Prior to the Tendulkar Committee report (Government of India 2009), the consumer price index for agricultural labourers (CPI-AL) was used to update poverty lines over time, state-wise. The weights of different commodities in the CPI-AL are very old, and certainly do not take into account the effects of the PDS on the cost of living today.<sup>4</sup>

The price indexes and poverty lines used in the Tendulkar methodology have a better chance of capturing the effect of the PDS on the cost of living. In the Tendulkar methodology, the poverty line in a specific state and sector (say, rural Jharkhand or urban Tamil Nadu) in 2004-05 is essentially the cost of a fixed basket of commodities (the “poverty line basket”), calculated using the prices applicable in that state and sector.

**Table 2: The PDS in Bihar and Chhattisgarh (2011)**

	Bihar	Chhattisgarh
Proportion of BPL households who did not get any foodgrains from the PDS in the last three months (%)	35	0
Average foodgrain purchases of BPL households from the PDS in the last three months:		
In absolute terms (kg/month)	11	33
As a proportion of entitlements <sup>a</sup> (%)	45	95
Proportion of BPL respondents who said that they “normally” get their full PDS entitlements (%)	18	97
Proportion of BPL respondents who agree with the entries in their ration cards (%)	25	94
Proportion of BPL households who skipped meals in the last three months (%)	70	17
Proportion of BPL households who would support the PDS being replaced with equivalent cash transfers (%)	54	2
“Poverty-gap index” of rural poverty, 2009-10 <sup>b</sup> (%)		
Without implicit subsidy	14.4	16.3
With implicit subsidy	13.8	9.9
Percentage reduction	4	39

a Entitlements: 25 kg and 35 kg per household per month in Bihar and Chhattisgarh, respectively (for rice and wheat combined).

b Based on the all-India “Tendulkar poverty line” for rural areas (Rs 673/month in 2009-10). Source: PDS Survey 2011 (see Khera 2011b), based on a random sample of 264 households in 24 villages of Bihar and Chhattisgarh (six villages per district in two districts of each state). The last row (poverty-gap index) is based on calculations from NSS data, discussed in the text; see also Table 3.

The relevant prices are derived from NSS data. Further, in the case of rice and wheat, the relevant price is effectively calculated as a weighted average of the market price and the PDS price. The weights are the respective shares of market purchases and PDS purchases in total purchases of rice or wheat, in quantity terms, in the relevant state and sector. Thus, if we compare two otherwise identical states, where consumers are getting (say) one-fourth and three-fourths of their rice from the PDS respectively, the price of rice would be deemed lower in the second state. Correspondingly, the poverty line for that state would be lower too.

If the PDS were *universal* in each state (with PDS prices and quantities being the same for every household within though not necessarily across states), this might be a satisfactory way of adjusting state-specific poverty lines to take into account the effect of the PDS on the cost of living.<sup>5</sup> However, if the PDS is not universal, then for purposes of poverty estimation it is extremely important to take into account the distributional impact of the PDS. This cannot be done by adjusting price indexes and poverty lines.

To illustrate, consider a state where the PDS is used only by people below the poverty line, and poor people represent a small fraction of the population. In this state, the weighted-average price of foodgrains would not be very different from the market price, so that the PDS would have little impact on poverty estimates à la Tendulkar. And yet the PDS could make a big difference to poor people, and perhaps even raise most of them, effectively, above the Tendulkar poverty line. As this example illustrates, the Tendulkar methodology is likely to *underestimate* the effect of the PDS on poverty.

#### 4 A Way Forward

The problem discussed in the preceding section arises mainly when *several states* are included in the analysis. When we focus on a single state, there is no major difficulty. Since the poverty line is in any case an arbitrary benchmark, we can take any poverty line and examine the effect of the PDS on rural poverty in terms of that poverty line using the method described earlier, as we have already done for Chhattisgarh. It is when several states are involved that the question arises as to whether and how state-specific poverty lines should be adjusted to take the PDS into account.

One way to proceed is as follows. Instead of using state-specific poverty lines, we use the all-India poverty line of Rs 673 per person per month (in 2009-10) in *each state*, and calculate the impact of the PDS on rural poverty using the implicit transfer method outlined in Section 1. In other words, we do not make *any* adjustments for differences in the price level across states. This helps to ensure that there is no double-counting of the effect of the PDS on rural poverty (as there might be if we combined the implicit-transfer method with state-specific poverty lines that already take the PDS into account). On the other hand, it means that the poverty lines are not strictly comparable across states, since they ignore inter-state price differentials. This, however, is not a major issue as long as we focus on the comparative *reduction* of rural poverty

associated with the PDS in different states, rather than on the respective *levels* of poverty.

Another possible approach is to revert to the pre-Tendulkar practice of updating poverty lines using the CPI-AL. State-specific poverty lines for 2004-05 using the pre-Tendulkar method are available from Deaton (2008), and these can be combined with CPI-AL data to work out the corresponding 2009-10 poverty lines. In effect, this would mean extending the methodology of the pre-Tendulkar days, proposed by the 1993 Expert Group on poverty estimation (Government of India 1993), up to 2009-10. Since the CPI-AL essentially ignores the PDS, as discussed earlier, the corresponding poverty lines can also be assumed to ignore the PDS. The implicit-transfer method can then be used to estimate the impact of the PDS on rural poverty in terms of these poverty lines.

We shall present and compare estimates based on both methods – the national poverty line method and the CPI-AL-based poverty lines method.<sup>6</sup> Before that, the valuation of PDS commodities needs further discussion.

#### 5 Valuation of PDS Commodities

In the simplest version of equation (1),  $p$  and  $q$  (market and PDS prices, respectively) are the same for all households. In practice,  $q$  is indeed household-invariant, at least among households with the same ration card within a particular state.<sup>7</sup> However, the market price  $p$  does vary from household to household, for at least three reasons: regional variations in production and transport costs; lack of market integration; and inter-household variations in the quality of rice or wheat being purchased. This raises the question – what is the appropriate price to use for the purpose of calculating the implicit PDS transfer?

One option is just to rewrite equation (1) as

$$T^h \equiv Q^h \cdot (p^h - q) \quad \dots(2)$$

where  $p^h$  is the market price paid by household  $h$ . If the quality of foodgrains purchased by household  $h$  from the market is higher than that of PDS foodgrains, this formula would overestimate the implicit transfer. In the case of wheat, this may not be a major issue, because wheat does not have the sort of quality grading that rice has, and while PDS wheat has often been of poor quality in the past, it appears to be of fair average quality in most states today. In the case of rice, however, quality is an issue, and equation (2) might involve a non-trivial overestimation of the implicit PDS transfer. Another problem is that  $p^h$  is missing for a substantial proportion (about 13%) of households.

An alternative is to use the mean or median price in the sample to value PDS commodities – in other words, revert to equation (1) where  $p$  is interpreted as the mean or median price. Mean price is not a good idea, because the distribution of market prices (for a specific PDS commodity, rice or wheat) has a long tail on the right, so that the mean price is driven up by freak cases of very high price, including at least some that would be due to measurement errors. The median price, on the other hand, sounds like a reasonable benchmark, though it

could lead to some overestimation or underestimation of the implicit transfer. For instance, if most PDS cardholders buy at a price below the median price when they purchase rice or wheat on the market, this method is likely to lead to some overestimation of the implicit transfer. A more conservative benchmark is “ $p_{25}$ ”, the price corresponding to the 25th percentile of the price distribution. We tried both  $p_{50}$  (the median price) and  $p_{25}$ , and since the results are very similar, the calculations presented here pertain to the median price.

## 6 Rural Poverty and the PDS

Table 3 presents state-wise estimates of the impact of the PDS on rural poverty, based on NSS data for 2009-10 (close to 60,000 rural households). As discussed earlier, we treat the PDS as an implicit transfer, and use median prices to calculate

**Table 3: Rural Poverty and the PDS (2009-10)**

	Average Implicit Subsidy <sup>a</sup> (Rs/month/capita)		Poverty Reduction due to the PDS <sup>b</sup> (%)			
	Rural	Urban	Using the Tendulkar National Poverty Line <sup>c</sup>		Using CPI-AL-Based Poverty Lines <sup>d</sup>	
			HCR	PGI	HCR	PGI
Andhra Pradesh	61.7 (70.7)	46.6 (92.8)	32.8	40.6	56.1	57.2
Assam	13.7 (43.1)	5.6 (33.7)	9.2	17.9	16.3	27.2
Bihar	5.5 (37.5)	3.8 (41.3)	1.3	4.3	4.2	7.1
Chhattisgarh	70.6 (106.6)	43.4 (110.7)	17.2	39.0	44.4	56.8
Gujarat	14.4 (37.6)	10.0 (38.1)	11.8	15.3	18.7	18.7
Haryana	8.4 (42.6)	4.0 (40.4)	13.8	15.1	15.4	15.1
Himachal Pradesh	46.1 (52.2)	28.8 (52.1)	36.1	35.3	37.9	36.9
Jammu and Kashmir	41.7 (61.0)	58.9 (87.0)	45.0	35.3	26.4	41.5
Jharkhand	16.2 (61.4)	5.3 (53.2)	3.3	13.2	16.0	21.7
Karnataka	49.4 (64.7)	23.9 (76.3)	22.2	33.1	34.6	45.5
Kerala	37.1 (57.8)	28.5 (52.4)	33.0	36.7	39.6	38.2
Madhya Pradesh	25.1 (50.7)	10.0 (38.1)	6.0	13.4	9.6	25.7
Maharashtra	19.0 (40.2)	6.2 (44.8)	18.9	30.0	35.5	30.1
Odisha	37.1 (62.7)	19.2 (63.9)	9.6	23.3	27.7	40.8
Punjab	8.1 (36.1)	5.6 (44.6)	15.8	14.4	19.6	14.9
Rajasthan	6.4 (35.3)	5.8 (35.3)	7.6	11.7	15.7	14.2
Tamil Nadu	107.3 (112.8)	86.0 (110.5)	44.4	61.3	80.3	83.4
Uttar Pradesh	10.8 (45.5)	5.8 (27.4)	5.2	11.1	11.4	16.7
Uttarakhand	17.8 (43.9)	5.1 (27.1)	17.7	24.1	27.3	26.8
West Bengal	13.0 (33.4)	5.9 (33.0)	9.6	11.5	13.5	14.4
India	26.2 (60.4)	20.2 (71.6)	10.6	17.6	16.4	22.4

a The average is taken over all households. In brackets, average over households with positive PDS purchases (of rice or wheat) in 2009-10.

b Proportionate reduction in the headcount ratio (HCR) and poverty-gap index (PGI).

c All-India “Tendulkar poverty line” for rural areas (Rs 673/month in 2009-10), applied to all states without adjustments for interstate price differences.

d “Pre-Tendulkar” state-specific rural poverty lines for 2004-05 from Deaton (2008), updated using state-specific CPI-AL.

Source: Authors’ calculations from NSS data (66th round, “mixed reference period”). CPI-AL data from Labour Bureau, converted into yearly figures, state-wise, by taking unweighted averages of month-wise figures from July to June. For the six states bifurcated from undivided Bihar, Madhya Pradesh and Uttar Pradesh (i.e. Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Uttar Pradesh and Uttarakhand), the CPI-AL figures pertain to the relevant undivided state (e.g. undivided Bihar in the case of Jharkhand). Implicit subsidies are calculated using median prices (see text for further details).

the implicit transfer. Two different sets of poverty lines are used: (1) the national poverty line (Rs 673 per month at 2009-10 prices, in rural areas) without interstate price adjustments, and (2) the CPI-AL-based poverty lines.

Focusing for now on the national poverty line approach, the estimates in Table 3 suggest that the PDS-induced reduction of rural poverty at the all-India level in 2009-10 was around 11% based on the headcount ratio, and 18% based on the

poverty-gap index. At the state level, the impact of the PDS on rural poverty varies a great deal, as one would expect. In states like Jharkhand and Uttar Pradesh, where the functioning of the PDS was very poor at that time, the impact is very small. But in states with a well-functioning PDS, the impact of the PDS on rural poverty is substantial, especially in terms of the distribution-sensitive poverty-gap index: 61% reduction in Tamil Nadu, 33% to 41% in the other southern states (Andhra Pradesh, Karnataka and Kerala), 39% in Chhattisgarh, and around 35% in Himachal Pradesh as well as Jammu and Kashmir.

Keeping the focus on the poverty-gap index, which is more appropriate for our purposes than the headcount ratio, a few other states deserve special mention. The impact of the PDS on rural poverty is well above the all-India average in Odisha, a state where the PDS has significantly improved in recent years.<sup>8</sup> The improvements seem to have continued after 2009-10, with a correspondingly larger impact, hopefully, on rural poverty and economic insecurity. In Rajasthan, on the other hand, the poverty impact of the PDS is below the all-India average. It is worth noting, however, that Rajasthan initiated significant PDS reforms in 2010, with positive results.<sup>9</sup> Finally, the state where there is least evidence of any impact of the PDS on rural poverty is Bihar. This is not surprising, since Bihar seems to have the worst PDS in India.<sup>10</sup> The impact of the PDS on rural poverty is also small in Uttar Pradesh and West Bengal, two other poor (and large) states where PDS reforms have barely begun.

As one would expect, the results are sensitive to the choice of poverty lines (less so, it seems, when the poverty-gap index is used instead of the headcount ratio). When CPI-AL-based poverty lines are used instead of the national poverty line (last two columns of Table 3), the percentage reduction in poverty associated with the PDS is larger at the national level: 18% for the headcount ratio and 24% for the poverty-gap index. This is not surprising, since the all-India poverty line in this approach (the pre-Tendulkar poverty line) is lower than the Tendulkar poverty line. The same pattern applies state-wise, with a few exceptions like Kerala and Punjab. While there are, as expected, significant differences between the two approaches in terms of the state-specific estimates, the contrasts across states are much the same in each case. In particular, major reductions of rural poverty are attributable to the PDS in states like Chhattisgarh and Tamil Nadu where the system works relatively well, but not in states like Bihar and Uttar Pradesh where the opposite applies.

The benefits of the PDS, of course, need to be evaluated against the costs and compared with possible alternatives. Using Rs 26 and Rs 20 per month as the per capita implicit transfer achieved by the PDS (Table 3), and combining this with population figures from the 2011 Census, the aggregate transfer adds up to Rs 35,000 crore in 2009-10. This is about 60% of the food subsidy in that year (Rs 58,242 crore).<sup>11</sup> To put it another way, for each rupee of actual transfer to consumers through the PDS, the central government was spending Rs 1.68 in 2009-10. However, part of this Rs 1.68 is an implicit transfer

to farmers, not a transaction cost, insofar as the minimum support prices paid by the government are higher than market prices. If the implicit income transfers to consumers and farmers are added up, they would account for more than 59% of the food subsidy. Correspondingly, the ratio of government expenditure to actual transfer would be lower than 1.68. Not all of this transfer, of course, is a transfer to people BPL. But nor would it be right, in the accounting of the benefits of the PDS, to give zero weight to transfers received by people above the poverty line (as some earlier studies have done), considering that the poverty line is so low. A convincing cost-benefit analysis would need to separate the transaction costs from the transfer component of the food subsidy, and also to give appropriate weights to transfers received by different groups.

## 7 Further Considerations

Before concluding, we should mention a few qualifications as well as possible extensions of this analysis. First, there is no simple way of taking into account possible differences in the quality of foodgrains bought from the PDS and the open market. The fact that the basic results do not vary much whether we value PDS purchases of rice and wheat at median prices or at “ $p_{25}$ ” is somewhat reassuring. A more explicit analysis of quality differences, however, would be a useful extension of this enquiry.

Second, this analysis also ignores possible transaction costs borne by households in the process of buying PDS commodities, such as the cost of queuing or of repeated visits to a ration shop that has unpredictable opening hours. It is important to mention that the PDS can also have transaction *benefits* for rural households. For instance, in the tribal areas of central India, the local ration shop is often far more accessible and convenient than the nearest market (typically a weekly market situated at some distance). Nevertheless, it is quite possible that PDS purchases, in general, do involve substantial transaction costs.

Third, our illustrative calculations are based on the official poverty line (set by the Planning Commission), which is very low. Since most of the literature on poverty in India is based on this poverty line, we have followed the same convention, for purposes of comparability. With a higher poverty line, however, the percentage reduction in the headcount or poverty-gap index associated with the PDS would be smaller.

Fourth, our analysis ignores general-equilibrium effects of the PDS on production, prices and so on. For purposes of general-equilibrium analysis, one would have to compare the current situation with a “counter-factual” where the PDS is dismantled. If the counter-factual involves selling on the market what is currently being distributed through the PDS (keeping procurement levels unchanged), then the main difference between the “with PDS” and “without PDS” scenarios would be the implicit income transfer associated with the PDS. The general equilibrium effects would work mainly through this income transfer as well as through the corresponding change in government revenue. On the other hand, if the “without PDS” counter-factual involves lower levels of foodgrain procurement, or larger foodgrain exports, other general equilibrium effects (e.g., on foodgrain availability and prices) would also need to be considered. This is way beyond the scope of this paper.

Finally, even in a partial-equilibrium framework, treating the PDS as an implicit income transfer is a simplification. PDS entitlements can have value over and above this implicit transfer, for various reasons. For instance, in-kind transfers through the PDS can help to ensure that income is not misused, and also that resources are shared equitably within the family. More importantly perhaps, the PDS has important “stabilisation benefits” (in the form of a regular and assured source of economic support) in addition to “transfer benefits”.<sup>12</sup> From this point of view, the estimates we have presented of the impact of the PDS on rural poverty are likely to *underestimate* the real benefits of the PDS.

## 8 Concluding Remarks

There is both good news and bad news in our findings. The good news lies in clear evidence that India’s public distribution system now has a significant impact on rural poverty. The impact is particularly large in states with a well-functioning PDS, reinforcing recent evidence of the fact that the PDS is now an important source of economic security for poor people in many states.<sup>13</sup> The bad news is that, in 2009-10, the PDS still had very little impact on rural poverty in a number of large states such as Bihar, Jharkhand, Uttar Pradesh and West Bengal where PDS reforms are long overdue. Hopefully, evidence of continued revival of the PDS around the country will emerge from later NSS rounds.

## NOTES

- 1 For further discussion of the PDS in Chhattisgarh, see Drèze and Khera (2010), Raghav Puri (2012), John Parker (2012), Sheila Vir (2012), among others. The statement about equivalence with NREGA work assumes that the market price of rice is Rs 16 per kg and that the wage rate on NREGA works is Rs 82 per day. Both figures are based on NSS data (median price and average wage, respectively).
- 2 See Khera (2011b). While Bihar had the worst PDS among nine states included in that survey, even in Bihar there were signs of improvement over time, partly due to rudimentary PDS reforms such as the introduction of a system of coupons aimed at tracking PDS transactions.

- The fact that the sample households in Bihar had received 45% of their PDS entitlements during the preceding three months puts Bihar in a very poor light compared with other states, but it is much more than what they used to get just a few years earlier, when the bulk of PDS rice and wheat was sold in the black market. There are also, it appears, some signs of improvement in Bihar’s PDS performance in NSS data for 2011-12; see Himanshu (2013).
- 3 Government of India (2012), Table 2.
  - 4 The current base year of the CPI-AL series is 1986. However, for the purpose of updating state-specific poverty lines from 1973-74 onwards (prior to the Tendulkar Committee report), some of its components used to be

reweighed using 1973-74 weighting diagrams. Further, the interstate differentials in price levels used to set state-specific poverty lines in the initial year, i.e., 1973-74, are based on a method and data that go back to 1960-61 (see Government of India 1993).

- 5 In fact, it can be shown that this method would generally *overstate* household benefits from the PDS. To see this, consider someone who is getting 15 kg of rice from the PDS at (say) Rs 2/kg, and buying another 10 kg on the market price of Rs 12/kg. Would this person be better off paying for rice at a single weighted-average price of Rs 6/kg? The answer is yes. This is because he or she would pay the same amount for 25 kg of rice (namely, Rs 150), but only

- Rs 6/kg from there at the margin, as against a "marginal willingness to pay" of Rs 10/kg. This would make it possible for him or her to achieve an increase in utility by buying some more rice. Thus, the price-index adjustment overstates the implicit transfer associated with the PDS. This argument is based on textbook reasoning on consumer choice, but it is also plausible from a common sense point of view.
- 6 A third method is to recalculate the Tendulkar poverty lines by valuing rice and wheat at market prices, instead of valuing them at the weighted-average of market and PDS prices. This seems to be the approach followed by Himanshu (2012), who arrived at similar findings on the impact of the PDS on rural poverty based on independent work.
- 7 One qualification is due: sometimes the PDS dealers "over-charge", i.e., they charge cardholders more than the official issue price and pocket the difference (or use it to pay for various transaction costs). This does not affect our results since we are using the PDS price actually paid, household-wise, to calculate implicit subsidies.
- 8 See e.g., Ankita Aggarwal (2011), Jijo Jose (2011), Mihika Chatterjee (2013). The last author found that 97% of households with a ration card in Koraput district were getting their full monthly quota of rice from the PDS. This is particularly encouraging since Koraput is one of Odisha's poorest districts – part of the "KBK" (Kalahandi-Bolangir-Koraput) region, known not so long ago for regular starvation deaths.
- 9 See Khera (2011b) and Ria Singh Sawhney (2011). Some of these positive results, in fact, already show in the fourth quarter of the 66th round of the NSS, for instance in the form of higher household purchases from the PDS.

- 10 See Khera (2011b) and Dhorajiwala and Gupta (2011). As mentioned earlier, however, there are some signs of gradual improvement in the performance of the PDS in Bihar in recent years.
- 11 Strictly speaking, this is the amount spent by the central government on the food subsidy. Some states, like Chhattisgarh and Tamil Nadu, also spend some of their own resources on the PDS. On the other hand, the central subsidy also includes expenditure on items other than the PDS, such as midday meals and buffer stocks. The figures in this paragraph should be treated as illustrative.
- 12 On the distinction between transfer benefits and stabilisation benefits, see Martin Ravallion (1990).
- 13 See Ankita Aggarwal (2011), Khera (2011b), Raghav Puri (2012), Mihika Chatterjee (2013), among others.

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