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What Factors Determine Family Spending on Education in India and Does it Vary Across Well-Being Measures?

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Abstract: The present paper estimates the drivers of family spending on education across economic groups. The questions that are explored include: (i) Does family spending on education vary across economic groups and over time? (ii) The subsidiary question is to understand the gender bias in education spending across these groups. As a corollary to this, at which levels of education and to what extent is the gender bias in expenditure on education? These aspects are estimated using the hurdle model, using the NSSO survey data of the 52nd, 64th, and 71st rounds, relating to social consumption: Participation in education. Based on the expenditure elasticity, it is found that the middle class spends proportionately more than the bottom (justifiably) but also the top expenditure quintiles. The difference between the middle and top expenditure groups' elasticity is marginally advantageous to the middle expenditure groups and the gap is widening in the 71st round. This emerging middle class and their aspirations for education and hence upward mobility are noticeable. Years of schooling of the head of the household has a positive and significant probability of family spending on education over expenditure classes and across time. In the middle expenditure group, the average effect is more compared to the top expenditure category, like the one observed in per capita consumption expenditure. Yet another significant factor, skill type, depicts positive and significant probabilities of family spending on education over full and sub-samples. The caste dummy, that being SC/ST (socially deprived section of the population) statistically and significantly reduces the probability of spending on education across the board. Children who reside in rural areas (D_sector) are spent less on family expenditure on education compared to those who live in urban areas. There is clear statistically significant gender bias across expenditure groups. The female bias in the 10-14 age groups is quite substantial and has widened in 2014 compared to previous years. In the age class pertaining to secondary schooling 15-19, the female bias is apparent and widened over time.

Keywords: Family Spending, Spending on Education, Income Groups, NSSO, Gender

Introduction

Neoliberal policies have been adopted since the late 1980s both globally and in India. The decades of economic reforms depict a number of detrimental moves in the financing of education, paradoxically at a time when India urgently needs to prepare her bulging youth for the fourth revolution. At the macro level, a paradigm shift in the approach to financing education paves way for more cost-sharing and cost recovery from households. Though such structural changes are beyond the control of households, they do entail changes in their expenditure patterns related to household spending on education, health, and other essential services. Parallel to this, the share of the middle-income population is found to be rising. One of the estimates shows that the Indian middle class is expected to expand by more than 10 times from its current size of 50-583 million people by 2025 (Beinhocker *et al*., 2007). Several forces are driving this shift: Income growth; increasing urbanization; favorable demographics; technology and innovation; and evolving consumer attitudes besides changing family structure, etc. All these combined with the aspirations of the growing middle class are seen as a catalyst in boosting the social

demand for education reflected via the increased share of education expenditures in the household budgets, (Mukherjee and Satija, 2012).

On a different note, while such structural changes are beyond the control of households, they do entail changes in their expenditure patterns related to household spending on education, health, and other essential services. Hence, it would not be appropriate to attribute the growth of expenditure by relatively poorer households to voluntary choice alone. Thus, one of the important sources of growth of the service sector (education and health) expenditures in India could be with compulsions, rather than the affluence, of the poor. The decline in public expenditures on essential services and goods in nature, may have forced households to substitute private for public provisioning, leading to increasing demands on the household budget, (Basu and Das, 2015). While explaining the calorie consumption puzzle over decades, (Basu and Basole, 2013) show a statistically significant negative effect of the rising share of expenditures on non-food essentials, viz., education, transportation, and consumer services on calorie intake.

In this light, the present paper examines the pattern and determinants of household expenditure on education across well-being measures over the last two decades. Well-being is defined as the extent to which a person owes to a high quality of life, can achieve desired outcomes in life, and can contribute to society. It is multidimensional, capturing all important aspects of life, including mental health, physical health, economic well-being, social well-being, and live ability (Stiglitz *et al*., 2009). This study makes an attempt to examine the education spending behavior of households across economic status, an objective measure of well-being primarily because the information related to subjective well-being is rarely available from NSSO.

Review of Earlier Studies

A growing literature examines the drivers of household educational expenditure during the last two decades. This aspect has received moderately less attention compared to the studies on demand for education, determinants, and disparities in educational attainment. Though they are related, studies reviewed here focus on the budget share of family spending on education, its pattern of behavior, and determinants. We try to broadly group them into four categories.

Studies adopted the Engel curve framework and estimated working-leser equations. For instance, Acerenza and Gandelman (2017) estimate drivers of family expenditures on education in 12 Latin American Countries (LAC) along with the USA using data from income and expenditure surveys. Using the survey dates from 2003-2004 (Bolivia) to 2014 (Mexico), they adopt the Engel curve framework and estimated Working-Leser equations. They find that more educated and richer HH heads spend more on education. HHs with both parents present and those with a female as the main income provider spend more than their counterparts. On average, education in LAC is a luxury good, while it may be a necessity in the US. Unlike earlier studies, Nahm and Hong (2009) by adapting the semi-parametric estimation approach, estimate the non-linear Engel curve. They show that the Engel curve has an inverted-U shape, showing different patterns according to the householder's education level. Their estimated income elasticity indicates that private education expenditure is a normal good in South Korea.

A number of studies examine the household expenditure on education and their determinants by using a simple OLS method more often adopting the double log functional form of the regression equation, (Tilak, 2002; Andreou, 2012; Schroeder *et al*., 2015; Rizk and Abou-Ali, 2016). Invariably all these studies estimate the income elasticity of family expenditure on education.

The Engle curve approach has been used to test for gender gaps in household education expenditure. For instance, Subramanian and Deaton (1991) come across a weak pro-male bias in the age group 10-14 years in rural Maharashtra. Lancaster *et al*. (2008) also estimate a pro-male bias in the age group of 11-16 years in the rural areas of Bihar and Maharashtra. Unlike these studies, using hurdle models, (Kingdon, 2005; Azam and Kingdon, 2013; Aslam and Kingdon, 2008), estimate the gender bias in intra-household allocation in India and Pakistan. They find that gender bias in intra-household resource allocation towards girls is pronounced more among girls at the secondary and higher levels of education. Kingdon and associates find a greater pro-male bias in enrolment decisions in the age group of 15-19 years but further a larger tendency in expenditure decisions in the age group of 10-14-year-old girls. On a similar issue, but from estimating the female bargaining power on the share of educational expenditures in the family budget, using the 3SLS method, Nordman and Sharma (2016) estimate a negative difference in the marginal effects between female and male across age groups, implying that families spend more on boys' education than that of girls, though the pattern varies across the rural and urban sample.

The development of methodological approaches can be noticed among the studies that are reviewed here. Such that from simple OLS, Linear Probability Model (LPM), Tobit equations, and Hurdle models with a variation of either log-normal or truncated second-tier equations. For instance, using LPM Huston (1995) examines the drivers of education expenditures to understand the value of education placed by households. The value of education expressed as the ratio of education expenditures to the expenditures on non-necessities in a household is regressed

on a set of household characteristics such as age, education level, income, race, family size, and region. By estimating the linear probability model, she found that age, education level, income, region, race, and family size are significant factors in assessing the importance of the value of education households place on education.

Since the information on expenditure on education is truncated in the data set, many studies apply censored regression or the Tobit model. For instance, Huy (2012) estimates the determinants of demand for education using household expenditure on education, instead of enrolment. By estimating Tobit, (Acar *et al*., 2016) examine the evolution of income elasticity over time and across income groups for Egypt; while Ebaidalla (2017) estimates for Sudan. Though Tobit models are widely used for corner solutions, the problem with Tobit models is that it treats both positive and zero values as the same decisions, rather than treating them as two diverse decision-making process. This is circumvented by the hurdle model (details in the method section). Using the double hurdle model which takes these two decisions into account, Jenkins *et al*. (2019) estimate the drivers of expenditure on education in Nigeria. They find that the income elasticity of education expenditures is four times higher for top-income households vis à vis the bottom category.

Across studies, it can be noted that the most proximate determinates include income and education levels of the head of the households, besides a number of household characteristics such as location, household size, number, and share of school-aged children. Results of these studies suggest that families with higher income, whose heads are better educated and reside in urban areas tend to spend more on education compared to poor and rural families.

As highlighted in the introduction, yet another consideration espoused in this study is the changing perspective on macroeconomics, thereby the well-being and their connection with expenditures on education, health, etc. Well-being is defined as the positive state of happiness or absence of depression and can be measured objectively and subjectively. Objective measures of well-being use indicators such as income, education, labor force status, or homelessness. To understand what has happened over time, an attempt is made here to explore this issue using the National Sample Survey Organization (NSSO) rounds on social consumption in education. Since there is no information on subjective well-being in NSSO surveys, we are constrained to use the per capita consumption expenditure groups.

The important questions examined include: (i) Does expenditure on education vary between/across well-being levels and over time? In other words, how does income (expenditure) elasticity evolve by levels of income and over time? (ii) The subsidiary question is to estimate the gender bias in education spending across these groups. Equally important is, at which levels of education and to what extent the gender bias in expenditure on education? These are examined by estimating the hurdle model. It adds value by estimating the drivers of expenditure on education over a period of time and across expenditure groups. In other words, it attempts to examine how the drivers of family spending on education have evolved over time.

Materials and Methods

The present paper uses the Engel curve framework originally used to model the relationship between consumer income and quantity demanded. Working (1943) proposed the log-linear budget share specification, which is known as the Working-Leser model, since L conventionally equations Leser (1963) found that this functional form fits better that relates commodity budget shares linearly to the natural log of total expenditure. Working-Leser specification can be extended to include socio-demographic variables, which take the form of:

$$wi = \alpha + \beta \log\left(xi / ni\right) + \gamma \log ni + \sum \theta_k \left(nki / ni\right) + \varphi zi = ui \quad (1)$$

where, *wi* is the budget share of education of i^{th} household, *xi* is the total expenditure of household, *ni* is household size, a sign of β coefficients determines whether goods are necessities or luxuries, log *ni* allows for independent scale effect, $n\lambda_i/ni$ age-sex composition and *zi* is a vector of other household socio-demographic characteristics. ε is a disturbance term capturing unobserved characteristics, ε_i, $\sim N(0, \sigma^2\varepsilon)$. Equation (1) captures four types of variables: Variables for household heads (age, educational attainment level, type of occupation engaged; and skill level of household head), variables on household characteristics (household size, location of household, and region), student-related variables in terms of the relative age composition of households and policy variables (whether children benefit from Midday Meals (MDM), scholarship, etc.). Details of the variables are reported in Table A1.

The nature of the dependent variable, i.e., family expenditures on education is distributed with a substantial number of zero expenditure entries. Tobit models are the natural choice for such corner solutions. But, the inadequacy of the Tobit model is a single mechanism that determines the choice between zero expenditure on education ($y = 0$) versus positive expenditures on education ($y > 0$) and the actual money spent i.e., $y > 0$. Alternatives to Tobit models, called hurdle models or two-tiered models allow the initial decision of $y > 0$ versus $y = 0$ to be separate from the decision of how much y is given that $y > 0$. The present paper uses the Hurdle model (Wooldridge, 2002), which is specified as:

$$Pr(w=0 \mid x) = 1 - \Phi(xy) \quad (2)$$

$$\log(w / x, w > 0) \sim normal(x\beta, \sigma^2) \quad (3)$$

where, w is budget share as in Eq. (1), and x denotes the vector of explanatory variables. γ and β are parameters and σ standard deviation is to be estimated. Equation (2) states the probability that w is zero or positive and Eq. (3) says that conditional on $w > 0$, w/x follows a lognormal distribution. As Eq. (2) is a binary probit, we can get a Maximum Likelihood Estimate (MLE) of γ using $w = 0$ verses $w > 0$. The MLE of β is the OLS estimator by regressing log (w) on the x vector of explanatory variables, using the positive education expenditures. σ is the usual standard error from this OLS regression. The estimation turns simple as we assume that conditional on $w > 0$, log (w) follows a classical linear model. The conditional mean, i.e., $E(w/x, w > 0)$, and the unconditional mean, $E(w/x)$ are easy to obtain by using the properties of the log-normal distribution.

Conventionally Eq. 1-3 is estimated with households as a unit of analysis. This study estimates the hurdle model using individual data. Moreover, Kingdon (2005) demonstrates that using individual-level data on the educational expenditures of each child in the sample is a better alternative than using aggregate household-level data. Studies in India used the India Human Development Surveys (IHDS), but rarely the NSSO surveys. NSSO education surveys are dedicated surveys to collect information on household expenditures on education from time to time. This study uses three rounds of data from the nationally representative surveys of NSSO (52nd, 64th, and 71st rounds on social consumption: Schedule 25.2: Participation in education). Variables are grouped as Household head characteristics, household characteristics, and student-related and policy variables (details in Table A1 in Annexure 2). In the 64th and 71st rounds, variable NCO2004 provides 3-digit industrial codes. By applying ISCO-08 concepts to NCO2004 and adapting to Government of India (2015), four skill levels hierarchical from low (skill level 1) to high (skill level 4), in which skill is defined as the ability to carry out tasks and duties of a given job for which the person earns a remuneration (details in Tables A2 and A3 in Annexure 2).

We classify the number of 32/35/36 states over three rounds correspondingly into six regions and keep the south as the reference category. The detail of states in each region is explained in footnote 6. Like earlier studies, age and gender class are used as one argument. Age composition broadly relates to levels of education viz., primary (5-9), upper primary (10-14), secondary (15-19), and graduates and above (20-24/20-29), keeping female at the age group 5-9 as the reference category. Gender bias is identified using this set of dummy variables and tests for the differences in the female and male coefficients using the chow test. Another dimension covered is a set of policy variables, like the type of institutions students attend, whether the government provided or not. Further, incentives in both kind and cash are incorporated such as whether children benefit from the mid-day meal, receive incentives in kind like textbooks and stationery; or cash incentives like scholarships. This is another reason to use individual data instead of household data. This set of variables entails the complementary nature of private spending with that of public spending on education and is an added value in the paper. The summary statistic of the selected variables is reported in Table 1 in Annexure 3.

Results and Discussion

To understand the determinants of family spending on children, we estimate the hurdle model as in Eqs. (2-3). Three equations in each category, viz., (i) The likelihood of whether the households incur educational expenditure on the children or not capturing via probit, first tier in Hurdle model (ii) Conditional OLS on the positive education expenditures incurred on the currently attending children[1]. (iii) Unconditional estimates capturing the impact of both the decisions to spend and the amount to spend. These three sets of equations are estimated across three income groups and on the full sample, hence $4 \times 3 = 12$ equations for each NSSO round, i.e., $12 \times 3 = 36$ equations. The set of explanatory variables almost remains the same across three NSSO rounds. The correlation coefficient matrix of the selected variables is reported in Annexure 3 from Tables A1-3 corresponding to three surveys. Our analysis is limited to the age class 5-29, reporting positive expenditures on education. The relevant statistics from the estimated results of probit, conditional OLS, and unconditional estimated effect of spending on education are reported in Tables 2A-C in Annexure 3. Our focus is on the reported results of the unconditional estimates because this is the one that combines the marginal effect of both estimates that we are interested in whether to spend and the amount to spend on education. Results are discussed under the sub-heads viz., PCCE, HH size, characteristics of the head of HH, location, child-related and policy variables.

Per Capita Consumption Expenditure

We explore whether threshold levels of income (expenditure) affect the decision on the family spending on education. The probability of spending on education improves as families move from the bottom to that of the

[1]We run OLS with dependent variable education expenditures (LEdEx) is log normally distributed (see Figure A1 portraying histograms of LEdEx across three Rounds at annexure 3)

middle expenditure group, but declines at the top expenditure group. The unconditional estimates provide the elasticity, i.e., parameter estimates of β in Eq. (3). We can note that elasticity is more than one across the board which indicates spending on education is elastic. But in 2007-2008 is quite different than expenditure elasticity with respect to education is inelastic, ranging between 0.163 among the bottom class to 0.380 among the top class. This change is after more than a decade of neoliberal economic policies inducing spending on education less elastic, though the budget share from 1995-1996-2007-2008 is increasing. While in 2014, the elasticity is more than one across the middle, top and full sample and closer to one (0.892) among the bottom expenditure class. This is something similar to the findings of Subramanian and Deaton (1991) for India and Jenkins *et al*. (2019) for Nigeria. The interesting trend is that the middle-income group, in other words, the middle class spends proportionately more than the bottom (understandably) but also top expenditure quintiles. Similar results have been reported by Acar *et al*. (2016) for Turkey. This emerging middle India and their aspirations for education and upward mobility are clearly evidenced through family spending on education, especially with movement from bottom to middle expenditure class. The difference between middle and top expenditure group elasticity is marginally advantageous to the middle class also it widens in the 71st round. But, for the poorest families, there is barely adequate income to even start making some positive education expenditure. But if the income of the poor increases and able to reach a threshold level of the middle category, spending on education becomes a priority.

Household Size

Household size indicates scale effect and fertility preference per se. It has a significant and positive impact on the probability of spending on education indicating larger households tend to spend lesser on the education of children. But unconditional estimates of the elasticity coefficient are positive and significant in that amount spent on each additional child adds on to 17, 13, 12, and 15% among full and sub-samples in 1995-96. But it does not show a significant probability of spending on education, but both conditional and unconditional estimates are negative and significant in 2007-08. Larger family size in the bottom class tends to spend about 5% less, compared to 3% less spending across middle and top classes. A similar pattern continues in 2014, estimates of all four models show negative and significant coefficient values. Amount spent on each additional child on average reduces to 18, 19, 20, and 18% across full and sub-samples. This corroborates with the decreasing and negative spending among the poorest expenditure groups in the 64th and 71st, during the post-2000s. It brings out the quantity-quality trade-off on the number of children the couples would like to have. Using the district level household survey of 2007-08, Kugler and Kumar (2016), show that family size has a negative impact on schooling as reported in the present study. The high fertility rate within households may therefore have caused the low level of spending on education. In economic terms, the cost of school attendance, both direct and indirect (foregone earning or opportunity cost), increases as the size of the family increases.

Characteristics of the Head of the Household

Family fixed effects are examined using years of schooling, age, and gender of the household. Years of schooling of the head of the household has a positive and significant probability of family spending on education over expenditure classes and across time. Unconditional average marginal effects consistently increase from the bottom to the top expenditure class. However, in 2007-08 and 2014, the average marginal increase in spending is lesser compared to the marginal effect noted in 1995-96. But the point to be noted is in the middle expenditure group, the average effect is larger compared to the top expenditure category, like the one observed in PCCE. Many studies confirm the same finding for example for India (Azam and Kingdon, 2013); Vietnam (Huy, 2012); Nigeria (Jenkins *et al*., 2019).

The age of the head of the household indicates experience, not necessarily to capture the money aspect of the experience as a wage premium, but also from the consumption perspective of investing in the human capital of off their springs. It exerts positive and significant probabilities of family spending on education across expenditure categories and over three rounds. But the average marginal effects are tiny around a 2-3% increase in family spending on education. A negative and significant coefficient on the gender of the head of household indicates that being male reduces the family spending on education. The average effect gets reduced at an increasing rate across expenditure categories. A similar pattern is observed in 2007-08 and 2014, with substantially lower effects.

Yet another factor expected to have a positive influence on family spending on education is the skill type, the head of households owes to. Skill type, having four categories, the dummy variable on skill levels from 2-4 depicts positive and significant probabilities of family spending on education over full and sub-samples in 2007-08 while it is significant only among the middle expenditure class in 2014. The positive and significant coefficient on this dummy variable Skill_2 suggests that average family spending on education improves by 4, 3, and 5% across the bottom, middle, and top expenditure classes respectively. While the same variable in the 71st round exerts a substantially higher average effect of 18 and 27% across the bottom and middle expenditure class while it is statistically insignificant at the top expenditure class.

Skill_3 displays positive and significant probabilities of spending on education among middle, top, and full

samples except for the bottom sub-sample in 2007-08. But the pattern is not the same across 2014, where skill_3 indicates positive and significant probabilities of spending on education overall categories except at the top expenditure class. Unconditional average marginal effects suggest that family spending on education will increase by 7, 6, and 4% across three expenditure groups in 2007-08, while a substantial increase of 52 and 48% more compared to skill_1 among the bottom and middle expenditure class but statistically insignificant at top expenditure class. The highest skill level captured via dummy variable skill_4 reports positive and significant probabilities of household spending on education in 2007-08 across the board. While in 2014, it is the same except across the top expenditure class. Coefficient values of skill_4 exert an average increase of 7, 8, and 9% of family spending on education. In 2014, the marginal effects are substantial that it can add family spending by 24 and 54% over skill_1 in the bottom and middle expenditure class.

Caste dummy, that being SC/ST (socially deprived section of the population) statistically and significantly reduces the probability of family spending on education across the board. It does not have income (expenditure) thresholds, and it is generally believed that economic capacity can offset caste deprivation, where education is viewed as an instrument for upward mobility. That however does not hold in the present study in any period. The average marginal effect is negative and statistically significant among families belonging to SC/ST compared to others across the board and suggests reduced family expenditure on education. The reduction in figures varies from 4-5% in 2007-08; 12-20% in 2007-08 and 21-28% in 2014.

Location

As found in the review of earlier studies, children who reside in rural areas (D_sector) spend less family expenditure on education compared to those who live in urban areas. The probability of D_sector is negative and statistically significant across sub-samples and full samples over time. The combined marginal effect suggests that on average residing in rural areas reduces expenditures by 7, 8, 5 and 8% across full, bottom, middle, and top expenditure groups in 2007-08, while this average reduction of expenditures has risen to 10, 25, 7 and 19% across the same in 2014. But the reduction was substantial to the extent of 33, 43 and 59% among the bottom, middle, and top expenditure class in 1995-96. This has been found in a number of studies (Nordman and Sharma, 2016; Jenkins *et al*., 2019). One of the plausible reasons for these differences across surveys could be due to a number of government interventions to promote schooling that was initiated in 2000 through Education for All schemes like Sarva Shiksha Abhiyan and later implementation of the Right to education act, boosted a good amount of government expenditure into the schooling system.

Yet another location-related variable examined here is to what extent regions play a role in determining family spending on education. We categorize 32/35/36 states of India into six broad categories based on their location south, west, east, NES, north, and central (details in Table A1). Keeping south as a reference, we create five dummy variables to denote regions. The probability of family spending on education is negative across regions and over three rounds, except among the bottom and middle expenditure class in D_west; all, bottom and middle in D_central in the 52nd round. On the contrary, the probit in the 64th (except D_NES) and 71st rounds are negative and almost significant across the board.

Unconditional marginal effects are positive in the 52nd round only among the bottom in D_west (an increase of 18% compared to the south); and D_central (an average increase of 11% among the full sample, 20 and 11% among poor and middle expenditure classes compared to south). The rest of the regions spend less than the south. On the contrary, in the 64th round, all regions spend more than the South except D_central (full and subsamples), and D_west except bottom spent less than the South. While in the 71st round, all regions spend substantially less than the south. It indicates that education has become more expensive in the south because of the emergence of a large share of private unaided engineering and professional education in the rest of India. Chandrasekhar *et al*. (2016) find that the average share of expenditure on higher education out of total household expenditure is higher in the southern states since individuals from these states are more likely to be enrolled in private unaided institutions where fees are higher and are more likely to be pursuing technical education.

Child Related: Age Gender Class

Age-gender-related socio-demographic variables cover the number of children in each school going age range between 5 and 29 that is categorized into 10 different age-gender class. Grouping of age can relate to levels of education viz., primary (5-9), upper primary (10-14), secondary (15-19), and graduates and above (20-24/20-29). Equality of the male and female coefficients across age groups is tested using the chi2 test and presented at the bottom rows of each of Tables A2. Keeping the Female5_9 age group (where the lowest spending occurs) as the base category, when children move from primary to upper primary; from there to secondary, and so on, the increasing cost of education is obvious. Families across the board complement this increasing cost when their children move from primary to upper primary and the probability of family spending is found to be gender-neutral. When the such transition happens from elementary to secondary education, the probit is negative across both gender and expenditure groups. The scenario is no different in the higher education age group.

Combined marginal effects show interesting insights (Fig. 1). Male children across age groups are spent an average higher percentage of family spending while transiting from primary to upper primary, from then on to secondary but not while moving up to higher education. This pattern holds well for the 52nd and 71st rounds but in the 64th round, a clear upward spending across levels of education along the ladder of male-female hierarchy. This pattern indeed captures higher education becoming expensive for all.

The test of equality of female and male coefficients of chi2 reported in Table 2A-C clearly establishes the gender bias in family spending on education across age classes 10-14, 15-19, and 20-29 corresponding to upper primary, secondary, and higher education respectively. There is clear statistically significant gender bias across expenditure groups[2]. The bias though prevalent across expenditure groups seems to have more among the bottom expenditure class compared to middle and top expenditure groups.

Policy Variables

We examine the policy variables such as whether the children enrolled are attending government or local body type of schools or do they attend private schools and other school incentives such as whether the children receive the Mid-Day Meal (MDM)[3]. The dummy variable of D_Mgt_type exerts positive and significant probabilities across the board and over time. The combined effect of management type suggests strong positive and significant values, indicating the family expenditure on education augmented considerably to the tune of 261, 185, 253, and 302% across the full and sub-samples in 1995-96. The pattern is similar in 2014 as well, with the combined effect of substantially to the tune of 447, 335, 432, and 520% across the full and sub-samples. But, the combined unconditional effect as expected is negative and significant and suggests that when children are enrolled in govt/LB educational institutions, expenditure on education by families on an average decline, clearly evidencing the complementary nature of government and household expenditures on education in 2007-08.

D_MDM exhibits positive and significant probabilities in 1995-96 and 2014. The combined effect is positive and significant to the tune of 69, 58, 89, and 18% across full and sub-samples. The same pattern was observed in 2014 the combined effect is positive to the levels of 94, 113, and 80% across the sub-samples. On the contrary, the probit is negative and significant across the board except at the top expenditure class in 2007-08. The combined effect as well is negative and significant which suggests the decline in family spending on education to the tune of 37, 29, 34, and 46% across full and sub-samples.

Concluding Remarks

The present paper makes an attempt to examine the education spending behavior of households across economic status groups. Based on the expenditure elasticity, it has been found that the middle-income group, rather the middle class spends proportionately more than the bottom (justifiably) but also top expenditure quintiles. The difference between the middle and top expenditure groups' elasticity is marginally advantageous to the middle and the gap widens in the 71st round. This emerging middle class and their aspirations for education and upward mobility are noticeable, especially with movement from the bottom to the middle expenditure class.

But for the poorest families, there is hardly adequate income to initiate making some positive education expenditure. Nevertheless, when the income of the poor increases and able to reach near the basic minimum, expenditure on the education of the family becomes a priority.

Household size is negative and significant across expenditure classes and over time, indicating the quantity and quality trade-off of the number of children demanded in families. Years of schooling by the head of household has a positive and significant probability of family spending on education. The point to be noted is in the middle expenditure group, the average effect is more compared to the top expenditure category, like in per capita consumption expenditure the age of the head of the household indicates the experience, not necessarily to capture the money aspect of the experience as a wage premium in wage equations, but from the perspective of investing in the human capital of offspring. It exerts positive and significant probabilities of family spending on education across expenditure categories. Yet another significant factor that is expected to have a positive relation with family spending on education is the skill type of the head of the household. Skill type, having four categories, the dummy variable on skill levels from 2-4 depicts the positive and significant probabilities of family spending on education over full and sub-samples in 2007-08 while it is significant only for the middle expenditure class in 2014. Caste dummy, being SC/ST (socially deprived section of the population) statistically and significantly reduces the probability of spending on education. Children who reside in rural areas (D_sector) spend less family expenditure on education compared to those who live in urban areas.

[2]The difference from female5_9 is significantly higher across male in the same age class. The difference actually rises as we move up in the ladder of age groups. This can be attributable to the simple reason that as the levels of education go up, the cost of education as well escalates

[3]These variables on scholarships, textbooks and stationery were initially included in the model ad later dropped due to estimation related issues

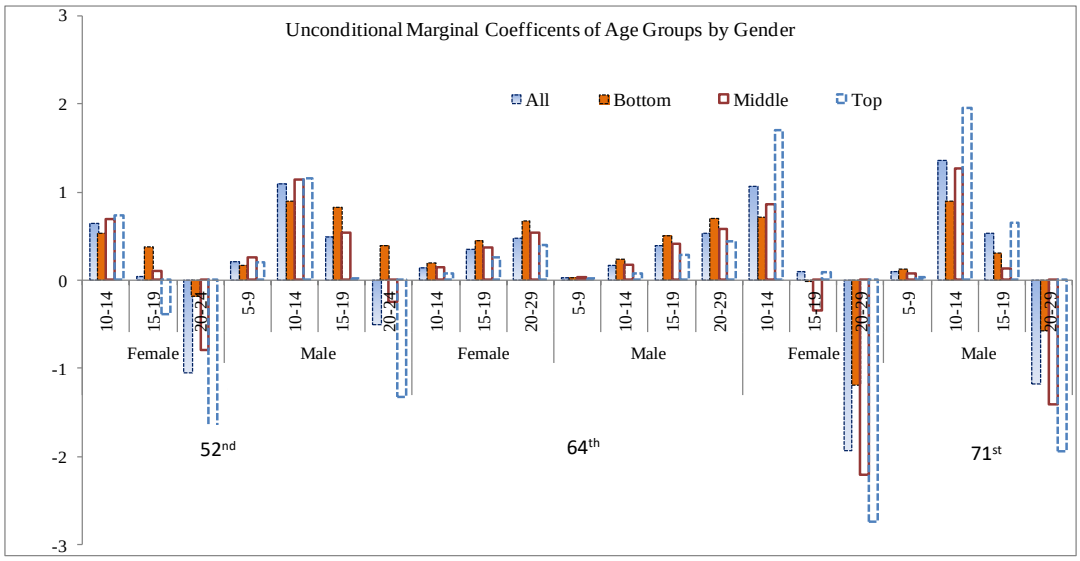

Fig. 1: Unconditional marginal coefficients of age groups by gender in NSSO rounds

Female bias in the age class 10-14 is quite substantial and has widened in 2014 compared to previous years. Age class of secondary schooling, the female bias is observable, however, compared to earlier rounds of data 1995-96, the female bias appears to have extended. There is clear statistically significant gender bias across expenditure groups. Bias prevalence seems to have more among the bottom expenditure class compared to middle and top expenditure groups. It is found across all three rounds of data, indicating that gender bias had remained during the two decades. The moot question here is will this gender bias alter? If transforms, when will it alter and how long will it take for such change? In the absence of such a move, what ought to be the government's policy towards the financing of education especially for girls given the immense positive externalities of girls' education?

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Ethics

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Annexure 1

Review of earlier studies on the determinants of expenditure on education*

	Author	Dependent Variables	Data and Model	Methods	Results
1	Huston (1995) Objective: to analyze the impact of income and HH characteristics on the proportion of the non-necessity HH budget allocated to education goods &services	ER = Education ratio; measured as proportion of HHX on education out of the non-necessity HH budget	$\ln[ER/(1-ER)] = \beta_0 + \beta_1 I + \beta_2 HC_i$ for all i=1,....,n; I = HH Income; HC = HH characteristics variables like Age of HH head, family size, region (DV), Race (DV),	1990-91 BLS Consumer Expenditure Survey; uses modified Engel function; N =661 HHs; OLS for binary variable-Linear Prob. Model	Age, education, income, region, race, and family size are found to be significant

Annexure 1: Continue

			gender, presence of children		
2.	Tilak (2002) i. Elasticity between HHX on ed and Govt; PC and P/S – elementary state level ii. elasticity bet HHYTot to HHX tot; hhY-hhX both pc; HHY pc-HHX p/s iii. determinants of HHX on edn_ using OLS (27 eqns – across states, caste, boys/girls, mgt. type, ps primary; ps middle, ps elementary, etc.)	State level: total HHX education (all levels), HHX on elementary P/S as Literacy (%) (1991); SDP/pc SDP (Rs.) (1994-95); GEX/pc Govt exp. on education P/C (1994-95); GEX on Ed/SDP % (1994-95); GEXELY/PS (Rs.) (1994-95); PTR in primary (1994); HABITAT % of habitations with a school (1993)	ln HHEX = a+ $b_i X_i$ +ε HHY Total annual (Rs.); HHY/pc per capita (Rs.); HHY/NonAg %; HHEX on education (Rs.); HHEX/pc on education (Rs.); HHEX/ps on(Rs.); HHEX/ps on education, p/s (Rs.); HHEXELY/ps on elementary ed p/s(Rs.); HHED: Highest education level of the head of HH in years of schooling; caste (DV): Religion (DV); gender, HH size; occupation-DV; VDI Devt Index; on school/ PHC availability in a villages, etc.	(1994) NCAER survey data on Human Development in rural India (HDI) & other secondary sources from MHRD, NCERT, etc.,	HH variables: HH income, education of head of HH, HH size, caste & religion are found to be significant
3.	Kingdon (2005) The data show gender bias in educational resource allocation marked it in rural India via non-enrolment of girls, implying zero educational spending. Hence, what is visible is a small gender bias in educational expenditure among enrolled children	Simple hurdle model: $P(s=0 \mid x) = 1-\varphi(x\gamma)$ (2) $\log(s) \mid (x, s>0) \sim N(x\beta^2, \sigma^2)$ (3); where s is the budget share of education, x is a vector of explanatory variables, γ and β are parameters to be estimated, and σ is the *S.D.* of s. Eq. (2) makes the probability of s zero or positive, and eq (3) states that conditional on $s>0$, $s \mid x$ follows a lognormal distribution	Working's Engel as: $si = \alpha+\beta ln(x_i/n_i)+\lambda ln\ n_i+ \Sigma\theta_k(nk_i/ni)+ \psi Z_i + \epsilon_i$ (1) where x_i is total expenditure of HH i, s i is the budget share of education { edu exp/xi}, n_i HH size, and z_i is a vector of other HH characteristics such as religion, caste, and HH head's education and occupation. ui is the error term. The term $ln\ n_i$ gives independent scale effect for household size. $j=1, \ldots, J$ refers to the J^{th} age-gender class within the HH. HH-z vector -caste, religion, wage lab, education in years of schooling	1994 NCAER rural household survey of 16 major states in India Hurdle model estimation 16 states with one ols and2 hurdle - Total 48 equations estimated	Engel curve method fails to find significant gender bias; individual expenditure data show significant bias. Two explanations: incorrect functional form of the budget share equation and the effect of aggregation of data at the HH level
3a.	Azam and Kingdon (2013)	Estimate 3 equations for each state: Unconditional OLS of budget share of education at HH & individual level; Probit- budget share of education is positive or not at HH & individual level; Conditional OLS of log of budget share of education in the HH & individual level. W_i = log normally distributed and hence log of of wi is the dep var in all models	$Wi = \alpha+\beta_1(x_i/n_i)+\lambda ln\ n_i + \Sigma\theta_k(nk_i/ni)+ \psi Z_i + \epsilon i$, where Wi is the budget share of education of the ith household; x_i is the total expenditure of the HH; n_i - HH size; x_i /n_i log of total per capita expenditure; nk_i/n_i - the fraction of the HH members in the kth age-gender class within HH i; Z_i is a vector head's education, other HH characteristics viz., gender, occupation and dummy variables to capture state etc. $\alpha, \beta, \lambda, \theta, \psi$ are the parameters to be estimated	India human development survey 2005: Engel curve- using the Working-Leser specification; Hurdle model	Found that pro-male gender bias exists in the primary school age group for many states; gender bias increases with age greater for age group- 10-14 and 15-19 years. Pro-male gender bias in Ed. Exp. Is greater in rural areas
4	Aslam and Kingdon (2008)	Z_i set = HH variables include head_ female, head_marital, head_edu_miss ; primary, secondary, head_matric ead_ occu_m iss, service, white collar, urban, region dummies	$W_i = \alpha+(x_i/n_i) + \lambda ln\ n_i + \Sigma\theta_k(nk_i/ni) + \psi Z_i + \epsilon_i$, where W_i is budget share of education of i^{th} HH; x_i is total expr. of HH; n_i - HH size; x_i /n_i log of total per capita expenditure; $0k_i/n_i$ - fraction of HH members in kth age-gender class within HH i; Z_i is a vector of other HH characteristics*; $\alpha, \beta, \lambda, \theta, \psi$ parameters to be estimated	Pakistan Integrated Household Survey (PIHS 2001-2002), Hurdle Models; aggregation of data at HH level is tested using individual-level data on each child in the sample	Engel approach is found to be restrictive; data aggregation diminishes ability to detect gender bias. Using HH fixed effects find pro-male biases in education expr. Within-household
5.	Nahm and Hong (2009) Engel curve for private education expenditure according to HH head education levels by employing a semi parametric method,	Engel curve functions are quadratic to log of total expenditure) and age of HH, demographic details as residential distinct (Seoul, for metropolitan), sex of HH head (=1 if male), status of empt (=1, if unemployed), and ownership of house (if HHs own their house). No. of children into two groups, high school students or lower and college student or higher, Educ. level 1 refers to HH head education of high school or lower, & education level 2 college or higher	$Y_i^* = x_i'\beta_0 + u_i$ …. (1) where y_i is the share of expenditure on private education, includes log of total household expenditure and variables of household characteristics Two factors considered: i. Consumption ability of HH and student's intellectual ability (captured trough mothers' education)	Korea Labor and Income Panel Study 9th waves, assuming different functional forms according to householder's education levels. Semi parametric method, Symmetrically Trimmed Least Squares (STLS) estimation; by OLS, Tobit and STLS	Engel curve has the inverted-U shape, showing different patterns as per HH head education levels. Income elasticity tells that private education service is a 'normal goods'
6.	Huy, (2012) The purpose is to investigate the determinants of the demand for education in Vietnam by examining the education expenditure pattern of Vietnamese households	Dependent Variable: Logarithm of education expenditure; separate regressions are estimated for different income quintiles; separately for subsample with primary school-age, secondary school-age and college-age children. These eqs. focus on income effect and other family characteristics on the patterns of educational expenditure allocation among school age children	Indept. Var: HH head occupation(categorical); HH head education -cate, HH no of children cate, other HH head characteristics – male, marital status, region Tobit model; where the households with no education expenditure are censored; $y_i^* = x_i\beta + \varepsilon_i$ where is the latent variable, and xi is the vector of household characteristics The observed yi (education expenditure) is defined as $yi = 0$ if, and if >0 & when positive in logarithmic scale	Vietnamese HH Living Standards Surveyfrom 2006 (VHLSS 2006); VHLSS2006 data covers 9,189 HHs with 39,071 persons in 64 provinces; considered HH with dependent children and where their age was less than 23, so 4,578 valid responses	i. HH income significant effects on educational expenditure. ii HH heads have higher level of edu. Or with professional jobs enhances probabilities of edu. expenditure. iii HH with more primary or secondary school-age children spend more on edu. & less ed. spending by HHs with pre-school or college-age children
7.	Andreou, (2012)	Factors affecting expenditure on education HH choice regarding public vs private schooling	Income; no. of children (4 cate 0-5 ref; 6-12, 13-19, 20-30), region (5 categories), Head Occupation category, Head Gender, employer sector (Agri, construction; ref other), Head age group; Head education categorical ref: primary), other House characteristics-sq.feet, no of rooms, rent, House type-categorical	Data from the family expenditure Surveys 1996/7, 2002/3 and 2008/9 OLS	results show that level of education expenditure increases with income across years. % of HHs spending on pvt. Tutorials range between 60-90% at primary & secondary education, while variation of this proportion over income groups remain stable
8.	Schroeder *et al*. (2015) Analyzes private spending on various educational provisions such as child daycare services, private schools, or non-formal educational programs, i.e. sports clubs or music schools	Relationship between expenditures on education Relative to HH Income and HH Characters: Dept Var	HH income, Youngest child below school age, Youngest child of primary school age, Reference: Youngest child of secondary school age; Number of children in the HH, Lone-parent household (Ref: Couple household); Both parents work full-time (Ref: Only one or no parent works full-time), At least one parent with university degree (Ref: No parent with university degree), Living in East Germany (Ref: Living in West Germany)	DIW Berlin is based on data from the Socio-Economic Panel (SOEP) study and the SOEP-related study, Families in Germany (Familien in Deutschland, FiD) for 2012	Findings: Families who actually spend money on their children's education, it is the low-income HH that use a higher share of their HH budget for this purpose this applies both to overall. education expr-& to spending on individual education services
9.	Rizk and Abou-Ali (2016)	logarithm of annual household expenditure on education Income Quintile Eq. 5 Age wise 3 eqns -pre and primary, secondary nnd college-aged	XX is a vector of various family characteristics namely, household income, father's education, mother's education, parent's occupation, and geographic location of household. OLS $Y* = \beta'X + \mu$ (1) Where $Y*$ is logarithm of annual household expenditure on education	Ffour countries employing Harmonized Household Income and expenditure surveys. The datasets used are 2010/ 2011 round of the HHIES of Egypt, Jordan and Palestine & 2009 round for Sudan	HH in lower social strata are found to spend more on educating children's at all educational level with exception in Egypt, where wealthier household spend more on children's education
10	Acar *et al*. (2016)	Estimates another eqn all same except dept. variable educshr	lnedex = β_1+ β_2 lnexp+ $\beta_3$age+ β_4Emp+ β_5HHS+ β_6SHRPS+ β_7RUR+ β_8 SHRFS	Turkish Household Budget Surveys from 2003, 2007 and 2012;	Estimated expr. Elasticities have lower values for top-& the

Annexure 1: Continue

		+ β_9 RURF+ β_{10}NS +$\sum \alpha_j$EDUCD$_j$ + ε, where j = 2,3,..5 (levels of edn); HH heads (age, education level-DV and empt. status - DV), HH characters (HH size, location rural-DV) and student variables (share of primary + high school students, & share of female students, interaction term- rural & share of female students; total no. of students in the HH (NS)	Tobit regressions of real educational expenditures by income groups; Engel curve framework	bottom-income quartiles while larger values for the middle-income quartiles. Results show for all income groups expr elasticity of education increases over time*
11 Nordman and Sharma (2016) Objective is to assess the effect of female bargaining power on the share of education expr. in the HH budget in India Raise 3 questions viz., (i) Does the bargaining power of women affect the household's budget share devoted to education? (ii) Does the intra-household allocation of educational expenditure among sons and daughters depend on female bargaining power? (iii) Do these effects vary by caste of households	By improving the collective HH model by endogenizing female bargaining power and use 3SLS approach; simultaneously estimate female bargaining power, per capita household expenditure and budget share of education All regressions include district dummy variable	$\theta = (X_1, TotExp)+\vartheta_1$, (1) $PCExp = PCEx(X_2)+\vartheta_2$, (2) $bedu = (\theta, PCExp, X_3)+\vartheta 3$ (3); where. X_1, X_2, and X_3 are vectors of exog. determinants; & ϑ_1, ϑ_2, of exog. determinants; & ϑ_1, ϑ_2, and ϑ_3 are error terms. X_1, in bargaining power Eq. (1) includes education share of adult females in HH; its squared value, log HH size; dummies for caste, religion, & urban; & age of HH head. X_2 -in log p/c expenditure Eq. (2) includes age; years of education ; a sex dummy of HH head; dummies for caste, religion, & urban; no. of adults in HH; & two HH wealth controls (electricity , homeown). X_3 - set of exog. Variables in budget share of edu. Expr. & includes log HH size, urban, & share of different sex–age class & formed into age groups: 0–4, 5–9, 10–14, 15–19, 20–55, & over 55 years. Females over 55 years omitted category	India human development Survey 2011–12; system of equations; 3SLS	Find that: (i) Female bargaining power has a positive effect on the HH budget share of education expr; (ii) Bargaining power is positively related to educ. spending in urban but negatively in rural areas; (iii) Female bargaining power has positive effect on education expr of girls in urban areas among all caste groups, but negative in rural areas in lower caste groups; and(iv) a pro-male bias exists in education spending for all age groups, differ across regions and caste
12. Acerenza and Gandelman (2017) 12 Latin American and Caribbean countries and the US. Bahamas, Chile and Mexico have the highest household spending in education while Bolivia, Brazil and Paraguay have the lowest *On average, education in LAC is a luxury good, while it may be a necessity in the US. No gender bias is found in primary education, but HHs invest more in females of secondary age than same-age males	Public-Private Spending and Its Impact on Inequality Equation (1) expanded to include age-gender class $w_i = \alpha + \beta ln\ (x_i/n_i) + \gamma\ ln\ n_i + \Sigma\theta(n\delta_i/ni) + \psi z_i + \varepsilon_i$ (2)** Per capita expenditure (in logs); Age of the HH head; Female HH head; HH head education = secondary incomplete ;HH head education = secondary complete; HH head education = tertiary; dummy for family with both parents; HH members (in logs)	$w_i = \alpha + \beta ln\ (x_i / n_i) + \gamma\ ln\ n_i + \psi z_i + \varepsilon_i$ (1), where w_i is the budget share of education of the ith household, x_i is the total expenditure of the HH, n_i is the household size Z_i a vector of other HH socio-demographic characteristics as education and gender of the household head and dummies for urban or rural residence. ε_i is the error term The expenditure elasticity of educational spending is = 1 + β/w_i. This functional form allows the elasticity to vary by the share of educational expenditure but does not allow the good to be a necessity (β < 0) for some and a luxury (β > 0) for others	Micro data from income and expenditure surveys in 12 LAC countries and the United States as a benchmark of comparison; The survey dates range from 2003-2004 (Bolivia) to 2014 (Mexico) Working-Leser framework	Tertiary education is the most important form of spending, and most educational spending is performed for individuals 18-23 years old. More educated and richer HH heads spend more in the education. HHs with both parents present& those with a female main income provider spend more than their counterparts. Urban HH also spend more than rural HH. *
13. Ebaidalla (2017)	Dep Var: HH expenditure on Education In addition, the effect of household income is found to be positive and significant in the highest income quintile	Income; HH head characters: Age, Gender of Head, married, education Level of HH Head *i*. Primary secondary university; education level of spouse: Primary, Secondary University; No. of Children in HH Pre-school, Primary School, Secondary School, University Level; Profession of HH Head (agri. as ref.) Service Industry; HH Type of Dwelling (house as ref.) Apartment, villa, other HH characters; HH size, room, electricity, Urban, Region	National baseline household survey data NBHS, 2009) for national, urban (and rural Levels of Sudan; Tobit model; 48,825 individuals of 7,913 households & covers 15 states	HH's income, head education, head age, HH size, number of school-age children and residence in urban are significant factors. Income elasticity of education in urban is greater than rural areas
14. Jenkins *et al*. (2019)		$\ln w_i = \alpha_i + \beta ln Y_i + \Sigma_k \gamma_k Z_{ki} + \xi i$; where W_i = HHX *i* for education, vector Z = HH's socio-demog. Variables (gender HH head, education of HH head, major occupation of HH head, number of children, family size and location of the HH). α, β and γ are the estimated parameters while ξ symbolizes the random error	Nigerian general household Survey, Panel 2012/2013, Wave 2; 4,986households with 29,533 household members Hurdle Model	HH income, age, education, gender of the HH heads and urban versus rural impact on the decision to spend on education. Such expr. Are income elastic, but vary in magnitude for low income compared low income compared to higher income families

Note: *Studies are arranged chronologically

Annexure 2

Table 2: Summary statistics

	52nd round				64th round				71st round			
Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
LEdEx	6.274191	1.408571	0	11.11245	7.054697	1.495916	0	13.33505	5.351362	4.31002	0	14.88469
LPCHHX	8.420036	.4767396	5.703783	11.27617	9.043889	.5645066	5.480639	12.37328	9.792473	.6020543	6.733402	13.52783
lhhsize	1.789862	.3991453	0	3.871201	1.708612	.3481012	0	3.401197	1.679767	.3989001	0	3.465736
Head_years~l	5.644431	4.872162	0	18	5.919259	4.949662	0	18	7.024769	4.519257	0	16
Head_Age	45.00041	11.32143	0	99	44.94877	11.18847	1	100	47.0993	12.10657	10	105
D_Head_Gen~r	.9279631	.2585504	0	1	.93303	.2499714	0	1	.902683	.29639	0	1
hhtype					2.813965	1.931558	0	1	.1379672	.3448667	0	1
D_Skill2					.5915234	.4915548	0	1	.5796716	.4936133	0	1
D_Skill3					.0418702	.2002935	0	1	.0476853	.2131003	0	1
D_Skill4					.1116724	.3149647	0	1	.1448334	.351934	0	1
D_Caste	.2663042	.4420276	0	1	.3086461	.4619373	0	1	.3108873	.4628583	0	1
D_sector	.5735933	.494557	0	1	.6461274	.4781729	0	1	.5809218	.4934099	0	1
D_West	.1288991	.33509	0	1	.128242	.3343609	0	1	.1277556	.3338186	0	1

Table 2: Continue

D_East	.1971207	.3978264	0	1	.209585	.4070147	0	1	.1939042	.395356	0	1
D_NES	.1108385	.3139337	0	1	.1183404	.3230125	0	1	.1152193	.3192875	0	1
D_North	.1596485	.3662817	0	1	.1460494	.3531577	0	1	.1485436	.3556392	0	1
D_Central	.1968505	.3976205	0	1	.2192302	.4137272	0	1	.2404204	.4273402	0	1
D_Female1~14	.1829403	.3866196	0	1	.1805268	.3846277	0	1	.1019328	.302561	0	1
D_Female1~19	.0759063	.2648495	0	1	.0864611	.2810452	0	1	.1086707	.3112266	0	1
D_Female2~24	.0130996	.1137019	0	1	.0178854	.1325358	0	1	.1691492	.3748849	0	1
D_Male5_9	.1643393	.3705852	0	1	.1919226	.3938147	0	1	.0977969	.2970408	0	1
D_Male10_14	.264456	.4410455	0	1	.2197319	.4140673	0	1	.1186862	.32342	0	1
D_Male15_19	.1348544	.3415698	0	1	.1131554	.3167844	0	1	.1321484	.3386532	0	1
D_Male20_24	.0288904	.1674995	0	1	.0263487	.1601708	0	1	.1864094	.389438	0	1
N	161,222		69,522	91,700	201,036		106,837	94,199	148,013		54,568	93,445

Annexure 3

Table 2A: Determinants of log of expenditure on education of children between the Ages 5-24 in 1995-96

	CO1_All			CO1_Bot			CO1_Mid			CO1_Top		
52nd round	Probit	Condin	Uncond	Probit	Condin	Uncond	Probit	Condin	Uncond	Probit	Condin	Uncond
LPCHHX	0.945***	0.984***	1.446***	0.872***	0.803***	0.911***	1.195***	1.126***	1.743***	0.699***	0.944***	1.501***
	(0.014)	(0.008)	(0.013)	(0.050)	(0.030)	(0.035)	(0.080)	(0.041)	(0.077)	(0.029)	(0.013)	(0.036)
lhhsize	0.127***	0.094***	0.172***	0.183***	0.032	0.129***	0.066*	0.120***	0.129***	0.074**	0.085***	0.149***
	(0.015)	(0.008)	(0.014)	(0.029)	(0.017)	(0.020)	(0.026)	(0.014)	(0.026)	(0.022)	(0.011)	(0.029)
Head_yearsschool	0.076***	0.020***	0.082***	0.076***	0.022***	0.058***	0.079***	0.019***	0.083***	0.072***	0.019***	0.101***
	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Head_Age	0.009***	0.004***	0.011***	0.008***	0.005***	0.007***	0.010***	0.004***	0.011***	0.010***	0.003***	0.014***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)
D_Head_Gender	-0.224***	-0.065***	-0.248***	-0.142***	-0.080**	-0.125***	-0.238***	-0.086***	-0.268***	-0.256***	-0.039**	-0.341***
	(0.020)	(0.011)	(0.019)	(0.041)	(0.024)	(0.028)	(0.034)	(0.019)	(0.033)	(0.030)	(0.014)	(0.038)
D_Caste	-0.116***	-0.071***	-0.150***	-0.122***	-0.094***	-0.119***	-0.119***	-0.030**	-0.127***	-0.103***	-0.111***	-0.202***
	(0.012)	(0.006)	(0.012)	(0.021)	(0.012)	(0.014)	(0.021)	(0.011)	(0.020)	(0.023)	(0.011)	(0.030)
D_sector	-0.317***	-0.292***	-0.463***	-0.302***	-0.311***	-0.330***	-0.301***	-0.282***	-0.438***	-0.328***	-0.279***	-0.592***
	(0.012)	(0.006)	(0.011)	(0.024)	(0.015)	(0.016)	(0.019)	(0.010)	(0.018)	(0.019)	(0.009)	(0.023)
D_West	-0.004	-0.044***	-0.028	0.140***	0.207***	0.182***	0.057	-0.090***	0.002	-0.094***	-0.141***	-0.212***
	(0.018)	(0.010)	(0.018)	(0.039)	(0.022)	(0.027)	(0.032)	(0.017)	(0.031)	(0.026)	(0.013)	(0.033)
D_East	-0.112***	0.118***	-0.039*	-0.143***	0.057***	-0.064**	-0.032	0.132***	0.045	-0.091**	0.217***	0.036
	(0.016)	(0.009)	(0.016)	(0.030)	(0.017)	(0.021)	(0.029)	(0.015)	(0.028)	(0.029)	(0.013)	(0.037)
D_NES	-0.320***	0.405***	-0.071**	-0.338***	0.474***	0.004	-0.380***	0.348***	-0.155***	-0.280***	0.374***	-0.088
	(0.023)	(0.010)	(0.022)	(0.050)	(0.025)	(0.033)	(0.038)	(0.017)	(0.036)	(0.036)	(0.015)	(0.045)
D_North	-0.271***	0.436***	-0.007	-0.411***	0.696***	0.059	-0.240***	0.445***	0.030	-0.299***	0.316***	-0.151***
	(0.018)	(0.009)	(0.018)	(0.049)	(0.026)	(0.033)	(0.032)	(0.017)	(0.031)	(0.025)	(0.012)	(0.032)
D_Central	0.077***	0.060***	0.107***	0.172***	0.211***	0.203***	0.117***	0.002	0.109***	-0.032	-0.017	-0.051
	(0.016)	(0.009)	(0.016)	(0.029)	(0.018)	(0.020)	(0.027)	(0.015)	(0.026)	(0.027)	(0.013)	(0.035)
Female Age10-14	0.330***	0.611***	0.657***	0.251***	0.822***	0.530***	0.345***	0.667***	0.696***	0.416***	0.324***	0.731***
	(0.019)	(0.010)	(0.019)	(0.034)	(0.019)	(0.023)	(0.034)	(0.016)	(0.032)	(0.036)	(0.014)	(0.045)
Female Age15-19	-0.581***	1.038***	0.043*	-0.455***	1.456***	0.375***	-0.601***	1.175***	0.108**	-0.688***	0.670***	-0.388***
	(0.020)	(0.012)	(0.020)	(0.041)	(0.034)	(0.030)	(0.035)	(0.022)	(0.034)	(0.033)	(0.016)	(0.041)
Female Age20-24	-1.791***	1.133***	-1.040***	-1.498***	1.666***	-0.182*	-1.701***	1.377***	-0.795***	-1.928***	0.785***	-1.832***
	(0.029)	(0.025)	(0.029)	(0.085)	(0.120)	(0.076)	(0.054)	(0.054)	(0.057)	(0.039)	(0.027)	(0.047)
Male Age5-9	0.199***	0.060***	0.221***	0.227***	0.052**	0.166***	0.217***	0.110***	0.262***	0.147***	0.025	0.197***
	(0.019)	(0.010)	(0.019)	(0.033)	(0.018)	(0.022)	(0.033)	(0.017)	(0.032)	(0.035)	(0.016)	(0.044)
Male Age10-14	0.762***	0.672***	1.097***	0.775***	0.912***	0.900***	0.793***	0.723***	1.142***	0.736***	0.367***	1.154***
	(0.019)	(0.009)	(0.019)	(0.033)	(0.017)	(0.023)	(0.034)	(0.015)	(0.032)	(0.036)	(0.014)	(0.045)
Male Age15-19	-0.175***	1.162***	0.494***	0.163***	1.594***	0.825***	-0.195***	1.272***	0.539***	-0.408***	0.752***	0.012
	(0.019)	(0.011)	(0.019)	(0.035)	(0.023)	(0.025)	(0.032)	(0.018)	(0.032)	(0.032)	(0.015)	(0.040)
Male Age20-24	-1.338***	1.333***	-0.501***	-0.816***	1.983***	0.389***	-1.210***	1.551***	-0.242***	-1.586***	0.906***	-1.328***
	(0.024)	(0.018)	(0.023)	(0.052)	(0.054)	(0.040)	(0.042)	(0.035)	(0.042)	(0.035)	(0.021)	(0.043)
cons	-8.915***	-2.382***		-8.678***	-1.121***		-10.942***	-3.628***		-6.421***	-1.694***	
		(0.129)	(0.070)		(0.405)	(0.245)		(0.671)	(0.348)		(0.266)	(0.123)
Adjusted r2		0.6043			0.4171			0.4166			0.4945	
N	161135	91652	161,135	53696	53,696	53,696	53715	30478	53,715	53708	36692	53,708
Probit LR chi2(24)	142622			53993.97			47614.3			36291.63		
Pseudo R2	0.6473			0.7295			0.6479			0.5411		
chi2 (Female=Male)												
Age10-14	250.7***	26.41***	579.7***	250.7***	26.41***	277.8***	190.8***	16.67***	210.7***	80.51***	13.97***	90.52***
Age15-19	223.5***	14.95***	591.3***	223.5***	14.95***	217.0***	165.1***	19.33***	185.3***	108.13***	32.06***	135.2***
Age 20-24	54.28***	5.98***	278.9***	54.28***	5.98***	47.74***	73.10***	8.05***	76.02***	88.48***	17.44***	106.5***

Note: * p<0.05, ** p<0.01, *** p<0.001; within brackets indicate SE; Average marginal effects derived using delta-method

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Table 2B: Determinants of log of expenditure on education of children between the Ages 5-29 in 2007-08

	CO2_All			CO2_Bot			CO2_Mid			CO2_Top		
64th round	Probit	Condin	Uncond	Probit	Condin	Uncond	Probit	Condin	Uncond	Probit	Condin	Uncond
LPCHHX	0.189***	0.668***	0.316***	0.374**	0.342***	0.163***	0.796**	0.760***	0.371***	0.047	0.752***	0.380***
	(0.048)	(0.007)	(0.004)	(0.119)	(0.023)	(0.011)	(0.297)	(0.038)	(0.020)	(0.121)	(0.014)	(0.009)
lhhsize	0.038	-0.086***	-0.038***	0.203	-0.122***	-0.045***	-0.049	-0.054***	-0.026**	-0.030	-0.053***	-0.028**
	(0.061)	(0.010)	(0.005)	(0.106)	(0.018)	(0.009)	(0.116)	(0.016)	(0.008)	(0.110)	(0.016)	(0.009)
Head_yearsschool	0.024***	0.025***	0.013***	0.033***	0.025***	0.012***	0.028**	0.023***	0.011***	0.016	0.023***	0.012***
	(0.005)	(0.001)	(0.000)	(0.009)	(0.001)	(0.001)	(0.009)	(0.001)	(0.001)	(0.009)	(0.001)	(0.001)
Head_Age	0.001	0.007***	0.003***	-0.001	0.007***	0.003***	0.015***	0.006***	0.003***	-0.006	0.008***	0.004***
	(0.002)	(0.000)	(0.000)	(0.003)	(0.001)	(0.000)	(0.004)	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)
D_Head_Gender	-0.051	-0.011	-0.007	-0.104	0.014	0.002	0.195	-0.030	-0.008	-0.236	-0.020	-0.019
	(0.075)	(0.012)	(0.006)	(0.124)	(0.022)	(0.011)	(0.137)	(0.020)	(0.010)	(0.135)	(0.019)	(0.011)
Skill_2	0.247***	0.060***	0.037***	0.226**	0.070***	0.039***	0.208*	0.051***	0.030***	0.058	0.090***	0.048***
	(0.050)	(0.007)	(0.004)	(0.074)	(0.012)	(0.006)	(0.090)	(0.012)	(0.006)	(0.127)	(0.016)	(0.009)
Skill_3	0.195	0.082***	0.045***	-0.364	0.201***	0.072**	0.754**	0.081*	0.061***	0.022	0.076***	0.039**
	(0.116)	(0.016)	(0.009)	(0.288)	(0.056)	(0.027)	(0.234)	(0.034)	(0.017)	(0.185)	(0.023)	(0.013)
Skill_4	0.292***	0.174***	0.092***	0.518**	0.116***	0.071***	0.159	0.176***	0.085***	0.117	0.171***	0.091***
	(0.081)	(0.012)	(0.006)	(0.165)	(0.030)	(0.015)	(0.163)	(0.021)	(0.011)	(0.155)	(0.019)	(0.011)
D_Caste	-0.220***	-0.093***	-0.051***	-0.222**	-0.088***	-0.047***	-0.112	-0.085***	-0.042***	-0.234*	-0.118***	-0.068***
	(0.046)	(0.007)	(0.004)	(0.069)	(0.011)	(0.006)	(0.084)	(0.011)	(0.006)	(0.103)	(0.012)	(0.007)
D_sector	-0.031	-0.159***	-0.075***	-0.189*	-0.167***	-0.080***	0.090	-0.127***	-0.055***	0.093	-0.163***	-0.079***
	(0.051)	(0.008)	(0.004)	(0.095)	(0.016)	(0.008)	(0.088)	(0.012)	(0.006)	(0.100)	(0.012)	(0.007)
D_West	-0.105	-0.086***	-0.044***	-0.185	0.031	0.006	-0.154	-0.130***	-0.064***	-0.000	-0.137***	-0.069***
	(0.072)	(0.010)	(0.006)	(0.135)	(0.022)	(0.011)	(0.134)	(0.018)	(0.009)	(0.124)	(0.015)	(0.009)
D_East	-0.067	0.066***	0.028***	-0.058	0.039*	0.014	0.006	0.122***	0.056***	-0.001	0.149***	0.075***
	(0.068)	(0.009)	(0.005)	(0.114)	(0.017)	(0.009)	(0.127)	(0.016)	(0.008)	(0.142)	(0.017)	(0.010)
D_NES	0.235**	0.371***	0.181***	0.877***	0.579***	0.286***	0.103	0.419***	0.193***	-0.266	0.253***	0.118***
	(0.075)	(0.011)	(0.006)	(0.140)	(0.028)	(0.013)	(0.140)	(0.018)	(0.010)	(0.143)	(0.017)	(0.010)
D_North	-0.256***	0.339***	0.147***	-0.155	0.550***	0.232***	-0.245	0.362***	0.157***	-0.355**	0.208***	0.092***
	(0.075)	(0.010)	(0.006)	(0.158)	(0.024)	(0.012)	(0.135)	(0.017)	(0.009)	(0.130)	(0.015)	(0.009)
D_Central	-0.270***	-0.110***	-0.061***	-0.397***	-0.005	-0.018*	-0.116	-0.155***	-0.074***	-0.014	-0.176***	-0.089***
	(0.067)	(0.010)	(0.005)	(0.113)	(0.018)	(0.009)	(0.123)	(0.016)	(0.008)	(0.136)	(0.017)	(0.010)
Female Age10-14	0.173*	0.293***	0.142***	0.234*	0.426***	0.194***	0.030	0.318***	0.145***	0.361	0.120***	0.073***
	(0.075)	(0.010)	(0.005)	(0.111)	(0.017)	(0.009)	(0.132)	(0.016)	(0.009)	(0.184)	(0.017)	(0.011)
Female Age15-19	-0.203*	0.777***	0.352***	-0.187	1.043***	0.443***	-0.163	0.813***	0.364***	-0.292	0.547***	0.265***
	(0.080)	(0.013)	(0.007)	(0.135)	(0.027)	(0.013)	(0.150)	(0.022)	(0.011)	(0.166)	(0.019)	(0.011)
Female Age20-29	-0.872***	1.129***	0.488***	-0.898***	1.643***	0.673***	-0.866***	1.261***	0.545***	-0.898***	0.859***	0.400***
	(0.093)	(0.023)	(0.011)	(0.211)	(0.080)	(0.036)	(0.192)	(0.049)	(0.023)	(0.165)	(0.028)	(0.015)
Male Age5-9	0.013	0.060***	0.028***	-0.040	0.067***	0.027***	0.125	0.067***	0.034***	0.003	0.038*	0.019
	(0.066)	(0.009)	(0.005)	(0.092)	(0.016)	(0.008)	(0.126)	(0.016)	(0.008)	(0.165)	(0.017)	(0.011)
Male Age10-14	0.310***	0.342***	0.170***	0.309**	0.513***	0.234***	0.408**	0.356***	0.175***	0.249	0.147***	0.083***
	(0.075)	(0.009)	(0.005)	(0.110)	(0.016)	(0.008)	(0.143)	(0.016)	(0.009)	(0.182)	(0.017)	(0.011)
Male Age15-19	-0.129	0.860***	0.393***	0.064	1.157***	0.502***	-0.245	0.926***	0.413***	-0.256	0.598***	0.292***
	(0.076)	(0.012)	(0.006)	(0.127)	(0.025)	(0.012)	(0.140)	(0.020)	(0.010)	(0.161)	(0.018)	(0.011)
Male Age20-29	-0.743***	1.230***	0.540***	-0.646***	1.688***	0.703***	-0.704***	1.339***	0.585***	-0.857***	0.950***	0.447***
	(0.086)	(0.019)	(0.010)	(0.172)	(0.056)	(0.025)	(0.167)	(0.037)	(0.018)	(0.162)	(0.026)	(0.014)
	(0.072)	(0.050)	(0.024)	(0.128)	(0.084)	(0.037)	(0.131)	(0.098)	(0.045)	(0.138)	(0.081)	(0.042)
cons	-4.659***	1.340***		-6.358***	4.057***		-11.125***	0.369		-2.428*	0.572***	
	(0.470)	(0.090)		(1.073)	(0.219)		(2.707)	(0.366)		(1.186)	(0.167)	
Adjusted r2		0.6726			0.4736			0.5355			0.5897	
N	193881	89801	193,881	65999	28553	65,999	64798	28431	64,798	63084	31813	63,084
Probit LR chi2(24)	263647			88690			88129.7			86356.8		
Pseudo R2	0.9848			0.9823			0.9870			0.9875		
chi2 (Female=Male)												
Age10-14	2.98	30.34***	29.62***	0.39	28.62***	22.50***	6.93***	6.42***	12.63***	0.37	3.36	0.95
Age15-19	0.90	42.58***	38.96***	3.11	15.06***	18.12***	0.33	25.51***	19.18***	0.07	8.77***	7.33***
Age 20-29	1.90	13.98***	15.80***	1.09	0.23	0.50	0.66	1.83	2.26	0.10	8.4***	8.29**

Note: * p<0.05, ** p<0.01, *** p<0.001; within brackets indicate SE; Average marginal effects derived using delta-method

Table 2C: Determinants of log of expenditure on education of children between the ages 5-29 in 2014

	CO3_All			CO3_Bot			CO3_Mid			CO3_Top		
71st round	Probit	Condin	Uncond	Probit	Condin	Uncond	Probit	Condin	Uncond	Probit	Condin	Uncond
LPCHHX	0.677***	0.739***	1.514***	0.506***	0.553***	0.892***	0.987***	0.678***	1.900***	0.597***	0.751***	1.683***
	(0.011)	(0.007)	(0.017)	(0.036)	(0.022)	(0.043)	(0.068)	(0.042)	(0.105)	(0.023)	(0.014)	(0.045)
lhhsize	-0.11***	-0.011	-0.18***	-0.13***	-0.057**	-0.19***	-0.131***	-0.010	-0.20***	-0.091***	-0.009	-0.182***
	(0.015)	(0.011)	(0.024)	(0.028)	(0.019)	(0.034)	(0.026)	(0.018)	(0.041)	(0.024)	(0.016)	(0.048)
Head_yearsschool	0.070***	0.040***	0.133***	0.088***	0.028***	0.117***	0.077***	0.033***	0.135***	0.046***	0.033***	0.113***
	(0.001)	(0.001)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)	(0.001)	(0.003)	(0.002)	(0.001)	(0.004)
Head_age	0.017***	0.009***	0.032***	0.017***	0.006***	0.023***	0.018***	0.007***	0.031***	0.015***	0.009***	0.036***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
D_Head_sex	-0.06***	-0.05***	-0.13***	-0.072*	0.019	-0.073	-0.068*	-0.037	-0.124**	0.007	-0.038*	-0.013
	(0.017)	(0.012)	(0.027)	(0.034)	(0.021)	(0.041)	(0.030)	(0.019)	(0.047)	(0.027)	(0.017)	(0.053)
Skill_2	0.141***	0.067***	0.261***	0.165***	-0.013	0.182***	0.150***	0.071***	0.270***	-0.020	0.086***	0.023
	(0.013)	(0.008)	(0.021)	(0.022)	(0.013)	(0.026)	(0.023)	(0.014)	(0.035)	(0.025)	(0.016)	(0.049)
Skill_3	0.111***	0.157***	0.271***	0.344***	0.216***	0.516***	0.247***	0.188***	0.488***	-0.079*	0.122***	-0.063
	(0.026)	(0.016)	(0.041)	(0.074)	(0.048)	(0.090)	(0.050)	(0.031)	(0.078)	(0.036)	(0.021)	(0.070)
Skill_4	0.142***	0.158***	0.319***	0.189***	0.044	0.242***	0.292***	0.162***	0.538***	-0.026	0.168***	0.071
	(0.018)	(0.012)	(0.029)	(0.041)	(0.026)	(0.049)	(0.033)	(0.020)	(0.050)	(0.028)	(0.017)	(0.056)
D_Caste	-0.11***	-0.174***	-0.27***	-0.16***	-0.18***	-0.28***	-0.10***	-0.10***	-0.21***	-0.058**	-0.136***	-0.210***
	(0.012)	(0.007)	(0.019)	(0.021)	(0.012)	(0.025)	(0.020)	(0.012)	(0.031)	(0.021)	(0.013)	(0.042)
D_sector	0.008	-0.184***	-0.11***	-0.13***	-0.18***	-0.25***	0.011	-0.13***	-0.067*	0.127***	-0.075***	0.189***
	(0.011)	(0.007)	(0.017)	(0.022)	(0.015)	(0.026)	(0.018)	(0.011)	(0.028)	(0.018)	(0.011)	(0.036)
D_West	-0.234***	-0.149***	-0.457***	-0.290***	-0.180***	-0.435***	-0.313***	-0.223***	-0.608***	-0.151***	-0.129***	-0.383***
	(0.017)	(0.012)	(0.028)	(0.045)	(0.027)	(0.053)	(0.030)	(0.019)	(0.046)	(0.025)	(0.016)	(0.050)

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Table 2C: Continue

D_East	-0.498***	0.327***	-0.564***	-0.607***	0.237***	-0.567***	-0.491***	0.244***	-0.586***	-0.219***	0.164***	-0.302***
	(0.017)	(0.011)	(0.028)	(0.038)	(0.021)	(0.045)	(0.030)	(0.018)	(0.047)	(0.029)	(0.017)	(0.057)
D_NES	-0.394***	0.277***	-0.435***	-0.345***	0.253***	-0.255***	-0.417***	0.143***	-0.537***	-0.344***	0.094***	-0.592***
	(0.020)	(0.012)	(0.032)	(0.045)	(0.026)	(0.054)	(0.034)	(0.019)	(0.052)	(0.033)	(0.019)	(0.064)
D_North	-0.321***	0.151***	-0.401***	-0.290***	0.077**	-0.290***	-0.261***	-0.028	-0.409***	-0.282***	-0.024	-0.557***
	(0.017)	(0.011)	(0.027)	(0.043)	(0.026)	(0.052)	(0.030)	(0.019)	(0.046)	(0.024)	(0.015)	(0.047)
D_Central	-0.156***	-0.278***	-0.417***	-0.073*	-0.526***	-0.379***	-0.120***	-0.444***	-0.455***	-0.075**	-0.248***	-0.321***
	(0.015)	(0.010)	(0.025)	(0.034)	(0.021)	(0.041)	(0.026)	(0.017)	(0.041)	(0.026)	(0.016)	(0.051)
Female Age10-14	0.554***	0.338***	1.071***	0.449***	0.344***	0.710***	0.458***	0.270***	0.854***	0.827***	0.155***	1.695***
	(0.027)	(0.013)	(0.042)	(0.043)	(0.020)	(0.050)	(0.048)	(0.021)	(0.072)	(0.061)	(0.023)	(0.119)
Female Age15-19	-0.38***	1.101***	0.099**	-0.40***	0.781***	-0.020	-0.488***	0.636***	-0.34***	-0.156***	0.548***	0.095
	(0.022)	(0.013)	(0.035)	(0.038)	(0.025)	(0.045)	(0.038)	(0.023)	(0.059)	(0.042)	(0.023)	(0.083)
Female Age20-29	-1.88***	1.563***	-1.92***	-1.72***	1.411***	-1.19***	-1.950***	1.156***	-2.21***	-1.776***	0.935***	-2.732***
	(0.021)	(0.017)	(0.031)	(0.041)	(0.043)	(0.050)	(0.038)	(0.032)	(0.053)	(0.038)	(0.025)	(0.069)
Male Age5_9	0.038	0.073***	0.105**	0.092*	0.031	0.123**	0.024	0.071***	0.080	-0.008	0.071**	0.036
	(0.023)	(0.013)	(0.037)	(0.038)	(0.020)	(0.045)	(0.040)	(0.021)	(0.062)	(0.045)	(0.024)	(0.088)
Male Age10_14	0.714***	0.405***	1.361***	0.595***	0.383***	0.899***	0.704***	0.337***	1.265***	0.939***	0.207***	1.948***
	(0.026)	(0.012)	(0.041)	(0.041)	(0.019)	(0.048)	(0.046)	(0.020)	(0.070)	(0.059)	(0.022)	(0.114)
Male Age15_19	-0.17***	1.272***	0.544***	-0.19***	0.959***	0.314***	-0.249***	0.809***	0.127*	0.065	0.726***	0.645***
	(0.021)	(0.013)	(0.034)	(0.036)	(0.024)	(0.044)	(0.037)	(0.022)	(0.058)	(0.041)	(0.022)	(0.081)
Male Age20_29	-1.51***	1.844***	-1.17***	-1.30***	1.636***	-0.58***	-1.540***	1.470***	-1.40***	-1.467***	1.216***	-1.937***
	(0.020)	(0.015)	(0.031)	(0.037)	(0.034)	(0.044)	(0.036)	(0.026)	(0.051)	(0.038)	(0.023)	(0.070)
cons	-7.01***	0.549***		-5.54***	2.990***		-10.08***	1.628***		-6.037***	0.893***	
		(0.117)	(0.078)		(0.348)	(0.216)		(0.671)	(0.418)		(0.249)	(0.151)
Adjusted r2		0.6766			0.5957			0.5956			0.5520	
N	147970	93420	147970	50251	28122	50251	48737	30142	48737	48982	35156	48,982
Probit LR chi2(24)	109446			45623.40			37221.84			25740.17		
Pseudo R2	0.5618			0.6617			0.5744			0.4415		
chi2 (Female=Male)												
Age10-14	30.92***	35.63***	41.38***	10.73***	4.60**	13.19***	23.39***	14.07***	28.41***	2.55	7.35***	3.48*
Age15-19	136.3***	200.54***	223.2***	36.49***	51.49***	65.96***	57.07***	73.53***	90.4***	42.78***	117.19***	70.27***
Age 20-29	591.2***	277.25***	851.8***	133.8***	21.70***	150.7***	221.41***	98.12***	315.6***	221.57***	210.79***	360.52***

Note: * p<0.05, ** p<0.01, *** p<0.001; within brackets indicate SE; Average marginal effects derived using delta-method

Annexure 4

Annexure: Table A1: Correlation coefficient matrix of selected variables 52nd round

	LEdEx	LPCHHX	lhhsize	Head_y~l	Head_Age	D_Head~r	D_Caste	D_sector	Region	Age_all	D_Gender	Age_Ge~p	Mgt_type
LEdEx	1												
LPCHHX	0.3361*	1											
lhhsize	-0.0568*	-0.3117*	1										
Head_years~l	0.3187*	0.4685*	-0.1176*	1									
Head_Age	-0.0052*	0.0001	0.3770*	-0.1323*	1								
D_Head_Gen~r	-0.002	-0.0414*	0.1495*	0.1289*	-0.0007	1							
D_Caste	-0.1055*	-0.2039*	-0.0358*	-0.2117*	-0.0757*	0.0067*	1						
D_sector	-0.1955*	-0.3999*	0.0942*	-0.3762*	0.0353*	0.0172*	0.1628*	1					
Region	-0.0027	-0.0274*	0.1597*	-0.0291*	0.0121*	0.0564*	0.0505*	0.0971*	1				
Age_all	-0.2513*	0.1591*	-0.1002*	0.0533*	0.1577*	-0.0317*	-0.0405*	-0.0677*	-0.0431*	1			
D_Gender	0.1201*	0.0198*	-0.0424*	-0.0169*	0.0055*	0.0142*	0.0012	0.0114*	0.0250*	0.0063*	1		
Age_Gender~p	-0.0175*	0.0864*	=-0.0813*	0.0066*	0.0758*	-0.0012	-0.0168*	-0.0189*	0.0044	0.4523*	0.8862*	1	
Mgt_type	0.8336*	0.2944*	=-0.0386*	0.2978*	-0.0203*	-0.002	-0.1202*	-0.2210*	-0.0159*	-0.2891*	0.0949*	-0.0554*	1

Note: * statistically significant at 95% level

Annexure: Table A2: Correlation coefficient matrix of selected variables 64th round

	LEdEx	LPCHHX	lhhsize	Head_y~l	Head_Age	D_Head~r	HhType	Skill_~O	D_Caste	D_sector	Region	Age_all	D_Gender	Age_Ge~p
LEdEx	1													
LPCHHX	0.1946*	1												
lhhsize	0.0203*	-0.3242*	1											
Head_years~l	0.2320*	0.4845*	-0.1667*	1										
Head_Age	0.0021	0.0144*	0.4443*	-0.1420*	1									
D_Head_Gen~r	0.0103*	-0.0353*	0.1397*	0.1464*	-0.0515*	1								
HhType	0.0491*	0.0057*	-0.0621*	0.0447*	0.0146*	-0.1378*	1							
Skill_ISO	0.1462*	0.4102*	0.0161*	0.3989*	0.1078*	0.0194*	-0.0135*	1						
D_Caste	-0.0599*	-0.1504*	-0.0170*	-0.1515*	-0.0736*	-0.0090*	0.0330*	-0.1839*	1					
D_sector	-0.1072*	-0.4517*	0.0917*	-0.3128*	0.0065*	0.0238*	0.2921*	-0.2787*	0.1380*	1				
Region	-0.013*	-0.100*	0.163*	-0.027*	0.011*	0.049*	0.058*	0.006*	0.053*	0.068*	1			
Age_all	-0.5504*	0.1396*	-0.1510*	0.0490*	0.0766*	-0.0186*	-0.0038	0.0447*	-0.0171*	-0.0670*	-0.0305*	1		
D_Gender	0.0645*	0.0279*	-0.0474*	-0.0108*	0.0155*	0.0186*	-0.0055*	-0.0063*	-0.0019	-0.0092*	0.0183*	-0.0290*	1	
Age_Gen_Gp	-0.2164*	0.0956*	-0.1164*	0.0083*	0.0633*	0.0047*	-0.0052*	0.0142*	-0.0107*	-0.0406*	0.0039	0.4609*	0.8606*	1

Note: * statistically significant at 95% level

Annexure: Table A3: Correlation coefficient matrix of selected variables 71st round

	LEdEx	LPCHHX	lhhsize	Head_y~l	Head_Age	D_Head~r	hhtype	Skill_~O	D_Caste	D_sector	Region	Age_all	D_Gender	Age_Ge~p
LEdEx	1													
LPCHHX	0.2957*	1												
lhhsize	-0.0788*	-0.3381*	1											
Head_years~l	0.2650*	0.4820*	-0.1897*	1										
Head_Age	0.0424*	0.0482*	0.4107*	-0.1004*	1									
D_Head_Gen~r	0.0135*	-0.0252*	0.1168*	0.1659*	-0.0736*	1								
hhtype	-0.0211*	-0.0448*	-0.1473*	-0.0649*	-0.0756*	-0.2150*	1							
Skill_ISO	0.1791*	0.3923*	-0.0145*	0.4071*	0.1152*	0.0186*	-0.3471*	1						
D_Caste	-0.0847*	-0.1730*	0.0096*	-0.1499*	-0.0583*	-0.0098*	0.0817*	-0.1514*	1					
D_sector	-0.1161*	-0.3616*	0.0987*	-0.2693*	-0.0117*	0.0316*	0.1216*	-0.2642*	0.1544*	1				
Region	-0.0662*	-0.1558*	0.1753*	-0.0123*	0.0058*	0.0455*	-0.0322*	-0.0524*	0.0319*	0.0573*	1			
Age_all	-0.4031*	0.1503*	-0.0889*	0.0681*	0.1426*	-0.0177*	-0.0153*	0.0614*	-0.0114*	-0.0529*	-0.0193*	1		
D_Gender	0.0811*	0.0361*	-0.0589*	0.0027	0.0147*	0.0099*	-0.0068*	-0.0006	-0.0105*	0.0064*	0.0083*	-0.0158*	1	
Age_Gen_Gp	-0.0972*	0.1128*	-0.0956*	0.0365*	0.0922*	0.0001	-0.0139*	0.0315*	-0.0163*	-0.0194*	-0.0007	0.4526*	0.8711*	1

Note: * statistically significant at 95% level

Table A1: Variables used in the models from NSSO surveys

Vector	Explanatory variables	Nature of variables	52nd	64th	71st
Household head characteristics	Log per capita cons. Expr.	Continuous	✓	✓	✓
	Head_age	Continuous	✓	✓	✓
	D_Head_gender	Dummy; =1 for male; 0 for female	✓	✓	✓
	Head_years schooling	Continuous	✓	✓	✓
	HHtype	Dummy; =1 if Reg salaried; 0 = others	x	✓	✓
	Skill_ISO*	Categorical; (4 skill levels)	x	✓	✓
Household	Log Hhsize	continuous	✓	✓	✓
	D_caste	Dummy; =1 if SC/ST; 0 = others	✓	✓	✓
	D_sector	Dummy; =1 if rural; 0=urban	✓	✓	✓
	i.Region	Categorical (6 categories)	✓	✓	✓
Student related	Female Age 5-9	Dummy	✓	✓	✓
	Female Age 10-14	Dummy	✓	✓	✓
	Female Age 15-19	Dummy	✓	✓	✓
	Female Age 20-24/20-29	Dummy	✓	✓	✓
	Male Age 5-9	Dummy	✓	✓	✓
	Male Age 10-14	Dummy	✓	✓	✓
	Male Age 15-19	Dummy	✓	✓	✓
	Male Age 20-24/20-29	Dummy	✓	✓	✓
	Age_all	Continuous	✓	✓	✓
	Gender	Dummy; =1 for male; 0 for female	✓	✓	✓
Policy variables	D_Mgt_type	Dummy- =1 if Govt/LB; 0 otherwise	✓	✓	✓
	D_MDM	Dummy; =1 if yes; =0 if No	✓	✓	✓
	D_stationery	Dummy; =1 if yes; =0 if No	✓	✓	✓
	D_text_books	Dummy; =1 if yes; =0 if No	✓	✓	✓
	D_scholarship	Dummy; =1 if yes; =0 if No	✓	✓	✓

Note: * Details in Tables A2 and A3; Northern: Jammu and Kashmir, Himachal Pradesh, Punjab, Chandigarh, Haryana, Delhi, and Rajasthan North East: Arunachal Pradesh, Nagaland, Manipur, Mizoram, Tripura, Meghalaya, and Assam Eastern: Bihar, Sikkim, West Bengal, Jharkhand, Orissa, and Andaman and Nikobar Islands Central: Uttarakhand, Uttar Pradesh, Chhattisgarh, and Madhya Pradesh Western: Gujarat, Daman and Diu, Dadra and Nagar Haveli, Maharashtra, and Goa Southern: Andhra Pradesh, Karnataka, Lakshadweep, Kerala, Tamil Nadu, Pondicherry, and Telengana

Table A2: Type of skill levels as per ISCO-08

Skill level	Definition	Examples
Level 1	Skills involving simple and routine physical or manual tasks	Hawker, street vendor, gardner, cook, household servant, construction worker, mason etc.
Level 2	Skills involving operation of machinery and electronic equipment	Plumber, electrician, artisan, barber, Mechanic, tailor etc.
Level 3	Skills involving written records of work, simple calculations, good personal communication skills in specialized fields	Clerical, supervisory level etc.
Level 4	Skills involving decision making and creativity-based on theoretical and factual knowledge	Doctor, lawyer. chartered accountant, engineer, architect, scientist, actor, author etc.

Source: Based on Rani *et al*. (2019)

Table A3: Type of skill levels as per NCO 2015 and ISCO-08

NCO 2015 divisions	Title	Skill level
1	Legislators, senior officials and managers *	IV
2	Professionals	IV
3	Associate professionals	III
4	Clerks	II
5	Service workers and shop and market sales workers	II
6	Skilled agricultural and fishery	II
7	Craft and related trades	II
8	Plant and machine operators and assemblers II	II
9	Elementary occupations	I

Note: * Not defined as per the source
Source: NIC (2015), GoI

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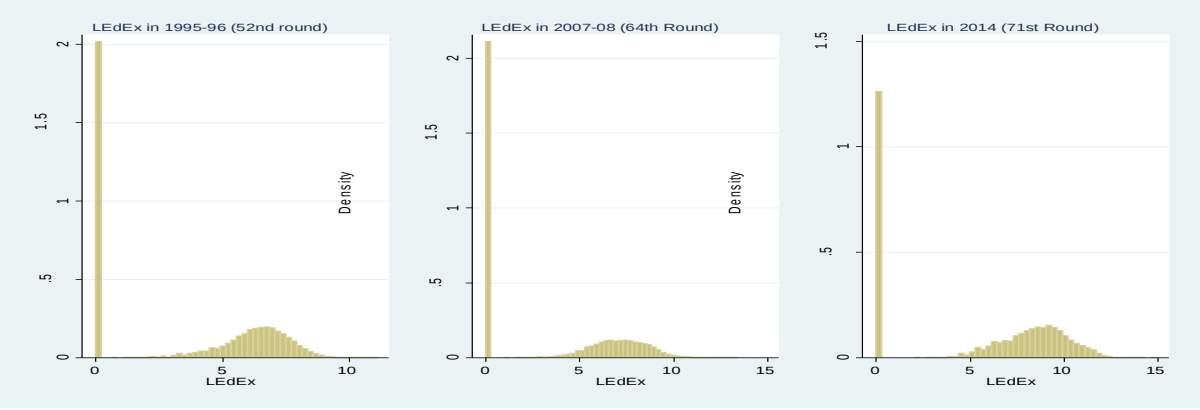

Fig. A1: Histograms of LEdEx in individual data of 52nd, 64th and 71st rounds of NSSO surveys