

Inequality of Opportunity: Application to India

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Abstract: What part of the economic inequality observed in India is due to unequal circumstances, rather than due to differences in individual efforts or luck? Drawing on the distinction between ‘circumstance’ and ‘effort’ variables in Roemer’s (1998, 2006) work on equality of opportunity, we associate inequality of opportunities with outcome differences that can be accounted to morally irrelevant pre-determined circumstances which lie beyond the control of an individual, such as parental education, parental occupation, caste, religion, place of birth etc. This paper estimates the opportunity share of inequality in wage earnings as well as per capita household earnings for urban India and opportunity share of inequality in per capita household earnings as well as per capita household consumption expenditure for Rural India, for different age based cohorts for the year 2004-05. The estimates obtained are the lowest bound estimates and suggest that government’s redistributive policies should aim at reducing inequality of opportunity rather than aiming at reducing income inequality itself because inequality of opportunity is the cause which leads to income inequality which is an outcome.

Keywords: Inequality of opportunity, earnings inequality, India

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1. Introduction

Indian society is characterized by its diversity be it in terms of religion, caste, region or language. This kind of diversity gives rise to people with very different kind of family backgrounds and demographic characteristics. Though diversity in any state is considered a healthy phenomenon but only when people of different caste, religion or region are provided with same kind of opportunities and growth prospects in terms of access to education, employment and other fundamental services. There should not be any kind of discrimination between individuals based on their caste, religion, region or sex. In this light, if we observe Indian society we find that, based on caste and ethnicity, it suffers from substantial inequalities in education, employment and income (Desai & Kulkarni, 2008). If the inequalities are arising due to differences in level of efforts made by individuals of different backgrounds then it is morally acceptable but if inequalities are due to circumstances beyond the control of an individual such as caste, religion, region of birth, sex, ethnicity and so on, then it is deemed unethical and unacceptable and also calls for compensation in some form or other, from the society, to those who have suffered due to inferior circumstances.

In the case of India this problem becomes much more relevant since historically the Indian society is severely divided into different caste (or religion and other social group) structures with several groups enjoying privileges more than other groups just because of their superior social status (Dreze and Sen 1995, Sharma 1999, Dubey et al. 2006, Government of India 2006, Shah et al. 2006). So, as far as India is concerned, it is very important from the point of view of both academic interest as well as policy implication, to estimate the extent of inequality due to different circumstances of people as it will help in going to the root cause of prevailing income or wealth inequality, evaluating the age old government programs aimed at bringing equality in society, developing policies for bridging gaps between different sections of society and thus leading towards a state which is more just and equal.

However, there are three basic challenges, first, how do we differentiate between inequalities due to effort from inequalities due to circumstances, second, development of a sound methodology to estimate the extent of inequality due to circumstances (henceforth

referred as inequality of opportunity following the standard literature) in a society and third, application of this methodology to an appropriate dataset for India and obtain estimates which are consistent and robust.

The answer to first two challenges comes from the existing literature where the ideas of inequality due to efforts and inequality due to circumstances (inequality of opportunity) have been developed fairly by a number of scholars, in the area of political philosophy, normative economics and empirical applications². It is important to mention about Roemer (1998, 2006) here because the formalization of the concept of unequal opportunities suggesting that one should separate the determinants of a person's advantage (i.e., desirable outcomes, such as income or cognitive ability) into circumstances and efforts and on which the empirical applications are based was offered by him. The concept is motivated by two principles: the first one, also known as the principle of compensation, states that differences in individual achievements which can be unambiguously attributed to differences in factors beyond the individual responsibility (also referred as inequality of opportunity), are inequitable and have to be compensated by society. If India is considered, an individual's circumstances such as religious background, parental education, geographical location, and caste are exogenous to and outside the control of the individual, for which he or she should not be held responsible. Inequalities due to differences in circumstances often reflect social exclusion arising from weaknesses of the existing systems of property and civil rights, and thus should be addressed through public policy interventions. On the other hand, the second principle commonly known as the principle of responsibility advocates that differences in achievements which can be attributed to factors within the personal responsibility (inequalities due to individual efforts) are equitable and need not be compensated.

² See Rawls (1971), Dworkin (1981), Arneson (1989), Cohen (1989), Roemer (1998) for theoretical background and Checchi and Peragine (2005), Lefranc et al. (2006), Bourguignon et al. (2007), Ferreira and Gignoux (2008), Barros et al. (2009) for empirical application.

Though there have been some studies which have estimated inequality of opportunity for different countries³, we have not come across any study which does it for India. Given this context, the present study addresses the third challenge, that is, estimation of the opportunity share of total economic inequality for India using three indicators of economic welfare which are wage earnings, per capita household earnings and per capita household consumption expenditure. The study helps us not only to understand the genesis of income inequalities and the status of prevailing social condition in the country as far as equality is concerned, but also, gives a clearer information on the priorities of a redistributive policy by taking into account the differential intensity of opportunity share of overall economic inequality across various regions, or even income classes.

Following an approach similar to Checchi and Peragine (2005) and Ferreira and Gignoux (2008), we have found that father's education is a very important exogenous circumstance variable which affects desirable outcomes like earnings of an individual. Also, opportunity share forms a significant part of the total income or consumption expenditure inequality in both the urban as well as rural parts of India. More over it is significantly higher in urban areas compared to the rural areas of India. The results are robust in nature and very much in line with the recent findings for other developing countries.

In light of the above discussion, the paper is organized as follows. The next section briefly describes the dataset and the methodology. Section 3 explains the non-parametric approach which has been used in this paper, Section 4 deals with analysis and results and finally Section 5 involves further discussion and concludes.

³ Checchi and Peragine (2005), Lefranc et al. (2006), Bourguignon et al. (2007), Ferreira and Gignoux (2008), Barros et al. (2009). There are a couple of papers which sought to quantify the costs and effects of implementing Roemer's "equal opportunity policy" in different contexts. Taking race and parental education as determinants of opportunities in the United States, Betts and Roemer (1999) asked what reallocation of educational expenditures would equalize opportunities across individuals in the US. In a related study, Page and Roemer (2001) investigated the extent to which the fiscal system could be seen as an "opportunity equalizing device" in the United States. These studies differ from ours in the sense that they seek to assess specific policies with respect to their opportunity-equalizing impact, whereas we seek to measure inequality of opportunity itself.

2. Data and Methodology

The data for the present study has been taken from India Human Development Survey (IHDS), 2004-05, conducted by National Council of Applied Economic Research (NCAER), New Delhi, India, in collaboration with some other organizations. This survey is a micro unit recorded, nationally representative survey based on a stratified, multistage sampling procedure. The survey is spread over all the states and union territories of India except Andaman & Nicobar Islands and covers 26,734 households (143,374 individuals) and 14,820 households (72,380 individuals) in rural and urban areas respectively. The survey contains substantial information on a person's family background and other demographic details like sex, religion, place of birth, parental education and parental occupation etc.. Besides, the survey also reports the actual earnings from different sources for the households as well as the individuals, which is very important for analysis as it removes the sole dependency on consumption expenditure as an indicator of income.

As the basic approach is to partition people into homogenous groups, with each group (henceforth referred to as "*type*") having the same set of circumstances, and then decomposing the total earnings inequality into between-group and within group components using an appropriate inequality measure (the details have been provided in section 3: The Non-Parametric Approach), the choice of circumstance variables becomes very important. The set of circumstances which we are concerned with, is represented by family background which is in turn measured by the level of father's education.⁴ Following Checci and Peragine (2005), Bowles (1972) and Behrman and Taubman (1976) we could identify the following channels through which parents affect the income earning capacity of their children:

⁴ As the previous studies on the subject suggest, It will be more desirable to consider the education of both the parents but the lack of information on mother's education in our data set leaves us with no choice but to use father's education as the only instrument to capture parental education.

Though, it is advisable to consider father's occupation in addition to parental education as a measure of family background and our data set has the information but as we increase the number of circumstance variables, the number of partitioned cells (whose details are provided in section3) increase enormously and we enter the problem of data insufficiency because the no. of observations in each cell will decrease significantly. Also, in India the father's occupation is believed to be very strongly correlated with father's education

- (i) formation of beliefs and skills in children, through family culture and investment;
- (ii) provision of social connections which are relevant in the labour market;
- (iii) genetic transmission of native ability; and
- (iv) instillation of preferences and aspirations.

On the basis of available data, we consider only factors (i) and (ii) as circumstances, which are captured in our analysis, by the level of father's education. This amounts to say with effect that any other factors, such as native ability, luck, and so on, are implicitly classified as within the sphere of individual responsibility. Given this extreme conservative view of what constitutes responsibility, our analysis is able to identify the lower bound of opportunity inequality.

In India, caste and religion play very important role in explaining the background of an individual and a combination of them is required for analyzing their impact in a study like ours. To analyze such a complex combination of caste and religion along with parental education as circumstance variables we require a sample size large enough⁵ to analyze their impact. Unfortunately the dataset after the required treatments is not large enough for such an analysis. But even then, this study is very significant because of the reasons explained below: first, previous studies (Checchi and Peragine (2005), Bourguignon et al (2007), Ferreira and Gignoux (2008) and larger literature on intergenerational mobility) clearly single out parental education as the single most influential circumstance variable as far as inequality of opportunity is concerned. Second, there is a consensus among the demographers about the use of parental education as an appropriate variable for capturing family background as far as impact of family circumstances on an individual is concerned. Finally, individuals included in our sample are born before 1984 and their fathers would have been born before end of 1960's, it is established fact that at that time literacy rates in India were very low and most of the educated people belonged to higher caste categories. Literacy rates were poorest for Scheduled castes and Scheduled Tribes, followed by Other Backward Classes and highest for Others (Brahmins, Kshatriyas etc.). Therefore, our choice of using father's education for capturing family

⁵ Refer section 3: The non-parametric approach for details.

background for the present study is very much appropriate.⁶ It would have been desirable to include females in the sample and capture the impact of gender but given their very low number in the sample and parental education not available for most of them, it became impossible to include them.

The study has been done after dividing the samples into four age based cohorts that is , individuals with age 21yrs to 30yrs, 31yrs to 40yrs, 41yrs to 50yrs and 51yrs to 65yrs respectively. This allows us, not only to measure the role of inequality of opportunities in shaping the inequality of outcomes (earnings or consumption) at a point in time, but also to study how this role may vary across cohorts. Further, the analysis is also restricted to male individuals who are either household heads or sons or brothers of household heads. This was done because parental education in the dataset was available only for this set of people.

Given the nature of this research, the analysis has been done separately for urban areas and rural areas because of multiple reasons such as: in urban areas the sample of individuals on regular wages and salaries is large enough to use them for estimating the opportunity share of total wage inequality but the same is not true for rural areas; also for urban areas two sets of estimations have been done, one based on the sample of wage and salary earners (with positive earnings)⁷ and another based on per capita household income (with positive earnings). These two estimations were done to avoid underreporting and check for possible biases in the

⁶ Given the importance of family background (parental education) as a key circumstance variable, our paper is also related to the larger empirical literature on intergenerational mobility, which dates back at least to Bowles (1972). Much of it focuses on the intergenerational elasticity of some measure of economic status, estimated as the coefficient β in the Galtonian regression: $\ln y = \alpha + \beta \ln y_{-1} + \epsilon$, where y denotes the measure of economic status of interest, and y_{-1} denotes the same variable for a person's parent(s). This elasticity measures the degree of transmission of economic status across generations, and is thus interpreted as a measure of persistence of inequality. An excellent survey of this literature exists in Solon (1999). Although it is possible to view the coefficient β as an indicator of inequality of opportunity but as explained earlier we want to keep the study as general as possible so we have used the nonparametric approach which doesn't rely on any functional form.

⁷ Out of the total sample of wage and salary earners, further restrictions were provided to include only those individuals who were not involved in any other business or farm activities along with their regular jobs. Finally, individuals living in households receiving income from farm were also excluded from the sample. This was done to minimize the error in taking into account the actual earnings of the individuals (for the individuals in the final sample, only the actual total earning (annual) from wages or salaries was taken for analysis).

As per the literature on determinants of earnings (reviewed in Card 1999), individual earnings varies according to many other observable characteristics such as age or gender, though we have not put any direct control for age but we have carried out the analysis based on age cohorts which gives us some control for age. Also, since the study only includes males, the problem of gender is automatically taken care of.

estimation of the opportunity share of total inequality. The underreporting in the first estimation (based on actual wage earnings) can be due to exclusion of individuals who have inherited handsome businesses from their parents and whose earnings (from ownership of the business) are very high, from the sample of actual wage earners, but since all such individuals are included in the second estimation (based on per capita earnings) their effect on the opportunity share of earnings inequality will be taken care of in the second estimation. The same is true for another set of people who are born in poor, low caste uneducated families and are poor vendors or so by occupation and which are not included in the first estimation, but get included in the second one. On the other hand the first estimation will be better in terms of reporting of income because it only includes individuals with wages and salaries whereas the second estimation includes income for the household from different sources where error can creep in recalling income from different sources thus resulting in biased estimates. Moreover, the second estimation may get affected by household size because a household with good circumstances (and high overall household earnings) but a large no. of household members (thus low per capita earnings) will go down in comparison to another household which is characterized by inferior circumstances and therefore has lower overall household earning but because of small household size, whose per capita earnings is high. In this case the inequality of opportunity will again be underreported but this problem will not arise in first estimation which is based on actual wage or salary earnings of the individuals. However, we have put control for the household size in second estimation by including individuals of only those households whose household size falls within a span of two standard deviations from either side of the mean household size. The two alternative estimations (based on actual individual wage earnings and based on per capita earnings of the household) are therefore complementary in nature and results can be compared for robustness checks. The same could not be done for rural areas because as mentioned earlier the sample of wage earners is not sufficiently large to permit the study. There is another problem of general imprecision of earnings and income measurement in rural areas. Therefore, for rural areas again there are two sets of estimation, one uses per capita household income (positive income) and the other deals with per capita

household consumption expenditure. This adds a robustness check on our results for rural areas.

Thus, this study reports the result of decomposition of unequal outcomes (into unequal outcomes resulting from circumstances which are socially unacceptable and a second part resulting from unequal individual effort or luck) for three different indicators of economic welfare: wage earnings, household income per capita, and household consumption expenditure per capita. The rationale, in addition to those explained above, for using the three indicators is to capture the differential impacts they may have on household welfare and, thereby, gain a more complete understanding of inequality of opportunity.

3. The Non-Parametric Approach⁸

The approach is conceptually simple and comes from Checchi and Peragine (2005) who themselves have followed the basic framework of Roemer (Roemer 1998, 2006). First, a suitable variable (father's education) related to circumstances exogenous to the individual was identified. This has already been described in detail in previous section. Then the sample was partitioned (in each age cohort) into groups or "cells," such that all individuals in any given cell have exactly the same combination of circumstances. The resulting subgroups are known in the literature as "*types*." These cells are then compared with one another. The difference in outcomes between cells can be attributed to inequality of opportunity, while the differences within cells can be considered as the result of effort or luck. For example, in this study, for each cohort the sample is partitioned into four groups or cells based on father's education, that is, individuals whose fathers are uneducated (*type 1*), educated but up to primary school (*type 2*), educated more than primary but up to secondary school (*type 3*) and educated more than secondary school (*type 4*), respectively. Next, an inequality measure was chosen that satisfied the following two properties in addition to the properties of anonymity, mean independence, population replication and Pigou-Dalton transfer axiom:

⁸ The analytical approach here follows Checchi and Peragine (2005) and Ferreira and Gignoux (2008).

- It had to be *decomposable*, in the sense that the value of the index for some population is exactly equal to the sum of the value of the index across types (that is, computed over group means) and the (appropriately aggregated) value of the index within all types.
- It had to be *path independent*, in the sense that the decomposition must yield the same result whether the direct or the residual approaches were used. In other words, the decomposition is invariant on whether within-group inequality is eliminated first and the between-group component computed second (using process of smoothing), or the reverse (using process of standardization).⁹

There is a single index¹⁰ that satisfies all of the above requirements: the mean log deviation, or GE(0), or Theil-L index. The decomposition can change for other generalized entropy inequality measures that are path-dependent, therefore this paper uses mean-log deviation, GE(0), for inequality decomposition and attributes the difference in outcomes (wage earnings, per capita household earnings or per capita household consumption expenditure) between the above four “types” to inequality of opportunity. It will be worthwhile to mention that our samples satisfy the other desirable assumptions whose details are mentioned in the footnote.¹¹

⁹ Refer Ferreira and Gignoux (2008) for smoothing and standardization processes.

¹⁰ The literature on inequality measurement (e.g. Bourguignon (1979), Shorrocks (1980) and Ferreira and Gignoux (2008)) has established that total inequality is only additively decomposable into a between-group component and a within-group component for some indices. The best-known family of additively decomposable measures is the Generalized Entropy class, which includes the mean log deviation (GE(0) and the Theil entropy index (GE(1)) but out of these only GE(0) is path independent. The Gini coefficient is neither additively decomposable in the same way nor path independent.

¹¹ Let the society be of N individuals. Let the set of circumstances be C , belonging to a finite set $\tilde{C} = \{C^1, \dots, C^i, \dots, C^K\}$; effort for short, represented by a scalar variable $e \in E \subseteq R_+$. Now a primitive ordering “ $>$ ” over \tilde{C} is considered, assumed to be antisymmetric, so that, in general, $C^{i+1} > C^i$ for $i \in \{1, \dots, K-1\}$ where $K \leq N$. Hence we are able to rank individuals according to their circumstances. All individuals are assumed to have the same degree of access to the set E of possible values of effort; however, the value actually chosen by each individual is unobservable. Income is generated by a function $f : \tilde{C} \times E \rightarrow R_+$, that assigns individual incomes to combinations of effort and circumstances: $y = f(C, e)$. The form of the function f is not specified in order to keep the approach as general as possible. The function f is assumed to be fixed and it is the same for all individuals. It is also assumed to be increasing in both circumstances and efforts. A societal income distribution can be represented by a vector Y such that $Y = \{y_1, \dots, y_N\} \in R_+^N$, where $R_+^N = \{Y \in R^N : Y > 0\}$

Assumption 1 : For any $e \in E$, $f(C^{i+1}, e) > f(C^i, e) \forall i \in \{1, \dots, K-1\}$.

Assumption 2 : f is monotonically increasing in e .

As we are considering the case of non-observability of the responsibility variable, we need to deduce the degree of responsibility exercised from some observable behavior. More precisely, we need a proxy in order to

As, for each cohort, we have divided the sample into four groups based on father's education, the number of observations in each cell is sufficiently large for conducting a robust study (refer table 1 and table 2). If the number of cohorts or the number of types for each cohort is increased, this leads to a nontrivial number of cells with a small number of observations, leading to large sampling variances in mean estimation. This can create an upward bias in the estimate of between-group inequality and decreases the precision.

Although a true measure of inequality of opportunity would require using all relevant circumstance variables to partition the population into types. But this is, of course, extremely unlikely to be feasible in practice for any conceivable dataset. Therefore, the empirical estimates defined in this paper should be interpreted as the lower-bound estimates of inequality of opportunity; including any additional circumstances would cause each cell to be further subdivided. This cannot lower the between-group inequality share and, unless the additional element is orthogonal to the measure of advantage, will raise it.

4. Analysis and Results

4.1 Urban India

Using the Indian Human Development Survey, and applying the previously described inequality decomposition, we have estimated the opportunity share of both, the overall wage inequality as well as per capita household earnings inequality for urban India. Totally there are 9219 observations in the sample of wage earners and 16876 observations in the sample of per capita household earnings. Referring to the descriptive statistics as reported in table 1, it is easy to

measure in an ordinal sense and to compare the effort of different individuals. The idea again comes from Roemer (2006). In each type k there will be a distribution of effort; given the circumstances, which are common for all the individuals in the same type, and the function f , there will ensue a distribution of income. These distributions will differ across types; note however that the distribution function is a characteristic of the type, not of any individual. Equality of opportunity holds that individuals should not be held responsible for their circumstances, that is, for their type. In constructing an inter-type-comparable measure of effort, we must therefore take account of the fact that some individuals come from types with "good" distributions of effort, and some from types with "poor" distributions. Roemer therefore suggests to take the inter-type comparable measure of effort to be the quantile of the effort distribution in his type at which an individual sits; this, given the monotonicity of the income function, will correspond to the quantile in the income distribution of the type. We say that all individuals at the p th quantile of their income distributions, across types, have tried equally hard. Using the quantile measure of effort sterilizes out the "good" or "bad" nature of the distribution of effort in the type. **Our data satisfies the above assumptions, refer fig. 3 and 4.**

note that individual earnings are increasing in the level of parental education for all the age cohorts in both the samples. The data also satisfies our initial assumptions: the income function is strictly increasing in opportunity for all the four cohorts (see fig. 3, which uses the log of actual wage earnings of the individuals) in both samples. This reinforces the fact that parental education has a high impact on attained outcome (earnings).

The main results are summarized in table 4. The inequality of opportunity, as a percentage of total observed earnings (wage) inequality, ranges from 11% to 17% across the age cohorts (the simple average across cohorts being 14.7%) and the same varies from 11% to 15% across the age cohorts (the simple average across cohorts being 13.3%) when per capita household earnings are used. Both the results are quite significant, more so if we consider the fact that they are the lower bound estimates of opportunity inequality. For both the samples, the opportunity share is low for the youngest cohort, increases for the middle cohorts and is lowest for eldest cohort. It being lowest for the oldest cohort, that is, the individuals born between 1939 and 1953 is rather surprising. One possible reason may be the non existence of proper labor market (and individuals used to pursue their traditional methods of earning) so that parental education was not transforming significantly into earnings through jobs. This is again a reason why we have significantly lower number of observations for the oldest cohort compared to the other cohorts (for the oldest cohort the number of observations was 1333 compared to an average of 2629 observations for other cohorts) in the sample of wage earners. Another interesting observation is regarding the variation of inequality of opportunity across income quantiles. In both the analyses, for all the cohorts except the youngest one, inequality of opportunity increases sharply in the initial quantiles, attains maximum in the middle ones and subsequently declines, where as for the youngest cohort it keeps on increasing, peaks near the end and then declines (see fig.1). Further discussion on these results has been carried out in the “Discussion and Conclusion” section.

4.2 Rural India

Using the same survey we have carried out estimation of inequality of opportunity for rural India separately for reasons already discussed in second section. Since there is a problem of

general imprecision of earnings and income measurement in rural areas, two approaches have been used, one based on per capita household earnings and another based on per capita household consumption expenditure to check for the consistency of results. The total sample sizes for the analysis based on per capita household income and per capita household consumption expenditure are 30913 and 30893 respectively. We have treated data for outliers (based on household size) and included individuals of only those households whose household size falls within a span of two standard deviations from either side of the mean household size.

As in case of urban India, the earnings (and consumption expenditure) are increasing in the level of parental education in all the age cohorts (refer table 2) and the data satisfies initial assumptions: the income function is strictly increasing in efforts and opportunity for all the four cohorts (see fig. 4). Once again, parental education comes out to have a high impact on observed outcome.

Table 5 gives the summary of the main results for this section. The inequality of opportunity as a percentage of total observed earnings inequality when per capita household earnings is considered, ranges from 5% to 6% across the age cohorts (the simple average across cohorts being 5.6%). The same figures vary from 4 % to 7 % with the simple average of 5.2% when the unit of analysis is per capita household consumption expenditure. The estimates as described in previous section are once again very significant and the closeness in the estimates is validation of the consistency of results. The estimates of inequality in consumption expenditure are lower than the estimates based on household income for all age cohorts except for the oldest (people born before 1954). The analysis based on per capita household income shows a trend (low for youngest cohort, increases in the middle and then decrease) similar to that of urban India. The same is not true for per capita consumption expenditure. In a manner analogous to the analysis for urban India, for all the age cohorts, inequality of opportunity in per capita household income across income quantiles, increases sharply in the initial quantiles, attains maximum in the middle ones and subsequently declines, (fig. 2(a)). But the same is not observed for consumption expenditure (fig. 2(b)). Further research needs to be

done to find out why inequality of opportunity in consumption expenditure does not follow a trend similar to that of income.

One important point to notice here is that the estimates for rural India are significantly lower than that of urban India (almost half of urban India), which is not surprising, partially because a look at table 2 clearly shows that the number of individuals with very low parental education is much larger than the individuals with high parental education (in fact the number of individuals with high parental education is very small). In the sample of per capita household income, the average number of observations, across cohorts, of individuals with uneducated parents is 4684 compared to 251 observations for individuals whose parents have education more than secondary school. The same figures are 4679 observations and 251 observations when sample of household consumption expenditure is considered. Another possible reason for low estimates for rural areas is the absence of high paying jobs in rural areas, because of which the individuals pursue either their traditional occupation or low paying jobs, therefore the disparity in income and consumption is low compared to urban areas.

5. Discussion and Conclusion

If our results of urban areas are compared with the results of previous studies for other developing nations (of Latin America), we find that our results are comparable to them. In the study of Bourguignon et al (2007)¹² which is limited to urban Brazil, the overall inequality of opportunity as a share of total earnings (wages) inequality varies from 13% to 34% (mean estimates), however, if inequality of opportunity due to parental education alone as a circumstance variable is taken into account, then as a fraction of total observed earnings inequality, it varies from 13% to 24% following the same trend as ours, that is, low for the youngest cohort increasing in the middle and decreasing thereafter. Some other studies which are not limited to urban areas alone but represent countries as a whole are Ferreira and Gignoux (2008) and Barros et al. (2009). Ferreira and Gignoux (2008) have measured inequality of opportunity for Colombia, Peru, Panama, Ecuador, Guatemala and Brazil and their non-

¹² The study uses parametric approach and has a richer set of circumstance variables including parental education, father's occupation, race and region of birth.

parametric estimate of opportunity inequality share of total earnings (wages) inequality ranges from 20% for Colombia to 35% for Brazil but again if we consider only mother's education as the circumstance variable then the estimates vary from 9% for Guatemala to 12% for Brazil and if father's education is considered as the only circumstance variable then the estimates vary from 7% to 11% across the countries. If per capita household earnings are considered then the figures for overall inequality of opportunity vary from 25% for Columbia to 33% for Brazil, but if father's education is considered alone, then the corresponding estimates vary from 10% for Panama to 15% for Columbia. Similarly, Barros et al. (2009) have also measured inequality of opportunity for various Latin American countries and their overall estimates are very similar to Ferreira and Gignoux (2008) and also to ours.

Since there is no previous study analyzing the inequality of opportunity separately for rural areas, it is difficult to compare the results for rural areas with any of them. However, a couple of studies for Latin American countries have measured opportunity share of inequality in consumption expenditure which this study has also estimated for rural areas (opportunity share of income inequality has already been discussed above). It varies from about 8 % for Mexico to about 20 % for Guatemala if father's education is considered as the circumstance variable (Barros et al., 2009). As per Ferreira and Gignoux (2008), the same ranges from about 11 % for Panama to about 20% for Guatemala. Our estimates are lower than the estimates for these countries but an important point to note here is that our estimates are only for rural areas compared to theirs' which are combined estimates for rural as well as urban areas.

Though the coherence in results (this study's estimates using different indicators of economic welfare for both urban and rural areas and estimates of previous studies) is a modest proof of the robustness of the estimation, but a note of caution here will be to not to consider the variation in the shares across cohorts (for both estimations for urban as well as rural) as evidence of changes over time, since they are measured at the same point in time, and it is impossible to disentangle period, age and cohort effects. Nonetheless the results are important because they give a clear picture about the extent to which family background affects the earning ability of an individual.

The main suggestion of an equal opportunity philosophy is that social and economic inequalities due to factors beyond the individual responsibility are inequitable and to be compensated by society; whereas inequalities due to personal responsibility are equitable and not to be compensated. Therefore, according to the opportunity egalitarian conception, to judge a country's status as an egalitarian society, one has to distinguish, in a given distribution of outcomes, the inequalities due to personal responsibility as opposed to the inequalities due to non responsible factors or opportunities. In this paper, we have tried to estimate the inequality of opportunity for India which is a diversion from the conventional way where the authors try to estimate the earnings inequality for different sections and regions of the country. Though their results are useful, by using them we cannot actually go to the root cause of the earnings inequality. By trying to understand the causes and the components of the earnings inequality, we will be in a better position to suggest focused policies in terms of type and extent of redistribution and welfare measures required to reduce (and how much to reduce) the disparities in the society.

Moreover, we have compared different age cohorts and focused on individual wage earnings, per capita earnings, as well as per capita consumption expenditure. We have studied how individual achievements (earnings) vary according to the family background, as measured by the level of parent's education. We find that for all cohorts, the earnings increase with the increase in parental education. Also, given the difficulties inherent in estimating the share of earnings variation associated with the observed variable when other, unobserved, determinants are known to be correlated with them, the interval of estimates, for the share of inequality accounted for by unequal opportunities is not too wide. Further, considering that a large share of this interval is due to the natural inter-cohort variation, the results are even more significant.

If our results are any indication and economic inequality has to be reduced then one of the main objectives of the policy makers should be to attract children of uneducated parents to attend schools which are at par with the best schools in the country and to ensure that they complete their schooling. Though the government is spending large amount of money on

education but it needs to be more focused in terms of where and on whom to spend because of the limitation of the resources. One of the possible policies may be to focus on minimum education for all rather than very high education for few which is costlier.

Last but not the least; the results are a lower bound on the true estimate of the inequality of opportunity because we have considered parental education as the sole measure of circumstance. If other factors like caste, religion, gender, region of birth and so on are also included, then the true opportunity share of inequality may be even higher. In that case, the results can also be taken as suggestion that we can aim at policies that reduce the effect of family background on the child's chances of acquiring skills and abilities and therefore future earnings, if we want to reduce inequality of opportunity and thereby reducing economic inequality itself.

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Table 1: Descriptive Statistics (Earnings) – Urban India (IHDS: 2004-05)

Father's Education (types)	Actual wage earnings (annual in Indian Rupees)					Household earnings (per capita, annual in Indian Rupees)				
	First Cohort (21yrs-30yrs)	Second Cohort (31yrs-40yrs)	Third Cohort (41yrs-50yrs)	Fourth Cohort (51yrs-65yrs)	Total	First Cohort (21yrs-30yrs)	Second Cohort (31yrs-40yrs)	Third Cohort (41yrs-50yrs)	Fourth Cohort (51yrs-65yrs)	Total
No formal education (Type 1)	27954.04	37487.41	48519.97	54767.16	40518.73	11308.87	10747.13	12996.67	16511.26	12684.62
	18844.48	33726.92	40941.26	48909.47	36837.1	10995.39	12461.72	12817.8	19814.8	14315.64
	956	1228	955	568	3707	1429	1796	1534	1298	6057
Educated but less or up to Primary (Type 2)	34059.67	49913.91	62894.31	74252.55	53226.42	13639.23	14524.08	17564.35	20924.87	16345.24
	27045.32	39748.96	46822.2	62200.11	45672.01	12479.88	15861.6	18998.56	21923.04	17516.27
	543	656	564	339	2102	1012	1038	912	768	3730
More than Primary and upto Secondary (Type 3)	42142.57	66359.32	83732.54	93387.52	66179.97	18181.81	19539.04	22218.34	28566.73	20906.9
	35125.63	52840.44	51952.06	63094.52	52542.27	18102.49	19979.36	18625.4	26460.17	20460.62
	786	741	610	296	2433	1856	1280	963	724	4823
More than Secondary (Type4)	68720.44	96009.25	127556.2	135246	100119.5	27927.42	28841.08	32689.49	43301.73	30658.56
	57298.6	66684.1	93141.23	107527.8	81091.43	25435.31	25503.96	32232.76	37776.76	28611.69
	286	348	213	130	977	1066	602	335	263	2266
Total	38116.13	54275.66	68341.28	76147.07	56504.77	17430.42	16274.42	18243.28	22788.22	18256.98
	34325.57	48920.68	56976.08	67854.24	52698.55	18391.07	18466.55	19265.12	25255.07	20136.10
	2571	2973	2342	1333	9219	5363	4716	3744	3053	16876

(First Row: Mean; Second Row: Standard deviation; Third Row: Number of Observations)

Table 2: Descriptive Statistics (Earnings and Consumption) – Rural India (IHDS: 2004-05)

Father's Education (types)	Household earnings (per capita, annual in Indian Rupees)					Household consumption expenditure(per capita, monthly in Indian Rupees)				
	First Cohort (21yrs-30yrs)	Second Cohort (31yrs-40yrs)	Third Cohort (41yrs-50yrs)	Fourth Cohort (51yrs-65yrs)	Total	First Cohort (21yrs-30yrs)	Second Cohort (31yrs-40yrs)	Third Cohort (41yrs-50yrs)	Fourth Cohort (51yrs-65yrs)	Total
No formal education (Type 1)	7237.28	6387.74	7301.08	8766.60	7378.50	647.28	616.92	709.04	762.73	681.11
	8676.83	8067.09	8802.42	10036.99	8927.05	564.01	505.43	609.02	698.61	597.40
	4685	5087	4599	4364	18735	4680	5080	4597	4362	18719
Educated but less or up to Primary (Type 2)	8342.08	8267.739	9868.22	12236.26	9342.85	749.67	698.35	866.48	1014.53	807.59
	9779.52	10529.46	12524.9	17273.31	12311.97	807.08	577.36	905.68	1246.10	881.28
	2277	1825	1309	1228	6639	2276	1825	1309	1228	6638
More than Primary and upto Secondary (Type 3)	10802.62	10712.34	14363	17133.2	11839.91	928.50	872.91	1030.18	1338.76	974.70
	13071.47	13257.58	26286.28	21124.05	16335.31	854.51	757.86	936.83	2101.73	1044.61
	2386	1148	552	449	4535	2386	1147	550	449	4532
More than Secondary (Type4)	13937.3	13697	17618.54	18809.24	14501.92	1039.61	976.31	1283.77	1638.84	1080.77
	14047.86	14566.42	17982.97	16097.73	14765.34	1026.9	837.06	1317.66	1928.21	1095.32
	610	242	97	55	1004	610	242	97	55	1004
Total	8754.608	7612.08	8560.70	10172.39	8686.22	762.17	680.73	780.99	863.82	764.35
	10679.33	9904.69	12407.69	13182.92	11434.49	745.41	582.86	734.92	1026.49	772.30
	9958	8302	6557	6096	30913	9952	8294	6553	6094	30893

(First Row: Mean; Second Row: Standard deviation; Third Row: Number of Observations)

Table 3: Descriptive statistics: inequality measures

Inequality measures	Urban		Rural	
	Actual Wage earnings (gross)	Household earnings (per capita)	Household earnings (per capita)	Household consumption expenditure (per capita)
First Cohort				
Gini coefficient	0.40504	0.45031	0.47536	0.37918
Mean Log Deviation (GE(0))	0.28632	0.35973	0.40955	0.23883
Theil index (GE(1))	0.29042	0.36470	0.42255	0.27823
Second Cohort				
Gini coefficient	0.42294	0.47325	0.49360	0.36304
Mean Log Deviation (GE(0))	0.31398	0.39920	0.44083	0.21841
Theil index (GE(1))	0.30600	0.40845	0.46385	0.24330
Third Cohort				
Gini coefficient	0.41676	0.45417	0.49774	0.37872
Mean Log Deviation (GE(0))	0.32584	0.37040	0.45229	0.23798
Theil index (GE(1))	0.28967	0.36904	0.48065	0.27024
Fourth Cohort				
Gini coefficient	0.44852	0.48713	0.50323	0.40953
Mean Log Deviation (GE(0))	0.41061	0.44399	0.46764	0.27940
Theil index (GE(1))	0.33693	0.41972	0.47402	0.33598

Table 4: Inequality decomposition (within types and between types) by cohorts –Mean Log Deviation (Urban)

	Actual wage earnings				Household earnings (per capita)			
	Opportunity Inequality	Effort Inequality	Total Inequality (per capita earnings)	Opportunity share of total inequality (%)	Opportunity Inequality	Effort Inequality	Total Inequality (per capita earnings)	Opportunity share of total inequality (%)
First Cohort	0.04280	0.24352	0.28632	14.95	0.05325	0.30648	0.35973	14.80
Second Cohort	0.05448	0.25950	0.31398	17.35	0.06041	0.33879	0.3992	15.13
Third Cohort	0.05002	0.27582	0.32584	15.35	0.04529	0.32511	0.3704	12.23
Fourth Cohort	0.04550	0.36511	0.41061	11.08	0.04955	0.39444	0.44399	11.16

Figure 1 (a): Inequality of opportunity across income quantiles (urban, based on actual wage earnings) by Cohorts

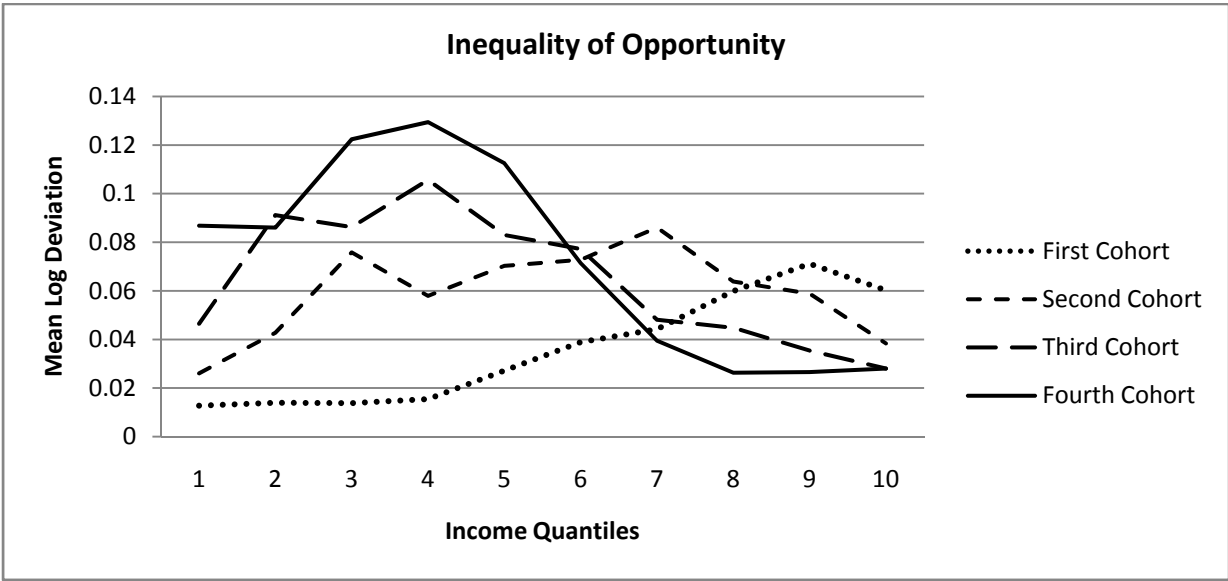


Figure 1 (b): Inequality of opportunity across income quantiles (urban, based on household per capita earnings) by Cohorts

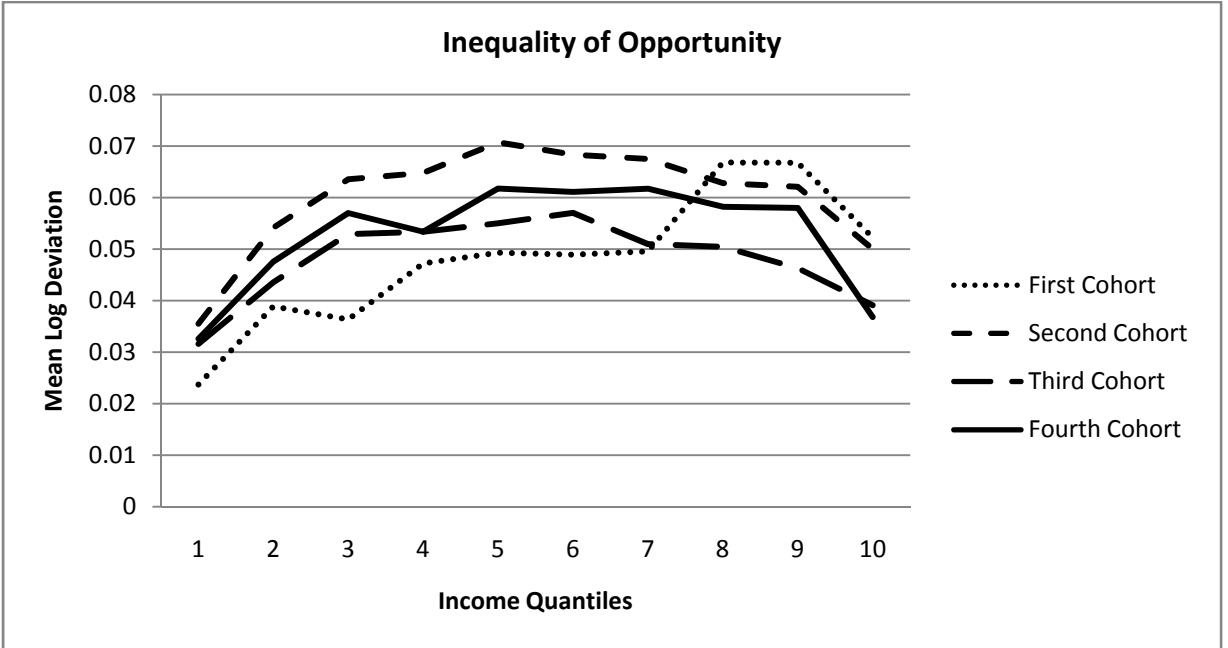


Table 5: Inequality decomposition (within types and between types) by cohorts –Mean Log Deviation (Rural)

	Household earnings (per capita)				Household consumption expenditure (per capita)			
	Opportunity Inequality	Effort Inequality	Total Inequality (per capita earnings)	Opportunity share of total inequality (%)	Opportunity Inequality	Effort Inequality	Total Inequality (per capita earnings)	Opportunity share of total inequality (%)
First Cohort	0.02173	0.38782	0.40955	5.31	0.01426	0.27404	0.2883	4.95
Second Cohort	0.02492	0.41591	0.44083	5.65	0.00974	0.20867	0.21841	4.46
Third Cohort	0.02902	0.42327	0.45229	6.42	0.01170	0.22628	0.23798	4.92
Fourth Cohort	0.02531	0.44233	0.46764	5.41	0.01862	0.26078	0.27940	6.67

Figure 2(a): Inequality of opportunity across income quantiles (rural, based on household per capita earnings) by Cohorts

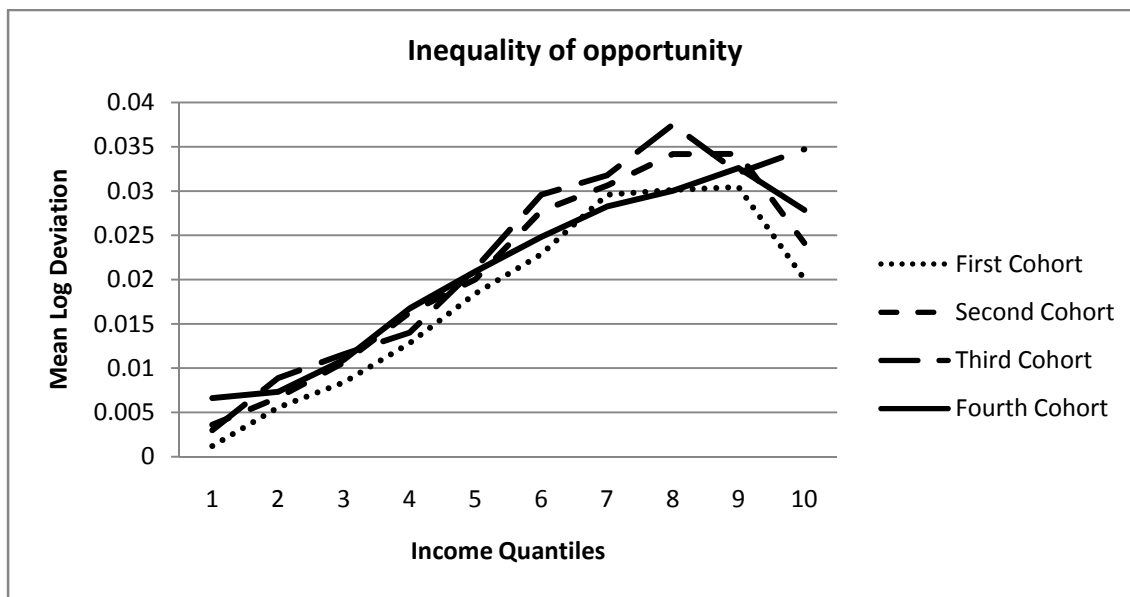


Figure 2 (b): Inequality of opportunity across consumption expenditure quantiles(rural, based on household consumption expenditure per capita) by Cohorts

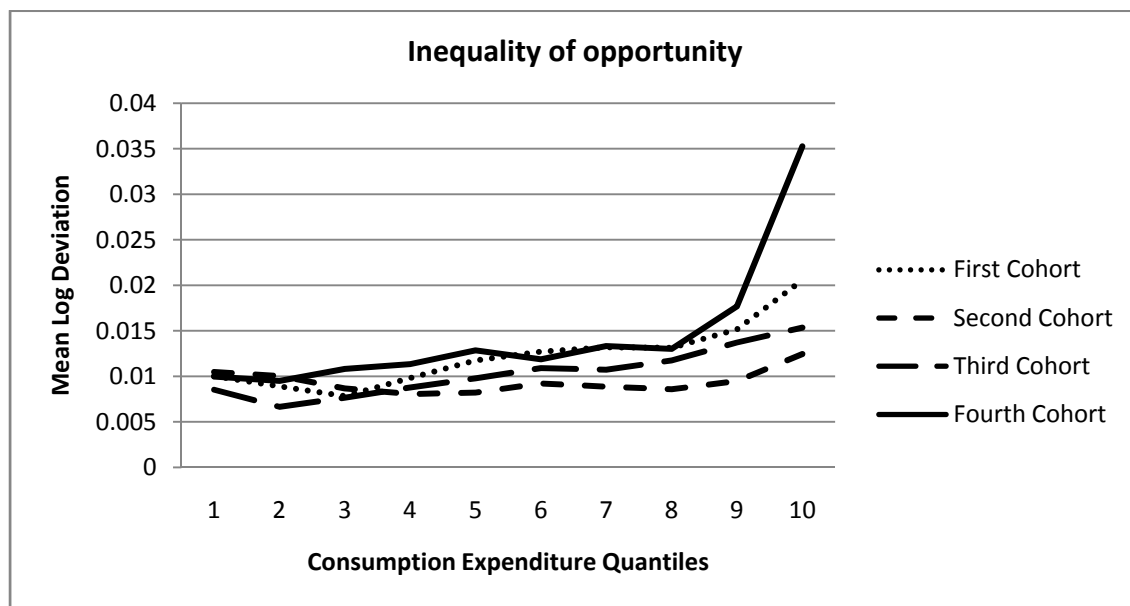
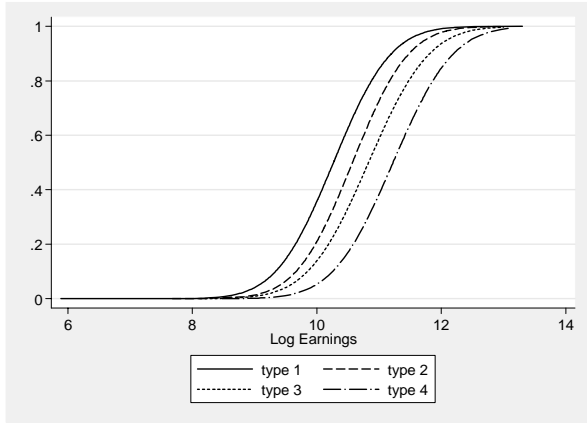
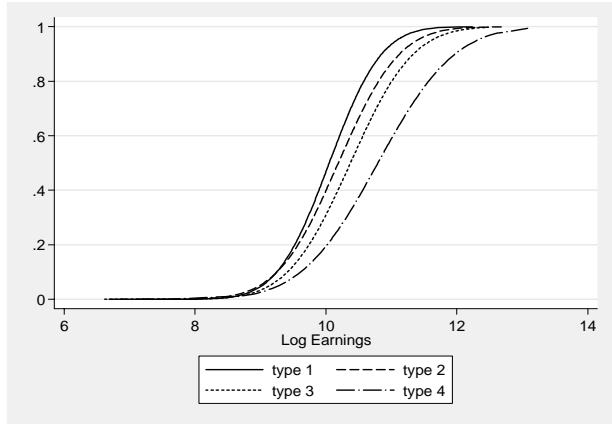


Figure 3 (a): The distribution of urban actual wage earnings conditional on father's education

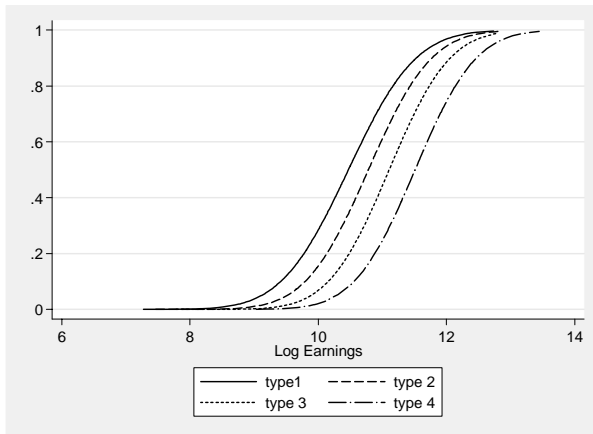
First Cohort



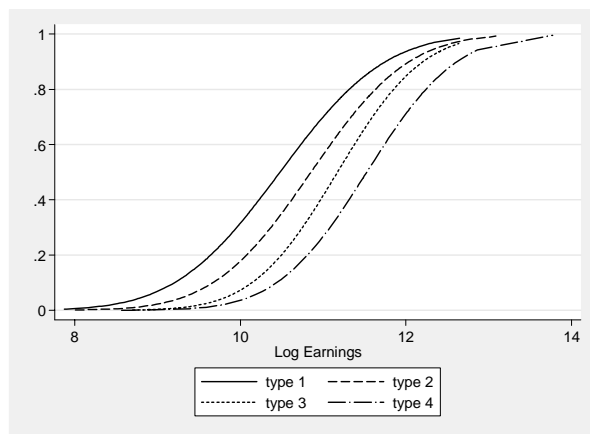
Second Cohort



Third Cohort



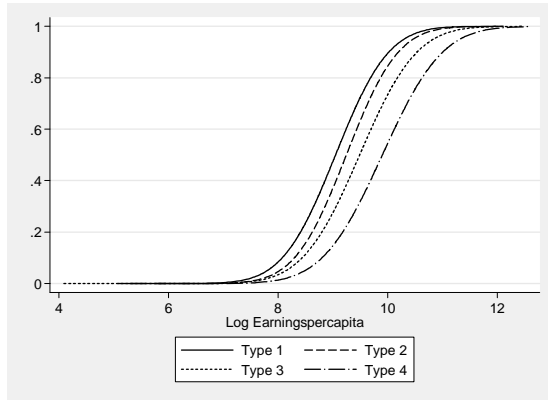
Fourth Cohort



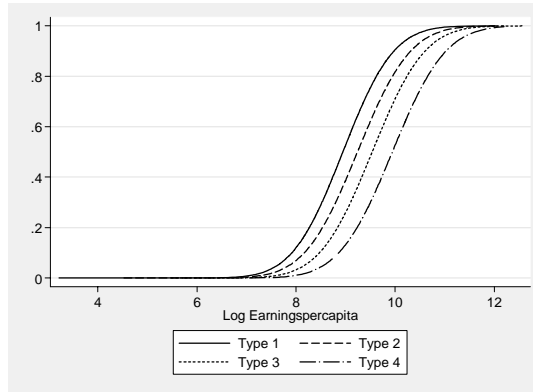
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Figure 3 (b): The distribution of urban household earnings (per capita) conditional on father's education

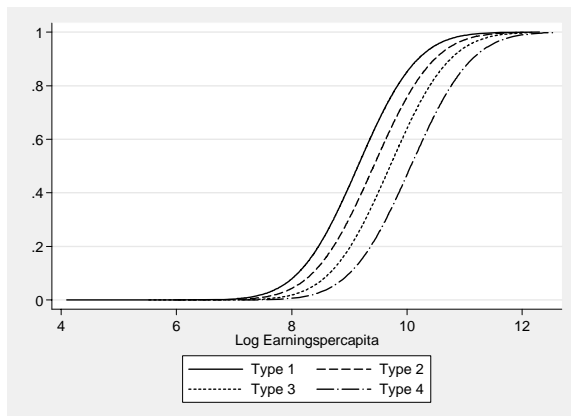
First Cohort



Second Cohort



Third Cohort



Fourth Cohort

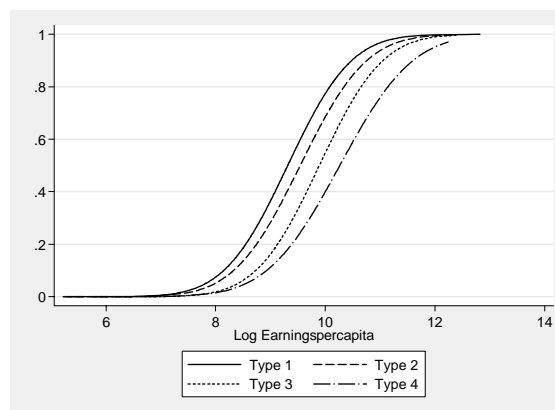
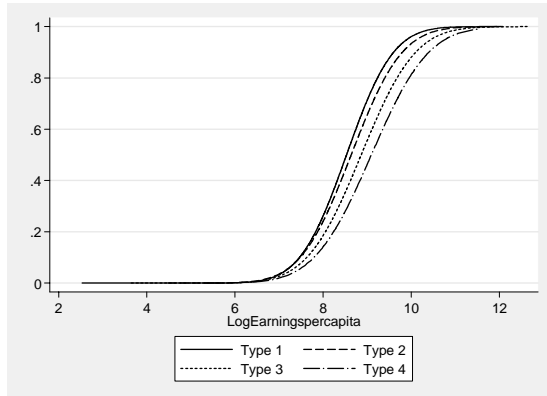
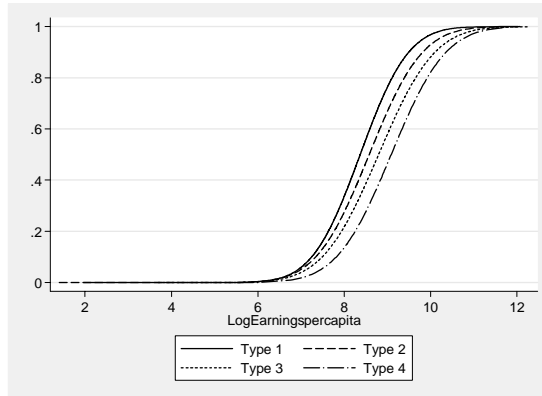


Figure 4 (a): The distribution of rural household earnings (per capita) conditional on father's education

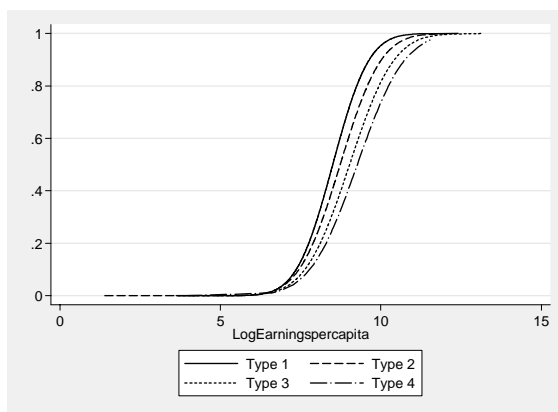
First Cohort



Second Cohort



Third Cohort



Fourth Cohort

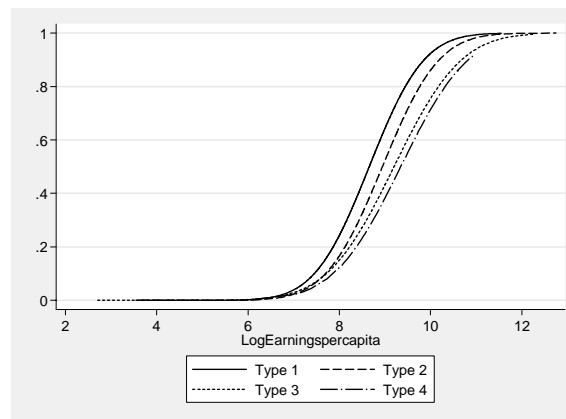
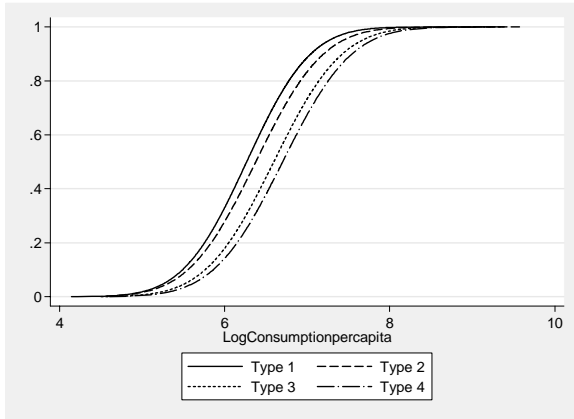
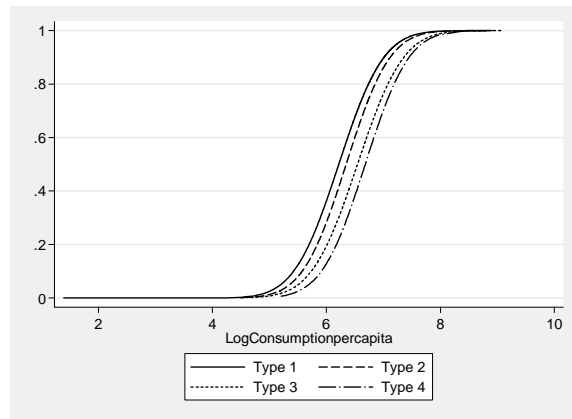


Figure 4 (b): The distribution of rural household consumption expenditure (per capita) conditional on father's education

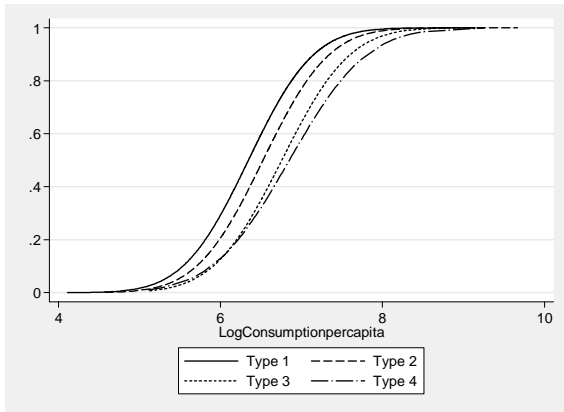
First Cohort



Second Cohort



Third Cohort



Fourth Cohort

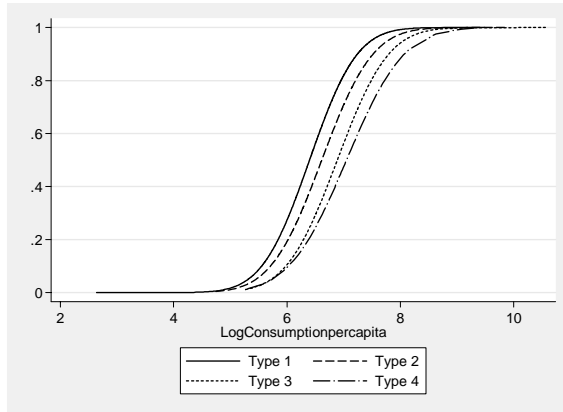


Table 6: Comparison of the estimates of inequality of opportunity obtained for the two regions

	Opportunity share of total inequality (% Urban)		Opportunity share of total inequality (% Rural)	
	Actual wage earnings	Household earnings (per capita)	Household earnings (per capita)	Household consumption expenditure (per capita)
First Cohort	14.95	14.80	5.31	4.95
Second Cohort	17.35	15.13	5.65	4.46
Third Cohort	15.35	12.23	6.42	4.92
Fourth Cohort	11.08	11.16	5.41	6.67