

Inequality of Opportunity in access to Primary Education: Case of Indian Children[†]

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Abstract: Every child deserves an opportunity of quality education comparable to any other child. If a child's access to education depends on circumstances such as caste, religion, gender, place of birth, or other parental characteristics, then it leads to disparity in access based on circumstances which are beyond the control of a child. This unacceptable disparity (inequality of opportunity) needs to be measured and addressed by policy interventions. Using two rounds of Indian National Family Health Surveys and concepts of Inequality of Opportunity and Human Opportunity Indices this paper measures inequality arising out of unequal access to primary education for Indian children. The results suggest overall high level of inequality of opportunity with substantial geographical variations. Inequality of opportunity in access to primary education decreased during 1992-93 to 2005-06 but the decrease varied considerably across different geographical regions, which calls for regional focus apart from national level policy revisions.

Keywords: Inequality of Opportunity, Access to primary education, Children, India

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1. Introduction

Most societies agree on the importance of education in the development process of children. This is one of the reasons behind the massive educational growth throughout the world (Meyer, Ramirez, and Soysal 1992) during the past decades. But, despite the high educational growth, the inequality in education between different social strata continues and sometimes even widens (Halsey, Heath, and Ridge 1980).

India has also undergone significant educational expansion in recent years. Educational attainment increased for both males and females between 1983 and 1999-2000 for all social groups, but the overall educational attainment remains low (Desai and Kulkarni 2008). Though the educational attainment increased for all social groups, there remains, substantial inequalities in educational attainment across caste, religion, and ethnic boundaries (Desai and Kulkarni 2008; Dreze and Sen 1995). Discussing about caste, religion and ethnicity, it is important to note that India is one of the most diverse nations, the diversity arising due to caste, religion, region and language. When there is large amount of diversity on account of caste, religion or region, there is bound to be disparity in outcomes such as educational attainment in children belonging to different socio economic groups.

Traditionally the literature on educational stratification focuses either on final educational attainment or educational transition (Anitha 2000; Desai and Kulkarni 2008; Dreze and Sen 1995; Sharma 1999; Shavit and Blossfeld 1993) but this study goes one step before and asks a simple question. What are the chances that a girl child born in rural area, to poor uneducated parents who are from lower castes, will have access to primary education comparable in quality to a male child born in urban area to affluent and educated parents belonging to higher caste category? Since education is necessary for a child to blossom into a competent youth, every child should get an opportunity in terms of access to quality education equal to any other child of the society.

If there are unfair differences at starting points, it can be damaging, in particular if an opportunity is systematically denied to specific groups of the population. Opportunities here mean the set of goods and services that are critical for children, for example access to primary education, minimum nutrition, basic housing necessities or an identity document. Equality of opportunity seeks to level the playing field so that circumstances such as gender, ethnicity, birthplace, or family background, which are beyond the control of a child, do not influence a child's life chances. For any child, access to a primary school is clearly an exogenous opportunity, which is controlled not by him/her but by his/her family or society. If in a society, there is disparity in the extent and level of access to primary education, among children belonging to different socioeconomic groups, then it is accounted as inequality of opportunity (Barros et al. 2009; Roemer 1998), is unacceptable and must be countered by policy interventions in terms of redistribution or other affirmative action. But any policy intervention can happen only if, the extent of this inequality can be systematically measured. This is precisely the objective of the present study, to measure the inequality of opportunity in access

to primary education for Indian children. How this inequality has changed over the post economic reform period is another aspect which this study addresses.

The first challenge in systematically estimating inequality of opportunity lies in identifying the circumstances which are exogenous to a child but affect his/her chances of access to primary education. In India where caste forms a major axis of social stratification, there is ample evidence of lower castes (the two caste groups that are lowest in the Indian social hierarchy are the Scheduled Caste and Scheduled Tribes followed by castes which are categorized in Other Backward Castes and the most advantaged castes which are referred as the Upper castes or General category) suffering severe exclusion from social activities and public resources. They have been deemed untouchables (though the Indian Constitution makes untouchability illegal) involving prohibition of interactions including any kind of direct physical contact (Beteille 1969; Mendelsohn and Vicziany 1998; Shah *et al.* 2006). The children belonging to Scheduled Castes and Scheduled Tribes suffer from a number of disadvantages including reported instances of discrimination by teachers and other students. There are number of instances of students belonging to Scheduled Castes and Scheduled Tribes being made to sit outside the classroom during primary school or sit separately, with their notebooks and slates not touched by teachers (The Probe Team 1999). Also, teachers' behavior often tends to humiliate students belonging to Scheduled castes with a number of Upper caste teachers having low expectations of lower caste students in addition to considering them dull and uneducable. These all contribute to low education attainment in children belonging to lower social groups.

In a manner similar to caste, religion also affects access to basic services such as primary education where Muslim children have tended to fall behind Hindus and Christians in access to basic governmental services including education (Desai and Kulkarni 2008; Government of India 2006).

Castes and religion are not the only circumstances which affect the well being and educational attainment of children. Gender is another factor which influences the chances of a child's access to primary education. There is ample evidence of female children being neglected by their family in comparison to the male children when it comes to provide for education and other basic facilities (Das Gupta 1987; Miller 1981; Singh, Hazra and Ram 2008).

Similarly, whether a child is born into rural or urban area affects his/her chances of getting admitted to a good school, and other services, for example, access to electricity and safe drinking water. This happens because the provision for these basic services is much lesser in rural India compared to urban India (IIPS and ORC Macro 2007).

In addition to the above social circumstances, there are some other parental characteristics which affect the overall development of a child. Extant demographic literature suggests 'parental education' as one of the most important determinants of overall development of child (Davis 2005; Eccles 2005; Jejeebhoy 1993; Mukherjee and Das 2008). There can be many channels through which parents affect the attainments of their children, be in terms of cognitive ability; formation of beliefs

and skills, through family culture and investment; genetic transmission of native ability; instillation of preferences and aspirations; or provision of social connection.

Number of siblings is also an important circumstance which may affect the chances of a child's access to education. The evidence of parents selectively sending their children (not all children) to schools and preferring one child above other when it comes to sharing resources including food is not hard to find (Bhat 2002; Jejeebhoy 1993; Knoedel et al. 1991).

Once the exogenous circumstances are identified, the inequality of opportunity in access to primary education can be measured using Inequality of Opportunity and Human Opportunity Indices which are recent developments in the field of equality of opportunity. The Human Opportunity Index (Barros et al. 2009, pp.2)¹ which is a synthetic measure of inequality of opportunity posits that a development process in which society attempts to equitably supply basic opportunities (such as access to primary education) requires ensuring that as many children as possible have access to those basic opportunities. With a target of universalism, it requires distributing available basic opportunities increasingly towards the more disadvantaged groups. The Human Opportunity Index summarizes in a composite indicator two elements: (a) how many opportunities are available, that is, the coverage rate of a basic service; and (b) how equitably those opportunities are distributed (measured by inequality of opportunity index which is a version of dissimilarity index), that is, whether the distribution of that coverage is related to exogenous circumstances. Hence, an increase in coverage of a basic service at the national level will always improve the index. Its distribution sensitivity, however, will ensure that the increase will be more, if the increased opportunities benefit the disadvantaged groups.

The Human Opportunity Index focuses on coverage and inequality of opportunities among children for the following main reasons (Barros et al. 2009, pp.3): First, for children, access defines opportunity because children unlike adults cannot be expected to make the efforts needed to access these basic goods. Second, there is evidence that interventions to equalize opportunity early in the lifecycle are more cost effective and successful than interventions in later stage. Third, focusing on children helps in putting inequality of opportunity at the centre of the policy debate. As pointed out by the World Development Report 2006, on the day of their birth, children cannot be held responsible for their family circumstances, despite the fact that these circumstances, such as, caste, religion, gender, parent's education, and urban or rural location, will make major differences in the lives they lead.

Since, in India there is sufficient evidence that children belonging to different castes, religions, gender, or region may face different levels of opportunities as far as access to primary education is concerned, this study attempts to estimate the extent of inequality of opportunity in access to primary education in India. This has been done for six regions² of India (North, Central, East, North East, West and South) for the year 2005-06 and 1992-93. Estimations at two time points and six regions will bring out a clearer picture about how the inequality of opportunity varies across

¹ Interested readers can also refer Molinas et al. (2010).

² Details of states in each region have been provided in subsection 2.2 on Estimation.

different parts of the country and how it has changed over a period of thirteen years or so. In light of the above discussion the paper is organized as follows: the next section is about the data and the methods, followed by results and final section concludes with further discussion along with policy implications.

2. Data and Methods

Before proceeding to the description and details of the data and the variables used, it is important to describe the Human Opportunity Index³, its components and their estimation.

The component of the Human Opportunity Index which is used to estimate the inequality of opportunity (dissimilarity or difference in access to primary education among children based on circumstances beyond the control of an individual) is a version of the dissimilarity index (D), widely used in sociology and applied to dichotomous outcomes (Barros et al. 2009, pp.5). The D -index measures the dissimilarity in access rates for a given service for groups defined by circumstance characteristics (for example, caste, religion, gender, location and parental education) compared with the average access rate for the same service for the population as a whole. If the equal opportunity principle is consistently applied, an exact correspondence between population and opportunity distribution should be observed. The D -index ranges from 0 to 1 (0 to 100 percentage terms), and in a situation of perfect equality of opportunity, D will be zero.

Access probability gaps are at the heart of the D -index (Barros et al. 2009, pp.5). The D -index is a weighted average of the absolute differences of group specific access rates, p_i (the average probability in the subgroup i that a child will have access to primary education), from the overall access rate, \bar{p} (the average probability in the entire population that a child will have access to primary education). For example, if the two subgroups are rural and urban population (there can be any number of subgroups based on different circumstances or combination of circumstances), p_{rural} (average probability in the rural population that a child will have access to primary education) is less than \bar{p} (average probability in the entire population that a child will have access to primary education) then it captures that the children of rural areas have a much lower probability of having access to primary education than the urban counterparts and the D -index will be higher than zero. There can be as many probability gaps as there are possible combinations of group defining circumstances. The exact procedure to calculate the p_i 's (the average probability in the subgroup i that a child will have access to primary education) is described in the next subsection.

The D -index can be interpreted as showing the fraction of all available opportunities that needs to be reassigned from better-off groups (groups whose access rate is higher than the access rate for the population) to worse-off groups (groups whose access rate is lower than the access rate for the population) to achieve equal opportunity for all.

³ The index was first developed by Barros et al. (2008). Interested readers can also refer Barros et al. (2009) and Molinas et al. (2010).

The Human Opportunity Index (O) combines the above D -index with the average access to opportunities (\bar{p}). The level of opportunity measured by this index can be interpreted as the number of existing 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 access. Another interpretation of the Human Opportunity Index is, as the equal opportunity equivalent coverage of basic goods and services (Barros et al. 2009).

The human opportunity index is given by $O = \bar{p} (1-D)$. On an intuitive level, the human opportunity index takes access to a basic opportunity, the coverage rate, and discounts it if those opportunities are allocated inequitably. Two factors drive the index: for a given level of D , an increase in the prevalence of opportunities (that is, a higher \bar{p}) increases the index, while an improvement in the way existing opportunities are allocated (a reduction in D) will also improve the index. The index is also Pareto-consistent, in the sense that it will improve if the overall average access to a given opportunity increases, no matter how access is distributed, at least someone is better off, and no one is worse off. Moreover, the D -index gives much greater weight to those opportunities allocated to a disadvantaged sector of the population than to those allocated to an advantaged group, and is therefore a distribution-sensitive measure.

2.1 Computing Inequality of Opportunity and Human Opportunity Indices⁴

Assume that there is a random sample of population of children with information on whether a child i has or doesn't has access to primary education ($I_i = 1$ if that child has access to primary education and $I_i = 0$ otherwise) and a vector of variables indicating his/her characteristic/criteria (for example, caste, religion, gender, location, parental education, wealth status of family and number of siblings), the total criteria is m

$$x_i = (x_{1i}, \dots, x_{mi}).$$

Given this information, as is the case with the present study, the predicted probability (conditional on circumstance variables) of access to primary education of a child can be and have been obtained using the following separable logistic model (the specification is chosen in such a way that in all cases, all functions end up being linear in parameters) which has been estimated as the first step for estimating D

$$\text{Ln} \left(\frac{P(I = 1|x_1, \dots, x_m)}{1 - P(I = 1|x_1, \dots, x_m)} \right) = \sum_{k=1}^m h_k(x_k) \quad (1)$$

where x_k denotes a vector of variables representing the k -dimension of characteristics (criteria, that is, caste, religion, gender, urban or rural, average parental education, wealth status and number of siblings). The complete specification has been described in subsection 2.2 (Estimation). Using the

⁴ The inequality of opportunity and human opportunity indices were first developed by Barros et al., 2008 (also, see Barros et al., 2009). The notations are retained in order to maintain coherence.

predicted probability of access to primary education (which itself is obtained from the coefficient estimates of the above logistic model) for every child, the average access rate (\bar{p}) and the inequality of opportunity index (\hat{D}) have been calculated using the following expressions:

$$\bar{p} = \sum_{i=1}^n w_i \hat{p}_i \quad (2)$$

and

$$\hat{D} = \frac{1}{2\bar{p}} \sum_{i=1}^n w_i |\hat{p}_i - \bar{p}| \quad (3)$$

where n is the total population and $w_i = \frac{1}{n}$ or some sampling weights.⁵

Once the average access rate (\bar{p}) and dissimilarity index (D) have been estimated, the Human Opportunity Index can be simply given by

$$O = \bar{p} \cdot (1 - D) \quad (4)$$

It is nothing but the product of average access rate and how equitably the access to basic opportunity is distributed across subgroups. It is important to note that both the dissimilarity index (D) and human opportunity index (O) vary between 0 and 1. If the dissimilarity index is zero, it means that there is perfect equality between children belonging to different subgroups, in terms of access to primary education. A dissimilarity index of 1 is the completely opposite case, therefore a low D -index is desired for any society. D -index is insensitive to a balanced increase in access rate. Balanced increase means that the new opportunities are distributed among circumstance groups in the same way as the preexisting distributions are. Intuitively neither the proportion of population in each group, nor the proportion of population having access to a particular opportunity (out of total having access to the particular opportunity) in each group change as a result of balanced increase in access rate, therefore the inequality of distribution will be insensitive to this type of balanced increase in access rate.

On the contrary a high human opportunity index is desired for any society because it will be high only when the average rate of access is high (\bar{p}) and the inequality in access rates across subgroups (D) is low. The human opportunity index has another desirable property of additive decomposability in terms of decomposability of changes into scale affect (change in average access

⁵ In a strict sense D is not defined when $\bar{p} = 0$. A close substitute D_s , can be used where

$D_s = \frac{1}{2(1-\bar{p})} \sum_{i=1}^n w_i |p_i - \bar{p}|$. The interpretation will change a little where it signifies the proportion of all opportunities which need to be rearranged as a proportion of number of children who don't have access to an opportunity. However if \bar{p} is zero, then the dissimilarity index doesn't make any sense, but the human opportunity index will become zero showing no availability of the opportunity at all (Barros et al. 2009).

rate to primary education) and distribution effect (change in the distribution of access to primary education across subgroups).⁶ The additive decomposability can be shown as follows:

Let O_{t1} and O_{t2} be the human opportunity indices at time $t1$ and time $t2$. The average access rates to primary education being \bar{p}_{t1} and \bar{p}_{t2} and the dissimilarity indices being D_{t1} and D_{t2} at time $t1$ and $t2$ respectively.

Then the change in human opportunity index during time $t1$ and $t2$ can be decomposed as,

$$O_{t2} - O_{t1} = \bar{p}_{t2}(1 - D_{t2}) - \bar{p}_{t1}(1 - D_{t1}) \text{ which can be rewritten as,}$$

$$= [\bar{p}_{t2}(1 - D_{t1}) - \bar{p}_{t1}(1 - D_{t1})] + [\bar{p}_{t2}(1 - D_{t2}) - \bar{p}_{t2}(1 - D_{t1})] = [\Delta_{\bar{p}}] + [\Delta_D] \quad (5)$$

where $\Delta_{\bar{p}}$ = scale effect and Δ_D = distribution effect.

2.2 Estimation

The research is based on India and uses data from two rounds (Ist round: 1992-93, and IIIrd round: 2005-06) of National Family Health Survey (NFHS). These surveys are nationally representative and cover more than 99 % of India's population. The two rounds of NFHS are reliable in terms of sample size, survey design, coverage etc. as well as very rich in terms of variables concerned (child's education, child's anthropometric measures like height and weight, caste, religion, gender, urban-rural residence, wealth status, parental education, etc.).

The estimates obtained from the two rounds of NFHS are comparable because both the rounds followed comparable sampling design to select households and individuals for the interview (Mishra et al. 2004; Ram and Roy 2004). The NFHS followed Stratified Probability Proportional to Size (PPS) systematic sampling design. More than 85,000 households were covered in each of the rounds of NFHS. The household response rate in NFHS 2005-06 was 96 percent or higher in all the states. The individual response rate was 95 percent for the country as a whole (IIPS and ORCMacro 2007). The household and eligible women responses rates in NFHS 1992-93 were 96 percent (IIPS and ORCMacro 1995). So, the response rates in the two rounds of NFHS were very similar.

Since NFHS used a multistage sampling design and the design being self-weighting only at the domain level; the domains being urban and rural areas of each state and slum and non-slum areas of eight selected cities in NFHS 2005-06 and urban and rural areas in NFHS 1992-93, it is very important to use appropriate weights to make the estimates representative and comparable over the two survey rounds. Appropriate weights (already given in the two rounds of NFHS) were used while generating all the estimates presented in the paper (IIPS ORCMacro 1995 and 2007). The details of the sampling weights in the two rounds are given in the respective NFHS reports.

India is comprised of 29 states and seven Union Territories. The different states of India are at different levels of socio-economic development; most of the western and southern states of India are economically and demographically advanced than the northern and eastern states of India (Bhat and

⁶ See Barros et al. (2009) for greater details.

Zavier 1999; Bose 1991; Pathak and Singh 2009). So, any meaningful analysis should take into account the vast regional diversity present in India. To take care of this regional diversity, present analysis was carried out for India as a whole and separately for the six major geographic regions of India namely North, Central, East, North-east, West, and South. Northern region comprises of states of Jammu & Kashmir, Himachal Pradesh, Delhi, Uttaranchal, Punjab, Haryana and Rajasthan. The states of Uttar Pradesh, Madhya Pradesh and Chattisgarh come under the central region. The Eastern region comprises of states of Bihar, Jharkhand, West Bengal and Orissa. The North-eastern region includes the seven north-eastern sister states namely Assam, Arunachal Pradesh, Meghalaya, Manipur, Tripura, Nagaland and Sikkim. The Western region includes states of Maharashtra, Goa and Gujarat. Finally, the Southern region comprises of states of Andhra Pradesh, Karnataka, Kerala, Tamil Nadu and Pondicherry. The sample sizes for each region were large enough to carry out the bivariate and multivariate analysis presented in the paper.

The dependent variable used in the analysis is completing fifth standard on time (to capture inequality in access to primary education). For analytical purposes, the children (between 10 and 12 years of age) who completed fifth standard before 12 years of age were considered as 'completed fifth standard (primary school) on time'. The age group of 10-12 years was taken considering the fact that the normal age for admission in 1st standard in India is 5 years. Completion of fifth standard on time was given preference over attendance rate because, if a child is not in a good school or doesn't have access to capable teachers who can motivate him/her to study or his/her parents are uneducated (circumstances beyond the control of a child), s/he may take more time for completion of studies than a child in a good school with capable teachers and educated parents. Therefore completion of fifth standard (primary school) on time captures the access to primary education in a better way than the school attendance in fifth standard.

The independent variables used in the analysis are caste of the household head (categorized into scheduled castes, scheduled tribes, other backward castes, and general; scheduled castes as reference category), religion (categorized into Hindu, Muslims, Others; Hindu as reference category), sex of the child (male and female; female as reference category), place of residence (rural-urban; rural as reference category), wealth quintiles (categorized into poorest, poorer, middle, richer, richest; poorest as reference category), average parental education (categorized into 0 years, 1-4 years, and greater than 4 years of education) and number of siblings (continuous). All the variables except 'average parental education' and 'number of siblings' were converted into dummy variables for inclusion into the logistic regression models. The variables 'average parental education' and 'number of siblings' were treated as continuous variables in the logistic regression models. However for generating bivariate results, average parental education was treated as a categorical variable having three categories as mentioned above. The NFHS 1992-93 included 'other backward castes' into 'general' category. Therefore, no estimates for 'other backward castes' were generated in NFHS 1992-93.

In the absence of direct data on income or expenditure in DHS, the wealth index based on the ownership of household assets is largely used as a proxy for assessing the economic status of the households (Filmer and Pritchett 2001; Howe et al. 2009; Montgomery et al. 2000; Rutstein and Johnson 2004; Vyas and Kumaranayake 2006). This index was constructed using household asset data and housing characteristics. Each household asset is assigned a weight generated through principal components analysis (Filmer and Pritchett 2001; Vyas and Kumaranayake 2006). Each household is then assigned a score for each asset, and the scores are summed for each household; individuals are then ranked according to the total score of the household in which they reside. The sample is then divided into quintiles i.e., five groups with an equal number of individuals in each (IIPS and ORCMacro 2005-06). The wealth quintile is already generated and is given in the NFHS 2005-06 dataset. Same methodology was adopted to create a comparable estimate of wealth quintile in NFHS 1992-93.

Using the predicted probabilities from the logistic regression analysis, inequality of opportunity (dissimilarity index) was estimated in access to primary education for the years 1992-93 and 2005-06.⁷ Also, Human Opportunity Index was computed for access to primary education for the aforesaid years. This was done separately for each of the six geographical regions of India. Further, the change in the human opportunity index for India and its six regions was decomposed into scale effect and distribution effect to gauge the nature of change. The next section presents the main findings of the analysis.

3. Results

The percentage distribution of children by their socio-economic characteristics in NFHS I and NFHS III are presented in Table 1 [Insert table 1 here]. A comparison of the two samples clearly suggests that, except for few exceptions, the distribution of children by their socio-economic characteristics remained same across the two NFHS rounds. The religious and gender distribution remained almost same during the two periods. An increase of eight percentage points was observed in the percentage of children belonging to the 'scheduled castes' in NFHS III. The percentage of 'scheduled tribes' in the sample remained almost same. However, the combined percentage of 'other backward castes' and 'general' declined by almost eight percent during the two survey rounds. The results suggest that India is still predominantly rural. Around three-fourths of Indian children were living in rural areas in the two rounds of NFHS. The percent of children belonging to urban areas increased marginally during the two NFHS rounds.

Parental education is considered as one of the most important variable in explaining the performance of children in terms of health, nutrition and education. The descriptive statistics presented in Table 1 suggest that the average parental education increased by only 'one' year during

⁷ The regression results were as per expectations and can be provided on request.

the last thirteen years (i.e. during 1992-93 to 2005-06). The average parental education was only four years in 1992-93 which increased to approximately five years in 2005-06. Results show very low levels of education among the parents of sampled children. However, there are some positive signs of improvement. The percentage of children with parents having four or more years of schooling increased from 39% in 1992-93 to 48% in 2005-06. On the other hand, the percentage of children whose parents had no formal education declined from 32% in 1992-93 to 25% in 2005-06.

Access to education has been measured by whether a child has completed fifth standard on time. Table 2 [insert table 2 here] presents the variation of average access to education across children with different socio-economic characteristics. The average access to education was found to be very low in India; just 28% and 33% of children in India completed their fifth standard on time in 1992-93 and 2005-06 respectively. Not only was the access to primary education low, no significant increase was found in the access to primary education during the last 13-14 years period.

A region level analysis shows large disparities in completing fifth standard on time among children of different regions. The southern region was found best with 62% of children belonging to this region completing fifth standard on time in 2005-06. The improvement in completing fifth standard on time was also found to be highest in the southern region; the percentage of children completing fifth grade in time increased by 22 percentage points (52.5%) during 1992-2006. This compares with 3, 8, 8 and 3 percentage points increase in western, northern, northeastern, and central regions respectively. The eastern region fared worst in terms of access to primary education. In addition, it was the only region that registered a decline in access to primary education during 1992-2006. The figures for central and northeast regions were also low with only 25% and 31% children completing fifth standard on time in 2005-06.

The average access to primary education was also found to vary by caste and religion of the children. As usual, the probability of completion of fifth standard on time was found to be higher among children belonging to 'general caste' and children belonging to Hindu religion compared to their counterparts. The highest increase in access to primary education was observed among children belonging to 'scheduled castes' and children belonging to Hindu religion. Of note is the incredibly lower average access to education among children belonging to the 'scheduled tribes' (21.6% percent in 2005-06) compared to the children belonging to 'general castes' (the figure for 'general castes' being 37.7%). It is surprising to note that the average access to education during 1992-2006 declined for children belonging to 'nonhindu and nonmuslim' religious categories.

That the gender differences in access to primary education were not significant in 2005-06 is worth mentioning. Approximately 33% and 34% of male and female children completed their fifth standard on time in 2005-06. Interestingly, the gender divide in access to primary education has narrowed down during the 1992-2006 period; female children registering higher increase in access to primary education than male children during this period. On the contrary results suggest urban-rural divide in access to primary education in both the periods; 43 % of children residing in urban areas

compared to only 30% of children residing in rural areas had access to primary education in 2005-06. The urban-rural difference in access to primary education declined during 1992-93 to 2005-06.

Wealth status was also found significant in explaining the variations in access to primary education. The children belonging to richest wealth quintile were significantly more likely than children belonging to poorest wealth quintile to have access to primary education. For example, 51% of children belonging to richest wealth quintile had access to primary education compared to only 17% of children belonging to poorest wealth quintile in 2005-06. The situation was similar in 1992-93 as well.

Demographic and economic literature from across the world suggests parental education as one of the single most important predictor of their children's school performance. The results obtained in this study also support the above finding. The children whose parents had four or more years of education were more than 2 times as likely as children whose parents had no formal education to complete their fifth standard on time in 2005-06. The situation was even worse in 1992-93 when the average access to education for the children with parents having no formal education was only 12% compared to the 46% for the children with a average parental education of 4 or more years. Further, the extremely low average access to education (19.6% in 2005-06) for the children with parents having no formal education raises question about the intergenerational mobility in education in India.

The inequality of opportunity in access to primary education is presented in Table 3 [insert table 3 here]. The inequality of opportunity in access to primary education in India declined from 26% in 1992-93 to 19% in 2005-06. The result suggests that 19% of the total opportunities need to be transferred from the better off groups to the worse off groups in order to achieve equity in access to education. The regional variations were stark with southern region performing much better than the other regions (not only the levels were lower, but also the decline was highest in the last 13-14 years). The southern region registered a decline in inequality of opportunity from 19% in 1992-93 to 8% in 2005-06. On the contrary, there is the eastern region where the inequality of opportunity was found to be highest (29% in 2005-06). All the other regions lied between the southern and eastern regions and registered decline (including eastern region) in inequality of opportunity during 1992-2006.

The human opportunity index data presented in Table 4 [insert table 4 here] depict low levels of index in India (26.9% in 2005-06). The only encouraging fact is the improvement in human opportunity index over the two NFHS rounds. The human opportunity index for India increased from 21% in 1992-93 to 27% in 2005-06. The increase in the index is also important because the increase is due to improvement in both the components, the average availability in access to primary education (completion of fifth standard on time) for the children increased from 28% to 33% and inequality of opportunity decreased from 26% to 19%. Though the increase is encouraging but it is far from satisfaction as only 27% of the total opportunities needed to ensure universal access to primary education were available and equitably distributed in 2005-06.

There is large amount of dissimilarity in Human Opportunity Index in education across different regions of India. At one end of the spectrum was the southern region with a human opportunity index (2005-06) of 57% and at the other extreme was the eastern region with the index value of 13%. As usual, the southern region showed highest increase in the index during the thirteen year period whereas the eastern region showed the lowest increase. The improvement in southern region came because both the average level of opportunities and inequality of opportunity improved substantially (the average access to education increased from 40.6% to 61.9%, an increase of 21.3 percentage points or 52.4% and inequality of opportunity decreased from 18.8% to 7.9%, a decrease of 10.9 percentage points or 58%). Whereas, in the eastern region, the marginal increase came only because of an improvement in the inequality of opportunity (a decrease of 8.8 percentage points or 23.2%) with the average access to education actually decreasing from 19% in 1992-93 to 18% in 2005-06 (a decrease of 1.0 percentage points or 5.1%). All other regions also registered increase in human opportunity index during 1992-2006. However, the improvement in human opportunity index took place at varying levels in the four regions of the country.

Since, the study is based on the framework proposed by Barros et al. (2009), it is important to compare our results with the findings of the aforesaid study which is based on Latin America and the Carribean (LAC). The human opportunity index (completing sixth grade in time in case of LAC) varies from 24% in case of Guatemala to more than 75% in case of six LAC (Jamaica, Mexico, Argentina, Chile, Ecuador and Uruguay) countries, Jamaica being highest (86%). The human opportunity index (completing fifth grade on time) in case of India as a whole is 27% which is barely 3% higher than the most unequal (least human opportunity index) country (Guatemala) among the LAC. If different regions of India are considered then it goes to as low as 13%. The reason probably lies in the complex division of Indian society (since historical times) along caste and religious lines and its resulting effects (including social exclusion and discrimination). The phenomenon has already been discussed at great lengths in the introduction section so it adds no value to repeat it gain. However, the one thing which needs to be emphasized here is that the Indian society is required to put more efforts than their counterparts in LAC if the goal of equality in access to primary education has to be realized.

4. Discussion and Conclusion

The present study uses two unique and new indices, namely inequality of opportunity index and human opportunity index, to measure inequality of opportunity among Indian children in access to primary education (measured in terms of completing fifth standard on time). The earlier socio-demographic and economic studies have used measures like rich-poor ratio, concentration curves and concentration indices to measure inequality in access to various child services. This study for the first time (for India) has used the above mentioned new indices to actually examine the inequality in opportunities in access to primary education. The advantage of using these new measures over the

earlier measures is that these measures directly inform the policy makers about the magnitude of the opportunities that need to be transferred from the favorable to the less favorable groups to achieve equality. Similarly, the human opportunity index suggests what proportions of the opportunities that are required to achieve equality were available and equitably distributed between the various population subgroups. In addition, the use of data from the two NFHS rounds which were 13-14 years apart gives a unique opportunity to examine changes in the access to primary education during the economic reform period. The NFHS 1992-93 round provides evidence for the pre-reform period. The estimates for the post-reform period can be obtained from 2005-06 round of NFHS. Again the findings based on these new indices can throw useful insights for improving the policies and programmes related to societal welfare in general and child welfare in particular.

Studies have shown that India has achieved noteworthy advancement in the field of science, agriculture, medicine, information technology, and unprecedented economic growth over the past decade (CSNSI 2008). The implementation of the new economic policy in 1991 by the Government of India led to such remarkable improvements in the Indian economy during the last two decades. The Indian economy has grown steadily at healthy rate and the per capita income has doubled during the post reform period. Recent studies (Ahluwalia 2002; Ghosh and Chandrasekhar 2003; Sen and Himanshu 2005; Pal and Gosh 2007) have shown that, despite such an impressive economic growth, the economic inequalities and regional disparities have enlarged in India during the post reform period. The findings of the present study also show that despite India's economy growing at such a faster rate the inequality of opportunity measured in terms of access to primary education remained high and did not change dramatically during the last 13-14 years. In addition, the findings suggest large inter-regional disparities in access to primary education in Indian children. The inequality of opportunity ranged from 8% in the southern region to 29% in the eastern region. The central region and the northeastern region also performed poorly in comparison to the other remaining regions.

The human opportunity index values also present some very important and significant findings related to access to primary education among Indian children. The human opportunity index values remained at low levels and did not register substantial improvement over the post reform period. Only the region of south had equal opportunity equivalent coverage of primary education (human opportunity index) at more than 50%. The southern region not only had the highest human opportunity index values but also registered highest improvements in the human opportunity index during the post reform period. The regions like central and eastern regions which were lagging behind in socio-economic and demographic development were also the regions having low human opportunity index values. It is clear from the results that the developed states and developed regions not only had more opportunities but were also more likely to have those opportunities equitably distributed.

The components of change (scale effect and distribution effect) in human opportunity indices which can be seen from Table 5 [insert table 5 here] throw some further light on the nature of change

during the thirteen year period or so. For the regions apart from central and east, the major source of increase (more than 50%) in human opportunity index was due to positive scale effect, that is, due to increase in average access to primary education (though the equality of distribution also increased, its contribution was lower than scale effect). The regions of central and east which are the lowest in the ranking of human opportunity index are the only regions for which the major source of increase was the positive distribution effect, that is, the increase due to increase in equality of distribution. Eastern region which has fared worst is the one and only region with at least one component negative. It has shown decrease in average access to primary school and therefore negative scale effect. For all other regions both the scale effect and distribution effect were positive (increase) which is an encouraging sign.

Coming to the effect of individual circumstances, parental education was found to have substantial effect on access to primary education. The findings are consistent in the light of findings from studies conducted in various settings in India and abroad (Davis 2005; Eccles 2005; Jejeebhoy 1993; Mukherjee and Das 2008; Shavit and Blossfeld 1993). The findings further suggest that less than 50% of the children had access to primary education. Even the access to primary school varied considerably across the important socio-economic characteristics considered in the analysis. The access to primary education was found to vary considerably across the caste and religious category to which the children belonged. The gap between children belonging to Scheduled castes/Scheduled Tribes and General castes has remained large. The children belonging to the 'muslim' religious category were less likely to have access to primary education than the children belonging to 'hindu' religious category. This again leads to a debate on inequitable distribution of access and availability of basic opportunities to children of various religious groups. The findings are consistent in the light of the Government of India's recent report (Government of India 2006) which suggests that 'muslims' have tended to fall behind 'hindus' and 'christians' in access to basic governmental services including education. The findings are also consistent with other recent studies (Desai and Kulkarni 2008) which indicate that the educational gap between hindus and muslims continued and sometimes expanded. Wealth status of household was also found to have considerable effect on the inequality of opportunity and human opportunity index. This finding becomes significant in the light of the 'Right to Education Act' enacted by the Government of India with effect from April 01, 2010 which is considered to be one of the most significant land mark in the history of independent India. The 'Right to Education Act' promises free and compulsory education to all children 6 to 14 years of age. By implementing this act the government of India has shown its commitment towards providing basic education to all children and thereby investing in the future of the country.

The findings of the current study are very relevant and have significance for the various policies and programmes implemented in the country since independence. The findings provide clear clues for the improvement of existing policies and implementing region specific policies. Results clearly suggest considerable regional variations in access to primary education. So, policies and

programmes made at the national level are less likely to be effective in reducing the inequality of opportunity and improving the human opportunity index at the regional level. Policies and programmes catering to the need of specific regions are the need of the hour. It is important and useful to review the policies and programmes successfully implemented in the southern states and the strategies adopted to make these programmes successful. Such review may help the central and eastern states to better formulate and implement their policies and programmes to reduce the inequality in opportunity. Further, special thrust is required for the central and the eastern regions which comprise more than 50% of the India's population. India's average values are less likely to change unless significant improvements are registered in these two regions of the country.

Findings also suggest the importance of providing basic education to the general masses of the country. Education of the parents came out to be one of the decisive factors in access to primary education. So, increasing the educational level of the population is likely to reduce a substantial proportion of the inequalities in opportunities and also likely to increase the access to basic opportunities such as education. The programmes like 'Sarva Siksha Abhiyaan', 'Night Schools', and other 'Literacy' related campaigns are likely to pay dividends in educating the masses in general and parents of younger children in particular, thereby increasing the access to education and reducing inequality of opportunity among the Indian children.

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Table1. Percentage Distribution of Socio-economic characteristics of Children (NFHS 1992-93 and NFHS 2005-06)

Characteristics	NFHS 1992-93	NFHS 2005-06
	Education (Completion of 5 th standard on time)	Education (Completion of 5 th Standard on time)
Caste		
SC	12.39	20.50
ST	8.40	8.48
OBC	NA	42.65
General	79.21	28.37
Religion		
Hindu	80.14	78.43
Muslim	14.12	16.51
Others	5.73	5.06
Gender		
Female	47.84	47.27
Male	52.16	52.73
Place of Residence		
Rural	73.94	72.75
Urban	26.06	27.25
Wealth Quintiles		
Poorest	20.64	23.91
Poorer	20.46	22.80
Middle	19.47	20.03
Richer	19.50	18.35
Richest	18.93	14.90
Mean Parental Education		
Mean Value	3.69	4.24
0	34.52	30.55
1-4	30.92	29.98
>4	34.56	39.68

NA: Not Applicable, General in NFHS 1992-93 also includes OBC

Table 2. Crosstab of different outcome variables with the socio-economic variable of children, India, NFHS 1992-93 and NFHS 2005-06

Characteristic	NFHS 1992-93	NFHS 2005-06
	Education (Completion of 5 th standard on time)	Education (Completion of 5 th standard on time)
Caste		
SC	22.57	31.05
ST	14.79	21.64
OBC	NA	34.38
General	30.42	37.67
Religion		
Hindu	28.57	34.98
Muslim	21.68	25.18
Other	37.87	35.71
Sex		
Female	25.17	32.82
Male	30.89	33.93
Place of Residence		
Rural	23.42	29.89
Urban	41.32	42.78
Quintile		
Poorest	11.33	17.05
Poor	17.40	27.55
Middle	23.59	36.72
Rich	36.49	44.38
Richest	57.83	50.61
Mean Parental Education		
0	12.36	19.60
1-4	24.71	30.96
>4	46.46	45.85
Region		
North	25.76	33.54
Central	22.17	25.18
East	19.52	18.48
North East	23.26	30.88
West	36.21	39.04
South	40.61	61.92
India	23.20	33.40

NA: Not Applicable

Table 3. Index of Inequality of Opportunity (D, in percentage) in India and its six regions (1992-93 and 2005-06)

Region	Primary Education (Completion of 5th grade on time)		
	NFHS 1992-93	NFHS 2005-06	Increase in percentage points
North	26.7	18.8	-7.9 (-29.6)
Central	30.5	20	-10.5 (-34.4)
East	38.0	29.2	-8.8 (-23.2)
North East	27.6	21.8	-5.8 (-21)
West	20.9	16.6	-4.3 (-20.6)
South	18.8	7.9	-10.9 (-58)
India	26.2	19.3	-6.9 (-26.3)

Note: The figure in parenthesis is the percentage increase.

Table 4. Human Opportunity Index (O-Index*) in percentage) for India and its six regions (1992-93 and 2005-06)

Primary Education (Completion of 5th Standard on time)			
Region	NFHS 1992-93	NFHS 2005-06	Increase in percentage points
North	18.9 (25.8, 26.7)	27.2 (33.5, 18.8)	8.3 [43.9]
Central	15.4 (22.2, 30.5)	20.1 (25.2, 20)	4.7 [30.7]
East	12.1 (19.5, 38)	13.1 (18.5, 29.2)	1.0 [8.3]
North East	16.9 (23.3, 27.6)	24.2 (30.9, 21.8)	7.3 [43.2]
West	28.6 (36.2, 20.9)	32.5 (39.0, 16.6)	3.9 [13.6]
South	32.9 (40.6, 18.8)	57.0 (61.9, 7.9)	24 [72.9]
India	20.8 (28.2, 26.2)	26.9 (33.4, 19.3)	6.1 [29.5]

Notes: 1.*The *O-index* is given by $O = \bar{p} \cdot (1 - D)$

2. Figures in parenthesis (,) represent the average access rate, \bar{p} and index of inequality of opportunity, D .

3. Figures in parenthesis [] represent the percentage increase.

Table5. Decomposition of change in Human Opportunity Index (*O-Index) in access to Primary Education into Scale effect and Distribution Effect**

Region	Human Opportunity Index, (O_{t1})	Human Opportunity Index, (O_{t2})	Overall Increase ($\Delta = O_{t2} - O_{t1}$)	Decomposition of Increase into Scale Effect and Distribution Effect ($\Delta = \Delta_{\bar{p}} + \Delta_D$)			
	NFHS 1992-93	NFHS 2005-06	1992-93 to 2005-06 (Percentage points)	Scale Effect ($\Delta_{\bar{p}}$ ** (Percentage Points)	(As percentage of overall increase)	Distribution Effect (Δ_D *** (Percentage points)	(As percentage of overall increase)
North	18.9 [25.8, 26.7]	27.2 [33.5, 18.8]	8.3 [43.8]	5.6	67	2.7	33
Central	15.4 [22.2, 30.5]	20.1 [25.2, 20]	4.7 [30.7]	2.1	45	2.6	55
East	12.1 [19.5, 38]	13.1 [18.5, 29.2]	1.0 [8.3]	-0.6	-60	1.6	160
North East	16.9 [23.3, 27.6]	24.2 [30.9, 21.8]	7.3 [43.2]	5.5	75	1.8	25
West	28.6 [36.2, 20.9]	32.5 [39.0, 16.6]	3.9 [13.6]	2.2	56	1.7	44
South	32.9 [40.6, 18.8]	57.0 [61.9, 7.9]	24 [72.9]	17.3	72	6.7	28
India	20.8 [28.2, 26.2]	26.9 [33.4, 19.3]	6.1 [29.5]	3.8	62	2.3	38

Notes: 1. * The O-index is given by, $O = \bar{p} \cdot (1 - D)$

2. **The scale effect, $\Delta_{\bar{p}} = \bar{p}_{t2} (1 - D_{t1}) - \bar{p}_{t1} (1 - D_{t1})$, the change in *O-index* due to change in average access rate (\bar{p}).

3. ***The distribution effect, $\Delta_D = \bar{p}_{t2} (1 - D_{t2}) - \bar{p}_{t2} (1 - D_{t1})$, the change in *O-index* due to change in equality of distribution ($I-D$).

4. The Figures in parenthesis [,] represent the average access rate, \bar{p} and index of inequality of opportunity, D .