Redefining PDS in the states of India: An impact assessment of National Food Security Act

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Abstract

The National Food Security Act, 2013 is redefining the dimensions of food security by making headway in the poorest states of the country. The present study has focused on the impact of Public Distribution System policy on the states which have accomplished the tasks of PDS reforms. Although NFSA is crucial for PDS, it is not restricted to PDS alone. There are some other critical components under this act which includes maternity entitlements and children's entitlements which are important for the poor especially for the persistently excluded and the indigenous groups of SCs and STs. But the present study focuses on the expansion of food security to the entitled beneficiaries through PDS. As NFSA is going to reframe the food security aspects, this pioneering initiative can give insights on how effectively the food security through Public Distribution System can be extended to the states of India through this Act. As the study reveals the National Food Security Act (NFSA) is an important initiative, to ensure that the majority of India's population has access to an adequate quantity of food at affordable prices. The experience of the states which have completed PDS reforms provides a qualified support for the fact that the inclusive PDS policy can improve the PDS rice consumption. Hence there is a considerable impact for the PDS policy with subsidized PDS rice in 2011-12 on these states which initiated the PDS reforms in the early phase of 2011-12. So these states provide a model for an inclusive PDS which can be replicated across the country.

Introduction

India's Public Distribution System (PDS) has improved steadily during the last 10 years. The National Food Security Act (NFSA), enacted three years ago, was — and still is — a chance to complete the process of PDS reform and ensure a modicum of food security for everyone (Dreze, 2016). National Food Security Act 2013 (NFSA) is a unique step taken by Indian government to fight against hunger and protect rights of the people for food. As NFSA is going to redefine the food security aspects it will have certain ramifications (Tanksale and Jha, 2015). Based on the quantum of grain-distribution commitment, the depth of coverage of people and the scope of impact, the TPDS forms the largest component of NFSA, 2013 (Gulati and Saini, 2014).

Under the NFSA, the APL category is abolished and eligible households come under two well defined categories: priority households, entitled to 5 kg of foodgrains per person per month at nominal prices, and Antyodaya households (the poorest), entitled to 35 kg per household per

month. The PDS is to cover at least 75 per cent of rural households at the national level, rising to 8090 per cent in the poorest States (Dreze, 2016). The Act is globally seen as the biggest experiment in the world history of food-based welfare schemes (Gulati and Saini, 2014) by any government. By ensuring that the majority of population in India has access to adequate quantity of food at affordable prices, the Act is seen as a vital conduit for addressing the persistent problems of food and nutritional security of the Indian population (Gulati and Saini, 2014).

At the end of one year after National Food Security Act, 2013 (NFSA) came into force, i.e, upto July, 2014, implementation of the Act had started in 11 States/UTs. Since then, 14 more States/UTs have joined NFSA and the total number of States/UTs now implementing the Act is 25. As per the evaluation of the implementation by the Ministry of Consumer Affairs, Food and Public Distribution by April, 2016 the Act was likely to be implemented in all remaining States /UTs (GOI, 2016-NFSA coverage n al states). But officially 9 states and 2 UTs have implemented the Act (Food grain bulletin, 2015)

The states of India have been fast implementing the NFSA. Even before the implementation of this Act the states have taken up initiative to implement the reforms prescribed in the NFSA. For example, some states like Tamil Nadu, which has universal coverage, and Chhattisgarh with 90 per cent coverage of their populations, thus extended their coverage beyond the centre's TPDS. They have been supplying rice at a price even lower than what is envisaged under NFSA, 2013. Their extra grain needs are acknowledged and are grandfathered under the NFSA as the tide-over allocation (Gulati and Saini, 2015). It is interesting to evaluate experience of these states who took up the challenge and administrative efforts for PDS reforms with the implementation of this Act and the impact of PDS policy in these states. Also some states are in the course of initiating these reforms.

1.1 A glance through States with PDS reforms

Till June 2015, NFSA has been implemented in 11 States/UTs viz. Bihar, Delhi, Haryana, Himachal Pradesh, Punjab, Chandigarh, Rajasthan, Karnataka, Maharashtra, Madhya Pradesh, and Chhattisgarh. West Bengal has also implemented NFSA partially, only in the 3 districts viz. Cooch Behar, Uttar Dinajpur, and Dakshin Dinajpur (FCI, 2016). The recent studies on PDS efficacy across states provide a more encouraging picture. According to an assessment by development economists Jean Dreze and Reetika Khera, Bihar, Chhattisgarh and Odisha have reported sharp

falls in grain leakages through public distribution system (PDS) during the period between 2004-05 and 2011-12 (Financial Express Bureau, 2015).

Among Indian states, Bihar has the highest proportion of people living below the official poverty line (a line which is often considered akin to the starvation line), with 53.3percent of the state's population classified as poor in 2009-10 (quoted in Choithani and Pritchard, 2015). The deep-rooted incidence of poverty in Bihar implies heavy reliance on PDS allocations throughout the state. On top of these problems, the PDS in Bihar is afflicted by woeful delivery inefficiencies. The PDS in Bihar has historically been riddled with huge problems of pilferage and leakage. In its 2005 nationwide performance evaluation of the scheme, the Planning Commission estimated that 75 percentages of PDS foodgrains did not reach its intended beneficiaries in Bihar, compared to the national average of 57 percentages (quoted in Choithani and Pritchard, 2015). Bihar's recent experience is even more interesting, because of the state's notorious record of large-scale embezzlement of PDS foodgrains in the 2000s, with leakages in the range of 80 percentage to 90 percentage throughout that period. Signs of improvement emerged around 2011, notably with the introduction of a system of tracking coupons. However, evidence of the effectiveness of these early reforms is somewhat mixed. NSS data suggest a dramatic reduction in PDS leakages in Bihar between 2004–05 and 2011–12, but field surveys suggest that in spite of some improvement Bihar's PDS remained one of the most corrupt as recently as 2011. Nevertheless, Bihar's PDS seems to be improving in a way that few observers would have thought possible five years ago. This experience, aside from being important in its own right, suggests that effective PDS reform is possible even in the worst-governed states (Dreze and Khera, 2015).

In more recent times, Chhattisgarh has applied some important lessons from Tamil Nadu: this includes an expansion of PDS coverage, reduction in PDS prices, computerisation, doorstep delivery of grain, "deprivatisation" of ration shops (handing over ration shops to community institutions such as the gram panchayats and self-help groups) and setting up proper channels for grievance redressal. These measures along with other PDS reforms put Chhattisgarh fourth among the nine PDS states included in PDS survey 2011. Since 2008, Orissa has been emulating the Chhattisgarh model (including universalisation of the PDS in the "KBK" region); it is ranked sixth (quoted in Khera, 2011). Along with this, bold PDS reforms were launched e g, doorstep delivery, computerisation, and deprivatisation of "fair price shops "preceding the survey (Dreze and Khera,

2015). Its experiment with entrusting the management of the Fair Price Shops (FPS) to gram panchayat secretaries has had encouraging results (quoted in Khera, 2011).

The holistic monitoring of PDS are found across India, very limited evidence exists on states using technology to reduce the incentive to diversion. In public discourse, Information Communication Technologies (ICTs) are being increasingly constructed as a potential means for moving from PDS to cash transfers—a system in which households, rather than receiving food rations, would be entitled to either food coupons, or pre-determined amounts of cash to use toward purchases of food. If ICTs are to be used to improve existing social schemes, they should address the root causes of the problems into place. The vision of technology as a carrier of food security policies, as designed in the Kerala PDS, has high potential for program improvement (Masiero, 2015).

Among the other states in the group, Madhya Pradesh has opted for the technologically most sophisticated—and costliest—method for revamping its public distribution system (PDS). It is one of a handful of states that is trying to ensure that subsidised food reaches the segment it is meant for, the poorest of the population or those below the poverty line (BPL) (Jishnu and Sood, 2011). What makes Punjab a torch-bearer state in this category is the fact that it has successfully implemented the online and systematic monitoring of the Act. This has been achieved by the online and systematic monitoring of the Act. This has been realised by linking the beneficiaries with Aadhaar card and guaranteeing complete quality control. No other state in the country has been able to achieve this status yet (Government of Punjab, 2015). Maharashtra is the eighth state to implement the National Food Security Act, which will benefit seven crore people (Press Trust of India, 2014). Rajasthan was expected to be a model State in terms of the scheme's ambit and [wide] range of eligible beneficiaries when the Act was enacted in 2013 since it had been already providing wheat at Re. 1 per kg to 38.83 lakh families under the BPL, State BPL and Antyodaya Anna Yojana. These families will continue to get the foodgrain on the existing price, while 50 lakh additional families would get wheat at Rs. 2 per kg under the food security scheme (The Hindu, 2013). This has been realized by the state after the implementation of the Act recently.

As the FSB makes clear, the government commitment ends with the supply of 5 kg per capita per month even if, due to leakages and waste, beneficiaries receive much less. If the current rate of leakage continues, beneficiaries may receive only 3 kg per capita per month (Kotwal, Murugkar and Ramaswami, 2013a). The major concern about the NFSO is not its immediate cost. The major concern ought to be how to ensure that the full benefits are received by households. How can

leakages be stopped? The costs to think about are those borne by households and not by the government. A PDS driven model drives out local and often more nutritious cereals from household budgets (Kotwal, Murugkar and Ramaswami, 2013b).

2. Review of Literature

The review of some recent studies available on the PDS reforms initiated extensively at the initial phases of the NFSA sheds light into the dimensions of recent PDS reforms. By transforming food aid from a discretionary component of the social safety net to a legal right, the National Food Security Act (NFSA) represents an important policy change. Passed in 2013, the NFSA expands the number of households entitled to receive food grains through the public distribution system (PDS). It also introduces a number of reforms - many of which are modeled on PDS reforms implemented by the state of Chhattisgarh - to improve the distribution of PDS food grains. We find, however, that the improvement in Chhattisgarh´s PDS performance pre-dates most of the reforms on which the NFSA is modeled (Krishnamurthy, Pathania and Tandon, 2015).

The success of NFSA lies in the appropriate identification of the genuine beneficiaries. NFSA proposes to cover up to 75 percentage of rural and 50 percentage of urban population as priority households for entitlement of benefits. One of the path breaking objectives of NFSA is to leverage the AADHAR (an identity card issued by unique identification authority of India) for the purpose of identification and distribution of foodgrains to the individuals as well as for availing food subsidies. Suggestions evolved from the NFSA shows that Food security through direct cash transfer may be a cost effective option for the safety net program, which can benefit in exploring more options to the consumers, reduce the risk of distortions and boost investment in agricultural and nonagricultural activities due to improved access to the credit. Mexico, Brazil and Bangladesh are the few countries who have been successfully implementing the safety net programs though cash transfer (Tanksale and Jha, 2015).

Based on the provisions of NFSA the PDS rests on a three-way division of the population, among “priority”, “general” and “excluded” households. Priority households, covering at least 46 percent of the rural population at the all-India level, are to get 35 kg of grain a month at ‘Antyodaya prices” (Rs.3 a Kg for rice, Rs.2 for wheat and Rs.1 for millets). General households will get 20 Kg at no more than half of the Minimum Support Price. And excluded households, which account for 10 percent of the rural population, will get nothing (Dreze, 2011).

From a human rights and ethics perspective, the most important step forward in NFSA is the recognition of explicit duties or 'obligations' of various levels of government for the promotion of food security. Thus, the main obligation of the central government is to provide foodgrains (or adequate funds) to state governments at specified prices. State governments, however, have the main duty to implement the provisions of the Act together with local government institutions, and may extend the level of benefits with additional resources from their own coffers. The main advantage of the legislation is that it will ensure that foodgrains that are procured by the government are actually distributed to the needy rather than rotting in official storage houses (Banik, 2016).

The study by Kaul (2013) found that the NFSA implementation can increase the per person caloric intake of the beneficiaries. Under the provisions of the National Food Security Bill (NFSB), which was passed in September 2013, an increase in the reach and value of subsidies provided through the PDS is imminent. While the financial implications of the Bill have received a lot of attention, it is also important to estimate its possible impact on the nutritional status of beneficiary households. Once implemented, the NFSB hopes to provide 5 Kg of food grains, per person, per month, at prices ranging from Rs. 3 per Kg to Re 1 per Kg. It will also expand the coverage of the PDS to include 67% of the country's population. Thus, the programme will offer a bigger discount to a larger number of people.

BPL population is, on average, eligible for 4 to 5 Kg of food grains per person, per month. Thus the Bill does not entail a big increase in the quota. However, at current prices, the Kg per subsidy will increase from Rs. 13.5 to Rs. 16.5.8. This implies an increase in the value of the subsidy from approximately Rs. 67.5 to Rs. 82.5per person, per month. The average caloric intake for PDS rice users from the 2009 to 2010 wave of the NSSO surveys is estimated at 2,260 Kcal/day in rural and 2,076 Kcal/day in urban areas. The study also found that the larger discount included in the NFSB will increase the per person caloric intake of the present beneficiaries of the programme by 66 Kcal/day in urban and 72 Kcal/day in rural areas.

The best alternative to achieve economic access to food more efficiently is by substituting the present system of physically distributing grains with conditional cash transfers as envisaged in NFSA, based on the platform created by the Aadhaar Unique identity scheme. As this system would require fingerprints of all those drawing benefits from the government and can deposit the cash directly in their accounts, the leakages can be reduced dramatically (Gulati and Saini, 2014).

Khera (2013) has given coherent response for the misconceptions regarding NFSA. According to Khera, these limited interventions are important for the following reasons. Firstly, the National Food Security Bill (NFSB) includes maternity entitlements (Rs. 1000 or approx. 16.67 USD per month for six months for pregnant women) which could go a long way in ensuring better nutrition in the womb. Secondly, it includes supplementary nutrition for children under six through the Integrated Child Development Services (ICDS) scheme, including children in the 03 year age group, a crucial period for battling under nutrition and finally, even the PDS can contribute to better nutrition. There is also a provision to supply more nutritious grain (for example, millets and maize) instead of wheat and rice. Some states (Andhra Pradesh, Chhattisgarh, Himachal Pradesh, and Tamil Nadu) already provide nutritious commodities such as pulses and oil, and the National Food Security Ordinance (NFSO) may prompt others to follow. Further, households may use the 'implicit transfer' from buying cereals at cheap prices to diversify diets and buy more nutritious food items. What remains true is that the NFSO is only a step ahead, where a leap was required. She has given valid and clear justifications for the apprehensions regarding the affordability of NFSO. Currently, the increase in food subsidy is less than the subsidy given to gold and diamond industry and even to fertilizer subsidy. It is also reasonably well accepted that the fuel and fertilizer subsidy do not go to the poorest. Viewed in this manner, the affordability of the food bill is ultimately a question of political commitment and priorities. It is clearly asserted that the fiscal space does exist. In such states, as the NFSO rolls out, many APL card holders will become 'entitled' households with clear entitlements (25kg per month at Rs. 123/ kg). Grain flowing through the leaky APL "pipe" will be channeled through a transparent BPLAAY 'pipe', with significantly lower cheating. Hence the NFSO is an opportunity to end the large scale diversion of APL grain (Khera, 2013).

Given the findings of several researchers on the envisioned scope and recent experience of the PDS reforms with NFSA implementation, there is further scope and space for research to analyse the impact PDS policy based on the states that have completed the PDS reforms with a computerized system of PDS .This probing research question has been left unforeseen by the previous studies.

3. Objectives

1. To compare the PDS coverage and price in states which have initiated PDS reforms and the states which are yet to complete the PDS reforms.

2. To estimate the interstate differences in the impact of PDS policy changes on the purchase of PDS rice in the states which have completed the PDS reforms in India.

4. Data Sources and Methodology

The data base for the present study is the 61st round of National Sample Survey (NSS) data on Public Distribution System and other sources of household consumption for the period July 2004 to June 2005 and the 68th round NSS report on the same topic for the period July 2011 to June 2012. The data is also collected from various issues of Food Grain bulletins.

4.1 Difference-in-Difference method for impact evaluation

The difference-in-differences method compares the changes in outcomes over time between a population that is enrolled in a program (the treatment group) and a population that is not (the comparison group) (Gertler and et al., 2016). At their intuitive core, differences-in-differences models identify program impact as the difference in the changes in an outcome experienced between participants and non-participants across an interval of time over which a program was introduced. To put it in a different way this unique method identifies the program impact as the difference in outcome trend between the two groups across an interval of time during which the program was introduced (Lance, et al.,2014). Several researchers have used this method for impact evaluation of various economic policies. Card and Kruger (1992) used a dramatic change in the New Jersey minimum wage to see whether the higher minimums reduce employment, perhaps hurting the very workers minimum-wage policies. A more encouraging example comes from Pischke (2007), who looks at the effect of school term length on student performance using variation generated by a sharp policy change in Germany (quoted in Angrist and Pischke 2009).
The National Food Security Act, 2013 introduced, "the New PDS" model providing cheaper grains to a larger population. A careful evaluation of the improvement of PDS in various states can give a sense of the impact of this model on the PDS purchase of foodgrains. The primary objective of the proposed study aims to estimate the impact of decline in the price of rice to Rs.3/- (or less) on coverage, quantity purchased and value of purchase of PDS in 2 groups of states; states which have initiated and completed PDS reforms to the recent period (treatment group) and states which are

yet to complete the PDS reforms (control group) of states. This will be examined using Difference-in-Difference method (Card and Krueger, 1992), which compares the outcome of reforms in treatment group with the control group of states between 2004-05 (before) and 2009-10 (after). The objective is to estimate the impact of decline in the price of rice to Rs.3/- (or less) on coverage, quantity purchased and value of purchase of PDS by making a comparison of the two groups of states (treatment and non-treatment/control group of states using difference-in-difference method during 2004-05 and 2011-12. The treatment group of states in the study is the group of states which have completed the PDS reforms, which are also the major states[1] in the NSSO reports consisting of Bihar, Chattisgarh, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, and the control group of states in the study consists of states which are yet to complete the PDS reforms group which includes Andhra Pradesh, Assam, Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Odisha, Tamil Nadu, U.P, West Bengal (control group).

The states are chosen on the basis of the norms of National Food Security Act (2013) where the price of rice should not exceed Rs.3/-.A way to improve on the simple difference method is to compare outcomes before and after a policy change for a group affected by the change (Treatment Group) to a group not affected by the change (Control Group) (quoted in Duflo).

The regression set up gives the same answer but allows testing coefficients after adjusting for covariates.

The regression equation:

$$\mathbf{Yhst = \beta_0+\beta_1 A_{hst} + \beta_2 T_{hst} + \beta_3 A_{hst} T_{hst} + X_{hst} +\varepsilon}$$

Where Yhst= Outcome of households in states in a particular time period (here quantity of PDS rice purchased).

A_{hst}=1, impact after 2011-12; A_{hst}= 0 impact before 2011-12

T_{hst}=1 if state is in treatment group; T_{hst}=0 if state is in control group

A_{hst} T_{hst} : Interaction between two dummies (product of the 2)

[1] This refers to the 17 States of India which had a population of 20 million or more according to the Census of 2001. The States are: Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra,Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal (NSSO).

β_3 = Interaction coefficient gives the DID estimate.

X_{hst}= Controls like MPCE, Religion, Social Group, Land possessed, Education and so on.

5. Empirical Results

Table 5.1 shows the PDS coverage[2] and price during 2004-05 and 2011-12. PDS coverage is indicated in terms of Households (household size) that bought PDS rice. The table also gives an account of the monthly per capita consumption per individual and per household. In 2004/2005, none of the states in India sold rice (or wheat) at or below Rs 3/kg (in 2004/2005 current prices) even to households in bottom three households in bottom three MPCE deciles. (Kishore and Chakraborti, 2015).

Table 5.1 PDS coverage and Price

All India PDS rice				
Price and Coverage	2004-05		2011-12	
	Rural	Urban	Rural	Urban
Percentage of Households that bought PDS rice	24.4%	13.1	45.9%	23.3%
Percentage share of PDS in quantity consumed of rice	13.2%	11.3%	27.9%	19.6%
Monthly per capita consumption (Kg) per individual	0.839	0.530	1.670	0.882

[2] PDS coverage refers to the population covered by PDS. States with expanded coverage have very low leakages (quoted in Gulati and Saini, 2015).

Households that bought PDS rice (mean)	5.55	5.56	4.42	4.39
Average Price of PDS rice	.6563	.6869	.0047	.0061
Monthly per capita consumption (Kg) per household	4.9399	5.4775	4.3145	3.9475

Source: Estimated from NSSO unit level data and reported in NSSO report 61st and 68th rounds

Food prices in fair-price shops were close to the central issue price, set by the government of India, in almost all states of India in 2004/2005. The only exceptions were Tamil Nadu and Gujarat, where rice was sold for less than Rs 4 per kilogram (Kishore and Chakraborti, 2015).

Table: 5.2 PDS Coverage and price in treatment states and Non-treatment

Treatment States				
Price and Coverage	**2004-05**		**2011-12**	
	Rural	**Urban**	**Rural**	**Urban**
Households (household size) that bought PDS rice	5.05	4.52	4.65	4.92
Monthly per capita consumption (Kg) per household	2.7669	1.1499	3.5819	2.9735
Monthly per capita consumption (Kg) per individual	0.5479	0.254	0.770	0.604

Average Price of PDS rice bought (Rs/Kg)	.9019	.4287	.0053	.0054
Non Treatment States				
Households that bought PDS rice	4.94	4.44	4.40	4.24
Monthly per capita consumption (Kg) per household	4.6017	4.0102	4.6918	4.3247
Monthly per capita consumption (Kg) per individual	0.932	0.9031	1.066	1.0199
Average Price of PDS rice bought (Rs/Kg)	1.2970	1.0493	.0044	.0054

Source: Estimated from NSSO unit level data and reported in NSSO report 61st and 68th rounds on PDS and other sources of Household Consumption

Table 5.2 asserts that the coverage of PDS rice shown in terms of household size is greater in treatment states compared to the non-treatment states. Findings from the table 5.2 shows that given the present situation in the states that have introduced PDS reforms (treatment states) have achieved expanded coverage and increased subsidy with decline in the PDS price.

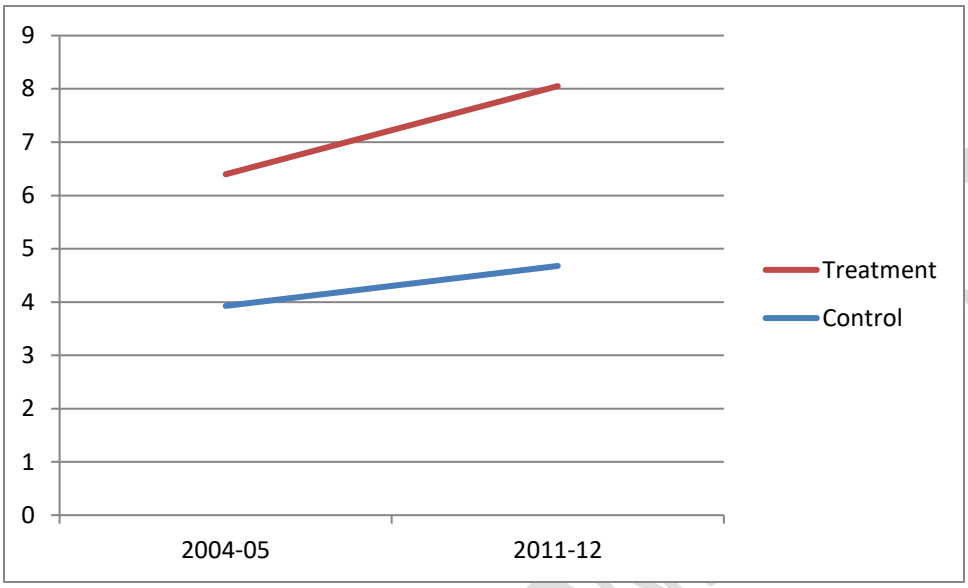
5.1 Testing For Parallel Trends

The DD-estimate is an unbiased estimate of the effect of the policy change if, absent the policy change, the average changes in Y1-Y0 would have been the same for treatment and controls. This is the “parallel trend" assumption (Duflo) . In other words if the policy change is present the average change in Y1-Y0 would not have been same for treatment and controls. And there will be deviation from the parallel trend.

The study has adopted two periods (2004-05 and 2011-12) to test for parallel trends since DD estimates are more reliable when you compare outcomes just before and just after the policy

change because the identifying assumption (parallel trends) is more likely to hold over a short time-window. With a long time window, many other things are likely to happen and confound the policy change effect (Duflo).

Figure 5.1 Graphical Representation of the Parallel Trend



Source: Estimated from NSSO 61st and 68th rounds on PDS and other sources of Household Consumption

The impact estimated through Difference-in-Difference must be exactly equal to the true impact. For this a strong assumption must be verified. This is referred to as the parallel trend assumption. It states that if the subsidized rice policy had not been implemented, the red line and blue line would have followed parallel paths. A deviation from the parallel path shows that there is impact of PDS policy on the treatment states under consideration.

5.2 The Difference in Difference impact of PDS policy in NFSA implemented states

The actual difference-in-difference impact in Table 5.2.1 is computed as follows: first the difference in the outcome (Y) *is* calculated between the before and after situations for the treatment group (B − A).Then the difference in the outcome *(Y)* between before and after situations for the comparison group *(D − C)* is calculated and finally the difference between the difference in outcomes for the treatment group *(B − A)* and the difference for the comparison group *(D − C),* or DD = *(B − A) − (D − C).* This "difference-in-differences" is the actual impact estimate. The same

estimated through the regression set up to get the estimated DID impact in Tables 4 and 5 (Gertler, et al., 2011) .

Table 5.2.1 Actual DID impact

States	2004-05	2011-12	First difference	DID
Control	3.926756	4.676811	0.750055	0.154195
Treatment	2.470888	3.375138	0.90425	
	1.455868	1.301673		0.154195

Source: Estimated from NSSO 61st and 68th rounds on PDS and other sources of Household Consumption.

Table5.2.2 Estimated DID impact

Dependent variable	Quantity of PDS rice consumed with controls	Quantity of PDS rice consumed with 2control variables	Quantity of PDS rice without controls
DID impact	.870 (2.197)	1.150 (2.452)	.870 (2.197)
Treatment state	.631 (1.973)	.522 (2.081)	.631 (1.973)
After treatment	-7.438 (1.241)	-7.557 (1.345)	-7.438 (1.241)

Source: Estimated from NSSO 61st and 68th rounds on PDS and other sources of Household Consumption

Positive coefficients on the Difference-in-Difference dummy and treatment dummy in Table 5.2.2 show that TPDS worked better in the treatment states during 2004-05 and 2011-12. After treatment dummy is negative due to the fact that is some of the control group of states like Andhra Pradesh,

Karnataka, Kerala and Tamil Nadu, where the average quantity of PDS rice did not increase in 2011-12. But in treatment states there was a notable increase in the average quantity of PDS rice in 2011-12. Similar to the recent study by Kishore and Chakraborti, 2015, the interaction term labeled DID impact is statistically insignificant while estimating DID impact.

Table 5.2.3 Estimated Impact of PDS policy disaggregated by states

Variable	Quantity of PDS rice consumed without controls	Quantity of PDS rice with controls
After treatment	7.435 (1.609)	7.155 (1.746)
Bihar dummy	4.170 (3.188)	3.622 (3.874)
Haryana dummy	1.758 (3.609)	2.985 (4.328)
Rajasthan dummy	.513 (3.687)	1.355 (15.572)
Madhya Pradesh Dummy	.709 (3.680)	.689 (4.115)
Maharashtra dummy	.048 (3.694)	.036 (4.126)
Karnataka dummy	7.435 (1.609)	7.628 (1.760)
Chattisgarh dummy	1.750 (3.610)	1.975 (4.137)

Source: Estimated from NSSO 61st and 68th rounds on PDS and other sources of Household Consumption

The individual dummies in the second column of table5.2.3 shows that the PDS rice purchase in Rice has increased in the states of Karnataka (7.63 kg), Haryana 2.99kg) and Chattisgarh (1.98 kg).

The reason for adopting NSSO data for the present study for assessing the states with PDS reforms in context of NFSA, 2013 has great relevance, since the State-wise percentage coverage for NFSA has been determined by the Planning Commission, based on 2011-12 National Sample Survey Organization (NSSO) survey on consumption expenditure. Since coverage under NFSA has been delinked from poverty estimates, the hitherto followed system of APL and BPL beneficiaries would no longer be relevant. NFSA provides a statutory basis for a framework which assures food security for nearly two-thirds of the population and seeks to make the right to food a legal entitlement by providing subsidized foodgrains on the existing TPDS. Up to 75 per cent of the rural and 50 per cent of urban population as per Census 2011 at all India level is envisaged to be covered under NFSA and the States shall be allocated foodgrains as specified for the above coverage. (GOI, 2015)

The Coverage, entitlements and implementation of the PDS at the state level vary so much that it now makes little sense to evaluate it only at the national level (Khera, 2011). The PDS performance depends on foodgrains operations of the central government as well as the distribution of subsidized grain by state governments. As a result, regional diversity in PDS performance can be expected. Hence grouping the treatment states alone as a group will not suffice to learn the real impact of PDS policy on each of the states that have completed the PDS reforms. So disaggregating the impact of the states as in Table 5.2.3 is of utmost importance to assess the real PDS policy of impact of subsidized rice on these states. A large number of states have undertaken large scale reforms. One excellent example is Chattisgarh, which is in the process of turning around the PDS system with the help of improved practices, governance and technology. There are also initiatives most recently by some of the states for computerizing the PDS operations which range from use of smart cards for beneficiaries in an experimental way in Haryana and Chandigarh, use of Global Positioning System in Tamil Nadu, Chattisgarh and Delhi, bar coded bags in Gujarat and SMS alerts on grain availability in Uttar Pradesh and Madhya Pradesh. However each of these initiatives targets a part of the system and is not comprehensive and replicable at the all India level (Report NFSB, 2010).

The states vary considerably in the performance of PDS before the reforms started and the extent of reforms implemented there as measured by the size of expansion in the number of beneficiary

households and the price at which rice was sold to targeted households after reforms (Kishore and Chakraborti, 2015).

68th Round NSSO data (2011-12), has greater relevance with regard to the provisions of NFSA. The state wise coverage under the NFSA has been determined by the Planning Commission based on the National Sample Survey Organization (NSSO) survey report (2011-12) on consumption expenditure. So this study has greater scope for an impact evaluation of the PDS policy in the states in India where PDS reforms with certain requirements of NFSA have been realized at an earlier stage.

NFSA, 2013 proposed by the National Advisory Council (NAC), is a revolutionary Act that can have a huge impact on the economy. Based on the universal coverage as envisaged by NFSA the richer households will normally opt out of such schemes and hence with tight monitoring of offtake of grains, over time it would be possible to minimize leakage of foodgrains. Since the coverage proposed by the NAC is also not 100% and there are differential categories of entitlement, the need for proper identification of beneficiaries still exists. Further the Public Distribution System (PDS) with its network of about half a million Fair Price Shops (FPS) is the most obvious choice for the distribution of the entitled foodgrain under the proposed NFSB. On the identification of beneficiaries the Expert Committee (EC) has recommended that the entitled population may be defined as the percentage of population below the official poverty line + 10 per cent of the BPL population. Using the Tendulkar poverty line, this works out to 46 per cent rural and 28 per cent urban population. These percentages are the same as those recommended by the NAC for categorization as the 'priority' households. This captures not only the poor but also some at the margin, which is desirable given the objectives of the NFSB (Report NFSB, 2010). However the actual contribution and cost effectiveness of the act will depend on the extent to which its implementation can overcome the deficiencies of the current PDS (Kishore, Joshi and Hoddinot, 2014).

The National Food Security Act (NFSA) is an important effort to ensure that the majority of India's population has access to an adequate quantity of food at affordable prices (Mishra, 2013).

The Chhattisgarh experience provides qualified support for the claim that the NFSA can increase PDS consumption. It is difficult to predict how the NFSA might affect the distribution of subsidised food grains in states where delivery is poor. The post2004 reforms in Chhattisgarh which are included in the NFSA may have improved the availability of subsidised food grains, but

they were clearly operating in conjunction with earlier reforms that increased the number of FPSs and rice procurement, as well as the political will to make efficient delivery of food aid a priority. Therefore, the NFSA may not improve the availability of subsidised food grains in states where households lack easy access to shops distributing food aid. However the research study carried out in Chattisgarh strongly suggests that if states are pushed by both the NFSA and national attention on the issue do improve the distribution of subsidised food grains, then millions of households will receive an extra layer of income support and will use the savings on food grains to improve their nutritional status (Krishnamoorthy et al. 2015). Similar to the present study, the analysis by Paul (2015) also asserts that the situation is somewhat better in states of Chattisgarh, Bihar and Karnataka that have implemented the NFSA. The magnitude of leakage is the least in Chhattisgarh among the six states covered under the study, and it remained the *best performing* state for PDS. The secret of its success is the creation of an efficient delivery mechanism along with the spread of high awareness among beneficiaries about their PDS entitlement. Bihar has become a successful *revival state* with a moderate leakage figure. The state went through a major revamp in the functioning of the PDS after it introduced the coupon based distribution method in 2007 to curb corruption. Karnataka one of the better performing states in the PDS has adopted several reforms, though the magnitude of leakage is higher as compared to the other two states that have implemented the NFSA (Paul, 2016). In sum, there is a considerable impact for the PDS policy in 2011-12 as the evidence from the study supports the increase in PDS purchase of rice from the Fair price shops among the major NFSA implemented states of Chattisgarh, Bihar and Karnataka and also on those states which initiated some part of the NFSA reforms in the early phase of 2011-12. So when NFSA is implemented in full length it can redefine and strengthen the existing system of PDS within these states.

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