INTERGENERATIONAL MOBILITY IN EDUCATION IN INDIA

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1. Introduction

India's rapid economic growth since the 1980s has been accompanied by increasing inequality in *outcomes*, raising widespread concern that it may be a reflection of growing inequality in *opportunities*. Inequality in opportunities across people – when different groups (e.g., caste, gender, or class) have unequal chances of acquiring assets, earn unequal returns to assets (for similar effort), or have unequal access to basic services — is of concern for intrinsic reasons and also because it may have an instrumental impact on the development process (World Bank, 2005). It is particularly important for India which stands out as a society deeply stratified by caste which has historically been associated with poor outcomes and very low mobility (Gupta, 2004).[2]

In this paper, we focus on one dimension of inequality of opportunities – acquisition of human capital. One natural way to assess inequality in opportunities for investment in human capital is to examine how educational outcomes vary across different groups (by location, caste, gender, and class) of individuals, controlling for other factors that influence the demand for schooling. An additional lens is to study the impact of parents' education on a child's education, to ask whether inequality in human capital in today's generations reflects very unequal opportunities that individuals inherit from their parents. This approach, of focusing on inter-generational education mobility to understand inequality in opportunities, has been followed in several papers that focus on Latin America (e.g., Behrman et. al, 2000) and on Brazil in particular (Bourguignon et. al., 2003).

Following a similar approach, we use the 1992-93 and 1998-99 National Family Health Surveys to look at inequalities in educational outcomes across groups of individuals and the perpetuation of these inequalities across generations. We pay special attention to the roles of caste and class, asking whether particular caste or wealth groups have experienced

lower education mobility, and whether these factors still matter once parental education is controlled for.

There are three main results. Education mobility across generations has increased significantly and consistently. And in sharp contrast to its image of low social mobility, our estimates show India to have average, or above average mobility when compared to estimates from similar studies of other countries. Furthermore, while there is indeed evidence of inequality of opportunities by caste or social group, education gaps are not that large once other attributes are controlled for. In magnitudes, the most striking gaps arise not between castes but between rich and poor, suggesting that at least outright discrimination against backward castes is not widespread. However, another critical attribute that matters to schooling is wealth, which has not shown dramatic improvements over the last decade particularly for the lower castes. Thus while not motivated primarily to counter discrimination, there may still be a role for government programs to target improvements in enrollments for backward castes.

Despite the obvious importance of inter-generational education mobility, limited empirical work has been done in this area on India. Knowing the importance of family background characteristics (such as parental education) for human capital investments, and the mechanisms through which inter-generational transmission matters, should inform the choice of policies between correcting the market failures that lead to structural differences in opportunity, or pursuing some forms of redistribution (e.g., assets, access to services).

The paper is organized as follows. In section 2, we describe trends in educational outcomes in India, over time and across social groups. Section 3 describes the methodology and data used in the study. Section 4 is a description of our empirical results, which are subjected to a series of robustness checks in Section 5. Section 6 concludes.

2. Setting the Context: Trends and Disparities in Educational Outcomes

Over the last half-century, educational outcomes – as measured by the time a person spends in school – have improved considerably in India. The mean years of schooling have grown noticeably across successive generations, for both men and women, in both rural and urban areas (Table 1 and Figure 1).[3] Gender gaps in urban areas have shrunk over time: the most significant gains were among urban females for whom the number of years of education grew by 1.3 years per decade, whereas that of urban males increased by less than half that rate at 0.5 years per decade. In rural areas, mean years of schooling grew at comparable rates for both men and women.

During this period, the reach of the schooling system has vastly expanded. "Education for All" has been a political mantra for successive governments that have introduced a series of educational interventions focused on getting children into school (midday meals, free textbooks, free uniforms etc). The most recent centrally sponsored initiative has been the Sarva Shiksha Abhiyan (SSA) to expand enrollments, and ultimately raise learning achievements.[4] At the same time, the private sector has expanded, absorbing in urban areas over 40 percent of students enrolled in elementary school.

Improving educational outcomes, however, remains a key development challenge in India. Despite improvements, elementary education is far from universal and educational achievement continues to be highly uneven. Average years of schooling vary a great deal by region (urban vs. rural), class, caste, and gender. In general, educational outcomes tend to be worse in rural areas, among women, and for the disadvantaged castes, notably the "scheduled castes" (SC) and "scheduled tribes" (STs) (Table 1).[5]

The pace of improvement in schooling has also been uneven across groups. The results in Table 1 and Figure 1 show that all social groups have experienced growth in education outcomes but at different rates. ST women stand out as a particularly disadvantaged group: the average rural forward caste (FC) woman born in 1980 has about 6 years of schooling while an ST woman in rural areas only has one-third that level of schooling. Caste-based differences in mean years of schooling and divergence across social groups in this measure over time is all the more striking considering that pupil incentives and reservation policies have often been targeted in favor of scheduled castes (SCs) and scheduled tribes (STs).

The number of years a child spends in school is only one measure of educational outcomes. Enrollment does not guarantee learning, and existing literature on learning outcomes in India suggests that overall achievement is very low. A recent survey tested children from almost all districts from India and reports low levels of learning: 52 percent of children between the ages of 7 and 10 could read a short paragraph at Grade I difficulty, 32 percent could read a story text, and 54 percent were unable to divide or subtract (Pratham, 2005). There is little consensus on the nature and extent of socio-demographic variation in achievement levels, with some studies reporting better learning outcomes for boys and students from upper castes, while in others there are no gender or caste differences (see Das et. al. 2006 for summary of studies).

A full understanding of the inequality in educational opportunities would require focusing on educational quality and learning outcomes. But while many household surveys

reveal who joins schools and how long they stay, information on the basic competencies they acquire in school is typically not available. Years of schooling remains an important indicator to monitor and understand in the Indian context where a large number of children still do not complete the requisite years of school. But, we also caution that our focus on the changes in mobility captured by this measure represents a very partial picture of educational outcomes.

To what extent is the increase in years of schooling across cohorts related to rising education mobility across generations? And to what extent do differences in educational outcomes across social groups relate to very unequal opportunities that individuals inherit from their parents? We turn to these questions in the remainder of the paper.

3. Estimating Inter-generational Education Mobility: Methodology and Data

3.1 Methodology

To examine inequalities in educational outcomes across groups of individuals and the perpetuation of inequalities across generations, we rely on a multivariate model, estimated as OLS, and specified as:

$$C_i = \alpha + \beta M_i + \gamma F_i + \varphi' SG_i + \theta' W_i + \nu' Sib_i + \delta' Child_i + \eta' HH_i + \lambda' Village_i + cohort\ effects\ (\text{date of birth of child, parents}) + error \quad (1)$$

where C_i is the number of years of education of child i, M_i is the years of education of the mother and F_i is the years of education of the father. The coefficients β and γ that relate the education level of children to that of parents are (inverse) measures of inter-generational mobility. A higher value for the coefficients implies that parental education has stronger effects on the schooling of their children, and therefore implies less mobility. Since education of both parents and children is measured in number of years of schooling, the extent to which these coefficients are less than unity describe how fast differences in education tend to systematically lessen across generations. A unit value for the coefficient would mean that a one year difference in the schooling of parents results in a difference of one year in the child's schooling – an indicator of perpetuation of educational outcomes across generations. Conversely, a coefficient less than unity means that educational differences tend to diminish across generations.

Estimating equation (1) for successive cohorts allows us to ask whether the increase in the educational level of successive cohorts been accompanied by more or less inequality of opportunities or if it corresponds to a uniform upward shift in schooling achievements, with constant inequality of opportunities.

Equation 1 also allows us to decompose average years of schooling into differences across population sub-groups. Following the recent literature on equality of opportunities, we focus on two subgroups: caste/ethnicity and class or wealth. For intrinsic reasons, we believe that differences across children in these attributes should not affect their opportunities in life.

Gaps in schooling outcomes between these groups are picked up in the coefficients of the relevant attribute (social group dummies SG_i and wealth category dummies W_i) in equation (1). The coefficient suggests the extent to which two children with the same observable characteristics (controlled for in the regression) still exhibit a difference in their length of stay in school due to (say) their caste status.

To isolate the association of child's schooling with parental education, caste, and wealth, equation (1) also includes a number of other controls at the child, household, village, and state level. Cohort effects, captured by child age and ages of mother and father are introduced to control for trends in paternal, maternal, and child education. $Child_i$ and Sib_i are vectors of child and sibling characteristics to control for birth order related effects, including the birth order of the child, a dummy for whether the child is the oldest child in the family, and average years of schooling of older male and female siblings. These variables are included because of well know differences in the demand for schooling by birth order. In addition, the regression includes HH_i a vector of household characteristics that includes dummy variables for religion. In contrast to much of the literature on intergenerational mobility for developed countries, because access to schooling facilities is not universal, we control for indicators of school availability at the village level.

The regressions are estimated at the All-India level, separately for rural and urban areas, and by gender. Each regression includes state fixed-effects.

3.2 Data

We rely primarily on the 1998-99 National Family Health Survey (NFHS) for India in our analysis. The NFHS sample frame covers 99 percent of India's total population, with large enough samples designed to be representative at the state level. The household survey has a sample size of more than 80,000 ever-married women in the age group 15-49 years. Rural and urban samples in each state are drawn separately. As discussed later, we also make

limited use of the 1992-93 NFHS in the regression analysis for robustness checks of the specification in equation (1).

Although the primary goal of the NFHS was the collection of data on fertility and child health from a primary female respondent from each household, questions on educational history were asked about all household members. These questions allow us to calculate the number of years of schooling for every individual in the sample. The NFHS also includes the standard data on household characteristics (caste/ethnicity, religion, and demographics), characteristics of the household's dwelling, and ownership of various assets. We use data on household demographics to calculate birth order for every child in the sample, as well as characteristics of siblings both older and younger siblings. Children of all parities are included in the sample but birth order and sibling characteristics are included as regressors, as described above.

Since the goal is to estimate the relationship between child and parental education, it is important to control for economic status. The NFHS does not collect direct information on household consumption expenditures or household income. However, the data on household ownership of various assets and characteristics of the household's dwelling can be combined through principal components to proxy for household wealth (Filmer and Pritchett, 1999). Each household is assigned to a wealth class depending on whether their value of their index places them in the bottom 33 percent, the middle 33 percent or top 33 percent of households in India.

The NFHS also included a community level survey which collected information on a range of village infrastructure, including availability and distance to schools. We use the information on presence of different school types (primary, middle, and secondary) in the village of residence of the individual to control for access to schools for children.[6] For urban areas, since facility data were not collected, we control for whether the household is in a slum area or a metropolitan area.

The NFHS is reasonably well suited, but not ideal, to studying inter-generational mobility which requires data on both child and parental educational education outcomes. Since respondents are not asked directly about the education of their parents, parental outcomes are only known for child-parent pairs that are still living in the same household. The survey includes a question on how every person in the household is related to the head of household. Based on responses to this question, we can identify three types of child-parent pairs with certainty: (i) household head and his/her children, (ii) children of head and their children (i.e., grandchildren of household head), and (iii) household head and his/her parents.

Children who are not related to the household head in these three ways are excluded from the analysis. We also exclude adopted or foster children from the sample.

The main concern with the data is that the sample of individuals whose parents can be clearly identified may be non-random. There could be two sources of bias. First, if certain types of parents (e.g., from poorer households) are more likely to be missing, either because of having migrated out for work or because of early demise. And second, if some types of children are more likely to move out of the household (e.g., girls who leave their home of birth for marriage) before the age range considered for analysis. Information on the number of living children ever born to the respondent, and number of children living with the respondent at the time of the survey suggests that approximately 15 percent of children do not reside with their mothers for all age groups. The median age of such children is 21 years. Of these, female children are twice as likely not to be living with their parents. Median age of marriage in India is 16.4 years while cohabitation with husband for first time is 17.4 years. These numbers suggest that the problem of sample selection bias is likely to be much worse for females than males, and is likely to be worse at higher ages.

To minimize bias, for much of the analysis, we focus on the sample of children 15-19 years residing in the 16 major states. The age range is limited to select children who are still likely to be living at home in order to observe their parents' education levels. By the age of 15 years, if a student does not drop out or repeat a grade, (s)he should have completed primary (Class 1-5) and upper primary (Class 5-8) schooling. For a subset of the analysis, to examine change in education mobility over the decade preceding the survey, we also focus on the sample of two older cohorts, between 20-24 years and 25-29 years of age.

Within this age range, imposing the selection criterion on relationship to the household head leads to exclusion of a little under 6 percent of individuals. That is, for about 6 percent of 15-19 year olds, we are unable to identify their parents. Amongst those who are related to the head (as child, grandchild, or parent), less than 1 percent of children in the 15-19 years age group have information missing on both parents. Thus the first type of selection bias does not appear to be a significant concern in the youngest cohort. These children are excluded from the analysis. Selection becomes more problematic in the older cohorts, but is still small (less than 1 percent with information missing on both parents). When information on only one parent is missing, we retain the child in the sample and introduce two dummy variables that each takes a value 1 to signify that either the mother or father is missing.

The second source of bias, of children having moved out of their home of birth, is more relevant to the data at hand, especially for the older 20-24 and 25-29 year cohorts and

for women. Therefore in the analysis, we only examine changes in education mobility across cohorts of males. For females, while we present some basic regressions for all cohorts, the results are to be treated as purely suggestive. Much of the focus on females is on the youngest cohort only.

Table 2 shows some selected statistics for the 15-19 years sub-sample used in our analysis. We have data on roughly 30,000 children in this age group, of which 57 percent are males and 69 percent reside in rural areas. Average years of schooling are lower in rural areas and lowest for rural girls who have a significant gap with rural boys. This is reflected in very low educational attainment levels: about 30 percent of rural girls in this age group have not received any schooling. By comparison, the vast majority of boys and girls in urban areas have completed more than primary schooling. Educational outcomes have improved across generations, particularly amongst girls as the gender gap amongst children is much lower than that among parents in both urban and rural areas.

Figure 2 shows the secondary school completion rate in our sample broken down by paternal and maternal education. The education of children appears closely correlated with the education of their parents. The relationships are steep in both urban and rural areas. There are sizable gaps between the completion of girls and boys in rural areas, and this gap does not appear to narrow with parental education. By contrast, the gender gap is reversed in urban areas. The estimates in Figure 2 are of course the unconditional relationships, without controlling for other household or geographic characteristics that could matter to the demand for schooling.

4. Empirical Results

To what extent can patterns of change in educational attainment across gender and social groups be explained by the resources and characteristics of individual families? In particular, what has been the role of parental education in the inter-generational transmission of human capital? There are many possible causal paths that may result in a correlation between the schooling of parents and their children, and alternative paths will have different implications for policy. For instance, higher parental education may increase family income and therefore the ability to finance education. Or it may affect the quality of time that the mother spends with the child. Alternatively, there may be no underlying causal relationship, and parental education could simply proxy for unmeasured economic, demographic, and genetic factors that influence schooling decisions for both parents and children. Relating parental education with children's education, as we do in the results that follow, therefore does not necessarily

imply causality. For the purpose of characterizing inter-generational mobility however, the basic question at least at a descriptive level, is one of association. We return to possibilities of teasing out some of the causal links with the data at hand in section 6.

Figure 3 shows Lowess regression estimates of the unconditional relationship between child and parental education for the sample of males from both rural and urban areas. The analysis is conducted on 5-year cohorts, for individuals born between 1969-73 to those born between 1979-83, to examine how the role of parental education may have changed over time. The height of each line represents the mean years of schooling of males in the cohort at different levels of maternal or paternal years of schooling. The slope of the line represents the extent to which increases in parental schooling translate into children's schooling for a given cohort: a less steep line implies a weaker relationship between education levels across generations.

There are two main points to observe. First, mobility has increased across cohorts, with gains occurring mainly in the mid-80s when the youngest cohort was entering school. There was little change in mobility between the two older cohorts. This is true in both urban and rural areas, and with respect to both father's and mother's education: the gradient of the child-parent schooling relationship in all four panels becomes less steep moving from the oldest to youngest cohort.

Second, education levels for the youngest cohort of 15-19 year olds are lower than the years of schooling for older cohorts (20-24 year olds, and 25-29 year olds). This simply reflects the fact that the youngest cohort has not yet completed schooling by that age.

In Table 3, we report OLS regression estimates to check the robustness of these results to controls for other child, household, and geographic factors that may influence the years of schooling. The dependent variable is the number of years of schooling of the child. The key independent variables of interest are the number of years of education for mothers and fathers. These are entered linearly into the regression, as suggested by the roughly linear relationships implied by the data in the non-parametric estimates reported in Figure 3.

Estimates in Table 3 support the insights from the simple graphs discussed above. There has been a significant increase in education mobility across generations. For urban men born in the early 1970s, a one-year difference in the schooling of their parents resulted in a difference of approximately 0.22-0.24 years in their own schooling. For the younger cohort that was entering school in the mid-80s, the same difference in parental education results in a 0.09-0.15 year difference in schooling. Mobility has risen among rural men as well, with the coefficient on father's education declining by one-third from 0.30 to 0.20, and the coefficient

on mother's education declining from 0.19 to 0.12 across the three cohorts. While the regression results still support the finding that gains in mobility took place during the mid-80s, the distinction with the gains experienced by the earlier cohort is not as sharp once we control for other determinants of schooling.

The decline in persistence should not be attributed to the general rise in education levels over time. It is natural to expect that the influence of parental education will decline over time as mean education levels rise. However, the general rise in education is captured by the intercepts in the estimated regressions. If it were true that there was a rise in education levels regardless of family background, only the intercept in the regressions reported in Table 3 would be increasing across successive cohorts.

A similar rise in mobility is seen for women as well, but the results for women should be treated as purely suggestive. As described in the Data section, our sample is only confined to those who are still living at home with their parents and are related to the household head. This will not create a major selection problem for the youngest birth cohort analyzed because such children were only 15-19 years of ages at the time of the survey. However, many more of the oldest cohort analyzed (25-29 year olds when data were collected) can be expected to have left the household by the time of the survey. This is apparent from the sharp drop in sample sizes from the youngest to oldest cohort, particularly among women for whom it is likely driven by marriage. It is possible that the distribution of educational attainment among girls still living at home between 25-29 years of age will be different from that in the population.[7] For this reason, in the remainder of the paper, we only report estimates of mobility for females in the youngest cohort.

How does mobility compare across males and females? Figure 4 shows Lowess regression estimates of the child-parent schooling relationship for the 15-19 year cohort of males and females. In urban areas, there is no difference either in levels or degree of persistence of education by gender. Rural females, by contrast, at the lower tail of the education distribution suffer a significant disadvantage compared to males. At low levels of parental education, there is a large gap of 2 to 3 years of schooling between boys and girls. The slope of the female child-parent relationship is also steeper than that for boys, suggesting that in addition to a possible gender disadvantage in levels, rural girls also have less education mobility. This is confirmed in the results in Table 3: a one year difference in the mother's education results in a 0.12 year difference in schooling of rural boys (15-19 year cohort), while the same difference translates into a 0.20 difference for rural girls.

It is useful to put our estimates in an international context. There is widespread concern that India's rapid economic growth in the last two decades has not yielded benefits for all. Income inequality is on the rise, poverty reduction does not seem to be commensurate with growth, and there is much concerned debate that India remains afflicted by a highly rigid social structure with low prospects of mobility. Although international comparisons of education mobility are difficult -- because of differences in definition, methodology, and data type across studies – our estimates for India do not support the image of low mobility, at least when it comes to educational outcomes. Coefficient estimates for Brazil, noted for its high levels of income inequality and low levels of education mobility, are found to be in the 0.4 – 0.5 range when very similar techniques and empirical specifications are employed (Bourguignon et. al, 2003). Most other countries (notably the US and European countries) tend to have coefficients comparable to the ones we obtain for India. At the other end of the spectrum are countries like Norway where there appears to be little evidence of a causal relationship between parents' education and children's education (Black et. al., 2003).[8]

Beyond the role of parental education, Table 3 also shows the effects of caste. Focusing on the estimates for the youngest cohort, we find significant effects of caste among urban females. Even after taking into account parental education, SCs and STs have between half a year to three-quarters of a year less education than OBCs and forward castes. In rural areas, the group disadvantage extends to OBC women as well. By contrast, among males, social group-wise differences are strong only in rural areas. The reasons for the caste disadvantage could be many, relating to differences in the demand for education (such as lower labor market returns) or factors that relate to a bias in access to education. Note that the apparent bias against lower castes in educational attainment is not an issue of wealth constraints that could influence the actual or opportunity costs of education: all regression specifications control for household wealth. The results suggest that focusing on the direct or opportunity costs of education as explanations for the lower attainment by lower castes is not supported by our results.

To what extent is the caste disadvantage reinforced by lower education mobility among backward castes? To examine this question, we interact the two parental education variables with dummy variables for the four social groups. The regressions also include intercept terms for the social groups. Regression results are reported only for males due to the selection problem in the sample of older females. Parameter estimates reported in Table 4 are also plotted in Figure 5 for ease of comparison across groups and cohorts.

A striking feature of Figure 5 is that mobility has risen consistently for all social groups. In urban areas, the rate of increase in mobility has been approximately the same for all groups. In rural areas, backward castes show more rapidly rising mobility across cohorts than do other groups. Second, even the lowest estimates of mobility – for the youngest cohort of STs in urban India and for 15-19 year cohort of SCs/STs in rural India – are not low by international standards. And third, the only group that stands out in urban areas is STs for whom the degree of persistence is significantly higher than that of other groups. This is important for policy as pupil incentives and government programs to improve access to education tend to club SCs and STs together. In rural areas, on the other hand, backward castes (including SCs and OBCs) suffer both a disadvantage in levels (which as discussed earlier, could be due to discrimination or other reasons) as well as lower inter-generational mobility than the forward castes.

Wealth is another factor that can matter to schooling outcomes and education mobility, and indeed, there is much debate in India that the poor are trapped because of limited opportunities for mobility. The coefficient estimates on the wealth category dummy variables, reported in Table 3, show that children from richer families have considerably higher education levels, controlling for other attributes. To examine differences in education *mobility* by wealth, we split the sample into two groups – bottom 30 percent and richest 30 percent — based on the distribution of the wealth index. Estimates for rural males (Table 5) show that while persistence has declined over time, for both the rich and the poor, the degree of education mobility among the rich is more than double that for the poor.

We also examine the question of whether the relationship between child schooling and wealth varies by social group. Simple non-parametric regressions plotted in Figure 6 show that there are no significant differences between social groups on this aspect. Put differently, we find that increasing wealth has the same impact on children's schooling for all social groups, in both urban and rural areas.[9]

To sum up the results on wealth and caste, we find that while there is evidence of differential mobility and persistent schooling gaps by both sets of attributes, the gap between social groups is dwarfed by differences between rich and poor. Unadjusted gaps between forward castes and STs are between 2 to 2.5 years of schooling, depending on the sector/location under consideration. Wealth gaps between the poorest 30 percent and the richest 30 percent range between 4 to 6 years. These gaps reduce sharply in a multivariate context, once we control for other attributes (Figure 7). But after the adjustment, wealth gaps are even more important, roughly *6 to 8 times* the adjusted gap between social groups.

Similarly, in magnitude, the gaps in mobility between rich and poor far outweigh the gaps between social groups (compare Tables 4 and 5).

Are small differences between social groups reason enough to question the rationale for government programs that have been targeted to raising enrollments among backward castes? Not necessarily. While evidence for pure discrimination is not overwhelming, caste remains a useful proxy for targeting the poor because of its close association with low wealth (Figure 8). And inferring from past trends, relying on direct wealth improvements as a channel to close education gaps and raise mobility could take a long time. Even at the rapid growth rates of the 1990s, improvements in SC/ST wealth (comparing the 1992-93 and 1998-99 NFHS) were too small to expect significant impacts on educational outcomes through direct wealth effects.

5. Robustness of parental education estimates

In the previous section, we present associations between children's years of schooling and their attributes. But these correlations – in particular the coefficients on parental education — cannot be interpreted as causal effects because potential endogeneity of parent's education cannot be ruled out. Teasing out the causal effects requires adequate identifying instruments. A number of different strategies have been employed in the literature. Behrman and Rosenzweig (2002) use data on twins to control for inherited genetic characteristics. Alternatively a comparison of adopted with natural children by Plug (2003) among others find that the positive effect of maternal education on children's education disappears. Black et. al. (2003) exploit the occurrence of policy change that changed the educational distribution of parents without directly affecting the children. Shea (2002) uses union status of the parent's to instrument for income, while Meyer (1998) uses variation in family income that are affected by state welfare rules. Chevalier et. al. (2005) control for both unobserved inherited characteristics and household income. A general finding of almost all the existing studies is that the correlation between child's education and parent's education weakens once inherited genetic characteristics and endogenous income effects have been controlled for. Thus, OLS estimates, of the sort presented in the preceding section, if anything, under-estimate the degree of inter-generational education mobility in the population.

In this section, we attempt to identify the exogenous effect of parental education on the child's education levels using the following identification strategies. One way for approximating genetic characteristics that maybe passed on from the mother to the child and in turn may affect his/her ability to learn is to use the mother's current nutritional status

measured by height of mother, or weight for height or BMI as available in the NFHS data. There is some scientific evidence that mothers with height below a critical level have a higher probability of giving birth to kids that are slow learners. Controlling for father's genetic characteristics in the existing data is more difficult.

Child's education achievements may be correlated with his/her innate abilities typically unobserved by the econometrician. In absence of standardized test scores for the specific child (or cohort), it is very difficult to control for these innate abilities that can in turn be correlated with parent's characteristics. However in our data we have information about the extent of prenatal care that the mother received during her pregnancy. There is adequate scientific evidence to suggest that good prenatal care where the expectant mothers get adequate vitamins, minerals, and other nutrients could affect children's intelligence and development. This is especially true in developing countries like India where more than 50 percent (20 percent) of pregnant mothers in rural (urban) India in 1992-93, do not receive any prenatal care.[10] Moreover, more than 30 (45) percent of urban (rural) women who received some prenatal care are not given iron/folic acid tablets, a vital ingredient in the mental and motor development of children later in life. Prenatal care in turn could be very highly correlated with both the spouse's as well as the mother's education levels. In 1992-93, according to the NFHS data for India, the proportion of mothers who received prenatal care increased with more educated mothers from 50 percent among illiterate mothers to 95 percent among mothers who had completed high school. Given these statistics, if we omit prenatal care variables, we may have an omitted variable bias. We test whether our estimates of the impact of parent's education on child's education is biased because of the possible omitted variable bias. We estimate an extended form of equation (1) as follows:

$C_i = \alpha + \beta M_i + \gamma F_i + \varphi' HH_i + \theta W_i + \nu' Sib_i + \delta' Child_i + \lambda' Village_i +$ *cohort effects* (date of birth of child, parents) + τ'*prenatal* care + error

Scientific research on prenatal care for expectant mothers with advances in medicine and technology is a continuous process. Thus we need to proxy the prenatal care facilities that were available when the current 15-19 year old was born. Ideally, if we had panel data we could have easily controlled for the prenatal care used when their mothers were pregnant with them. However, we do not have panel data but a time-series of cross-sections. In this case we use extent of prenatal care utilization by the cohort of mothers that would be as closely identified as the mothers of current 15-19 year olds. We therefore use prenatal care

received by expectant mothers in the 1992-93 data as a proxy. However even this is not ideal because the current 15-19 year old would have been 9-12 year old in 1992-93. Once the latest round of data for 2004-05 (NFHS3) becomes available we would be better able to proxy the medical facilities available to the expectant mothers given that the 15-19 year old in 2004-05 would be a 2-5 year old in 1992-93.

Income, or wealth, is also potentially endogenous and failing to correct for income endogeneity could bias the parental education coefficients. To instrument for income, we use occupational categories of the parents. Again, since we would like the occupation of the parents at the time the child was of school going age we use the occupation categories of the parental cohorts in 1992-93. So our estimated two stage least squares model in this case would be:

$C_i = \alpha + \beta M_i + \gamma F_i + \varphi' HH_i + \theta W_i + \nu' Sib_i + \delta' Child_i + \lambda' Village_i$ + *cohort effects* (date of birth of child, parents) + τ'*prenatal* care + error

$W_i = a + b$*Father's Occupation* + *cMother's Occupation* + error

Table 6 reports the coefficients of the parent's education once endogeneity of inherited and environmental characteristics have been controlled for. The main results are not altered, suggesting that the OLS estimates are not unreasonable. However, we should reiterate that at this stage our instruments are not ideal. Once the latest round of the NFHS data are released, we would better be able to proxy the conditions prevailing for the parents when they were expecting their current 15-19 year old children.

7. Conclusions

Investment in human capital, an important instrument of income mobility, has grown significantly in India over the last few decades. In this paper, focusing on one measure of human capital – years of schooling – we show that inter-generational mobility in education has improved significantly and consistently across generations. Mobility has improved, on average, for all major social groups and wealth classes. Our estimated mobility coefficients are comparable to those available from other developed countries and higher than the estimates available for some Latin American countries like Brazil. Education gaps continue to persist across social groups and class, but contrary to expectations, gaps between social groups are fairly small, and dwarfed by differences between rich and poor.

Rising education mobility (at comparable rates for most groups) hand-in-hand with increasing inequality in outcomes (incomes) is consistent with two (broad) explanations. First is that we are focused on a limited and partial dimension of inequality in opportunities. One might prefer a more general approach based on 'human capital' rather than years of schooling, where human capital might take account of the quality of learning, not just the time spent in school. Another is that education mobility is an important determinant of well-being, but only one determinant. As discussed earlier, other studies find that caste is associated with low occupation and geographic mobility, factors that could be equally important to determining incomes. Second, even if education mobility were a strong determinant of incomes, rising mobility and increasing inequality could be observed depending on the distribution of innate ability in the population.

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Table 1. Levels and Growth in Educational Attainment in Adults

Variable	Scheduled Castes	Scheduled Tribes	Other Backward Castes	Others	All
Urban					
A. Males					
Mean years of education	7.01	6.42	8.38	10.13	9.07
Growth per year	0.09	0.09	0.08	0.03	0.05
B. Females					
Mean years of education	4.12	3.38	5.78	7.97	6.64
Growth per year	0.14	0.10	0.14	0.12	0.13
Rural					
A. Males					
Mean years of education	4.22	3.47	5.42	6.75	5.42
Growth per year	0.11	0.09	0.11	0.10	0.10
B. Females					
Mean years of education	1.47	1.12	2.27	3.53	2.42
Growth per year	0.07	0.05	0.08	0.11	0.08

Notes: Sample is 16 major states, all adults between ages 19 to 70 years. Growth rates are the coefficient estimates from a least-squares regression of years of education on birth year. Each estimate based on a separate regression.

Source: NFHS 1998-99

Table 2. Descriptive Statistics for age-group 15-19 years– Estimation Sample

	Rural		Urban	
	Girls	**Boys**	**Girls**	**Boys**
Child Educational Outcomes				
Years of schooling	5.32	6.63	8.45	8.26
Proportion of children with:				
No schooling	0.30	0.15	0.07	0.06
Up to primary school completion	0.10	0.10	0.05	0.06
More than primary school	0.60	0.75	0.87	0.88
Parents' characteristics				
Father's years of schooling	4.05	3.67	7.21	6.74
Mother's years of schooling	1.65	1.34	4.49	4.31
Father's age	43.7	43.56	43.09	42.84
Mother's age	41.21	41.06	40.93	39.99
Proportion of children from different caste groups:				
Scheduled Castes (SC)	0.19	0.22	0.16	0.18
Other backward castes (OBC)	0.34	0.35	0.29	0.31
Forward castes (FC)	0.35	0.33	0.51	0.48
Scheduled Tribes (ST)	0.11	0.11	0.03	0.03
Proportion of children with missing parent information:				
Father missing	0.10	0.11	0.11	0.11
Mother missing	0.03	0.03	0.02	0.04
Both parents missing	0.00	0.00	0.00	0.00
Number of observations	9487	13350	4771	5836

Notes: Sample is 16 major states, boys and girls between ages 15 to 18 years. Only people in the target age group for whom child-parent relationships can be identified in the data, as described in the text, are included in the sample.

Source: NFHS 1998-99

Table 3. Schooling Determinants by Birth Cohort

	Males			Females		
	b1969-73	**b1974-78**	**b1979-83**	**b1969-73**	**b1974-78**	**b1979-83**
Urban						
Father's education (yrs)	0.236	0.204	0.153	0.293	0.202	0.132
	(14.12)**	(15.15)**	(14.99)**	(8.52)**	(10.63)**	(11.62)**
Mother's education (yrs)	0.222	0.163	0.087	0.281	0.227	0.12
	(13.45)**	(12.46)**	(10.30)**	(8.39)**	(12.80)**	(11.92)**
SC	0.383	0.342	0.192	1.772	1.484	-0.052
	(0.85)	(1.04)	(0.72)	(1.87)	(2.97)**	(0.21)
OBC	0.671	0.509	0.568	1.521	1.856	0.503
	(1.51)	(1.61)	(2.20)*	(1.67)	(3.79)**	(2.09)*
FC	0.871	0.557	0.434	2.325	2.18	0.774
	(1.99)*	(1.78)	(1.72)	(2.58)**	(4.58)**	(3.31)**
Poorest 30 percent	-3.995	-4.276	-2.818	-5.594	-4.993	-3.666
	(12.46)**	(16.49)**	(14.03)**	(8.58)**	(13.80)**	(14.29)**
Next 30 percent	-2.198	-2.222	-1.318	-3.493	-2.732	-1.797
	(13.25)**	(16.95)**	(12.46)**	(10.07)**	(13.23)**	(14.39)**
Observations	*3568*	*4736*	*5405*	*977*	*2557*	*4425*
R-squared	*0.44*	*0.46*	*0.44*	*0.57*	*0.54*	*0.52*
Avg. child yrs of education	*10.22*	*9.91*	*8.39*	*10.19*	*10.74*	*8.54*
Rural						
Father's education (yrs)	0.298	0.287	0.197	0.237	0.278	0.214
	(19.70)**	(24.09)**	(23.40)**	(7.51)**	(14.98)**	(22.21)**
Mother's education (yrs)	0.187	0.149	0.118	0.378	0.313	0.198
	(8.01)**	(9.30)**	(11.03)**	(8.38)**	(12.51)**	(15.83)**
SC	0.367	0.004	0.393	0.125	-0.15	-0.16
	(1.80)	(0.02)	(3.14)**	(0.37)	(0.56)	(1.17)
OBC	0.662	0.305	0.626	0.572	-0.213	0.073
	(3.51)**	-1.84	(5.30)**	(1.76)	-0.87	-0.56
FC	0.898	0.631	0.765	1.369	0.532	0.45
	(4.70)**	(3.77)**	(6.39)**	(4.06)**	(2.11)*	(3.43)**
Poorest 30 percent	-3.949	-3.161	-2.112	-4.227	-4.276	-3.224
	(23.48)**	(22.32)**	(21.62)**	(10.86)**	(17.73)**	(26.81)**
Next 30 percent	-1.455	-1.056	-0.728	-2.211	-1.97	-1.24
	(10.25)**	(8.94)**	(9.38)**	(6.45)**	(9.94)**	(13.05)**
Observations	*7294*	*9632*	*12454*	*1423*	*3530*	*8813*
R-squared	*0.32*	*0.32*	*0.32*	*0.56*	*0.56*	*0.50*
Avg. child yrs of education	*7.33*	*7.49*	*6.68*	*4.85*	*6.00*	*5.33*

Notes: Dependent variable: years of schooling. Regressions also include religion and wealth category dummies, cohort effects (child, father and mother's age), sibling characteristics, village infrastructure, and state dummies. OLS estimates with robust t statistics, corrected for clustering within household in parentheses. * significant at 5%, ** significant at 1%.

Source: NFHS 1998-99

Table 4. Schooling Determinants for Males by Birth Cohort: Allowing for Differential Mobility across Social Groups

	Males		
	b1969-73	**b1974-78**	**b1979-83**
	Urban		
SC*mother's education	0.202	0.183	0.094
	(4.00)**	(5.04)**	(4.10)**
ST* mother's education	-0.009	0.16	0.1
	(0.06)	(1.71)	(1.63)
OBC* mother's education	0.218	0.144	0.104
	(7.05)**	(5.87)**	(6.38)**
FC* mother's education	0.232	0.166	0.081
	(11.96)**	(10.66)**	(7.95)**
SC*father's education	0.257	0.198	0.172
	(7.10)**	(6.69)**	(8.07)**
ST* father's education	0.327	0.291	0.242
	(3.16)**	(4.61)**	(4.52)**
OBC* father's education	0.241	0.187	0.139
	(8.72)**	(8.50)**	(8.66)**
FC* father's education	0.228	0.209	0.149
	(12.25)**	(13.39)**	(11.89)**
Observations	3568	4736	5405
R-squared	0.44	0.46	0.44
	Rural		
SC*mother's education	0.199	0.157	0.087
	(2.97)**	(3.57)**	(3.16)**
ST*mother's education	0.321	0.215	0.189
	(3.40)**	(2.55)*	(3.48)**
OBC*mother's education	0.143	0.155	0.137
	(3.86)**	(5.88)**	(8.35)**
FC*mother's education	0.207	0.155	0.112
	(6.64)**	(7.45)**	(7.95)**
SC* father's education	0.342	0.329	0.226
	(10.01)**	(13.06)**	(13.81)**
ST* father's education	0.416	0.408	0.252
	(7.18)**	(9.42)**	(7.81)**
OBC* father's education	0.305	0.285	0.194
	(13.03)**	(15.51)**	(15.13)**
FC* father's education	0.266	0.252	0.171
	(13.26)**	(15.41)**	(14.58)**
Observations	7294	9632	12454
R-squared	0.32	0.32	0.32

Notes: Dependent variable is years of schooling. Regressions also include religion, caste, and wealth category dummies, cohort effects (child, father and mother's age), sibling characteristics, village infrastructure, and state dummies. OLS estimates with robust t statistics, corrected for clustering within household in parentheses. * significant at 5%, ** significant at 1%.

Source: NFHS 1998-99

Table 5. Schooling Determinants for Rural Males by Birth Cohort and Wealth Category

	Bottom 30%			Richest 30%		
	b1969-73	**b1974-78**	**b1979-83**	**b1969-73**	**b1974-78**	**b1979-83**
Father's education (yrs)	0.393	0.390	0.283	0.214	0.174	0.109
	(13.83)**	(18.93)**	(18.51)**	(7.51)**	(7.30)**	(7.74)**
Mother's education (yrs)	0.331	0.309	0.204	0.175	0.14	0.08
	(4.97)**	(7.88)**	(7.25)**	(4.96)**	(5.92)**	(5.80)**
Observations	*3457*	*4796*	*5968*	*1040*	*1253*	*1788*
R-squared	*0.16*	*0.19*	*0.20*	*0.23*	*0.23*	*0.32*

Notes: Dependent variable is years of schooling. Regressions also include religion dummies, cohort effects (child, father and mother's age), sibling characteristics, village infrastructure, and state dummies. Wealth categories are estimated separately for each cohort, based on the All-India ranking of the wealth index. OLS estimates with robust t statistics, corrected for clustering within household in parentheses. * significant at 5%, ** significant at 1%.

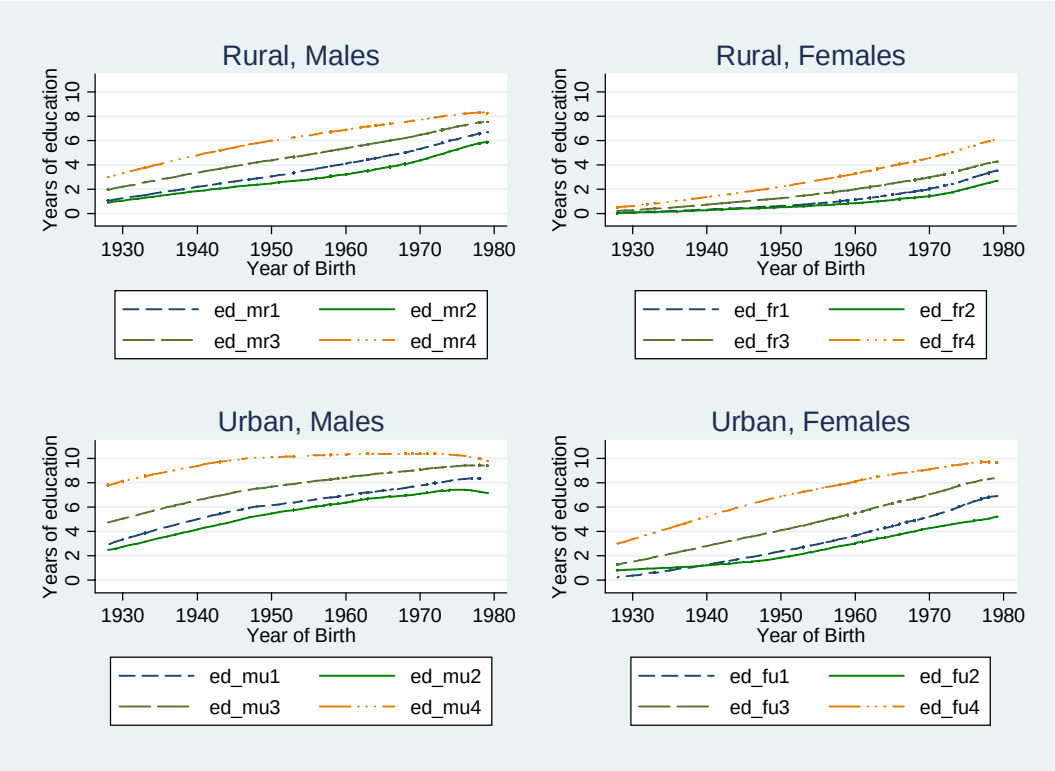
Table 6. Robustness Checks on Basic Specification

	Height of mother, Rohrer's index	**Prenatal variables**	**Mother's and father's occupation variables**
		Rural Males	
Father's education (years of education)		.200	.192
		(22.16)**	(2.53)**
Mother's education (years of education)		.119	.111
		(10.75)**	(0.99)
		Rural Females	
Father's education (years of education)		.206	.195
		(19.92)**	(1.92)
Mother's education (years of education)		.201	.141
		(15.33)**	(0.89)
		Urban Males	
Father's education (years of education)		.147	.170
		(13.13)**	(2.66)**
Mother's education (years of education)		.083	.082
		(9.18)**	(2.88)**
		Urban Females	
Father's education (years of education)		.125	.148
		(10.17)**	(3.06)**
Mother's education (years of education)		.118	.096
		(11.16)**	(2.82)**

Notes: Other variables included are the same as those in the models reported in Table 3. Dependent variable: years of schooling. Estimates with robust t statistics, corrected for clustering within household in parentheses. * significant at 5%, ** significant at 1%.

Source: NFHS 1998-99 and NFHS 1992-93

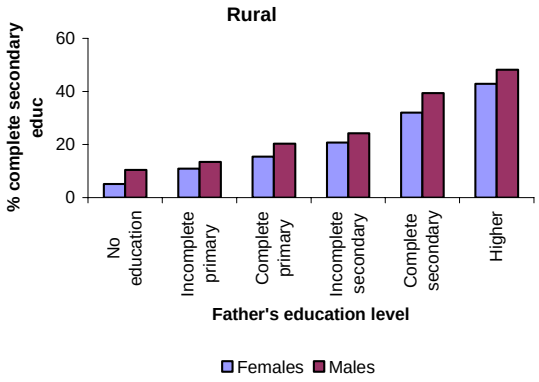
Figure 1. Mean years of education by year of birth

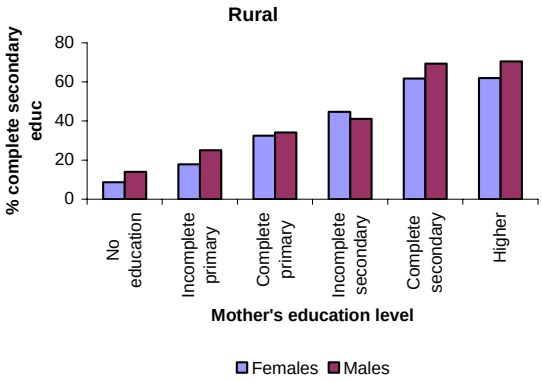


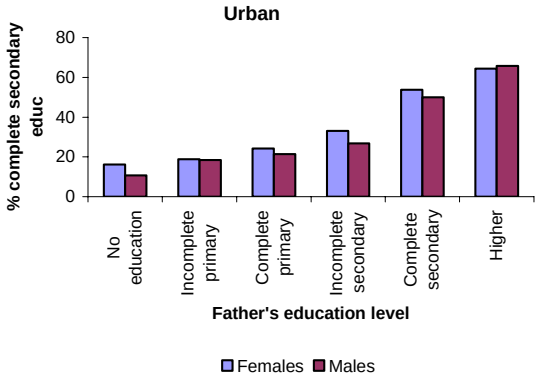
Notes: Sample is 16 major states, all adults between ages 19 to 70 years. Graph coding as follow: 1=SC, 2=ST, 3=OBC, 4=FC.

Source: NFHS 1998-99

Figure 2. Completion of secondary schooling among 15 to 18 year olds, by parental education levels







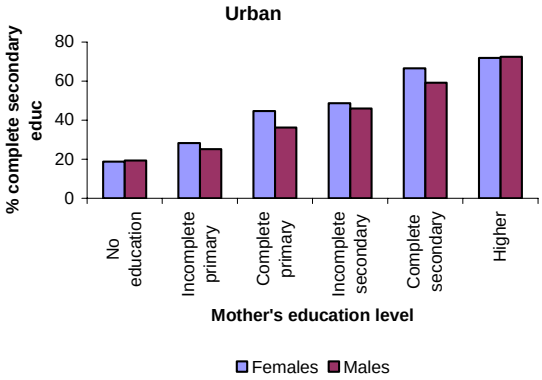
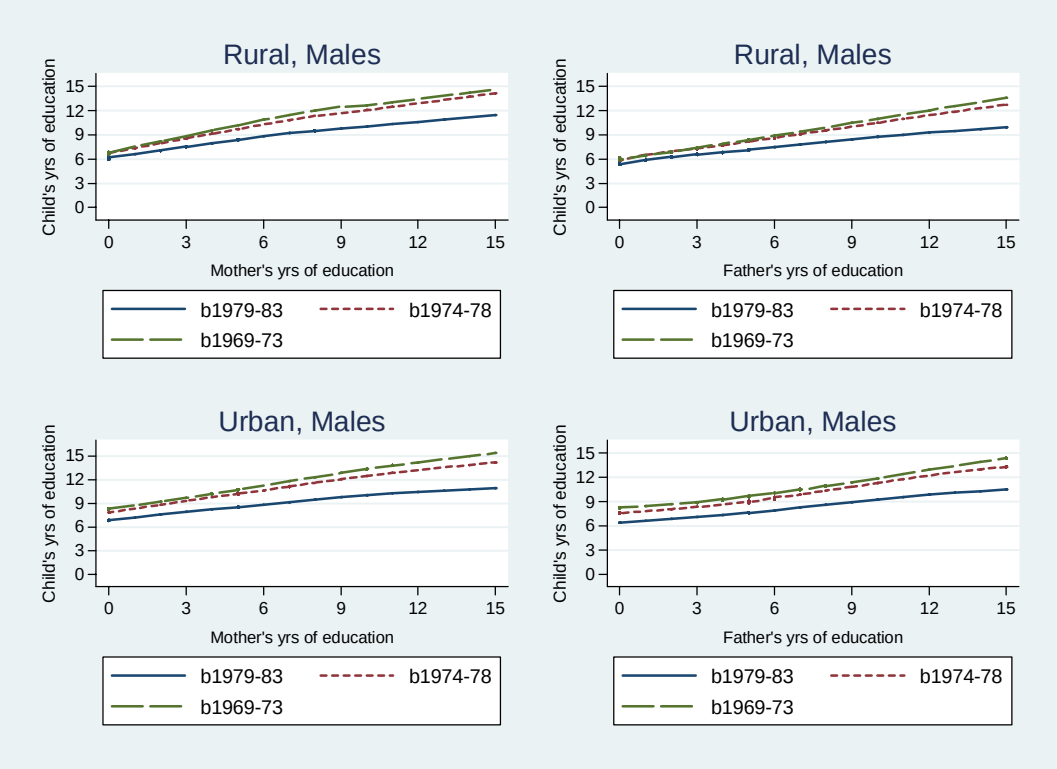


Figure 3. Relationship between child and parental education among males, by birth cohorts



Note: Lowess plots of child's education against parental education. *Source:* NFHS 1998-99

Figure 4. Relationship between child and parental education among 15-19 year olds, by gender

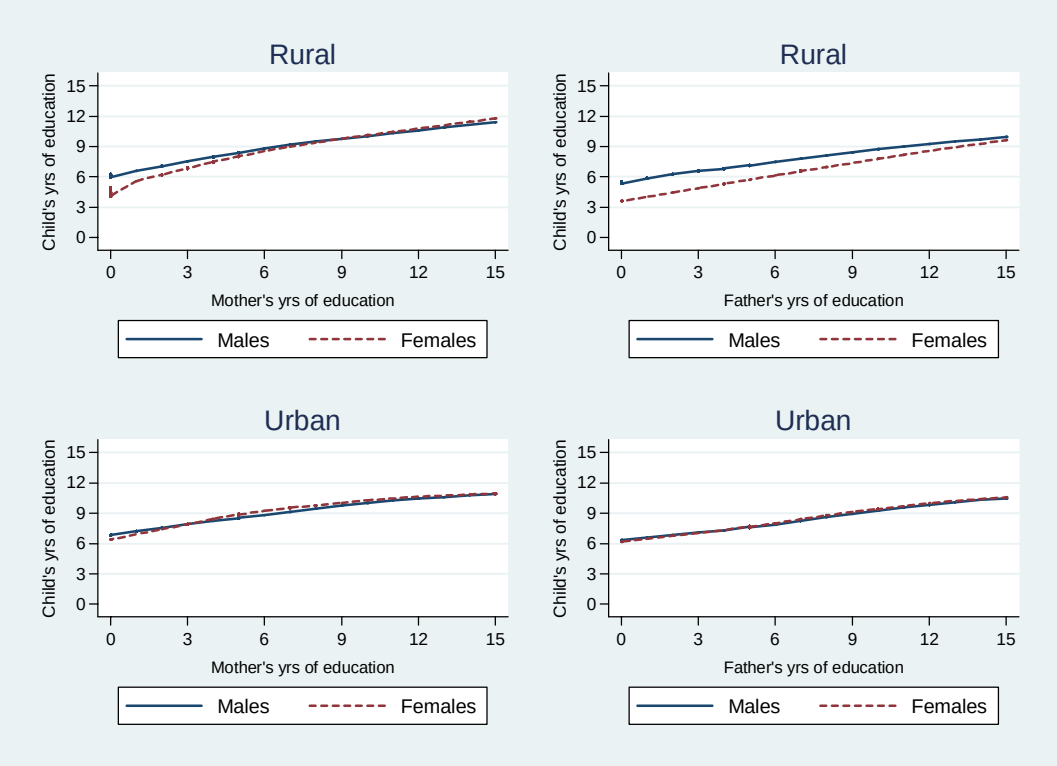


Figure 5. Increase in education mobility among males, by birth cohorts and social groups

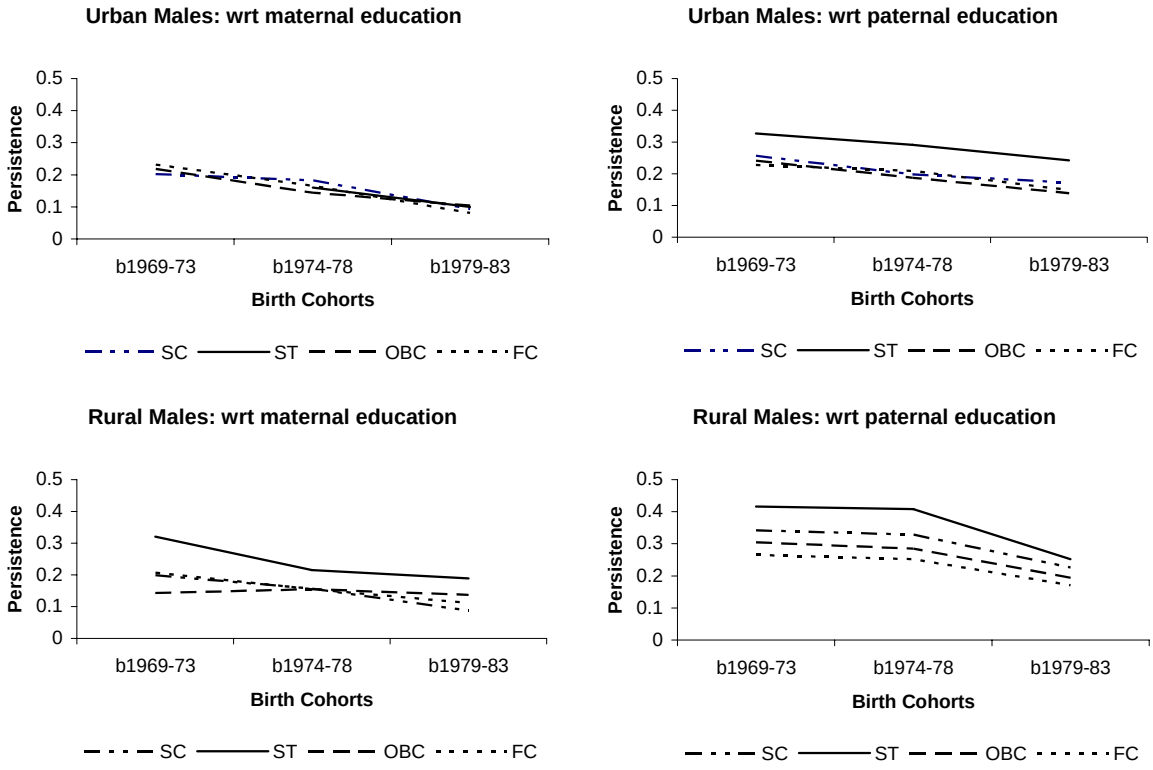
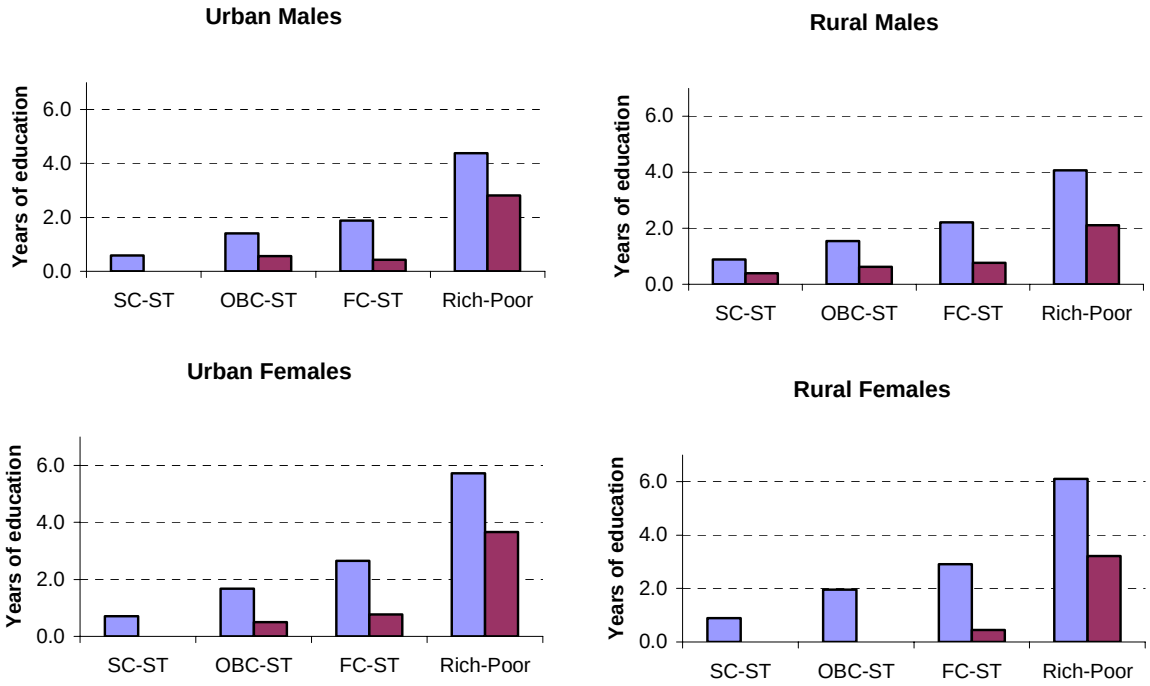


Figure 6. Adjusted and Unadjusted Gaps in Schooling by Social Group and Wealth Categories



Notes: The unadjusted gaps are the differences in average years of schooling in the 15-19 years cohort between the group represented on the X-axis and the excluded category: ST in the case of social groups, and the poorest 30% for wealth categories. Adjusted gaps are the coefficients on the variable of interest from the OLS regressions for the youngest cohort reported in Table 3. Adjusted gaps in all panels are the longer bars on the left.
Source: NFHS 1998-99

Figure 7. Relationship between child education and wealth among 15-19 year olds, by social group

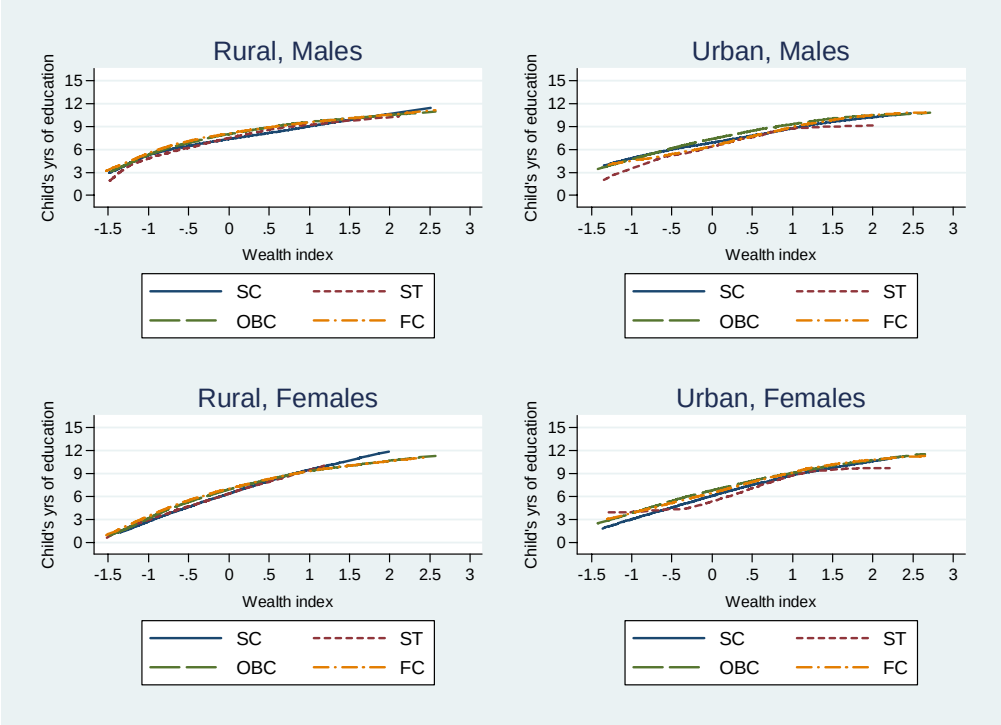
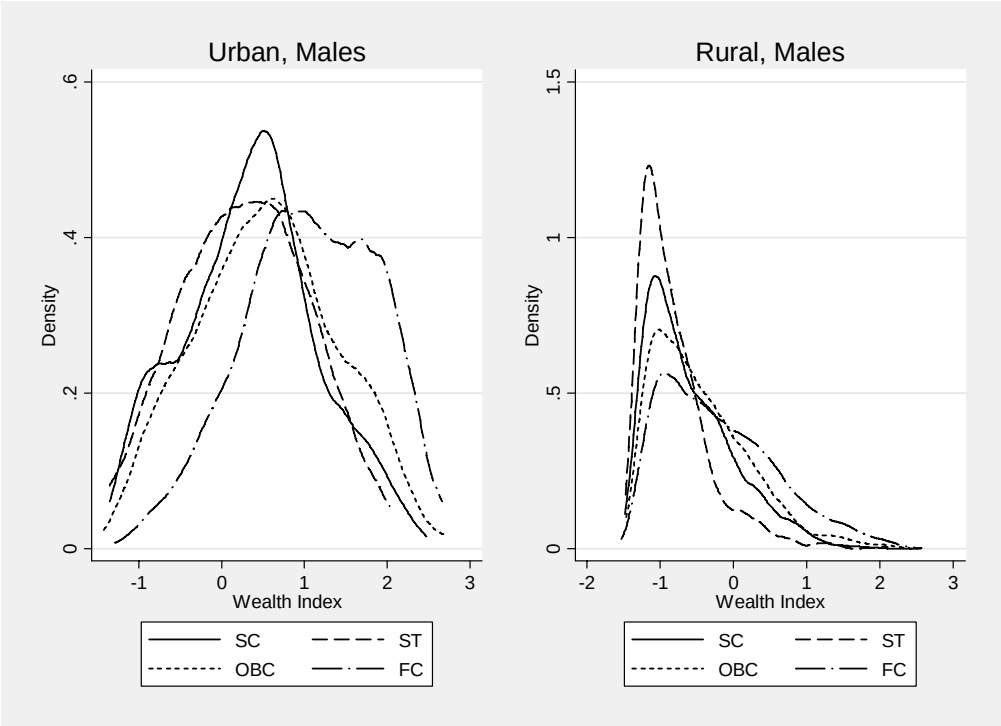


Figure 8. Distribution of wealth in rural areas, by social group



Appendix Table A1. Determinants of Schooling, by clusters of states

RURAL MALES: 15 – 19 YEARS in 1998-99

	ALL INDIA		***BIMARU***		***Karnataka, TN, AP***	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Father's education (years of education)	0.197 (23.44)**	-	0.199 (14.87)**	-	0.136 (5.44)**	-
Mother's education (years of education)	0.117 (10.97)**	-	0.106 (5.20)**	-	0.131 (4.76)**	-
Scheduled Caste (SC)	0.388 (3.09)**	0.507 (3.19)**	0.415 (2.28)*	0.466 (2.05)*	0.711 -1.63	0.992 (2.00)*
Other Backward Castes (OBC)	0.623 (5.27)**	0.789 (5.23)**	0.495 (3.01)**	0.479 (2.29)*	1.055 (2.51)*	1.318 (2.81)**
Forward Caste (FC)	0.758 (6.32)**	1.082 (6.97)**	0.631 (3.66)**	0.686 (3.17)**	2.001 (4.51)**	2.727 (5.12)**
SC*Mother's education	-	0.085 (3.09)**	-	0.047 (0.72)	-	0.088 (1.27)
ST*Mother's education	-	0.187 (3.43)**	-	0.162 (1.97)*	-	-0.052 (0.31)
OBC*Mother's education	-	0.136 (8.30)**	-	0.139 (4.00)**	-	0.158 (4.61)**
FC*Mother's education	-	0.112 (7.94)**	-	0.098 (3.74)**	-	0.101 (1.9)
SC*Father's education	-	0.227 (13.83)**	-	0.197 (7.43)**	-	0.165 (3.30)**
ST*Father's education	-	0.253 (7.84)**	-	0.198 (4.13)**	-	0.467 (3.75)**
OBC*Father's education	-	0.194 (15.17)**	-	0.205 (10.18)**	-	0.136 (4.17)**
FC*father's education	-	0.17 (14.54)**	-	0.194 (10.40)**	-	0.067 (1.49)
Bottom 33percent of wealth distribution	-2.129 (21.89)**	-2.149 (22.14)**	-2.259 (14.97)**	-2.271 (15.06)**	-1.861 (6.79)**	-1.864 (6.86)**
33-66 percent of wealth distribution	-.742 (9.58)**	-0.769 (9.93)**	-.940 (7.24)**	-0.951 (7.31)**	-.4309 (1.87)	-0.443 (1.94)
Other controls:	State & Village fixed effects, Cohort effects, Sibling characteristics, religion dummies					
No of observations	12454	12454	4919	4919	1713	1713
R^2	.32	.32			.25	.25

**: significance at 5% *: significance at 1%

Appendix Table A2. Determinants of Schooling, by clusters of states

RURAL FEMALES: 15 – 19 YEARS in 1998-99

	ALL INDIA		***BIMARU***		***Karnataka, TN, AP***	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Father's education (years of education)	0.215 (22.32)**	-	0.244 (15.21)**	-	0.173 (6.10)**	-
Mother's education (years of education)	0.198 (15.78)**	-	0.254 (10.70)**	-	0.222 (6.61)**	-
Scheduled Caste (SC)	-0.152 -1.11	0.00 (0.00)	-0.555 (2.81)**	-0.409 (1.83)	1.131 (2.33)*	1.202 (2.11)*
Other Backward Castes (OBC)	0.075 -0.57	0.394 (2.47)*	-0.201 -1.09	-0.102 (0.47)	1.012 (2.22)*	1.18 (2.19)*
Forward Caste (FC)	0.453 (3.44)**	0.846 (5.15)**	0.239 -1.28	0.423 (1.91)	1.913 (3.88)**	1.934 (3.11)**
SC*Mother's education	-	0.268 (7.77)**	-	0.182 (2.60)**	-	0.347 (3.38)**
ST*Mother's education	-	0.302 (5.98)**	-	0.274 (4.34)**	-	0.44 (1.00)
OBC*Mother's education	-	0.205 (10.28)**	-	0.352 (6.85)**	-	0.191 (4.41)**
FC*Mother's education	-	0.177 (10.83)**	-	0.23 (7.83)**	-	0.227 (4.14)**
SC*Father's education	-	0.236 (11.21)**	-	0.247 (6.79)**	-	0.137 (2.00)*
ST*Father's education	-	0.303 (9.31)**	-	0.293 (6.24)**	-	0.175 (1.29)
OBC*Father's education	-	0.201 (13.27)**	-	0.231 (8.11)**	-	0.174 (4.79)**
FC*father's education	-	0.203 (15.45)**	-	0.24 (11.41)**	-	0.19 (4.53)**
Bottom 30 percent of wealth distribution	-3.202 (26.44)**	-3.214 (26.50)**	-3.308 (15.97)	-3.324 (16.02)**	-3.036 (9.31)**	-3.031 (9.23)**
30-60 percent of wealth distribution	-1.207 (12.36)**	-1.234 (12.87)**	-1.771 (9.51)	-1.794 (9.56)**	-.976 (3.72)**	-0.986 (3.75)**
Other controls:	State & Village fixed effects, Cohort effects, Sibling characteristics, religion dummies					
No of observations	8813	8813	3227	3227	1266	1266
R^2	.5	.5	.45	.46	.38	.38

**: significance at 5% *: significance at 1%

Appendix Table A3. Determinants of Schooling, by clusters of states

URBAN MALES: 15 – 19 YEARS in 1998-99

	ALL INDIA		***BIMARU***		***Karnataka, TN, AP***	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Father's education (years of education)	0.152 (14.91)**	-	0.154 (8.65)**	-	0.136 (5.24)**	-
Mother's education (years of education)	0.086 (10.19)**	-	0.07 (5.08)**	-	0.116 (4.79)**	-
Scheduled Caste (SC)	0.198 (0.75)	0.505 (1.17)	-0.316 (0.82)	-0.023 (0.04)	-0.536 (0.48)	-0.102 (0.05)
Other Backward Castes (OBC)	0.583 (2.26)*	1.039 (2.45)*	0.381 (1.08)	0.895 (1.62)	-0.715 (0.65)	-0.604 (0.3)
Forward Caste (FC)	0.442 (1.75)	0.939 (2.25)*	0.214 (0.61)	0.671 (1.22)	-0.978 (0.88)	-0.643 (0.32)
SC*Mother's education	-	0.094 (4.10)**	-	0.084 (1.94)	-	0.09 (1.53)
ST*Mother's education	-	0.098 (1.61)	-	0.134 (1.16)	-	0.532 (1.57)
OBC*Mother's education	-	0.104 (6.40)**	-	0.091 (3.35)**	-	0.136 (4.27)**
FC*Mother's education	-	0.079 (7.78)**	-	0.062 (3.69)**	-	0.085 (2.17)*
SC*Father's education	-	0.171 (8.03)**	-	0.172 (4.37)**	-	0.114 (2.09)*
ST*Father's education	-	0.241 (4.51)**	-	0.232 (3.77)**	-	-0.132 (0.93)
OBC*Father's education	-	0.137 (8.50)**	-	0.127 (4.59)**	-	0.142 (4.48)**
FC*father's education	-	0.149 (11.89)**	-	0.155 (7.24)**	-	0.148 (3.14)**
Bottom 30 percent of wealth distribution	-2.795 (14.09)**	-2.761 (13.78)**	-3.180 (9.01)**	-3.167 (8.76)**	-1.752 (4.06)**	-1.713 (3.94)**
30-60 percent of wealth distribution	-1.353 (12.87)**	-1.344 (12.75)**	-1.519 (7.56)**	-1.5 (7.44)**	-.910 (3.88)**	-0.886 (3.79)**
Other controls:	State & Village fixed effects, Cohort effects, Sibling characteristics, religion dummies					
No of observations	5405	5405	1791	1791	945	945
R^2	.44	.44	.47	.47	.31	.32

**: significance at 5% *: significance at 1%

Appendix Table A4. Determinants of Schooling, by clusters of states

URBAN FEMALES: 15 – 19 YEARS in 1998-99

	ALL INDIA		***BIMARU***		***Karnataka, TN, AP***	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Father's education (years of education)	0.132		0.145		0.133	
	(11.61)**	-	(7.41)**	-	(4.59)**	-
Mother's education (years of education)	0.118		0.133		0.14	
	(11.77)**	-	(6.90)**	-	(5.21)**	-
Scheduled Caste (SC)	-0.039	0.683	-0.016	0.469	0.853	2.209
	-0.16	(1.68)	(0.04)	(0.75)	(1.12)	(2.40)*
Other Backward Castes (OBC)	0.514	1.624	0.823	1.628	0.571	1.596
	(2.13)*	(4.03)**	(2.09)*	(2.67)**	(0.77)	(1.87)
Forward Caste (FC)	0.794	2.202	0.961	2.006	0.767	2.16
	(3.39)**	(5.63)**	(2.50)*	(3.45)**	(1.00)	(2.26)*
SC*Mother's education	-	0.185	-	0.218	-	0.113
		(6.67)**		(3.74)**		(2.00)*
ST*Mother's education	-	0.005	-	0.065	-	-0.442
		(0.1)		(0.8)		(1.17)
OBC*Mother's education	-	0.115	-	0.15	-	0.159
		(6.03)**		(4.04)**		(4.42)**
FC*Mother's education	-	0.113	-	0.115	-	0.12
		(10.17)**		(5.82)**		(2.69)**
SC*Father's education	-	0.167	-	0.168	-	0.122
		(6.95)**		(3.87)**		(2.16)*
ST*Father's education	-	0.402	-	0.373	-	0.831
		(8.15)**		(4.99)**		(2.46)*
OBC*Father's education	-	0.14	-	0.138	-	0.14
		(7.41)**		(3.97)**		(3.83)**
FC*father's education	-	0.106	-	0.131	-	0.122
		(8.26)**		(5.83)**		(2.61)**
Bottom 30 percent of wealth distribution	-3.686	-3.589	-4.351	-4.258	-2.908	-2.923
	(14.55)**	(14.19)**	(9.78)**	(9.36)**	(5.26)**	(5.19)**
30-60 percent of wealth distribution	-1.780	-1.733	-2.6	-2.547	-1.118	-1.119
	(14.44)**	(14.02)**	(10.98)**	(9.95)**	(4.89)**	(4.85)**
Other controls:	State & Village fixed effects, Cohort effects, Sibling characteristics, religion dummies					
No of observations	4425	4425	1432	1432	728	728
R^2	.52	.52	.56	.56	.44	.44

**: significance at 5% *: significance at 1%

[1] These are the views of the authors and need not represent those of the World Bank or any affiliated organization. We have benefited greatly from discussions with Jishnu Das.

[2] Munshi and Rosenzweig (2003), for example, show how caste-based labor market networks have locked entire groups of individuals into narrow occupational categories for generations. In another paper, Munshi and Rosenzweig (2005) report low rates of spatial and marital mobility, and relate these to the existence of caste networks that provide mutual insurance to their members.

[3] Mean growth rates for adults (19-70 years), reported in the second row of each panel are estimated from the 1998-99 NFHS by regressing years of schooling on birth year.

[4] Some reports attribute massive reductions in the number of children out of school to this program, but attribution is fraught with difficulty, particularly since this period has also witnessed a dramatic expansion of private schools. Other centrally sponsored schemes have included the Non-formal Education Program (1979-90), Operation Blackboard for small rural schools (1986), Total Literacy Campaigns (1988), District Primary School Education Program (1994-2002) and more recently the mid-day meal schemes. Some of the state sponsored schemes are the *Lok Jumbish* and *Shiksha Karmi* programs in Rajasthan, Education Guarantee Scheme in Madhya Pradesh, Uttar Pradesh Basic Education Program among others.

[5] The PROBE report (1999) documents that discrimination against under-privileged groups within the schooling system can take several forms, ranging from different types of schools (e.g., public versus private), differentiated facilities even within government schools, and unequal treatment even within the same school.

[6] Since data analysis is carried out at the individual level, using dummy variables for presence of different types of schools is preferable to distance to schools. The latter is a cluster aggregate which measures the distance between individual children and schools imprecisely, and therefore has measurement error. Dummy variables for presence are less precise indicators of school availability but less susceptible to measurement error (Filmer, 2004).

[7] In further work, we propose to use the forthcoming 2004 NFHS for India to compare the youngest cohort of individuals (15-19 years) across three surveys, spanning a 12 year period between 1992 and 2004. Focusing only on the youngest cohort will help ameliorate such problems of selection bias.

[8] For comparison, the simple OLS specifications for Norway, comparable to the ones we estimate in this paper, yield coefficient estimates between 0.13-0.15 (Black et. al., 2003).

[9] To examine whether patterns of inequality in education levels and mobility vary across states, we also estimate the basic and caste-interacted regressions separately across two clusters of states: BIMARU (Bihar, Rajasthan. Madhya Pradesh and Uttar Pradesh) states and the southern states of Karnataka, Andhra Pradesh and Tamil Nadu. However there is no consistent and clear difference between the two sub-groups of states as compared to the All India results (See Appendix Tables A1-A4 for details).

[10] *Source*: NFHS Report 1998-99