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What Factors Determine Family Spending on Education in India and Does It Vary across Well-being Measures?

P. Geetha Rani[1] and R. Gopinathan[2]
[1]*ICCR Chair Professor, Department of Business Studies, The PNG University of Technology, Lae.*
E-mail: geethselva@gmail.com
[2]*Assistant Professor, Department of Economics, Matha Vaishnov Devi University, Jammu, India.*
E-mail: gopieco@gmail.com

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Abstract: The present paper estimates the drivers of education spending of households across economic groups. The questions that are explored include: (i) does expenditure on education vary across economic groups and over time? In other words, whether expenditure elasticity varies by levels of income 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 the gender bias in expenditure on education is estimated using the hurdle model. The paper uses the NSSO survey data of 52nd, 64th and 71st rounds, relating to schedule 25.2, on Social Consumption: Participation in Education. Based on the expenditure elasticity, it has been found that middle class spend proportionately more than bottom (justifiably) but also at the top expenditure quintiles. The difference between middle and top expenditure groups elasticity is marginally advantageous to the middle and the gap widening in the 71st round. This emerging middle class and their aspirations for education and upward mobility is 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. Point to be noted is in the middle expenditure group, the average effect is more compared to top expenditure category, like the one observed in per capita consumption expenditure. Yet another significant factor the skill type of the head of the households. Skill type, depict that positive and significant the 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) spend less family expenditure on education compared to those who live in urban areas. The female bias in 10-14 age group is quite substantial and has widened in 2014 compared to previous years. In age class pertaining to secondary schooling 15-19, the female bias is apparent, compared to earlier rounds of data 1995-96, extended. There is clear statistically significant gender bias across

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expenditure groups. The bias is though prevalent across expenditure groups, seems to have more among the bottom expenditure class compared to middle and top expenditure groups. This phenomenon 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 financing of education especially on girls given the immense positive externalities of girls' education?

Keywords: Family spending, spending on education, income groups, NSSO, gender

I. INTRODUCTION

Neoliberal policies have been adopted since late 1980s both globally and in India. As part of this economic policy reforms, growth in public provisioning of social services including education, healthcare, and other essential services has been on the decline. Government allocation towards social sector has been on the decline, indicating 'state's withdrawal ensuing more private sector participation and privatization of social services (Panchamukhi 2000; Mooji and Dev 2004; Pal and Ghosh 2007). The decades of economic reforms depict a number of detrimental moves in the financing of education in India. Paradoxically at a time when, India urgently needs to prepare her bulging youth for the fourth revolution, where her comparative advantage in the service sector and in knowledge-based work depends on it. At the macro level, there has been a paradigm shift in the approach to financing education from public or (state) funding to household (private) funding from family resources (Tilak, 2004). Such moves can be evidenced from the increase in fees, privatization of publicness in state institutions, increasing private sector in education paving way for more cost sharing and cost recovery from households are found to be structural in nature.

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 middle income population is found to be rising. One of the estimates show that the Indian middle class is expected to expand by more than 10 times from its current size of 50 million to 583 million people by 2025[1] (Benhocker 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. Over the recent decades, there have been two noteworthy changes in consumer spending patterns. The first is a rise in the total amount spent on education, leisure and telecommunications, driven by both greater demand, as well a change on the supply side. The second is the shift towards better, higher-priced sub-segments in the same historical categories ranging from food to consumer durables. The digital technology and the internet

enable Indians to gain access to global education, healthcare and other products and services.

Favorable demographic edge, increasing income trends combined with the aspirations of the growing middle class for upward economic mobility are being seen as catalyst in boosting the social demand for education. Share of education expenditures in the household budget has been increasing in recent decades. Moreover, the emerging demand for higher education predominantly comes from the growing middle class, which is increasingly diverse (Mukherjee et al, 2012). In rural areas, households emerging from poverty would prefer educating their children a priority, while higher-income urbanites would be spending more on better-quality education, university degrees, and study-abroad programs. Yet another changing phenomenon more so among the middle class is increasing acceptance to consumer loans, student loans, etc. The culture of acceptance for taking up loans and repaying them over regular installment payments for fulfilling their growing aspirations have been on the rise.

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. Hence it is argued that one of the important sources of growth of the service sector (education and health) expenditures in India can be with compulsions, rather than the affluence, of the poor. These declines in public expenditures on items which are essential in nature, may have forced households to substitute private for public provisioning, leading to increasing demands on the household budget, (Basu and Debarshi, 2015). While explaining the calorie consumption puzzle over the past four decades, Basu and Basole, (2013) show statistically significant negative effect of a rising share of expenditures on non-food essentials, viz., health, education, transportation and consumer services on calorie intake. In the same vein, Wong (2016) cautions that middle income is in the middle class of India but not in the Middle India - they are actually in the upper middle class of India using India's Consumer Expenditure survey data.

In this light, this paper examines the pattern and determinants of household expenditure on education across well-being measures over the last two decades. Wellbeing a relatively new academic field became popular with the 2010 publication of Stiglitz *et al* (2010). Wellbeing 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 in life, including mental health, physical health, economic wellbeing, social wellbeing and liveability. Well-being is

the measurement of standard of living of human being. Measurement of it can take one of two forms: constituents and determinants of well-being. Health, welfare, freedom of choice and more specifically, basic liberties, come under constituents of well-being; and those which reflect the availability of food, clothing, shelter, portable water, legal aid, education facilities, health care, etc, are examples of the determinants of well-being (Dasgupta, 1990).

It is well known that education and well being is closely related. Easterlin (2001) and many others have argued that people with more education and thus high levels of income have a higher subjective well-being than those with a lower level of education. This paper makes an attempt to examine education spending behaviour of households an objective well being across economic status. In other words, how does household expenditure on education vary across economic status? Given this background, the rest of the paper is organized as follows: Section II presents a brief review of earlier studies. The data sources and methodology adopted in the paper is discussed in Section III. The pattern of the expenditure on education across economic status over regions is discussed in the section IV on descriptive statistics. Section V discusses the results of the estimated models. The last section concludes with policy implications.

II. REVIEW OF EARLIER STUDIES

Growing literature examine the drivers of household educational expenditure more so in the last two decades. This aspect has received moderately less attention compared to the aspects on demand for education and determinants and disparities in educational attainment. The studies reviewed here focus on a vital question: 'Do households devote an increasing share of their budget on education across income groups and over time?' This review covers studies that have more often analysed family allocation of expenditure on education in relation to income / total expenditure in Engel curve framework. Huston (1995) examines the drivers of education expenditures with an aim to understand the value of education placed by the households. 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 households place on education. Many earlier studies estimate the determinants of family expenditures on education using OLS with double log models, estimating the income elasticity of education expenditures, (Tilak, 2002; Andreou, 2012; Spieß and Storck, 2015; Rizk and Ali, 2016).

Within Engel framework, Acerenza and Gandelman (2017) estimate the drivers of expenditures on education in 12 Latin American countries along with USA and estimate the income elasticity of education spending. Invariably all studies reviewed here estimate the income elasticity of family expenditure on education irrespective of whether they adopt Engel framework or not. Since the information on expenditure on education is truncated in the data set, many studies apply censored regression or Tobit model. For instance, Huy (2012) estimates the determinants of demand for education using household expenditure on education, rather enrolment. By estimating Tobit, Acar *et al* (2015) examine the evolution of income elasticity over time and across income groups for Egypt; while Ebaidalla (2017) estimates for Sudan. Unlike the earlier studies, Joonwoo and Hong (2009) by adapting the semi parametric estimation approach estimate the non-linear Engel curve. They show that Engel curve has the inverted-U shape, showing different patterns according to householder's education levels. Their estimated income elasticity indicates that that private education expenditure is a normal good in South Korea. Though Tobit models are widely used for the 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 hurdle model (details in the Method section). Using double hurdle model which takes these two decisions into account, Jenkins et al (2019) estimate the drivers of expenditure on education for Nigeria. They find that income elasticity of education expenditures is four times higher for top income households vis à vis the bottom category.

Engle curve approach has also been used to test for gender gaps in 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, 2003; Azam and Kingdon 2011 and Aslam and Kingdon 2008, estimate the gender bias in intra-household allocation in India and Pakistan. They find that gender bias in intra-household resources allocation towards girls is pronounced more at the age group of 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 predisposition in expenditure decisions in the age group of 10–14 year old girls. On the similar issue, but from estimating the female bargaining power on the share of educational expenditures in family budget, using 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 rural and urban sample.

The most proximate determinates across studies include income and education levels of the head of the households, besides a number of household characteristics such as location, household size and number and share of school aged children (details in the annexure 1 on Review table on select earlier studies). Overall, the results of the studies suggest that families with higher income, whose heads are 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 paper is the changing perspective on macro economics, thereby the well being and their connect 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 wellbeing use indicators such as income, education, labour force status or homelessness. To understand what has happened over time, an attempt is made here to explore this issue using the special National Sample Survey Organization (NSSO) rounds on social consumption on education. Since there is no information on the subjective wellbeing indicators in the NSSO survey, we are constrained to use the per capita consumption expenditure groups.

The important questions that are examined here include: (i) does expenditure on education vary between / across well being levels and over time? In other words, whether income (expenditure) elasticity varies by levels of income and over time? (ii) The subsidiary question is to estimate the gender bias in education spending across these groups? As a corollary to this, at which levels of education and to what extent the gender bias in expenditure on education is estimated using the hurdle model. These questions and the empirical estimates are significant for the government financing of education in India.

III. METHODOLOGY AND DATA

The present paper uses the Engel curve framework for analyzing the education expenditures, which is originally used to model the relationship between consumer income and quantity demanded[2]. Working (1943) proposed the log-linear budget share specification, which is known as the Working-Leser model, since Leser (1963) found that this log-linear functional form fit better that relates commodity budget shares linearly to the natural log of total expenditure. This model is used to find the relative share of different heads of household expenditure and investment. This Working-

Leser specification can be extended to include the socio demographic variables, which take the form of:

$$wi = \alpha + \beta\log(xi/ni) + \gamma\log ni + \Sigma\theta_k(nk_i/ni) + \varphi zi + \mu i \quad (1)$$

where wi is the budget share of education of the ith household, xi is the total expenditure of the household, ni is the household size, the sign of the β coefficients determines whether goods are necessities or luxuries, log ni allows for independent scale effect, nk_i/ni age-sex composition and zi is a vector of other household socio-demographic characteristics. ε is a disturbance term capturing unobserved characteristics, $\varepsilon_i \sim N(0, \sigma^2\varepsilon)$. Equation (1) captures four types of variables: variables for household heads (age, educational attainment level, type of occupation engaged; and skill levels by the household head), variables on household characteristics (household size, location of the household and region) and policy variables (whether children benefit from midday meals (MDM), scholarship, etc). The details of the variables and notations are reported in Table 1.

The dependent variable, expenditures on education is distributed with substantial number of zero expenditure entries. Tables 2 and 3 reveal the extent of households with zero education expenditures across expenditure quintiles and educational attainment of the households respectively. Tobit models are the natural choice for such corner solutions. But, the inadequacy of the Tobit model is that a single mechanism determines the choice between the zero expenditure on education ($y = 0$) versus positive expenditures on education ($y > 0$) and the actual amount of expenditures incurred 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 given that $y > 0$.

The present paper uses the Hurdle model (Wooldridge, 2002, pp. 546-548). The hurdle or the first tier is whether to spend on education or not. A simple hurdle model is specified as:

$$Pr(w = 0 \mid x) = 1 - S(xc) \quad (2)$$

$$\log(w / x, w > 0) \sim \text{Normal}(x\beta, \sigma^2) \quad (3)$$

where w is the budget share as in equation (1), x denotes the vector of explanatory variables. Y and β are the parameters and μ the standard deviation are to be estimated. Equation (2) states the probability that w is zero or positive and equation (3) say that conditional on $w>0$, w / x follows lognormal distribution. As equation (2) is a binary probit, we can get a maximum likelihood estimate (MLE) ofɣ using $w = 0$ verses $w > 0$. The MLE of β is the OLS estimator by regressing log (w) on x vector of explanatory variables, using the positive education expenditures.σ is the usual standard error from this OLS regression. The estimation turns into 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 log normal distribution.

The present paper attempts to estimate the simple hurdle model following Wooldridge, (2002). In the existing literature, equation (1) is estimated either using either OLS or Tobit. However, few recent studies use somewhat different versions of hurdle models. For instance Kingdon (2011) used the simpler version of the log normal distribution while Jenkins et al (2019) applied the truncated normal model. Both make the conditional independence assumption.

Conventionally education expenditure in the budget share of families at the household level is used in the estimation of equations 1 to 3. This paper prefers to use the unique individual data that is available on each child besides the rich information available on the supply side or the policy variables. This aspect has been rarely examined by earlier studies. Moreover, Kingdon (2005, 2008 and 2011) demonstrate that using individual-level data on educational expenditures on each child in the sample is a better alternative than using aggregate household level data[3]. Studies in India used the India Human Development Surveys (IHDS)[4] to examine the household expenditures on education, but rarely the NSSO surveys. It is important to note these are dedicated surveys to collect information on the household expenditures on education from time to time. The present study adds value to the existing studies; it attempts to examine 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. Following simple hurdle model is suitable given that education expenditure follows log normal distribution (see figures A1 at annexure 3).

Data

The paper 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, covering the period from 1995-95 to 2014. The present paper uses the household and individual data from the 52nd round on the Attending an Educational Institution in India: Its Level, Nature and Cost covering the period from July 1995 – June 1996. A stratified multi-stage design was adopted for the survey, covering the number of households of 43076 in rural and 29807 in urban areas with the total sample of 3,71,672 persons (GoI, 2008). The present paper uses the relevant information from Blocks 2-6 of the schedule 25.2, containing household consumption expenditure, household characteristics of the members, besides other

variables. The second stratum in this round is in the age group of children between 5-24 years and we use that as a benchmark[5].

The present paper uses the household and individual data from the 64th round, schedule number 25.2 on Participation and Expenditure in Education collected by NSSO. The survey covered whole of India and period of survey was of one year duration starting from 1st July 2007 to 30th June 2008. A stratified multi-stage design was adopted for the survey. The survey has covered a total sample of 445960 persons consisting of 63318 rural and 37263 urban households (GoI, 2010). The second stratum in this round and the next 71st round has been the age group of children between 5-29 years and we use that as a benchmark in our estimations. The present paper uses the relevant information from Blocks 2-6 of the schedule 25.2, containing household consumption expenditure, occupational category, socio-economic characteristics of the household members, besides many other variables. The detail of variables used in the paper is reported in Table 1.

The present paper uses the household and individual data from the 71st Round data of NSSO on 'Participation and Expenditure in Education'. The survey covered whole of India and period of survey was of six month duration starting on 1st January 2014 and ending on 30th June 2014. A stratified multi-stage design was adopted for the survey. The total number of households surveyed, was 36479 and 29447 in rural and urban India respectively. The total number of individuals covered are 1,78,331 in rural and 1,32,496 in urban India, (GoI, 2015). The present paper uses extensively the information from Blocks 2-6 of the schedule 25.2 in understanding the central question of the paper, viz., factors that influence the household expenditure on education.

Variables

Table 1 report the variables included in OLS and Hurdle regressions. They are grouped as: household head characteristics, household characteristics, student related, and policy variables.

The rationale for the choice of these variables is as per the espoused model. However, we have made an effort to include alternative variables like skill level of the head of the households, region, etc. In the 64th and 71st rounds, the variable NCO2004 provide 3 digit industrial codes. This has been classified into ISO2012 into four skill levels. By applying ISCO-08 concepts to NCO2004 and adapting to GoI (2015), we have classified the skill levels, where skill is defined as the ability to carry out tasks and duties of a given job for which the person earns a remuneration. In keeping with the skill levels defined in Table A1, so as to accommodate with the Indian situations and occupations, GoI (2015) classified the divisions of skill levels

Table 1: Variables Used in the Models across 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[6]	Categorical (6 categories)	✓	✓	✓
Student related	Female Age5-9	Dummy	✓	✓	✓
	Female Age10-14	Dummy	✓	✓	✓
	Female Age15-19	Dummy	✓	✓	✓
	Female Age20-24/20-29	Dummy	✓	✓	✓
	Male Age5-9	Dummy	✓	✓	✓
	Male Age10-14	Dummy	✓	✓	✓
	Male Age15-19	Dummy	✓	✓	✓
	Male Age20-24/20-29	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 annexure 2 and Tables A1 and A2.

vis a vis occupations and is reported in annexure Table A2. Accordingly, using NCO2004 as illustrated in Tables A1 and A2, we arrive at four hierarchical skill levels. Skill level 1 is treated as the base category in the OLS and the same is introduced as dummy variables into hurdle regressions.

Yet another alternative variable to represent the regional variation into the model, regions as a categorical variable in OLS is integrated into the model, while the same is used as a dummy variable in the hurdle model. We classify the 32/35/36 states of India over three rounds respectively into

six regions and keep south as the reference category. The detail of the states in each region is explained in foot note 7 below table 1. Following the tradition of many earlier studies, the age-gender class is used as one of the important arguments. This age composition broadly relate to the 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. The gender bias is identified using these set of dummy variable and test for the differences in the female and male coefficients (use of DV as an explanatory variable)- using chow test. Another important dimension covered in the paper is the set of policy variables, like the type of institutions student attend, whether government provided or not. Further, the incentives in both kind and cash have been incorporated such as whether children benefit from MDM, receive the incentives in kind like textbooks and stationary; cash incentives like scholarship. This is yet another valid reason to use the individual data instead of the household data. This set of variables entail 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 4 in annexure 3.

IV. DESCRIPTIVE STATISTICS

This section makes an attempt to examine the budget share of education expenditures across expenditure groups using the household data. This is followed by the analysis of descriptive tables and figures on the key variables using individual data. Analyses of data over time reveal a sharp increase of education's share in the average household budget (see Tables 2 and 3). Given the estimation issues of zero education expenditures as explained in the previous section, the columns 2 and 3 of these two tables display the distribution of zero education expenditures across expenditure quintiles and educational attainment levels of head of the household. As one would expect the share of households with zero expenditure do not decline across the three rounds (Table 2), while it clearly shows such a declining trend when tabulated against the educational attainment of the head of the households (Table 3).

With regard to the budget share of family expenditure on education, on an average, 7.1 % is budget share in 1995-96 which increased to 10.4 % over a 12 year period in 2007-08, while in 2014, within a period of just seven years, the budget share as raised over 23.5 per cent in 2014. As households become economically better off, their share of education gradually rises from 4.2% for the bottom 20% households to 11.6% for the top 20% in 1995-96. But the range has increased at both bottom 6.5 % and top quintiles with

18.5 %. The extent on increase is farther in 2014 that the budget share of education expenditures is quite high even at the bottom expenditure quintiles as 16.4 % while it is 34 % among the top expenditure quintile. There could be many plausible reasons for this increase in the budget share of education expenditure. Households increasingly realize the economic and social benefits of education. One side of the argument is that rise in incomes through economic growth has paved way for a larger space for education in their budgets. This is also the reason why the rich households tend to spend more. Yet other arguments are such that education is becoming expensive and more and more private players occupying the public space of education, where cost of education has been on the rise at an increasing rate.

Table 2: Households with Zero and Positive Education Expenditures, Budget Share, Expenditure on Education, PCEXP by Expenditure Quintiles in the NSSO surveys

Per Capita Income Q	*Zero (%)*	*Positive (%)*	*EdExShare*	*Exp on Ed (Rs)*	*PCEXP (Rs)*
		52nd Round 1995-96			
Q1 (Bottom 20%)	40.41	59.59	0.0416	1852	6528
Q2	36.26	63.74	0.0500	2915	9190
Q3	35.19	64.81	0.0650	4559	11830
Q4	36.92	63.08	0.0838	7255	15678
Q5 (Top 20%)	42.07	57.93	0.1157	14085	27858
Total	38.17	61.83	0.0707	6029	14048
N (HH)	27,878	45,161	45,161	45,161	45,161
		64th Round 2007-08			
Q1 (Bottom 20%)	42.96	57.04	0.0648	2380	6324
Q2	47.35	52.65	0.0731	3714	9393
Q3	50.18	49.82	0.0936	6037	12511
Q4	52.16	47.84	0.1213	10153	17428
Q5 (Top 20%)	55.09	44.91	0.1850	24523	35334
Total	49.53	50.47	0.1042	8776	15429
N (HH)	49,809	50,731	50,731	50,731	50,731
		71st Round 2014			
Q1 (Bottom 20%)	35.10	64.90	0.1641	7391	8060
Q2	32.88	67.12	0.1766	12004	12296
Q3	35.75	64.25	0.2204	18269	16042
Q4	34.54	65.46	0.2780	30152	22863
Q5 (Top 20%)	32.05	67.95	0.3398	63457	46759
Total	34.12	65.88	0.2355	26170	21118
N (HHs)	16,766	32,374	32,374	32,374	32,374

Note: HH – households; Exp on Ed – average expenditure on education in 2011-12 prices; EdExShare – share of education expenditure in total consumption expenditure; PCEXP – per capita consumption expenditure in 2011-12 prices.

Source: Unit records of households of the corresponding NSSO Rounds

Among those who spent positive expenditures on education, the gap in the average expenditure on education is around 7.6 times higher from the bottom expenditure category to the top 20 percent in 1995-96. While the same gap has increased to 10.3 times in 2007-08, but declined marginally to

the tune of 8.6 times in 2014. It is important to note this gap is rather more to that of the gap in per capita consumption expenditure between the bottom and top quintiles. The same ratio also known as polarization ratio is 4.3 (7.6 in education expenditure) in 1995-96 and increased to 5.6 (10.3) in 2007-08 and more or less remained at 5.8 (8.6) in 2014. Across three rounds and over time the dispersion in spending on education and consumption expenditure prevails, while it higher among the mean education expenditures.

Since the per capita consumption expenditure is a flow variable, an attempt is made here to examine the budget share of education spending over a stock variable based on the educational attainment of the head of the households. The patterns on zero verses positive expenditure on education provide a striking difference between when the head of the household is with no education or illiterate and the rest of households having any level of education (Table 3). Further, the variations across levels of education of the head of the household remain minimal across rounds.

Table 3: Households with Zero and Positive Ed. Expenditures, Budget Share, Expenditure on Education, PCEXP by Education Levels of head of the Household in the NSSO surveys (%)

HH Head Education	*Zero (%)*	*Positive (%)*	*EdExShare*	*Exp on Ed (Rs)*	*PCEXP (Rs)*
		52nd Round 1995-96			
No Education	48.05	51.95	0.0466	3132	10446
Elementary	33.37	66.63	0.0661	5080	12789
Secondary	30.09	69.91	0.1021	9652	18524
Higher	33.03	66.97	0.1203	14427	24934
Total	38.17	61.83	0.0707	6029	14048
HHs	27,878	45,161	45,161	45,161	45,161
		64th Round 2007-08			
No Education	55.91	44.09	0.0623	3731	10130
Elementary	47.85	52.15	0.0885	6161	13090
Secondary	43.21	56.79	0.1600	14760	21062
Higher	46.54	53.46	0.1899	24249	31130
Total	49.54	50.46	0.1042	8776	15427
HHs	49,809	50,731	50,731	50,731	50,731
		71st Round 2014			
No Education	48.09	51.91	0.1342	10857	13313
Elementary	33.91	66.09	0.1900	17760	17130
Secondary	25.26	74.74	0.3106	35311	25370
Higher	27.64	72.36	0.3982	59336	37882
Total	34.12	65.88	0.2354	26178	21118
HHs	16,766	32,374	32,374	32,374	32,374

Note: Exp on Ed – average expenditure on education in 2011-12 prices; EdExShare – share of education expenditure in total consumption expenditure; PCEXP – per capita consumption expenditure in 2011-12 prices.

Source: Unit records of households of the corresponding NSSO Rounds

In terms of budget share of expenditure on education, the disparity has been quite wide apart from 4.6 % among illiterate Heads to that of 12 % among heads with higher education in 1995-96. This gap has widened to the tune of 6.2 % to 19 % in 2007-08. This has further widened in 2014 from 13.4 % among illiterate heads to that of 40 % among heads with higher education in 2014. It can be noted in comparison with the education expenditure gap across expenditure quintiles from Table 2, the education expenditure gap is wider among educational categories of the head of the households. The share of budget expenditures on education across both expenditure and educational levels widened over a period time, the extent of variation is accentuated across educational attainment levels of the head of the households.

Average expenditure on education over illiterate head of the household with that of the heads with higher education reveal a variation is 4.6 times more expenditure on an average. The same is 6.5 times in 2007-08, while this has declined to 5.5 times in 2014. Though declined, when examined over a period of time, the dispersion widened in terms of family spending on education. But in terms of per capita consumption expenditure levels, the variation is minimal from 2.4 per cent in 1995-96 to that of 3.1 % in 2007-08 and declined to 2.8 % in 2014. On similar lines, Shukla and Bardoi, (2013) point out that share of other than food items like education, health, durable goods, consumer services and conveyance, is increasing. Education has reported the fastest growth rates among different items of expenditures. Household expenditure on education has risen in across income brackets; even among the poor. This feature depicts that the members of India's new middle class share dreams of upward mobility. The bottom quintiles and no or low of levels of education families draw their inspiration from the success of professionals such as software engineers and entrepreneurs. Education is viewed as one of the key instruments for economic and social mobility.

Accordingly, compared to the poor, the lower-middle class has lower fertility rates, a significantly larger spending on education for children and a higher household budget share for healthcare. Consonant with Engel's law, as income rises, the proportion of income spent on food falls, even if absolute expenditure on food rises — there is a lower share of food in the consumption baskets of the middle class as compared to the under-$2 cohort. This reduction in food share is accompanied by a higher share of cheap consumer durables such as television sets and smart phones. Empirical evidences suggest that there is significant demand from the middle class, both for cheap consumption goods as well as investment goods, particularly those that target human resources such as health and education (Chakravarty, 2018). This phenomenon resembles Baumols cost disease[7].

V. RESULTS AND DISCUSSION

Three equations in each category, viz., (i) the likelihood of whether the households incur educational expenditure on the children or nor capturing via Probit, the first tier in the Hurdle model (ii) the conditional OLS on the positive education expenditures incurred on the currently attending children. We run OLS as our dependent variable education expenditures (LEdEx) is log normally distributed (see Figure A1: Histogram of LEdEx in 52nd, 64th and 71st Rounds at annexure 3). (iii) The unconditional estimates capturing the impact of both the decisions to spend and the amount to spend. These three set of equations are estimated across three income groups and on full sample, hence 4X3=12 equations for each NSSO rounds 12X3=36. The set of explanatory variables almost remain the same across three NSSO rounds except for the availability of data (details in Table 1). The correlation coefficient matrix of the selected variables are reported in the annexure 3 from Tables A1 to A3 corresponding to three surveys. Individual data covering eligible school going age class is 1,61,222, but those who spend positive education expenditure is 91,700 in 1995-96. Similarly, in 64th round, our analysis pertains to the 5-29 age class consisting of a sample of 2,01,040. Among them, who incur positive education expenditures are reported in 94,199 students. In the 71st round, our analysis is limited to 1,48,013 in the age class of 5 to 29, while 93,445 children spend positive expenditures on education.

The relevant statistics from the estimated results of probit, conditional OLS and unconditional estimated effect of spending on education (36 equations) are reported in tables 8A, 8B and 8C in annexure 3. These hurdle models are estimated across full sample, three sub samples based on three groups of per capita consumption expenditure, viz., bottom, middle and top category. We will focus on the reported results of the unconditional estimates, because this the one which provides the combined marginal effect of both estimates that we are interested in whether to spend and the amount to spend on education.

Per Capita Consumption Expenditure

With the eligible age group of school or college going individuals, the paper attempts to explore whether the threshold levels of income (expenditure) affect the decision on the family expenditures on education. The probability of spending on education improves as families move from bottom to that of middle expenditure group, but declines at the top expenditure group. The unconditional estimates provide the elasticity, i.e., parameter estimates of β in equation (1). We can note that elasticity is more than one across the board that indicates spending on education is elastic. But the scene in 2007-08 is quite different that expenditure elasticity with respect to education is

inelastic, range between 0.163 among the bottom class to 0.380 among the top class. This change is after more than a decade of neo-liberal economic policies making spending on education less elastic, though the budget share from 1995-96 to 2007-08 are increasing as reported in Tables 2 and 3. While in 2014, the elasticity is more than one across 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 (1995) 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 bottom (understandably) but also at the top expenditure quintiles. Similar results have been reported by Acar *et al* (2016) in the context of Turkey. This emerging middle India and their aspirations for education and upward mobility are clearly evidenced through the expenditures on education, especially with the movement from bottom to middle expenditure class. The difference between middle and top expenditure groups elasticity is marginally advantageous to the middle class and the gap widens in the 71st round. However, 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 to middle category, expenditure on education of the family becomes a priority.

Household Size

Household size indicates scale effect and the fertility preference per se. However joint family system prevails in India, more in rural parts. This variable has a significant and positive impact on the probability of spending on education. The larger households generally tend to spend lesser on education of the children. But the unconditional estimates of the elasticity coefficient are positive and significant. The amount spent on each additional child adds on to 17%, 13%, 12% and 15% among full, bottom, middle and top expenditure class in 1995-96. But, the same variable does not show significant probability of spending on education, but both conditional and unconditional estimates are negative and significant in 2007-08. The larger family size in bottom class tends to spend about 5 % less, compared to 3 % less spending across middle and top classes. Similar pattern continues in 2014, estimates of all three models show negative and significant co-efficient values. The amount spent on each additional child on average reduces to 18%, 19 %, 20 % and 18 % across full, bottom, middle and top expenditure classes.

Characteristics of the Head of the Household

The 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. Educational attainment of the head of the household is a stock variable unlike the per capita consumption expenditures, a flow variable. The unconditional average marginal effects consistently increase from bottom to 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 top expenditure category, like the one observed in per capita consumption expenditure. Many studies confirm the same finding for example for India using IHDS II survey (Azam and Kingdon, 2011); for Vietnam (Huy, 2012); and for Nigeria (Jenkins, *et al*, 2019).

Age of the head of the household indicate the experience, not necessarily to capture the money aspect of experience as a wage premium in wage equations, but from the perspective of investing on human capital of off springs. This variable exerts positive and significant probabilities of family spending on education across expenditures categories and over three NSSO rounds. But, the average marginal effects are tiny with less than an average of 2 to 3% increase in family spending on education. The negative and significant coefficient on gender of the head of the household indicates that being male reduces the family spending on education. The average effect reduces at an increasing rate across expenditure categories. Similar pattern is observed in 2007-08 and 2014, though with a substantially lower effects.

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

The variable Skill_3 display positive and significant probabilities of spending on education among the sub-samples middle and top and full samples but not among bottom sub-sample in 2007-08. But, the pattern is not the same across in 2014, where Skill_3 indicate positive and significant probabilities of spending on education over all categories except at top expenditure class. The unconditional average marginal effects suggest that

family spending on education will increase by 7%, 6 % and 4% across the three expenditure groups in 2007-08, while substantial increase of 52% and 48% more compared to other skill levels among bottom and middle expenditure class but statistically insignificant at the top expenditure class. The highest skill level captured via the dummy variable Skill_4 report 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. The 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 others in bottom and middle expenditure class.

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. It does not have the income (expenditure) thresholds, that it is generally believed that economic capacity can off set the caste deprivation, where education is viewed as the medium. That however does not hold in the present study in any period. The families belonging to SC/ST compared to others as the average marginal effect is negative and statistically significant across the board and suggest reduced family expenditure on education. The reduction in figures varies from 4 to 5 % in 2007-08; 12 to 20% in 2007-08 and 21 to 28% in 2014.

Location

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 this dummy variable is negative and statistically significant across sub-samples and full sample over time. The combined marginal effect suggest that on average residing in rural areas reduces the expenditure by 7%, 8%, 5% and 8% across full, bottom, middle and top expenditure groups in 2007-08, while this average reduction of expenditures have risen to 10%, 25%, 7% and 19% across the same in 2014. But the reduction was substantial in the corresponding figures of 33%, 43% and 59% among bottom, middle and top expenditure class in 1995-96. The mean expenditures reported in descriptive tables 4A, 4B and 4C and the results analysed here confirm the differences. 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 intervention to promote schooling that was initiated since 2000 through Education for All schemes like *Sarva Shiksha Abhiyan* and later the implementation of Right to Education Act, boosted good amount of government expenditure in to the schooling system. However, the difference

in the reduction between rural and urban family expenditures has been contained compared with 1995-96 to 2014.

Yet another location related variable examined here is to what extent the regions play a role in the expenditures on education. We categorize 32/35/36 states of India into six broad categories of region based on the direction of their location as south, west, east, NES, north and central. The states included under each category are explained in the note given below table 1. Leaving south[8], we create five dummy variables to denote regions. The probability of children reside in western India, spending on education is positive and significant among the bottom class, on the contrary the probability of family spending on education is negative and significant among the top class. In the full and sub sample middle expenditure class, the probit is not statistically significant in 1995-96. The combined effect suggest that the D_west exert an average an increase of 18% spending on education compared to the south region, but it reduces the spending by 21 % among the top class. In 2007-08, the probit results are negative though statistically insignificant across the board. The combined effect suggest that the reduction of family spending on education occur at 4%, 6% and 7% across full, middle and top expenditure class. The similar trend continues in 2014 that the probit is negative and statistically significant suggesting that possibility of no positive spending across the board. The combined effects suggest substantial reduction in family spending to the tune of 46%, 44%, 61% and 34% among the full, bottom, middle and top expenditure classes respectively. The extent of reduction increases as we move up in the expenditure class from bottom to top in both 64th and 71st rounds. The western part of India includes some of the economically prosperous states though the state policies and socio-cultural milieu is not conducive for investing on education.

In the case of D_east, the probability is negative and significant among the full sample, bottom and top expenditure class in 1995-96. However, the combined effect is statistically significant only among the full sample reducing the spending by 4% and bottom expenditure class by 6%. In 2007-08, the probit suggest that the possible positive spending is negative and significant across the board. The unconditional marginal effect indicate that the reduction of family expenditures by 4%, 6% and 7% across full middle and top expenditure categories. Analogous pattern continues in 2014 in probit results, while the combined effects reveal substantial reduction in family spending for the children and families living in eastern India to the tune of 46%, 31%, 15% and 38% across full, bottom, middle and top expenditure classes.

The north eastern regions (NES) generally face the cost differential due to its hilly landscape. But that does not show up in the family spending that

the probability of spending on education negative and strongly significant across the board in 1995-86 and in 2014, while the same is found to positive across the board in 2007-08. The combined effect exerts a negative coefficient value indicating an on average 7% education among the full and 15% reduction among the middle expenditure class. Similar to 1995-96, the combined effect suggest a substantial lessening of family spending an on average by 43%, 25%, 54% and 59% across the full, bottom, middle and tope expenditure classes. But in 2007-08, the combined effect indicate substantial increase in spending an on average of 18%, 27%, 19% and 12% across the full, bottom, middle and top expenditure class.

With regard to D_north, the probit is negative and significant across the board in 1995-95 and 2014 saying that there is no possible positive spending in the region compared to the south region. The combined effect suggests that the reduction of family spending an on average is 15 % among the top expenditure class and the rest of the cases, it is statically insignificant. While it the combined effect is negative and significant entailing the decline of family spending on education to the substantial tune of 40%, 29%, 41% and 56% across full, bottom, middle and top expenditure categories. It is important to note that the states that fall in north region are the so called BIMARU the economically and educationally backward states in India. However, the same dummy variable in 2007-08, the probit is negative and significant across full, middle and tope expenditure classes. The combined effect is however positive and significant and indicates an on average add to 15%, 23%, 16% and 9% across full, bottom, middle and top expenditure groups.

With regard to D_Central, the probit result is positive and significant across full sample, bottom and middle expenditure class, saying that the children and their families reside in central part of India more often make a positive spending on education. The combined effect suggest that the spending on education an on average increase by 11% among full sample, 20% and 11% among poor and middle expenditure class. On the contrary the same dummy variable in 2007-08 indicates that the probit is negative and significant across full sample and the sub sample bottom, while it is negative and significant across board in 2014. The combined effect in 2007-08 is negative and significant suggest a decline in family spending by 6%, 2%, 7% and 9% across full, bottom, middle and to expenditure groups. In 2014, the combined effect suggest a substantial decline of family expenditures on education to the tune of 42%, 38%, 45% and 32% in the same sequence of full and sub samples. The set of dummy variables on region highlights the regional disparity in family spending on education. These differences can be attributable to the state policies besides the cultural and social values placed on education.

Child Related: Age Gender Class

Yet another important question is how gender gap in expenditure behaves across expenditure groups.

The set of age-gender related socio-demographic variables introduced in the model covers the number of children in each school going age range between 5 and 29 that has been categorized into 10 different age-gender class. Grouping of age largely relate to the 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 chi2 test and presented at the bottom rows of each of the tables 8A, 8B and 8C.

Keeping Female5_9 age group as base category, the dummy variable on D_male5_9 indicate positive and significant probit across the board. The combined marginal effect of the strong positive and significant coefficient values indicate the family spending increase an on average by 22%, 17%, 26% and 20% across full, bottom, middle and top expenditure classes in 1995-96. In 2007-08, the dummy variable on D_male5_9 indicate positive except bottom class but insignificant probit across the board. Nonetheless the combined marginal effect is positive and significant. These coefficient values indicate the family spending add to 3 % each across the board except in middle expenditure class. With regard to 2014, the same variable D_male5-9 depicts positive and significant probabilities only in bottom expenditure class. However, the combined effect is positive and significant suggesting an increase in family spending an on average of 11 % and 12 % across bottom and top expenditure classes.

The probability of the variable D_female10-14 is positive and significant across the board in 1995-96. The combined effect suggest a substantial increase in family spending to the tune of 66%, 53%, 70% and 73% across full, bottom, middle and top expenditure groups. While the same age class in male, expressed as D_male10-14 exert a negative and significant probit results across full, middle and top expenditure class. The combined effect of this variable is positive and significant and suggests the family spending on education increase an on average substantially to the tune of 49 %, 82 %, 54 % and 12 % among full, bottom, middle and top expenditure groups. It can be noted that the increase in average spending across female raise as they move from bottom, middle and top expenditure classes. But in the case of male, the reverse i.e. decline in average spending as they move up in the expenditure ladder is observed. It implies that the boys in the bottom expenditure classes are spent more on education compared to girls. The test of equality of female and male coefficients of chi2 reported in table 5A clearly establishes the gender bias in family spending on education in the age class 10-14, corresponding to upper primary schooling level itself.

In 2007-08, the probit of D_female10-14 entail positive and significant values across full sample and bottom sub sample. However, the combined effect is positive and significant across the board, signifying the increase of family spending on education an on average by 14 %, 19 %, 14 % and 7 % across full, bottom, middle and top expenditure classes. The same age group among male children is denoted by D_male10-14, entail positive and significant probabilities across the board suggesting possible positive spending. As expected, the combined effect is positive and significant across the group. The co-efficient values suggest an increase in the family spending on education by 17 %, 23 %, 17 % and 8 % across full, bottom, middle and top expenditure classes. The female bias is quite apparent across the full and sub samples. Further, the female bias appears to have greater than 1995-96. The test of equality of female and male coefficients of chi2 as reported in table 5B for the year 2007-08 noticeably points to the gender bias in family spending on education among upper primary schooling age class of 10-14.

In 2014, the probability of D_female10-14 is positive and significant across the full and sub samples. Also the combined effect is positive and significant indicating that the families spending on education augment substantially an on average by 107 %, 71 %, 85 % and 170 % across the full, bottom, middle and top expenditure classes. The same age group among male, noted as D_male10-14, imply positive and significant probabilities saying the likelihood of possible family spending on education. The combined effect of the unconditional values of the coefficients are positive and significant indicating that the family spending on education boosts up an on average to 136 %, 90 %, 126 % and 195 % across the full sample and the sub samples in the sequence respectively. The female bias in this age group is quite substantial. It is noticeable that the female bias has widened in 2014 compared to previous years. Over the years, the female bias has widened at this age group pertaining to upper primary schooling. The test of equality of female and male coefficients of chi2 as reported in table 5C for the year 2014 noticeably points to the gender bias in family spending on education among upper primary schooling age class of 10-14.

Though in the next age class, D_female15-19, we get the negative and significant probability indicating that possibility of no spending across the board, yet the combined effect exert a positive and significant coefficient values suggest the family spending increase an on average by 4 %, 4%, and 11% across full, bottom and middle expenditure class in 1995-96. On the contrary, the combined effect is negative and significantly reduces the family spending by 39 % in the top expenditure class compared to the spending on female5_9 age class. The same age class relating to male captured through

the variable D_male15-19, exert a negative and significant probit across full sample, middle and top sub samples. Nonetheless, the combined effect is positive and significant with substantial coefficient values of 49 %, 82 %, 54 % and 12 % across full, bottom, middle and top expenditure classes. Unlike the upper primary age group, the gender bias quite apparent in terms of the value of the coefficient. The female bias in spending is accentuated in the secondary schooling age group across expenditure classes. The extent of bias is more among the bottom and middle class compared to top expenditure class. The test of equality of female and male coefficients of chi2 reported in second from the bottom rows of table 5A evidently hold the gender bias in family expenses on education in the age class 15-19, equivalent to secondary schooling.

In 2007-08, D_female15-19 exert negative and significant probit across the board suggesting the likelihood of no positive family spending on education. Even so, the combined effect is positive and significant and suggests the increase in family spending on education is on an average by 35 %, 44 %, 36 % and 26 % across full and sub samples. The same age group in male denoted by the dummy variable D_male15-19 wields the likelihood of no positive spending across the board but the coefficients are not statistically significant. However, the combined effect is positive and significant entailing the increase in family spending on education an on average by 39 %, 50 %, 41 % and 29 % across the full and sub samples. In this secondary schooling age class as well, the female bias is quite perceptible, however compared to 1995-96, the female bias appears to have declined. Test of equality of coefficients of chi2 as reported in table 5B for the year 2007-08 distinctly points to the gender bias in family spending on education among secondary schooling age class of 15-19.

In 2014, D_female15-19 exert negative and significant probit across the board as found in 2007-08. Yet, the combined effect is positive and significant and suggests the increase in family spending on education is on an average by 10 % across full sample. On the contrary, it displays negative and significant combined effect suggesting a reduction of 34 % of family spending on education among the middle expenditure class. The same age group in male, D_male15-19 exerts the likelihood of negative and significant coefficients across the board except top expenditure class. However, the combined effect is positive and significant entailing the increase in family spending on education an on average by 54 %, 31 %, 13 % and 65 % across the full and sub samples. In this age class pertaining to secondary schooling, the female bias is observable, however compared to earlier rounds of data in 1995-96 and 2007-08, the female bias appears to have extended. Test of equality of coefficients of chi2 as reported in table 5C for the year 2014

distinctly points to the gender bias in family spending on education among secondary schooling age class of 15-19.

Beyond age 20 which is usually relating to post secondary schooling, expressed via the dummy variables D_female20_24, the probit is negative and significant across the board in 1995-96. The combined effect suggest that the relationship is negative and significant indicating that the family spending on education on an average decline by 104 %, 18 %, 79% and 183% among full, bottom, middle and top expenditure classes. The same age class pertaining to male denoted by variable D_male20-24, exert a negative and significant probit across the board, saying the possibilities of no positive spending. Nevertheless, the combined effect is positive and significant indicating the increase of family spending on education an on average by 39 % among the bottom expenditure class. But in the rest of the cases, it is negative and significant which suggest the fall in family spending to the tune of 50 %, 24 % and 133 % across the full sample and middle and top sub samples, except the bottom expenditure class favoring an increase in expenditure for male. The test of equality of female and male coefficients of chi2 reported at the bottom row of table 5A evidently hold the gender bias in family expenses on education in the age class 20-24, equivalent to post secondary schooling.

In 2007-08, the dummy variable relating to female in the post secondary schooling denoted by D_female20-29 notify a negative and significant probabilities, which suggest the likelihood of no possible family spending on higher education. However, the combined effect is positive and significant that suggests the family spending raise by an on average 49 %, 67 %, 55 % and 40 % across the full and sub samples. The same age class relating to male is noted as D_male20-29 exerts a negative and significant probits across the board. Nonetheless, the combined effect is positive and significant indicating that the family spending enlarges an on average by 54 %, 70 %, 58 % and 45 % across full, bottom, middle and top expenditure classes. The female bias is quite oblivious in this age class as well. When compared to 1995-96, the female advantage has vanished. Test of equality of female and male coefficients of chi2 reported at the bottom row of table 5B unmistakably hold the gender bias in family expenses on education in the age class 20-29, equivalent to graduate education and above.

In 2014, the dummy variable D_female20-29 exerts negative and significant probabilities, which suggest the likelihood of no possible family spending on higher education across the board. However, the combined effect is positive and significant that suggests the family spending raise significantly by an on average 192 %, 119 %, 221 % and 273 % across the full and sub samples. The same age class relating to male, noted as D_male20-29 exerts a negative and significant probits across the board. Also, the

combined effect is negative and significant indicating that the family spending reduces substantially an on average by 117 %, 58 %, 140 % and 193 % across full, bottom, middle and top expenditure classes. Though the family spending decline across both age classes the female bias seems to be visible in this age class as well. Test of equality of female and male coefficients of chi2 reported at the bottom row of table 5C unmistakably hold the gender bias in family expenses on education in the age class 20-29, equivalent to graduate education and above. There is clear statistically significant gender bias across expenditure groups[9]. The bias is though prevalent across expenditure groups, seems to have more among the bottom expenditure class compared to middle and top expenditure groups.

Policy Variables

Besides these set of household head, household and student characteristics, the paper attempts to examine the policy variables such as whether the children enrolled are attending in 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)[10]. The dummy variable of D_Mgt_type exerts positive and significant probabilities across the board and over time. The combined effect of management type suggest strong positive and significant values, indicating the family expenditure on education augment 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 suggest that when children are enrolled in Govt/LB educational institutions, the expenditure on education by the family on an average declines, clearly evidencing the complementary nature of the government and household expenditures on education in 2007-08.

Yet another policy variable included in the models is the dummy variable on D_MDM, exhibit 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 observed in 2014 that the combined effect is positive to the levels f 94 %, 113 % and 80 % across the sub samples in the same sequence. On the contrary, the probit is negative and significant across the board except at top expenditure class in 2007-08. The combined effect as well is negative and significant which suggest the decline in the family spending on education to the tune of 37 %, 29 %, 34 % and 46 % across full and sub samples of bottom, middle and top expenditure classes.

V. CONCLUDING REMARKS

The present paper makes an attempt to examine education spending behaviour of households across economic status groups. In other words, how does household expenditure on education vary across economic status? The questions that are explored include: (i) does expenditure on education vary across economic groups and over time? In other words, whether expenditure elasticity varies by levels of income 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 the gender bias in expenditure on education is estimated using the hurdle model. The paper uses the NSSO survey data of 52nd, 64th and 71st rounds, relating to schedule 25.2, on Social Consumption: Participation in Education.

Based on the expenditure elasticity, it has been found that the middle income group, rather the middle class spend proportionately more than bottom (justifiably) but also at the top expenditure quintiles. The difference between middle and top expenditure groups elasticity is marginally advantageous to the middle and the gap widening in the 71st round. This emerging middle class and their aspirations for education and upward mobility is noticeable, especially with the movement from bottom to 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 to near basic minimum, expenditure on the education of the family becomes a priority.

The explanatory variable household size is negative and significant across expenditure class and over time, evidently indicating the quantity and quality trade-off of the number of children demanded in families. 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. Point to be noted is in the middle expenditure group, the average effect is more compared to top expenditure category, like the one observed in per capita consumption expenditure. Age of the head of the household indicate the experience, not necessarily to capture the money aspect of experience as a wage premium in wage equations, but from the perspective of investing on human capital of off springs. This variable exerts positive and significant probabilities of family spending on education across expenditures categories and over three NSSO rounds. Yet another significant factor that is expected to have positive relation with family spending on education is the skill type of the head of the households. Skill type, having four categories, the dummy variable on skill levels from 2 to 4 depict that

positive and significant the probabilities of family spending on education over full and sub-samples in 2007-08 while it is significant only the middle expenditure class in 2014. 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) spend less family expenditure on education compared to those who live in urban areas.

The female bias in this age group is quite substantial. It is noticeable that the female bias has widened in 2014 compared to previous years. Over the years, the female bias has widened at this age group pertaining to upper primary schooling pertaining to the age class of 10-14. In this age class pertaining to 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. The bias is though prevalent across expenditure groups, seems to have more among the bottom expenditure class compared to middle and top expenditure groups. This phenomenon 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 financing of education especially on girls given the immense positive externalities of girls' education?

NOTES

1. A study by the McKinsey Global Institute forecasts that if India can achieve 7.3 percent annual growth—a reasonable assumption if economic reforms continue—consumer spending will quadruple, from about 17 trillion Indian rupees ($372 billion) in 2005 to 70 trillion rupees in 2025.
2. Engel curves have been estimated for a variety of consumption goods.
3. Kingdon and her associates concludes that for those concerned with reliably measuring gender bias in the intra-household allocation of expenditure, household level expenditure data is a poor substitute for individual level expenditure data.
4. More details in the section on review of earlier studies.
5. It is equally important to note that during this period the GER in higher education remained as low as around 7 per cent and the concept of lifelong learning and its practice had been quite limited.
6. 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

7. It entails that the cost of industrial goods such as cars, TVs, fridges, mobile phones, etc in techno-robot milieu to plunge, while the cost of services in labour-intensive sector, viz., schooling, health care, child care, legal services, etc to grow.
8. Southern part of India is educationally and economically better off than the rest of India besides being better in terms of many of social and human development indicators. The southern states' fertility rates have started declining since 2001.
9. 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.
10. These variables on scholarships, textbooks and stationery were initially included in the model ad later dropped due to estimation related issues.

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Annexure 2

Table A1: 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 Geetha Rani, *et al.* (2019).

Table A2: 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 & 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