Gender Differentials in Inequality of Educational Opportunities in India: New Evidence from an Indian Youth Study

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Abstract *Using data from the 'Youth in India: Situation and Needs' survey, this paper provides perhaps the first estimates of inequality of opportunity in schooling outcomes for males and females separately for India. The inequality of educational opportunity in completion of primary (and secondary) schooling among females is more than twice (and nearly twice) than that among males. Further, among females only 20% of total schooling opportunities needed for universal completion of secondary schooling are available and equitably distributed; a figure substantially lower than that for males (35%). We also find stark inter-state variations in gender-differential in inequality of educational opportunities.*

Key words: Inequality of educational opportunity; Primary schooling; Secondary schooling; Gender differential; India; South Asia

Equity, Development and Opportunities

Improving social and economic conditions through equity has gained momentum in the recent past and is now among the top priorities of the United Nations (UNDP, 2003; World Bank, 2006). 'Equity' as defined by the World Bank is related to normative concerns of fairness and social justice and is organized around the conception of equality of opportunities. This definition acknowledges that there could be inequalities in outcomes such as income and educational attainment because different socioeconomic

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groups (for example, women, ethnic, caste or religion) face different opportunities owing to differences in their status, power and influence within a society (World Bank, 2006, p.1).

Presently, equity as defined in world development report is also considered central to poverty-reducing development because of the following fundamental reasons (World Bank, 2006, p.2). First, inequalities in opportunity or capabilities can be a profound source of poverty. Poor individuals remain poor because of inadequate access to schools, health care, market opportunities, credit, and effective risk-management mechanisms. These in turn are associated with inequalities in the power to influence the shaping of policies and their effective implementation (World Bank 2006, p.2). Second, reduction in poverty is a product of both aggregate development and its distribution. There are potentially important interactions between policies and institutions for dealing with equity and such development processes include both the level of economic growth and its distribution. This can sometimes involve cases where equal distribution of growth benefits is subdued by a desire to achieve higher economic growth at any cost (World Bank, 2006, p.2). Third, at a national level all currently 'developed' societies historically put in place policies and institutions to increase equity in basic necessities including education provision, risk management and equality before the law (World Bank, 2006, p.2). Finally, at a more micro level, some areas of lack of equity – for example, restrictions on girls schooling, the household allocation of labor between men and women or access to credit - have been shown to be potentially bad for economic efficiency and growth (World Bank, 2006, p.2).

It is considered desirable that development be accompanied with equity; a condition which is often not met. India is no exception to this. India has experienced unprecedented economic growth since the advent of economic reforms in the early-1990s and is often considered a major growth engine for the global economy along with China (Callen, 2007; Peterskovsky and Schüller, 2010). However, the persistence of substantial caste, religion, gender and region based inequalities in various economic as well as non-economic outcomes including education, health and income in India (Pal and Ghosh, 2007; Pathak and Singh, 2011; Singh, 2011, 2012a, 2012b; Vakulabharanam, 2010; Weisskopf, 2011) has raised

serious concerns among academicians, policy makers and general masses about the apparent lack of equity associated with the Indian growth process. The persistence of socioeconomic inequalities is worrisome because it might lead to a number of social and economic problems including social unrest and derailment of growth process (Dev, 2008; Weisskopf, 2011).

An ideal growth process is one that generates equal opportunities for different sections of a society (Ali and Zuang, 2007). In simple terminology, socioeconomic background of individuals neither should affect their access to opportunities nor should decide their share in the fruits of a growth process. Any outcome of interest - such as income, health, etc. - should depend on individuals' choices and efforts rather than on predefined circumstances such as caste or gender which are ascribed at the time of birth and which are beyond the control of individuals. It is therefore important to distinguish between unequal opportunities and unequal outcomes. Roemer (1993, 1998) offer a formal framework to differentiate the concept of unequal opportunities from unequal outcomes. His framework suggests separating the determinants of a person's advantage (i.e., desirable outcomes, such as income or educational attainment) into two groups, circumstances (factors that are beyond the control of individuals – caste, religion, etc.) and efforts (factors that are within the personal responsibility). The differences in individuals' achievements due to differences in circumstances are inequitable and such differences are generally referred to as "inequality of opportunity" in the economic and social literature. On the other hand, the differences in achievements arising due to the differences in efforts of individuals are equitable and are referred to as "inequalities due to efforts". Having clearly defined the terms – inequality of opportunity and inequality due to efforts – it is easier to distinguish between inequality of opportunity and inequality of outcome. Inequalities of opportunities are mostly due to differences in individual circumstances, while inequalities of outcomes such as income reflect some combination of differences in efforts and in circumstances (World Bank, 2006; Ali and Zuang, 2007).

The concept of inequality of opportunity is gaining significance in the contemporary literature because any differences in outcome due to differences in circumstances is unjust and calls for policy

interventions that fully compensate for the disadvantages due to circumstances (World Bank, 2006; Bourguignon *et al.*, 2007; Barros *et al.*, 2009, Ferreira and Gignoux, 2011). This concept is particularly important for India primarily because India has substantial diversity based on caste, religion, region and languages and there are considerable inequalities in various social, economic and demographic indicators based on caste, religion and region (WHO, 2009; Joe *et al.*, 2010; Pathak *et al.,* 2010; Pathak and Singh, 2011; Singh, 2012a). India also suffers from significant gender based disparities in health and schooling outcomes as well as employment and income (Borooah, 2004; Filmer, 2005; Desai and Kulkarni, 2008; Agrahari and Singh, 2009; International Institute for Population Sciences and Population Council, 2010; Joe *et al*. 2010). Closing gender gaps in the above-mentioned outcomes has become an important challenge for policy makers in India (Agrahari and Singh, 2009).

Inequality of Opportunity: The Indian Scenario

Surprisingly, inequality of opportunity as a research agenda has received little attention in India and thus the literature on inequality of opportunity in India is rather sparse. Systematic literature search provides only a few studies that have investigated inequality of opportunities in India. Using data from the India Human Development Survey (2004-05), Singh (2012) estimates inequality of opportunity in income and consumption expenditure for India. A few studies have also focused on non-economic outcomes in India. Singh (2011) estimates inequality of opportunity in access to nutrition and immunization among Indian children. The study uses data from multiple rounds of National Family and Health Surveys (NFHS), and dissimilarity and human opportunity indices proposed by Barros *et al*. (2008 and 2009). Singh (2012b) using data from NFHS estimates inequality of opportunity in access to primary education in India. Another study by Asadullah and Yalonetzky (2012), using data from various rounds of National Sample Survey Organization (NSSO), investigates inequality of opportunity in school completion for individuals aged 25 years or above.

Although there are a few studies which have investigated inequality of opportunity in India, they suffer from various limitations – data limitations, representativeness and methodological weaknesses. For example, Singh (2012a) is restricted to males and remains silent on maternal education as a circumstance variable. Surprisingly, none of the earlier studies investigate inequality of opportunities separately for males and females. The study by Asadullah and Yalonetzky (2012) includes mainly two circumstance variables – religion and gender and ignores other important circumstance variables like parental education, parental occupation and place of residence.

Given the limitations of the studies presented in the earlier section of the paper, our study attempts to investigate inequality of opportunity in schooling outcomes in India and for the states of Rajasthan, Bihar, Jharkhand, Maharashtra, Andhra Pradesh and Tamil Nadu using a more recent, representative and large-scale dataset. We are particularly interested in investigating inequality of opportunity in schooling outcomes because such inequalities are likely to translate into numerous inequalities - including inequalities in income and wealth – later in the life of individuals. Thus, inequality of opportunities in schooling is a channel through which socio-economic disparities permeate in the society. Since school participation, especially among girls, responds to a wide range of variables, including parental education and motivation, social background, dependency ratios, work opportunities, village development, teacher postings, mid-day meals and infrastructural quality (Dreze and Kingdon, 2001; International Institute for Population Sciences and Population Council, 2010), it is undoubtedly important to estimate the inequality of opportunity separately for males and females. An overall average will hide significant differences in inequality of opportunity in schooling outcomes among males and females and will underestimate the extent of inequality of opportunity in India.

We hypothesize that inequality of opportunity among females is higher than inequality of opportunity among males in India. We present separate estimates for inequality of opportunity in completing primary and secondary schooling. This is primarily done to take into account the high dropout rates after completing primary schooling in India. To estimate inequality in educational opportunities, we use the

dissimilarity – based inequality of opportunity and human opportunity indices proposed by Barros *et al.* (2008, 2009) that are specifically suited and widely used for dichotomous outcomes. The results thus obtained can be used directly to inform the policy makers about the extent of redistribution needed to bring equality in educational opportunities (completion of primary and secondary schooling) in India and the states selected for the study.

The remaining of the paper is organized as follows: the next section describes the data used in our study. It also provides the details of the inequality of educational opportunity and human educational opportunity indices. It is followed by a section which presents our main findings whereas the last section discusses these findings along with listing the major conclusions.

Data and Methods

We use data from the 'Youth in India: Situation and Needs' survey conducted in the year 2006-07 by the International Institute for Population Sciences, Mumbai (India) and the Population Council, New Delhi (India) under the stewardship of the Ministry of Health and Family Welfare, Government of India. A brief description of the survey and the sample used for analysis is presented below.

Data: Youth in India: Situation and Needs (2006–2007)

The Youth in India: Situation and Needs study (also referred as the Youth Study), is the first-ever sub-nationally representative study conducted to understand the conditions and needs of the young people in India. Its objectives were: to identify key transitions experienced by youth, including those pertaining to education, work force participation, sexual activity, marriage, health and civic participation; to provide state-level evidence on the magnitude and patterns of young people's practices, decision-making and attitudes; and, finally, to identify key factors underlying, attitudes and life choices (International Institute for Population Sciences and Population Council, 2010).

The Youth Study focused on married and unmarried young women and unmarried young men aged 15–24 in both rural and urban settings. Married men in the age group 15-29 were also interviewed in the survey. The study was conducted in Andhra Pradesh, Bihar, Jharkhand, Maharashtra, Rajasthan and Tamil Nadu; these states together represent 39% of the country's population. These six states were purposively selected to represent the different geographic and socio-cultural regions within the country (International Institute for Population Sciences and Population Council, 2010). Bihar and Jharkhand belong to the eastern region; Rajasthan belongs to the northern region; Maharashtra belongs to the west region; whereas Andhra Pradesh and Tamil Nadu belong to the region of south.

The sample in rural areas was selected in two stages. Villages were selected at first stage using probability proportional to size (PPS) sampling scheme. Households were selected at the second stage using systematic sampling scheme. In urban areas, the sample was selected in three stages. At the first stage of selection, wards were selected systematically using PPS sampling scheme. At the second stage, census enumeration blocks (ceb) containing approximately 150-200 households were selected using PPS sampling scheme. Households were selected at the third stage using systematic sampling scheme. A total of 50,848 married and unmarried young women and men were successfully interviewed. Response rates for individual interviews were in the range of 84-90%. Unmarried women registered the highest response rate (90%). The response rates were marginally lower among those residing in rural areas compared to those residing in urban areas. The response rates varied only marginally over the states included in the survey (International Institute for Population Sciences and Population Council, 2010).

Data were collected using six questionnaires: a rural community questionnaire; a household questionnaire; and four individual questionnaires, one each for married young men, married young women, unmarried young men and unmarried young women (International Institute for Population Sciences and Population Council, 2010). A comparison of estimates based on 'Youth Study' with other large-scale population based household surveys in India – like National Family Health Survey (NFHS), District Level Household Survey (DLHS) – suggests that data collected in 'Youth Study' are of optimal

quality and can be utilized to provide national and state level estimates (International Institute for Population Sciences and Population Council, 2010).

For comparison purpose, we restrict our analysis to men and women aged 15-24 years only. The analysis related to primary schooling is based on men and women aged 15-24 years whereas the analysis related to secondary schooling in only based on men and women aged 18-24 years. Appropriate sampling weights are used to derive the estimates at national and state levels. The details of the sampling weight are given in the survey report (International Institute for Population Sciences and Population Council, 2010).

Outcomes of Interest

The outcomes variables included in the analysis are completion of primary school (coded as '1' if the youth has completed five or more years of schooling; '0' otherwise) and completion of secondary school (coded as '1' if the youth has completed 10 or more years of schooling; '0' otherwise).

Circumstance Variables

The circumstance variables included in the analysis (for males and females separately) are mother's schooling (no formal schooling; 1-4 years of schooling; 5-9 years of schooling; 10 or more years of schooling), father's schooling (no formal schooling; 1-4 years of schooling; 5-9 years of schooling; 10 or more years of schooling), mother's occupation (not working/housewife; cultivator; laborer; skilled/administrative/clerical/business), father's occupation (cultivator; laborer/not working; skilled/administrative/clerical/business), caste (Scheduled Caste (SC); Scheduled Tribe (ST); Other Backward Classes (OBC); Others), religion (Hindu; Muslim; other religion), place of residence (urban; rural), age (quadratic form), wealth status of household (Q1; Q2;Q3;Q4;Q5). State dummies are also included in the all India analysis. It is important to note that for the analysis on full sample (males and females combined), gender (male; female) is also taken as a circumstance variable. These circumstance variables are derived from the systematic review of the existing literature. Some of the variables are included to account for the socio-economic context prevailing in India. We did not include 'effort' related

variables as determinants of completion of primary (or secondary) schooling in our analysis because at the time of primary or secondary schooling individuals are in their childhood stage and they cannot be held responsible for schooling decisions or other aspects of efforts.

Dissimilarity Index of Inequality of Educational Opportunity

We estimate inequality of educational opportunity in completion of primary and secondary schooling at two levels. At the first level we use dissimilarity based inequality of educational opportunity index (henceforth referred to as *DIEop* Index) proposed by Barros *et al*. (2008, 2009). The index has received vide acceptability in literature and is specially suited for dichotomous outcomes (Barros *et al.,* 2008, 2009; Singh, 2011, 2012b). The index is given by

$$DIEop = \frac{1}{2\overline{p}} \sum_{i=1}^{n} \alpha_i \left| \overline{p} \quad - \quad \hat{p}_i \right| \qquad \text{where } i = 1,..., n. \tag{1}$$

where $\hat{p}_i$ is the predicted probability of completion of primary/secondary schooling (depending on whether *DIEop* index is for primary or secondary school completion) of the i^{th} individual in the population (sample) obtained from the logit regression of completion of primary/secondary schooling on the circumstance variables (it can be interpreted as the probability of completion of primary/secondary schooling of the i^{th} individual given her/his circumstances); $\alpha_i = \frac{1}{n}$ in case individuals have equal weights in the sample; in case the weights for individuals are different in the sample (as in our case), α_i is the normalized sample weight for the i^{th} individual ($\alpha_1 + \alpha_2 + ... + \alpha_n = 1$); and $\overline{p}$ is the average probability of completion of primary/secondary schooling for the population (sample), given by, $\overline{p} = \sum_{i=1}^{n} \alpha_i \hat{p}_i$.

The *DIEop* index varies from '0' to '1' (0 to 100 in percentage terms) and in case of perfect equality of educational opportunity (completion of primary/secondary schooling), it takes a value of '0'. The

DIEop index can be interpreted as the amount of educational opportunities (completion of primary/secondary schooling) that need to be rearranged (as a proportion of the number of individuals who already have an educational opportunity – primary/secondary) from the better off groups (groups in which average completion of primary/ secondary schooling is more than the population average) to the worse off groups (groups in which the average completion of primary/secondary schooling is lower than the population average) to have equal average completion of primary/secondary schooling for all the groups. Here groups are nothing but the set of individuals who have same set of considered circumstances. For example, in the national level combined sample of males and females; all individuals who are aged 15 years and are females, belong to OBC caste category and Hindu religion, reside in rural areas of Rajasthan, whose mothers and fathers are cultivators with no formal schooling and whose households fall into the first quintile of wealth status will constitute one group. In simple terms, *DIEop* index can also be interpreted as the inequality in educational opportunities (completion of primary/secondary schooling) due to all the (considered) circumstances taken together.[2]

Human Educational Opportunity Index

At the second level we use Human Educational Opportunity (*HEOp*) Index which is a composite index that combines the *DIEop* index with the average rate of completion of primary/secondary schooling ($\overline{p}$). The *HEOp* index is given by[3]

$$HEOp = \overline{p}(1 - DIEop) \qquad (2)$$

The level of educational opportunity (completion of primary/secondary schooling) measured by *HEOp* index can be interpreted as the number of existing educational opportunities in a given society that have been allocated based on an equal opportunity principle. It is measured as a proportion of the total opportunities necessary for universal completion of primary/secondary schooling. Another interpretation of the *HEOp* index is, as the equal opportunity equivalent coverage of completion of primary/secondary schooling (Barros *et al.*, 2009). To elucidate it further – consider a case where *HEOp* index for

completion of primary schooling comes out to be x%; it means that x% of the total opportunities required for the universal completion of primary schooling are available and are equally distributed among the various circumstance groups.

On an intuitive level, the *HEOp* takes the average rate of completion of primary/secondary schooling, and discounts it if the completion of primary/secondary schooling is not distributed equitably across the different circumstance groups. Two factors drive the index: for a given level of *DIEop* index, an increase in the prevalence of educational opportunity (that is, a higher $\overline{p}$) increases the index, while an improvement in the way existing educational opportunity is allocated (a reduction in *DIEop* index) will also improve the index. Further, the index is also Pareto-consistent, in the sense that it will improve if the average prevalence of educational opportunity increases, no matter how prevalence is distributed across groups, at least someone is better off, and no one is worse off. Moreover, the *DIEop* index gives much greater weight to those opportunities allocated to a disadvantaged group of the population than to those allocated to an advantaged group, and is therefore a distribution-sensitive measure (Barros *et al*., 2009).

Together *DIEop* and *HEOp* indices provide a good picture of inequality in educational opportunity in the Indian society.

Results

Descriptive Statistics

The socio-economic and demographic characteristics of the survey respondents are presented in Table 1. The mothers of 68-69% of youth interviewed in the survey do not have any formal schooling. Only 7-8% of the mothers have 10 or more years of schooling. Fathers of the surveyed youth have on an average more years of schooling compared to the mothers, with 23-24% of the fathers having 10 or more years of schooling. Only 43-44% of the fathers have no formal schooling. About 48-49% of the mothers are not working or are homemakers. In complete contrast, about 33% of the fathers are engaged in

skilled/administrative/clerical or business activities. A majority of the households belong to 'Other Backward classes' (49.8% and 49.2%). Scheduled Castes/Tribes comprise 28% of the surveyed households. Approximately 84% of the surveyed households belong to Hindu religion.

[Table 1 about here]

Urban-rural distribution of surveyed households suggests that about 30-31% of the households are from urban areas and the remaining 69-70% from rural areas. State wise figures suggest that 14%, 17-19%, 6-7%, 24-25%, 20-21%, 15-16% of the surveyed households belong to Rajasthan, Bihar, Jharkhand, Maharashtra, Andhra Pradesh and Tamil Nadu, respectively. The average age of the survey respondents is 19 years. Results presented in Table 1 further confirm that the male and female samples are fairly similar in terms of socio-economic and residence related characteristics.

The schooling outcomes for males and females are given in Table 2. The percentage of youth completing five or more years of schooling varies considerably across the categories of mother's schooling. For example, about 63% of youth whose mothers do not have any formal schooling complete five or more years of schooling compared to 99% among those whose mothers have 10 or more years of schooling. Likewise, only 53% of youth whose fathers do not have any formal schooling complete five or more years of schooling compared to 94% among those whose fathers have 10 or more years of schooling. Completing primary schooling is also higher among youth whose mothers are not working/homemakers or are engaged in skilled/clerical/administrative/business activities. Father's occupation is also closely associated with primary school completion.

[Table 2 about here]

Caste wise differentials in completing primary schooling are marked. About 87% of the youth belonging to 'other' castes complete primary schooling compared to only 62% of youth belonging to Scheduled Tribes. About 64% of youth belonging to 'Muslim' religion complete primary schooling. This compares with 74% and 80% among 'Hindu' and 'other' religious categories. Completion of primary

schooling is much higher in urban areas compared to rural areas (89% versus 67%). Gender gap in completing primary schooling is also wide, with only 68% of the females completing primary schooling compared to 85% males. Wealth status is also positively associated with completion of primary schooling. Youth belonging to higher wealth quintiles have higher completion rates compared to youth belonging to lower wealth quintiles. Further, the completion of primary schooling varies considerably across the different states included in the survey. The primary school completion rates are in the range of 48-92%. The lowest and highest completion rates are observed in Bihar and Tamil Nadu, respectively. Although, bivariate associations are similar in the male and female samples, the primary school completion rates are much lower among females than males.

The bivariate associations in case of completion of secondary schooling are similar to those obtained in case of completion of primary schooling. However, the secondary school completion rates are significantly lower than the primary school completion rates. The results clearly suggest substantial dropouts after completing primary school. The secondary school completion rates are in the range of 22-48%, with the highest completion rates in Tamil Nadu. Maharashtra (46%) is also not behind when it comes to secondary school completion.

Inequality of Educational Opportunity – Overall and by Gender

Overall, the inequality of educational opportunity index value for India for the completion of primary schooling is 16%, that is, all the considered circumstances together result in 16% inequality in completion of primary schooling among Indian youth (Table 3). In other terms, 16% of the total available primary school completion opportunities need to be shifted from the better off groups to the worse off groups in order to have equal average completion of primary schooling for all the groups. State-wise picture shows Tamil Nadu and Maharashtra to be the most equal in terms of opportunities for primary schooling (inequality of opportunity being only 4% and 6%, respectively). Inequality of opportunity is very high in the Indian states of Bihar (31%), Jharkhand (23%) and Rajasthan (21%).

[Table 3 about here]

The inequality of opportunity results (based on *DIEop* index) by gender are striking, with inequality of opportunity in completion of primary schooling among females (20%) being more than 2 times than the inequality of opportunity among males (only 8%) at the national level. Inequality of opportunity in completion of primary schooling among females is consistently higher than males in all the six states considered in the analysis. The gender gap in inequality of opportunity is particularly pronounced in the eastern states of Bihar and Jharkhand and the northern state of Rajasthan. Interestingly, inequality of opportunity among females is almost four times as high as the inequality of opportunity among males in Rajasthan. Although the extent of inequality of opportunity among both males and females is low in Andhra Pradesh, inequality of opportunity among females is twice as high as inequality of opportunity among males.

Inequality of opportunity in completion of secondary schooling is also presented in Table 3. The overall (males and females combined) inequality of opportunity in completion of secondary schooling (33%) at the national level is more than twice as high as the inequality of opportunity in completion of primary schooling (16%).

Among males, inequality of opportunity in completion of secondary schooling varies from 17% in Andhra Pradesh to 35% each in Bihar and Jharkhand. Inequality of opportunity in completion of secondary schooling among females is in the range of 25-59%. Inequality of opportunity among females is lowest in Tamil Nadu and highest in Rajasthan. The gender gap in inequality of opportunity (in percentage points) in completion of secondary schooling is higher than the gender gap in inequality of opportunity in completion of primary schooling both at the national and state levels (except Bihar). Like the case of primary schooling, the female-male gap in inequality of opportunity in completion of secondary schooling is also most pronounced in Rajasthan (59% vs. 26%). The gender gap is also prominent in Bihar, Jharkhand and Andhra Pradesh, with inequality of opportunity among females being

higher by 59%, 62% and 84%, respectively compared to males. Like the case of completion of primary schooling, the western state of Maharashtra and the southern state of Tamil Nadu fare much better in case of secondary schooling as well.

Human Educational Opportunities Index (HEOp) – Overall and by Gender

The results related to *HEOp* are presented in Table 4. Findings suggest that only 61% of the total opportunities required for universal completion of primary schooling are available and equally distributed at the national level (males and females combined). The state wise variations in *HEOp* for completion of primary schooling are notable. The *HEOp* values range between as low as 33% in Bihar to as high as 88% in Tamil Nadu. Jharkhand and Rajasthan are also not much ahead of Bihar. These results clearly indicate that the opportunities required for universal completion of primary schooling are lower in the eastern states of Bihar and Jharkhand and the northern state of Rajasthan. Moreover, the opportunities that are available are unequally distributed. On the other hand, primary schooling opportunities are almost available and more equally distributed in the western state of Maharashtra and the southern state of Tamil Nadu.

[Table 4 about here]

Gender difference in *HEOp* for completion of primary schooling is substantial at the national level. Among males, 78% of the total opportunities required for universal completion of primary schooling are available and equally distributed. This compares with only 54% among the females. The gender gaps in *HEOp* are considerably large in four (Rajasthan, Bihar, Jharkhand and Andhra Pradesh) of the six states selected in the study. Interestingly, the state wise variations in opportunities required for universal completion of primary schooling are starker in case of females compared to males. Only 25% of the total opportunities required for universal completion of primary schooling are available and equally distributed in Bihar. This compares with about 86% in Tamil Nadu. The corresponding figures in case of males are

63% and 91%, respectively. Rajasthan and Jharkhand are also close to Bihar in terms of *HEOp* for females.

The educational opportunities required for universal completion of secondary schooling are far more limited. Only 24% of the total opportunities required for universal completion of secondary schooling are available and equally distributed at the national level. Such opportunities are almost negligible in the states of Rajasthan, Bihar and Jharkhand. In these states, less than 15% of the opportunities required for universal completion of secondary schooling are available and equally distributed. Even in the socio-economically advanced states of Maharashtra and Tamil Nadu, only one-third (34% and 36%) of the total opportunities required for universal completion of secondary schooling are available and equally distributed.

Gender gaps in opportunities required for universal completion of secondary schooling are strikingly large, both at the national and the state levels. For example, at the national level, 35% of the total opportunities required for universal completion of secondary schooling are available and equally distributed among males. This compares with only 19% among the females. The gender gap in opportunities required for universal completion of secondary schooling is largest in Rajasthan followed by Bihar and Jharkhand. The gender gap is least in Tamil Nadu.

Discussion and Conclusions

Our study perhaps for the first time investigates inequality of opportunity in completion of primary and secondary schooling separately for males and females in India. Another novelty of the study is that it uses data from a more recent, rich and contextual household survey conducted in 2006-07. We have substantial evidence to support our hypothesis that inequality of opportunity in completion of primary and secondary schooling is substantially higher among females than males. Findings suggest that inequality of opportunity in completion of primary and secondary schooling among females is 147% and 69% higher than the males at the national level. Furthermore, there are considerable variations across the states

selected in the study. The level of inequality of educational opportunity is substantially higher in the state of Rajasthan, Bihar and Jharkhand. On the other hand, Maharashtra and Tamil Nadu have very low level of inequality of educational opportunity. The findings based on human educational opportunity indices further suggest that the opportunities required for universal completion of primary and secondary schooling are limited in the eastern states of Bihar and Jharkhand and the northern state of Rajasthan, particularly so in the case of secondary schooling.

Our findings have potential policy implications. Our findings clearly suggest that aggregate averages hide striking variations. For example, the overall inequality of opportunity in completion of primary schooling at the national level is 16%. When disaggregated by gender, the inequality of opportunity for males is only 8% whereas for females it is about 20%. Similar is the case of inequality of opportunity in completion of secondary schooling. These findings imply two things – first, it is the females who get affected by circumstances more than that of males; and second, it is important to estimate averages separately for different socio-economic groups for better formulation of policies and programs, and to monitor ongoing programs and national targets. Our estimates offer support for the various affirmative action programs that the Government of India has initiated – Sarva Siksha Abhiyan, National Programme for Education of Girls at Elementary Level (NPEGEL), Kasturba Gandhi Balika Vidyalaya (KGBV) – to increase the enrolment of girls in primary and secondary schooling. A number of State Governments have also launched various schemes to encourage girls' enrolment in primary and secondary schools - Mukhyamantri Balika Cycle Yojana (Chief Minister's Bicycle Programme for Secondary School Girls) of the Bihar and Tamil Nadu are some of those programs. Our findings clearly suggest that girls get affected by circumstances much more than boys when it comes to completion of primary and secondary schooling in India and thus require Governmental intervention.

Since inequality of opportunity arises due to the differences in the 'circumstances (like parental education, caste and religion)' that are beyond the control of individuals, it must be neutralized by policy interventions. Just policy to promote school enrolment for children is not enough; efforts must also be

made to apprise the parents of children about the need and importance of schooling in their children's life. Programs must target children (especially girls) from uneducated parents, children belonging to socio-economically disadvantaged castes and religion, and residing in rural areas. Recently, the state of Gujarat has made significant improvements in reaching to the households and parents for improving child schooling in the state. The present Gujarat State Government has made it a point to take the campaign of girl child education to every home, to 'lit the lamp of educating daughters in every heart' so that to herald Gujarat into the 'Golden Era' (State Government of Gujarat, 2012).

A key finding of the study relates to the state differentials in opportunities for primary and secondary school completion. Such opportunities although not universal, are clearly better in the southern and western states of India (and extremely limited in the states of north and east). These findings call for concerted efforts to create opportunities for primary and secondary schooling particularly in the states located in the northern and eastern part of India. Since there are huge state/regional variations in the availability and distribution of opportunities, any national level policy ignoring the state level variations is unlikely to become effective. As the needs of states are different, there is clearly a need for state focused policies which cater to the needs of identified states. For example, our findings suggest that the opportunities that are required for universal completion of primary schooling are largely available and relatively equally distributed in the states belonging to the southern parts of India. However, when it comes to secondary schooling, the opportunities are again limited. On the other hand, in the states belonging to north and east India, the opportunities for both primary and secondary schooling are limited. Moreover, the northern and eastern states must learn from the experiences of the southern states that have actually succeeded in increasing the enrolment at the primary school levels. Furthermore, there is a need to systematically review school enrolment related programmes of the southern states so that the other states that are lagging in terms of primary school enrolment can adopt those.

Another striking finding of our study relates to opportunities for secondary schooling of males. Although males have higher opportunities for secondary schooling compared to girls both at national and

state level, such opportunities are limited even for males. Even in the better performing states – Maharashtra and Tamil Nadu – only 39-40% of the total opportunities that are required for universal completion of secondary schooling among males are available and equally distributed. It is below 30% in the eastern and northern states of India. These findings call for a focus on secondary schooling of males as well. Although females need higher focus, males also deserve attention of the policy makers and program managers as far as secondary schooling is concerned.

Though our study offers many advantages it also suffers from a few limitations. An important limitation of our study is that it is based on a survey conducted only in six states of the country and hence may not seem to be representative at the national level. However, the states were selected from each region of India to account for the huge regional variations in the country and to capture the socioeconomic conditions of the regions from which they were selected. Furthermore, a comparison of the estimates obtained from 'Youth Study' with those of other large-scale surveys in India suggests that the data collected in 'Youth Survey' are of optimal quality and that 'Youth Survey' can be effectively used for national level analysis. The second limitation could be related to our restricting the male sample to those in 15-24 year age group. As described earlier, the 'Youth Survey' collected data from unmarried and married women aged 15-24 years and unmarried men aged 15-24 years and married men aged 15-29 years. However, for comparison purpose, we restricted our analysis to men and women aged 15-24 years. The exclusion of men aged 25-29 years from our analysis is not likely to introduce any significant bias in our analysis as the distribution of socioeconomic characteristics of these males is similar to those included in the analysis.

As a concluding remark we would like to mention that, in order to have a better understanding of the changes in availability and distribution of opportunities for completion of primary and secondary schooling at the national level as well as at the regional and state levels, there has to be a regular monitoring and analysis of educational opportunities. There is also a need to examine the availability and distribution of educational opportunities disaggregated by socio-economic characteristics. Future studies

must focus more on investigating the trends in availability and distribution of opportunities for primary and secondary schooling in India by the socio-economic status. This is required to examine the effectiveness of the various interventions/ programs of the Government of India and of the various state governments, and to take corrective measures in case the interventions/programs are not producing desired results. Since females suffer more from circumstances (beyond their control), the central and state governments must focus more on creating opportunities for girls particularly belonging to socio-economically disadvantaged classes.

Notes

1. Studies on inequality of opportunities across the developing world have shown that maternal education is the major contributor of inequality of opportunities in developing countries (Bourguignon et al. 2007; Barros et al. 2009; Ferreira and Gignoux 2011).

2. See Barros et al. (2008) for a formal proof and other properties especially the range (0-1) of *DIEop* and the insensitivity of *DIEop* to a 'balanced increase' in the outcome analyzed. A balanced increase is a situation in which new educational opportunities are assigned to the circumstances groups in the same way as the pre-existing ones were in the past.

3. *HEOp* was also first developed by Barros et al. (2008) to measure inequality of opportunity in access to basic services among Latin American and Caribbean children.

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Table 1: Distribution of socioeconomic characteristics in the sample

Characteristics	Primary School Completion			Secondary School Completion		
	Combined Sample	Males	Females	Combined Sample	Males	Females
Mother's Education (yrs)						
No formal schooling	68.40	67.33	68.89	69.32	69.01	69.47
1-4	6.05	6.55	5.82	6.06	6.55	5.83
5-9	17.63	18.24	17.35	17.28	17.63	17.12
>=10	7.92	7.88	7.94	7.33	6.80	7.58
Father's Education (yrs)						
No formal schooling	42.77	40.66	43.74	44.42	43.12	45.03
1-4	8.10	9.33	7.54	7.70	9.21	7.01
5-9	25.58	26.69	25.07	24.83	25.51	24.51
>=10	23.55	23.32	23.65	23.04	22.15	23.45
Mother's Occupation						
Not working/ housewife	48.05	57.23	43.81	49.04	57.78	45.00
Cultivator	16.58	12.25	18.57	16.60	11.70	18.86
Laborer	29.14	25.85	30.65	28.47	26.26	29.49
Skilled/administrative/clerical and business group	6.24	4.68	6.96	5.89	4.27	6.65
Father's Occupation						
Cultivator	23.70	23.51	23.79	24.16	23.12	24.65
Laborer + Not working	42.98	43.08	42.93	43.11	44.38	42.52
Skilled/administrative/clerical and business group	33.32	33.40	33.28	32.73	32.50	32.83
Caste						
SC	20.33	19.68	20.64	20.35	20.04	20.49
ST	7.82	9.41	7.09	8.15	10.01	7.29
OBC	49.80	48.77	50.27	49.25	48.07	49.80
Others	22.05	22.14	22.00	22.25	21.88	22.42
Religion						
Hindu	83.99	85.34	83.37	84.20	85.32	83.69
Muslim	9.99	9.93	10.02	9.56	9.86	9.41

Other Religions	6.02	4.73	6.62	6.24	4.82	6.89
Sector						
Urban	29.72	30.26	29.47	31.05	31.73	30.74
Rural	70.28	69.74	70.53	68.95	68.27	69.26
Gender						
Male	29.72			31.60		
Female	70.28			68.40		
Age (mean in yrs.)	19.30	19.31	19.29	20.87	20.85	20.88
Wealth Status						
Q1	15.35	12.33	16.74	14.21	11.44	15.50
Q2	18.42	18.83	18.23	17.63	18.12	17.40
Q3	20.79	20.82	20.78	20.65	21.08	20.45
Q4	23.14	25.08	22.24	23.90	26.00	22.92
Q5	22.30	22.93	22.01	23.61	23.35	23.72
States						
Rajasthan	14.51	14.74	14.41	14.38	13.90	14.61
Bihar	19.53	19.86	19.38	17.02	17.37	16.86
Jharkhand	6.56	6.61	6.53	6.22	6.50	6.09
Maharashtra	24.32	25.81	23.63	24.76	26.70	23.86
Andhra Pradesh	19.62	18.78	20.01	21.05	20.76	21.18
Tamil Nadu	15.46	14.20	16.04	16.57	14.78	17.40
Total Observations	45555	14281	31274	29631	9766	19865

Source: Authors' computations based on India Youth Study (2006-07).

Table 2: Schooling outcomes of males and females by socioeconomic characteristics

Characteristics	Primary School Completion			Secondary School Completion		
	Combined Sample	Males	Females	Combined Sample	Males	Females
Mother's Education (yrs)						
No formal schooling	62.62	79.34	55.08	23.18	35.22	17.65
1-4	92.89	96.10	91.22	47.10	52.90	44.09
5-9	95.92	97.72	95.04	64.02	67.91	62.18
>=10	99.21	99.70	98.99	88.41	90.04	87.74
Father's Education (yrs)						
No formal schooling	52.69	71.49	44.62	17.19	27.86	12.47
1-4	81.58	89.63	76.98	32.34	41.57	26.74
5-9	85.95	93.93	82.02	41.61	49.99	37.58
>=10	93.82	98.18	91.83	69.48	77.99	65.77
Mother's Occupation						
Not working/ housewife	82.63	88.36	79.19	48.10	52.70	45.37
Cultivator	61.35	82.92	54.78	22.94	39.98	18.06
Laborer	62.29	78.85	55.85	22.12	31.90	18.10
Skilled/administrative/clerical and business group	83.37	91.82	80.74	47.11	55.65	44.58
Father's Occupation						
Cultivator	67.62	85.02	59.68	29.90	44.19	23.70
Laborer + Not working	68.04	81.14	61.97	28.76	37.99	24.31
Skilled/administrative/clerical and business group	83.89	91.15	80.53	51.48	57.84	48.57
Caste						
SC	66.54	81.04	60.15	28.51	38.50	23.99
ST	62.49	76.03	54.20	24.13	30.57	20.05
OBC	71.52	85.70	65.16	35.12	46.33	30.12
Others	87.05	92.58	84.49	51.26	58.65	47.94
Religion						
Hindu	73.78	86.52	67.77	37.38	47.44	32.64
Muslim	64.58	75.99	59.36	26.90	33.57	23.68

Other Religions	79.76	85.00	78.03	38.90	43.46	37.43
Sector						
Urban	88.84	92.36	87.17	54.66	57.77	53.17
Rural	66.62	82.38	59.43	28.28	40.35	22.79
Gender						
Male	85.40	85.40		45.88	45.88	
Female	67.60		67.60	32.13		32.13
Wealth Status						
Q1	38.33	60.74	30.71	7.74	15.64	5.05
Q2	58.26	75.71	49.95	17.53	28.08	12.46
Q3	74.30	86.16	68.81	27.14	38.60	21.68
Q4	86.27	93.00	82.76	41.90	50.70	37.29
Q5	95.05	97.61	93.82	70.58	75.69	68.26
States						
Rajasthan	64.73	86.02	54.02	26.66	42.71	19.17
Bihar	48.33	73.17	39.50	22.02	36.04	17.03
Jharkhand	59.81	78.45	50.58	24.32	36.48	18.03
Maharashtra	88.57	91.40	87.09	45.73	49.49	43.73
Andhra Pradesh	76.09	86.07	70.94	40.60	51.67	34.58
Tamil Nadu	91.65	94.12	90.71	47.64	50.67	46.52
Total	73.22	85.40	67.60	36.47	45.88	32.13

Source: Authors' computations based on India Youth Study (2006-07).

Table 3: Inequality of educational opportunity by gender

	Primary School Completion			Secondary School Completion		
	Combined Sample (%)	Males (%)	Females (%)	Combined Sample (%)	Males (%)	Females (%)
India	16.5	8.1	20.0	33.2	23.3	39.3
Rajasthan	21.5	7.3	27.2	45.9	26.1	58.8
Bihar	31.5	14.2	35.6	49.8	35.0	55.5
Jharkhand	23.3	11.4	27.9	49.1	35.5	57.5
Maharashtra	6.2	5.2	7.2	26.5	21.6	29.5
Andhra Pradesh	11.1	6.7	13.9	25.0	17.3	31.8
Tamil Nadu	4.2	3.3	4.7	23.7	20.5	25.2

Note: Based on dissimilarity index of inequality of opportunity (Barros et al. 2009).

Source: Authors' computations based on India Youth Study (2006-07).

Table 4: Human Educational Opportunity Index by Gender

	Primary School Completion			Secondary School Completion		
	Combined Sample (%)	Males (%)	Females (%)	Combined Sample (%)	Males (%)	Females (%)
India	61.1	78.5	54.1	24.4	35.2	19.5
Rajasthan	50.8	79.7	39.3	14.4	31.6	7.9
Bihar	33.1	62.8	25.4	11.1	23.4	7.6
Jharkhand	45.9	69.5	36.5	12.4	23.5	7.7
Maharashtra	83.1	86.6	80.8	33.6	38.8	30.8
Andhra Pradesh	67.6	80.3	61.1	30.5	42.7	23.6
Tamil Nadu	87.8	91.0	86.4	36.3	40.3	34.8

Note: Human Educational Opportunity Index, $HEOI = \overline{p}(1 - DIEop)$; where $\overline{p}$ is the average rate of completion and *DIEop* is the dissimilarity based inequality of educational opportunity index.

Source: Authors' computations based on India Youth Study (2006-07).