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Poverty Reduction in Rural India during 2004-05 to 2011-12: Role of Growth, Redistribution, and Population-Shifts

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Abstract: The Indian economy was amongst the fastest growing economies of the world during the period 2004-05 and 2011-12. This growth aided poverty reduction and the number of rural poor declined by 110 million. In this paper we quantify the relative contribution of the growth vis-à-vis the redistribution components to poverty reduction in rural India. Unlike in the pre-reform period, in the post-reform era period we analyse, inequality reduced the pace of reduction in rural poverty. An additional contribution is that we highlight the importance of demographic changes in determining the pace of poverty reduction. By this we mean population-shifts across land size classes because of differences in the total fertility rate by land size class. While the intra-land size class reduction in poverty is the most important driver, the relative importance of redistribution component and population-shifts effects vary at the sub-national level, and this depends on the stage of demographic transition.

JEL Classification: I32, J1

Key words: Poverty Change, Decomposition, Growth, Redistribution, Population-Shifts, Rural India

Introduction

This paper focuses on poverty reduction in rural India during the period 2004-2012, when India was one of the fastest growing economies of the world. India's gross domestic product increased from $709 billion in 2004 to $1.83 trillion in 2012. During this period, the total number of rural poor declined by a staggering 110 million to 216.6 million. The annual rate of reduction in rural poverty increased from 0.75 percentage points in the period 1993-94 – 2004-05 to 2.32 percentage points in 2004-05 – 2011-12 (Government of India 2014a). We find support for the conventional wisdom that economic growth contributed to poverty reduction. When we decompose poverty reduction into two components, viz. a growth component and a distribution component, we find that 107 per cent of the reduction can be attributed to the growth component while redistribution component accounted for -7 percent, i.e. the latter impeded poverty reduction. This finding is in contrast to the findings of Datt and Ravallion (1992) who found that in the decade preceding India's economic reforms redistribution aided poverty reduction. What we also find is that within India, i.e. across the major states, the relative importance of redistribution to poverty reduction varies.

Beyond revisiting Datt and Ravallion, which is the first contribution of the paper, we open another flank into the study of poverty reduction in India[1]. An aspect that is completely missing in the literature on poverty reduction in India is the role of population shifts. The standard way of looking at population shifts is from the rural-urban lens. Since it is seasonal migration and not permanent rural-urban migration that is a characteristic of India, it is not surprising that authors have not found migration to have any significant impact on the dynamics of rural poverty reduction[2].

What we observe in the data are population shifts across land size classes within rural India. In the seven year time period we consider, in rural India, the share of population in each land size class changed as follows: less than 0.1 hectare a reduction of 2.3 percent, an increase of 9.2 percent in population in land class 0.01-0.40 hectares and a reduction by 1 percent and 4.8 percent in land

[1] The focus of a recent paper by Datt, Ravallion, and Murgai (2019), who examine a period of six decades, is on understanding the relative importance of growth in primary, secondary and tertiary sectors to poverty reduction.

[2] Bhanumurthy and Mitra (2004) too find that the contribution of rural-urban population shifts to rural poverty reduction in India has been miniscule. They find that between 1993-99 and 1983-94 the component accounting for population shifts between rural and urban areas accounts for only 2.59 per cent and 1.64 per cent of poverty reduction respectively. The evidence presented in the World Development Report 2008 suggested that in developing countries rural-urban migration has not significantly contributed to rural poverty reduction. According to the Report, "more than 80 percent of the decline in rural poverty is attributable to better conditions in rural areas rather than to out-migration of the poor World Bank (p.3 2007).

size class 0.41-1 hectare and over 1 hectare respectively. We argue that these shifts are at least partially determined by demographic changes and in particular differential reductions in the total fertility rate (TFR) across states and land size classes. Also, as we point out later, as many as eight Indian states are lagging behind on the demographic transition. Yet, even today, for some inexplicable reason, the consequence of sub-national differences in TFR on population shifts across land size classes has not been explored.

While the association between large household size and poverty is accepted, the literature is sparse on how changes in share of population of different sub-groups, in our case distribution of population by land size class, affect the pace of poverty reduction. The intuition is fairly straight forward. Given the lack of alternative non-farm opportunities, in a region where there is an increase in the share of population which is landless or are marginal land holders, one would see a slower reduction in poverty.

Quantifying the relative importance of the population-shift effect is the second contribution of this paper. Towards this we use the framework suggested by Ravallion and Huppi (1991) which was later extended using the Shapley-value decomposition by Shorrocks (2013). For rural India, changes in poverty within land size groups contributed to 102 percent of poverty reduction while population shifts had a marginal albeit negative role, -2 per cent, in influencing the pace of poverty reduction. This is not to suggest that population-shifts do not matter since at the all India level the state level differences get averaged out. In fact demography matters. In India's most populous state of Uttar Pradesh, the contribution of population shift is a not so insignificant -12 percent. Uttar Pradesh is an example of a state not having undergone demographic transition, where an increase in the share of population who are marginal and small land holders has impeded the pace of poverty reduction. As is evident, we explicitly address which land group / groups contribute to or impede poverty reduction. Sub-group analysis by land size class is important given the centrality of land to rural livelihoods.

Following Son (2003), we unpack the within group reduction in poverty ~~split~~ into two parts, viz. sum of within land size group growth effect and sum of within land size group inequality effect. Needless to say, the growth component is the prime driver of poverty reduction. There are substantial sub-national differences, both in the direction as well as the magnitude of the

redistribution and population shift components in influencing poverty reduction in this time-period. To the best of our knowledge, this point has not been emphasized in the literature.

Our findings can partially explain the differential performance in poverty reduction across Indian states. The analysis also helps identify bottlenecks to poverty reduction and hence inform policy. Despite the impressive reduction in poverty, rural India continued to account for 83 percent of India's poor. The shrinking population of the poor is getting concentrated in the eight states that have not undergone the demographic transition. Progress towards attainment of Sustainable Development Goal 1 pertaining to 'no poverty' in south Asia will be determined by the India's progress. Moreover, there is an ongoing controversy in India on whether central transfers to the states should be higher for the poorer states or whether states should be incentivized to move towards replacement rate of fertility. The central government appears to be favorably disposed towards providing incentives. And our results would suggest that there might be empirical support for such a policy stance.

This paper is structured as follows. The focus of Section 2 is on patterns in TFR by land size class. This discussion is based on estimates from National Family Health Survey (NFHS), which is the equivalent of Demographic and Health Survey for India. In Section 3 we describe the data set we analyse. We use data from two rounds of survey of consumption expenditure conducted by India's National Sample Survey Organisation (NSSO) in 2004-05 and 2011-12. The focus of Section 4 is on the decomposition techniques and results. We undertake decomposition of the change in rural poverty using fairly established methods in the literature (Datt and Ravallion 1992, Ravallion and Huppi 1991, Shorrocks 2013, Son 2003). Section 5 concludes.

Background

In this section we provide support for the conjecture that population-shifts across land size classes are possibly driven by differential changes in the TFR. The suggestive evidence comes from India's NFHS. But before we get into the TFR differentials by land size class, it would be instructive to understand differences by geography. The differences in levels of TFR across states are apparent from Table 1. We present estimates of rural TFR for the 18 major Indian states in 2005-06 and 2015-16.

Overall, rural TFR declined from 3.7 in 1992-93 to 3.0 by 2005-06 and further to 2.4 in 2015-16. The negative association between fertility and income is mirrored at the sub-national level in India. As per estimates from NFHS 2015-16, the TFR varies across the richer and poorer states. In the richer states from south India, i.e. Andhra Pradesh, Karnataka, Kerala and Tamil Nadu, the TFR is markedly lower. In contrast, it is 3.14 in Bihar and 2.74 in Uttar Pradesh. These two states are part of what are known as the Empowered Action Group (EAG) states, an official grouping of states that have not undergone demographic transition, and account for over a third of India's rural poor in 2011-12. The eight EAG states, viz. Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttarakhand and Uttar Pradesh, have relatively higher fertility and mortality indicators as compared to other Indian states. Over the decade 2001-11, the rate of growth of population, in the rural areas of the eight states which are classified as EAG states was three times that of other Indian states[3]. Another point to note is that among the non-EAG states, a decline in the population growth is evident from 1971-81 onwards while in case of the EAG states, a decline is evident only the inter-censal period 2001-11. As mentioned earlier, poverty is getting concentrated in the EAG states. The share of the EAG states in India's rural poor increased from 57.7 percent in 2004-05 to 64.4 percent in 2011-12. On the other hand, the share of the four southern states in India's rural poor declined from 15.2 percent to 11.6 percent over 2004-05 and 2011-12.

Moving on to land, the TFR is higher among the landless and the marginal land holders. In 2015-16, The TFR by land size class was as follows: 2.49 among those with less .01 hectare of land, 2.18 among those with 0.01-0.40 hectare of land, 2.09 among those with 0.41-1 hectare of land and marginally higher at 2.16 among those with over 1 hectare of land. The differences in TFR across land size in case of southern states is not as stark as that in some of the EAG states where the difference in TFR between those with over 1 hectare of land and those with less than 0.41 hectare of land is high. In Bihar the TFR across the four land size classes was 3.93, 3.02, 2.66 and 2.87 respectively while in Uttar Pradesh it is 3.42, 2.81, 2.60 and 2.41 respectively. Such marked differences across land size classes are not evident in the southern states.

While the concerted efforts of the central and state governments to address the sub-national differences in fertility and mortality have begun to bear fruit, a long standing problem that has assumed gargantuan proportions in recent times is the declining average size of land holdings. Reliance on agriculture and hence land is an important determinant of poverty and well-being of

[3] http://censusindia.gov.in/2011-prov-results/paper2/data_files/india/Rural_Urban_2011.pdf

rural households, in particular for those residing in the EAG states. Poverty is concentrated among the landless or the marginal land holders. Data from agricultural census reveals that the average size of land holdings has declined from 2.8 hectares in 1970-71 to 1.15 hectares in 2010-11 and further to 1.08 hectares by 2015-16. This is also borne out from NSSO data sets. There are differences in average size of holdings at the sub-national level. The differences are apparent even within the EAG states: Bihar (0.39), Chhattisgarh (1.24), Jharkhand (1.1), Madhya Pradesh (1.57), Orissa (0.95), Rajasthan (2.73), Uttaranchal (0.85), and Uttar Pradesh (0.73). The challenge likely to be posed by small land holdings was flagged over a century ago by B R Ambedkar who is also credited as the father of the Indian Constitution. Over three decades ago, Sukhomoy Chakravarty, an economist who was involved in India's planning process wrote: "I believe that no sustainable improvement in the distribution of incomes is possible without reducing the 'effective' scarcity of land" (p. 5, Chakravarty 1987). Estimates from NSSO's survey of agricultural households 2013 show that the average income of a household with less than 1 hectare of land is insufficient to meet their consumption needs (Figure 1). This fact is also borne out by the NABARD Financial Inclusion Survey (National Bank for Agriculture and Rural Development 2018). Hazell (2015) has written about the inability of small and marginal holders in developing countries to eke out a meaningful living. A comparison over the period 2003-2013 shows that incomes of household with less than 0.40 hectare of land barely grew by 1.1 times, those with 0.4-1 hectare land grew by 1.38 times while that of those with over 10 hectare land doubled in real terms (Figure 1). Across Indian states and agro-climatic zones there are large variations in the structures and patterns in source of income, viz. wages, cultivation, livestock and non-farm business, in agricultural households. These in turn affect the growth of rural incomes. In two states, viz. Bihar and West Bengal, the average monthly income declined over the period 2003-13 (for details see Chakravorty et al 2019).

Land is not only a key driver of changes in income levels but also determines inequality in rural agricultural households[4]. Of particular relevance to this paper is their evidence that small land holders eke out a marginal existence. As we argue in this paper if population growth is relatively higher in this segment then it impedes pace of poverty reduction.

[4] In the decade 2003-13, the contribution of net income from cultivation to inequality increased from 39 to nearly percent (Chakravorty et al 2019).

Data

Data on monthly consumption expenditure of rural households comes from the survey of consumption expenditure conducted by NSSO in 2004-05 and 2011-12. The 2004-05 survey canvassed information from 79,298 households while the 2011-12 survey from 59,695 households. Both rounds of data are comparable, and are representative at the national and sub-national level. The details of the sampling procedures are available in the reports published by Government of India (2006, 2014b).

Estimates of the monthly consumption expenditure of the households are considered reliable and have been widely accepted in the literature for purpose of analysis. The monthly consumption expenditure of the household is the sum of expenditure on food, durable goods and services. The expenditure on some items is measured over a 30-day recall period while others are on both a 30-day and a 365-day basis. When the expenditure is calculated based on 30 day recall it is referred to as uniform reference period. When the expenditure is calculated based on 30 day recall for certain items and 365 day recall (scaled down to 30 days by multiplying the factor 30/365) then it is called mixed reference period. In line with convention we use the monthly consumption expenditure calculated using mixed reference period.

Based on NSSO surveys, it is an accepted practice to generate estimates of distribution of households by seven land size categories (Government of India 2014c). We group households into four coarser categories, viz. less than 0.01, 0.01-0.4, 0.41-1 and greater than 1 hectare.

The monthly per capita expenditure (MPCE) is the ratio of monthly consumption expenditure to household size. The average MPCE in rural India was Rs 579 in 2004-05 while it was Rs 1287 in 2011-12. While the average MPCE increased by 2.22 times the rural price deflator increased by 1.81 times.

All members of a household are deemed to be poor if the household's monthly per capita consumption expenditure is less than the poverty line. We use the poverty line recommended by the Expert Group on Methodology for Estimation of Poverty (Government of India 2009). The Expert Group which was appointed by Government of India constructed the all India poverty line and the state poverty lines. In Table 2, for each state, we report the head count ratio of poverty, the number of poor for the years 2004-05 and 2011-12 and also the change in poverty. As mentioned earlier the

poor are concentrated in the EAG states. Moreover, these states have witnessed lower percentage reduction in poverty, on average, than the other states.

An alternative lens is provided in Table 3. We can identify states where there is an over representation of the poor among households with 0-0.41 hectares of land. We compute the total number of poor in the land size class and then calculate the share of each state. Similarly, we calculate the share of each state in the total population in the land size class. We then take the ratio of these two shares. A value greater than 1 would imply a concentration of poor in a particular state. We do find that barring Rajasthan and Uttarakhand this ratio is not only higher than 1 in all the other EAG states but also increased over the period 2004-05 and 2011-12, except in the case of Bihar. This pattern from the NSSO surveys is what one would have expected given the TFR reported in Table 2. Establishing this pattern provides a context to our discussion in the next section.

Decomposition of Change in Poverty: 2004-05 and 2011-12

Let P_t and P_{t+1} be the rural poverty at time t (2004-05) and t+1 (2011-12) respectively. Our objective is to understand the change in rural poverty first at the aggregate level and then by land size classes. For this, we employ the class of decomposable poverty measures proposed by Foster, Greer, and Thorbecke (1984; commonly referred to as FGT in the literature).

Datt and Ravallion (1992) suggest a decomposition procedure for understanding poverty reduction in Brazil and India while Shorrocks (2013) refined their methodology[5]. The change in poverty ΔP at two points in time is decomposed into growth and redistribution effects as follows:

$$\Delta P = (\Delta P)_m + (\Delta P)_I \qquad \textbf{(1)}$$

The growth $(\Delta P)_m$, and redistribution component$(\Delta P)_I$, respectively are:

$$(\Delta P)_m = \frac{1}{2}\left[P\left(z, \mu_{t+1}, L_t(p)\right) - P\left(z, \mu_t, L_t(p)\right) + P\left(z, \mu_{t+1}, L_{t+1}(p)\right) - P\left(z, \mu_t, L_{t+1}(p)\right)\right] \quad \textbf{(1a)}$$

$$(\Delta P)_I = \frac{1}{2}\left[P\left(z, \mu_t, L_{t+1}(p)\right) - P\left(z, \mu_t, L_t(p)\right) + P\left(z, \mu_{t+1}, L_{t+1}(p)\right) - P\left(z, \mu_{t+1} + L_t(p)\right)\right] \quad \textbf{(1b)}$$

[5] The "drdecomp" command in STATA relies on Shorrocks' (2013) framework to decompose change in poverty into growth and redistribution effects using the Shapley value. Shorrocks' method is an exact decomposition unlike that of Datt and Ravallion (1992), which has a residual term in addition to the growth and redistribution component. In the Datt and Ravallion (1992) results, for India, the residual term is small.

In terms of notation $P(z, \mu, L(p))$ is the measure of poverty, z is the poverty line, μ_t is the mean consumption in society in time period t, and $L_t(p)$ is the Lorenz curve of the distribution of the welfare indicator, in our case household's monthly per capita consumption expenditure, at time period t. The decomposition is based on the fact that, given a poverty line, the poverty level at a point in time can be expressed as a function of mean consumption and the Lorenz curve.

Datt and Ravallion (1992) find that in the pre-reform era i.e. 1977-78 to 1988, 62 percent of the reduction in poverty, as measured by FGT (2), in rural India, could be attributed to growth component and 47 percent to redistribution effects. Using Shorrocks' (2013) methodology, we find the contribution of growth and redistribution to be 107 per cent and - 7 percent respectively. Even when we use the Datt and Ravallion methodology the magnitudes are in the same ball park[6]. This implies that, in rural India, unlike in the pre-reform period, in the recent decade of the post-reform era where India was among the fastest growing economies and for which the data are available, inequality reduced the pace of reduction in rural poverty. The all India estimates mask state specific differences. At the sub-national level, we find that in some states the redistribution effect is positive while in other states is negative (Table 4). Only in case of one state, i.e. Haryana, and only in the case of the FGT (0) measure, the redistribution effect is positive and also greater than the growth effect.

There could be multiple reasons why poverty can decline at differential rates across Indian states. We explore one plausible channel, viz. changes in the distribution of population across land size groups. Land is an important determinant of well-being of rural households. For instance, if the larger land holders are less likely to be poor then an increase in the share of population of large land holders could also reduce poverty. We provided evidence of not only differences in TFR across land size classes but also how the rate of reduction in TFR varies across states. These in turn could influence pace of poverty reduction. Hence, we next address the relative importance of improvements within a land size group and the contribution of population shifts across groups to poverty reduction.

Let us assume that individuals are distributed across g land size classes (in our case we have four land size groups). By way of notation v_{gt} and P_{gt} are respectively the population share and poverty in land size group g in time t. Then P_t which is the poverty at time t can be written as follows.

[6] For the period between 2004-05 and 2011-12, we replicated the decomposition method used by Datt and Ravallion (1992). We use the "dfgtgr" command in STATA.

$$P_t = \sum_{g=1}^{4} v_{gt} P_{gt} \qquad \textbf{(2)}$$

While we have grouped population by land size classes, in the extant literature researchers have estimated poverty by region (rural or urban), educational attainment etc. The change in the poverty across two points of time t+1 and t can be written as follows

$$\Delta P = \sum_{g=1}^{4} \left[v_{gt+1} P_{gt+1} - v_{gt} P_{gt} \right] \quad \textbf{(3)}$$

We follow the approach taken by Shorrocks (2013) for decomposing equation 3.[7]

$$\Delta P = \sum_{g=1}^{4} \left[\left(\frac{v_{gt} + v_{gt+1}}{2} \right) \Delta P_g \right] + \sum_{g=1}^{4} \left[\left(\frac{P_{gt} + P_{gt+1}}{2} \right) \Delta v_g \right] \qquad \textbf{(4)}$$

Where $\Delta P_g = P_{gt+1} - P_{gt}$ and $\Delta v_g = v_{gt+1} - v_{gt}$

The first term on the right hand side of equation (4) is the contribution of changes in poverty within land size groups and the second term is the change in poverty because of population shifts. Note that equation 4 can be written equivalently for absolute change in poverty or the percentage change in poverty.

Before proceeding further, it might be useful to focus on the change in population share and change in poverty across land size classes. Within the EAG states and other major states, we see differences in the extent of population-shifts across land size classes, an aspect we come back to when we discuss our findings (Table 5). There is an increase in the share of population with 0.01-0.41 hectare of land though the magnitude varies across states. Among the EAG states, the increase is much larger than the all India average, in case of Bihar and Jharkhand in particular. Among the other major states, Punjab is an exception. In addition, except for the case of West Bengal, none of the non-EAG states witnessed movement into the first category.[8] In the analysis that we undertake we focus on the change in the level of poverty rather than the percentage change in poverty. We report estimate of change in poverty by land size class in Table 6. When examined together Tables 5 and 6 give us a clue of what to expect if we are to decompose the change in poverty that is attributable to intra-land size group change and population-shift effect.

[7] This is a refinement to Ravallion and Huppi (1991)'s decomposition.
[8] Assam does not experience any change in this category.

Moving on to our findings, we begin with the findings from the Shorrocks' (2013) decomposition (Table 7). Our focus is on the change in poverty and what percentage of the reduction can be attributed to changes in poverty within land size groups (we call this the intra-land component) and what percentage can be attributed to population-shift. The two percentages will add up to 100. Irrespective of the poverty measure, we find the intra land component to be the dominant factor in each and every state. There are clear differences by geography. In the EAG states as well as Assam and West Bengal the population-shift factor offsets the growth component and thus reduces the pace of poverty reduction. Additional insights are available if we unpack the growth component further by land size classes. Hence, in Table 7a we have reported the detailed results of decomposition of poverty reduction, as measured by the change in the squared poverty gap (i.e. FGT (2)) within each land-size class separately. Take the case of two EAG states, viz. Madhya Pradesh and Rajasthan. In these two states the redistribution effect negatively impacted poverty reduction (Table 4). This is not surprising since the greatest poverty reduction took place for the highest land size class. However, the population shift is observed into the lower land size classes, the proportion of those possessing land of less than 1 hectare increased by about 8 percentage points in these states. On the other hand, in the states which show a substantial positive redistribution effects on poverty reduction, viz. Andhra Pradesh, Haryana, Karnataka, and Punjab, they experienced relatively larger poverty reductions within the lower land size classes than larger land size classes. In fact in Punjab, the larger land holders are unlikely to be poor. The case of the state of Chhattisgarh is different. There is a population shifting away from the largest land size class that witnessed greatest poverty reduction as well as from the lowest land size class witnessing least poverty reduction towards medium-sized land size classes. As a consequence, the intra land class differences in poverty reductions do not lead to adverse redistribution effects on poverty.

While the above discussion has established the relative importance of changes in poverty within land size groups, i.e. the intra land component, this component can be further decomposed. Son (2003) develops the methodology in this regard. She splits the first component of the right hand side of equation 4 into sum of within land size group growth effect and a sum of within land size group inequality effect.

$$\Delta P = \sum_{g=1}^{4}\left[\left(\frac{v_{gt}+v_{gt+1}}{2}\right)\left(\Delta P_g\right)_m\right] + \sum_{g=1}^{4}\left[\left(\frac{v_{gt}+v_{gt+1}}{2}\right)\left(\Delta P_g\right)_I\right] + \sum_{g=1}^{4}\left[\left(\frac{P_{gt}+P_{gt+1}}{2}\right)\Delta v_g\right] \quad \textbf{(5)}$$

The notation is the same as in Equation 1. $\left(\Delta P_g\right)_m$ and $\left(\Delta P_g\right)_I$ is defined same as in Equation 1a and 1b with the only difference being that we need to add a g subscript through the equation. The

first term on the right hand side of Equation 5 is the within group growth effect, the second term within group inequality effect and the third term is the population-shift effect.

The results are reported in Table 8. Note that the value of the contribution of the population-shift to poverty reduction is the same as in Table 7. Our objective behind undertaking the above exercise is not to focus on the value of each component but only to understand the relative importance of each component. Of particular interest is where the inequality component is more than the population-shift component. We do not find any commonality across the Indian states. Our broad findings are as follows. First, the relative importance of the three components depends on the measure of poverty. Second, in some states the population-shift component and the inequality component have different signs. In India's populous states of Uttar Pradesh and West Bengal the population shift effect on change in head count ratio of poverty is not only negative and but also offsets the positive effect of inequality. In Bihar, which is part of the EAG states, both inequality and population-shift effects impede poverty reduction.

At this point a logical follow up question is with regard to the implications of our findings. Our results, which are descriptive, and not necessarily causal in nature, do suggest that TFR differences across land classes affects the pace of poverty reduction. This means there might be a role for policy. In the Indian policy debates a question that has become controversial in recent times is whether to give a higher share of divisible pool of tax resources to the states that are far from the replacement rate of fertility. The background to the controversy is as follows. India follows a formulaic approach to apportioning the divisible pool of taxes between the central and state governments. The formula is decided by the Finance Commission which finds a mention in Constitution of India and has a fixed term of five years. One of the terms of reference given to the XVth Commission was to provide incentives to states for their "efforts and progress made in moving towards replacement rate of population growth". The XVth Commission was tasked with coming up with the resource sharing formula for the five year period beginning April 2020. Every state government makes a representation to the Commission on what it believes should be the factors taken into consideration while arriving at the share of the different states. Since the southern states had managed to reduce their population growth rate and were close to the replacement level of fertility, they objected to providing any incentives for fertility reduction to the other states. Their argument is that they managed the transition without any incentives and moving forward they were concerned about their share of taxes in the divisible pool. In fact, one of the states in their presentation to the XIVth Commission argued for weight to be given to

poverty, i.e. states with higher head count ratio of poverty would be given additional resources. Finally, in its report the XIVth Commission did not accede to this request. However, it is expected that the XVth Commission in it is report will indeed incentivize the states for population reduction and this will benefit the EAG states and Assam.

Conclusion

This paper is a contribution to the large empirical literature focused on understanding the factors contributing to influencing poverty reduction in developing countries. We quantify the factors that contributed to poverty dynamics in rural India during 2004-05 and 2011-12. We decompose the change in poverty into growth, distributional, and population shift effects.

Unlike in the pre-reform period, in the post-reform era period, inequality reduced the pace of reduction in rural poverty. The period we analyze was characterized by substantial variation in poverty reduction at sub-national level. While the intra-land size class reduction in poverty is the most important driver, the relative importance of redistribution component and population-shifts effects vary at the sub-national level, and this depends on the stage of demographic transition. On the one hand, we have states where population-shifts away from the landless and marginal, small land holders aids poverty reduction. On the other hand, in the states not having undergone demographic transition, and which are poorer than other states, an increase in the share of population comprised of landless and marginal and small land holders has impeded the pace of poverty reduction, with the magnitude of this effect being in double digits in several of these states. The lack of out migration from rural India, the continued preponderance of economic activity in agriculture and allied activities combined with higher TFR in states with fewer non-farm opportunities calls to attention the centrality of land, a crucial input into the sector, on the dynamics of poverty reduction.

The relevance of this paper should be seen against the backdrop of SDG 1 which seeks to eradicate poverty of all forms. While SDG 1 acknowledges that India did make substantial progress in poverty reduction it also points to the uneven reduction in poverty. In this paper we open another avenue in the literature on poverty reduction in India in order to better understand what drives this unevenness. We highlight the importance of demographic changes and the resultant population shifts in determining the pace of poverty reduction.

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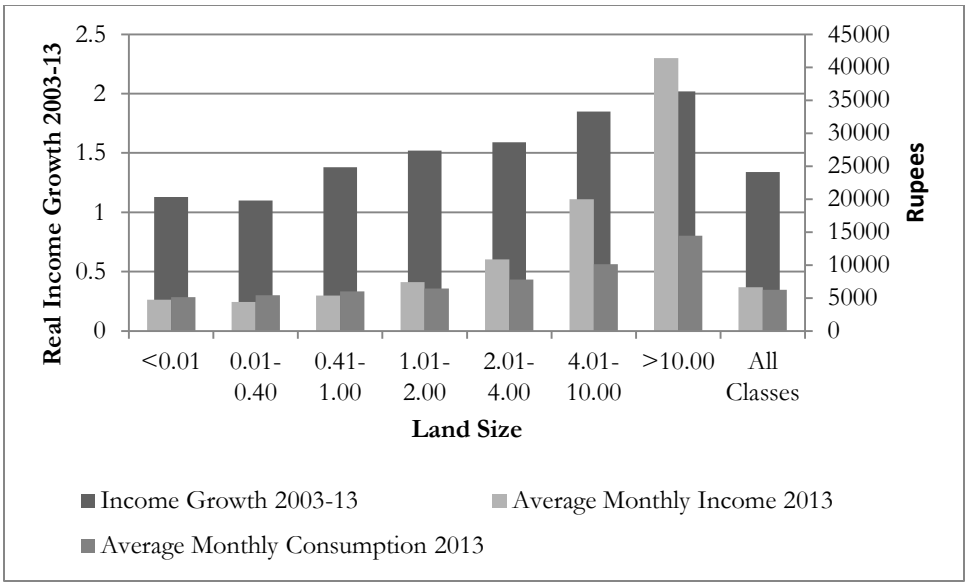

Figure 1: Growth in Average Real Monthly Income of Agricultural / Farmer Households in the Decade 2003-13 and Average Monthly Income and Consumption in 2013

Table 1: Total Fertility Rate in Rural Areas by Land Size Class

	NFHS 2015-16					NFHS 2005-06				
	Less than 0.01 ha	**0.01 – 0.40 ha**	**0.41 – 1.0 ha**	**More than 1.0 ha**	**All**	**Less than 0.01 ha**	**0.01 – 0.40 ha**	**0.41 – 1.0 ha**	**More than 1.0 ha**	**All**
EAG States*										
Bihar	3.93	3.02	2.67	2.88	**3.56**	4.55	4.34	3.64	2.90	**4.22**
Chhattisgarh	2.54	2.40	2.29	2.24	**2.37**	3.14	2.95	2.66	2.75	**2.88**
Jharkhand	2.90	2.82	2.52	2.66	**2.84**	4.13	3.61	3.66	3.55	**3.69**
Madhya Pradesh	2.63	2.49	2.43	2.35	**2.48**	3.59	3.34	3.23	3.14	**3.34**
Orissa	2.21	1.98	2.09	2.03	**2.11**	2.54	2.31	2.65	1.98	**2.48**
Rajasthan	2.66	2.86	2.50	2.34	**2.56**	3.70	3.51	3.61	3.55	**3.62**
Uttar Pradesh	3.42	2.81	2.60	2.41	**2.99**	4.67	4.20	3.60	3.41	**4.13**
Uttaranchal	2.40	2.18	1.91	2.02	**2.24**	2.92	2.76	2.71	2.39	**2.67**
Other States										
Andhra Pradesh*	1.98	1.77	1.69	2.07	**1.93**	1.64	1.76	1.60	1.76	~~1.82~~ 1.66
Assam	2.48	2.09	1.77	2.10	**2.34**	2.83	2.60	2.57	1.90	**2.65**
Gujarat	2.17	2.19	2.36	2.37	**2.19**	3.15	2.60	2.89	2.42	**2.80**
Haryana	2.45	2.13	2.21	1.77	**2.22**	3.05	2.82	2.46	2.59	**2.92**
Karnataka	1.84	1.83	1.92	2.06	**1.91**	1.87	2.06	2.08	2.19	**2.19**
Kerala	1.56	1.41	1.32	1.43	**1.55**	1.81	2.41	2.68	2.32	**2.03**
Maharashtra	2.10	1.94	1.89	2.09	**2.05**	2.17	2.22	2.22	2.20	**2.31**
Punjab	1.75	1.23	1.46	1.43	**1.63**	2.39	-*	1.88	1.53	**2.06**
Tamil Nadu	1.87	1.83	1.84	1.81	**1.86**	1.95	1.84	-*	1.66	**1.90**
West Bengal	1.94	1.86	1.51	1.61	**1.85**	2.70	2.28	2.02	1.82	**2.54**
India	2.49	2.18	2.09	2.16	**2.41**	2.97	3.10	2.78	2.63	**2.98**

Empowered Action Group or EAG states have not undergone the demographic transition. For additional details see text.

-* Not enough observations.

A couple of points need to be borne in mind in the context of these estimates. First, the NFHS sample does not generate a precise distribution of households by land size holding. Second, the confidence interval of estimates of TFR in the third and fourth land size class do overlap in some cases but do not overlap in the case of first and fourth or second and fourth land size class.

Table 2: Head Count Ratio of Poverty (HCR) (%), Number of Poor (in lakhs) and Share of each State in All India Poor							
	2004-05			2011-12			
	HCR	**Number of Poor**	**Share of Poor**	**HCR**	**Number of Poor**	**Share of Poor**	**Percentage Change in HCR**
EAG States*							
Bihar	55.7	445.1	13.6	34.1	320.4	14.8	38.8
Chhattisgarh	55.1	96.5	3	44.6	88.9	4.1	19.1
Jharkhand	51.6	115.1	3.5	40.8	104.1	4.8	20.9
Madhya Pradesh	53.6	255.3	7.8	35.7	191	8.8	33.4
Orissa	60.8	197.3	6	35.7	126.1	5.8	41.3
Rajasthan	35.8	167.2	5.1	16.1	84.2	3.9	55.0
Uttar Pradesh	42.7	604.7	18.5	30.4	479.4	22.1	28.8
Uttarakhand	35.1	23.3	0.7	11.6	8.2	0.4	67.0
Other Major States							
Andhra Pradesh	32.3	187.1	5.7	11	61.8	2.9	65.9
Assam	36.4	88.8	2.7	33.9	92.1	4.3	6.9
Gujarat	39.1	130.1	4	21.5	75.4	3.5	45.0
Haryana	24.8	39.3	1.2	11.6	19.4	0.9	53.2
Karnataka	37.5	135	4.1	24.5	92.8	4.3	34.7
Kerala	20.2	49.5	1.5	9.1	15.5	0.7	55.0
Maharashtra	47.9	277.1	8.5	24.2	150.6	7	49.5
Punjab	22.1	36.5	1.1	7.7	13.4	0.6	65.2
Tamil Nadu	37.5	125.6	3.8	15.8	59.2	2.7	57.9
West Bengal	38.2	231.2	7.1	22.5	141.1	6.5	41.1
India	**41.8**	**3266.6**		**25.7**	**2166.6**		38.5

Empowered Action Group or EAG states have not undergone the demographic transition. For additional details see text.

Table 3: Ratio Share of Poor in the Land Size Class 0-0.40 hectare to the Share of Population in Land Size Class 0-0.40 hectare

	2004-05	2011-12
EAG States*		
Bihar	1.43	1.37
Chhattisgarh	1.27	1.75
Jharkhand	1.15	1.44
Madhya Pradesh	1.30	1.64
Odisha	1.24	1.36
Rajasthan	0.98	0.92
Uttar Pradesh	1.10	1.30
Uttarakhand	0.83	0.49
Other Major States		
Andhra Pradesh	0.65	0.32
Assam	1.15	1.30
Gujarat	0.94	0.65
Haryana	0.75	0.62
Karnataka	0.90	0.85
Kerala	0.46	0.34
Maharashtra	1.11	1.07
Punjab	0.65	0.36
Tamil Nadu	0.89	0.58
West Bengal	0.90	0.85

Empowered Action Group or EAG states have not undergone the demographic transition. For additional details see text.
Poverty is measured as per the Head Count Ratio

Table 4: Decomposition of Change in Poverty into Growth and Redistribution Components

	FGT (0)		FGT (1)		FGT (2)	
	Growth	Redistribution	Growth	Redistribution	Growth	Redistribution
EAG States						
Bihar	105	-5	110	-10	114	-14
Chhattisgarh	100	0	77	23	64	36
Jharkhand	125	-25	107	-7	98	2
Madhya Pradesh	101	-1	130	-30	163	-63
Odisha	88	12	82	18	78	22
Rajasthan	105	-5	128	-28	164	-64
Uttar Pradesh	94	6	101	-1	107	-7
Uttarakhand	113	-13	116	-16	116	-16
Other Major States						
Andhra Pradesh	89	11	82	18	76	24
Assam	240	-140	131	-31	95	5
Gujarat	102	-2	75	25	65	35
Haryana	47	53	56	44	59	41
Karnataka	144	-44	137	-37	134	-34
Kerala	98	2	83	17	73	27
Maharashtra	80	20	74	26	76	24
Punjab	87	13	87	13	93	7
Tamil Nadu	107	-7	116	-16	120	-20
West Bengal	89	11	85	15	84	16
All-India	107	-7	113	-13	116	-16

Sum of growth and redistribution component equals 100
Empowered Action Group or EAG states have not undergone the demographic transition. For additional details see text.

Table 5: Change in Share of Population in Four Land Size Classes between 2004-05 and 2011-12

	Less than 0.01 ha	0.01 – 0.40 ha	0.41 – 1.0 ha	More than 1.0 ha	Total
EAG States*					
Bihar	-8.6	19.8	-4.4	-6.8	0.0
Chhattisgarh	-4.2	3.8	4.0	-3.6	0.0
Jharkhand	1.1	21.5	-15.1	-7.5	0.0
Madhya Pradesh	7.5	0.1	-0.9	-6.7	0.0
Odisha	-7.4	7.8	3.6	-4.0	0.0
Rajasthan	3.4	4.6	-2.7	-5.4	0.0
Uttar Pradesh	-1.1	8.1	-0.9	-6.1	0.0
Uttarakhand	3.8	15.5	-17.5	-1.9	0.0
Other Major States					
Andhra Pradesh	-5.00	7.00	1.09	-3.08	0.0
Assam	0.04	8.90	4.39	-13.32	0.0
Gujarat	-3.92	5.67	-0.05	-1.72	0.0
Haryana	-6.01	7.24	-4.14	2.91	0.0
Karnataka	-5.97	3.17	3.09	-0.29	0.0
Kerala	-0.67	8.37	-6.15	-1.55	0.0
Maharashtra	-5.02	9.22	-1.61	-2.59	0.0
Punjab	-15.64	18.72	0.29	-3.38	0.0
Tamil Nadu	-2.58	6.54	-2.76	-1.19	0.0
West Bengal	3.84	11.55	-8.49	-6.88	0.0
India	**-2.32**	**9.23**	**-2.06**	**-4.83**	**0.0**

Source: Calculations based on Unit Level Data from NSSO Survey of Consumption Expenditure 2004-05 and 2011-12
Empowered Action Group or EAG states have not undergone the demographic transition. For additional details see text.

Table 6: Change in Head Count Ratio of Poverty in Four Land Size Classes between 2004-05 and 2011-12

	Less than 0.01 ha	0.01 – 0.40 ha	0.41 – 1.0 ha	More than 1.0 ha	All Classes
EAG States					
Bihar	-21.33	-29.89	-23.91	-4.20	-21.2
Chhattisgarh	-1.29	-18.58	-13.72	-9.32	-10.5
Jharkhand	-8.61	-15.51	-11.92	-2.87	-10.9
Madhya Pradesh	-12.63	-24.17	-23.68	-19.74	-17.8
Odisha	-28.25	-18.34	-29.26	-30.23	-25.2
Rajasthan	-16.23	-22.74	-22.77	-20.35	-19.8
Uttar Pradesh	-16.43	-15.68	-14.74	-8.62	-12.3
Uttarakhand	-37.40	-22.37	-27.20	-14.21	-23.4
Other Major States					
Andhra Pradesh	-25.41	-15.39	-26.27	-15.98	-21.1
Assam	-41.47	-15.30	-5.00	7.39	-2.5
Gujarat	-23.89	-34.14	-13.84	-5.28	-17.7
Haryana	-19.62	-13.53	-19.04	-1.89	-13.1
Karnataka	-20.02	-15.45	-18.10	-3.68	-13.0
Kerala	-18.17	-12.30	-4.31	-8.54	-10.9
Maharashtra	-23.38	-18.91	-28.71	-23.84	-23.7
Punjab	-21.28	-14.03	-4.79	-2.34	-14.6
Tamil Nadu	-28.89	-21.56	-16.49	-4.18	-21.7
West Bengal	-18.76	-19.17	-12.91	-14.88	-15.5
India	**-20.61**	**-18.21**	**-17.08**	**-12.20**	**-16.3**

Source: Calculations based on Unit Level Data from NSSO Survey of Consumption Expenditure 2004-05 and 2011-12

Note: Change in Poverty Gap Index and Squared Poverty Gap Index available on request.

Empowered Action Group or EAG states have not undergone the demographic transition. For additional details see text.

The change in poverty reported in Table 2 and those reported here are slightly different due to rounding off.

Table 7: Contribution of Population Shifts Across Land Size Class & Improvements Within a Land Size Classes to Change in Poverty between 2004-05 and 2011-12

	FGT (0)		FGT (1)		FGT (2)	
Component	**A**	**B**	**A**	**B**	**A**	**B**
EAG States						
Bihar	106	-6	104	-4	102	-2
Chhattisgarh	107	-7	103	-3	102	-2
Jharkhand	105	-5	106	-6	104	-4
Madhya Pradesh	108	-8	111	-11	115	-15
Odisha	102	-2	101	-1	101	-1
Rajasthan	106	-6	107	-7	108	-8
Uttar Pradesh	114	-14	112	-12	112	-12
Uttarakhand	106	-6	107	-7	107	-7
Other Major States						
Andhra Pradesh	98	2	97	3	97	3
Assam	207	-107	156	-56	139	-39
Gujarat	101	-1	101	-1	102	-2
Haryana	95	5	94	6	94	6
Karnataka	97	3	96	4	95	5
Kerala	104	-4	103	-3	101	-1
Maharashtra	100	0	99	1	99	1
Punjab	87	13	85	15	84	16
Tamil Nadu	100	0	99	1	99	1
West Bengal	114	-14	112	-12	111	-11
India	103	-3	103	-3	102	-2

Source: Authors Calculations
Empowered Action Group or EAG states have not undergone the demographic transition.
For additional details see text.
Component A: Contribution of changes in poverty within land size groups
Component B: Contribution of population shifts
A+B=100

Table 7a: Contribution of Population Shifts Across Land Size Class & Improvements Within a Land Size Class to Change in Poverty as Measured by FGT-2 between 2004-05 and 2011-12

	Contribution of Changes in Poverty within Land Size Groups					
EAG States	Less than 0.01 ha	0.01 – 0.40 ha	0.41 – 1.0 ha	More than 1.0 ha	Intra Land Size Component	Population Shift Component
	(A)	(B)	(C)	(D)	(E)	(F)
Bihar	37	58	10	-2	102	-2
Chhattisgarh	-3	28	30	48	102	-2
Jharkhand	24	47	26	7	104	-4
Madhya Pradesh	35	17	20	43	115	-15
Odisha	14	24	33	30	101	-1
Rajasthan	4	25	33	46	108	-8
Uttar Pradesh	21	57	25	8	112	-12
Uttarakhand	34	51	21	2	107	-7
Other Major States						
Andhra Pradesh	50	13	16	18	97	3
Assam	38	96	13	-8	139	-39
Gujarat	40	27	26	9	102	-2
Haryana	58	21	14	0	94	6
Karnataka	41	20	21	14	95	5
Kerala	10	76	14	1	101	-1
Maharashtra	45	3	19	32	99	1
Punjab	59	24	2	0	84	16
Tamil Nadu	59	27	10	3	99	1
West Bengal	29	67	8	7	111	-11
India	31	35	19	17	102	-2

Source: Authors Calculations

Empowered Action Group or EAG states have not undergone the demographic transition. For additional details see text.

Note: A+B+C+D=E, E+F = 100

Table 8: Decomposition of Poverty Reduction into Within Group Growth, Within Group Inequality and Population Shifts across Land Size Groups

	FGT (0)			FGT (1)			FGT (2)		
EAG States	**Within Group Growth Effect**	**Within Group Inequality Effect**	**Population Shift Effect**	**Within Group Growth Effect**	**Within Group Inequality Effect**	**Population Shift Effect**	**Within Group Growth Effect**	**Within Group Inequality Effect**	**Population Shift Effect**
	(A)	**(B)**	**I**	**(D)**	**I**	**(F)**	**(G)**	**(H)**	**(I)**
Bihar	114	-9	-6	125	-22	-4	131	-28	-2
Chhattisgarh	107	0	-7	82	22	-3	68	34	-2
Jharkhand	124	-18	-5	110	-4	-6	101	4	-4
Madhya Pradesh	99	9	-8	133	-21	-11	163	-48	-15
Odisha	93	10	-2	85	17	-1	81	20	-1
Rajasthan	108	-2	-6	127	-21	-7	161	-53	-8
Uttar Pradesh	112	2	-14	117	-5	-12	124	-13	-12
Uttarakhand	111	-5	-6	118	-12	-7	125	-18	-7
Other Major States									
Andhra Pradesh	89	8	2	85	13	3	78	18	3
Assam	411	-204	-106	247	-91	-56	199	-60	-39
Gujarat	105	-4	-1	84	17	-1	75	27	-2
Haryana	32	63	5	36	58	6	37	57	6
Karnataka	134	-38	3	124	-28	4	125	-29	5
Kerala	103	1	-4	89	14	-3	80	21	-1
Maharashtra	80	20	0	74	25	1	77	22	1
Punjab	56	32	13	63	22	15	73	11	16
Tamil Nadu	108	-8	0	116	-16	1	120	-20	1
West Bengal	107	7	-14	101	12	-12	99	13	-11
India	**109**	**-5**	**-3**	**114**	**-11**	**-3**	**118**	**-15**	**-2**

Source: Authors Calculations

Empowered Action Group or EAG states have not undergone the demographic transition. For additional details see text.

Note: A+B+C=100, D+E+F = 100, G+H+I=100