DETERMINANTS OF LEARNING OUTCOMES IN PRIMARY SCHOOL CHILDREN

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DECLARATION

I declare that the dissertation entitled ***Determinants of Learning Outcomes in Primary School Children*** submitted by me in partial fulfillment of the requirements for the award of the degree of **Master of Philosophy** of Jawaharlal Nehru University is my own work. The dissertation has not been submitted for any other degree of this university or any other university.

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CERTIFICATE

We recommend that this dissertation be placed before the examination for evaluation.

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Dedicated to

My family and well-wishers

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Chapter 1: INTRODUCTION

1.1 Introduction:

The role of basic education in process of development and social progress has been extensively studied and conclusively proved to be immensely important. As Sen(2013) puts it “the capability to read and write and count has powerful effects on our quality of life: the freedoms to understand the world, to lead an informed life, to communicate with others, and to be generally in touch with what’s going on.”[1]. Illiteracy is compared to a situation akin to “being imprisoned” and school education as an escape route for the same. The ability to comprehend enhances and opens up economic and employment opportunities especially with growing globalization resulting in higher specialization even in formerly mundane jobs like distribution let alone higher skills required in production. An educated society is not only stronger economically but is expected to possess greater consciousness about health problems and awareness. “General education can develop an individuals capacity to think, and can generate social understanding in ways that may be extremely important in facing epidemiological problems”(Sen 2013). Studies have shown greater effectiveness of general school education in implementation of health programs for immunization, sanitation, and epidemic prevention.

Human rights and political voice have much wider and broader reach when the entitled are socially empowered with a clearer perception of what is important for them and are better equipped to grasp and communicate among themselves their rights and democratic voices. This also includes the question of legal rights, which maybe granted to them by state but literacy imposes certain limitations on invoking them. “Lack of schooling can

directly lead to insecurities by distancing the deprived from the ways and means of resisting the violation of established legal rights"(Sen 2013). Large volume of development literature finds proof of positive trickle effect of educated women and young girls in the family: family decisions, lowering of fertility rates, child survival. Cases in example are that of Kerala and Himachal Pradesh where higher levels of literacy have been the major driving factors for assertive demands for quality health care, realization of female rights[2] and reduction in insecurities borne out of distancing of deprived from the ways and means of resisting the violation of established legal rights. [1]

Caste inequalities remain a major hurdle to India's economic and social transformation. Education has a great impact on upward mobility, reduction in inherited inequalities by virtue of birth and the overall enhancement to quality of life at school going age aside from the lifelong payoff of good quality schooling.

Adam Smith, besides showing the mechanics of market system, stressed putting in "state resourced for public education and argued: For a very small expence the publick can facilitate, can encourage, and can even impose upon almost the whole body of the people, the necessity of acquiring those most essential parts of education." [3]

Comparative past experiences of currently leading world economies bring out the centrality of the issue at hand in a manner that doesn't need much proof. The European and American cases show how government initiatives are necessary to facilitate and sustain long-term economic and social progress. Beginning Nineteenth century, the Asian countries learnt their lessons from the erstwhile developed nations and began recognizing the transformative role of school education. Japan,

the first one to do so in Asia, its authoritative yet constructive focus on literacy allowed it to deliver exponential progress. The intense focus on education during the Meiji era (1868- 1912) resulted in rapid spread of elementary education. By 1910 the country was fully literate and publishing twice the volume of books as the United States and more than British[1]

“The fact that human development in general and school education in particular are first and foremost allies of the poor, rather than only of the rich and the affluent, is an understanding that has informed the Japanese strategy of economic development throughout its entire modern history.”(Sen, 2013). Similarly, in the following years, South Korea, Taiwan, Singapore, Hong Kong and China followed similar routes and firmly focused on state delivered basic education. When East Asian economic progress in analyzed, its willingness to make good use of the global market economy is often and rightly emphasized. “But that process was greatly helped by the achievements of these countries in public education. Widespread participation in a global economy would have been hard to accomplish if people could not read or write.”[1]

Beatty (2012) gives example of the USA to show that even with a host of education reforms there is no reason to believe that there exists a “natural trend” to learning that just automatically happens by getting kids in school or through just more inputs. Countries need to make a deliberate effort to promote learning.[4]

Many countries already exceeding MDG enrollment rate targets have only a small percentage of students meeting even low minimum competency levels in reading, mathematics and science (Filmer et al, 2006). With time, attention is slowly being shifted to what is learnt once at school from enrollment goals.

“The goal of education has always been learning. Schooling goals like enrollment or completion crept in to replace actual learning goals because they were easier to track. The assumption was that if kids attended, teachers would teach, children would learn, and more schooling would produce more learning. But what doesn’t get measured often doesn’t get done, and since it doesn’t get measured, people don’t even know it isn’t getting done (or worse, can claim it is getting done when it’s not). “[4]

1.2 Theoretical Idea of Education and learning

a.) Education in development economics literature

Traditionally economists have modeled education with respect to its contribution to national growth, wage earnings, employment. Standard models include Becker’s model dealing with education and distribution of earnings.[5], Mincers idea of education where he dealt with net investments in education, earning distribution among workers during both schooling and post schooling experiences.[6] As the field progressed, further models were developed to deal with the externality and adverse selection problems posed by the nature of public merit good at hand. Spence (1973) [7] dealt with the signaling problem in the education and job market. This was one of the earliest attempts to model the information “disequilibria under uncertainty for both employers and employee. “ (Spence, 1973)

Schultz studied upon education as an investment with linkages to development extensively in his chapter on education investment and returns.[8] Education as “human capital” was perhaps first looked into by Schultz (1960). He looked at education as a value generator in the economy that resulted in important increases in national income. The paper models

education both as a consumption and an investment good that finally results in returns at some time in future. [9]

While all of these form the standard models of education economics, need for advancing the literature was felt since all of them implicitly assumed a robust school system where each enrolled child was automatically taken to have acquired necessary capabilities of comprehension. These models soon proved to be oversimplified versions of reality. This measure simply counts the time spent in schools without judging what happens in schools – thus; it does not provide a complete or accurate picture of outcomes.[1] Subsequent studies especially in developing countries showed that this was far from true as "educated" and "learned" soon emerged to be two different concepts thus necessitating theoretical modeling that incorporated learning as a goal.

b. The approach to "learning"

1. *Production of learning*:

The production function that converts inputs to output is modified for learning and converted to an educational production function to show how effective particular inputs into a child's education improve cognitive achievement (Monk, 1989). [10]

Inputs "may be divided into school inputs, household inputs and individual child level inputs. The child brings their natural aptitude, motivation and effort, maturity (measured by age), gender and health, and these will all have a bearing on his or her achievement. The household resources contribute to the child's education, financially, nutritionally and also through the home environment e.g. whether it is conducive to study. The parent's

[1] Hanushek, Eric A., "education production functions", "The New Palgrave Dictionary of Economics", Eds. Steven N. Durlauf and Lawrence E. Blume, Palgrave Macmillan, 2008, The New Palgrave Dictionary of Economics Online, Palgrave Macmillan

ability and motivation are also important, while their education, income and occupation will all have a bearing on the child's outcomes. School quality determines child's outcomes through a combination of infrastructure, resources, teacher quality and the organizational structure.“ Though individual and household factors may be more important than school factors in determining outcomes, school quality is the area of policy interest. The government can do relatively less about the child or household characteristics at least in the short to medium term, whereas policy changes can actually make some difference to school quality. [10]

The output term of the function is the increment in human resource. Wage returns may be a long-term measure for it, but at school level it can be measures through learning tests. This achievement test is the only way to measure and indicate the future prospect of earnings for the student once he enters into the labor force.

2. Participation decision models:

Hanushek and Woessmann (2008) point out “mere grade completion may not matter as much for determining individual earnings and national economic growth than what is learnt at school.“Choice of type of school has a bearing on lifetime earnings; therefore effectiveness of private and public schools is of vital importance in India. They provide strong case for “cognitive skill and growth causality.” [11]

The education participation decision for child can be thought as a “solution of household cost benefit analysis. The costs may be opportunity costs (forgone wages, forgone domestic help) or direct costs such as tuition fees. Benefits would include increased human capital and higher wages. The participation decision is

made in two stages, the first to attend any kind of school, and second given that one will attend school, whether to attend government or private school. The primary benefit of schooling is the accrued future wage flow. Other benefits include access to a superior peer group"[10].Returns to education would be higher as quality of schooling increases.

Hanushek (2003) analysis of school quality found little evidence of increased learning outcomes as a result of increased inputs. This suggests that it "may not be material differences that make the private schools more effective/attractive, but more to do with their organizational structure, something that is far less easily observed." [10]This is why analysis of teachers and an involvement of school level management with parents become important.

Numerous theories have been postulated regarding relationship between education and socio economic development. Most of the theoretical models focus on quantitative aspects of education. Hector Correa used two types of indices to refer to quality of education. [12]The first includes what can be called "indices of the productivity of the educational system, for example the coefficients of retention, drop out, repetition, promotion, etc. These indices show the relationship between a given input of enrollment and the output of graduates. In this sense, they measure the productivity of the educational system. The second includes indices of the factors that on an intuitive basis can be assumed to determine the quality of education, such as the student-teacher ratios, student-class- room ratios, etc. These indices will be called factor-inputs indices." He uses the definition of Haribson Myers index [12]to conclude "quality of the product of education is more a result of socio-economic factors outside the educational system than of the inputs in the educational system itself." Other than the paper by Correa there

is a lack of formal literature exploring determinants of quality of education. The crisis is deeper in case of Indian scenario where there is no literature that explicitly deals with the complete problem.

1.3 The Indian case

The mixed success of India's educational scenario presents an interesting case study. The dichotomy in the achievements is one of the most pressing problems that may as well be called a ticking time bomb. On the one side there have been stupendous improvements in school participation, the base of the "educational pyramid" continues to remain weak. What is even more interesting that despite the plethora of challenges India has emerged as a major player in the information technology revolution.

India inherited rampant illiteracy and lack of proper provisioning for education. As part of the constitution writing exercise it was envisaged that the new Indian state would strive to provide free and compulsory education to all children up to age 14 by 1960. The goal remained unfulfilled and was repeatedly pushed forward.

In recent years the long-standing neglect of Indian education has partially been addressed and progress has been made as a result of both Governmental decisions along with SC orders, enactment of the Right to Education Act 2010, all India Sarva Shisksha Abhiyan with Central government support. Education was made a fundamental right with the constitutional amendment that was succeeded by imposing 2% cess to raise funds for elementary educational purposes.[1] This was followed by creation of a non-lapsable Prarambhik Shiksha Kosh to ensure that the income created from the cess was used only for elementary education.

Funding for Sarva Shiksha Abhiyan was substantially increased with increasing income from the cess obtained as a result of increased wealth in the country. Both government and independent surveys have chronicled the progress [1]in educational levels. What has been particularly heartening is the "rapid movement towards universalization of primary school enrollment across social groups."(Sen 2013)

School education in India ails from "two principal shortcomings: limitation of coverage and secondly, poor standards of the education that is offered and received."(Sen 2013) Experience of past few years has shown vast improvements in the first case, quality realm of education remains exceptionally low over wide range of institutions with children learning little in schools. The PROBE 2006 survey conducted tests as part of its survey and found "nearly half of pupils in class 4 and 5 could not do single digit multiplication, or a simple division by 5."[2] Their knowledge of important facts, in general, remains dismally poor. These results are consistent with those of a whole series of other studies.[1]

The 2005 ASER survey reported enrollment rates of 93.4% for 6-14 year olds. "During the period there was no effort from the government's side to track learning."(Beatty 2012). The same survey found that only 47% of standard 4 children could successfully read class 2 standard texts. These findings were initially rejected by NCERT on grounds of assessment methods and "minimalist" suggestions for improving learning achievements. [3]

The government in the meantime responded by readying its own "holistic" National Curriculum Framework and the Ministry of

[2] PROBE 2006
[3] ASER 2014

Human Resource Development handed the quality aspect to NCERT, the official action was largely limited to building schools, hiring teachers and creating facilities. The NCERT reading cell was created and that too did not result in increased learning reading levels in children hence basic learning levels as reported by ASER remained low. More worrisome is the fact that the "fraction of students mastering these very basic skills has been going down over the last seven years." (Beatty 2012)

The ministry continued its focus on provision infrastructure and inputs well into the second decade of the century. Infrastructure was prioritized and quality issues took a backseat in the process. In a response to questions raised in the parliament about learning achievements, the government listed the non-availability of professionally trained teachers and adverse Pupil Teacher Ratios (PTR) at the school level. Close look at the DISE data between 2006- 07 and 2013- 14 shows net increase in both government school (10 lakh) teachers and new schools (3.63 lakh), drop in primary school PTR from 36 children per teacher to 25 children per teacher in 2013 and a similar drop for upper primary PTR from 39 (2005) to 17 (2013).

Therefore review of basic school statistics makes it clear that the Ministry of Human Resource Development and SSA, and state governments have done rather well in providing key inputs, building infrastructure and hiring teachers. They focused on it and achieved it. [4] The government's obsession for quick fix solutions to chronic problems of India's education is evident through the vigor with which information and communication technology (ICT) is being pushed into the school system. While it may be beneficial but its presence would not magically enhance skills and learning outcomes overnight. Available data shows that attention to teaching relation is an important precondition to the

[4] ASER 2014

prospect of success of any of these “digital reforms”. All the more important is early childhood primary years development. An early handicap in terms of learning can lead to highly circumscribed future choice structure for the child.

The paradox remains that while successive governments spent funds into constructing schools, providing free textbooks, uniforms, mid day meals, hiring teachers: the net enrollment in government schools went down and enrollment in private schools went up sharply, especially in the primary stage. “Between 2007 and 2013, according to DISE, total enrollment in primary schools peaked in 2011 at 137 million while the upper primary enrollment has grown from 51 million to about 67 million. During this period enrollment in government schools (Std. 1-8) declined by about 11.7 million, from 133.7 million to 121 million. In contrast, the enrollment in private schools went up by 27 million, from 51 million to 78 million.”(ASER 2014)

Equivalent literacy figures for India’s “contemporaries” really put the striking scenario in perspective. Lagging behind the BRIC countries, Sri Lanka, and the average of developing countries. Primary school enrollment rates have increased to near universalization rates of 96% (ASER 2014). India lags behind substantially when secondary enrollment rates are calculated for other contemporaries. As Kingdon (2007) shows “India remains more than 30 years behind China in terms of the proportion of population with completed secondary and post secondary schooling.”

Learning achievement of students measured and compared through international tests shows equally disparaging results. The TIMSS 2003 (Trends in International Mathematics and Science Study) pilot study conducted on secondary school students in Rajasthan and Orissa showed both states to have

considerably lower average score as compared to the international mean of achievement in math tests, 34 and 37 per cent respectively compared to 52 per cent globally.

While primary school enrollment registered increases, significant gender bias existed throughout.[13] Recent years have seen closing in on this gender gap, it remains to be seen whether this enrollment convergence has resulted in similar closing in for learning levels. Hanushek (2005) summarized the literature that developed on the idea that mere number of years of education may not be the only determinant of earnings and productivity; what is learnt in school is equally important if not more. [14]

The government, at its end continues a linear thrust approach on learning achievement side. The problem therefore remains that of strategy: Padhe Bharat Badhe Bharat envisages a goal of 85% children of standard 1 and 2 reaching specified learning indicators by 2016 – 17. Not only the older children who have big deficits in basic skills have been left out, a disproportionate amount of responsibility on teachers to assess learning abilities of each child, in addition an implicit assumption is made in the way the law is written that all children in school achieve "grade-level capabilities and that out of school children joining these classes will have to catch up". What stands out in the Act is a lack of clear definition of "grade level capabilities" and no description of a measurable index for learning levels; therefore there is no official quantification of how low the standard actually is. The result is evident in the embarrassing performances of domestically "high" ranking states Himachal and Tamil Nadu at 72nd and 73rd in PISA among the 74 participating countries especially for a country that has achieved near universal enrollment, appointed staff and provided basic school infrastructure. The situation is all the more disheartening for

children studying in higher grades, the ASER 2014 study documents that these children are unable to comprehend what they read. “The Government of India took a long time to move to a learning outcomes orientation and stopped well short of what is urgently needed.”[5]

The backlog and lag in basic skills needs to be covered through by teaching focused on deeper comprehension exercises along with creating hospitable and learning atmosphere at home and in social surroundings. Key areas needs to be focused on the institutional front, it is equally important however to study and analyze that what a student assimilates is also a function of the environment at home and his other social interactions. Once these factors are brought into the picture, a better holistic and a long term strategy can be devised as opposed to the usual box type- one size fits all approach to a hurdle that may could become a limitation to India’s economic advancement at the least and a great social dividing factor in every village and community.

Quality of schools therefore becomes the pivotal policy instrument in governments control from where future earnings, productivity and economic growth can be pushed ahead. This does not mean however that the government’s job is limited to constructing buildings, installing tables, toilets. These factors though important are not an end in themselves. The decaying public system of education needs to be revived. NSSO 71st round revealed the stark biases that have increased with time. The Net Attendance Ratio (NAR) shows that the Indian education system is reproducing social inequalities and not removing them[6] the District Primary Education Project (DPEP) and its successor Sarva Shiksha Abhiyan have helped in improving school infrastructure. The amenities though still remain far from

[5] ASER 2014
[6] Frontline , Volume 33 no.13

satisfactory. Substantial number of schools remain without essentials like drinking water, toilets, classrooms let alone advanced resources such as fans playgrounds, musical instruments, computers, etc.

These tangibles are not the only problem on part of institutional provision. Teacher negligence continues to be a big problem in our school system. There are a number of problems in the area itself; "first is the issue of teacher absenteeism"[15]. Even if teacher is present, their quality becomes an issue of inquiry. Recent literature has shown us that mere "highly qualified" teachers may not be the answer to our problems. What is more important is teachers that are not only present but actively involved in teaching too. As opposed to what was found in the PROBE survey of 1999. "The Probe Team (1999) states that the extreme cases of teacher negligence were less devastating than the quiet inertia of the majority of teachers. In half of the sample schools, there was no teaching activity at the time of investigators' visit. Inactive teachers were found engaged in variety of past times such as sipping tea, reading comics or eating. Teaching activity has been reduced to a minimum in terms of both time and effort. It has become a way of life in the profession"[7] (Probe Team, 1999, p. 63) The ASER2005 report also found a teacher absence rate of 25 per cent, as in Kremer et al. (2005).

This narrative makes it important that factors affecting the learning outcome problem are identified, quantified and analyzed to give us a robust structure for future policy formulations. There needs to be a concrete and factual backing to what maybe asserted as a vague developmental problem. A sustained effort to establish the scale of problem and study the still neglected public

[7] PROBE 1999

policy problem needs to be made. Only through collection of large-scale representative data of learning outcomes but other microeconomic household choices, backgrounds can we appreciate the scale of crisis in the country. Data and statistics form the first step of identification of any problem and a stepping stone towards coming up with result oriented solutions requiring deeper policy intervention at a human level that do not either squarely blame the victim "children uneducable", "parents weren't interested", "India is a poor country", " first generation learners" or are not crowded out "by a set of "solutions" of the type government bureaucracies love – "more inputs." [8] The disinterest at bureaucratic end is evident once one looks at the DISE statistics that publishes "performance indicators" through variables like boundary walls in schools and kitchen shed [9]. The "report card" has no mention of any learning outcome. [10] Therefore the biggest problem at policy level is the failure of education bureaucracy to identify that inputs are not the end all solution the quality problem. While they may act as catalysts in the process, learning process is a much deeper problem that cannot be solved by merely guaranteeing the right to attend school (RTE) and pouring in higher funds. The policy focus has been on "how much" is spent by government on education, while that is important, it should not become be all of policy interventions, it is necessary to evaluate whether there is any learning outcome. No country can progress and catch up in the current globalizing scenario if its workforce is unable to read and comprehend even one language. All debates on curriculum content become futile when the foundation itself is this weak.

[8] ASER 2014
[9] ASER 2014
[10] DISE

1.4 Conceptual Framework and Research questions

Now that we have shown that how pressing the problem is, it is sufficiently clear that a broad structure needs to be constructed so that corrective action may be taken in the future policy frameworks. There is enough evidence in the literature that highlights the multidimensional aspect of the problem. The two parallel streams of arguments that run after the findings of Colman report resonate till date. It is important that both sides are studied and looked into from this vantage point. It is abundantly clear that neither of the two : family social effects and school quality effects, if looked individually fully explain the problem. Therefore the sub standard levels of learning as a whole become a result of two forces playing together to give us what we observe.

The over simplistic assumption of merely concentrating on increasing enrollment doesn't by itself guarantee learning by students. Clearly if enrollments are rising and what is learnt at school is falling (Amanda Beatty and Pritchett), there is something amiss in our understanding of the system. The rot that we see needs to be mapped to its causes so that next step of solution is taken. Learning as we have seen is the final outcome variable of both individual and parental input factors and school factors. Unless both are studied we cannot fully explain the vast inequalities in learning outcomes.

Therefore availability of school by itself will not ensure learning. We need to bifurcate the possible determinants into two streams of examination: the demand side and the supply side. The demand side is defined as those factors that work at the individual household choice level. These variables are those that influence the child by means of socialization and proximity. This is the behavioral aspect of the problem since the government

cannot by virtue of its direct intervention correct this part of the problem. The Coleman Report first conclusively highlighted the demand side of problem. It was a game changer of sorts for studying the issue. The report and its subsequent literature from the developed world conclusively proved that when learning was concerned its not only the school which influences how much is assimilated; family, social structure and interactions with other socioeconomic factors are much more important factors for the same. The other parallel strand of argument is the school quality debate. This is a more direct interventionist aspect of the crisis. Simple supply side argument underlies the debate here. Institution and management policy is the backbone of the structure that would ultimately influence what is learnt at school. What is important to note is unless both the sides are analyzed, the explanation remains incomplete. Both effects are independent of another but nevertheless exert important influence on final observed outcome.

Therefore we have two aspects of the problem each exerting independent influence on the output variable. The resulting research question can therefore be grouped under the two heads of demand and supply side. The observed reading and mathematical attainment of primary children can specifically be studied through the following questions:

1) Do the mathematical and reading levels differ by segmentations, parental involvement, and societal interactions? (Demand side)
2) Does the observed learning level in children attribute its nature to quality of institutions where education is imparted from? (Supply side)

1.5 About the data

"In 2004-2005, University of Maryland and National Council of Applied Economic Research designed and fielded a survey of 41,550 households. This survey, India Human Development Survey 2005 (IHDS), contained questions about, health, education, employment, income, and gender empowerment. The survey was conducted all over India – in 25 states and Union Territories – and included urban as well rural areas. This data collection was funded by grants from the National Institute of Health to the University of Maryland." [16]

"A major innovation of this survey was to conduct short assessments of reading, writing and arithmetic skills for children aged 8-11. Conducting educational assessment in developing countries – particularly India -- is difficult for a variety of reasons: children's ability varies tremendously and an instrument must capture children at both ends of the distribution; tests must be translated in many different languages with similar difficulty levels; the instrument must be simple and intuitive so that interviewers can administer it easily and it would not frighten children who are not used to standardized tests."[16]The whole activity was completed with the help of Pratham, an organization that has a vast experience in the field of elementary education. Simple tests were developed to study child's reading and mathematical learning at five levels.

"Children were asked to write simple sentences and were considered able to write if they could write a simple sentence such as "I like blue color" with zero or one mistakes. Interviewers were trained extensively by Pratham volunteers using specially developed films so that they could differentiate between a child's shyness and inability to read. They were also taught how to develop rapport with children. Tests were developed in a variety

of Indian languages as well as English and children were asked to take the test in whichever language they were most comfortable in." (Desai et al 2010)

"As a result, what we have is a survey that contains unique child assessment data as well as a wealth of household socioeconomic information. Children are classified according to their ability to read in one of the five categories: (1) Can not read at all; (2) Can read letters but not form words; (3) Can put letters together to read words but not read whole sentences; (4) Can read a short paragraph for 2-3 sentences but not fluent enough to read a whole page; (5) Can read a one page short story."[16]

"Children's mathematical skills are classified in four categories: (1) Can not read numbers above 10; (2) Can read numbers between 10 & 99 but not able to do more complex number manipulation; (3) Can subtract a two digit number from another; (4) Can divide a number between 100 and 999 by another number between 1 and 9. Note that we focus on 2 digit numbers to avoid calculations on fingertips and to get a better estimate of true understanding of subtraction and division. Also, given the Indian system of expecting children to memorize multiplication tables from 1 to 20, chose to test children on division rather than multiplication skills." [16]

The IHDS- II 2011-12 is the second round of the survey spread over 42,152 households in 1,503 villages and 971 urban neighborhoods across India. These data are mostly (85%) re-interviews of households interviewed for IHDS-I. each surveyed household was questioned on topics convering health, education, employment , economic status, marriage, fertility, gender relations, and social capital. the data has been grouped under ten datasets: individual, household, eligible women, birth history, medical staff, medical facilites, non resident, school staff, school

facilities, wages and salary.[11] The major innovation of this survey that makes it stand out is the cognitive assessment tests that have been conducted along with complete information about household choices and statuses among other things. This makes it a very powerful dataset compared to other surveys that either only focus on school quality measure (DISE, NCERT surveys) or only focus on limited household factors (ASER).Data constraint did not allow any research of this sort to happen for India.The fact that it has reinterviwed previous household further adds to its usability and strength to delve into cohort longitudnal analysis in the future.

1.6 Methodology

Different sources of Data were evaluated regarding usability for the research at hand. Once the appropriate source was shortlisted, the supporting questionnaires and codebooks were studied at length get a sense of its comprehensive nature. Subsequently required variables were then zeroed in on through detailed literature reading on the matter. Some variables used did not have direct literature; an attempt was made to explore larger development literature for their transmission mechanics and preliminary attempts were made to fit into the model.

As suitable econometric model (ordinal Logit Model) was fixed, dependent variables were recoded and new independent variables that were needed were created. Owing to the ordinal nature of our outcome variable and the possibility of measurement errors in the data we modeled the learning outcomes in the following form

$$y_i^* = x_i\beta + \varepsilon_i \quad y_i = m$$

$$\text{if } \tau_{m-1} \le y_i^* < \tau_m \text{ for } m = 1 \text{ to } J$$

[11] http://www.icpsr.umich.edu/icpsrweb/DSDR/studies/36151

with each level of learning being identified by the latent variable tied to it. Numerous repeated regressions were run and evaluated with respect to the limited available literature to assess the direction of results.

1.7 Chapter division and approach ahead

The research is divided into two chapters each of which discusses at length the progress and mechanism of the problem. Available research from the developed world is used as the base for building up corresponding preliminary model for India. The rich data at hand allows us to view the learning problem holistically, from both the sides, a first for India.

Chapter 2: Demand side determinants of learning outcome

2.1 Background

It is now a well-documented fact that inequalities are striking and vastly prevalent in educational attainment in the country. The manifestation of social disadvantage and mechanisms underlying the process remains under researched. Even more interesting is the case when educational "attainment" is not merely defined and studied on basis of quantitative terms in enrolment numbers but in qualitative terms of what is actually learnt in schools by children. Hence documented reading and arithmetic skill differentials can be used to study how social disadvantages, social networks and other family and household factors work to finally result in a biased outcome of tomorrows labor force.

Social Discrimination can take several forms: direct or indirect. "Direct discrimination is an explicit, deliberate policy of exclusion from opportunities. Indirect discrimination is said to occur when supposedly neutral provisions, criteria or practices disadvantage individual(s) due to their social status or due to capabilities derived from socialization differentiated by social status."[17].White(2010) further expands on discrimination as an ideology with "three separable aspects - 1. Discrimination, as a principle for organizing social relationship. 2 Discrimination as capillary power. and 3. Discrimination as a set of political practices effected through formal and informal institutions in the realm of the state, market and civil society. Together, the ideology of discrimination and the institutions through which it is operationalized constitute a *regime of social discrimination."*

Discrimination in India is "practiced both as historically

recognized instituted practices as having effects in inverse proportion to peoples' position in the class system, caste/religious status groups and the gender hierarchy."(White 2010) The regime of discrimination is not an isolated individual choice behavior but a social behavior that seeks to maintain hierarchy through array and varied techniques of non homogenous forms of biases against Dalits, Adivasis, Muslims and women. The idea of us vs them results in use of different normative practices that are tacitly given socio cultural and political colors. An example in point is caste privileges that seek to justify the upper hand of general population over the lower castes, or religion or gender that is used to treat the said subject as a subordinate.

These existing forms of discrimination are inimical to interests of any democratic society. Even though blatant caste discrimination may have been declared as unconstitutional under the fundamental rights, disdain and subtle discrimination continues. Matters are made worse by the third feature of the regime of discrimination, the politics of discrimination. "The politics of discrimination charts the course of the advance of 'dominant' social groups in the face of consistent democratic assertion by deprived social groups constituting Dalit Adivasis and Muslims (DAM). It tries to ensure that practices of capillary power flowing from the hierarchical norms of social order are not dissipated by the rationalities of market exchange or of state planning. In effect, the politics of discrimination formally forges a space for DAM, giving them a socially sanctioned voice in society, polity and economy. However, the politics of discrimination also ensures that this 'space' and 'voice' fails in practice to be transformative. It seeks instead to ensure that emerging voices do not translate into successful and effective social and economic engagement; and that striving for representation does not

transform itself into practical control over productive socio-political and economic resources."[17]

Even though India is majorly a Hindu nation with varied religious diversity, there exist substantial differentiations as a result of the caste system within the Hindu majority itself in addition to adivasis or tribals located outside the Hindu caste hierarchy. "Both the lower castes and adivasis are enlisted in the schedule appended to the Indian Constitution as SC (schedule caste) and ST (schedule tribe) respectively"[16]

The government, recognizing social discrimination as a fact, in the scheme of constitutional mechanism introduced affirmative action programs since independence to close in on the gap between general population, dalits (scheduled caste) and adivasis(scheduled tribe). Glaring educational disparities are found to exist irrespective of these continued efforts of upliftment. [16]

Desai and Kulkarni find the inequalities arise at primary level and once primary level of schooling is completed it is more likely that these children would go on to finish their middle school. Therefore what this suggests is that primary school is an important site for creation of educational inequality[18]. Therefore we concentrate on primary stage of education as a point of inquiry.

As Desai et al analyze in their paper using IHDS 1 data, "the children of disadvantaged caste ethnic and religious backgrounds of the country are likely to attain lower levels of arithmetic and reading skills even when school enrollment and grade attainment are held constant."[16]

Most of the current literature emphasizes on two factors as major determinants of inequalities in the field. "Commuting distance

being too large for these communities since they are traditionally known to reside in distant locations and household factors"[19] that includes parental motivation, poverty, labor demands from children. Current policy focus has been principally on the first factor while the more detrimental second factor has not been pursued. As B social and proximate literacy may be bigger impact factors as compared to merely infrastructural provisioning.

Contemporary research for developed nations has gone further than access and family factors to assess the role of schools and communities on learning outcomes. Among other things, child taking up adult responsibilities like childcare and household chores has been found as a contributing factor for biased learning outcomes.[20, 21]There is a vast amount of literature that exists for the US that goes on to show that it is an interaction of individual and environmental factors that finally determine the learning outcomes along with the inequalities at birth.

We have already modeled the learning problem to be a result of two streams of factors interacting together at the individual level. Here we focus on the demand side of the problem. By demand side we mean factors at an individual and social choice level that influence the learning outcome. Household choice variables, demographic variables, study work decisions and social environment of the child have been now found to be bigger impact factors as compared to the traditional teacher school infrastructure arguments.[22]

Discrimination remains one of the biggest causes for alienation from the school system. Reported instances from the PROBE 1999 document some of these cases 'we were asked to sit separately. Our copy or slates were not touched by the teachers'

[12]. The study found that teacher behavior was biased against students from the marginalized communities. Teacher behavior often tends to humiliate dalit students. “Upper caste teachers have low expectations of dalit pupils and consider them as ‘dull’ and ‘uneducable’.“[13]

The students from adivasi families are at an even bigger disadvantage in addition to low expectations, tough terrain of living, inaccessibility further constraint their learning process. Language of instruction is a particularly important problem for the adivasi children. “Tribal students feel further alienated when the teachers are not well trained to communicate in the tribal dialects.”[23] Similar problems are faced by the Muslim students in terms of harassment as a result of religious tensions and stereotyping.

This question is important because the PROBE 1999 study found a relation between quality of teaching, discrimination and school drop out. A survey of 226 never-enrolled children found that 32 percent of the boys and 23 percent of the girls were never enrolled because the child was not interested. Among 106 drop-outs in the same survey, it was observed that 35 percent of the boys and 16 percent of the girls dropped out because the child did not wish to continue (The Probe Team, 1999). It is therefor expected that “don’t wish to continue maybe a result of learning difficulties. Thus, children’s achievements are both important as measurements of quality of education and markers of drop-out potential.”

Having achieved near universal enrollment rates and access to schooling largely been addressed at policy level, learning rates continue to be less than satisfactory. This means that merely

[12] PROBE 1999
[13] PROBE 1999

constructing buildings and employing more teachers isn't enough to address the inequalities in learning. Desai (2010) argues hat above and beyond school enrollment, children's educational outcomes are a function of school interactions with children from privileged sections of society faring better than children from marginalized communities. Poor learning outcomes lead to higher drop-out rates among these children.

There exists a major flaw in the current research on learning outcomes and economic choices, the problem of oversimplification. By concentrating attention on enrollment or even on school factors, studies fail to appreciate how measured ability of learning may occur as a result of "adverse environment at home or through lack of stimulation in early life"[24] The vast amount of literature is conspicuously silent about "intra household externalities of literacy and education."[22] In their study of the propensity to innovate among Guatemalan farmers, Green, Rich and Nesman (1985) "observe how having a literate family member is like being partly literate oneself. "Likewise, Drèze and Saran (1995) note how the advantages of literacy can spread to others in the household by "virtue of certain kinds of decision-making on behalf of the household shifting toward the literate."[22]

Natural externalities such as this have been modeled in Basu and Basu and Foster(1998). The essential idea was that presence of a literate member in household has spillover benefits on illiterate members. They partitioned the illiterate members of the society into two categories the proximate illiterate, that is, an illiterate person who lives in a household in which at least one person is literate, and the isolated illiterate, that is, an illiterate who lives in a household of all illiterates. It is arguable that a "proximate illiterate is significantly better off than an isolated illiterate (though of course it is best to be literate oneself). The

reason is that, for certain activities, all one needs is an easy access to a literate person. For instance, an illiterate farmer who occasionally receives pamphlets from extension workers or needs to read the label on a new fertilizer packet could benefit enormously from such access. An urban worker whose work entails some knowledge of what is happening in the world at large or just plenty of 'commonsense', which comes from interacting with knowledgeable people, might benefit a lot from having a literate person at home. Of course, employers, being aware of this, will be willing to pay more for a proximate illiterate than for an isolated illiterate."[22]

Evidence for the external effect within the family has been researched extensively; with each study concluding the increased attainment levels as a result of better-educated parents[25] Therefore literacy sharing and its positive spillover effects form an important determinant of observed reading and mathematical abilities. In considering relationship between environment and educational opportunity, initial allocation of endowment may still be a major factor determining achievement levels. But external factors such as parent's interests, encouragements, and home circumstances may in tandem work "towards a considerable waste of talent"[24] owing to lower learning. There is evidence that extreme poverty of the environment "leads to progressive deterioration in academic ability."[24] Failure to acquire these skills will result in waste of ability that no amount of redistribution would be able to correct. Therefore "living conditions, improved asset ownerships have been found to improve children's academic outcomes."[24] One reason for this maybe that the children saw improvements in their health conditions or they try harder once they begin interacting and networking in an area where education is valued. Larger families with greater number of children to look after have shown lowered

measured abilities and a consistent deterioration in test scores between eight to eleven years. JWB Douglas in his study enumerates number of dependents (overcrowding), exposure to 'unsatisfactory' environment as a handicap in performance. Education of parents, their social background, views of mothers on education and size of families each has cumulative effect on academic records in his study. He states when children of similar measured ability compete for grammar school places, "those from satisfactory homes have an advantage over the rest, which, though small, is consistent in each social class, whether the area be one of good or poor provision of grammar school places."[24] It is logical to expect that students with unskilled workers as parents, often of low educational attainment they would take little interest in their children's school work, have larger families and live in grossly overcrowded homes lacking amenities.

The deteriorated performances can be explained in terms of this unsatisfactory environment at home. Bad circumstances result in lower concentration along with diversion into household chores, lack of amenities. "With an increase in income and as families get progressively well off and push into middle class brackets, although home circumstances may still be unsatisfactory, a lot of this negative effect may reduce in intensity as a result of social networking and interaction with other middle class children where education may be valued."[24] This peer effect of learning may become an offsetting factor in the longer run.

In this respect parent's influence becomes very important especially at initial primary stages. "There is evidence to show that the care of understanding and intelligent parents in early years gives background and meaning to what is learned."[24] The child whose memories are associated with resentment cannot be expected to compete successfully with those whose memories are associated with a "feeling of personal satisfaction or a sense of

achievement."[26]

Social origins and education of parents can result in vast differences in a childs health and standards of living for the child. This assumes greater importance in case of education and empowerment of mothers in decision making at home. Instability in asset situation, frequent job switches for unskilled families have been found to be reasons behind lower performances of children of such homes. "It may be that the key to their backwardness lies in the worries and anxieties at home."[24] The study goes on to show that upward mobility on social scale results in higher measured ability of children too. Children of such families improved their test scores and if the upward movement was maintained, it soon eliminated their initial handicap. "The reverse was found to be true for children in families that moved down."[24]

What can be concluded therefore is that occupational changes tend to reshuffle families and result in positive spillover effects for their children. While the effect may be stronger for homogenous societies like United Kingdom, we would hope to see preliminary effects for India too. Though Indian society by virtue of its numerous axes of discriminations is a much complex case. It is for this reason gender caste cannot be left out even economic choices of households are included as variables for analysis.

Background of mothers is one of the most important factors when influence of parents on learning is studied. Douglas considers it to be a greater force in influencing attitude to learning. The mother has been shown to play a pivotal role in supplying the drive and incentive for her children to do well at school. When studying the learning outcome therefore effect of mothers education level cannot be discarded as not only early contacts with mothers have the greatest influence on learning, at

later ages too it is the mother who is more concerned than the father with school problems. Therefore “at any rate it would be unwise to ignore social origins and standard of education of mothers when devising a new social classification.”[24]

Further, asset background used as proxy for grouping families according to class background become important to study family stature and characteristics within household. Douglas found higher scores and significant differences in effort on learning and performances as family classes differed. He reasoned the higher middle class scores to greater aspirations and interests of parents. The difference and unevenness in learning outcomes was found to be in same direction as age. That is, at “eleven years the average test scores made by children in the four social classes differed more widely than they did at eight.”[24]

2.2 Research question

Having theoretically justified and presented numerous experimental studies and arguments for our model, we are now in a position present our hypothesis and the conceptual framework for it. The chapter specifically seeks to discuss the demand side determinants of learning outcomes. It is proposed herewith that other than school level interaction, learning outcome is a function of much deeper interplay of parental and societal factors. These factors are individual level factors that may not be tweaked by direct government intervention. Proximate literacy, parental asset situation, mothers standing in the household, childs social setting, upward mobility of the family, encouragement within the family, caste rigidities, family structure “overcrowding” affect the learning rates apart from basic demographic variables one is born with.

These maybe hypothesized to constraint the assimilation of education levels. The externalities both within the household and in broader social setting need to be looked into. We call them the demand side factors and study them separately for the simple reason as highlighted in the literature findings above, none of these factors comes into picture at the provisioning level. No amount of government fund into building classrooms, toilets, hiring teachers would change the effect that these variables would have irrespective of school interactions. If these factors are understood and concerted welfare efforts are made in the right causal direction by the policy makers, we would be able to solve the ironical dichotomous problem the country is facing – of increasing enrollments, infrastructure funding on schooling and decreasing achievement levels.

The hypothesis under study therefore is-

1. As observed in other countries, do demand factors also play a role in differing learning levels?

2.3 Data

The Indian human development survey I(2004-05) and II (2011-12) was result of a joint effort of researchers from the National Council of Applied Economic Research and University of Maryland. "The goal of collection of data of this scale was to track changes in daily lives and choices of Indian households. The survey is a nationally representative, multi topic study of about 41,554 households across India. Subjects of inquiry included economic status, decision-making, marriage, fertility; social capital, gender, employment, income, health and education. Children were given short reading writing and arithmetic tests. The first round of the survey was completed in 2005; this was the

second round of the study with the households being re-interviewed for accurate tracking of changes."

Therefore we have a large data set of learning outcomes of primary school children along with their socioeconomic and household information. "Their reading and mathematical abilities have been classified into five categories Can not read at all; (2) Can read letters but not form words; (3) Can put letters together to read words but not read whole sentences; (4) Can read a short paragraph for 2-3 sentences but not fluent enough to read a whole page; (5) Can read a story. Children's mathematical skills are classified in four categories: (1) Can not read numbers above 10; (2) Can read numbers between 10 & 99 but not able to do more complex number manipulation; (3) Can subtract a two digit number from another; (4) Can divide a number between 100 and 999 by another number between 1 and 9. Also, given the Indian system of expecting children to memorize multiplication tables from 1 to 20, children were tested on division rather than multiplication skills."[16]

The learning levels were recoded for the age group under study so that the dependent variable became the ability to read a paragraph and similarly mathematical achievement was measured by the correct subtraction done by child on the day of the test.

Primary independent variables included social group: this includes caste ethnicity and religious diversity. Higher caste groups formed the omitted category. Rest of the sample was divided between mutually exclusive categories "comprising of dalits, the lowest or scheduled castes, adivasis or the scheduled tribes, other backward castes, Muslim and other religious groups that includes Christians, Jains and Sikhs."[16]

As discussed in addition to the social class of the respondent, several other independent social and economic household variables are also included in the subsequent models.

Since we had the luxury of a dataset that allowed us look into what goes inside the house and what possible impact it could have on the learning outcomes, we could include other than basic demographic factors like age, gender, castes (with general class forming the omitted category), socio economic factors like asset position (taken here in quintile form). The availability of family statistics allowed us to include factors that could be possibly be a source of both negative and positive externalities: one such variable is the number of elderly in the household and number of infant girls in the household. Both these factors maybe cause of overcrowding argument in the household and their presence may well be a source of lower learning outcomes.[24]

Effect of "Proximate literacy" is looked through presence of literate adult in the house in the form of a dummy, negative externality of social network through combined index of presence of social problem that included presence of conflict or untouchability or harassment in area of residence. This factor would give us a better idea about how discriminatory and disturbing social settings can hamper an individuals learning for life. The variable was calculated using simple summation technique the idea was presence of any of the three would be an indication of the animosity faced by the family within its area of contact thus affecting the childs learning outcome.

As discussed at length in the previous section Apart from these, role of mother or female literacy has been included. To further substantiate our theoretical modeling we also included source of

loan along with urban rural controls, since situation may differ in both the settings. The loan source is taken as a broad measure of the family moving towards formalization, up the ladder and attempt has been made to study if better loan situation and lower exploitation by informal circles for parents would end up actually affecting the learning of the child.

All these factors were fitted using the ordinal logit model since our response variable is a binary outcome. Assimilation of what is taught depends critically on parental household and social characteristics. The model used is ordinal logit model, which takes the following form

$$y_i^* = x_i \beta + \varepsilon_i$$

$$y_i = m \text{ if } \tau_{m-1} \leq y_i^* < \tau_m \text{ for } m = 1 \text{ to } J$$

Outcome variable is classified as propensity to read paragraph. Observed reading levels tied to this latent variable by the measurement model underlying the ordinal logit regression:

$y_i = 1$ (does not read) if $\tau_0 = -\infty \leq y_i^* < \tau_1$

$y_i = 2$ (paragraph) if $\tau_1 \leq y_i^* < \tau_2$

Each model contains a dummy for state of residence (URBAN4_2011)

2.4 Results

As each model was regressed using the above specified variables that have been reasoned out by supporting theory discussed in the previous section. Interesting results are obtained in the process. In the first model when only basic demographics are

used female students perform worse than the boy students for both maths and reading ability. Differences between communities are large with only the exception of minority community all the others are highly significant. The negative sign for each of them is an indication that discrimination and imbalances in skills are higher as we progress from OBC to Muslim, this is in line with our earlier mentioned theory that discusses higher social handicaps for adivasis and Muslims as compared to the other backward castes.

Model 2 adds standard completed and status of enrollment of the child and the difference between the classes sees a reduction. This implies that participation in school system will reduce some of the initial differences among castes. Model 3 adds assets quintile and as reasoned by theory greater endowment of assets within the family results in higher abilities. It is important to see here that asset acquisition reduces differences among the disadvantaged too.

Highly significant results in the next model, model 4 go on to substantiate our earlier claim of proximate literacy being a powerful in learning outcomes and the effect of female literacy on childs achievement levels across the board. Model 5 Includes presence of 0-14 infant girls in the household, this factor has been used as an indicator for family composition and the diversion of child due to child rearing within the family. The variable has a negative impact on the learning level implying greater number of female infants in the house lower the observed learning level. To understand this we need to note that India is a country where there is a male child preference within the family. A greater number of female babies precisely show the well-documented tendencies to have greater number of children to increase the probability of bearing a male child. This factor

therefore other than an indicator of diversion to household chores, also shows the imbalanced tendencies of gender relations within the family a larger estimate of which would naturally lead to lower learning rate. Similarly presence of elders was included to study the effect of "overcrowding" within the family. What our results in fact end up showing is presence of elders may actually be a positive externality in case of India. Elder members of the family may become additional motivational force and a helping hand within the family, which would make the child perform better on the tests. [24]

Model 6 and 7 are indicators of social interactions of the individual and the resulting impact on learning. Negative and significant effects have been observed for both presence of social conflict (an aggregate measure of presence of conflict, untouchability and harassment) and access to informal sources of loans. Informalization has been divided into two heads – social circle borrowing and moneylender borrowing. What we see once we control for rural urban residence is that a family borrowing from moneylender has a lower learning output for its children. The reason for this can be traced back to our initial theory discussion where borrowing has been shown to be a dampner for the child as household atmosphere suffers a setback due to the vortex of exploitation that the family gets embroiled in once it accesses loans from the moneylender.

Tables

Table 2.1 Summary Statistics

Table 2.2 Effects of various demand side factors on reading capabilities of 6- 14 year olds

Table 2.3 Effect of various demand side factors on mathematical abilities of 6-14 year olds

Table 2.1 summary statisticcs

Variable	Mean	Std. Dev.	Min	Max
Age	10.15038	2.612219	6	14
Reading Ability	0.5474068	0.4977686	0	1
Gender	1.478197	0.4995312	1	2
Currently Enrolled	0.9180938	0.2742255	0	1
Standard Completed	3.212694	1.858938	0	5
Assets Quintile	2.89246	1.37335	1	5
literate Adult in Household	0.8961082	0.3051244	0	1
Highest Female literacy	4.828309	4.944676	0	16
0-14 girls in Household	1.388931	1.182006	0	10
Elderly in household	0.4669256	0.7006161	0	4
Presence of social problem	0.358163	0.43776	0	1
Loan from moneylender	0.42785	0.62743	0	1
Groups	3.60833	1.6269	1	7

Table 2.2 Effect of various demand side factors on reading abilities of 6-14 year olds

	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6	MODEL 7
Age	1.4861*** (0.3962)	1.074*** (0.0720)	1.2114*** (0.11435)	1.1504*** (0.1401)	1.1489** (.1388)	1.1330** (0.1364)	1.1350** (0.1366)
Gender	0.9206** (-.0826)	0.8828** (-.1245)	0.9085** (-.09585)	.91621** (-.08750)	1.0222 (-.0757)	1.0324 (0.290)	1.0329 (0.2944)
Obc	.6308*** (-.460)	0.6840*** (-.3796)	0.8796** (-.1282)	0.9638 (-0.0368)	0.9758 (-.0244)	0.9293 (-0.266)	0.936 (-.0246)
Dalit	0.4324*** (-.8382)	0.4500*** (-.7983)	0.6161*** (-.4842)	0.7006*** (-.3557)	0.7120*** (-.339)	0.7165*** (-.3516)	.7221*** (-.3521)
Adivasi	0.3664** (-1.0251)	0.3760*** (-.9779)	0.5818*** (-.5416)	0.6390*** (-.4478)	.645*** (-.4371)	.6046*** (-.4495)	.6155*** (-.4489)
Muslim	0.3545*** (-1.0370)	0.4846*** (-.7242)	0.6224*** (-.4741)	0.7041*** (-.3508)	.7344*** (-.3086)	.6921*** (-0.3052)	.6980*** (-.3054)
Minority	1.0621 (0.060)	1.0396 (0.0388)	0.8057 (-.2160)	0.8192 (-.1993)	0.808 (-.2131)	0.8775 (-.2394)	0.9107 (-.2440)
Current enrollment		4.3921*** (1.479)	3.943*** (1.3719)	3.5644*** (1.271)	3.6225*** (1.2871)	3.9001** (1.2916)	3.8851** (1.3021)
Standard completed		1.6341*** (0.4910)	1.5776*** (0.4559)	1.5100*** (.4121)	1.5061*** (0.4099)	1.4517** (0.42267)	1.4529** (.42269)
Assets quintile			1.4900*** (0.3987)	1.3363*** (0.2899)	1.3291*** (.2845)	1.3012** (0.2970)	1.3081** (0.2971)
Highest female education				1.0536*** (0.0522)	1.0503*** (0.0491)	1.0368** (0.0492)	1.0377** (0.0485)
Literate adult in household(dummy)				2.9729*** (1.089)	2.943*** (1.0795)	3.1096*** (1.0862)	3.0829** (1.0866)
No of 0 - 14 girls in household					0.9053*** (-.0994)	.9256** (-.09877)	.9251** (-.09516)
Elderly in household (m+f)					1.0854*** (0.0819)	1.080*** (0.0850)	1.0849*** (0.0862)

	MODEL 1	MODEL 2	MODEL 3	MODEL 4	MODEL 5	MODEL 6	MODEL 7
Social problems (conflict, untouchability, harassment)'						.9479**	.9488**
						(-.0766)	(-.0752)
Source of loan (formal bank omiited)							
urban/rural control							
Informal- social circle							1.0109
							(.3852)
informal- money lender							.76018**
							(-.0663)
NUMBER OF OBSERVATIONS	11781	11781	11781	11781	11781	11781	11781

p***<.01 ; p**<.05 ;p *<.1

Table 2.3 Effect of various demand side factors on mathematical abilities of 6-14 year olds

State of residence control	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Age	1.461*** (0.3793)	1.0694*** (0.0671)	1.116*** (0.1104)	1.1508*** (0.140)	1.1490*** (.1389)	1.1468*** (.1372)	1.1262*** (.1173)
Gender	0.8469*** (-.1660)	0.8096*** (-.2111)	0.836*** (-.1788)	0.8366*** (-.1784)	0.9454 (-.0561)	0.968 (-.0574)	0.9851 (-.0583)
Obc	0.5889*** (-.5293)	0.6265*** (-.4676)	.8108*** (-.2096)	0.8962** (-.1094)	0.9063* (-.0983)	0.9066* (-.0988)	.9084* (-.0992)
Dalit	.4675*** (-.7601)	0.4882*** (-.7168)	.6837*** (-.3802)	.7990*** (-.224)	.8095*** (-.2113)	0.8098*** (-.2108)	0.8265** (-.2205)
Adivasi	.3172*** (-1.148)	.3280*** (-1.1145)	.5309*** (-.6331)	.5845*** (-.5369)	.5863*** (-.5338)	.587*** (-.5331)	0.5941*** (-.5279)
Muslim	.352*** (-1.0426)	.46023*** (-.7760)	.5990*** (-.5123)	.6924*** (-.3675)	.7232*** (-.3239)	.7331*** (-.3212)	.7568*** (-.3118)
Minority	1.093 (0.0892)	1.08 (0.0845)	0.846 (-.1662)	0.8694 (-.1398)	0.8588 (-.1521)	.8561 (-.1248)	.8601 (-.1465)
Current enrollment		3.9708*** (1.378)	3.493*** (1.2509)	3.1940*** (1.161)	3.2202*** (1.169)	3.1864*** (1.157)	3.1673*** (1.132)
Standard completed		1.590*** (.4640)	1.5310*** (.4259)	1.4722*** (.3867)	1.4678*** (.3837)	1.4528*** (.3831)	1.4519*** (.3729)
Assets quintile			1.5618*** (.4458)	1.368*** (.3138)	1.3657*** (.3117)	1.3656*** (.3109)	1.2381*** (.3047)
Highest female education				1.066*** (.0645)	1.064*** ((0.0620)	1.065*** (0.0632)	1.0626*** (0.0614)
Literate adult in household(dummy)				2.670*** (.9823)	2.6260*** (.9654)	2.6159*** (.9541)	2.5844*** (.9502)

No of 0 - 14 girls in household					.8932***	0.9112***	.9135***
					(-.1128)	(-.1134)	(-.1159)
Elderly in household (m+f)					1.0337	1.0314	1.0278
					(0.033)	(0.0214)	(0.0209)
Social problems (conflict, untouchability, harassment)						.8621**	.8665**
						(-.0612)	(-.0589)
Source of loan (formal bank omiited)							
urban/rural control							
Informal- social circle							0.9762
							(-.0240)
Informal- money lender							.7191**
							(-.3296)
Number of observations	11731	11731	11731	11731	11731	11731	11731

p***<.01 ; p**<.05 ;p *<.1

CHAPTER 3: THE SUPPLY SIDE DETERMINANTS

3.1 Introduction

Education as a process becomes enjoyable when students are actively creatively engaged in the process of learning. Apart from the long-term benefits of quality schooling, an amicable environment well supported by better inputs can add to "quality of life"(Sen 2013) by making it fun and rewarding. The documented reluctance on part of parents to send their children to school has been reasoned by Dreze and Sen(2013) to be a result of "nature of schooling arrangements", for example concern about safety of children, school distance, teacher absenteeism. Affordability and more importantly effectiveness, safety of schools are important drivers in inciting 'interest' of both children and parents. The alarming story of sustained neglect in elementary education is stronger in case of girls' education, a necessity in process of economic and social development[1]

After the discussion of demand side household factors on learning outcomes, we move to the more traditional standard modeling of learning levels. If the last chapter highlighted how proximate literacy and behavioral social choices at individual, household and social level influence the observed outcomes. This chapter seeks to put the last piece of the puzzle in place to determine the effect of institutional factors on the achievement levels. By institutional factors here, we seek to theorize the effect of those variables that form the supply side of provisioning of education. It is important to incorporate the same for simple reason that no amount of parental and social choices can result in higher learning for the pupil if the basic factors at the place where he studies are inadequate. These factors also assume grave importance in the backdrop of governments harping on its schooling achievements both in front of voters, policy documents and parliament. It becomes a point of inquiry therefore, to map as to why

even when school level factors and institutional continue to show increments, the resulting learning at schools remains abysmal to say the least.

3.2 Background and Source of the Problem

Even though the sorry state of school education in India has been partially addressed by the government in the past years. The progress in enrollment rates and pouring in of funds for inputs have made situation better in the recent years. The PROBE report found that of the villages that were surveyed by 2006 73% of sample schools had at least two weather rooms compared with 26% in 1996.[14]Also, by 2006, "60% of schools had their own toilets, almost three fourth of them had drinking water facilities. Free uniforms were given to students in more than half of the schools (up from 10% in 1996), and free textbooks were distributed in nearly all schools by 2006 (up from less than half in 1996). Provisioning of cooked mid day meals were functioning in 86% of the schools by the end of the period"[16]

Despite these vast improvements, the working of schools remains a disaster. Student absenteeism, teacher absenteeism, number of appointed teacher, contract teachers continue to plague the field. In the 2006 survey, single teacher schools accounted for 21% of sample schools - either because they had a single teacher appointee or due to teacher absenteeism. Half of the schools had no teaching activity at all at the time of investigators unannounced visit – both in 1996 and in 2006.[1] Study by Kremer et al[15] found that "in a sample of more than three thousand schools across the country, fewer than half of the teachers were engaged in teaching activity on an average day." These studies go on to show the shambles our system is in, it certainly does not inspire confidence about a public merit good in a country that has majority of its population in youth or pre youth phase. While much of

[14] PROBE

the rest of the world, were buzzing with teaching activities, half of the schools in these states did next to nothing to impart education to children, neglecting their duties as well as "ignoring the right of the young students to receive elementary education and to join the modern world."[1]

The cost of this "catastrophic breakdown" of order in education system is reflected by looking at the data on the impact it has on active teaching days a child enjoys over the school year. The number of teaching days reduces to about 50% in PROBE states as probability for both teacher and child is incorporated together that means an average teacher absence rate of 20% and corresponding rates for student of about 33% can result in the teaching days falling to just about 100 days from official figure of two hundred. It is important to note that this is a conservative calculation, if the time that is bereft of any teaching activity within the remaining fifty percent is subtracted, we are left with one fourth or total of about fifty days where actual teaching takes place within the well functioning schooling system.

The process of learning even when it does take place is a victim of "mindless rote learning, repetition- often without comprehension and endless chanting of multiplication and other tables."[1] What is interesting here is the poor learning outcome is observed in 'top schools' too. This crisis begins to get even graver when figures for another year of schooling not resulting in the student passing a test that he initially failed are brought in the picture- 80-90%.[4]Goyal and Pandey (2012) and Mukerji and Wadhwa (2012) observe that the gap between government and private schools is not large once the socio economic differences are accounted for.[1] The ASER surveys similarly point in the same direction of universal falling average pupil achievements during the last few years.[15]

[15] ASER 2013

Concentrated State effort has internationally and historically been the main driver for speeding literacy in countries that are now economic leaders. The transformation that began in Europe, U.S was matched by Japan followed by Soviet Union, China, Cuba, Vietnam, East Asia despite strong commitments in most of these countries to develop privatized market economies.[1] Reliance on private schooling at such nascent stage, without state efforts in the direction may not be the sort of long-term sustainable solution we need.

Underfunding by the state[1] is a historical problem of the subject at hand. The underfunding continued even post independence despite contrary claims by the government of the time 'Education is our first priority'.[1] The intensity of the problem has reduced in the past few years, with remedied funding options; "other problems of public education in India have become increasingly more limiting and powerfully regressive."(Sen,2013)

The lack of guidance and teaching faculty can be analyzed to be a result of virtual lack of accountability in the delivery of school education. Most of students as a result are either unable to acquire basic levels or are unable to continue education beyond the constitutionally guaranteed minimum of eight years.
This complacency is heightened when indifferent attitude of teachers is brought in perspective with the steep rise in their salaries, "based on recommendations of successive Pay commissions." [1] "In fact, the salaries of government teachers in India are now well out of line with private sector norms as well as with international patterns."

When teachers salaries is calculated as a ratio of per capita GDP, what we see is except India in 2001, none of the countries has the ratio higher than 3 . China had estimated value of close to 1 and most OECD countries had the value between 1 and 2. Similar trends were

calculated for 2005 and 2009.[16]The ratio in 2009 oscillated around 1.2 for OECD for the period between 2000 to 2009. The same ratio, already high in India, shot up to 5 or 6 after the 6th pay commission announcement. Therefore "whatever may be the source of the problem of low teaching efficiency the blame cannot be placed on any alleged lowness of salary of schoolteachers."(Sen,2013)

Muralidharan in his 2012 paper showed that high salaries do not in "particular help in raising teaching standards."[27] High salaries have an ambiguous effect therefore, in realizing higher learning goals. While on the one hand they increase the pool of talent for hiring, they also "transform teaching posts in to plum jobs that attract anyone with required qualification"(Sen,2013)– irrespective of their interests in teaching. Even more importantly the high salaries may end up increasing the "social distance" between teachers and parents.(Sen, 2013) In a rural setting where finding daily employment may itself be a struggle and a vast majority of population is engaged as agricultural laborer, the imbalanced ratio of earnings may pose a "significant challenge in fostering mutual cooperation between parents and teachers."(Sen, 2013) Calculated gap of ten times the income is a large enough difference to impede the close working based on mutual trust required between the two biggest impact factors in any child's educational success.

The misguided logic of high salaries resulting in greater efficiencies has made the "expansion of school education immensely more expensive in a country with a large pool of people qualified to teach and eager to do so."[1] The practice of raising salaries without accounting for wage determination and impact on those not included in the pay commission net. This lopsided non-answerability responsibility system of salary fixers towards the vast majority of population including rural laborers and urban commoner gives us a

[16] OECD 2011

"bizarre system"(Sen 2013) that has in recent years become one of the reasons for enhanced economic inequalities.

The resulting high cost argument on the other hand has resulted in higher hiring of contract teachers. The nature of contractual teachers is such that they earn a fraction of regular teachers; typically have lower formal qualification, less training. On the other hand, they are also expected to be more accountable, due to nature of their contracts.(Sen, 2013) Recent researches have shown however, that in terms of learning outcomes their students perform no less than those of regular teachers. Therefore the phenomenon of hiring contract teachers does not worsen the learning outcome while being the lower cost option at the same time. The renewable contract system with no regularization however, could easily become a "major barrier against improvement of teaching standards" in the long run.[1]

Rivkin etal research on the impact of teacher quality on student performance. Their results show that teacher quality has powerful effects on reading and mathematics achievement. They go on to conclude "high quality of instruction at initial stages of education could act as a mitigating factor against disadvantages associated with low socio economic background."[28] They measure effect of class sizes on level of academic achievement and conclusively find a positive effect of lower sizes of classes at primary levels on learning outcomes. "Class size effects were found to be statistically significant; the impact declines markedly as students' progress through school and tends to be smaller and less significant in reading than in mathematics."[28] What they also find is on job training is a dominant factor in the teacher quality and experience effect.

The Coleman report (1966) in its original form concluded that family influences were "more important" than institutional impacts. The paper by Revkin et al found "variation in quality and learning

outcomes in a way that ruled out the possibility that the observed differences are driven by family factors."[28] This conclusion holds an important policy implication especially for a country like ours. It highlights how important supply side factors are in determining what is finally observed at ground level. Therefore "school policy becomes an important tool for raising the achievement of low-income students"[28] quality of teachers becomes a prime factor at the school level in realizing learning goals and bringing about economic and social equality.

Interestingly, they present a case in length of permanence of teachers as a positive reinforcing factor in achievement numbers. The "succession of good teachers" has been propounded as a long-term solution in closing existing achievement gaps across income groups.(Rivkin et al 2005)

Experimental and observational data has found statistically significant effects of school and teacher factors. "Primary school and early learners have greater effect on their learning levels from not only teacher quality variables but also school resources. As discussed before, "class size has small but positive effect on mathematics and reading achievements" therefore organizational structure of schools, incentive mechanisms and accountability norms become rather important in a system where benefits accrued in future increase with time, but current costs of restructuring may seem high and may require special will at higher echelons of policy to do so.

The debate on school quality vs. family effects on pupil achievement literature initiated by the Coleman reports revolutionary findings continues extensively in education economics literature in the west. Moffitt [29]points that a separate strand of literature "focused on impact of school quality on earnings later in life." Data from England and Wales was analyzed by Dearden et al (2002) to look at educational achievement and earnings. Using ordered probit model they find that

school quality variables matter in the longer run for both men and women in terms of wage determination and subsequent quality of life.[30]

These results and studies may be criticized on the basis of their limited applicability in developed first world cases. That would be a misguided argument to make.

Alderman Orazem and Paterno explore the case of enrollment efficiency or learning outcome and factors that influence of choice of school made. Their results go on to show that fees charged and school quality affect math and reading capabilities. [3131]Though they go on to show that private schools in case of Pakistan deliver higher returns in terms of acquired learning. The effect of fess and subsequent willingness to pay argument therefore needs to be explored for government schools in case of India too. In addition they also factor in school distance as a variable affecting school choice. This discussion is important for a simple reason that parents respond to school quality. It is reasonable to assume that the "response to quality measures is due to presumptions of improved educational outcomes."[31] In general, it has proven difficult to measure the impact of school inputs on performance in either developed (Hanushek 1996) or developing countries (Hanushek 1993; Kremer 1993).

It is therefore important to explore the potential importance of intangibles and school level inputs that are a function of management provisioning and policy.

3.3 Conceptual Framework and Research question

Government documents and surveys along with major part of education economics literature focuses on addressing the access to schooling part whenever literacy crisis in the country is brought up. Parliamentary debates, NCERT survey, DISE statistics all concentrate

on the infrastructure aspect of the problem. It is therefore almost necessary to look into the manner in which facilities once provided, affect the final outcome of enrollment. The inequalities observed in learning outcomes as discussed before may be modeled to be a function of twin effects of demand and supply side factors at work, with their principal mode of transmission working independently of each other. Interaction and positive reinforcement may result in exacerbating the negative and positive effects. For simplicity of the model and to obtain clearer understanding of mechanics we bifurcated the two into two separate parts holding each part constant while the other is analyzed.

The argument remains that mere school enrollments do not guarantee learning. On the basis of available literature an attempt is made to study impact of school level characteristics that are a function of government functioning on the observed primary school learning levels for mathematics and reading. The question is an important policy flag since this is where funds are flowing and knowing the direction of impact is necessary to move further.

In order to examine the impact of these quality indicators, focus has been kept on children's basic reading and mathematical abilities. Specifically an attempt has been made to study the following hypothesis-

1) Do reading and mathematical ability levels vary with school quality indicators like fees, teacher quality variables even when state of residence is controlled for

3.4 Data and Methodology

The IHDS – II round of data has been used here as well. The nationally representative sample of over 42152 households covered a vast variety of topics from health education, employment, economic

status, marriage fertility, gender relations and social capital. Children were administered basic writing and arithmetic tests.

The survey was a second round of similar activity conducted in 2004-05 under the IHDS-I survey. The households were re-interviewed with a rate of 85%. The data along with cognitive assessment tests provides the school level data that includes both the facilities provided figures and staff details. It is therefore an extremely rich data set that gives a wide insight into the working of the school system at a national level.

The child assessment data has been studied under the two heads of their mathematical and reading abilities. Each has been further categorized into five and four categories respectively: "(1) Can not read at all; (2) Can read letters but not form words; (3) Can put letters together to read words but not read whole sentences; (4) Can read a short paragraph for 2-3 sentences but not fluent enough to read a whole page; (5) Can read a one page short story. Children's mathematical skills are classified in four categories: (1) Can not read numbers above 10; (2) Can read numbers between 10 & 99 but not able to do more complex number manipulation; (3) Can subtract a two digit number from another; (4) Can divide a number between 100 and 999 by another number between 1 and 9." [16]

We study school quality variables for government schools for a simple reason that unaided private schools are not direct recipients of government policy. School inputs at government institutions are a function of unified scheme of funding and therefore make the argument statistically and logically clearer and easier. Elite private schools have been found to deliver higher learning outcome levels. Students attending private schools have been concluded by Berkowitz, Hoekstra[32] to be "faring better in life and having a higher probability of getting through to better colleges."

The principal independent variables include hours of homework given out per week, school fees along with basic infrastructure indicators like availability of toilets, shortage of classrooms, provision of scholarships to students.

As analysis is continued, further factors that are broad indicators of quality are added. These include fulltime teacher ratio (calculated as proportion of full time teacher to number of total teachers in each surveyed school). An attempt also has been made to analyze the effect of parental involvement in school activities as a measure of engagement of the school with parents and its corresponding effect on learning levels. At the end "school enjoyment" is added to the model to get a complete picture of quality variables effect on the dependent variable.

To measure teacher quality, we used the perception and effectiveness of the teacher indicators as a proxy for direct quality measures. Classroom discussion and whether the teacher is "nice" were both used to approximate teacher quality numbers. The data at hand gives us the liberty to look into the effect of how teacher's perceptibility will impact learning outcome of their student statistically. Each of the regressions needs to be controlled for state of residence

The reading level was measured by ability to read a paragraph; similarly mathematical ability has been re-indexed to the ability of 6-14 year old to subtract. This means that those who student who could read paragraph or more were clubbed into one category and similarly students that were able to subtract or exhibited higher order of mathematical ability were grouped into one category and the remaining into the other. Since we are concentrating only on government primary schools here, the school data was segregated for government and private schools. Similarly the school staff data for government teacher was filtered out and each of these independent variables was regressed using appropriate regression model that could

by its very nature be used for cases where measurement errors were bound to come.

For this multivariate analysis was used. Since the outcome variable is ordinal in nature, ordinal logit regression model was employed, which takes the following form:

$$y_i^* = x_i \beta + \varepsilon_i$$

$$y_i = m \text{ if } \tau_{m-1} \leq y_i^* < \tau_m \text{ for } m=1 \text{ to } J$$

"Since interviewers were specifically trained to distinguish between students at varying levels of reading and mathematical ability but nonetheless, the same student may well be classified by one interviewer as being able read letters and not words and by another interviewer as being able to put the letters together in words. So the outcome variable is better classified as a propensity to read rather than a specific skill level. Observed reading levels are tied to this latent variable by the measurement model underlying the ordinal logit regression:"[16]

$$y_i = 1 \text{ (does not read) if } \tau_0 = -\infty \leq y_i^* < \tau_1$$

$$y_i = 2 \text{ (paragraph) if } \tau_1 \leq y_i^* < \tau_2$$

These levels were reduced to two levels whether the student being surveyed was able to read a paragraph and correspondingly for mathematics: whether he was able to subtract.

As we look for the impact of various factors working inside government school and their role in determining the probability of the enrolled student from age 6 – 14 we consider the following factors as being independent determinants of the observed learning levels as given by the theoretic discussion based on past researches in other

nations. Inputs of related to both factor and productivity are used. First and foremost time spent by test child on homework per week and school fees are used. The school fees argument has been explained before (Alderman, Orazen, Paterno, 2005). Including fees in the picture gives us a crude measure of efficiency and its impact on learning needs to be explored. Further, availability of toilet as an indicator for basic infrastructure provisioning was used. To account for differences in quality of government schools due to their location, we control for state of location for each model.

Moving further, facilities made available to the student are incorporated by including the variable for number of classes that did not have permanent classrooms. Classroom deficiency is an important indicator of government input within the education system, paucity of which can adversely hamper the observed learning levels, as has been quoted before. To control for age of the school, control has been added indicating the opening year of the school. This has been done to control for any difference that may arise simply due to the age of the school under survey. Daily average attendance of students in school was added from Model 4. As discussed, merely enrollment in school is of no use if attendance is low, school attendance is a sign of how many children are actually engaged in the institutionalized education system.

Teacher characteristics are perhaps the most vital and varied figures. Their indispensible role along with many documented short run cheap quick fixe solutions by school management (temporary teachers) make them a point of inquiry to assess the sustainability of this solution along with the effect their absenteeism has on students.

A quasi-complimentary variable that has become a standard operating practice needs to be included for better appreciation of the problem at schools end. Private tuitions are generally taken independently as support system to school classroom education, therefore when school

effects are calculated it is important to see the impact of those choosing this option. Choosing to seek Private tuition is itself a sign that what is taught in school isn't of appropriate quality and those with a level of willingness and ability to pay, that is lesser than those choosing to go to private schools, are at least making up for the perceived lower quality education at school.

The other three factors- scholarships provided, parent teacher associations and general "enjoyment" at school are incentive and driving mechanisms that are directly a function of school management policy. We have seen that this factor in itself can produce changes in learning that are greater in magnitude than any other policy variable in the matter. The degree of involvement of teachers with parents reinforces the positive feedback effects of school system. Students have shown higher learning abilities when given an amicable environment of trust and parental involvement into their school life. Parent teacher association is an indicator of effort from the supply or school side to actively engage with students family and is important for success of lowering of learning gaps. Similarly scholarships to students' forms part of the incentive and encouragement on part of management without any policy shift from government. Small reward scholarships have also worked as positive push for bettering effort put into learning on part of students. Last factor to be included is a catchall variable that tends to indicate if the enrollee is satisfied with what he's receiving. "Satisfaction" therefore not only includes more focus or complete focus on studies, it is a broad review variable that measures if whatever is provided to the student as a part of his "schooling experience" is enough to make him enjoy the process on the whole so that he may be expected to deliver better results vis a vis his performance tests.

Each of these variables were regressed using the ordinal logit model on the ability to read a Para and ability to subtract and the following results were observed.

3.5 Results

After applying appropriate dummies (state of location of schools), regression was carried out and the odds ratio and their corresponding coefficients hence obtained need a brief discussion.

Model 1 of table 3.2 and table 3.3 shows the effect of two basic school factors on reading and mathematical skills of 6-14 year olds. Results show that as load of homework and school fees is increased skill level would show an improvement of almost equal in magnitude in both reading and mathematical abilities. This may be reasoned to bet an indication of higher fees resulting in better quality and a larger load of homework meaning a greater involvement of school on its part into the student.

Model 2 adds basic school facility of availability of a toilet within the premises. As expected the skill levels in both cases are positive and significant. This is especially important since it has two processes through which it affects students p[performances: one is lowering in wastage of time, better concentration and the other is through better health cycle. In the next 2 models average attendance and dear of classroom are studied. Ratios of both of these are less than one, with coefficients being negatively significant for each of them. It is clear why these factor inputs into learning production function would hamper the skills obtained. The second factor can be mapped as a result of increase in class size leading to lower attention per pupil finally resulting in lower learning.

Teacher indicators when regressed in model 5 and 6, give us interesting results that are in tandem with the theory discussed. The full time teacher ratio calculated here as ratio between number of full time teachers and total teachers in the school, with a value ranging between 0 and 1 with a mean of 0.8949 in govt schools has positively

significant effect on learning for both parameters. Teacher absenteeism though shows differing results with the latter ability not exhibiting significance. This is may be however be said to be offsetted by effect of private tuition hours per week calculated in quintiles here, the effect of private tuition is larger for mathematical ability and maybe this is the reason why teacher absenteeism does not significantly affect what is learnt at school in maths because most children if given a choice, tend to join mathematics tuition.

The last 3 models also give us very interesting insight into the problem and its causes: scholarships do turn out to be a positive reinforcement for learning, more so for reading than maths; a fact that maybe because of the way maths is taught in schools and a general disdain for the subject from early ages. The involvement of parents in association is an important factor that sets apart most private schools from govt run institutions. The results show that once parents are involved even beyond household and social level, learning levels increase positively and significantly. This is so because once an environment of mutual cooperation is made and social gaps are closed it has been theoretically proved to be a beneficial factor for the student. Greater support, motivation and a higher contact among guardians show positive effects on the child's learning outcome.

Thus what were scattered theories through the economics literature have been holding ground when held against a data set that allows us to actually study the micro level policy choices on learning outcomes from both supply and demand side.

Tables

Table 3.1: summary statistics for supply side determinants of learning outcomes

variable	mean	standard deviation	minimum	maximum
homework hours	7.4857	6.365881	0	60
school fees	1641.156	5061	0	70800
toilet faciity	0.86377	0.343	0	1
dearth of classroom	0.3813	1.014	0	9
average attendance	140.3694	129.208	0	1119
fulltime teacher ratio	0.8949	0.874	0	1
teacher absenteeism	1.479	0.5999	1	3
private tuition hours/ week (in quintiles)	1.897	1.5908	1	5
scholarship	0.675737	0.4681	0	1
general pta	0.4587	0.4983	0	1
enjoys school	3.1493	0.984	1	4

Table 3.2 determinants of reading ability for a paragraph in government schools for age group 6- 14

Govt	Model1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Hw hours/week	1.0491*** (0.0479***)	1.0484*** (0.0472***)	1.0504*** (0.0491***)	1.0494*** (0.0482***)	1.0479*** (0.0468***)	1.0475*** (0.0464***)	1.0429*** (0.0420***)	1.04320*** (0.0422***)	1.0402*** (0.03943***)	1.0394*** (0.0387***)
School fees	1.0000*** (.0005***)	1.000*** (0.0005***)	1.000*** (.0005***)	1.0000*** (.0005***)	1.000*** (.0005***)	1.00*** (0.0004***)	1.000*** (0.0004***)	1.000*** (.0004***)	1.000*** (.0003***)	1.0000** (.0003***)
Toilet		1.506*** (.4099***)	1.4531*** (.3737***)	1.4962*** (0.4029***)	1.4590*** (0.3778***)	1.4701*** (.3853***)	1.4157** (0.3476**)	1.3557** (0.304**)	1.3396** (0.2924**)	1.3720** (0.31632**)
Dearth of classroom			.90364** (-0.1013**)	0.9116** (-0.0924**)	.9210* (-0.0822*)	.9250* (-0.07787*)	.9227* (-0.0804*)	0.9266* (-.07614*)	.9133* (-.0906*)	0.9195* (-.08381*)
Average attendance				0.9987*** (-0.001272***)	.9988** (-0.0011**)	.9988** (-.0011**)	.9988** (-0.0011**)	0.9988** (-0.0011**)	.9990* (-.0009*)	.9991* (-.0008*)
Fulltime teacher ratio					1.795** (.5851**)	1.7252** (.5453**)	1.842**(0.611**)	1.8810** (.63180**)	1.8484** (0.614**)	1.8664** (.6240**)
Teacher absenteeism						0.8360** (-.1791**)	0.8292** (-.1872**)	0.8395** (-.1748**)	0.8311** (-.1848**)	0.8464** (-.1663**)
Private tuition hours/ week							1.1161*** (0.1098***)	1.1091*** (0.1036***)	1.1166*** (0.1103***)	1.11472*** (0.1086***)
Scholarship ps30b								1.2785** (0.2457**)	1.2806** (0.2473**)	1.242** (0.2174**)
General pta									1.5411*** (0.4325***)	1.552** (0.4396***)
Enjoys school										1.139*** (.130**)
	1942	1942	1942	1942	1942	1942	1942	1942	1942	1942

p***<.01 ; p**<.05 ;p *<.1

Table 3.3 determinants of mathematical ability of subtraction in government schools for age group 6- 14

Govt	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Hw hours/week	1.0590*** (0.0573***)	1.0584*** (0.05679***)	1.0596*** (0.05793***)	1.0586*** (0.0569***)	1.0576*** (0.5608***)	1.0576*** (0.05606***)	1.0529*** (0.0516***)	1.0529*** (0.0516***)	1.0500*** (0.0488***)	1.0501*** (0.04893***)
School fees	1.000*** (0.0005***)	1.000*** (0.0005***)	1.000*** (0.0005***)	1.000*** (0.0005***)	1.000*** (0.0005***)	1.000*** (0.0005***)	1.0000*** (0.004***)	1.000*** (0.0004***)	1.000*** (0.0003***)	1.000*** (0.0003***)
Toilet		1.2371* (.2128*)	1.1979* (.1805*)	1.2451* (0.2192*)	1.2135* (0.1935*)	1.2179* (0.1971*)	1.1576 (0.1463)	1.192 (0.1757)	1.172 (0.159)	1.1695 (-0.1566)
Dearth of classroom			.8918*** (-.1144***)	.9007** (-.1045**)	.9121** (-.09198**)	.913** (-.0905**)	.9068** (-.00978**)	0.9038** (-.1010**)	.8913 (-.1149**)	.8910* (-.1153*)
Average attendance				.9984*** (-.0015***)	.9983*** (.00163***)	.9983*** (-.0016***)	.9984*** (0.0015***)	.9984*** (-.00156***)	.9986*** (-.0013***)	.9986*** (-.00138***)
Fulltime teacher ratio					1.5109* (.4127*)	1.4868* (0.396*)	1.5954* (0.4671*)	1.1577* (0.4557*)	1.554* (.4410*)	1.155* (.4410*)
Teacher absenteeism						.9294 (-.0731)	0.9177 (-.0857)	.9079 (-.0965)	.9019 (-.1031)	.9002 (-.105)
Private tuition hours/ week							1.140*** (0.1310***)	1.1467*** (0.1369***)	1.151*** (0.1414***)	1.152*** (.1417***)
Scholarship								0.8316** (-.1844**)	.8333 (-0.1822*)	.8356* (-.1795*)
General pta									1.5918*** (0.4648***)	1.590*** (.4641***)
Enjoys school										.9876 (-.0123)
	1942	1942	1942	1942	1942	1942	1942	1942	1942	1942

p***<.01 ; p**<.05 ;p *<.1

Chapter 04: CONCLUSION

Having looked at the problem now from both the perspectives we are now in a position to evaluate and draw policy conclusions for mitigation of degraded education quality crisis in the country. We began with modeling of learning outcomes as choice dependent and production function modeling. What began as a case study for USA from the Colman Report that analyzed that it was not only school level characteristics but also family level household factors that determined what students learned. Subsequent researches reiterated the factual findings and studies in various countries threw light bit by bit that it was not only traditional pedagogical variables like teacher salary, pupil teacher ratio that determined qualitative improvements.

Social and behavioral micro choices were also found to be equally important in determining the observed outcomes. Vast trove of literature on both sides discussed both social effects vs. school quality effects on learning outcomes. More recent findings while not dismissing the traditional literature of role of schools, stress on importance of parents motivation as a function of their ability and other socialization factors for learning rate determination.

We began with assessing the role of basic education in terms of better and a more meaningful quality of life with benefits accruing not only to the individual in terms of future wage flow but also as a positive externality for future generations' development. An educated mind is not only an asset in terms of his economic contribution; he also forms an aware citizenry of the country with better information about his own legal social political rights. He can not only enhance his own life but also of those around him ("Proximate Literacy").

After discussing models for production of literacy; cognitive development and its impact on earnings, the discussion steered to the

Indian Scenario where the problem is graver as a result of two forces working against each other. We achieved near universal enrollment rates (quantity) but the numbers for what is actually learnt in school paint a very different depressing picture(quality). This qualitative lag is universal and falling through the years as reported by the ASER surveys. This therefore becomes a serious public policy development problem because the vast mass of "educated" in the country tomorrow would have sub par grasping skills that are basic in nature. The handicap of educated but illiteracy at this early age would continue to hamper his opportunities through life.

Once the gravity of the problem is recognized it is important to wade through it with surgical precision. Factors need to be zeroed in by help of available economic and behavioral agent literature so that the current lopsided discussion of the problem can be corrected. Indian policy circles are either dismissive of the crisis or use the "one size fits all" approach to the problem by allocating funds to schools.

While maintaining the quality of schools, teachers, and infrastructure is important, they form a miniscule part of the solution which requires grass root strategies. The factor and productivity inputs are in no way substitute to decentralized changes required at social and household level. The observed variable therefore is modeled to be an outcome of two forces: the demand and supply mechanisms.

The bifurcation helps us organize the plethora of variables available to us through the IHDS-II survey on the basis of their impact on a childs learning outcome.

While discrimination remains a big factor hampering learning in our study, other social and economic factors have given results that are in line with the theoretic understanding of the issue. Enrollment was found to reduce the differentiation that arose as a result of being born

in a particular caste. As other socioeconomic factors were included the grey clouds over what influences learning get clearer and we can see that assets holding, presence of literate female in the household may result in higher performance on survey tests. Proximate social literacy and negative externalities of social and household environment can be seen to affect the learning outcome in the expect manner. Presence of social conflicts, using moneylender as a source for loan needs, greater diversion in household chores as a result of overcrowding hampers the learning outcome of the young in a manner that may be impossible to reverse.

Even though individual factors remain important in ultimately determining what is learnt at school. We cannot choose to ignore school level variables in determining the factors behind learning outcomes. The supply side issues have been the policy focus for long partly because they are easier to influence and observe as compared to the behavioral micro choices at individual demand level for learning. The variables considered give us robust expected results: greater homework, higher fees, bare minimum infrastructure of sufficient classrooms and toilets were found to be aiding in higher learning.

Things get interesting when teacher variables are included. Even though efficiency of full time teachers remains a matter of debate, our results along with Sen and Dreze's argument show that having higher ratio of full time teachers may actually be beneficial in the long run. Great number of experimental and observational studies have confirmed the negative impact of teacher absenteeism on learning of students, our regression results also point in a similar direction. Parent teacher involvement as a determinant of learning outcome remains underappreciated in India. Our regression results show that as interaction between the harbingers of two sides of a childs world increases his learning levels would show increment. The confidence

instilled in schooling institution and active involvement on parts of both teachers and students goes a long way in influencing childs achievements in learning. We have reasoned the argument for the same in the third chapter about how an environment of mutual trust and accountability at both end would be a major push factor in ensuring that the child becomes “literate and educated.” Parent teacher interaction and the perception of school enjoyment are both a matter of localized intra school policy which can lead to enhanced outcome without any mass transfer of funds into the sector.

4.1 WAY FORWARD

By this time it is very clear that observed learning levels is not simply an input output function that would give quick results with larger fund spending and devising band aid solutions to the problem. Observed learning is a complex outcome that has a demand, behavioral, microeconomic choice side to it, and an aspect completely absent from all policy discussions. International experience has shown that household and social variable may in fact result in multiplier effects on learning levels. None of current public policy debate in India seems to recognize this. The miniscule amount of available studies concentrate on the supply side of the problem. The research presented here was an attempt to present the holistic picture of the problem and to draw attention to the fact that micro choices may have huge macro impacts.

The government of the day needs to recognize this urgently because the crisi of learning awaits us at the door. A decentralized, democratic, localized Bottom up approach needs to replace the top down solutions currently being advocated.

Further research on social determinants of learning levels needs to be done especially for India. As a future course of action I propose the studies be progressed on following lines

1) Role of social networks in learning outcomes, modeling effect of social networks.
2) Household chores and learning
3) Role of private school selection and learning outcomes
4) A comparative approach to learning and effect of change in various household and social choice variables to get an idea of rate of transmission of the studied effects. This is possible with the rich data set with us (IHDS-1 and IHDS-II) especially because of the reinterview sample strategy used in the survey that could help us in minimizing errors.

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