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Household Consumption Expenditure Inequalities in Rural India: 1993-94 to 2011-12

Abstract

We examine the comparative role of determinants of household-level consumption expenditure inequalities (henceforth, inequalities) in rural India between two sub-periods, 1994 - 2005 and 2005 - 2012, using three rounds of NSS consumption expenditure surveys. We explore how the changes in the components of consumption expenditure and population characteristics explain inequalities during the two sub-periods that represent distinct policy environments. We use both *a priori* and *regression-based* decomposition (RBD) methods for the analysis. We find that there is a complete reversal of the role of education in explaining inequalities from being an inequality increasing factor during 1994 - 2005 to inequalities equaliser during 2005 - 2012, and this reversal is induced by decreasing consumption returns to education due to depressed job market situation. The role of locational factors has increased in explaining the increase in inequalities over time. The non-food component induces an increase in the overall inequalities *via* an increased contribution of expenditure on durables. The within-group component contributes the most to the level of and change in inequalities.

Keywords: consumption inequalities, inequalities decomposition, education and inequalities, India

1 Introduction

After embarking on the market-based reforms in 1991, India experienced much higher real per capita GDP growth of around 4.2% annually during 1991-2004 as compared to around 2.7% during 1981-1991. This further increased to around 5.2% during 2004-2012. The economic crisis of 1991 led to the implementation of reforms in several arenas. However, during post-2005, distinctive *inclusive growth* policies were announced and implemented. These were in the form of various development schemes and programs in the areas of infrastructure, nutrition, employment and human capital, which were implemented with the objective of reduction of inequalities and poverty, improvement in the well-being of vulnerable groups and an increase in wages (Drèze & Khera 2013; Dev 2017). Such policy changes have implications for the determinants of inequalities (Atkinson 2015).

After liberalisation, the inequalities increased during 1994-2005 and the increase was chiefly determined by education and state of residence (Cain et al 2010). Inequalities increased further during 2005-2012 despite policy aiming at inclusive growth (Basole and Basu 2015). Although the studies (Basole and Basu 2015; Singh 2012) looked into the change in components

of inequalities during 1994-2012, the question of the comparative role of determinants of increase in inequalities has not been addressed as yet, to the best of our knowledge. Also, the question of tracking the role of education, which is vital in the light of it being a single dominant factor influencing inequalities in general (Piketty 2017) and in India in particular (Cain et al 2010) has remained unaddressed. In view of this, it is pertinent to investigate the levels of and changes in inequalities. However, we have investigated inequalities in consumption expenditure only in rural areas in this paper. The reasons for this are: (i) the consumption expenditure data is less affected by measurement errors *vis-à-vis* income data, especially in rural areas; and (ii) consumption expenditure reflects the long-term well-being status of the households better than the income variable. Given the availability of data on consumption expenditure in India after 1991, we have used the three rounds of NSS Consumer Expenditure Survey (CES, henceforth): 1993-94, 2004-05, 2011-12 (1994, 2005 and 2012, henceforth). The first period of our investigation is 1994 to 2005 and the second period is 2005 to 2012. These periods also neatly map with the policy regimes in which inclusiveness was not focussed and focussed, respectively.

The two research questions that this paper addresses to answer are as follows. *First*, how do the various components of consumption expenditure and characteristics of population explain the levels of inequalities and their change over time? *Second*, what role does education play in explaining inequalities after 2005? The latter question is asked in the context of the empirical evidence that education was one of the most dominant factors in explaining the increase in inequalities during 1994-2005 (Cain et al 2010) and also that substantial changes have been witnessed by the rural areas of the Indian economy (Kanbur et al 2014). To address the research questions, we use two distinct approaches to inequalities decomposition: *a priori* decomposition approach and a more elaborate *regression-based* decomposition (RBD) approach. We also carry out several robustness checks in terms of various reference periods of survey response, different deflators and alternative model specifications and find that our results are robust to these alterations.

This paper contributes to the literature in many ways. We have used different decomposition approaches so as to give a robust picture of the determinants of inequalities and the underlying factors driving them. Moreover, we relate changes in the structure of inequalities to the structural changes in the economy and interpret the results in light of the labour market changes. Furthermore, to the best of our knowledge, this is the only paper studying reversal of education's role in explaining inequalities and its relevance with the labour market changes during 2005-2012. The rest of the paper is organised as follows: Section 2 discusses the relevant

literature. Section 3 discusses methodology and data details. Section 4 presents the empirical results. Sections 5 and 6 present robustness checks and discussion, respectively. Section 7 concludes.

2 Literature Survey

The literature that uses methods of micro-econometric decomposition of household-level inequalities is relevant to this study. Studies have mainly used two approaches to inequality decomposition: the *a priori* approach and the RBD approach. The *a priori* approach consists of two decomposition methods: the source decomposition method (Shorrocks 1982; Lerman & Yitzhaki 1985) and the population sub-group or within-Between (W-B) type decomposition method (Shorrocks 1984). The second approach - RBD (Fields 2003) provides more flexibility in terms of the combination of variables and decomposes overall inequality into its determinants. Both these approaches - *a priori* and RBD have been used in inequality studies in India.

Basole and Basu (2015) and Sen and Das (2018) use this method and expenditure data from various rounds of NSS surveys to decompose total consumption expenditure inequalities into the consumption items such as fuel, education, healthcare, conveyance, services, durables and clothing. The other method of *a priori* approach - the W-B type decomposition method is used to decompose total inequalities based on population characteristics, such as gender, sector (rural-urban), education, activity status and geographic location. Borooah et al (2014) use this method and data on expenditure from IHDS for the year 2004-05 to examine how much of the total inequalities can be explained by the caste, region and education. Azam and Bhatt (2017), using W-B type decomposition and income and consumption expenditure data from HDPI-NCAER and IHDS, and NSS surveys, examine the role of spatial factors in determining income inequalities in India during the period 1993-2011. Singh (2012) uses this method and data same as Borooah et al (2014) to associate inequality of opportunities with outcome differences that can be accounted by predetermined circumstances which lie beyond the control of an individual, such as parental education, parental occupation, caste, religion, and place of birth. The second approach to decomposition - RBD, is used to determine the causal factors influencing inequalities. Among others, Cain et al (2010), Pieters (2011), Borooah et al (2014) and Goel (2017) use RBD to decompose the total inequalities. Cain (2010) and Pieters (2011) use consumption expenditure data from various rounds of NSS surveys to identify the causal factors behind rising inequalities, particularly to examine the influence of rising returns to education on household consumption inequalities after liberalisation. Goel (2017) studies wage

inequalities in India using data on wages from various NSS employment-unemployment surveys. Apart from the micro-econometric decomposition of inequalities, there is a voluminous literature on the convergence of growth rates across regions and states of India. Lodayekar and Mukhopadhyay (2018) use PCNSDP data from EPWRF for the total period 1981-2010 and spatial regression methods to estimate regional income convergence. Das et al (2015) use district-level per capita income data availed from *Indicus* to examine the absolute and conditional convergence in India during 2000-2008.

During the period before liberalisation, the inequalities of various economic outcomes were declining in rural and urban sectors (Banerjee et al 2017). However, the studies examining the convergence of the growth rates across states show the absence of convergence before liberalisation (Lodayekar & Mukhopadhyay 2018). After liberalisation in 1991, inequalities increased (Cain et al 2010; Pieters 2011). The skill-biased technical change that brought disproportionate benefits to high educated individuals is perceived as a primary reason behind the increase of inequalities (Cain et al 2010). Along with inequalities in outcomes, the inequality of opportunity has also been high - whether it is urban India or rural India, a large portion of total inequalities is accounted by unequal circumstances (Singh 2012). Borooah et al (2014) find that the SC, ST, and Muslim households were more likely to be in the lowest quintile of consumption than high-caste Hindu households along with increasing overall consumption inequalities. Regional inequalities have also been rising after liberalisation. Azam and Bhatt (2017) find that over time the share of between-district differences in expenditure/income has increased. Lodayekar and Mukhopadhyay (2018) find increasing divergence in the growth rates across states after liberalisation. Regarding the contribution of sources of consumption expenditure to total inequality, results show that non-food expenditure drives the increase in the total inequality (Basole and Basu 2015). Furthermore, miscellaneous consumer services, durables, education and healthcare expenditure contribute greatly to the total inequality (Sen and Das 2018). The studies that use RBD approach find that education and the state of residence are the most important determinants of the increase in inequality after liberalisation (Cain et al 2010; Pieters, 2011). The contribution of the state of residence to inequality can be due to differences in growth rates, geography, infrastructure availability and policies. Education, on the other hand, can affect inequality in two ways: first, increasing educational attainment leads to the increase in the supply of high educated labour, and if the market rewards them with higher income, inequality increases; consequently, education appearing as inequality increasing. Second, if the supply of high educated increases but the requisite amount of jobs is not available due to capital intensive mode of production or other

restrictions in the labour market, inequality will increase, precisely due to the situation of jobless growth and a larger share of national income accruing to the capital owners rather than labour. This might reflect in the lower returns to education. In this second case, although inequality increases, education would not contribute to that. The first case prevailed during 1994-2005 (Cain et al 2010; Pieters 2011).

3 Methodology

As mentioned earlier, we use data on consumption expenditure and household characteristics of the Indian rural sector from the quinquennial NSS surveys¹ for the years 1994, 2005 and 2012. Our primary outcome variable is the inequalities of real monthly per capita consumption expenditure (MPCE, henceforth), based on the 30-day recall period². The deflator(s) used for conversion of nominal consumption expenditure (for aggregate and the sub-groups³) to the real counterpart(s) is the CPI-AL⁴ with base year as 1986-87. We limit the analysis to 16 major states⁵ that cover approximately 97% (97.4%) of India's total (rural) population as per the 2011 census. The variables used in the empirical analysis are primarily related to assets and population characteristics (Table 1). Inequalities are supposed to be affected by the interaction of the above-mentioned variables and changes therein (Bourguignon et al 2005).

Table 1

For the estimation of inequalities, we have used Generalised Entropy (GE) Measures and Gini index. Let Y be the MPCE, i index a household and μ denote the mean MPCE. Then, the family of GE measures is given as

$$E_{\theta} = \frac{1}{\theta^2 - \theta} \left[\frac{1}{n} \sum_i^n \left[\frac{Y_i}{\bar{Y}} \right]^{\theta} - 1 \right] \quad (1)$$

where θ is a real parameter that may take any value, positive, zero or negative (Cowell 2011). The GE measures used in the analysis are based on the parameter values: $\theta = -1, 0, 1$ & 2 . Theil's L and Theil's T are the special cases of the GE measures.

The Gini index is given as

$$Gini(Y) = \frac{1}{2n^2\mu} \sum_{i=1}^n \sum_{j=1}^n |Y_i - Y_j| \quad (2)$$

We have also used growth incidence curves (GICs) to investigate the MPCE growth across percentiles. A GIC gives annualised growth rates by quintiles (such as percentiles) ranked by MPCE between two points in time.

In order to identify the factors affecting inequalities and their comparative role with special emphasis on education, we use three decomposition techniques: source decomposition, population subgroup decomposition (within-between type) and RBD. The first two constitute *a priori* decomposition.

3.1 *A priori* Decomposition

The first type of *a priori* decomposition - Source (components) decomposition determines how various components of total consumption expenditure (MPCE) influence inequalities in MPCE and change therein. We use both Shorrocks (1982) and Lerman and Yitzhaki (1985) approaches to decompose the total inequalities into two components: food and non-food. We also decompose the non-food expenditure inequalities into their subcomponents using Lerman and Yitzhaki method only since Shorrocks' method cannot decompose a variable with zero values and subcomponents are populated with zero values.

We briefly discuss these two decomposition methods. Let k stand for a component of total expenditure (MPCE) like food and non-food, μ and μ_k denote the average of total expenditure and its sub-component k , respectively. The Shorrocks type source decomposition of inequalities using Theil's T index is given as

$$T = \sum_{k=1}^m \frac{1}{n} \sum_{i=1}^n \left(\frac{Y_i^k}{\mu} \right) \ln \left(\frac{Y_i}{\mu_k} \right). \quad (3)$$

where the total inequality is a summation of within component inequalities measured by Theil's T index. The Yitzhaki approach decomposes total inequality into its various components measured through the Gini coefficient:

$$G = \sum_{k=1}^m \left[\frac{\text{cov}(Y_k, F)}{\text{cov}(Y_k, F_k)} \right] \left[\frac{\mu_k}{\mu} \right] \left[\frac{\text{cov}(Y_k, F_k)}{\mu_k} \right] = \sum_{k=1}^m R_k S_k G_k \quad (4)$$

where F and F_k are cumulative distribution functions of total expenditure and expenditure on the component k respectively. The total Gini is a weighted average of Gini of individual components, G_k with weights depending upon the Gini correlation, R_k and proportion of average of MPCE of component k in the average of total MPCE given by S_k .

The W-B type decomposition is another type of *a priori* decomposition whereby the total inequality based on GE measure is decomposed into two terms additively separable: within-group (W-term) and between-group (B-term) term. According to Shorrocks (1984) the Theil's T index, for a population consisting of g subgroups, can be decomposed as:

$$T(Y, n) = \sum_g \frac{n_g \mu_g}{n \mu} T(Y^g, n_g) + \frac{1}{n} \sum_g n_g \frac{\mu_g}{\mu} \log \frac{\mu_g}{\mu} \quad (5)$$

Where $T(Y, n)$ and $T(Y^g, n_g)$ is Theil's T measure of inequalities for the total population and the g^{th} group, respectively. Total inequality decomposed in this manner is the sum of the $G+1$ contributions: G representing the summation of the contribution of W-term of all groups and one B-term.

3.2 Regression-Based Decomposition

The RBD method overcomes shortcomings of *a priori* decomposition in terms of inflexibility of variables and causal inference by determining each factor's contribution to total inequalities (Fields 2003). The first step in RBD is estimating an income-generating function (IGF), which is an OLS estimation of the log of MPCE on its explanatory factors for years 1994, 2005 and 2012 separately as given in equation (6)

$$\begin{aligned} \ln(Y_{it}) = & \alpha_t + \beta_{1t} \text{OCCUPATION_Dummy}_{it} + \beta_{2t} \text{INDUSTRY_Dummy}_{it} + \\ & \beta_{3t} \text{SCST_Dummy}_{it} + \beta_{4t} \text{LAND}_{it} + \beta_{5t} \text{GENDER_Dummy}_{it} + \beta_{6t} \text{EDUCATION}_{it} + \\ & \beta_{7t} \text{AGE}_{it} + \beta_{8t} \text{STATE_Dummy}_{it} + \varepsilon_{it} \end{aligned} \quad (6)$$

Where Y_{it} is the MPCE for the i^{th} household in year t and on the RHS are explanatory variables (Table 1). Compared to Cain et al's work, we include an additional variable of landholding since our analysis is restricted among the rural population, wherein landholding plays a vital role. Next, we calculate the relative factor inequalities weight (RFIW) that measures the contribution of a factor in the total inequalities and is given by:

$$s_{kt}(\ln(Y_t)) = \frac{\hat{\beta}_{kt} \times SD(Z_{kt}) \times \text{corr}(Z_{kt}, \ln(Y_t))}{SD(\ln(Y_t))} \quad (7)$$

where $s_{kt}(\ln(Y_t))$ is RFIW of Z_{kt}^{th} factor in total inequalities of $\ln(Y_t)$, $\hat{\beta}_{kt}$ is estimated regression coefficient of Z_{kt}^{th} factor and other terms have their usual meaning. Next, we measure the contribution of Z_{kt}^{th} factor in the change in total inequalities between two periods, $t = 1, 2$. We use the Gini coefficient denoted by $Gini_t$ in this decomposition. The contribution of Z_{kt}^{th} factor in the change of total inequalities is given by:

$$\Pi_{kt}(I(\cdot)) \equiv \frac{[(s_{k,2} \times Gini_2) - (s_{k,1} \times Gini_1)]}{[Gini_2 - Gini_1]} \quad (8)$$

Furthermore, changes in the four components on RHS of equation (7) induce the change in a factor's (for example, education) contribution, and these changes can be measured as given in equation (9).

$$1 \approx \frac{\% \Delta(\hat{\beta}_{kt})}{\% \Delta(s_{kt}(\ln Y))} + \frac{\% \Delta[SD(Z_{kt})]}{\% \Delta(s_{kt}(\ln Y))} + \frac{\% \Delta[\text{corr}(Z_{kt}, \ln(Y_t))]}{\% \Delta(s_{kt}(\ln Y))} - \frac{\% \Delta[SD(\ln(Y_t))]}{\% \Delta(s_{kt}(\ln Y))} \quad (9)$$

4 Empirical Investigation and Results

From the descriptive statistics (Table 2) we observe that the households are prominently engaged in low skilled occupations and agricultural and allied activities; however, this prominence declines significantly over the years. Consequently, the proportion of households engaged in medium and high skills and non-manufacturing and service activities increases. Although a high percentage of the household heads are illiterate, it decreases from 48% in 1994 to 29% in 2012, and the proportion with middle, secondary, higher secondary and graduate and above education increases marginally. The percentage of the households either holding no land or marginal landholding of less than 0.4 hectares increases marginally in our sample period. Real average MPCE increases for all groups over 1994-2012, but notably higher during 2005-2012 (around 4% - 6%) than 1994-2005 (around 1% - 2%). However, food expenditure growth is stagnant⁶ during 1994-2005, but records a substantial increase during 2005-2012.

Dreze and Khera (2017) have noted that the disadvantaged groups, such as females and scheduled castes/tribes benefitted more from social programs, especially in terms of employment during 2005-2012. The MPCE seems to have followed this, since we find that during this period, the share of non-food (food) component increases (decreases) for the disadvantaged groups along with high growth of MPCE. Our observation that the disadvantaged groups benefitting more should lead to decrease in the MPCE gaps between socio-culturally formed groups. Similarly, increasing share of non-food component should, over time, contribute higher to inequalities levels and change, as it is generally more unequal than food expenditure. To examine both these propositions, we estimate the W-B type decomposition, source decomposition and RBD.

***Table 2 ***

4.1 Inequalities Between 1994 to 2005 and 2005 to 2012

We find that Theil's T, Gini and $GE(\theta = 2)$ (equation (1) & (2)) show a higher annual increase in inequalities during 2005-2012 than 1994-2005 (Table 3). This might arise due to changes in the levels of MPCE in different parts of the distribution across years. GICs in Figure 1 reveal that MPCE growth during 2005-2012 is much higher than 1994-2005 for all percentiles. The level of the GIC curve between the 30th-80th percentile for 2005-2012 is higher than the 80th-95th percentile. This implies that during 2005-2012, the growth of the MPCE is higher around the median class distribution, which constitutes a large part of the population. Furthermore, in both periods, the top percentile experiences much higher MPCE growth than the rest. This shows increased gaps in the MPCE during 2005-2012 vis-à-vis 1994-2005, resulting in higher inequalities levels during 2005-2012.

*****Figure 1 *****

*****Table 3 *****

4.2 Non-food Component and Within-group Component Increase Inequalities

The source decomposition as given in equations (3) and (4) unambiguously shows a higher (lower) contribution of the non-food (food) component in the total inequalities in all three years (Table 4). According to Gini (Theil's T) decomposition, non-food component's contribution to total inequalities increases over time. During 1994-2005, Gini of the non-food component decreases but the contribution of non-food component in the total Gini increases, precisely due to the increase in the weight: both the share of the non-food component and Gini correlation increase. On the other hand, during 2005-2012, the non-food component's increasing role is determined by the share and the Gini of the non-food component. These results align with our prediction regarding the non-food component from summary statistics. To shed more light on the increasing importance of the non-food component, we decompose the inequalities of non-food MPCE into its subcomponents (equation (4)). The subcomponents are - fuel and light, footwear and clothing, education, healthcare⁷ expenditure, durables and others. Untabulated results show an increasing influence of durables in explaining the level of non-food inequalities over time, contributing highest to the non-food inequalities during 2005-2012. The expenditure on education and healthcare increases over time, but it did not significantly explain the growing non-food inequalities.

*****Table 4 *****

The W-B type decomposition (equation (5)) shows that the W-term's contribution to total inequalities is higher vis-a-vis B-term for all the characteristics in all the years (Table 5). Furthermore, the W-term drives an increase in inequalities over time as the W-term increases and the B-term decreases, in all subgroups except the state, which is in line with our other prediction from summary statistics. Regarding our two important variables of interest, education and state, W-term increases substantially for the education-based subgroups during 2005-2012, which implies that differences in MPCE of households within the education-based subgroups increase faster relative to the differences in average MPCE across subgroups. On the other hand, for the state-based subgroups, B-term contributes most to the increase in inequalities, which means the differences in average MPCE of states increase faster, signifying increasing regional inequalities.

*****Table 5 *****

4.3 Causal Determinants of Inequalities

Following Cain et al (2010), we carry out the RBD using years of education and education categories in two separate specifications and find that for both specifications, the model explains around 29%, 33% and 32% of the variance of log of MPCE in 1994, 2005 and 2012, respectively (Table A1). All the variables are statistically significant at conventional levels in all three years except for industry categories⁸. Occupation, landholding, education and age influence the log MPCE positively. SC/ST and the gender category influence MPCE negatively⁹. These results are robust to the choice of education either as a continuous variable or as a categorical variable. The coefficient of education categories falls across years (except for graduate and above during 1994-2005) and more so during 2005-2012. Our results of RBD in terms of education and state (following equation (7)) for the period 1994-2005 are almost similar to Cain et al's results (Table 6). Like them, we find that education's contribution to the level of inequalities is highest in 1994 and is second highest in 2005. During 1994-2005 education contributes positively to the increase of inequalities. Even though the direction of education's contribution to the change in inequalities (following equation (8)) is the same as Cain et al's, we get a lower magnitude than theirs. The state's contribution to inequalities change during 1994-2005 is the highest vis-a-vis other variables. Compared to Cain et al, the direction of the state's contribution to inequalities change is the same but with a higher magnitude.

Examining the role of education becomes a particularly interesting enquiry given the policy shift after 2005 wherein inclusive growth was focused and social programs such as MGNREGA, targeted PDS, ICDS were implemented. This shift has implications for the role of factors explaining inequalities. We find that education's contribution to the level of inequalities falls during 2005-2012, resulting in its negative contribution to the inequalities increase (Table 6). This shows a complete reversal in education's role during 2005-2012: It becomes an equalising factor for inequalities during 2005-2012 as opposed to inequalities increasing factor during 1994-2005. Moving ahead, the variable state is an inequalities increasing factor and it explains most of the increase in inequalities during 2005-2012, which signifies the increasing influence of locational factors that generate massive inequalities. Interestingly, this role of state as the biggest inequalities increaser during 2005-2012 is determined mostly by just four states, viz., Bihar, Uttar Pradesh, West Bengal and Orissa, which account for 95% of the total positive contribution of all states (Figure 2). Eight out of fifteen states are inequalities equalisers since they contribute negatively to the increase in inequalities. Across two periods, the above four states become more inequality increasers;

however, states like Andhra Pradesh, Haryana, Maharashtra, Punjab and Tamil Nadu become more inequality equalisers.

*****Figure 2*****

Besides education and state, the next highest positive contribution to inequalities levels comes from the occupation in 1994 and 2012 and social group in 2005. However, their positive contribution to inequality levels declines over time, due to which they contribute negatively to the inequality increase. The contribution of the landholding declines during 1994-2012, which coexists with the falling differences in average MPCE across various landholding groups, as shown by W-B type decomposition. The decreasing role of landholding might arise due to the increasing prominence of the non-farm sector in income generation that weakens the dependence on landholding. Broadly, we see two distinct groups of factors influencing inequality increase in two opposite directions: During 1994-2005, state, education, and age are inequalities increasing factors, and occupation, social group, land, and gender are equalising factors. However, during 2005-2012, most of the variables are equalisers except state and gender.

*****Table 6 *****

4.4 Consumption Returns to Education and Role of Education

To understand the reasons behind the reversal of the role of education, we carry out decomposition of RFIW of education. Regarding the four terms in this decomposition (equation (9)), we find: (i) coefficient of education which represents the ‘consumption returns to education’ (CRE) is almost stagnant during 1994-2005 but fall drastically during 2005-2012 (Table 7). (ii) The standard deviation (SD) of the years of education increases during 1994-2012; however, the increase is much higher during 1994-2005 than 2005-2012. (iii) The correlation between MPCE and years of education decreases during 2005-2012, which signifies a weakening relationship. (iv) The SD of MPCE increases during 1994-2005 as well as 2005-2012 and the increase is higher during 2005-2012 than 1994-2005, similar to results of other inequality measures. The changes in these four components induce change in the contribution of education in total inequalities. We observe that among these components, SD of education emerges as the single most important component determining the contribution of education during 1994-2005 (Table 7). Similar to Pieters (2011), our result shows that the inequalities of years of education increases so much and has such a large effect vis-a-vis other three components that it makes education an inequalities increasing factor.

However, contrary to the earlier period, education’s contribution to the inequalities level declines during 2005-2012 that makes it an inequalities equaliser and it is induced chiefly by

CRE, whose contribution is highest among other components. The RFIW of education decreases, but the coefficient's contribution is positive, implying that the CRE has an equalising effect. The coefficient of education decreases, implying that the market return to an additional year of education is less in 2012 compared to 2005 and 1994. This means that the falling CRE makes education an equaliser of inequalities during 2005-2012. The second important factor determining education's contribution during this period is the weakening correlation between years of education and MPCE; however, the effect of falling CRE dominates over all the components and becomes the single most factor contributing to the fall in RFIW of education, resulting in the reversal of education's role. To sum up, during 2005-2012, the fall in RFIW of education is matched by a decline of CRE, making the latter a dominant factor determining the contribution of education in total inequalities.

*****Table 7 *****

Since the fall in CRE induces the reversal of education's role, we examine the characteristics of this fall by estimating the CRE for different population groups across occupations, industries, states and social groups by estimating a modified version¹⁰ of our model (equation (6)). In an untabulated result, we find that the marginal effect of education decreases for all industries and occupation categories during 2005-2012. Interestingly, the falling CRE coexist with a reasonably broad-based expansion in the average years of schooling (AYS). For example, for the population engaged in manufacturing activities, the AYS increase from 3.47 in 1994 to 4.24 in 2005 and 5.09 in 2012. AYS increase across all the industries and occupations during 2005-2012. In terms of CRE across states, we observe a clear division between the rich and poor states: The rich states have higher CRE than the poor states in 1994 and 2005. However, in 2012, the CRE fall drastically for the rich states like Tamil Nadu, Andhra Pradesh, Maharashtra and Karnataka, while increase for some poor states such as Bihar, Assam and Rajasthan. CRE for all the social groups and regular salary earning group fall during 2005-2012. Furthermore, the differences in CRE across states and social groups reduce.

5 Robustness Checks

We have already shown that our results about RBD are robust to the definition of education. To capture the influence of changes in the production sector and the labour market on inequalities during 2005-2012, we include industry and occupation variables in our RBD model. Such changes might also be induced by the implementation of the social programs during 2005-2012, along with the changing structure of the economy. Unfortunately, we do not have much information regarding these programs in the dataset we are using. However,

utilising the information available, we find that PDS is a statistically significant determinant of MPCE in 2005 but not in 2012 (Table A2). Regular salary earning is statistically significant in both years; however, its contribution to the level of inequality and change in inequality is marginal. With these changes, the magnitude of the contribution of the coefficient in RFIW of education decreases; however, the direction of the results does not change. To sum up, our results pertaining to the role of state and education are robust to the above changes.

In another check, we redo all the three decomposition exercises using CPI-AL of total consumption expenditure instead of CPI-AL of different consumption components. We find that our results are robust to this change in deflating factors, albeit marginal changes in the magnitudes. We also redo source decomposition of non-food inequalities using a 365-days reference period instead of 30-days, recognising that the expenditure on education, clothing and footwear, healthcare, durables is erratic and might be sensitive to the reference period and find that our non-food inequalities decomposition results are robust to this change in the reference period, again, albeit marginal changes in the magnitudes.

6 Discussion

The CRE possibly fell due to the changes in the two distinct segments of the rural labour market: a market for high educated (secondary or higher education) labour and a market for low educated (lower than secondary education) labour¹¹. For high educated, there was low employment generation, the quality of new jobs created was low, and new industry relied more on capital than labour during 2005-2012 (Chand et al 2017; Dev 2017), which substantiates the lack of demand for high educated. On the other hand, the supply of relatively high educated increased faster (Jacoby and Dasgupta 2018), which is also pronounced by increasing average years of schooling in our study. Lack of availability of jobs for the high educated and high demand for them manifested in jobless growth (Kannan & Raveendran 2019). In the situation of increased supply and lacking demand, the real average wages should go down. The real average wages for high skilled self-employed workers decreased during 2000-2009 (ILO 2018). However, at the aggregate level, the average wages for all the high educated did not fall, maybe due to the stickiness of wages, especially for those employed in public administration, finance and communication - the activities that experienced growth in employment during 2005-2012 (Himanshu & Kundu 2016). In the case of the second segment, i.e. the labour market for low educated, the demand for relatively low educated labour increased due to increased agricultural productivity, the implementation of the MGNREGA and construction sector boom (Dutta et al 2012; Jacoby & Dasgupta 2018) resulting in higher wages for low

educated (Imbert & Papp 2015; Himanshu & Kundu 2016). To sum up, the labour market situation allowed the high growth of wages of the low educated (Dev 2017), and MPCE seems to have followed the changes in wages. The attainment of higher levels of education did not translate in the increase of MPCE during 2005-2012 as much as it did during 1994-2005, resulting in lower CRE in 2012. Furthermore, because of this failure of education in enhancing MPCE of high educated, there was a higher fall in the CRE for high educated than low educated (Table A1). This also explains why the correlation between education and MPCE fell (Table 7).

Our result showing increase in the regional inequalities over time is in line with the findings of the earlier studies, that discuss various causes of it, such as differences in growth rates of states, infrastructure availability, geography and policy (Cherodian & Thirlwall 2015; Das et al 2015). In this study, we find Tamil Nadu, Himachal Pradesh, Karnataka, Kerala, and Andhra Pradesh to be the top-performing states in terms of MPCE growth during 2005-2012. The same states performed better in terms of the PDS (Dreze & Khera, 2013). Also, there are striking differences in the effectiveness of programmes and the degree of targeting implicit in them across the Indian states (Kjelsrud & Somanathan, 2017). Our untabulated results show that MPCE gaps between PDS purchasing and non-purchasing population within states declined during 2005-2012, and this decline was different for different states. In our regression model, the PDS variable is statistically insignificant in 2012; however, its interaction with the state is statistically significant, which shows that the differences in the MPCE across states are conditional on PDS. Our result about the state's increasing role over time and particularly, the result that only 4 states determining this increasing role during 2005-2012 requires detailed examination and should be taken up as a future research.

This study has the following limitations: It is based on consumption expenditure and lacks the complementary analysis of income and wealth inequalities. The period of analysis ends in 2012 due to the unavailability of consistent data for recent years. We have relied on consumption returns to education, while it is imperative to examine the returns to education based on wages, salary and income. Lastly, we do not study the causal factors behind the increasing role of state. Future research can be directed towards addressing these limitations.

7 Summary and Concluding Remarks

We have shown, in the context of changed policy environment, how various components of consumption expenditure and characteristics of the population contribute to the level of

inequalities in a particular year and change in inequalities over time. We have used *a priori* and regression-based decomposition techniques in the enquiry. The answer to our first research question is that over time, the non-food component contributes increasingly to the increase in inequalities via its increasing share in total expenditure. Durables mainly drive this increasing contribution of non-food. Within-group component contributes most to the level of inequalities as well as change in inequalities. This shows that although the horizontal inequalities are high, they show a marginal decline over time. The answer to our second question is that there has been a reversal of the role of education in explaining the change in inequalities - it becomes inequalities equaliser during 2005-2012 compared to its inequalities increasing role during 1994-2005. This reversal of role is induced by falling consumption returns to education across various population groups. The consumption returns to education seem to have fallen due to the labour market conditions wherein high educated could not find good quality jobs. Also, the benefits of various social programs implemented during 2005-2012, which enhanced the consumption expenditure, were unconditional of educational attainment, which might have contributed to the weakening of correlation between education and consumption expenditure. The role of locational factors has increased in explaining the increase in inequalities over time, which shows horizontal inequalities in the form of regional inequalities leading to an increase in overall inequalities.

Notes:

¹As pointed out by (Cain et al 2010), there are errors probably due to data entry, particularly severe in the year 1993–94. The observations recorded in the high skills occupations have consumption expenditure levels and characteristics matching with those engaged in agriculture. As done by (Cain et al 2010), we also proceed by dropping such observations.

² We have also used 365-days recall period for robustness check.

³ The different components of total consumption expenditure, such as, for food, clothes and footwear, education and others.

⁴ Our results do not change with different normalization.

⁵These are as follows: Himachal Pradesh, Punjab, Uttar Pradesh, Haryana, Rajasthan, Bihar, Assam, West Bengal, Orissa, Madhya Pradesh, Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Kerala and Tamil Nadu. We have used backward compatibility by adding the newly created states to their earlier state boundaries, as is a common practice. Following newly formed states are considered belonging to their former states – Uttarakhand in Uttar Pradesh, Jharkhand in Bihar and Chhatisgarh in Madhya Pradesh.

⁶ This finding is similar to Basole and Basu 2015.

⁷ Healthcare expenditure includes institutional and non-institutional medical expenditure only.

⁸ There exist many decomposition exercises with some variables being statistically insignificant (for example Gunatilaka and Chotikapanich 2009).

⁹ The finding that female-headed households have higher levels of MPCE in rural India is discussed in literature. See for example (Cain et. al, 2010)

¹⁰ We interact years of education with the other variables and estimate the model.

¹¹ We treat unskilled labor synonymous to low educated and skilled labor synonymous to high educated.

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