

Revival of Rural Public Distribution System Expansion and Outreach

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This paper quantifies the improvements in the public distribution system in rural India after 2004-05 using data from three rounds of surveys conducted by the National Sample Survey. It finds that Tamil Nadu and Himachal Pradesh continue to be the leading performers, but early movers such as Odisha saw improvements in the functioning of the PDS between 2004-05 and 2009-10. In late movers such as Bihar and Jharkhand, improvement was evident between 2009-10 and 2011-12. The paper also estimates a seemingly unrelated regression model to quantify changes in the shares of consumption from the market, the PDS and home produce across states over the three rounds. The share of the PDS as a source of rice and wheat has increased over time, suggesting an improvement in its outreach.

The public distribution system (PDS) had earlier been criticised on the grounds that it did not reach the poor and there were leakages because of inefficiencies in distribution and errors of exclusion (poor households being left out) and inclusion (non-poor households benefiting from the PDS).¹ Khera (2011a, 2011b) and Himanshu and Sen (2011) have documented a revival in the PDS with better functioning and lower leakages. More recently, Dreze and Khera (2013) and Himanshu and Sen (2013) have recorded that an improved PDS has brought about a reduction in poverty and improved caloric intake through an implicit income transfer.

The recent debate on the implications of the National Food Security Act (NFSA), 2013 has centred on its impact on the foodgrains procurement policy, and its distribution and coverage. This paper focuses on the second issue, that of distribution and coverage of the PDS. In talking of distribution and coverage, one refers to two aspects of the PDS – the beneficiary households and the quantity purchased.

Responding to a stream of criticism on the functioning of the PDS, quite a few state governments took important initiatives to improve it. These included changes in grain entitlements (Bihar, Tamil Nadu, Andhra Pradesh and Rajasthan), universalisation of the PDS (Tamil Nadu and Himachal Pradesh), expanded coverage (Bihar, Andhra Pradesh, Chhattisgarh, Tamil Nadu and Rajasthan) and a better monitoring service (Chhattisgarh, Tamil Nadu and Andhra Pradesh) with a greater commitment to providing foodgrains to the poor. A reduction in price (Andhra Pradesh, Chhattisgarh, Jharkhand, Odisha, Rajasthan and Tamil Nadu) has also helped increase the PDS offtake. Some states (Jharkhand, Tamil Nadu, Bihar and Andhra Pradesh) prepared their own list of below poverty line (BPL) households and issued ration cards accordingly. Many states have increased the commission for fair price shop owners to lower the incentive for them to cheat and sell grains in the open market (Khera 2011a).

The extent of improvements in the PDS across states is an empirical issue. To quantify the extent of progress, this paper uses data from three rounds of surveys on consumer expenditure conducted by the National Sample Survey Office (NSSO) in 2004-05, 2009-10 and 2011-12. First, we evaluate the performance of the PDS in terms of targeting and providing subsidised foodgrains to households across monthly per capita expenditure (MPCE) classes over 2004-05, 2009-10 and 2011-12. We look at the changes that have taken place in the outreach of the PDS across states and offer plausible reasons for them. We

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evaluate the progress in revitalising the PDS along three dimensions – targeting (identifying beneficiaries), access (households purchasing from the PDS), and reliance (the quantity purchased from the PDS). We also provide estimates of the progress that needs to be made to reach the targets set for covering India's rural population under the NFSA.

We pool the three rounds of data and estimate a seemingly unrelated regression (SUR) model where the dependent variable is the share of consumption from home produce, purchase from the PDS, and purchase from the open market. We find clear improvements in the coverage of the PDS across states. We benchmark their progress against Tamil Nadu and Himachal Pradesh, two states that have a well-functioning PDS. We find that improvements are evident over the period 2004-05 to 2009-10 among early movers such as Odisha, while they are apparent between 2009-10 and 2011-12 among late movers such as Bihar and Jharkhand.

Data

We use data from the consumption expenditure surveys conducted by the NSSO in 2004-05, 2009-10 and 2011-12. The number of rural households surveyed in each round was 79,297, 59,119 and 59,695, respectively. For 2009-10 and 2011-12, we use the Type-1 schedule since it is comparable with data for 2004-05. The recall period for the consumption expenditure is 30 days and 365 days preceding the surveys. The measure of MPCE used is the mixed reference period. The survey is comparable across rounds except for the classification of household type where one more category was introduced in 2011-12. For 2004-05 and 2011-12, we have additional information on whether a household possesses a ration card and what type of card it is – Antyodaya Anna Yojana (AAY), BPL or above poverty line (APL). We use this information to compare differences by source of consumption among households with different ration cards.

Distribution of Ration Cards

Possessing a ration card is the first step towards accessing the PDS and buying from it. We look at a profile of those with different types of ration cards. In 2004-05, 29.5% of the households had either a BPL or an AAY card, and this increased to 42.59% in 2011-12, together with a decline in the number of households with no ration cards from 18.72% to 14.07% (Table 1). The proportion of households with APL cards declined by 9 percentage points to 42.34.

Bihar, Assam, Andhra Pradesh, Karnataka and Tamil Nadu have shown increases in the proportion of households with BPL cards. In Uttar Pradesh and Himachal Pradesh, more than 11% of households had AAY cards in 2011-12 compared to 3% and 6%, respectively in 2004-05 and 2009-10. In 2011-12, 47% of the households in Bihar possessed BPL cards compared to 15% in 2004-05. Combining the AAY and BPL categories, households with ration cards in Bihar increased threefold from 17% in 2004-05 to 51% in 2011-12. In Karnataka and Andhra Pradesh, 63% and 85% of households respectively had BPL cards. There was a large increase in the proportion of households with AAY and BPL cards in Tamil Nadu with 40% of households having either in 2011-12.

The proportion of scheduled tribe (ST) households with BPL or AAY cards increased from 44% in 2004-05 to 58% in 2011-12, while those of scheduled caste (SC) households increased from 38% to 54%, and those of Other Backward Classes (OBCs) from 27% to 40% (Table 2).

We now look at the distribution of ration cards across households. Since the focus of the analysis is on state-wise

Table 1: Distribution of Ration Cards across States (in percentage)

	AAY		BPL		APL		No Card	
	2004-05 (1)	2011-12 (2)	2004-05 (3)	2011-12 (4)	2004-05 (5)	2011-12 (6)	2004-05 (7)	2011-12 (8)
Jammu and Kashmir	0.52	2.37	22.68	24.11	73.41	66.38	3.39	7.15
Himachal Pradesh	6.19	11.36	10.64	18.4	75.99	65.12	7.19	5.12
Punjab	0.14	1.13	11.91	28.51	75.71	56.67	12.23	13.69
Uttarakhand	2.49	1.79	23.25	31.28	66.32	58.52	7.94	8.41
Haryana	2.61	3.03	15.97	19.24	68.32	66.79	13.1	10.93
Rajasthan	2.78	2.79	15.71	23.22	77.88	68.37	3.63	5.62
Uttar Pradesh	2.84	11.24	13.54	17.74	65.14	53.07	18.48	17.96
Bihar	2.32	5.17	15.11	46.95	60.06	34.57	22.51	13.31
Assam	0.56	5.68	11.79	40.82	63.07	34.61	24.58	18.89
West Bengal	3.19	3.02	27.3	35.12	61.13	58.27	8.38	3.59
Jharkhand	2.98	6.97	22.82	28.95	51.12	24.76	23.08	39.32
Odisha	1.98	5.49	42.45	47.86	22.45	18.22	33.12	28.43
Chhattisgarh	4.41	5.72	34.86	53.82	32.13	19.63	28.6	20.83
Madhya Pradesh	3.3	6.69	30.79	35.41	38.03	41.83	27.88	16.08
Gujarat	0.81	1.53	36.1	31.23	50.43	54.35	12.67	12.9
Maharashtra	4.36	7.69	30.47	27.07	46.32	46.46	18.84	18.77
Andhra Pradesh	2.76	3.63	53.7	85.07	16	2.57	27.54	8.74
Karnataka	9.59	6.16	42.13	62.99	25.72	16.12	22.55	14.73
Goa	5.08	3.25	13.36	10.02	72.86	79.8	8.7	6.93
Kerala	1.82	1.55	27.72	28.76	57.07	61.42	13.39	8.27
Tamil Nadu	1.47	5.32	18.89	35.62	68.87	52.19	10.76	6.87
India	2.94	5.67	26.53	37.92	51.8	42.34	18.72	14.07

Columns (1), (3), (5) and (7) add to 100. Similarly, (2), (4), (6) and (8) add to 100.

Source: Computed from NSSO 2004-05 and 2011-12.

Table 2: Distribution of Ration Cards across Social Groups (in percentage)

	AAY		BPL		APL		No Card	
	2004-05 (1)	2011-12 (2)	2004-05 (3)	2011-12 (4)	2004-05 (5)	2011-12 (6)	2004-05 (7)	2011-12 (8)
ST	5.02	7.72	39.59	50.72	30.84	24.86	24.55	16.7
SC	4.4	8.99	34.85	45.43	43.73	32.56	17.03	13.01
OBC	2.3	4.87	24.52	36.95	54.5	43.85	18.68	14.32
Others	1.9	3.12	17.34	26.66	63.03	56.93	17.73	13.28
Total	2.94	5.66	26.54	37.93	51.8	42.34	18.72	14.07

Columns (1), (3), (5) & (7) sum to 100. Similarly (2), (4), (6) & (8) sum to 100.

Source: Computed from NSSO 2004-05 and 2011-12.

Table 3: Distribution of Ration Cards across MPCE Deciles (in percentage)

MPCE Deciles	AAY		BPL		APL		No Card	
	2004-05 (1)	2011-12 (2)	2004-05 (3)	2011-12 (4)	2004-05 (5)	2011-12 (6)	2004-05 (7)	2011-12 (8)
0-10	7.31	13.44	37.61	55.03	34.69	19.89	20.4	11.64
10-20	4.62	9.87	38.78	50.89	39.34	28.07	17.25	11.17
20-30	3.48	7.24	34.28	46.73	45.05	32.63	17.19	13.4
30-40	3.4	6.93	31.46	42.1	48.39	37.51	16.75	13.46
40-50	2.95	5.45	29.93	41.26	49.94	40.44	17.18	12.85
50-60	2.77	5.03	27.38	40.09	52.64	43.04	17.2	11.84
60-70	2.46	4.25	23.72	37.86	56.6	45.42	17.21	12.48
70-80	1.81	3.48	21.86	32.46	57.7	51.16	18.64	12.9
80-90	1.51	2.45	17.77	27.49	60.64	55.11	20.08	14.95
90-100	0.95	2.4	12.47	19.18	62.96	55.95	23.62	22.46
Total	2.94	5.67	26.53	37.92	51.8	42.34	18.72	14.07

Columns (1), (3), (5) and (7) add to 100. Similarly, (2), (4), (6) and (8) add to 100.

Source: Computed from NSSO 2004-05 and 2011-12.

differences, we group households into 10 MPCE classes based on the state in which they live. In the lowest MPCE class, 7.3% of the households possessed AAY cards, while 37.6% held BPL cards in 2004-05 (Table 3, p 63). This increased to 13.5% and 55% respectively in 2011-12. Those with “other” or “no card” in the lower MPCE classes saw a large decline. In 2004-05, 55% of the lowest MPCE class had either an APL card or no card, and this declined to 30% in 2011-12. Since we expect households in the lowest MPCE class to be poor and eligible for AAY or BPL cards, the current findings suggest a notable improvement, which implies a decline in errors of exclusion. A larger proportion of households had AAY or BPL cards in 2011-12 than in 2004-05. This suggests the persistence of errors of inclusion.

To sum up, we find a more equitable and inclusive distribution of ration cards across the population in 2011-12 compared to 2004-05. The coverage of socially disadvantaged groups and the lower MPCE classes has improved. States whose PDS performance was unsatisfactory earlier have improved their performance.

PDS Access

By access, we refer to whether households consume any amount of foodgrains from the PDS. In 2004-05, 24% and 11% of households reported consumption of rice and wheat from the PDS, respectively. In 2011-12, the numbers increased to 46% and 34% for rice and wheat, respectively (Table 4). The increase was sizeable among the major rice-consuming states. In Jammu and Kashmir, Himachal Pradesh, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu, more than 70% of the households purchased rice from the PDS. While access to the PDS has improved over time, the reliance on home produce and the open market has declined. In Tamil Nadu and Himachal Pradesh, only 10% of the households purchased rice from non-PDS sources. Similarly, purchase of rice from other sources was low in Andhra Pradesh (13%), Kerala (20%), and Karnataka (25%). The other rice-consuming states with less than 70% of the households reporting any consumption from the PDS were West Bengal (34%), Jharkhand (33%), Odisha (55%), Assam (52%) and Chhattisgarh (61%). Access to the PDS in these states has improved considerably – by almost 30 percentage points between 2004-05 and 2011-12. None of the wheat-consuming states report such a high rate of access to the PDS apart from Himachal Pradesh (84%) and Uttarakhand (68%). This corroborates Khera’s (2011b) finding that rice-consuming states have better access to the PDS.

With the NFSA, PDS coverage is bound to expand. The PDS having been assigned an important role in the implementation of the Act, two key questions come up. The first is whether the PDS can widen its coverage to such a massive scale, and the second concerns the fiscal implications of the food security

Table 4: Source of Consumption for Households (in percentage)

	Rice						Wheat					
	PDS			Any Other Source			PDS			Any Other Source		
	2004-05 (1)	2009-10 (2)	2011-12 (3)	2004-05 (4)	2009-10 (5)	2011-12 (6)	2004-05 (7)	2009-10 (8)	2011-12 (9)	2004-05 (10)	2009-10 (11)	2011-12 (12)
Jammu and Kashmir	30.8	57.25	74.59	69.2	42.75	25.41	15.19	43.19	54.97	84.81	56.81	45.03
Himachal Pradesh	50.01	81.5	89.45	49.99	18.5	10.55	24.37	75.1	84.07	75.63	24.9	15.93
Punjab	0.06	0.03	0.35	99.94	99.97	99.65	0.29	21.87	24.17	99.71	78.13	75.83
Uttarakhand	23.68	26.41	62.13	76.32	73.59	37.87	21.28	29.55	68.02	78.72	70.45	31.98
Haryana	0.07	0.02	0.89	99.93	99.98	99.11	4.02	19.85	17.26	95.98	80.15	82.74
Rajasthan	0.03	0.47	0.8	99.97	99.53	99.2	12.73	17.44	27.79	87.27	82.56	72.21
Uttar Pradesh	5.79	21.13	24.54	94.21	78.87	75.46	5.63	22.12	25.68	94.37	77.88	74.32
Bihar	1	13.48	46.1	99	86.52	53.9	1.74	14.05	45.83	98.26	85.95	54.17
Assam	8.99	30.58	52.38	91.01	69.42	47.62	0.21	1.61	6.01	99.79	98.39	93.99
West Bengal	12.78	25.03	34.37	87.22	74.97	65.63	9.04	31.25	43.87	90.96	68.75	56.13
Jharkhand	4.39	23.56	33.27	95.61	76.44	66.73	4.35	22.92	1.33	95.65	77.08	98.67
Odisha	21.54	53.78	55.26	78.46	46.22	44.74	0.2	5.45	11.76	99.8	94.55	88.24
Chhattisgarh	21.66	65.46	60.84	78.34	34.54	39.16	5.31	25.77	25.52	94.69	74.23	74.48
Madhya Pradesh	17.92	21.61	31.9	82.08	78.39	68.1	20.35	43.95	38.94	79.65	56.05	61.06
Gujarat	31.54	35.33	29.14	68.46	64.67	70.86	28.67	36.26	25.76	71.33	63.74	74.24
Maharashtra	27.48	46.98	44.22	72.52	53.02	55.78	25.85	43.1	42.08	74.15	56.9	57.92
Andhra Pradesh	62.22	82.69	86.36	37.78	17.31	13.64	0.6	2.21	9.5	99.4	97.79	90.5
Karnataka	58.52	75.95	75.02	41.48	24.05	24.98	45.63	70.02	70.31	54.37	29.98	29.69
Goa	8.5	58.03	70.99	91.5	41.97	29.01	4.46	14.81	42.36	95.54	85.19	57.64
Kerala	34.57	53.19	79.64	65.43	46.81	20.36	12.25	36.75	54.41	87.75	63.25	45.59
Tamil Nadu	78.94	90.62	89.65	21.06	9.38	10.35	8.88	56.22	60.41	91.12	43.78	39.59
India	24.36	39.17	45.81	75.64	60.83	54.19	11.04	27.61	33.88	88.96	72.39	66.12

Source: Computed from NSSO 2004-05, 2009-10, and 2011-12.

Table 5: Access to PDS – Comparison with Planning Commission Estimates

	Planning Commission Estimated % of Population with Access to PDS under NFSB	% of Population with Access to PDS from NSS 2011-12	Average Per Capita Grains from PDS (in kg) from NSS 2011-12*
Andhra Pradesh	60.96	89.26	4.0
Assam	84.17	55.15	5.1
Bihar	85.12	44.88	5.3
Chhattisgarh	84.25	61.86	6.8
Delhi	37.69	19.48	2.8
Goa	42.24	74.10	3.6
Gujarat	74.64	32.50	2.5
Haryana	54.61	18.43	6.1
Himachal Pradesh	56.23	93.90	5.8
Jammu and Kashmir	63.55	80.76	7.1
Jharkhand	86.48	34.86	6.1
Karnataka	76.04	76.06	3.8
Kerala	52.63	85.02	3.6
Madhya Pradesh	80.1	40.00	5.3
Maharashtra	76.32	48.12	5.3
Odisha	82.17	68.21	5.9
Punjab	54.79	25.18	4.7
Rajasthan	69.09	27.70	4.9
Sikkim	75.74	63.40	7.3
Tamil Nadu	62.55	94.68	5.2
Uttar Pradesh	79.56	26.96	5.7
Uttarakhand	65.26	73.72	5.0
West Bengal	74.47	51.15	3.2
India	75	50.03	4.9

*Averages have been calculated only for those households who consumed any quantity of grains from the PDS.

Source: Planning Commission and NSSO 2011-12.

programme (Mishra 2013; Sinha 2013). Since our focus is on distribution and coverage under the PDS, we use data from the NSSO's 2011-12 survey to present a comparison of the current PDS coverage to what is desired under the NFSA (Table 5, p 64). Against the desired 75%, 50% of the rural population had access to the PDS in 2011-12. Large state-wise differences exist in terms of current access and what is desired under the Act. In the southern states of Andhra Pradesh, Tamil Nadu, Karnataka, and Kerala and the northern states of Jammu and Kashmir, Himachal Pradesh, and Uttarakhand, PDS coverage was greater than the targeted population. These were also states where the PDS has been classified as "functional".² In Chhattisgarh and Odisha, where the PDS is "reviving", 45% and 68% of the population was covered by it against the desired 84% and 82%, respectively. The states that really lag behind in PDS coverage are Bihar, Uttar Pradesh, Madhya Pradesh and Jharkhand, which have a large number of the country's poor. The food-surplus states of Punjab (25%) and Haryana (18%) also report low levels of PDS coverage. Against the mandated 5 kg of grains per person per month, we find, as per NSSO 2011-12 data, that those with access to the PDS consume almost 4.9 kg from it, which is close to the desired amount.

Reliance on PDS

The total consumption of rice has decreased over time while the share of the PDS has increased (Table 6). Total rice consumed from different sources was 31 kg in 2004-05, and it declined to 28 kg in 2009-10 and further to 27 kg in 2011-12. The quantity of rice purchased from the PDS increased from 4 kg in 2004-05 to 7.67 kg in 2011-12, while consumption from home produce and the open market declined. A closer look at the state-wise consumption reveals interesting patterns. Between 2004-05 and 2011-12, we do not see any substantial increase in the consumption of rice from the PDS in Andhra Pradesh, Karnataka, Tamil Nadu and Himachal Pradesh. In contrast, the quantity of rice purchased from the PDS in Chhattisgarh and Odisha increased by more

than 10 kg, while reliance on the open market fell by almost half. By 2009-10, Odisha and Chhattisgarh showed large-scale improvements. Similar improvements can be observed in Bihar, Jharkhand and Assam, but only in 2011-12.

The consumption of wheat from the PDS has increased over time, especially in the major wheat-consuming states – Himachal Pradesh, Jammu and Kashmir, Punjab, Haryana, Uttarakhand, Rajasthan, Bihar, Uttar Pradesh, Madhya Pradesh and Maharashtra (Table 7). The most notable increase in consumption of

Table 6: Average Household Consumption of Rice (in kg)

	PDS			Market			Home			Total		
	2004-05 (1)	2009-10 (2)	2011-12 (3)	2004-05 (4)	2009-10 (5)	2011-12 (6)	2004-05 (7)	2009-10 (8)	2011-12 (9)	2004-05 (10)	2009-10 (11)	2011-12 (12)
Jammu and Kashmir	15.71	23.47	22.39	9.95	8.55	12.14	26.94	13.39	8.60	52.59	45.41	43.12
Himachal Pradesh	9.52	7.99	9.50	7.63	9.01	9.35	1.83	1.23	0.93	18.98	18.23	19.77
Punjab	0.00	0.00	0.01	2.81	2.98	3.19	1.01	0.97	0.80	3.83	3.96	3.99
Uttarakhand	5.27	4.06	8.81	12.95	9.15	10.14	7.02	3.61	3.45	25.25	16.82	22.40
Haryana	0.00	0.00	0.15	2.75	2.65	2.75	0.70	1.02	0.77	3.45	3.66	3.67
Rajasthan	0.00	0.01	0.08	0.89	1.04	1.09	0.06	0.10	0.01	0.95	1.15	1.18
Uttar Pradesh	0.80	4.07	4.76	12.21	10.32	9.65	9.85	8.88	7.89	22.87	23.28	22.30
Bihar	0.20	1.99	7.05	21.14	20.56	14.84	14.86	9.90	9.73	36.19	32.45	31.62
Assam	2.45	7.37	13.91	23.36	22.95	19.42	37.15	31.38	24.37	62.96	61.71	57.70
West Bengal	1.25	2.57	4.05	33.27	28.45	27.72	19.98	9.23	9.15	54.50	40.26	40.93
Jharkhand	0.75	4.98	10.19	25.84	24.47	19.16	22.33	10.88	13.61	48.93	40.33	42.96
Odisha	4.25	14.02	15.84	34.98	22.54	18.69	21.36	16.93	16.11	60.59	53.50	50.64
Chhattisgarh	7.24	21.18	18.56	23.36	14.57	12.53	32.11	14.27	22.29	62.71	50.02	53.37
Madhya Pradesh	1.87	1.95	2.21	6.62	5.75	5.15	3.42	2.71	2.98	11.91	10.41	10.34
Gujarat	1.13	1.86	1.32	6.32	5.85	6.61	1.04	1.24	2.16	8.49	8.95	10.09
Maharashtra	2.80	4.93	4.98	7.60	6.85	6.51	2.76	2.74	2.14	13.16	14.52	13.64
Andhra Pradesh	10.03	12.82	12.57	28.70	23.52	20.97	4.39	3.30	4.74	43.12	39.64	38.28
Karnataka	11.21	11.51	11.08	9.67	10.91	11.80	3.22	2.07	2.64	24.11	24.49	25.52
Goa	2.57	8.11	8.98	19.89	15.09	15.43	6.01	9.11	1.25	28.47	32.30	25.65
Kerala	7.31	8.20	11.01	27.34	21.76	18.30	1.58	0.70	0.30	36.24	30.67	29.61
Tamil Nadu	15.41	17.46	16.60	20.24	13.88	13.68	2.53	1.84	1.76	38.18	33.18	32.05
India	4.10	6.64	7.67	17.30	14.61	13.11	9.74	6.80	6.69	31.13	28.06	27.47

Source: Computed from NSSO 2004-05, 2009-10, and 2011-12.

Table 7: Average Household Consumption of Wheat (in kg)

	PDS			Market			Home			Total		
	2004-05 (1)	2009-10 (2)	2011-12 (3)	2004-05 (4)	2009-10 (5)	2011-12 (6)	2004-05 (7)	2009-10 (8)	2011-12 (9)	2004-05 (10)	2009-10 (11)	2011-12 (12)
Jammu and Kashmir	1.73	5.95	8.02	5.46	7.05	6.30	8.53	5.73	3.92	15.72	18.73	18.24
Himachal Pradesh	5.84	12.61	14.39	13.79	11.37	9.82	8.28	3.64	4.65	27.91	27.62	28.86
Punjab	0.10	5.21	5.62	30.34	21.46	21.73	14.98	13.22	11.89	45.42	39.89	39.24
Uttarakhand	4.21	3.20	7.90	17.09	12.19	17.81	10.03	4.94	6.47	31.32	20.33	32.18
Haryana	1.18	6.27	5.39	26.68	21.03	19.92	20.57	18.13	17.19	48.43	45.43	42.50
Rajasthan	4.84	4.20	6.70	23.17	24.24	21.14	18.12	17.13	17.52	46.13	45.57	45.35
Uttar Pradesh	1.11	3.07	3.67	21.66	17.23	16.00	25.43	20.93	19.45	48.20	41.23	39.12
Bihar	0.31	1.66	5.29	16.44	18.00	14.80	11.66	9.24	8.56	28.40	28.90	28.65
Assam	0.00	0.05	0.18	2.73	2.24	2.30	0.02	0.00	0.00	2.75	2.29	2.48
West Bengal	0.68	1.92	2.75	3.48	2.81	3.20	0.13	0.04	0.06	4.30	4.76	6.01
Jharkhand	0.59	2.56	0.20	12.39	11.33	11.69	1.50	0.28	1.55	14.48	14.17	13.44
Odisha	0.01	0.39	0.80	2.13	1.96	1.94	0.01	0.01	0.01	2.15	2.36	2.75
Chhattisgarh	0.39	1.37	1.80	1.69	2.12	1.84	0.32	0.23	0.53	2.40	3.73	4.16
Madhya Pradesh	4.75	8.25	7.62	16.17	13.57	13.85	18.74	16.63	18.34	39.66	38.45	39.81
Gujarat	2.50	3.47	2.59	11.45	11.94	11.28	2.96	5.74	3.20	16.91	21.16	17.08
Maharashtra	3.96	5.83	5.76	8.71	9.75	10.31	2.43	3.32	2.43	15.10	18.89	18.50
Andhra Pradesh	0.02	0.05	0.12	0.55	0.66	0.86	0.00	0.00	0.00	0.57	0.71	0.98
Karnataka	1.95	1.91	1.88	1.32	1.49	1.76	0.32	0.39	0.37	3.59	3.80	4.01
Goa	0.48	0.43	1.30	5.86	4.84	3.72	0.00	0.00	0.00	6.34	5.27	5.02
Kerala	0.71	1.38	1.63	1.96	1.76	1.43	0.00	0.00	0.00	2.67	3.14	3.05
Tamil Nadu	0.30	1.37	1.55	0.44	0.29	0.33	0.00	0.00	0.00	0.74	1.66	1.88
India	1.50	2.85	3.50	10.66	9.71	9.29	8.31	7.24	6.98	20.47	19.80	19.77

Source: Computed from NSSO 2004-05, 2009-10, and 2011-12.

wheat from the PDS has been in Bihar and the food-surplus states of Haryana and Punjab. From less than 1 kg of average PDS consumption of wheat in 2004-05, it increased to more than 5 kg in Punjab and Bihar in 2011-12. Himachal Pradesh and Uttarakhand, which have a well-functioning PDS, report a higher than all-India average consumption of wheat from the PDS.

Extent of Transfer in Monetary Terms

Another way of assessing the improvement in the PDS is to analyse the “implicit income transfer” as a result of greater PDS offtake and a widening between the PDS and open market price. The implicit income transfer is calculated as the quantity consumed from the PDS multiplied by the difference between the district-level open market price and the PDS price at the district level. Over the period 2004-05 to 2011-12, there has been a substantial increase in the implicit income transfer to households, which has had a significant effect on decreasing poverty (Himanshu and Sen 2013; Dreze and Khera 2013). Calculations are done by deflating prices at the 2004-05 level.³ While Dreze and Khera (2013) have calculated figures at the per capita level, we do so at the household level.⁴ In 2004-05, the income transfer was Rs 31.10 per household, which increased by more than twice to Rs 82.80 in 2009-10 and further to Rs 85.21 in 2011-12 (Table 8). In 2004-05, income transfers due to the PDS were almost negligible in Punjab (Rs 0.20) and Bihar (Rs 1.80), while households in Tamil Nadu and Karnataka gained Rs 134.47 and Rs 104.81 per month as implicit transfers. In 2009-10, there was a substantial gain in income transfers across all states. While the increase was Rs 127.29 in Tamil Nadu, Rs 100.68 in Himachal Pradesh, Rs 105.5 in Jammu and Kashmir, and Rs 91.71 in Andhra Pradesh, the biggest increase of Rs 165.49 was in Chhattisgarh. Implicit income transfer increased by more than

Table 8: Implicit Income Transfer to Households (in Rs)

	2004-05	2009-10	2011-12
Andhra Pradesh	58.46	150.17	121.56
Assam	10.05	45.58	85.61
Bihar	1.86	20.72	70.35
Chhattisgarh	26.24	191.73	154.78
Delhi	4.48	74.99	10.00
Goa	18.42	81.12	92.57
Gujarat	27.99	53.48	31.32
Haryana	3.47	33.91	23.85
Himachal Pradesh	47.17	147.85	147.72
Jammu and Kashmir	39.78	145.28	170.50
Jharkhand	7.51	53.79	98.84
Karnataka	104.81	162.33	104.38
Kerala	42.31	98.98	129.18
Madhya Pradesh	17.58	57.54	49.10
Maharashtra	29.37	74.26	60.16
Odisha	14.38	121.27	138.65
Punjab	0.21	26.48	25.03
Rajasthan	14.13	22.14	34.03
Tamil Nadu	134.47	262.76	218.25
Uttar Pradesh	8.18	41.28	36.72
Uttarakhand	33.19	46.65	146.45
West Bengal	10.22	38.38	56.66
India	31.10	82.80	85.21

All calculations are at 2004-05 prices that were arrived at using the poverty line estimates of the Expert Group on Methodology for Estimation of Poverty chaired by S D Tendulkar. Source: Computed from NSSO 61, 66 and 68.

Rs 100 per month in Odisha between 2004-05 and 2009-10. The change in income transfer from the PDS is markedly different in 2011-12 compared to 2009-10 in the states that did not have a well-functioning PDS earlier. The implicit income transfer increased by Rs 49.63, Rs 45.05, Rs 99.80, and Rs 39.93 in Bihar, Jharkhand, Uttarakhand, and Assam, respectively.

Table 9: SUR Estimates for the Sources of Rice Consumption
(State interacted with year)

	PDS Share		Market Share		Home Share	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Year dummy (2004-05)						
2009-10	11.94***	(0.63)	-11.45***	(0.95)	-0.17	(0.75)
2011-12	11.56***	(0.63)	-10.68***	(0.95)	-0.94	(0.75)
2009-10* State						
Jammu and Kashmir	10.69***	(1.14)	2.39	(1.71)	-13.69***	(1.35)
Himachal Pradesh	-9.32***	(1.09)	10.30***	(1.63)	-0.62	(1.29)
Punjab	-12.17***	(1.08)	16.02***	(1.62)	-0.92	(1.29)
Uttarakhand	-8.88***	(1.27)	11.37***	(1.90)	-3.37**	(1.50)
Haryana	-12.00***	(1.16)	5.65***	(1.74)	6.81***	(1.38)
Rajasthan	-11.67***	(0.95)	20.97***	(1.41)	2.74**	(1.12)
Uttar Pradesh	0.61	(0.79)	4.24***	(1.18)	-2.44***	(0.93)
Bihar	-7.31***	(0.89)	11.99***	(1.33)	-5.98***	(1.06)
Assam	-4.35***	(0.95)	11.60***	(1.42)	-7.68***	(1.13)
West Bengal	-8.64***	(0.87)	15.94***	(1.30)	-7.41***	(1.03)
Jharkhand	-2.12**	(1.06)	16.92***	(1.59)	-15.04***	(1.26)
Odisha	4.63***	(0.92)	-4.22***	(1.37)	-1.48	(1.09)
Chhattisgarh	9.71***	(1.12)	2.09	(1.68)	-12.00***	(1.33)
Madhya Pradesh	-14.30***	(0.93)	17.68***	(1.39)	-0.90	(1.10)
Gujarat	-8.30***	(1.07)	6.40***	(1.60)	1.91	(1.27)
Maharashtra	-1.99**	(0.85)	4.11***	(1.28)	0.56	(1.01)
Andhra Pradesh	-3.94***	(0.85)	3.97***	(1.27)	-0.14	(1.01)
Karnataka	-13.08***	(1.01)	13.27***	(1.51)	-0.68	(1.20)
Goa	10.53***	(3.11)	-3.79	(4.64)	-5.32	(3.68)
Kerala	-5.58***	(0.95)	5.42***	(1.42)	-0.57	(1.13)
2011-12* State						
Jammu and Kashmir	20.62***	(1.07)	3.54**	(1.61)	-24.23***	(1.27)
Himachal Pradesh	-4.32***	(1.09)	4.53***	(1.63)	0.90	(1.29)
Punjab	-12.04***	(1.09)	23.04***	(1.62)	1.65	(1.29)
Uttarakhand	4.71***	(1.27)	1.94	(1.90)	-6.62***	(1.50)
Haryana	-10.38***	(1.16)	9.31***	(1.74)	6.52***	(1.38)
Rajasthan	-11.79***	(0.95)	26.97***	(1.42)	4.18***	(1.12)
Uttar Pradesh	2.91***	(0.79)	0.69	(1.18)	-0.54	(0.93)
Bihar	9.45***	(0.89)	-4.68***	(1.33)	-4.36***	(1.06)
Assam	9.12***	(0.95)	3.63**	(1.42)	-13.02***	(1.13)
West Bengal	-4.35***	(0.87)	12.43***	(1.30)	-7.56***	(1.03)
Jharkhand	6.61***	(1.07)	2.84*	(1.59)	-9.34***	(1.26)
Odisha	8.50***	(0.92)	-6.47***	(1.37)	-1.46	(1.09)
Chhattisgarh	6.72***	(1.13)	-2.11	(1.69)	-4.46***	(1.34)
Madhya Pradesh	-4.84***	(0.93)	14.86***	(1.39)	1.44	(1.10)
Gujarat	-13.19***	(1.07)	6.37***	(1.60)	7.10***	(1.27)
Maharashtra	-1.24	(0.85)	3.90***	(1.28)	1.17	(1.01)
Andhra Pradesh	-3.00***	(0.85)	-0.39	(1.27)	3.86***	(1.01)
Karnataka	-12.03***	(1.01)	12.01***	(1.51)	-0.04	(1.20)
Goa	12.95***	(3.10)	-11.73**	(4.64)	0.20	(3.68)
Kerala	4.90***	(0.95)	-5.24***	(1.42)	0.41	(1.13)
Constant	58.20***	(0.58)	48.62***	(0.86)	-12.07***	(0.68)
R-squared	0.31		0.18		0.34	

The regressions also include MPCE decile class, household size, land size class, social group, religion and the sources of cooking and lighting as regressors. For the sake of brevity, only the state and year interaction terms are presented in this Table. Tamil Nadu is the reference state and 2004-05 is the reference year. The table only shows the major states, though the regression also included all the states and union territories. We have omitted them to conserve space, though the results can be had from the author on request.

*** p<0.01, ** p<0.05, * p<0.1.

Econometric Specification and Results

Having described the important features apparent from the three rounds of NSSO data, we undertake an econometric exercise to understand how the share of total consumption from the PDS, home produce, and market purchases has changed over time using the three years 2004-05, 2009-10, and 2011-12. We also seek to understand where the improvement is evident after controlling for household characteristics. Estimating the three equations (for PDS, home produce, and open market) separately could be erroneous since it is plausible that the error terms across the three equations are correlated, which would make the estimates inefficient. Using seemingly unrelated regression as proposed by Zellner (1962), one can jointly estimate these equations even in the presence of serial correlation across the error terms.

Regression Estimates

We run two sets of regression for rice and wheat separately. In the first regression, the dummy variables for the state are interacted with the year dummy (2009-10 and 2011-12) to capture the changes in the share of sources of consumption over time. In the second regression, the dummy variables for land size classes are interacted with the year dummy to examine any effect of change in the consumption share from the PDS for households belonging to the same land size class. This gives us an idea about the share of PDS, home produce, and open market purchase among those who possess less amount of land. In both these regressions, we control for household-level factors that could influence consumption shares.

For 2009-10, the interaction term between the state and the year dummy for rice shows that the share of the PDS in total rice consumption was less than in Tamil Nadu in most states, except Jammu and Kashmir, Meghalaya, Odisha, Chhattisgarh and Goa (Table 9, p 66). For 2011-12 and the state interaction term, Uttarakhand, Uttar Pradesh, Bihar, Assam,

Table 10: SUR Estimates for the Sources of Rice Consumption
(Land size class interacted with year)

	PDS Share		Market Share		Home Share	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Landclass* 2009-10						
0.01-0.40 hectare	1.80***	(0.41)	-0.74	(0.62)	-2.09***	(0.49)
0.41-1.00 hectare	1.10**	(0.46)	4.78***	(0.69)	-6.69***	(0.54)
1.01-2.00 hectare	-0.03	(0.53)	5.29***	(0.80)	-6.01***	(0.63)
2.01-4.00 hectare	-2.20***	(0.62)	7.24***	(0.92)	-4.67***	(0.73)
4.01-10.00 hectare	-4.45***	(0.75)	9.78***	(1.12)	-2.63***	(0.89)
> 10 hectare	-4.79***	(1.54)	11.69***	(2.29)	-4.55**	(1.82)
Landclass* 2011-12						
0.01-0.40 hectare	3.98***	(0.41)	-3.90***	(0.62)	-2.50***	(0.49)
0.41-1.00 hectare	2.23***	(0.46)	3.38***	(0.69)	-7.40***	(0.55)
1.01-2.00 hectare	-1.08**	(0.54)	8.00***	(0.81)	-8.33***	(0.64)
2.01-4.00 hectare	-3.81***	(0.62)	9.28***	(0.93)	-5.08***	(0.73)
4.01-10.00 hectare	-7.91***	(0.78)	15.65***	(1.16)	-5.51***	(0.92)
> 10 hectare	-9.56***	(1.57)	14.27***	(2.34)	-2.99	(1.86)
Constant	60.33***	(0.50)	45.43***	(0.74)	-12.46***	(0.59)
R-squared	0.30		0.17		0.34	

The regressions also include MPCE decile class, household size, state, social group, religion and the sources of cooking and lighting as regressors. For the sake of brevity, only the state and year interaction terms are presented in this Table. Tamil Nadu is the reference state and 2004-05 is the reference year.

*** p<0.01, ** p<0.05, * p<0.1.

Jharkhand, Chhattisgarh, Odisha and Kerala had positive and significant coefficients. This shows that the PDS share in total rice consumption increased in Odisha and Chhattisgarh in 2009-10, while in Uttarakhand, Bihar, Jharkhand, and Assam it increased in 2011-12. In most of these states, the share of rice consumed from home produce declined in 2011-12. Since these are also the major rice-producing states, this result might

Table 11: SUR Estimates for the Sources of Wheat Consumption
(State interacted with year)

	PDS Share		Market Share		Home Share	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Year dummy (2004-05)						
2009-10	27.36***	(0.96)	-11.39***	(1.41)	-14.97***	(0.88)
2011-12	32.19***	(0.96)	-19.19***	(1.41)	-11.66***	(0.89)
2009-10* State						
Jammu and Kashmir	-3.91***	(1.40)	16.75***	(2.07)	9.53***	(1.30)
Punjab	-15.29***	(1.35)	-0.42	(1.99)	13.98***	(1.25)
Uttarakhand	-25.43***	(1.52)	16.23***	(2.25)	7.40***	(1.41)
Haryana	-15.24***	(1.42)	2.99	(2.10)	11.37***	(1.31)
Rajasthan	-26.33***	(1.22)	13.85***	(1.80)	17.38***	(1.13)
Uttar Pradesh	-20.15***	(1.08)	7.86***	(1.60)	11.68***	(1.00)
Bihar	-22.78***	(1.17)	11.36***	(1.73)	10.96***	(1.08)
Assam	-25.71***	(1.22)	9.60***	(1.81)	16.15***	(1.13)
West Bengal	-11.33***	(1.15)	1.83	(1.70)	15.94***	(1.07)
Jharkhand	-12.52***	(1.33)	8.44***	(1.96)	12.12***	(1.23)
Odisha	-21.62***	(1.19)	12.80***	(1.77)	14.85***	(1.11)
Chhattisgarh	-13.73***	(1.38)	15.96***	(2.05)	14.40***	(1.28)
Madhya Pradesh	-20.34***	(1.20)	4.93***	(1.78)	16.96***	(1.11)
Gujarat	-25.44***	(1.33)	13.06***	(1.97)	21.91***	(1.23)
Maharashtra	-20.01***	(1.14)	6.38***	(1.68)	18.90***	(1.05)
Andhra Pradesh	-26.18***	(1.13)	19.36***	(1.68)	15.48***	(1.05)
Karnataka	-16.74***	(1.28)	14.68***	(1.89)	16.73***	(1.18)
Goa	-21.94***	(3.41)	28.62***	(5.04)	17.49***	(3.16)
Kerala	-7.48***	(1.22)	6.50***	(1.81)	15.79***	(1.13)
Tamil Nadu	17.82***	(1.17)	0.96	(1.74)	15.90***	(1.09)
2011-12* State						
Jammu and Kashmir	0.17	(1.34)	28.46***	(1.98)	1.05	(1.24)
Punjab	-19.11***	(1.35)	8.13***	(1.99)	8.87***	(1.25)
Uttarakhand	-21.42***	(1.52)	12.50***	(2.25)	5.83***	(1.41)
Haryana	-21.77***	(1.42)	12.02***	(2.10)	9.08***	(1.32)
Rajasthan	-26.41***	(1.22)	14.40***	(1.81)	17.99***	(1.13)
Uttar Pradesh	-23.73***	(1.08)	12.53***	(1.60)	9.58***	(1.00)
Bihar	-15.37***	(1.17)	7.33***	(1.73)	7.85***	(1.08)
Assam	-26.11***	(1.23)	13.75***	(1.81)	13.60***	(1.13)
West Bengal	-2.82**	(1.15)	4.82***	(1.71)	12.87***	(1.07)
Jharkhand	-35.90***	(1.33)	20.57***	(1.97)	15.18***	(1.23)
Odisha	-21.63***	(1.20)	26.70***	(1.77)	11.79***	(1.11)
Chhattisgarh	-19.55***	(1.39)	29.42***	(2.06)	12.75***	(1.29)
Madhya Pradesh	-25.68***	(1.20)	12.75***	(1.78)	15.68***	(1.11)
Gujarat	-32.37***	(1.33)	20.56***	(1.97)	18.06***	(1.24)
Maharashtra	-24.02***	(1.14)	15.80***	(1.68)	13.34***	(1.05)
Andhra Pradesh	-25.43***	(1.13)	39.64***	(1.68)	13.10***	(1.05)
Karnataka	-17.78***	(1.28)	22.86***	(1.89)	11.58***	(1.18)
Goa	-10.51***	(3.41)	12.77**	(5.04)	16.44***	(3.15)
Kerala	1.63	(1.23)	6.38***	(1.81)	13.20***	(1.13)
Tamil Nadu	15.62***	(1.17)	8.53***	(1.74)	12.51***	(1.09)
Constant	32.29***	(0.77)	42.87***	(1.13)	1.15	(0.71)
R-squared	0.24		0.19		0.40	

The regressions also include MPCE decile class, household size, land size class, social group, religion and the sources of cooking and lighting as regressors. For the sake of brevity, only the state and year interaction terms are presented in this Table. Himachal Pradesh is the reference state and 2004-05 is the reference year. The table only shows the major states, though the regression also included all the states and union territories. We have omitted them to conserve space, though the results can be had from the author on request.

*** p<0.01, ** p<0.05, * p<0.1.

Table 12: SUR Estimates for the Sources of Wheat Consumption
(Land size class interacted with year)

	PDS Share		Market Share		Home Share	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Landclass* 2009-10						
0.01-0.40 hectare	0.51	(0.45)	0.42	(0.66)	-0.31	(0.41)
0.41-1.00 hectare	-2.55***	(0.50)	4.65***	(0.73)	-1.13**	(0.46)
1.01-2.00 hectare	-4.42***	(0.58)	3.22***	(0.85)	0.10	(0.53)
2.01-4.00 hectare	-8.10***	(0.67)	3.75***	(0.98)	1.02*	(0.61)
4.01-10.00 hectare	-10.88***	(0.82)	1.34	(1.20)	4.83***	(0.75)
> 10 hectare	-10.02***	(1.67)	4.97**	(2.44)	4.54***	(1.52)
Landclass* 2011-12						
0.01-0.40 hectare	2.26***	(0.45)	-4.08***	(0.66)	0.97**	(0.41)
0.41-1.00 hectare	-2.04***	(0.50)	2.36***	(0.74)	-0.42	(0.46)
1.01-2.00 hectare	-5.60***	(0.59)	1.63*	(0.86)	1.47***	(0.54)
2.01-4.00 hectare	-9.55***	(0.68)	2.07**	(0.99)	3.68***	(0.62)
4.01-10.00 hectare	-13.67***	(0.85)	1.63	(1.24)	5.72***	(0.78)
> 10 hectare	-13.13***	(1.71)	4.07	(2.50)	4.87***	(1.56)
Constant	42.77***	(0.62)	35.59***	(0.91)	-6.60***	(0.57)
R-squared	0.21		0.18		0.40	

The regressions also include MPCE decile class, household size, states, social group, religion and the sources of cooking and lighting as regressors. For the sake of brevity, only the state and year interaction terms are presented in this Table. Himachal Pradesh is the reference state and 2004-05 is the reference year.

*** p<0.01, ** p<0.05, * p<0.1.

suggest that people are selling their home produce to the government at a higher minimum support price and possibly buying from the PDS for domestic consumption at a lower price.

Looking at the interaction term between the land size class with the year dummy, we find that compared to those with less than 0.01 hectare of land in 2004-05, households with less than 1 hectare consumed a greater proportion of rice from the PDS, while it declined among those with more than 2 hectares of land (Table 10, p 67). In 2012, the share from the PDS for those with less than 1 hectare of land increased and the share of households with more than 1 hectare of land declined.

In the case of wheat, the share from the PDS increased over 2009-10 and 2011-12 with a corresponding decline in the share from home produce and open market purchase (Table 11, p 67). Compared to 2004-05, the share of wheat consumed from the PDS increased by 27.36% in 2009-10, and by 32.19% in 2011-12. The share of open market purchases declined by 11.39% in 2009-10 and by 19.19% in 2011-12. For 2009-10 and 2011-12, the share consumed from home produce declined by 14.97% and

11.66%, respectively. A greater share of wheat is consumed from non-PDS sources across higher MPCE and land size classes. The interaction term between 2009-10 and the state dummy variables shows that relative to Himachal Pradesh in 2004-05, the share of the PDS in total wheat consumption did not increase in any state but Tamil Nadu. Though wheat is hardly produced and consumed in Tamil Nadu, the state government is promoting its consumption through the greater sale of wheat through PDS outlets.⁵ The same result holds when we see the interaction term between 2011-12 and the states suggesting no significant change. From the interaction term between the year dummy and the land size class, we find that households whose landholdings were less than 0.40 hectares had a greater share of wheat from the PDS in 2009-10 and 2011-12 (Table 12).

Conclusions

There is clear and consistent evidence of the PDS improving over time. It is important to discuss the reasons for this turnaround and its implications, especially in the context of the NFSA. Beyond doubt, there has been greater political will and commitment on the part of the various state governments to make the PDS viable. Since 2004-05, an expansion in the coverage of the PDS across all states is visible. It is encouraging to find that the expansion has covered those who are most vulnerable and live at the margins, such as the SCs and STs. Also, a greater number of households in the lower income classes now not only have greater access to the PDS, but are also consuming larger quantities from the PDS.

To implement the commitment to greater food security, state governments have taken a battery of measures, from end-to-end computerisation to more commission to fair price shop owners. Some states still lag behind and their performance continues to be less than satisfactory. Recent data suggests that the performance of the PDS in some of the “languishing” states such as Bihar and Jharkhand improved considerably in 2011-12, while the reviving states of Chhattisgarh and Odisha improved considerably in 2009-10. Since the success of implementing the NFSA depends entirely on the efficient functioning of the PDS, these improvements are very important. In terms of coverage and outreach to the poor, there is still quite a distance to be covered.

NOTES

- 1 See Ahluwalia (1993); Dev and Suryanarayana (1991); Geetha and Suryanarayana (1993); Howes and Jha (1992); Parikh (1994).
- 2 Based on the functioning of the PDS, Khera (2011b) has grouped states into three categories: functioning, reviving, and languishing.
- 3 We use the poverty lines arrived at by Expert Group on Methodology for Estimation of Poverty chaired by Suresh D Tendulkar to arrive at the price deflator for each of the states.
- 4 Dreze and Khera (2013) use the median price paid by the households while Himanshu and Sen (2013) use the mean price at the first stage units (FSU) level as the open market price. The numbers presented here use mean prices at the district level. The overall income transfer using any of these measures of central tendency does not change much.
- 5 “Wheat Purchase on the Rise in Tamil Nadu PDS Outlets”, *The Times of India*, Chennai, 31 May 2011.

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