UNIVERSITY OF SOUTHAMPTON

FACULTY OF LAW, ARTS & SOCIAL SCIENCES

School Of Social Sciences

Poverty and School Enrolment:

A Study of Two Provinces in India

by

Vandana Bhattacharya

Thesis for the degree of Master of Philosophy

April 2008

UNIVERSITY OF SOUTHAMPTON

ABSTRACT

FACULTY OF LAW, ARTS & SOCIAL SCIENCES

SCHOOL OF SOCIAL SCIENCES

Master of Philosophy

POVERTY AND SCHOOL ENROLMENT: A STUDY OF TWO PROVINCES IN INDIA

by Vandana Bhattacharya

This study uses Indian data from Living Standard Measurement Survey (LSMS) collected in 1997-98 to investigate the impact of poverty on child schooling and child work in the two states of India, namely, Bihar and Uttar Pradesh. Unlike other existing studies on this theme, this paper uses different measures to capture poverty. The paper uses the predicted measures of income and expenditure, and transitory income, and studies the impact of each measure on schooling. Household assets, which are important forms of household wealth, and include household ownership of land and durables like bicycle and sewing machine, have been factored into in this study. The study then predicts child wages using the Heckman's sample selection method and studies the impact of child wages on enrolment controlling for all other household's socio-economic characteristics. The paper also looks at the gender differences that persist in child schooling and the impact of child labour on schooling decisions in the given sample.

The results indicate that the child school enrolment is positively related to household wealth. The ownership of land tends to have a greater impact on the child school enrolment than the income and expenditure measures. Transitory income has a positive effect and is significant for schooling of the girl child. Household's ownership of land tends to have a bigger impact on both girls' and boys' school enrolment as compared to the other measures. On the whole, it can be seen that probabilities of boys attending school are higher than the probability for girls. Similar results are obtained when child wages are included in the analysis. A positive relation between child wages and child schooling are observed for both boys and girls. The findings, apart from the other implications, also point to the imperative of promoting a culture of equality between the genders, which advocates equality in educational opportunities, irrespective of the gender.

CONTENTS

LIST OF TABLES AND FIGURES

DECLARATION OF AUTHORSHIP

I, VANDANA BHATTACHARYA , [please print name]

declare that the thesis [enter title]

POVERTY AND SCHOOL ENROLMENT:
A STUDY OF TWO PROVINCES IN INDIA

and the work presented in it are my own. I confirm that:

- this work was done wholly or mainly in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
- where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
- I have acknowledged all main sources of help;
- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
- none of this work has been published before submission

Signed: VBhattacharya

Date: 10th April 2008

ACKNOWLEDGEMENTS

I would like to thank Dr. Jackline Wahba, who has been my friend, philosopher and guide all through my research undertaking. Dr. Wahba has always been a very helpful and supportive guide, ever ready to organize and interpret my rash ideas and loose assumptions on numerous occasions. My grateful thanks to her not only for her invaluable guidance as a supervisor but also for her kindness and generous attitude that she has consistently shown even when I was going through difficult times. It would not have been possible to complete the thesis without her guidance and support.

I would like to thank Dr. Patricia Rice, my co–supervisor, for her constructive criticisms and helpful comments. I have greatly benefited from her advice and guidance. My thanks are also due to Dr Peter Smith for his valuable support to me. The support provided by Dr. Smith by way of allowing me the teaching opportunities went a long way in completing my research undertaking.

I appreciate the insightful advice that has been frequently been provided by Dr. Sabu S. Padmadas. His suggestions have been useful and his motivating words always had the desired effect.

I would like to thank Mrs. Gill Crumplin for all her support starting from the time of admission till my last day at the University. It has always been a pleasure speaking to her. My special thanks to Mrs. Fatima Fauzel who wasn't just a member of the support team but also a good friend. Thanks are also due to Mrs. Glenda Stevens, Mrs. Chris Thorn and Mrs. Anne Edwards for their assistance and support. Mrs. Thorn has been kind enough to provide the necessary support even after I had moved out of Southampton.

A special thanks to the wardenal team at Highfield Hall, headed by Dr. Alex Boyland. My stint there as a Sub-warden has been a useful learning experience which I shall

always cherish.

I would like to express my profound and gracious thanks to my family, for their love, guidance and encouragement. They have always encouraged me to explore, study, and learn, and have always trusted me and believed in me under any circumstances. Thank you, Baba and Ma, for supporting me throughout. I also owe my brother Shanker a special debt of gratitude for his constant encouragement, even during the not-so-bright moments in life. He has always been proud of my accomplishments and encouraged me to strive for the best. I cannot show enough appreciation to my husband Subir for his support during the write-up phase of the thesis. I am aware it has not been easy for him but he has been magnanimous and fully supportive all through.

Lastly, but never the least, I am thankful for the unlimited love, support, and encouragement from many others who have supported me in my research undertaking.

1 INTRODUCTION

The importance of educational attainment and development of human capital for overall economic growth of the society has been widely recognized. No country with low levels of numeracy and literacy can achieve or sustain a satisfactory level of growth. Education is important not only in economic terms but also to ensure good governance, and free, fair and democratic running of the countries and welfare of the populace (see, for instance, Gupta, Davoodi & Alonso-Terme, 1998). A number of classical economists, particularly Adam Smith, have pointed out that education is instrumental in enhancing the productive capacity of workers. However, it was Shultz who more specifically focused on educational expenditure as a form of investment (Woodhall, 1997).

The returns to schooling is not only in terms of potentially higher earning capacity but also in several other ways, such as improved health status and family welfare, increased mobility and improved capacity to acquire and process information (Duraisamy, 2002). Available literature also suggests that female schooling is more important for social outcomes like reduced family size and the consequential positive impact on children's health, and a greater role for females in decision-making processes in the family (see, for instance, Kingdon, 1998; King and Hill, 1993). However, if there is no provision for compulsory schooling, then it is quite possible that children of low-income households may more likely end up in labour market to supplement the income of the parents or may be engaged in domestic chores instead of attending schools.

One of the important elements on which the schooling decisions are likely to be based is the potential employment opportunities. The possibility of better paying jobs for school graduates act as an incentive for demand for education. This, in turn, may be based on perceptions relating to costs and benefits of education (Psacharopoulos and Woodhall, 1995). In the Indian context, it is found that private rate of return on secondary education exceeded most alternative investment opportunities even after considering the possibility

of unemployment (Blaug, Layard and Woodhall, 1969). While returns for secondary and higher education is estimated to range from 10 to 12 percent, and may go up to 30 or 40 percent, the returns on primary education is estimated to be more than 15 per cent and may go up to 50 per cent (Psacharopoulos and Woodhall, 1995). The strong demand for education is, thus, reflective of the potential high private return on education. It is also felt that parents in higher socio-economic groups are better placed to adjudge the benefits of education to their children. Children from richer families may, thus, benefit from their parents' ability as well as the willingness to pay for the education.

Although, the issue of enhancing access to schools has become a priority concern in most of the developing countries, yet a number of factors operate to impede this process. This is particularly the case in the rural areas. The major reasons for the low demand for education identified by parents, teachers and administrators include high opportunity and direct costs of schooling, poor quality of schooling and related infrastructure, coerced participation in schooling, lack of pathways that could lead to non-farm employment thereby providing for increased employment opportunities, and the perceived irrelevance of schooling to rural life. Thus a greater understanding of the diverse dimensions of low schooling ratios, and then addressing them appropriately, can lead to the betterment of the society.

One of the main factors causing low schooling and high child labour rates is poverty. The household wealth has important bearing on child's schooling and child work in the rural areas. And, this becomes more pronounced in its gender dimensions. The magnitude of the impact of child labour in this context becomes evident when we consider the sheer number of child labour working in different countries. Although it may not be easy to obtain a generally acceptable data for child labour due to the sensitivities attached to the subject, one such set of data is provided by Coonghe (2000). According to Coonghe, more than 120 million children between the ages of 5-14 are employed as full time labourers around the world. It is also estimated that in India there are at least 44 million

child labourers in the age group of 5-14. More than eighty percent of child labourers in India are employed in the agricultural and non-formal sectors. It has also been noted that most of these children are either illiterate or have dropped out of school after two or three years. A more recent report of ILO (2006), however, does point to the reduction in the number of child labour globally. According to this report, the number of child labourers globally fell by 11 per cent over the last four years. And, this reduction is much more significant - 33 per cent in the 5-14 age-group - in the area of hazardous work by children.

There is a common perception that a child's alternative to school is to be working in labour market. However, in reality there may be many children who are neither in school nor are they at work. In their study of rural India, Cigno and Rosati (2000) find that a large proportion of children who are generally said to be neither working nor in school are actually involved in full time work. There may be many others who combine schooling with work, especially so when they belong to families with farm land ownership or enterprise. In the circumstances, a better understanding of the child schooling issues in the context of child labour is expected to facilitate a more effective response to the relevant concerns in countries similarly placed, irrespective of their location.

A number of studies have looked into the relation between poverty (household income) and child schooling (Duraisamy, 2002; Jayachandran, 2002; Kambhampati and Pal, 2001; Behrman and Knowles, 1997). The studies have generally used one or the other proxy for wealth to look at the impact of poverty on child schooling. However, not many studies have actually looked at how child schooling captured by enrolment varies by using different wealth measures taken together, as has been done in this paper. The available studies also recognize the importance of the cost factors affecting schooling decisions. However, although direct costs of schooling have been taken into account in a number of studies, data on the availability on child wages and the allocation of child's time on

schooling or work in rural India has been somewhat limited and, therefore, the studies focusing on opportunity costs of child schooling in rural India is also limited. Many of these studies find evidence of gender differences in schooling but explanation for all such variations are not easy to find (see, for instance, Pal, 2003).

The absence of adequate literature on the above themes, as noted above, provides the motivation for this study. The aim of the study is to examine how various wealth proxies and opportunity costs impact children's schooling decisions for both boys and girls, thereby contributing to the literature on poverty and child schooling and opportunity cost of a child's schooling. This study is also motivated by two important studies dealing with child schooling issues; one carried out by Pal (2003) and the other by Behrman and Knowles (1997). While the study conducted by Pal (2003) analyzes the implicit and explicit opportunity costs of schooling and also focuses on the factors responsible for gender differences in school enrolment in the context of rural West Bengal, the study conducted by Behrman and Knowles (1997) examines the association between the household income and schooling in the context of Vietnam suggesting important indicators of income and expenditure measurement so as to overcome the problem of endogeneity and measurement errors in such studies.

This study examines the relationship between poverty and schooling using different measures of poverty on the basis of data from rural Uttar Pradesh (UP) and Bihar, two of the bigger provinces (states) of India. The study deals with the relationship of household wealth with school enrolment for the children in the age group of 6 – 19 years in these two provinces. This paper also studies the opportunity costs incurred by the households in educating their children. We are using predicted measures of income and expenditure - both adjusted for household size, land holdings, and few durable goods as measures of poverty, as they are thought to capture the wealth effect of the people dwelling in the rural areas. The enrolment probabilities of the children are being studied focusing on how these ratios are different between the male and female children so as to better appreciate

the gender dimension involved. It is expected that the policy implications of the findings of this study may assist in moving towards an environment that supports increased school enrolment in the rural areas, especially for females.

The paper is structured as follows. After the introductory section, Section 2 briefly reviews the current literature on determinants of child schooling and child labour and then focuses on the gender concerns. This section also considers the economic model relevant to this study. This is followed by the description of the study area and that of the data used in Section 3. This section attempts to put together some of the more widely known definitions of poverty and some of the poverty-related issues so as to facilitate a better understanding of the interrelationship between poverty and child schooling. It describes the econometric issues focusing on the empirical model and the measurement and statistical issues in schooling decisions. The estimated results of the study are described in Section 4. The next section, i.e. Section 5, discusses the measurement issues related to the opportunity cost, i.e. child wages, and also provides the result of the analysis of the effect of child wages and child schooling controlling for household wealth and other household characteristics. Section 6 is the concluding section and discusses some of the policy implications of the findings.

2 LITERATURE REVIEW

In this study, in examining poverty and school enrolment we are dealing with the inter-related issues of household wealth, investments in child schooling and the child labour. With a view to facilitate a better contextual appreciation of these issues, we start with a brief review of available literature focusing on the relationship between parental income and children's schooling. Thereafter, the findings in the literature on child labour are discussed. This is followed by a close look at some of the studies on the gender dimensions of school enrolment. This section concludes with a discussion of the relevant economic models.

2.1 INCOME AND CHILD SCHOOLING

The importance of investment in education has been stressed time and again by various economists and non-economists alike. Human capital is widely recognized as essential for economic and human development. Education allows children to negotiate a better position for themselves in the future, providing them with both the information and the necessary competence required to do so. The way in which education is distributed has a serious impact on the distribution of income, and thus on the nature of growth in the economies. Education increases the productivity of the labour force, improves health, enhances the quality of life, betters income distribution, and, in turn, leads to economic growth (Behrman et al., 1997; Tansel, 1997). This is the rationale behind the well recognized proposition that if the objective is to ensure sustained positive impact of investment in labour and physical capital, all children should receive primary education, and the enrolment in secondary school should be increased. This is particularly true for developing countries (Psacharorapoulos and Woodhall, 1995).

In the theoretical literature various models have been discussed that relate parental

income and wealth to child's education. Taubman (1989) reviews the consumption and investment models and maximization of income and utility. In the consumption model, the benefits to the parent or child are not related to the labour market performance of the child. If such consumption is a normal good, income will have a positive effect on education. The investment models, on the other hand, assume that generally because of increases in marginal productivity all the benefits to the child occur as increases in earnings.

These issues come out more clearly in Becker's (1967) Woytinsky lecture on determinants of human capital as discussed in the study by Behrman and Knowles (1997). According to Becker, investments in human capital are made until the private marginal benefit of investment equals private marginal cost of investment. The private marginal benefits depend on the expected returns, in the form of market wages or salaries, from investment in human capital. These marginal benefits may be affected by public policies that have a bearing on household expenditure, thus impacting on schooling decisions. If the public policy makes good quality schools accessible to low income households, for instance, as a part of poverty alleviation program, then the private marginal benefits of schooling would be higher for the poorer household. If the public policy does not favour the poorer households in these circumstances, then the higher income households would have higher private marginal benefit of schooling.

The private marginal benefits are also affected by private incentives to invest in schooling. This is due to a number of factors. The investment in schooling, apart from direct costs, also involves indirect costs, for instance, those involved in improving health and nutritional status of the wards. If these costs are less for higher income households, then the marginal private benefits of schooling will be higher for the higher income households. Parents' human capital stock is also positively correlated to the household income and thus to schooling decisions. Moreover, the higher income households may be less risk averse to invest in schooling relative to low income households. They may also

be better prepared to deal with stochastic events and, therefore, may have better incentives to invest in schooling.

The private marginal cost maybe seen as the opportunity cost of time devoted to investment and the costs of borrowing on financial markets. Private marginal costs for human capitals are affected by household income. Since human capital cannot be used as collateral, it becomes difficult for the low income households to raise the required resources for investing in schooling. On the other hand, if exemption from payment of fees is available to the children from the poorer households, then the marginal private benefit of schooling becomes higher for such households.

In an overlapping generations growth model (Raut, 1990), the transfers that the parents anticipate from their children in their old age is a factor that is responsible for parental investment in their children's human capital. However, the contribution that the children make to their old parents may also depend upon social norms and other mechanisms and, therefore, may not be strictly in one-to-one relationship with the contribution made by the parents for their schooling. Although enough evidence of empirical testing of the motivation of the parents to invest in their children's education and its impact on transfers made by the children to the parents in their old age is not available in the literature, the fact that children do pay back in terms of the transfers to their parents in their old age and, thus, contribute to their old age security seems fairly well established (Lillard and Willis, 1996).

Thus, a child's role as an old age security for parents forms one of the important motivations for parental investment in child's education. Portner (2001) and Rammohan (2001) provide an interesting insight into the aspect of children providing old age security to their parents, after their schooling. According to them, when there is availability of other resources which provide old age security, the importance of children for old age security diminishes. They explain it in the context of a rural agrarian society where in the

case of an adverse shock to current agricultural yield, farmers would like to borrow in the current period against future expected income. Borrowing in a bad season and saving in a good one allows farm families to smooth consumption over time. This depends on the farmers' ability to borrow. Unless the farmers have access to credit by means of sufficient collateral they may not be able to save for their consumption needs in old age. When there are other reliable means of consumption smoothing and accumulating assets for use in old age, children are not as vital for old age security purposes. Otherwise, it may provide one of the motives for parents to invest in education. However, Pal (2004) in her study of rural India, finds little support for the hypothesis that the probability of amount of transfer received by elderly parents increases with the level of education of their children.

Pure altruism of parents may also be the driving force in the schooling decisions (Dreze and Kingdom, 2001). In the households, demand for education derives from the benefits that parents expect to receive from children who are well educated. The advantage from education is both direct and indirect. While economic assistance from educated children is the direct material benefit of education, the indirect benefits comes form the satisfaction of having educated and financially successful children. A child's time allocated to schooling increases its human capital in subsequent years and also adds to the child's utility to the parents. However, allocation of a child's time to schooling may also lower family income and thus its consumption. Thus, the fact that still there is a large proportion of out-of-school children may be reflective of the perception of the parents that the advantages of sending children to school are outweighed by the disadvantages. The main disadvantages are the direct and indirect costs associated with schooling. While expenditure on school fees, books, transportation, etc. constitutes direct costs, children's lost labour is an indirect cost. Schooling of children has costs in terms of financial resources as well as time. These costs factors are likely to affect the children from the poorer households more in terms of opportunities for attending school and progressing in school (Deininger 2003; Lloyd and Blanc 1996). The different factors affecting children's

school participation decisions in rural India have been studied by Dreze and Kingdom (2001). The authors observe that other than cost, pupil teacher ratio, the state of school infrastructure, presence of female school teacher, teacher attendance rates, and provision of midday meals are some of the factors which affect school participation of children.

One of the common threads in the literature reviewed is that schooling is positively related to household wealth, including cultural capital. This implies that wealthier families can afford more schooling and probably have a higher rate of return on education (Canagrajah and Coulombe, 1997). Brown and Park (2002) find that children from households which are poor and which also face credit constraint are three times likely to drop out of school. In view of the resources required in providing for education for the members of the household, it is the households with higher incomes which tend to demand more of education. This reflects the position that the higher the earnings of the household, the higher is the expected level of education in the household.

According to Lloyd and Blanc (1996), the resources of a child's residential household, in particular the education of the household head and the household standard of living, are determining factors in explaining the differences among children in attending schools as well as their school outcomes. Somewhat similar is the finding of Behrman and Knowles (1997) who in their study of child schooling in Vietnam find that the stronger the association between household income and child schooling, the lower is intergenerational social mobility.

Jacoby and Skoufias (1997) explore the link between incomplete financial markets and schooling in the rural areas of India. They note that there has been considerable emphasis on both financial markets and human capital as major factors in development but not on their interaction. It is also noted that a number of recent studies have tested the implications of incomplete financial markets in both developing and developed economies but most of these studies shed little light on the mechanisms by which

consumption smoothing is attained. Using panel data, they investigate how child school attendance responds to seasonal income fluctuations in agrarian Indian households. They study the responses to aggregate household idiosyncratic and anticipated/unanticipated income shocks. Their results indicate that seasonal variations in school attendance are a form of self insurance that significantly reduces the schooling of children in households vulnerable to risk, and this is likely to be a costly form of insurance, particularly for poorer households.

The findings of Filmer and Pritchett (1998), however, are different on this issue. On the basis of their study of the situation in the Indian states, Filmer and Prtichett find that credit constraints do not drastically affect enrolment. They have two main reasons in support of this view. Firstly, the requirement of resources for human capital is generally never a very high proportion of total expenditure of the household. Secondly, the payment for education is required to be made gradually and is not a one time payment. If a household wants to provide for ten years of schooling the payment for the same will also be staggered over ten years; it does not have to be at one go.

In their study, Filmer and Pritchett find that the variation across states in India is not well explained by credit constraints. While the estimated gap between the poorest and richest varies from 2.6 and 4.2 percent in Himachal Pradesh and Kerala, to 37 percent in Uttar Pradesh, and to 53 percent in Bihar, these large differences among the states are not accompanied by similar large differences in the functioning of capital markets as a means for financing education. The expressed or revealed demand for the use of credit for basic education also does not show a similar pattern.

They attribute this situation to three main factors: academic performance, labor market effects, and pure social exclusion. Firstly, poor children start with relatively lower academic potential due to a variety of effects arising out of growing up in a poorer household. This may be on account of lower nutritional intakes, inadequate intellectual

stimulation within the household owing to absence of appropriate books, lack of adult attention, and absence of inputs from other media. This may result in lower learning and a higher potential for drop out of the poor.

Secondly, in some cases investment in education may not be a preferred choice if the expected financial return is not considered satisfactory (Patrinos, 1997). This also explains the correlation between wealth and enrolment. Thirdly, there is the possibility that the poor may be socially excluded from attending school, even if they wanted to do so. This view is supported by the fact that the rich have higher enrolment figures as compared to the poor within the same village. The distance to the school, as also the fact of their social exclusion, may be the other contributory factors.

Researchers also observe that parents in low-income countries may under-invest in the schooling of their children, even when the returns on the investment are high. This is on account of risk aversion of the low income households and the credit constraints faced by such families, and these are important considerations for the poor (Schultz 1993). It is not possible to borrow for investing in a child's education since human capital is not seen as a good-enough collateral. This inability of individuals to borrow against their future earnings highlights the importance of parental finance for investment in education. It is one of the main reasons that educational decisions are so heavily influenced by the interests of the household head / parents.

The size of the household is also factor which impacts on schooling decisions. What is interesting is that this impact may be either positive or negative depending upon the specific circumstances. Parish and Willis's (1993) discussion of resource dilution suggests that the large family size may tend to lower educational attainment for all children. However, in many developing-country settings a large number of children in the family instead of leading to universal resource dilution may result in improved opportunities for schooling for the late born. Once they begin to work, early born children

continue to provide resources to the family and this may help the younger siblings in schooling (Chernichovsky, 1985). Thus, a reduced demand for the labor of any individual child is seen when more children are available implying thereby a lower opportunity cost of schooling. Thus, the demand for and supply of labor for home production activities may affect the schooling decisions in an important manner.

A child's schooling decision may also be affected by the relative bargaining power of the husband and the wife (Browning and Chiappori, 1998). In larger households, where household represents the husband's preference for a larger family, the household size will be correlated with husbands' power within the marriage. In this situation, mothers may be less able to use their educational advantages into advantages for her children. Thus, the advantages of maternal education are likely to be greater in smaller households. But the opposite may also be true if the mother enjoys a special position. A mother may be able to influence important decisions in the household, including decisions related to a child's schooling, if she bears many children, especially sons. The constraints of resources, however, may impact more severely on larger families and such constraints may seriously affect child schooling (Zimmerman, 2001). This may result in larger households utilizing less the available public primary schools facilities.

2.2 CHILD LABOUR

It is a well-known fact that many children, especially those living in developing countries, work full or part time whether it is paid or unpaid. Some of them combine school and work, and others are solely engaged in work without attending school. The definition of child labor is diverse. The term 'child labor' is often considered harmful, abusive and exploitative employment, which may deteriorate children's physical, mental, and psychological development and often negatively affecting their educational progress. Some children may drop out of schools before completion, and some may not even attend

schools even in the initial years because they have to work. Even though children attend schools while working, much research has found that children's work negatively affects an individual's academic achievement/attainment and consequently hampers household human capital accumulation, which would improve household economic condition (Basu and Van, 1998).

Children may become a valuable asset when property rights are insecure, or credit and insurance markets are imperfect, or there does not exist a well-developed labour market for women, particularly in rural areas. It is the perception of parents that there exist no other reliable means of support in old-age. Under these circumstances, where mature adults rely on their adult children for financial security, old-age support is expected to be an important motive for fertility so that subsequently children may work and provide the requisite support.

Children, by virtue of their culturally and economically defined role, can be relied upon to smooth the consumption of their parents when property rights are insecure (Parson and Goldin, 1989; Ranjan 1999). Even though land ownership exists it does not act as a substitute for children since land cannot provide people with health care, physical and emotional assistance. Second, land is costly to maintain, it requires management and is highly labour intensive. Weather induced environmental risks and the associated fluctuations in agricultural yields result in a high variance of expected income. Nonetheless, land ownership is expected to reduce parental reliance on children as a source of insurance against future disability.

Cain (1981) explores this issue in his study of three Indian villages and one village in Bangladesh. He finds children to be redundant as a source of insurance when alternative means of adjusting are available. In harsh risk environments and when the mechanisms of risk adjustment are ineffective, the insurance value of children acts as an incentive for high fertility. The greater the share of the old-age support parents expect from their

children, the greater will be the demand for children to satisfy this motive. In the context of high risk settings – high infant and child mortality, uncertainty regarding child loyalty and the possibility of child default – additional pressures may be placed on the household fertility decision. When alternative means of saving or investing are not available, it can be expected that fertility will remain high in order to guarantee enough surviving, loyal children to satisfy this need. Parents' fertility decisions can be influenced by the presence of such concerns. A larger household can spread the risk over more members. Rosenzweig and Evenson (1977) in their study of economic contribution of child labour in rural India find out that the size of land holdings, agricultural productivity and child wage rates are positively related to fertility and child labour-force participation while these factors are negatively related to child schooling. Chaudri's (1997) vicious spiral hypothesis points to the reinforcing factors responsible for high incidence of child labour. These are high fertility and high infant mortality rates, high rates of illiteracy and non-participation in school education, static and inferior technology in the face of technical progress, and unequal trade partnership, and indifferent or inappropriate public policies dealing with social infrastructures.

The vicious circle hypothesis (Dasgupta, 1995; Nerlove, 1991) also provides an explanation for use of child labour. In a rural and subsistence economy, children contribute to the household by collecting resources from common village properties, e.g. village forests and pasture land. Since these resources are limited, children have to spend more time in organizing the collections from these common village properties. This implies deployment of children for longer hours or deployment of larger number of children. The increase in population exacerbates the demand for child labour on account of increased demand even if the supply position remains the same although the supply position is also likely to be effected due to environmental deterioration on account of the activities thus carried out. Filmer and Pritchett (2002) provide empirical confirmation of this hypothesis.

Basu and Van (1998) show via their analytical formulation the interrelation between adult and child labour markets. The results in the Basu and Van analysis derive from two axioms which they refer to as the `Luxury' and `Substitution' axioms. Their substitution axiom stresses the substitutability between adult and child labour in production as an important precondition for child labour. A firm's demand for child labour depends on the child-adult wage and productivity ratio. Nielson and Dubey (2002) uses Indian data to test substitution hypothesis to find out that higher child – adult wage ratio increases the non-enrolment of children between 5 – 14 years old. So far as the issue of the household as an alternative employer is concerned, this argument is related to the one cited by Grootaert and Kanbur (1995) that child labour works as a substitute for the adult female labour in the household.

The luxury axiom assumes that at the household level, parents may send their children to work out of economic necessity when the household's income (from non child labour resources) is very low. There is evidence that child labour income contributes substantially to poverty alleviation. In their study of child labour in India's urban informal sector, Sharma and Mittar (1990) find that in the sample analysed, 77.8 per cent of households to be below the poverty line when child labour income is not taken into account. However, if the child labour income is included, this figure (households below poverty line) falls to 22.2 per cent. This goes to suggest that poverty is one of the important factors which give rise to child labour. The study by Nielson and Dubey (2002) also investigates the relationship between child labor and household expenditure (used as a proxy to household income) and show the existence of a negative association.

The supply of children to the labour market perpetuates a cycle of poverty and under-development trap in two ways: firstly, by interfering with the accumulation of human capital, child labour reduces the adulthood labour market productivity of child workers, thereby discouraging economic growth and development. Secondly, by depressing adult wages, child labour results in households becoming more reliant on children as income

earning assets (Dessy 2000). In her study based on the data collected from Egypt, Wahba (2000) finds that there is a trade-off between child labour and child schooling and concludes that not only is poverty the main cause of child labour but that child labour perpetuates poverty as well.

However, the contrary evidence is also available in the literature. The study conducted by Ray (2000) using data sets from Peru and Pakistan indicates that income and related variables do not reflect substantial negative effect on child labour. The study finds that the Pakistani data does not support the hypothesis that only poor parents send their children for work. The Pakistani data also does not support the hypothesis that if the female wage rates increase, then it results in increased participation of children in the labour market (substitution hypothesis). So far as the Peru data, as well as the pooled data, are concerned, it shows a somewhat little support for the hypothesis that poverty affects child labour. Interestingly,, a large-scale survey conducted in India by the National Sample Survey Organization (NSSO, 1997) finds that only 45 % of the children studied gave economic reasons, including domestic housework, for their non-participation in schooling, and that about 25% of them point to poor school quality as the reason for their non-participation.

Child labour may also assume importance in some farming families, especially when the farm holding is of small size. Due to the small size of the holding, the method used for farming is generally manual, not mechanized. Since the non-mechanized farming is labour-intensive, a larger number of agriculture hands has to be used, and since the family labour is the easiest source of labour, these family sizes tend to be relatively large. In this situation, having more children in a family is a means of increasing household income. Although all the agricultural operations cannot be performed by the child labour they are able to do a number of tasks which are less arduous in nature. More importantly, the deployment of child labour in such manner allows the adult members to attend to other tasks in the field.

Where opportunities for women's employment are not well-developed, the old-age security motive is likely to play a larger role in the household fertility decision. This is particularly true in rural areas where women's primary responsibilities are child rearing, household duties and general subsistence activities. In this regard, women may rely on their husbands for economic support and subsequently their children. The availability of child labour helps the females in seeking better employment opportunities outside the home since the younger members in the family are able to take care of the household chores which otherwise would have to be attended to by the female members. This situation results in somewhat of a paradox. In this situation, increased household income on account of contribution of the child labour encourages a larger family so that family members, including children, may be able to provide the much needed help in the farm operations (Dessy, 2000; Rosenzweig and Evenson, 1977).

2.3 THE GENDER CONCERNS

There is a substantial body of literature which identify the factors contributing to gender differences in educational investments in children (Pal, 2003; Sawada and Lokshin, 2001). While support for the benefits of greater education for men are documented in studies pointing to rates of returns to schooling (e.g., Psacharopoulos, 1994) amongst other factors, the benefits of improved women's schooling are linked to much improved outcomes from fertility and child health (Pal, 2003), even when the rates of return of education of girls vis-à-vis boys may a show a lower return.

So far as the situation in India, especially in the rural areas, is concerned, the gender gap in educational attendance is also largely a reflection of the underlying traditional gender roles. Filmer & Pritchett (1998) from their study in India argue that income differences apart from affecting the enrolment and attainment of children also exacerbate gender differences and that the gender gap is much larger for the poor when compared to the

rich. In the study conducted by them, they found that the gender gap for students enrolled was 24 percentage points for the poorest group and was close to zero at 3 percentage points for the richest group. According to another study, the gender bias in schooling is quite high in Bihar, Rajasthan and Uttar Pradesh where the difference between male and female school attendance is over ten percentage points (Jayachandran, 2002). Somewhat similar is the position in rural areas of Andhra Pradesh and Madhya Pradesh. The gender disadvantage is the maximum in rural Rajasthan with school attendance rates for girls as low as 18 percent, against 48 percent for boys. In urban areas, gender disadvantage in schooling is most prominent in the states of Rajasthan and Bihar.

The gender differences in school enrolment of the children is on account of the fact that parents often perceive the benefits of boys' schooling to be greater as compared to the girls'. There are two main explanations for this perception (Deolalikar, 1997). First, gender discrimination in enrolment rates may be as a result of discrimination in the financial rewards from schooling. If there are higher labour market returns for males relative to the females, then greater school enrolment among the males may reflect an efficient household allocation when the resources are scarce. Secondly, parents may also invest more in their sons' education than their daughters' if they expect greater future flow of funds from their sons.

Interestingly, Parish and Willis (1993), on the basis of their empirical work in Taiwan come up with a finding which is somewhat different. They argue that children's educational outcomes depend on economic security. Families with low income choose more carefully as to who in the home get educated. This, however, is not the case among the economically secure families where siblings have no effect on educational opportunity. This suggests that higher family income prospect tends to diminish the gender difference in investments in schooling.

In patrilineal societies, market forces have known to worsen women's economic and

social position, (Shapiro and Tambashe, 2001; Parish and Willis, 1993). In the initial stages of economic development when men occupied all the newer, higher-paid jobs, the women remained confined to their homes taking care of it. This resulted in increased opportunities for men but it also meant fewer and poorer job prospects for women. This kind of situation reduces the incentives for educating women. A vicious cycle of employers not hiring women because of poor education, and parents not wanting to educate women because of poorer employment prospects, thus, commences which is not easy to break.

In rural India, generally a girl child is also seen as a temporary member of the household since after her marriage she is expected to become a member of the husband's household. This view of a girl child also acts as an impediment in schooling decisions going in her favour since schooling does entail costs, both direct and indirect, and resource constrained parents may be reluctant to invest on a girl child who is unlikely to bring back any economic returns arising out of her schooling to the parent's family once she moves in to her husband's family (Pal, 2003; Kingdon, 2002; Kishore, 1993;).

Moreover, in the Indian context, married women are primarily expected to take care of the family and the house and, if they do enter paid employment, they face labour market discrimination (Kingdon, 1998). In the towns and cities it may be an investment for daughters to continue their academic studies because high school, college and university certification may open up relatively better employment opportunities and may result in a reduction in the dowry demanded, but these factors may not apply in rural settings. Therefore, even now the opportunity cost of schooling in terms of market wage forgone is greater for males than for females, especially in rural India. The position is the same even in the urban areas of some of the states like Uttar Pradesh, where significant proportions of gender differences are a result of differences in returns to schooling (Kingdon, 2002).

It has been noted in the literature that parental literacy, both male and female, reduces the gender bias in school attendance. In the case of adult female literacy, this is on the relative strength of same-sex effects and cross-sex effects (Jayachandran, 2002). It has also been suggested that in rural Bengal each parent's education may be taken as indicator of his/her individual preference suggesting that higher women's literacy encourages female education (Pal, 2003; Kambhampati and Pal, 2001). Household size exerts a negative influence on female school participation implying that as the family size increases, the proportions of girls attending school decreases. This may be reflective of the fact that with larger number of family members, the elder daughters are required to stay home and carry out household chores and look after younger siblings among other jobs at home.

The socio-economic determinants of school attendance and the possible causes of disadvantage faced by the girl child have been studied in the Indian context by Jayachandran (2002). In this study, the determinants of inter-district variations in school attendance are explored separately for boys and girls based on Census data for 1981 and 1991. A similar analysis is applied to the gender bias in school attendance. The findings indicate that school attendance is positively related to school accessibility and parental education, and negatively related to poverty and household size. There is also some evidence that income seems to affect schooling choices of both boys and girls in rural India although the gender gap closes at higher levels of income, especially if households are resource constrained (Kambhampati and Pal, 2001).

In an analytical study of the situation in the villages in West Bengal Pal (2003), suggests that indicators of household resources, parental preferences, returns to schooling and opportunity cost of domestic work significantly affect child school enrolment. The author takes account of the implicit and explicit opportunity costs of schooling to jointly determine child's participation in school and market jobs. The study finds that girls are more likely to be enrolled if the local adult female participation rate is higher while boys

are more likely to work when the local male participation rate is higher. However, when local daily wage rates were used the likelihood of boys' market participation increased with higher local male wage rates while female participation did not respond to local female wage rate.

From the above review, it is seen that while the beneficial impact of female education has been recognized, it has not been possible to fully generalize the factors which can be labelled as universally accountable for disparity in female enrolment. At the same time, some of the factors which hinder female enrolment identified by different researchers may be largely valid in a given set of circumstances and these serve as important pointers for further studies on the subject. This is notwithstanding the fact that ultimately the household in which schooling decision is taken need to be studied for a completely accurate analysis of the situation.

2.4 ECONOMIC MODEL

Now we turn to discuss one of the most commonly used cost and benefit model in the literature. The following model is based on Becker's (1967) framework of determinants of human capital investment and has been adapted from Alderman and Gertler's (1997) work 'Resources and Gender Differences in Human Capital Investments', to suit our need.

Assumptions: An individual lives for two periods. In the first period s/he is a parent of two children (a boy and a girl) and in the second period s/he is a retired person. As a parent in the first period s/he earns income, consumes and invests in his/her children's education, this being the only investment good. The utility functions for the parents depend on their own present consumption, the discounted value of the future income of their children and their next period's consumption. In old age, as a retiree, s/he does not

earn income and his/her utility function is limited to just his/her own consumption, which is a function of transfers from his/her children.

The utility function of a parent can thus be written as:

$$U_t = F(C_t) + G[\delta(C_{t+1}, W_B, W_G)] \quad (1)$$

where, $C_t \rightarrow$ Consumption in the first period

$C_{t+1} \rightarrow$ Consumption in the second period

$W_B \rightarrow$ Future income of Boys

$W_G \rightarrow$ Future income of Girls

$\delta \rightarrow$ Discount value

When, $W_B = W_G$ and if parents have no preference amongst boys or girls, then
$\partial G/\partial W_B = \partial G/\partial W_G$ and $\partial G^2/\partial W^2_B = \partial G^2/\partial W^2_G$

Children's future income is a function of the investment made on their human capital (H). Thus, the children's future income can be represented as:

$$W_B = \beta(H_B)$$
$$W_G = \gamma(H_G)$$

where, β and γ are the returns to investment in human capital for boys and girls respectively.

Parents' consumption in the second period depends on the transfers generated from the children. It is further assumed that the transfers are proportional to each child's income. Thus, the greater investment that they make in their children's education, higher is the level of transfer that they receive. The parent's second period consumption can be

indicated as:

$C_{t+1} = \tau^B . W_B + \tau^G . W_G$

where, τ is the rate of transfer per unit wealth of the child.

The family's budget constraint can now be indicated as:

$Y = C_t + P (H_B + H_G)$ such that $P < Y$

where, P is the cost of investing the human capital and Y is the household income.

The parents try to maximise the investment in their children subject to their budget constraint. The maximising condition then looks like:

$$\text{Max } H_B, H_G = F\{Y - P (H_B + H_G)\} + G\{\delta[(\tau^B.\beta H_B + \tau^G \gamma H_G), \beta H_B , \gamma H_G]\} \quad (2)$$

The first order conditions are as follows:

$$\frac{\partial U}{\partial H_B} = -\frac{\partial F}{\partial C_t} P + \frac{\partial G}{\partial C_{t+1}} \delta\beta\tau^B + \frac{\partial G}{\partial W_B} \delta\beta = 0 \quad (3)$$

And

$$\frac{\partial U}{\partial H_G} P = -\frac{\partial F}{\partial C_t} P + \frac{\partial G}{\partial C_{t+1}} \delta\gamma\tau^G + \frac{\partial G}{\partial W_G} \delta\gamma = 0 \quad (4)$$

The above conditions can be rewritten as:

$$\frac{\partial F}{\partial C_t}\frac{P}{\delta} = \frac{\partial G}{\partial C_{t+1}}\beta\tau^B + \frac{\partial G}{\partial W_B}\beta \tag{5}$$

And

$$\frac{\partial F}{\partial C_t}\frac{P}{\delta} = \frac{\partial G}{\partial C_{t+1}}\gamma\tau^G + \frac{\partial G}{\partial W_G}\gamma \tag{6}$$

The two first order conditions imply that parents would invest in their children's human capital to the point where the marginal cost in terms of present consumption would equal to the marginal benefit in the second period. It also shows that higher the discount rates, higher will be the costs of investing in education and therefore lower will be the investment especially for lower income households. This implies that higher income households will be in a better position to finance human capital investment, as they would have lower discount value.

Since the marginal costs are identical, therefore the first order conditions can be written as:

$$\frac{\partial G}{\partial C_{t+1}}\beta\tau^B + \frac{\partial G}{\partial W_B}\beta = \frac{\partial G}{\partial C_{t+1}}\gamma\tau^G + \frac{\partial G}{\partial W_G}\gamma \tag{7}$$

In case when $\beta > \gamma$ or in case when $\tau B > \tau G$ the above equation will then imply that the marginal benefits will be higher for boys than for girls for same level of human capital. As a result, the investment in boy's human capital will tend to exceed that of girl's. In such cases, to satisfy the first order condition for girls would require higher income levels.

Using this theoretical framework we obtain a reduced form of equation for the investment levels in a child's schooling (Hi) as follows:

$$H_i = f(Y, \tau^B, \tau^G; A) \qquad (8)$$

where i = B, G

This gives us an estimable equation for the investment in human capital investment as a function of the household income, transfers received from their sons and daughters and a vector of other variables, A. One of the problems in estimating equation (8) using the Bihar-UP (Uttar Pradesh) data is the lack of data on household's private transfers. However, we examine the other above-mentioned factors together with various measures of household wealth that affect school enrollment for every child in the household in the school going age group separately for both girls and boys. Secondly, Section 5, looks at the relation between a child's market wages, which is actually considered to be the opportunity cost of schooling, to their school enrolment.

The vector, A, representing a set of other variables, mentioned above, includes some of the important factors that encourages children to attend schools in the first place. They are the parental characteristics such as parents' education level. Studies have asserted that father's education plays an important role in their sons' enrolment and mother's education encourages daughters' education. The occupation the parents are engaged in is also another important factor. The other household characteristic is the relationship of the children to the household head. It is believed that the siblings of the household head have higher probability of getting enrolled in schools as compared to the other children in the household.

When we talk about human capital investment or children's school enrolment, some other factors which are important are the availability of schools and its proximity to the households, i.e. whether it is within the village or the children have to travel long

distances for attending the school. If the school is far away from the village then it is likely that we may observe a negative relation between school and the distance to the school. In this case the road conditions would play an essential role in determining school enrolment. These issues are further discussed in Section 3.2 of the paper.

3 THE STUDY AREA AND THE DATA

As noted earlier, the data for the study comes from the World Bank's LSMS (Living Standard Measurement Survey) survey carried out in 1997 – 98 for the two states in India - southern and eastern regions of Uttar Pradesh (UP) and northern and central regions of Bihar. These states are characterized by unusually large populations and where the per capita expenditure levels fall below the poverty line. Of all the Indian states, Uttar Pradesh is the most populous state. According to 1993-94 estimates, UP accounted for 17.9 percent of India's rural population and 20.3 percent of the country's poor. Nearly 42 percent of the population in UP were below the poverty line in 1993-94. Eastern and Southern UP, from where the study villages were drawn, are generally poorer than the western part of the state. The poverty levels have also been rising in these areas (Kozel and Parker 1999).

UP is identified as having the highest birth rate and the highest fertility rate. Post-1974 period was marked by a significant improvement in the total income of the state. The state achieved a growth of 5-7 % per annum, which was higher than the national growth of 5.3 %. The growth rate of the population in the state increased from 1.8 per cent per annum in 1961-71 to 2.3 per cent in 1971-81 which was higher than the country's population growth rate of 2.2 percent.

One predominant element in Uttar Pradesh education system is the persistence of high level of illiteracy in the younger age group. Within the younger age group, the illiteracy is high in the rural areas. In the 1980s, the incidence of illiteracy in the 10- 14 age group was as high as 32 percent for rural males and 61 per cent for rural females, and more than two-thirds of all rural girls in the 12-14 age-group never went to school. The figures were even lower at 19 per cent for rural areas, 11 per cent for the scheduled castes, 8 per cant for scheduled castes in rural areas, and 8 per cent for the entire rural population in the most educationally backward districts (Government of Uttar Pradesh).

Bihar, which lies to the east of UP, is the second most populous state of India (comprising a little more than 10 per cent of the country's population). It has the lowest per capita rural income in India, and with 87 percent of Bihar's population classified as rural, it is the most rural state in the country. Though, Bihar is well endowed with natural resources such as its large alluvial river valley area and rich mineral deposits, especially in the southern region, proper exploitation of the natural resources has been far from optimal. This is one of the factors behind the state lagging in its development efforts relative to other states of India. Large parts of northern Bihar are frequently affected by floods and this affects the conditions of life and livestock on account of large-scale displacement. Some flood control measures have been implemented. Some of the districts in the south Bihar plains and plateau region are drought-prone. The overall percentage of net area irrigated in Bihar is about 38 but irrigation is largely seasonal and protective. Water-logging in substantial parts of north Bihar is also a chronic problem.

In both the states, the gap between the rich and the poor is quite large. The Zamindari system has been abolished. The emergence of middlemen and contractors in the region, however, has given rise to another set of issues. There is a perception that these people resort to extortion by becoming contractors for the developmental programs in the region. The poor landless labourer is forced to work for the life time in the landlord's land; the other option being migration in search of better employment opportunities. The small debts of the family for the social occasions like marriage, birth and death finally could land them into permanent debt and bondage.

The caste system plays an important part in the social interactions. Persons belonging to the higher castes have been dominating important positions in the society and in the government. Tensions arising out of caste differentiation at times affect social harmony. In some cases, the caste considerations play a crucial role in making the poor poorer in the region although there are signs that the situation is changing for the better.

The target of cent percent enrolment at the primary level is yet to be achieved in the region. The administration and management of schools is always under scrutiny. And, so is the performance of the teachers. The government schools provide a number of incentives like financial incentive for attendance, mid-day meals and scholarships. The result is however mixed. There is apprehension that these measures do not yield fully satisfactory results and contribute towards the student welfare on account of inefficiencies in the system.

The data set contains detailed information on consumption expenditure, health status (for both adult and child), education, employment, demographic composition, and some information on local infrastructure in the rural areas. The data was collected through household and village level questionnaire, and in most of the cases, the questionnaire were completed by the head of household, thereby, also reflecting the relationship of an individual to the household head, and the socio-economic status of the household head.

3.1 THE POVERTY ISSUES

Given the importance of income and wealth in schooling decisions as noted earlier, we now look at some of the issues related to poverty. Defining poverty is not easy, the complications arising from the fact that the poor are not a homogenous group. As the nature of poverty is diverse, so too, is its causes and consequences. It is, therefore, not surprising that there are a number of definitions and measures of poverty. The fact that different people understand poverty differently makes the task of arriving at a common acceptable definition of poverty a difficult one.

Poverty is a multidimensional phenomenon. Different criteria have been used to define poverty. Any definition of poverty used will reflect the value judgement of the group

using the definition. One of the simplest definitions of poverty implies falling below a subsistence threshold. According to this concept, that part of the population is considered poor which is unable to meet the basic nutritional needs. This definition, however, is considered inadequate - one of the important weaknesses being in the difficulty that arises in the comparability of poverty lines across regions. For instance, the relationship between calorie intake and total expenditure can be different for rural and urban areas since the urban population is likely to buy more expensive calories. This may result in the poverty line for the urban sector being higher than that for the rural sector.

The definition of poverty in terms of basic nutritional needs has also been criticised on the grounds that nutritional needs of individual vary considerably, for instance, with age, sex and occupation. Moreover, even in situations of extreme poverty where nutritional inadequacy is widespread, the link between income and nutrition is strong only in some areas, not all (Streeton, 1990).

A more comprehensive definition of poverty relates to inability to meet the basic needs which is composed of two elements. The first is physical needs, that is, food, shelter, education, and health care, and the second is non-physical needs for a meaningful life, that is, participation, identity etc. According to Sen (1983), the concept of poverty is related to 'entitlements'. Entitlements, according to Sen, refers to various bundles of goods and services over which one has command, taking into consideration the means by which such goods are acquired (for example, money, coupons) and the availability of the needed goods. A certain level of income level is also sometimes used to identify poverty level although even this approach is much debated (Blackwood and Lynch, 1994).

In considering the notion of poverty, the concepts of 'absolute poverty' and 'relative poverty' are useful for better appreciation of its multidimensionality. These two notions are clearly distinct. Absolute poverty implies the state of being unable to meet the very basic needs while relative poverty indicates that those people whose incomes are

considered too low with regard to satisfaction of basic needs compared with other members of the society in which they live. Therefore, every society, except those where everyone receives exactly the same income, has poverty.

In the study of poverty, models designed to measure poverty fall into one of the two categories – absolute poverty measures and relative poverty measures. Given the topic of the research undertaking, this paper will be focusing on different measures of relative poverty. For instance, the paper will be looking at household income and expenditure, and make a comparison to see how one individual fares vis-a-vis another person in the sample population. Discussions based on the concept of measuring income and expenditure is indicated below.

3.1.1 Household Income and Wealth

Income represents an important area to consider when characterizing the poor. However, in practice, income is difficult to define, as it includes several components, of which only some are monetary i.e. payment of income in-kind. Also, where there is prevalence of subsistence farming, households consume most of their production. In these cases accurate valuation in monetary terms may not always be possible. These may be considered as an erratic income sources which tend to be generally under-estimated and poor record of earnings biasing the estimated income association with schooling towards zero. Income maybe underreported even at higher income levels because of taxes or other commitments; the use of such a measure causes an upward bias in the estimated income-schooling association.

As seen in the literature, many studies use household expenditure as a proxy for long-run resource constraint, assuming that households smooth consumption overtime since expenditure is less contaminated by random error originating in transitory income

fluctuations (which maybe considerable, particularly in developing countries). However, expenditure may still have random measurement error and be determined simultaneously with schooling investments.

Furthermore, as discussed in Behrman and Knowles (1997), bias may exist if households adjust their income and expenditure simultaneously with schooling decisions. For, example bias may occur when (a) the total income is used and households reduce their total income and expenditure, when they have school-aged children, through child labour in order to increase schooling; (b) when there is increase in expenditure through dissavings to cover schooling costs, even if the total income falls; (c) when the household head's income and parents increase their work efforts and income when children are of school age to finance their children's schooling.

It has been noted by Behrman and Knowles that the true association between income and schooling maybe remain hidden when a number of other household, community and school controls, related with income, are included in multivariate relations, they maybe proxying in part for the income association. Also if parental schooling is controlled in the estimate, the estimated association of child schooling with income is likely to be underestimated. Thus, in the presence of random measurement error or if income and expenditure decisions are made simultaneously with current schooling decisions with the assumption that household smooth consumption over time, the longer-run household resource constraint can be proxied by the use of predicted measures of household income and household expenditure. In this context, the permanent income hypothesis provides an useful approach (Behrman and Knowles, 1997).

The idea behind the permanent income hypothesis was proposed by Milton Friedman (1957) according to which consumption depends on what people expect to earn over a considerable period of time. People tend to save during periods when the income is very high and dip into that savings when the income becomes less. The objective is to

maintain a fairly constant standard of living even though their incomes may vary considerably from month to month or from year to year. As a result, temporary increases and decreases in income have little effect on expenditure.

According to Permanent Income Hypothesis (PIH), aggregate income can be divided up into two separate components: 'Y^P' Permanent (or projected levels of) Income and 'Y^T' Transitory (or unexpected changes in) Income. Thus:

$$Y = Y^P + Y^T.$$

The transitory component has an expected value of zero ($E[Y^T_t] = 0$) reflecting the notion that over time transitory gains are offset by future transitory losses and vice-versa. Thus in the long run observed levels of income 'Y' are equal to permanent income 'Y^P'.

Finally, according to this hypothesis consumption expenditure is proportional to permanent income:

$$C = kY^P$$

such that the parameter '**k**', a constant, representing both the average propensity to consume and the marginal propensity to consume. This consumption function is described more accurately as a long run consumption function consistent with the observed long run results of consumption behaviour. Thus the key determinant of consumption is an individual's real wealth, not his current real disposable income.

The theory suggests that transitory changes in income do not affect long run consumer spending behaviour and that consumers try to smooth out consumer spending based on their estimates of permanent income. Thus, only if there has been a change in permanent income will there be a change in consumption. This coupled with the fact that savings are low (especially in rural areas where there may be no savings), thus implies that long run household expenditure are better proxies for poverty than actual household income or expenditure.

Hence, according to the PIH the predicted measures are better known to capture the long run household credit constraint. Also, if some consumption smoothing is possible the predicted expenditure is likely to be a better measure of income than the actual values of income or expenditure. Hence in this study the predicted measures of income and expenditure are used to capture the wealth effect. The effect of transitory income on child schooling and child work is also analyzed in the study. The measurement issues are dealt with in the following sections.

3.1.2 Predicted Wealth Measures

The total household income used in this study is the log of household income per capita. It includes the total income earned by any household member, and the adult income variable is the log of adult income per capita. It is computed from the earnings of the adult members (over 19 years old) of the household. Income comprises of both labour and non-labour income. The sources of labour income maybe from self-employment, salaried employment, or casual labour, and the non-labour income maybe state/ government transfers (e.g. pension) or maybe those received as gifts. This income measure also includes imputed values of consumption since in those households that practice subsistence farming for their own consumption, if the food items had been sold in the market, the money from the sale would have been their income.

The household expenditure is the log of total expenditure expressed per capita. It includes food and non-food expenditure. The expenditure on food includes the estimated value of home produced or home-grown food consumed by the household. Estimation on food consumed that was received as payment in-kind, i.e. as remuneration for work done on someone else's farm, as gifts, or as presents from relatives and/or friends are also included in it. The non-food expenditure includes all the spending on health, remittances sent to other households, religious and social expenses and on household maintenance.

The children's schooling costs are excluded from the household expenditure. If the expenditure includes educational costs we find that the expenditure rises as schooling increases, thus we face the problem of endogeneity as discussed in the previous section. Hence, to avoid any such bias schooling expenditures are excluded in the expenditure variable.

We construct the predicted values using the household's long run characteristics such as household head's gender, caste, education and age; the main income source for the household; housing structure; facilities available within the household and their village facilities. In addition to these variables, the expenditure model includes the household age structure since it is generally the case that presence of very young children and old people in the household tends to increase the household expenditure. The estimates used to construct the predicted values are represented in Table A3 (Appendices).

The descriptive statistics of the six income measures and the correlation among the six income (expenditure) measures are shown below (Table 1).

Table 1: Summarizing Wealth Measures

	Observation	Mean	Std. Dev.	Min	Max
Household Income	4675	1.076384	.7783032	-2.834464	4.4963
Adult Income	4675	1.033249	.7991204	-2.834464	4.4963
Expenditure	4675	1.282377	.5766189	-.067056	5.291383
Predicted Household Income	4675	1.076384	.4930238	.1166525	3.025785
Predicted Adult Income	4675	1.033249	.5159878	-.0075547	3.08398
Predicted Expenditure	4675	1.282377	.3213711	.6744135	2.914775

The fact that the mean of income per capita (for both household income and adult income) is lower than the mean of log of expenditure per capita should not be surprising since the study focuses on the rural population of India where majority of the population survives on subsistence farming where people would mostly be consuming what they are producing, hence showing a very low earnings level. The absence of income in these cases is made good by resorting to borrowings for meeting the day to day requirements as well as those in connection with the social obligations. Thus we see transitory income fluctuations being smoothened overtime. It may also be seen that the standard deviations for the log values for both the income and expenditure are higher than their respective predicted measures. This may be consistent with the fact that the actual values suffer from measurement error as representations of the longer-run resource constraint (Behrman and Knowles, 1997), i.e. these differences accrue due to huge variations in transitory income.

Presented in Table 2 are the correlations between the actual and predicted values for household income and expenditure.

It may be seen from Table 2(a) that all the correlations are not very high and they lie between 0.41 and 0.74. Since the correlation between the predicted values and the log values are not very high it may be reflective of the fact that both income and expenditure represent slightly different long-run household resource constraint, especially when the livelihood of majority of the rural population is subsistence farming with very low income levels. For these poor households the resource constraint would be much greater to smooth consumption over time than for better-off households. Hence the fluctuations between income and expenditure measures are likely to be greater for such households, Behrman and Knowles (1997). Even when using log of adult household income, Table 2(b), the outcomes are quite similar. The correlations in this case lie between 0.41 and 0.74. Furthermore, Table 2(c) indicates the correlation between the total household income and the adult household income, for both the log and the predicted values, is 0.99.

Table 2: Correlation between Income and Expenditure measures

(a) Correlation between household income and expenditure measures				
	Household Income	Expenditure	Predicted Household Income	Predicted Expenditure
Household Income	1			
Expenditure	0.41	1		
Predicted Household Income	0.63	0.41	1	
Predicted Expenditure	0.51	0.56	0.73	1
(b) Correlation between adult income and expenditure measures				
	Adult Income	Expenditure	Predicted Adult Income	Predicted Expenditure
Adult Income	1			
Expenditure	0.41	1		
Predicted Adult Income	0.65	0.41	1	
Predicted Expenditure	0.52	0.56	0.74	1
(c) Correlation between adult income and household income				
	Adult Income	Household Income	Predicted Adult Income	Predicted Household Income
Adult Income	1			
Household Income	0.97	1		
Predicted Adult Income	0.65	0.63	1	
Predicted Household Income	0.64	0.63	0.997	1

Since total household income comprises of income from all sources and income from both working adults and working children, the high correlation indicates that the wages from working children are not clearly recorded. The lack of clarity in recording children's wages may arise due to the fact that firstly, many children may be working for their own land/ farm and hence receive no income. Secondly, children may be working at home performing household chores without receiving any compensation for it. What this high correlation figure also represents is that using household income and adult income

measure will provide us with identical results. Hence, for further analysis purposes we would be using the predicted adult income instead of predicted household income.

Since the focus of this paper is to look at various measures to capture household wealth and poverty and how each measure captures child's schooling enrolment, this analysis would be taking into account adult income, household expenditure, and their respective predicted values. In addition, since the rural poor faces huge transitory income shocks it would be worthwhile to study the effect of transitory income on child schooling in a separate model. As discussed in the previous section in the long-term there is no transitory income effect although it maybe be interesting to find out the short run impact of transitory income on child schooling and child work.

Other than income and expenditure measures some other indicators of income that may capture the household wealth can be the property of a household. This may include land, cultivated areas, livestock, agricultural equipment, buildings, household appliances and other durable goods. Although, it is very difficult to measure property such as livestock or depreciation of any assets, it still might be worthwhile looking at the impact some of these measures, such as land and durable goods, might have on the children's schooling enrolment; since, certain households, especially in rural areas, can be poor in terms of income, but wealthy when their assets are taken into consideration.

Finally, we run the regressions controlling for the above-mentioned different wealth measures, child characteristics, household head's and household characteristics, and the village characteristics.

3.2 DATA ANALYSIS

In this study, a child is defined as anyone between the ages of 6 to 19 years. A sub-sample of 4675 children of this age group has been used. 2475 children belong to the 6 - 11 age group, 1181 to the 12 -15 age group, and the remaining 1019 are in the age group of 16-19 years. Of these children, approx. 57.1% are enrolled in school, 35.4% are not enrolled, and no information on schooling is available for about 7.5% of the children.

Before looking at the data in details, it may be useful to briefly look at the education system in India. The Universalisation of Elementary Education (UEE) policy in India stipulates free and compulsory education for all children until they complete the age of fourteen years. A uniform structure of school education, the 10+2 system, as been adopted by all the sates and Union Territories of India, the first ten years covering general education followed by two years of senior secondary education. The minimum age for admission to class I of the Primary School stage is generally 6 years old, although the age for admission may slightly differ from place to place. Upon entering a school, the first five years constitutes the primary stage (Standards I-V) and the next five years, secondary or middle school (Standards VI-X). Pupils who have completed ten years of education (Standard X) take the Secondary School Certificate examination. They then enter higher secondary or senior secondary schools or Junior Colleges and complete a further two years of education (Standards XI and XII).

Based on above mentioned schooling structure, the sample children are divided into three categories for detailed analysis: 6 to 11 years old, 12 to 15 years old, and 16 to 19 years old.

3.2.1 Child Characteristics

The age and sex of the child plays an important role in determining their school enrolments. Table 3 presents the status of school enrolment of children by age-group and gender. The older the child gets, the lower will be the probability of attending schools. The proportion of girls enrolled decreases with age. This may be indicative of the fact that many girls may go for schooling up to the primary level but later on drop out of the school system due to household responsibilities or constraints. We observe a similar trend (of lower enrolment with increasing age) for boys' enrolment ratio as well although in this case the contributory factor may be different, namely, their absorption into the labour market.

Table 3: Enrolment of Children by Age Groups and Gender

Gender & Age Group	Total Sample	Number Enrolled	Enrolment Ratio (%)
Boys			
6 – 11 yrs	1366	970	71.01
12 – 15 yrs	669	492	73.54
16 – 19 yrs	567	250	44.09
All Boys	*2602*	*1712*	*65.8*
Girls			
6 – 11 yrs	1109	638	57.53
12 – 15 yrs	512	239	46.68
16 – 19 yrs	452	79	17.48
All Girls	*2073*	*956*	*46.12*
Both Genders			
6 – 11 yrs	2475	1608	64.97
12 – 15 yrs	1181	731	61.9
16 – 19 yrs	1019	329	32.29
All	*4675*	*2668*	*57.07*

It can also be seen from the data that higher number of boys are enrolled as compared to girls for each of the age groups. In India there has been evidence of extreme bias against the girl child. Relatively more boys would be preferred to send to schools. Even if a girl

is sent to school she is highly likely to be pulled out of schools at a relatively early age because the opportunity cost of schooling in terms of home production may be higher for older girls (Deolalikar, 1997). Girls are required to carry out household chores. If she is an older daughter she is expected to look after the younger siblings. Also, culturally speaking, since boys are known to look after the parents in their old age, parents may find it worth while investing in boys education rather than the girls as they will be married and gone away to her husband's family and take care of his parents.

3.2.2 Household-Head Characteristics

Parent(s) or the household head being the chief decision maker of whether a child is going to attend school or not makes the household head's characteristics very important for us to study. The sex and the education level of the household head play an important role in deciding whether a child will attend school or not. The gender-specific enrolment ratios across parental education classification are presented in Table 4.

The table represents that on the whole, the proportion of children enrolled in school increases as the level of parental education increases. It is believed that educated parents value their children's education and would thus have a greater urge to send their children to schools. Parents, especially when the household head is male, tend to send more boys to school than girls. The pattern is quite similar under the female headed households as well. It has been noted in the literature that mother's education tends to favour girl child's schooling and father's education favours boy's schooling (Duraisamy, 2002), accordingly, the figures in the above table shows that the enrolment ratios are generally higher under literate and primary female headed households. However, under illiterate male headed households enrolments ratios for both boys and girls are higher as compared to the female headed households.

Table 4: Enrolment Ratio of Children by Education and Gender of the Household Head

Education Level	Enrolment ratios (%)					
	Boys			**Girls**		
	6 – 11 yrs	**12 – 15 yrs**	**16 – 19 yrs**	**6 – 11 yrs**	**12 – 15 yrs**	**16 –19 yrs**
Male Household Head						
Illiterate	58.24	58.74	43.85	44.27	35	5.2
Literate	75.96	69.05	32.26	50.7	29.03	13.04
< primary	86.6	74.07	41.43	62.32	71.43	14.81
Primary	81.4	81.03	27.78	62.32	37.04	6.45
Middle	85.8	89.66	31.71	75.58	60.22	18.03
Matric	89.36	88.14	54.29	75.61	61.54	21.74
Intermediate and above	92.63	95.24	75.41	82.47	80.56	52.38
Female Household Head						
Illiterate	58.33	46.15	16.67	40.91	11.11	9.09
Literate	-	50	100	100	-	0
Primary	100	100	100	100	50	-

3.2.3 Socio-Economic Characteristics

Table 5 indicates that the sample proportion for school enrolment of the children on the basis of predicted expenditure of the household, the household's predominant occupation and the size of its landholdings.

Table 5: Enrolment Ratios by Predicted Household Expenditure, Landholding and Household Occupation

Characteristics	Enrolment ratios (%)			
	6 – 11 yrs	12 – 15yrs	16– 19 yrs	**Total**
Household Expenditure				
Bottom	50.49	42.62	27.78	*44.06*
Second	56.92	61.16	22.8	*50.91*
Third	64.14	58.24	19.66	*54.35*
Fourth	76.28	66.94	38.28	*66.07*
Top	80.76	83.81	46.33	*70.88*
Household Occupation				
Own farm activities	73.77	68.32	36.95	*63.86*
Casual labour	51.06	37.5	22.6	*42.35*
Long-term agri employee	34.78	37.5	0	*29.73*
Salaried employment	76.19	78.99	38.66	*67.76*
Business / Trade	70.59	53.85	0	*48.72*
Personal services	55.05	67.18	22.55	*51.85*
Others	52.5	57.89	36.36	*49.38*
Land Holding Size				
Landless	44.14	39.62	22.73	*38.46*
Land Owners				
Marginal	63.45	65.11	32.82	*57.28*
Small	74.15	70.5	30.06	*64.68*
Medium	68.05	64.1	22.44	*56.89*
Large	84.1	74.48	50.78	*72.34*

It can be seen that schooling is positively related to the level of household income. There is a gradual increase in the enrolment ratios as we move from bottom to the top quintile.

Wealthier families can afford more schooling and probably have a higher rate of return on education.

So far as the household occupation is concerned, the household involved in salaried employment have the highest enrolment ratios for all the age-group and is lowest amongst the long term agricultural employees. This is expected since agricultural related occupation will be seasonal and which may affect parents' ability to invest in their children's education. Among those households that are involved in some sort of business, the enrolment for the highest age group is zero which may indicate that the older age children may be involved in looking after the household's business.

Enrolment amongst the landless households are the lowest as compared to the ones with some land holdings which may reflect that land is the most important asset in rural areas, and the poorest households are often those that are landless. Enrolment ratio increases as we move up from marginal to small landowners but drops for medium land owners. When land holdings are small it is quite possible for the household adults to manage it however, when land holdings increase to medium size households may require more helping hands and as a result may end up employing children, as a result the enrolment ratios fall for these households. Also, in the literature, it has been noted that the more land a household has, it raises the productivity of child labour within the household, and hence the opportunity cost of attending school, on one hand; and on the other hand, land is a form of wealth, and is likely to have a positive effect on school enrolment. Likewise, it can be observed that the enrolment ratio seems to be highest for large land owners. This is possible when large land owners employ outside labour on daily basis, hence the children from these households are more likely to attend school (Dreze and Kingdom, 2001).

3.2.4 Socio-Cultural Characteristics

The caste system in India (as may be defined as 'the pattern of social classes in Hinduism') seems to be having a crucial effect, especially in rural India till date. The origin of caste system appears to be based on the basis of similarities or differences in people's profession, wealth, and with respect to their cultural and religious values and practices. To designate the caste hierarchy, the terms upper, middle, backward and Scheduled Castes or Scheduled Tribes (SC/ST) have been utilized.

People who enjoyed upper class status were usually those who were highly educated and wealthy, followed by those in the middle class. The Backward castes are those castes/communities that are notified as socially and educationally backward classes by the State Governments or the Central Government from time to time. They are usually better-off among the poor households, owning small portions of agricultural land, but the land does not constitute a significant source of wealth unless it is fertile. They often get involved in small business activities generally linked to agriculture or livestock (selling eggs or milk, producing sweets or simple prepared foods). Many of these are members of Agricultural Backward Castes and Other Backward Castes; both are higher in the caste hierarchy than Scheduled Castes or Scheduled Tribes (SC/ST) that are identified a typical poor household which is at the low end of the caste hierarchy (Dreze and Kingdom, 2001). The ST and SC households are usually grouped in a separate hamlet at the edge of the village (a practice which is since undergoing a change) but only a few of these families occupy a homestead plot in the village that belongs to their upper-caste employer.

However, the way the caste system operates in specific locations and its impact at different levels may vary from place to place, the true measure of which can be gauged only after careful observation over a period of time. It may however be stated without any

fear of contradiction that the caste system does operate in a rather dominant manner in the rural areas of UP and Bihar.

The caste system, because it is so prevalent, has a big impact on the schooling of the children. For the purpose of this study we have clubbed the upper caste and the middle caste under one category the Upper - Middle caste.

Table 6: Enrolment ratios by Social and Cultural Characteristics

Household Characteristics	**Enrolment ratios (%)**			
	6 – 11 yrs	12 –15 yrs	16 –19 yrs	*Total*
Caste				
Upper - Middle caste	87.58	82.3	44.41	*72.82*
Backward Agriculture	67.31	67.5	32.17	*60.69*
Backward Others	60.38	59.11	20.3	*53.51*
Scheduled caste/tribe	55.23	51.12	28.89	*48.62*
Muslims	53.36	37.5	18.29	*42.79*
Household size group				
Up to 5	54.08	57.76	21.49	*47.27*
6 – 8	64.13	63.12	30.65	*57.81*
9 and above	73	63.23	40.56	*62.47*

Table 6 indicates that the enrolment ratio for the upper – middle caste households is the highest and the lowest enrolment is observed for the Muslim households. The enrolment ratios for the SCs and STs are also low but is higher than that of the Muslim households.

The household size is also known to greatly affect the schooling enrolment for the children. It has been observed in the literature that a large household size and insufficient income of the head of the household tends to increase the dependency ratio and the scarcity of resources. This encourages the children to earn wages. Contrary to the literature, it can be seen that enrolment ratios increase with an increase in the household size indicating that the more people in the household, the lesser is the need for child to do household chores or to get engaged in the labour market, and this may give them more time to attend school.

3.2.5 Home Characteristics

The home related variables serve as an indicator of the economic condition of the household and also the need for children's time in alternative uses. Child contributes to the household by collecting resource from common village properties, for instance, firewood, water, etc (Nerlove, 1991; Dasgupta, 1995). In rural areas distance to water may have major impact on the children's schooling since it is usually the children who would go to fetch the water. Table 7 shows that with increasing distance to the water source, the school enrolment ratios fall for the age groups 12-15 years old and 16 – 19 years old. However for 6-11 year olds, enrolment ratios are highest when the distance to water is over a kilometre. This may be the case if elders go to fetch the water rather than the young children for security reasons.

Table 7: Enrolment ratio by Home Environment

Home Characteristics	**Enrolment ratios (%)**			
	6 – 11 yrs	12 – 15 yrs	16 – 19 yrs	*Total*
Distance to water				
Within premises	73.8	69.05	37.4	*63.39*
Less than 0.5 km	55.7	55.37	24.33	*50.02*
0.5 to 1 km	61.36	26.09	16.67	*44.3*
1 km or over	100	60	0	*55.56*
Source of Light				
Electricity	86	87.4	58.24	*78.39*
Others sources	62.07	58.82	27.09	*53.95*
House structure				
Katcha	59.73	57.85	29.11	*53.05*
Semi – pucca	71.25	67.8	36.53	*61.49*
Pucca	79.41	73.33	38.18	*67.9*

The source of lighting also a measure of household well being is indicative of child's schooling status. Households are divided into two: one with electricity and the other category includes those households that use oil, kerosene, firewood or gobar gas (is obtained by de-composition of organic cow dung) for providing light. Enrolment is

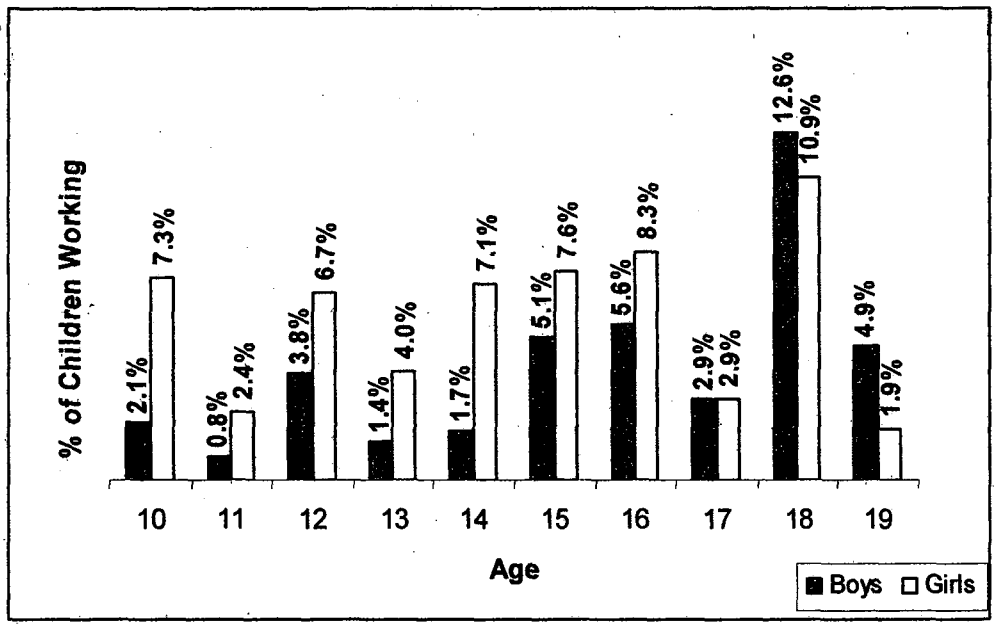
higher for children belonging to households with electricity. Households supplied with electricity may be the relatively wealthier households and need not engage their children in any sort of activity that would take them away from school.

The household structure tends to have a similar affect on enrolment; it increases as the house structure improves. Enrolment is the highest when children belong to the Pucca household and lowest in the Katcha households. This indicates that a household with Pucca structure has a higher ability to send their children to school relative to those children belonging to a less developed household structure.

3.2.6 Characteristics of Working Children

With a view to consider the opportunity cost of child's schooling, we consider the children in the age-group of 10-19 years and who are engaged in any kind of wage work and not enrolled in school. In this sample set, out of the total of 2922, we know that only 24% (i.e. 1131) of the sample children are working; information on the rest is not available. Out of these 24%, at least about 9% (99) children are known to be enrolled in school and working, and about 29% (860) known to be working only. Among these 29%, children, 20% (172) children are working for wages while the remaining 80% do not earn any income for their work. Figure 1, presents the distribution by age of those children who are engaged in work only and are not enrolled out of the total sample children.

Figure 1: Distribution of Children Working, by Age and Sex



From above it can be seen that overall the proportion of girls working are higher than boys, at 17 years of age the numbers are the same, and after 18 years of age the proportion of the boys working are higher. One of the reasons that may explain this

phenomenon is the common practice of girls getting married at an early age and in this case, around 17 years of age may be considered to be the marriageable age in the rural areas. On the other hand, for boys the highest proportion (12.6%) is engaged in work at age 18. In interpreting the findings it needs to be kept in view that this distribution is somewhat limited by data availability.

Table 8 presents a better understanding of the opportunity cost of a child being enrolled in school and thus provides a glimpse of the prevailing situation in UP and Bihar. The table calculates the average value of a child's opportunity cost as a proportion to the average household income in the particular age group. The value of a child's opportunity cost is calculated by making use of the data on wage work. In this sample subset, among the overall working children, 80% work without getting paid. Furthermore, the time allocated to domestic activities or the value of a child's work in the domestic activities has not been recorded. Therefore, this analysis is somewhat limited in presenting the overall impact of the opportunity cost of enrolment in school due to lack of data in child activities.

Table 8: Value of Child Labour as a Proportion of their Household Income

Age	Boys (%)	Girls (%)	Total Contribution (%)
10	6.74	29.86	16.95
11	4.58	23.08	11.48
12	15.35	29.59	22.14
13	9.68	37.78	21.50
14	8.33	62.89	27.44
15	29.33	50.39	39.07
16	28.24	48.63	37.66
17	28.09	50.00	35.97
18	48.65	44.76	46.76
19	48.84	34.78	43.94
Total	**6.74**	**40.13**	**29.43**

The overall finding is that for all the age groups, girls contribute a much higher

proportion of income to the total household income as compared to the boys, which later on reduces a little, relatively speaking. Thus we can say that the opportunity cost to send a girl to school maybe much higher relative to a boy of the same age group. The opportunity cost of sending a girl of 14 years old to school would imply compensating the household by approximately 63% of the household's income, while the compensation for a boy of the same age-group is only about 8%.

From the above preliminary analysis it is seen that children's schooling ratios fall with age. This may be due to the fact that both direct and indirect costs of schooling rise with age. The higher the financial ability of the household to meet the costs of schooling, the higher is the enrolment ratio. The socio-economic factors also play a crucial role in a child's schooling and child work decision. It may also be noted that higher the economic contribution of a child, the lower will be the probability of child schooling.

The available data, thus, give some indication of the relation between a child's schooling at the individual and household level. However, the cross tabulations presented here do not provide us with sufficient information on the statistical significance of the effect of any of the exogenous variables. The independent effect of exogenous variables cannot also be examined using this method (Duraisamy, 2002), and hence, the need for econometric analysis. In the first part of the analysis the paper looks at the relationship between child school enrolment and household wealth controlling for various other household characteristics, and in the second part of the analysis we look at the same analysis but include child's work wage to see how child wage affects their schooling decision.

3.3 ECONOMETRIC ANALYSIS

The prime objective of this paper is to study how household wealth affects school enrolment (E) of children in the school going age of 6-19 years old i.e. the probability of each child being enrolled. For this purpose, in the following section, we make comparisons between probabilities of enrolment when we have different wealth measures.

We can define the variable enrolment such that

$$\text{Enrolment (E)} = \begin{cases} 1 \text{ if the child is enrolled in any kind of formal education} \\ 0 \text{ Otherwise} \end{cases}$$

This is a binary choice variable and we estimate it using binary probit model. This wealth effect may be captured using household income and various other proxies such as expenditure, land ownership and durable goods like owning bicycle, watches or sewing machines. We use land as a measure since a household owning a big piece of land may be reflective of wealthy households, as noted before. Therefore, its impact on schooling is likely to be different. Since we also want to address the issue of gender biasness in school enrolment, the estimation is done separately for girls and boys as the impact of factors affecting child schooling may be gender specific.

The estimating equation can be given by:

$$E_{ihv} = \alpha_0 + \alpha_1 (IND_{ihv}) + \alpha_2 (HH_{hv}) + \alpha_3 (VILL_v) + \epsilon_{ihv} \quad (9)$$

where:

i	indexes the individual child
h	indexes household characteristics

v	indexes village characteristics
E	the probability of a child attending school
IND	individual level characteristics
HH	household level characteristics
VILL	village level characteristics
ϵ_{ihv}	iid disturbance term

As indicated above, IND is the characteristics of the individual child, for example their age, the child's birth order. In a developing country, in a resource constrained family it is usually the last born who has a higher probability of attending schools than the other siblings. HH is the household characteristics that capture the access to resources, difference in tastes for schooling, and opportunity costs for schooling. If the costs of schooling are perceived to be too much higher than the benefits then children will not be sent to schools. VILL represents the village characteristics such as the presence of schools and its distance from the village; the prevailing road conditions which might be important if the children have to travel long distances to go to school.

4 ESTIMATED RESULTS OF CHILDREN'S SCHOOL ENROLMENT

The binary probit results of school enrolment decisions are presented in Tables A4 and A5. The marginal effect of the selected covariates on the probability of attending school is computed using Equation (9). Eight different models are estimated using this equation and are presented separately for boys and girls. The first model is the base model which controls for the household and village characters. For the subsequent models different proxies for income measure (annual income per capita, annual expenditure per capita and their predicted measures, and transitory income; land ownership and ownership of few other durable goods) have been added to the base model, one at a time, to see how the dependant variable 'enrolment' (1 if the child is enrolled in a school) changes as the income proxy changes. The main finding here is that the enrolment probability does get affected when using different proxies of household wealth. In this study, a number of measures have been used to determine the probability of enrolment. An overall observation is that enrolment for girls is better explained by the covariates as reflected in higher pseudo R-squared and more significant variables.

4.1 WEALTH MEASURE

While using the predicted measures as a proxy to household wealth, the positive coefficient indicates that schooling is a normal good and the growth in permanent income will increase the schooling enrolment, i.e. enrolment increases with household wealth. Result shows a positive coefficient estimate for both boys and girls all the models of income, expenditure and transitory income. This implies that enrolment increases with every 1 percentage point increase in either of the income or expenditure measures.

Table 9: Summary Result of Household Wealth Measures

	Boys		Girls	
Household Wealth Measures				
Adult Income	0.037	[2.62]**	0.113	[5.71]**
Expenditure	0.114	[5.56]**	0.014	[0.51]
Predicted Income	0.032	[1.20]	0.159	[4.08]**
Predicted Expenditure	0.079	[1.33]	0.183	[2.23]*
Transitory Income	0.028	[0.80]	0.194	[3.87]**
Land Holdings: Reference Category – Marginal Land Holdings				
Small	-0.061	[2.54]*	0.037	[1.00]
Medium	-0.024	[2.80]**	-0.009	[0.56]
Large	0.001	[0.54]	0.011	[3.13]**
Household Ownership of some selected Durables				
Bicycle	0.205	[5.82]**	0.059	[1.29]
Sewing Machine	0.028	[0.81]	0.21	[4.19]**

Absolute value of z statistics in brackets + significant at 10%; * significant at 5%; ** significant at 1%

The summary result presented in Table 9 shows that the coefficient estimates are greater, and all highly significant, for girls than for boys when the predicted measures of income and transitory income were used implying that an increase in permanent income contributes more to the probability of schooling for the girls than of the boys. When using transitory income, the results show that for girls, the coefficient is positive and significant. However, for boys, it shows a positive effect on enrolment but not significant. This probably may imply that under normal circumstances boys would be sent to school, however for girls, only when there is an increase in the household's capital only then would she be encouraged to go to school and not under ordinary circumstances.

The log of adult income shows a positive and significant effect on enrolment for both boys and girls. However, the log of household expenditure gives significant effect for boys, enrolment increases by 11.4 percentage points, but not for girls its only 1.4 percentage points but is insignificant. Even though these measures are likely to be biased, but for the purpose of comparison the paper look at these measures.

When the size of the land-holdings is considered, results show that enrolment of girls of small land owners as compared to the marginal land owners increases by approximately 4 percentage points. There is a negative effect on enrolment when they come from a household of medium land owners but the effect is insignificant. This is consistent with the findings of Dreze and Kingdom (2001) which show a negative but insignificant effect of land ownership on girl's education. But in the case of large landowners there is a positive and a significant effect. Enrolment increases by approximately 1 percentage points. In case of boys, a negative and a significant effect can be seen when they belong to households of small and medium land owners. Their enrolment decreases by approximately 6 and 2 percentage points respectively. This result implies that more boys from families with small holdings are encouraged to work in fields rather than going to school. This may be on account of the fact that they provide the labour required for the agricultural operations. The study by Nielson and Dubey (2002) also show that ownership of farm land increases the probability of children working in own farm land. In larger lands the job may be mechanized hence the requirement of labour maybe reduced, and as a result enrollment rates may be positively significant. It has also been observed that in case of large landholdings the returns to child's education might be higher than the economic contribution of children since schooling might improve the child's ability to ultimately manage and operate large enterprise (Rosenzweig and Evenson, 1977).

Some of the durable goods possessed by the households (indicative of household wealth) also affect enrolment probabilities. Possession of bicycle increases the enrolment probability by approximately 20 percentage points for boys while for girls households' possession of sewing machines increases their probability by 21 percentage points. The two durable goods, bicycle and sewing machine, used in this analysis are used as a proxy for household asset. It is not necessary that the possession of these two goods in particular will have a huge impact on a child schooling but instead gives the reader an idea about the household's wealth status. Furthermore, the existence of any asset that

help the household generate income will have an impact on the enrolment and the possession of a bicycle and the sewing machine fall into that category. While a sewing machine may help the household in generating additional household income directly, the ownership of a bicycle may provide indirect support to generating additional income by reducing the time required to reach the workplace.

4.2 OTHER FACTORS

The analysis show that children's age seems to be an important factor in determining a child's schooling. The models, for both boys and girls, have control for child's age when it is linear as well as in its non-linear form. In all the models the marginal effect of linear child's age is positive and highly significant indicating that enrolment increases with age. For all the income and expenditure measures the enrolment increases by approximately 23 percentage points for boys and by approximately 21 percentage points for girls. When Land and durables are used the enrolment figures comes down to approximately 20 percentage points for boys and approximately 17 and 20 percentage points for girls respectively. The child age squared term gives us negative but significant values indicating that the enrolment first increases but probably during their teens it drops by approximately 1% for both girls and boys.

The literature on child schooling explains that birth order effects play an important role in schooling decisions. Higher the number of children in the family, the greater will be the strain on the resources available to the household (Parish and Willis, 1993). In order to make ends meet the older siblings are more likely to dropout of school and enter the labour market. In this analysis it can bee seen that this holds true for boys although the effect is negative but insignificant. However, for girls it is just the opposite; the higher the birth order, the higher the probability of enrolment and this effect is significant.

Next we consider the variable if a child is married. If a child is married we are likely to expect that the enrolment ratios will fall as per social norm as they would be expected to earn and raise their own family. The results show that the marital status has a negative effect on both boys and girls but the effect is significant in case of girls education. When girls get married at an early age their enrolment falls by approximately 42 percentage points. The effect is larger while considering landownership, which is about 47 percentage points. As mentioned, this is likely to be the case since after marriage she would be expected to stay at home to do the household chores or forced to enter the labour market under serious financial constraints; and in case of land ownership of the household, the probable need to work in their own land.

Households in developing countries, especially in the rural areas, are large and complex and as a result, nieces, nephews, sisters/brother-in-laws may be often counted amongst the children along with the sons and daughters of the household head. Assuming that the head plays an important role in decisions regarding child schooling, it is often hypothesised that biological children of the household head are more likely to attend school when other variables constant. The estimates show a negative relation between schooling and being the child of the household head, although, the results are not significant for girls but are significant for boys. This may be a reflection of the 'superiority' that the children of the household may like to project vis-à-vis the other children in the family. While the other children have to go to school, the children of the household may not wish to follow that path, which may be seem to be drudgery, and instead go for the 'good-life', so as to show their superiority over other children.

The characteristics of the head of the household, for instance, sex, age and education, also tend to play an important role in schooling decision. In this analysis, the sex of the household doesn't seem to have any significant affect. The age of the household head gives an indication of the stage of the lifecycle at which it stands. Over the life cycle, higher age is generally associated with higher household income and therefore, at that stage more resources are expected to be available for investing in children. From this

analysis however it can be seen that this holds true for girls only. The age of the head of the household plays a positively significant role in girls' education but for boys the outcome is insignificant. This supports the generally held perception that in resource constrained households girls' education occupies a secondary position compared to the boys in the family and it is only when increased resources are available that the girls' education is considered.

So far as the affect of education level of the head of the household is concerned, the pattern that emerges is that parents' schooling has positive and significant effect on child's schooling for mostly all the models and for both boys and girls. The effects is significantly larger for girls schooling than for boys in all the models especially so at the higher education levels of the parents.

As been discussed before, the caste factor plays an important role in any socio-political scenario in India. In the sample studied, positive and significant affect on the enrolment figures are observed when children, both boys and girls, belong to upper-middle caste. Negative effect on enrolment can be seen for all other caste. In case of boys, the caste system plays a negative effect on enrolment for children belonging to backward community and Muslim households. This situation may be reflective of poverty and low parental education, and, therefore, of lower parental motivation to invest in child's schooling in such households (Dreze and Kingdom, 2001). Since the caste classification is actually a form of social stratification for the population, the results imply that belonging to the upper-middle class where wealth constraints are likely to be lower, the gender bias in schooling children disappears. In fact, girls from upper-middle caste and agricultural community have a higher enrolment probability than boys.

The age structure also affects the enrolment probabilities. In case of boys a general trend found is that in all the age groups, any increase in the number of adults increases the enrolment. In the age group of 20 to 55 years old, in particular, shows a positive and

significant effect on schooling, for all income and expenditure models. For girls, however, it is observed that there is a negative and significant effect on their enrolment when the number of children between the age group of 0 – 19 increases. In the age group of 20 to 55 years old, a positive effect can be seen. This implies that the more the children in the household, the more discouraged the girls are form going to school. Instead, they may be expected to do the household chores or look after the little ones in the family while the boys go to school.

The distance to school in the sample studied has two different affects. As the distance to primary school increases the enrolment increases but falls when the distance to middle and senior school increases. The negative effect is significant for boys for both middle and senior school. For girls, a positive significant effect in case of distance to primary school and a negatively significant effect in case of distance to senior school. The positive effect on schooling enrolment even though that distance to primary school is increases may not appear to be too puzzling if it is recognized that all the primary schools are located in the village itself and given the rising aspirations of the people, the households may be keen to send their children to the primary school, the starting point in the education system, notwithstanding the distance.

Table 10: Predicted Probabilities of Enrolment

Proxies for Wealth Measures	Boys Enrolment	Girls Enrolment
Base (No wealth measure)	0.583	0.483
Adult Income	0.584	0.485
Predicted Income	0.587	0.483
Expenditure	0.584	0.484
Predicted Expenditure	0.585	0.483
Transitory Income	0.583	0.484
Land Ownership	0.612	0.579
Ownership of Durables	0.579	0.514

Table 10 above summarizes the predicted probabilities of enrolment for both girls and boys for a sub-sample of 11 year old children. These children belong to male headed

literate households, where the children in the sample considered is the child of the household head. It can be seen that overall, the predicted probability of boys being enrolled in school is much higher than the girls enrolment. The probabilities are approximately the same for the all the income and expenditure measures for boys and girls respectively. When land ownership is included in the model the enrolment probability for boys' increases by 61.2% and for girls' it is approximately 58%. While the inclusion ownership of durables decreases the boys' enrolment probability by approximately 58% and 51% for girls.

5 CHILD WAGES AND WORKING CHILDREN

The previous estimate indicates that different wealth measures have different and significant impact on household's decision to send their children to school. The gender of the child in question, his/ her age, family characteristics and, last but not the least, the economic status of the child's household reflect upon the decision regarding investing in child's schooling. It is evident from the literature that poverty may be a compelling factor for a child to enter the labour market so as to be able to provide some financial support to his/her family (see, for instance, Basu and Van, 1998). Therefore, in order to get a complete picture of the determinants of child schooling, this section looks into another important determinant, which is the opportunity cost of child's schooling to the household.

A number of studies have looked at the implication of the direct costs of schooling on enrolment probabilities (see, for instance, Deininger, 2003). However, when it comes to calculating the opportunity cost of schooling for the school age going children, the literature is somewhat limited. One such exception is the study of rural India conducted by Pal (2003) which examines the impact of the opportunity cost of schooling in terms of child's labour market participation. In the study conducted by Pal, the sibling composition variables are used to capture the implicit opportunity cost of schooling. The opportunity cost of child schooling usually entails the forgone return from the child's labour. The child wage used in this study takes into account wages from all sources for children between the age-group of 10 – 19 years old. The wage includes payments made in both cash and in-kind. It is, however, difficult to estimate the value of child work when the child works without an explicit wage on the household farm or enterprise. Also, in many cases the child may not even be paid, especially if the child is engaged in domestic chores.

In the present study, notwithstanding the data limitations and its attendant implications on the findings, this section attempts to estimate the impact of the child's opportunity cost of his/her school enrolment and how this opportunity cost is affected by his/her family and community. As before, we explore the outcomes for boys and girls separately. However, keeping in view the constraints arising out of limited data availability on child work and child wages, it is recognized that the limitation of data in our study calls for further analysis based on a bigger data set to ensure greater validity of the findings.

5.1 ESTIMATING CHILD WAGES

A further problem in dealing with this issue of child's opportunity cost of schooling is associated with the selection process. Since wages are only observed for those who are engaged in wage work, the opportunity cost of being enrolled in school is over estimated for the sample, and leads to sample selection bias. The sample children who work do not represent a random draw of all children. Rather, they have different characteristics than the others who do not work, and many of these characteristics, such as age and gender, can be expected to affect both their labour market wages and school enrolment. To correct for the sample selection we use the Heckman procedure. The Heckman selection model provides consistent, asymptotically efficient estimates for all parameters in the model. Since child wages represent the opportunity cost of schooling (assuming children are working for wages), it is interesting to determine if child's work is affected by their own wages and their parental wages. However, due to endogeneity, wages cannot be directly used and needs to be predicted. In what follows, we see a detailed discussion of the above-mentioned issues.

Let the wage equation of interest for all children be:

$$y = x\alpha + u_1 \qquad (10)$$

where y = children's market wages

$$u_1 \sim N(0, \sigma)$$

and the selection equation is given by:

$$w = z\beta + u_2 \qquad (11)$$

where w (=1) = children working,

$u_2 \sim N(0, 1)$,

$corr(u_1, u_2) = \rho$

So, the selection rule can be written as: when $w > 0$, data on y (i.e. market wages) would be available. Thus, $u_2 > -z\beta$

Irrespective of the fact whether the data are missing or not, one would ideally like to estimate the population function: $E(y \mid x) = x\alpha$

Since y is observed only for those who work, the regression function for the selected sub-sample to be estimated can be written as:

$$E(y \mid x, \text{sample selection rule}) = x\alpha + E(u_1 \mid w > 0)$$
$$= x\alpha + E(u_1 \mid u_2 > -z\beta) \qquad (12)$$

When the conditional expectation of u_1 is zero, the selected sample regression function is the same as the population regression function. In this case, OLS regression provides unbiased estimates. In the case of independence between u_1 and u_2 i.e. $\rho = 0$, the conditional mean of u_1 is zero. However, in the case of sample selection $\rho \neq 0$ and the OLS estimates are biased. The regression function depends on x and z, may be represented as:

$$E(y \mid x, w > 0) = x\alpha + E(u_1 \mid u_2 > -z\beta) \qquad (13)$$

One of the most widely used methods, the Heckman selection process, pioneered by Heckman (1979), allows us to use information from non-working children to improve the

estimates of the parameters in the regression model. Heckman's procedure is based on the assumption of normality of errors in equation (3). Now, the above equation can be rewritten as:

$$E(y \mid x, w > 0) = x\,\alpha + \lambda\,\alpha_{\lambda} + \mu \qquad (14)$$

where λ = denotes the probability that a population observation with characteristics z is selected into the observed sample. λ is also known as the inverse mills ratio.

Thus, in the Heckman's two-step method, at first the selectivity rule is estimated i.e. the participation in work is estimated represented by equation (11) and in the second step the wage equation is estimated. In estimating the wage equation (10), among other regressors, λ is also used that has been calculated from first step.

In order to estimate equation (14) we have identified selection beyond the group of variables included in the wage equation. The estimation for the selectivity corrected earnings is provided in table A6. The results of this estimation are used to predict wages of children. To capture the non-linearity in children's wages, log of child's wage is used in the model. Besides the predicted wages of children, other individual and household level characteristics are also considered in the model. The results also indicate that the selection term lambda or the inverse Mill's ratio is negative which indicates that unobservable that influence children to undertake wage employment also likely to decrease the earnings potential of the children.

5.2 ESTIMATED RESULTS INCLUDING CHILD WAGES ON SCHOOL ENROLMENT

Child wages can affect school enrolment in two ways. Increase in child wages can either reduce enrolment signifying that opportunity cost of child's time is higher if they are working for wages rather than going to school, hence reducing the enrolment rates. On the other hand, increase in child wages may also lead to increase in child schooling indicating that children work and contribute towards their own schooling. Although, compulsory school provided by Government is free for all children, there are however other associated costs, for instance, expenditure on uniform, books, stationary, and for higher classes, their tuition fees. Hence, even if the opportunity cost of child time may not be very high, but to cover these schooling costs a child maybe be compelled to work, especially so when they belong to rural areas.

The marginal effects of child earnings on their enrolment are presented in table A7 and A8. The set of regression are analysed as was done in previous section but with an additional inclusion of predicted log wages of children. The summary of the results for the household wealth is presented in the Table 11 below.

Table 11: Summary Result of Child Wages and Household Assets

	BOYS				GIRLS			
	Predicted Child Income		Household Wealth Measure		Predicted Child Income		Household Wealth Measure	
BASE	0.021	[4.39]**			0.045	[3.27]**		
Adult							0.109	[5.48]**
Income	0.020	[4.21]**	0.033	[2.30]*	0.040	[2.83]**		
Expenditure	0.020	[4.19]**	0.111	[5.41]**	0.045	[3.25]**	0.011	[0.39]
Predicted							0.154	[3.94]**
Income	0.020	[4.33]**	0.026	[0.96]	0.043	[3.09]**		
Predicted							0.195	[2.39]*
Expenditure	0.020	[4.34]**	0.069	[1.16]	0.047	[3.38]**		
Transitory							0.181	[3.61]**
Income	0.020	[4.35]**	0.020	[0.58]	0.041	[2.95]**		
Land	-0.183	[2.48]*			-0.184	[1.51]		
Durables	0.017	[3.37]**			0.040	[2.39]*		
Land Holdings: Reference Category – Marginal Land Holdings								
Small	-0.169	[3.39]**			-0.072	[0.89]		
Medium	-0.013	[1.29]			0.001	[0.06]		
Large	-0.005	[1.80]+			0.005	[1.02]		
Household Ownership of some selected Durables								
Bicycle	0.191	[5.38]**			0.051	[1.09]		
Sewing Machine	0.03	[0.88]			0.217	[4.31]**		

Absolute value of z statistics in brackets + significant at 10%; * significant at 5%; ** significant at 1%

The results show that for both boys and girls, an increase in child predicted wages increases the school enrolment significantly by approximately 2 percentage points for boys and 4 percentage points for girls. However, when land ownership is considered an increase child wages has a negative effect on enrolment. This effect is significant for boys implying that the opportunity cost for boys' time is higher if they attend school. For girls this impact is insignificant. This is probably indicative of the fact that the demand for boys is higher for field work as compared to the girls.

When the various sizes of land holdings are considered, for boys land ownership has a negative impact on their schooling. The impact is significant when they belong to

households with small as well as large land holdings. It is generally the case that with small land holdings the labour requirement is higher since the agricultural operations are performed manually. The requirement for labour even in the relatively large holdings is not likely to go down since agricultural operations in these holdings are also generally not mechanized in view of the limited resources available with the land owners. For girls, the impact of small land ownership is negative on their schooling and positive for other larger land holdings, although the results are insignificant.

The remaining results are all similar to the previous analysis done in Section 4. This shows that the impact of child wages, on the whole, does not have much impact on child schooling hence no significant difference is found among the two analysis. The only difference observed is while considering the land ownership variable. This may indicate that basically children in rural areas are engaged in agricultural work. But the wages received in most cases may be insignificant. Many children maybe work in their own agricultural land and hence receive no wages.

Table 12 below summarizes the predicted probabilities of enrolment for the sample studied for both girls and boys when log of child wages have been added to the model.

Table 12: Predicted Probabilities of Enrolment

Proxies for Wealth Measures	Boys Enrolment	Girls Enrolment
Base (No wealth measure)	0.583	0.484
Adult Income	0.584	0.486
Predicted Income	0.588	0.484
Expenditure	0.584	0.485
Predicted Expenditure	0.585	0.484
Transitory Income	0.583	0.485
Land Ownership	0.612	0.581
Ownership of Durables	0.581	0.516

Table 12 above summarizes the predicted probabilities of enrolment for both girls and boys for a sub-sample of 11 year old children. These children belong to male headed

literate households, where the children in the sample considered is the child of the household head, and their mean wage earned by the child. It can be seen that overall, the predicted probability of boys being enrolled in school is much higher than the girls enrolment. The outcome quite similar to the outcome in Table 10 done previously, even though the models here include predicted child work wages. Since in the data analysed the number of children working for wages is found to be low, the impact of inclusion of child wages in the model is seen to have little impact on the predicted probabilities of enrolment.

6 CONCLUDING REMARKS

This paper investigates the impact of household wealth on school enrolment and child work for two states in India, namely Bihar and Uttar Pradesh. The approach adopted has been to integrate the observations from the field study as revealed by the collected data with the relevant economic theory and an econometric analysis.

This paper looks at the impact of actual and predicted income and expenditure measures, transitory income, and household's ownership of land and household durables, proxied by bicycle and sewing machine, on child schooling. The study also analyzes the impact of opportunity cost of children's schooling, and that of the child wages, on child schooling, controlling for the household characteristics. The study shows the impact of child schooling for boys and girls separately, the findings reflective of the gender bias that is fairly prevalent in the rural economies of India.

As seen from the study, different measures of household wealth like income, expenditure and transitory income have positive effect on the enrolment probabilities for both girls and boys. The effect of predicted measures and that of transitory income on schooling decisions is greater for girls as compared to boys. So far as the ownership of land is concerned, when child wages are included in the regression, it gives a negative relation to school enrolment, and this is significant for boys. Household durables have a positive effect on enrolment probabilities. The ownership of bicycle tends to favour boys' schooling while the existence of sewing machine tends to favour girls' schooling.

It is well known that in spite of the good intentions of policy planners, education even at the basic levels elude many children in the rural areas. The findings of this study that the older the child, the greater is his/her probability of being out of school, although found to be valid for boys only, somewhat reinforces the above observation.

The study highlights a few striking features. First, it is seen that even when the economic

status of the rural population improves it may not automatically translate into decisions in favour of increased schooling for boys, as observed in the case of transitory income. As transitory income increases enrolment for boys increase but the effect is insignificant. However, an increase in the transitory income has a positive and significant impact on girls' schooling. Under normal circumstances girls may not get educated but a positive income shock promotes girls' education.

Secondly, child marriage is an important issue and needs to be appropriately addressed since it especially hinders girls' schooling. Given the fact that an educated woman brings a number of advantages to the members of her family, it is imperative that concerted efforts are made by all concerned to prevent child marriages and promote schooling of girl child.

Third, the sibling size in the family impacts schooling decisions. As shown by the study, the greater the number of children in the family and the higher the birth order of the child, the lower may be the probability of being in school. While this finding of the study holds good for boys, the opposite holds good for girls, i.e. the higher the birth order, the higher is the probability of being enrolled in school.

Fourthly, the caste factor may also play a role in schooling decisions. As revealed by the study, the enrolment probabilities for both boys and girls are the lowest when they belong to the backward castes as compared to the upper- middle castes. This may be reflective of the lower income status of the backward castes, which limits their investment options.

Fifthly, as can be expected, the distance to school is seen as a hindrance for child schooling. As seen from the study, the enrolment level falls as the distance to school increases, especially after primary schooling. Ensuring accessibility to good quality schools for all, particularly for post-primary education, therefore, needs serious attention.

And lastly, higher child labour wages together with household credit constraint encourages parents to send there children to work rather than to attend school. However

in case of land holdings an opposite effect is being found. Household's ownership of land reduces children's schooling as their wages increase.

The findings of the study have policy implications. The results highlight the need for sustained efforts in promoting schooling by all the stakeholders, including households. In doing so, it would be necessary to recognize that developmental initiatives aimed at reducing poverty (and making resources available to the underprivileged), even when successful, may not be a sufficient condition for achieving more educated human resources. Efforts need to be directed towards creating an environment which is conducive to promotion of schooling. This includes providing for adequate good quality schools in the proximity of the habitations and ensuring that schooling is seen as an attractive option by the students, and not as drudgery. The importance of small family size, apart from its other beneficial impact, also to prevent resource dilution which has an adverse impact on schooling decisions, needs to be instilled in the people of rural areas.

Efforts have also to be made, both at the social and political levels, to promote the culture of equality between the genders, which advocates equality in educational opportunities, irrespective of gender. Promotion of schooling for female children and doing away with the gender bias in such decisions, wherever it exits, have to be specifically targeted. The estimated results are also a pointer to the importance of preventing child marriage, especially for girls. In this regard, apart from efforts aimed at social awakening to the ills of child marriage, the populaces, especially in the rural areas, has to be sensitized regarding the legal implications of violation of the national laws by arranging marriages of children below the age prescribed by law.

From the perspective of further research, the issues which have been highlighted above, in their various facets, may provide some useful basis for further research. It is also clear that given the nature of the subject that is proposed to researched, special attention has to be paid in deciding about methodology to be used for data collection, both in terms of

quality and quantity.

Finally, it also needs to be pointed out that since the present study focuses on linkages between poverty and school enrolment, the demand side of child labour market (e.g. financial incentives for an employer to employ a child if the child performs the tasks of an adult and gets paid a child's wage, not an adult's wage) has not been dealt with in any detail in the study. This is not to say that the demand side of child labour market is not a serious-enough issue in addressing the concerns relating to child labour, including those relating to child schooling. In fact, the demand-side of child labour issues also need to be clearly understood and thoroughly researched for any comprehensive treatment of the subject.

Table A1: List of Variable Definitions

Variable name	Variable Definitions
Girl Child	1 if the child is a girl; 0 if child is a boy
Child Age	Age of the child
Child Age Squared	Child Age Squared
Birth Order	Birth order of the sample children, 6 -19 years old, generated by household.
Child Married	1 if child is or was ever married; 0 Otherwise
Child of Head	1 if the child is son or daughter of the head of the household; 0 Otherwise
Enrolment	1 if the children are currently enrolled in any school; 0 Otherwise.
Child Work	1 if children are engaged in any kind of employment; 0 Otherwise.
Log of Child Income	Log of child's wage.
Predicted Child Income	Predicted log of child's wage by Heckman selection.
Female Head	1 if the household head is female; 0 if headed by a male member.
Head Age	Age of the head of the household
Bihar	1 if observations belong to the state of Bihar; 0 if they belong to UP (Uttar Pradesh).
Education Level for the Household Head	
Illiterate	1 if head is an Illiterate; 0 otherwise
Literate	1 if head is Literate; 0 otherwise
Below Primary	1 if head has education level below Primary; 0 otherwise
Primary	1 if head has education level up to Primary; 0 otherwise
Middle	1 if head has education level up to Middle; 0 otherwise
Matric	1 if head has education level up to Matric; 0 otherwise
Intermediate and above	1 if head has education level up to Intermediate or above; 0 otherwise
Main Source of Livelihood for the Household	
Own Farm Activities	1 if the main source of earnings for the household comes from own farm activities; 0 otherwise
Casual labour	1 if earnings comes from being employed as a casual labourer; 0 otherwise
Long-term agricultural labourer	1 if earnings comes from being from being a long term agricultural labourer; 0 otherwise
Salaried employment	1 if earnings comes from being from being engaged in salaried employment; 0 otherwise
Personal services	1 if earnings comes from doing personal services, e.g. servants; 0 otherwise
Traders	1 if earnings come from being petty or major buyers; 0 otherwise
Others	1 if source of income is non-labour, e.g. collection, charity, pensioners; 0 otherwise

Caste Divisions

Upper - Middle Caste	1 if observations belong to Upper or Middle caste; 0 otherwise
Backward - Agriculture	1 if observations belong to Backward Agricultural caste; 0 otherwise
Backward Other	1 if observations belong to Backward other caste; 0 otherwise
SC/ST	1 if observations belong to Schedule Caste and Schedule Tribe; 0 otherwise
Muslim	1 if observations belong to Muslim community; 0 otherwise

Age Structure of the Household

Age Structure 0 - 3	1 = total number of household members within the age group of 0 to 3 years old; 0 otherwise
Age Structure 4 - 6	1 = total number of household members within the age group of 4 to 6 years old; 0 otherwise
Age Structure 7 - 10	1 = total number of household members within the age group of 7 to 10 years old; 0 otherwise
Age Structure 11 - 15	1 = total number of household members within the age group of 11 to 15 years old; 0 otherwise
Age Structure 16 - 20	1 = total number of household members within the age group of 16 to 20 years old; 0 otherwise
Age Structure 21 - 40	1 = total number of household members within the age group of 21 to 40 years old; 0 otherwise
Age Structure 41 - 60	1 = total number of household members within the age group of 41 to 60 years old; 0 otherwise
Age Structure 61- 100	1 = total number of household members within the age group of 61 to 100 years old; 0 otherwise
Age Structure 0 - 5	1 = total number of household members within the age group of 0 to 5 years old; 0 otherwise
Age Structure 6 - 19	1 = total number of household members within the age group of 6 to 19 years old; 0 otherwise
Age Structure 20 - 55	1 = total number of household members within the age group of 20 to 55 years old; 0 otherwise
Age Structure 56- 100	1 = total number of household members within the age group of 56 to 100 years old; 0 otherwise

Household Income and Expenditure Measures (in Rs 1000)

Household Income	Log of summation of income from all sources of both adult and child, divided by 1000, for each household member.
Predicted Household Income	Predicted value of the log of household income controlling for various household characteristics.
Adult Income	Log of summation of income earned by adult members of the household, divided by 1000, for each household member.
Predicted Income	Predicted value of the log of adult income controlling for various household characteristics.
Expenditure	Log of summation of expenditure on food and non-food items and imputed consumption value, divided by 1000, for each household member.

Predicted Expenditure	Predicted value of the log of expenditure controlling for various household characteristics.
Transitory Income	Difference between Predicted Adult Income and Predicted Adult Expenditure.
Land Holdings (in Acres)	
Marginal	1 = the actual land size is less than equal to 0.62 ; 0 otherwise
Small	1 = the actual land size is greater than 0.62 but less than equal to 1.5; 0 otherwise
Medium	1 = the actual land size is greater than 1.5 but less than equal to 4.3; 0 otherwise
Large	1 = the actual land size is greater than 4.3 but less than equal to 93; 0 otherwise
Household Ownership of some selected Durables	
Bicycle	1 if household owns bicycle; 0 otherwise
Sewing Machine	1 if household owns sewing machine; 0 otherwise
Housing	
Rooms	Number of separate rooms in a house
Type of House Structure	
Katcha	1 if it is a temporary housing structure often made with mud walls, thatch roof or a tile roof; 0 otherwise
Semi - Pucca	1 if it is a semi-permanent housing structure, made out of mud, wood, and brick; 0 otherwise
Pucca	1 if it is a permanent housing structure; 0 otherwise
Utilities	
Toilets	1 if household has access to any form of toilet, e.g. flush system, septic tank, etc; 0 otherwise
Electricity	1 if electricity is the main source of light; 0 otherwise i.e. oil, kerosene, no lighting
Firewood	1 if firewood is used as the main source of cooking fuel; 0 otherwise e.g. gas, coal, etc
Household's Distance to Water Source	
Within Premise	1 if water source within premise; 0 otherwise
Less than 0.5 km	1 if water source is less than 0.5km; 0 otherwise
0.5 - 1 km	1 if water source is within 0.5-1 km; 0 otherwise
Above 1 km	1 if water source is above 1 km; 0 otherwise
Road Accessibility to within the Village	
Trail only	1 if trail only, no roads; 0 otherwise
Katcha	1 if katcha road; 0 otherwise
Paved	1 if paved road; 0 otherwise
Pucca	1 if pucca road; 0 otherwise
Distance to:	
Primary School	Distance to Primary School (in km)
Middle School	Distance to Middle School (in km)
Senior School	Distance to Senior School (in km)

Table A2: List of Descriptive Statistics of all the Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Girl Child	4675	0.44342	0.4968418	0	1
Child Age	4675	11.5365	3.990643	6	19
Child Age Squared	4675	149.012	97.85089	36	361
Birth Order	4675	2.32021	1.480882	1	13
Child Married	4675	0.09027	0.2865951	0	1
Child of Head	4675	0.68727	0.4636539	0	1
Enrolment	4325	0.61688	0.4862037	0	1
Child Work	4675	0.18396	0.3874907	0	1
Log of Child Income	4675	0.32654	1.57837	0	10.6736
Predicted Child Income	4675	2.64982	2.03779	-1.4774	6.65636
Female Head	4675	0.02545	0.157518	0	1
Head Age	4675	47.594	12.65215	17	95
Bihar	4675	0.4320856	0.4954191	0	1
Education Level for the Household Head					
Illiterate	4675	0.47636	0.4994944	0	1
Literate	4675	0.0661	0.2484769	0	1
Below Primary	4675	0.07529	0.2638936	0	1
Primary	4675	0.06759	0.251074	0	1
Middle	4675	0.14588	0.353026	0	1
Matric	4675	0.07102	0.2568791	0	1
Intermediate and above	4675	0.09775	0.2970135	0	1
Main Source of Livelihood for the Household					
Own Farm Activities	4675	0.5061	0.5000163	0	1
Casual labour	4675	0.2308	0.4213911	0	1
Long-term agricultural labourer	4675	0.00791	0.0886199	0	1
Salaried employment	4675	0.10481	0.3063449	0	1
Personal services	4675	0.00834	0.0909639	0	1
Traders	4675	0.11551	0.3196682	0	1
Others	4675	0.01733	0.1304977	0	1
Caste Divisons					
Upper - Middle Caste	4675	0.2062	0.4046214	0	1
Backward Agriculture	4675	0.25904	0.4381531	0	1
Backward Other	4675	0.1739	0.3790672	0	1
SC / ST	4675	0.27187	0.4449717	0	1
Muslim	4675	0.08898	0.284751	0	1
Age Structure of the Household					
Age Structure 0 - 3	4675	0.71102	0.9071794	0	5
Age Structure 4 - 6	4675	0.81668	0.8287076	0	4
Age Structure 7 - 10	4675	1.36642	1.053483	0	7
Age Structure 11 - 15	4675	1.17048	0.928225	0	5
Age Structure 16 - 20	4675	0.91765	0.9659693	0	4
Age Structure 21 - 40	4675	2.15144	1.574208	0	9
Age Structure 41 - 60	4675	0.93262	0.8822133	0	4
Age Structure 61- 100	4675	0.36043	0.6448637	0	4

Age Structure 0 - 5	4675	1.21198	1.256641	0	8
Age Structure 6 - 19	4675	3.60406	1.844867	1	13
Age Structure 20 - 55	4675	3.10417	1.835342	0	12
Age Structure 56- 100	4675	0.50652	0.7453394	0	4
Household Income and Expenditure Measures					
Household Income	4675	1.07638	0.7783032	-2.8345	4.4963
Predicted Household Income	4675	1.07638	0.4930238	0.11665	3.02579
Adult Income	4675	1.03325	0.7991204	-2.8345	4.4963
Predicted Income	4675	1.03325	0.5159878	-0.0076	3.08398
Expenditure	4675	1.28238	0.5766189	-0.0671	5.29138
Predicted Expenditure	4675	1.28238	0.3213711	0.67441	2.91478
Transitory Income	4675	-0.2491	0.354355	-1.0045	0.89533
Land Holdings (in Acres)					
Marginal	3615	0.09209	0.1836344	0	0.62
Small	3615	0.26362	0.4682764	0	1.5
Medium	3615	0.69755	1.260541	0	4.3
Large	3615	3.19947	7.887622	0	93
Household Ownership of some selected Durables					
Bicycle	3671	0.8687	0.3377735	0	1
Sewing Machine	3671	0.15336	0.3603873	0	1
Housing					
Rooms	4675	3.63444	3.117931	0	21
Type of House Structure					
Katcha	4675	0.668877	0.4706676	0	1
Semi - Pucca	4675	0.14053	0.3475782	0	1
Pucca	4675	0.19059	0.392807	0	1
Utilities					
Toilets	4675	0.07487	0.2632037	0	1
Electricity	4675	0.1277	0.3337918	0	1
Firewood	4675	0.3031	0.4596479	0	1
Household's Distance to Water Source					
Within Premise	4675	0.53048	0.4991234	0	1
Less than 0.5 km	4675	0.44898	0.4974438	0	1
0.5 - 1 km	4675	0.0169	0.1289046	0	1
Above 1 km	4675	0.00193	0.0438388	0	1
Road Accessibility to within the Village					
Trail only	4675	0.0954	0.2937995	0	1
Katcha	4675	0.35701	0.4791677	0	1
Paved	4675	0.31401	0.4641703	0	1
Pucca	4675	0.22439	0.4172213	0	1
Distance to:					
Primary School	4675	1.12935	1.700673	0	6
Middle School	4675	3.40404	3.49649	0	14
Senior School	4675	5.41425	5.012629	0	21

Table A3: Estimates Of Income Per Capita And Expenditure Per Capita As Functions Of Long-Run Household Characteristics

	Household Income	Adult Income	Expenditure
Female Head	-0.201 [3.47]**	-0.226 [3.85]**	-0.132 [2.84]**
Head Age	0.004 [4.67]**	0.004 [5.07]**	0.001 [1.91]+
Education Level for Household Head: Reference - Illiterate Household Heads			
Literate	0.024 [0.63]	0.062 [1.63]	0.027 [0.89]
Below Primary	0.155 [4.26]**	0.187 [5.05]**	0.027 [0.94]
Primary	0.194 [5.17]**	0.221 [5.81]**	0.124 [4.13]**
Middle	0.026 [0.88]	0.042 [1.43]	0.101 [4.38]**
Matric	0.066 [1.72]+	0.103 [2.64]**	0.199 [6.44]**
Intermediate and above	0.082 [2.08]*	0.121 [3.03]**	0.190 [6.00]**
Caste: Reference - Schedule Caste and Schedule Tribe (SC/ST)			
Upper - Middle Caste	0.188 [5.71]**	0.181 [5.45]**	0.208 [7.86]**
Backward - Agriculture	0.186 [6.78]**	0.204 [7.34]**	0.089 [4.02]**
Backward Other	0.194 [6.72]**	0.171 [5.84]**	0.013 [0.58]
Muslim	0.138 [3.83]**	0.081 [2.22]*	0.145 [5.02]**
Main source of livelihood, Reference - Own Farm Activities			
Casual labour	-0.024 [0.93]	-0.062 [2.39]*	0.012 [0.60]
Long-term agricultural labourer	0.100 [0.98]	0.120 [1.16]	0.157 [1.93]+
Salaried employment	0.866 [26.79]**	0.856 [26.14]**	0.074 [2.85]**
Personal services	0.435 [4.41]**	0.361 [3.61]**	0.155 [1.97]*
Traders	0.434 [14.15]**	0.466 [14.97]**	0.103 [4.19]**
Others	0.200 [2.83]**	0.174 [2.43]*	0.310 [5.48]**
House Structure, Reference - Katcha			
Semi - Pucca	0.076 [2.79]**	0.089 [3.21]**	0.059 [2.69]**
Pucca	0.241 [8.99]**	0.258 [9.53]**	0.041 [1.92]+
Number of separate rooms	0.071 [18.22]**	0.070 [17.69]**	0.051 [15.10]**
Toilets	0.208 [4.98]**	0.216 [5.11]**	0.171 [5.02]**
Electricity	-0.066 [2.06]*	-0.057 [1.75]+	-0.078 [3.01]**
Firewood	0.022 [1.08]	0.029 [1.36]	-0.028 [1.68]+
Distance to Water Source, Reference - Within Premise			
Less than 0.5 km	-0.092 [4.45]**	-0.114 [5.42]**	-0.104 [6.25]**
0.5 - 1 km	0.059 [0.83]	0.068 [0.94]	-0.106 [1.87]+
Above 1 km	0.430 [2.12]*	0.215 [1.04]	-0.174 [1.07]
Road Accessibility, Reference - Katcha Road			
Trail only	-0.201 [6.35]**	-0.180 [5.60]**	-0.111 [4.38]**
Paved	-0.171 [5.27]**	-0.155 [4.72]**	-0.180 [6.93]**
Pucca	-0.070 [2.07]*	-0.059 [1.71]+	0.046 [1.70]+

Household Age Structure, Reference - Age group - Above 60 years old			
Age Structure 0 - 3			-0.055 [5.82]**
Age Structure 4 - 6			-0.067 [6.56]**
Age Structure 7 - 10			-0.078 [9.81]**
Age Structure 11 - 15			-0.038 [4.57]**
Age Structure 16 - 20			-0.001 [0.07]
Age Structure 21 - 40			0.012 [1.81]+
Age Structure 41 - 60			0.001 [0.12]
Constant	0.425 [7.50]**	0.350 [6.10]**	1.205 [26.07]**
Observations	4675	4675	4675
Adjusted R-squared	0.40	0.41	0.31

Absolute value of z statistics in brackets
+ significant at 10%; * significant at 5%; ** significant at 1%

Table A4: Marginal Estimates for Boys Enrolment controlling for different measures of Household Wealth

	BASE	Adult Income	Expenditure	Predicted Income	Predicted Expenditure	Transitory Income	Land	Durables
Age	0.235	0.236	0.232	0.235	0.234	0.235	0.208	0.204
	[13.16]**	[13.21]**	[12.97]**	[13.17]**	[13.12]**	[13.17]**	[11.77]**	[10.94]**
Child Age Squared	-0.010	-0.010	-0.010	-0.010	-0.010	-0.010	-0.009	-0.009
	[14.58]**	[14.64]**	[14.60]**	[14.58]**	[14.59]**	[14.58]**	[13.03]**	[12.17]**
Birth Order	-0.016	-0.016	-0.006	-0.016	-0.014	-0.017	-0.020	-0.023
	[1.27]	[1.23]	[0.49]	[1.29]	[1.12]	[1.33]	[1.62]	[1.79]+
Child Married	-0.083	-0.084	-0.082	-0.082	-0.081	-0.083	-0.095	-0.036
	[1.52]	[1.54]	[1.51]	[1.51]	[1.50]	[1.52]	[1.80]+	[0.71]
Child of Head	-0.070	-0.064	-0.066	-0.066	-0.065	-0.068	-0.079	-0.084
	[2.37]*	[2.15]*	[2.24]*	[2.25]*	[2.21]*	[2.32]*	[2.75]**	[2.75]**
Female Head	-0.017	0.001	0.005	-0.005	-0.006	-0.011	0.020	0.000
	[0.25]	[0.01]	[0.08]	[0.08]	[0.09]	[0.16]	[0.30]	[0.00]
Head Age	-0.000	-0.000	-0.001	-0.000	-0.000	-0.000	-0.001	0.000
	[0.08]	[0.34]	[0.55]	[0.40]	[0.45]	[0.23]	[1.04]	[0.02]
State: Bihar	-0.174	-0.168	-0.198	-0.175	-0.179	-0.174	-0.089	-0.061
	[8.23]**	[7.90]**	[9.07]**	[8.26]**	[8.33]**	[8.18]**	[3.73]**	[2.54]*
Education Level for Household Head: Reference Category - Illiterate Household Heads								
Literate	0.135	0.132	0.133	0.132	0.132	0.133	0.129	0.118
	[4.16]**	[4.06]**	[4.10]**	[4.04]**	[4.04]**	[4.10]**	[4.06]**	[3.60]**
Below Primary	0.141	0.136	0.131	0.136	0.135	0.138	0.116	0.084
	[4.67]**	[4.47]**	[4.27]**	[4.40]**	[4.37]**	[4.54]**	[4.05]**	[2.43]*
Primary	0.136	0.129	0.118	0.128	0.127	0.132	0.069	0.091
	[4.19]**	[3.91]**	[3.50]**	[3.78]**	[3.73]**	[4.00]**	[2.04]*	[2.72]**
Middle	0.188	0.184	0.183	0.184	0.180	0.188	0.136	0.148
	[7.18]**	[6.97]**	[6.91]**	[6.97]**	[6.53]**	[7.18]**	[5.20]**	[5.53]**
Matric	0.242	0.238	0.231	0.239	0.235	0.241	0.189	0.190
	[8.05]**	[7.81]**	[7.48]**	[7.77]**	[7.29]**	[8.04]**	[6.55]**	[6.32]**

Intermediate and above	0.265	0.258	0.254	0.259	0.257	0.263	0.213	0.226
	[8.35]**	[7.77]**	[7.74]**	[7.52]**	[7.23]**	[8.02]**	[7.10]**	[7.39]**
Caste: Reference Category - Schedule Caste and Schedule Tribe (SC/ST)								
Upper-Middle Caste	0.143	0.136	0.126	0.137	0.125	0.144	0.100	0.085
	[4.60]**	[4.31]**	[3.96]**	[4.31]**	[3.59]**	[4.63]**	[3.14]**	[2.56]*
Backward Agriculture	-0.004	-0.009	-0.022	-0.011	-0.013	-0.007	-0.029	-0.042
	[0.16]	[0.35]	[0.81]	[0.40]	[0.47]	[0.26]	[1.01]	[1.41]
Backward Other	-0.024	-0.034	-0.021	-0.031	-0.026	-0.029	-0.050	-0.095
	[0.84]	[1.16]	[0.73]	[1.04]	[0.90]	[0.98]	[1.52]	[2.86]**
Muslim	-0.083	-0.091	-0.090	-0.087	-0.098	-0.082	-0.141	-0.158
	[2.12]*	[2.29]*	[2.27]*	[2.21]*	[2.39]*	[2.08]*	[3.02]**	[3.50]**
Household Age Structure, Reference category: Age group - Above 55 years old								
Age Structure 0-5	0.014	0.018	0.018	0.014	0.018	0.013	0.006	0.022
	[1.38]	[1.75]+	[1.80]+	[1.46]	[1.74]+	[1.28]	[0.59]	[2.13]*
Age Structure 6-19	0.008	0.010	0.006	0.008	0.011	0.007	0.013	0.012
	[0.90]	[1.11]	[0.66]	[0.88]	[1.12]	[0.79]	[1.38]	[1.20]
Age Structure 20-55	0.017	0.012	0.013	0.015	0.014	0.016	0.010	0.003
	[2.10]*	[1.46]	[1.59]	[1.82]+	[1.67]+	[2.01]*	[1.32]	[0.40]
Distance to School								
Distance to Primary School	0.006	0.006	0.004	0.006	0.005	0.006	0.007	0.008
	[0.91]	[0.96]	[0.64]	[0.90]	[0.83]	[0.93]	[1.07]	[1.27]
Distance to Middle School	-0.006	-0.006	-0.006	-0.006	-0.006	-0.006	-0.004	-0.008
	[1.74]+	[1.79]+	[1.75]+	[1.77]+	[1.77]+	[1.76]+	[1.04]	[2.03]*
Distance to Senior School	-0.010	-0.010	-0.010	-0.010	-0.010	-0.010	-0.009	-0.007
	[4.83]**	[4.80]**	[4.58]**	[4.77]**	[4.86]**	[4.76]**	[4.14]**	[3.14]**

Household Wealth Measures								
Log Adult Income		0.037						
		[2.62]**						
Log Expenditure			0.114					
			[5.56]**					
Predicted Adult Inc				0.032				
				[1.20]				
Predicted Exp					0.079			
					[1.33]			
Transitory Income						0.028		
						[0.80]		
Land Holdings: Reference Category - Marginal Land Holdings								
Small							-0.061	
							[2.54]*	
Medium							-0.024	
							[2.80]**	
Large							0.001	
							[0.54]	
Household Ownership of some selected Durables								
Bicycle								0.205
								[5.82]**
Sewing Machine								0.028
								[0.81]
Pseudo R2	0.2368	0.2391	0.2474	0.2373	0.2374	0.2370	0.2347	0.2455
Observations	2472	2472	2472	2472	2472	2472	1926	1913

Absolute value of z statistics in brackets
+ significant at 10%; * significant at 5%; ** significant at 1%

Table A5: Marginal Estimates for Girls Enrolment controlling for different measures of Household Wealth

	BASE	Adult Income	Expenditure	Predicted Income	Predicted Expenditure	Transitory Income	Land	Durables
Age	0.211	0.198	0.211	0.208	0.210	0.208	0.171	0.200
	[7.21]**	[6.70]**	[7.21]**	[7.08]**	[7.17]**	[7.10]**	[5.09]**	[6.07]**
Child Age Squared	-0.011	-0.011	-0.011	-0.011	-0.011	-0.011	-0.010	-0.011
	[8.86]**	[8.42]**	[8.87]**	[8.76]**	[8.89]**	[8.69]**	[6.78]**	[7.66]**
Birth Order	0.040	0.043	0.041	0.040	0.044	0.035	0.050	0.022
	[2.45]*	[2.60]**	[2.48]*	[2.40]*	[2.69]**	[2.12]*	[2.82]**	[1.22]
Child Married	-0.424	-0.420	-0.424	-0.427	-0.427	-0.424	-0.477	-0.417
	[5.58]**	[5.47]**	[5.58]**	[5.58]**	[5.62]**	[5.54]**	[5.27]**	[4.85]**
Child of Head	-0.019	-0.010	-0.017	-0.012	-0.018	-0.010	0.023	-0.035
	[0.45]	[0.25]	[0.40]	[0.28]	[0.44]	[0.25]	[0.50]	[0.76]
Female Head	-0.038	-0.000	-0.036	0.001	-0.025	-0.004	-0.021	0.038
	[0.41]	[0.00]	[0.39]	[0.01]	[0.27]	[0.05]	[0.20]	[0.31]
Head Age	0.005	0.004	0.005	0.004	0.004	0.005	0.005	0.006
	[3.69]**	[2.72]**	[3.66]**	[2.56]*	[2.81]**	[3.17]**	[3.08]**	[3.67]**
State: Bihar	-0.263	-0.246	-0.266	-0.271	-0.273	-0.262	-0.240	-0.194
	[9.05]**	[8.35]**	[8.98]**	[9.26]**	[9.26]**	[8.99]**	[6.78]**	[5.57]**
Education Level for Household Head: Reference Category - Illiterate Household Heads								
Literate	0.135	0.120	0.134	0.105	0.120	0.115	0.113	0.136
	[2.45]*	[2.14]*	[2.42]*	[1.85]+	[2.15]*	[2.04]*	[1.81]+	[2.16]*
Below Primary	0.256	0.231	0.254	0.223	0.239	0.235	0.200	0.189
	[4.66]**	[4.12]**	[4.62]**	[3.96]**	[4.27]**	[4.20]**	[3.43]**	[2.98]**
Primary	0.129	0.099	0.127	0.090	0.100	0.112	0.018	0.092
	[2.30]*	[1.75]+	[2.26]*	[1.56]	[1.72]+	[1.99]*	[0.28]	[1.51]
Middle	0.323	0.312	0.323	0.305	0.299	0.326	0.237	0.327
	[8.28]**	[7.88]**	[8.25]**	[7.66]**	[7.26]**	[8.33]**	[5.39]**	[7.57]**
Matric	0.330	0.301	0.328	0.297	0.291	0.331	0.237	0.299
	[6.46]**	[5.71]**	[6.36]**	[5.56]**	[5.14]**	[6.45]**	[4.45]**	[5.63]**

Intermediate and above	0.402	0.373	0.398	0.351	0.357	0.389	0.325	0.376
	[7.99]**	[7.14]**	[7.75]**	[6.38]**	[6.12]**	[7.59]**	[6.06]**	[6.99]**
Caste: Reference Category - Schedule Caste and Schedule Tribe (SC/ST)								
Upper-Middle Caste	0.176	0.145	0.170	0.120	0.118	0.170	0.112	0.181
	[3.73]**	[3.01]**	[3.51]**	[2.42]*	[2.17]*	[3.58]**	[2.04]*	[3.45]**
Backward Agriculture	0.012	-0.016	0.009	-0.026	-0.009	-0.013	-0.039	0.079
	[0.31]	[0.41]	[0.24]	[0.66]	[0.22]	[0.32]	[0.83]	[1.75]+
Backward Other	-0.043	-0.066	-0.044	-0.079	-0.049	-0.080	-0.085	0.013
	[1.01]	[1.55]	[1.04]	[1.85]+	[1.17]	[1.86]+	[1.60]	[0.25]
Muslim	-0.021	-0.058	-0.024	-0.053	-0.056	-0.022	-0.086	-0.037
	[0.38]	[1.07]	[0.45]	[0.98]	[1.01]	[0.41]	[1.26]	[0.58]
Household Age Structure, Reference category: Age group - Above 55 years old								
Age Structure 0-5	-0.058	-0.048	-0.058	-0.057	-0.048	-0.067	-0.055	-0.059
	[4.60]**	[3.72]**	[4.58]**	[4.45]**	[3.59]**	[5.19]**	[3.68]**	[4.18]**
Age Structure 6-19	-0.029	-0.025	-0.029	-0.031	-0.023	-0.037	-0.033	-0.019
	[2.58]**	[2.25]*	[2.58]**	[2.75]**	[2.02]*	[3.27]**	[2.75]**	[1.54]
Age Structure 20-55	0.047	0.035	0.047	0.039	0.040	0.045	0.033	0.039
	[4.32]**	[3.13]**	[4.31]**	[3.58]**	[3.52]**	[4.18]**	[2.67]**	[3.13]**
Distance to School								
Distance to Primary School	0.022	0.024	0.022	0.023	0.022	0.023	0.025	0.020
	[2.35]*	[2.52]*	[2.33]*	[2.41]*	[2.31]*	[2.47]*	[2.31]*	[1.93]+
Distance to Middle School	-0.004	-0.006	-0.004	-0.005	-0.004	-0.004	0.003	0.002
	[0.74]	[1.13]	[0.72]	[0.93]	[0.85]	[0.85]	[0.44]	[0.35]
Distance to Senior School	-0.015	-0.014	-0.015	-0.015	-0.015	-0.014	-0.022	-0.015
	[4.65]**	[4.29]**	[4.67]**	[4.52]**	[4.75]**	[4.36]**	[6.01]**	[4.03]**
Household Wealth Measures								
Log Adult Income		0.113						
		[5.71]**						
Log Expenditure			0.014					
			[0.51]					

Predicted Adult Inc				0.159				
				[4.08]**				
Predicted Exp					0.183			
					[2.23]*			
Transitory Income						0.194		
						[3.87]**		
Land Holdings: Reference Category - Marginal Land Holdings								
Small							0.037	
							[1.00]	
Medium							-0.009	
							[0.56]	
Large							0.011	
							[3.13]**	
Household Ownership of some selected Durables								
Bicycle								0.059
								[1.29]
Sewing Machine								0.210
								[4.19]**
Pseudo R2	0.2727	0.2857	0.2728	0.2792	0.2746	0.2786	0.2786	0.3005
Observations	1853	1853	1853	1853	1853	1853	1401	1457

Absolute value of z statistics in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%

Table A6: Heckmen's Two – Step Estimation

	Enrolment	
Log Child-Inc		
Child Age	-0.005	[0.01]
Child Age Squared	-0.002	[0.11]
Girl Child	-2.834	[9.51]**
Caste: Reference – Schedule Caste and Schedule Tribe (SC/ST)		
Upper - Middle Caste	-1.464	[3.80]**
Backward - Agriculture	-1.257	[3.68]**
Backward Other	-0.727	[2.01]*
Muslim	-0.217	[0.49]
Road Accessibility, Reference - Trail		
Katcha	-0.412	[1.30]
Paved	-0.421	[1.25]
Pucca	-0.368	[1.06]
Land Holdings: Reference - Marginal Land Holdings		
Small	-0.587	[2.38]*
Medium	0.051	[0.58]
Large	-0.036	[1.99]*
Bihar	-0.233	[0.99]
Constant	6.581	[1.38]
Select variable: Work		
Child Age	0.667	[7.99]**
Child Age Squared	-0.017	[5.86]**
Birth Order	0.122	[2.92]**
Household Age Structure, Reference: Age group – Above 55 years old		
Age Structure 0-5	-0.028	[0.97]
Age Structure 6-19	-0.088	[2.36]*
Age Structure 20-55	-0.038	[1.75]+
Girl Child	0.609	[10.31]**
Female Head	-0.305	[1.71]+
Head Age	-0.004	[1.48]
Caste: Reference – Schedule Caste and Schedule Tribe (SC/ST)		
Upper - Middle Caste	0.082	[0.80]
Backward - Agriculture	0.422	[5.09]**
Backward Other	0.225	[2.33]*
Muslim	0.428	[3.74]**
Education Level for Household Head: Reference – Illiterate Household Heads		
Literate	-0.059	[0.47]
Below Primary	0.031	[0.29]
Primary	-0.046	[0.40]
Middle	-0.160	[1.79]+
Matric	-0.427	[3.33]**
Intermediate and above	-0.650	[5.32]**

Distance to Water Source, Reference - Within Premise		
Less than 0.5 km	0.193	[2.93]**
0.5 - 1 km	0.992	[5.04]**
Above 1 km	0.296	[0.56]
Constant	-6.793	[11.78]**
Mills: Lambda	-1.456	[2.55]*
Observations	4411	

Absolute value of z statistics in brackets
+ significant at 10%; * significant at 5%; ** significant at 1%

Table A7: Marginal Estimates for Boys Enrolment controlling for different measures of Household Wealth - Heckman

	BASE	Adult Income	Expenditure	Predicted Income	Predicted Expenditure	Transitory Income	Land	Durables
Pred. (Log Child Inc)	0.021	0.020	0.020	0.020	0.020	0.020	-0.183	0.017
	[4.39]**	[4.21]**	[4.19]**	[4.33]**	[4.34]**	[4.35]**	[2.48]*	[3.37]**
Age	0.236	0.237	0.233	0.236	0.235	0.236	0.209	0.206
	[13.17]**	[13.22]**	[12.98]**	[13.18]**	[13.14]**	[13.18]**	[11.80]**	[11.01]**
Child Age Squared	-0.010	-0.011	-0.010	-0.010	-0.010	-0.010	-0.010	-0.009
	[14.58]**	[14.63]**	[14.60]**	[14.59]**	[14.60]**	[14.58]**	[13.20]**	[12.22]**
Birth Order	-0.012	-0.012	-0.003	-0.012	-0.010	-0.013	-0.020	-0.021
	[0.94]	[0.91]	[0.20]	[0.97]	[0.82]	[0.99]	[1.66]+	[1.64]
Child Married	-0.085	-0.086	-0.084	-0.084	-0.083	-0.085	-0.096	-0.039
	[1.56]	[1.57]	[1.54]	[1.55]	[1.54]	[1.56]	[1.81]+	[0.77]
Child of Head	-0.065	-0.060	-0.062	-0.063	-0.061	-0.064	-0.077	-0.079
	[2.20]*	[2.01]*	[2.08]*	[2.10]*	[2.06]*	[2.16]*	[2.65]**	[2.55]*
Female Head	-0.014	0.002	0.007	-0.004	-0.004	-0.009	0.027	-0.007
	[0.21]	[0.03]	[0.11]	[0.07]	[0.07]	[0.14]	[0.42]	[0.09]
Head Age	-0.000	-0.000	-0.001	-0.000	-0.001	-0.000	-0.001	0.000
	[0.17]	[0.39]	[0.63]	[0.42]	[0.49]	[0.27]	[1.01]	[0.01]
State: Bihar	-0.135	-0.131	-0.159	-0.136	-0.139	-0.134	-0.131	-0.038
	[5.87]**	[5.69]**	[6.73]**	[5.91]**	[5.98]**	[5.85]**	[4.47]**	[1.52]
Education Level for Household Head: Reference Category - Illiterate Household Heads								
Literate	0.132	0.129	0.130	0.129	0.129	0.131	0.125	0.116
	[4.01]**	[3.92]**	[3.94]**	[3.91]**	[3.91]**	[3.96]**	[3.87]**	[3.52]**
Below Primary	0.140	0.136	0.130	0.136	0.135	0.138	0.114	0.080
	[4.62]**	[4.45]**	[4.23]**	[4.39]**	[4.35]**	[4.52]**	[3.95]**	[2.30]*
Primary	0.137	0.131	0.119	0.130	0.129	0.134	0.067	0.092
	[4.21]**	[3.97]**	[3.54]**	[3.86]**	[3.79]**	[4.05]**	[1.97]*	[2.75]**
Middle	0.181	0.178	0.176	0.179	0.174	0.181	0.136	0.143
	[6.81]**	[6.64]**	[6.55]**	[6.64]**	[6.23]**	[6.81]**	[5.19]**	[5.30]**

Matric	0.238	0.235	0.227	0.235	0.232	0.238	0.188	0.186
	[7.75]**	[7.54]**	[7.19]**	[7.52]**	[7.05]**	[7.74]**	[6.50]**	[6.09]**
Intermediate & above	0.264	0.258	0.253	0.259	0.257	0.262	0.211	0.224
	[8.28]**	[7.75]**	[7.67]**	[7.52]**	[7.22]**	[7.98]**	[6.99]**	[7.33]**
Caste: Reference Category - Schedule Caste and Schedule Tribe (SC/ST)								
Upper-Middle Caste	0.146	0.139	0.130	0.141	0.131	0.147	-0.188	0.087
	[4.69]**	[4.42]**	[4.06]**	[4.42]**	[3.72]**	[4.70]**	[1.42]	[2.64]**
Backward Agriculture	-0.006	-0.011	-0.023	-0.012	-0.014	-0.008	-0.298	-0.045
	[0.23]	[0.40]	[0.85]	[0.43]	[0.50]	[0.30]	[2.66]**	[1.51]
Backward Other	-0.028	-0.037	-0.025	-0.033	-0.030	-0.032	-0.208	-0.101
	[0.97]	[1.25]	[0.85]	[1.12]	[1.02]	[1.06]	[2.90]**	[2.99]**
Muslim	-0.099	-0.105	-0.104	-0.102	-0.111	-0.097	-0.191	-0.174
	[2.47]*	[2.61]**	[2.60]**	[2.54]*	[2.68]**	[2.44]*	[3.69]**	[3.79]**
Household Age Structure, Reference category: Age group - Above 55 years old								
Age Structure 0-5	0.016	0.020	0.020	0.017	0.020	0.016	0.005	0.022
	[1.65]+	[1.97]*	[2.02]*	[1.71]+	[1.94]+	[1.57]	[0.46]	[2.19]*
Age Structure 6-19	0.008	0.009	0.005	0.007	0.010	0.007	0.012	0.012
	[0.80]	[0.99]	[0.56]	[0.79]	[1.00]	[0.72]	[1.29]	[1.27]
Age Structure 20-55	0.014	0.010	0.010	0.012	0.011	0.013	0.012	0.002
	[1.69]+	[1.15]	[1.23]	[1.47]	[1.33]	[1.63]	[1.53]	[0.21]
Distance to School								
Distance to Primary Sch.	0.004	0.004	0.002	0.004	0.003	0.004	0.008	0.007
	[0.56]	[0.62]	[0.32]	[0.56]	[0.49]	[0.58]	[1.25]	[1.00]
Distance to Middle School	-0.005	-0.006	-0.006	-0.006	-0.006	-0.006	-0.005	-0.008
	[1.56]	[1.62]	[1.58]	[1.58]	[1.58]	[1.57]	[1.23]	[2.07]*

Distance to Senior School	-0.011	-0.011	-0.010	-0.011	-0.011	-0.011	-0.007	-0.008
	[5.00]**	[4.96]**	[4.76]**	[4.94]**	[5.02]**	[4.94]**	[3.34]**	[3.34]**
Household Wealth Measures								
Log Adult Income		0.033						
		[2.30]*						
Log Expenditure			0.111					
			[5.41]**					
Predicted Adult Inc				0.026				
				[0.96]				
Predicted Exp					0.069			
					[1.16]			
Transitory Income						0.020		
						[0.58]		
Land Holdings: Reference Category - Marginal Land Holdings								
Small							-0.169	
							[3.39]**	
Medium							-0.013	
							[1.29]	
Large							-0.005	
							[1.80]+	
Household Ownership of some selected Durables								
Bicycle								0.191
								[5.38]**
Sewing Machine								0.030
								[0.88]
Pseudo R2	0.2431	0.2449	0.2531	0.2434	0.2436	0.2432	0.2375	0.2506
Observations	2472	2472	2472	2472	2472	2472	1926	1913

Absolute value of z statistics in brackets

+ significant at 10%; * significant at 5%; ** significant at 1%

Table A8: Marginal Estimates for Girls Enrolment controlling for different measures of Household Wealth – Heckman

	BASE	Adult Income	Expenditure	Predicted Income	Predicted Expenditure	Transitory Income	Land	Durables
Pred. (Log Child Inc)	0.045	0.040	0.045	0.043	0.047	0.041	-0.184	0.040
	[3.27]**	[2.83]**	[3.25]**	[3.09]**	[3.38]**	[2.95]**	[1.51]	[2.39]*
Age	0.202	0.190	0.202	0.200	0.201	0.201	0.171	0.192
	[6.88]**	[6.42]**	[6.88]**	[6.78]**	[6.83]**	[6.81]**	[5.10]**	[5.78]**
Child Age Squared	-0.011	-0.010	-0.011	-0.011	-0.011	-0.011	-0.010	-0.010
	[8.49]**	[8.10]**	[8.50]**	[8.41]**	[8.52]**	[8.37]**	[6.93]**	[7.32]**
Birth Order	0.041	0.044	0.042	0.041	0.046	0.036	0.049	0.024
	[2.52]*	[2.66]**	[2.54]*	[2.47]*	[2.78]**	[2.20]*	[2.78]**	[1.32]
Child Married	-0.426	-0.422	-0.426	-0.429	-0.429	-0.426	-0.479	-0.422
	[5.64]**	[5.52]**	[5.64]**	[5.64]**	[5.69]**	[5.60]**	[5.27]**	[4.93]**
Child of Head	-0.009	-0.003	-0.008	-0.003	-0.009	-0.003	0.028	-0.027
	[0.22]	[0.06]	[0.18]	[0.07]	[0.21]	[0.06]	[0.60]	[0.59]
Female Head	-0.037	0.001	-0.036	0.000	-0.024	-0.005	-0.006	0.032
	[0.39]	[0.01]	[0.38]	[0.00]	[0.25]	[0.06]	[0.05]	[0.26]
Head Age	0.005	0.004	0.005	0.004	0.004	0.005	0.005	0.006
	[3.52]**	[2.59]**	[3.49]**	[2.43]*	[2.59]**	[3.04]**	[3.10]**	[3.49]**
State: Bihar	-0.236	-0.223	-0.238	-0.244	-0.245	-0.237	-0.281	-0.176
	[7.73]**	[7.22]**	[7.66]**	[7.97]**	[7.96]**	[7.76]**	[6.28]**	[4.93]**
Education Level for Household Head: Reference Category – Illiterate Household Heads								
Literate	0.127	0.113	0.126	0.097	0.110	0.108	0.110	0.127
	[2.29]*	[2.00]*	[2.27]*	[1.71]+	[1.95]+	[1.92]+	[1.76]+	[2.00]*
Below Primary	0.252	0.229	0.251	0.221	0.234	0.233	0.198	0.184
	[4.58]**	[4.06]**	[4.55]**	[3.91]**	[4.17]**	[4.16]**	[3.40]**	[2.88]**
Primary	0.120	0.092	0.118	0.082	0.088	0.105	0.018	0.082
	[2.13]*	[1.62]	[2.10]*	[1.42]	[1.52]	[1.85]+	[0.29]	[1.33]
Middle	0.318	0.308	0.318	0.301	0.292	0.321	0.235	0.323
	[8.10]**	[7.76]**	[8.08]**	[7.52]**	[7.04]**	[8.16]**	[5.33]**	[7.45]**

Matric	0.318	0.291	0.317	0.286	0.275	0.320	0.232	0.287
	[6.14]**	[5.45]**	[6.06]**	[5.30]**	[4.79]**	[6.16]**	[4.35]**	[5.30]**
Intermediate and above	0.401	0.373	0.398	0.351	0.352	0.389	0.321	0.372
	[7.95]**	[7.14]**	[7.73]**	[6.38]**	[5.99]**	[7.58]**	[5.97]**	[6.87]**
Caste: Reference Category - Schedule Caste and Schedule Tribe (SC/ST)								
Upper-Middle Caste	0.208	0.174	0.203	0.153	0.148	0.200	-0.156	0.205
	[4.32]**	[3.54]**	[4.11]**	[3.02]**	[2.69]**	[4.12]**	[0.83]	[3.86]**
Backward Agriculture	0.030	0.001	0.028	-0.007	0.009	0.005	-0.270	0.095
	[0.77]	[0.03]	[0.72]	[0.18]	[0.23]	[0.14]	[1.69]+	[2.07]*
Backward Other	-0.035	-0.058	-0.036	-0.071	-0.042	-0.071	-0.218	0.021
	[0.83]	[1.36]	[0.85]	[1.65]+	[0.99]	[1.64]	[2.12]*	[0.41]
Muslim	-0.030	-0.065	-0.032	-0.061	-0.068	-0.030	-0.125	-0.049
	[0.55]	[1.20]	[0.59]	[1.12]	[1.22]	[0.56]	[1.71]+	[0.78]
Household Age Structure, Reference category: Age group - Above 55 years old								
Age Structure 0-5	-0.055	-0.046	-0.055	-0.054	-0.044	-0.064	-0.056	-0.057
	[4.33]**	[3.54]**	[4.31]**	[4.20]**	[3.28]**	[4.89]**	[3.73]**	[3.99]**
Age Structure 6-19	-0.029	-0.026	-0.029	-0.031	-0.023	-0.037	-0.033	-0.019
	[2.61]**	[2.29]*	[2.61]**	[2.77]**	[2.02]*	[3.25]**	[2.75]**	[1.50]
Age Structure 20-55	0.046	0.034	0.046	0.039	0.038	0.044	0.034	0.037
	[4.21]**	[3.10]**	[4.21]**	[3.50]**	[3.36]**	[4.09]**	[2.74]**	[3.01]**
Distance to School								
Distance to Primary School	0.020	0.022	0.020	0.021	0.020	0.022	0.025	0.019
	[2.15]*	[2.34]*	[2.14]*	[2.23]*	[2.10]*	[2.28]*	[2.34]*	[1.74]+
Distance to Middle School	-0.003	-0.005	-0.003	-0.004	-0.004	-0.004	0.003	0.002
	[0.61]	[1.03]	[0.60]	[0.82]	[0.74]	[0.74]	[0.49]	[0.43]
Distance to Senior School	-0.015	-0.014	-0.016	-0.015	-0.016	-0.015	-0.021	-0.016

	[4.80]**	[4.43]**	[4.82]**	[4.66]**	[4.92]**	[4.50]**	[5.71]**	[4.17]**
Household Wealth Measures								
Log Adult Income		0.109						
		[5.48]**						
Log Expenditure			0.011					
			[0.39]					
Predicted Adult Inc				0.154				
				[3.94]**				
Predicted Exp					0.195			
					[2.39]*			
Transitory Income						0.181		
						[3.61]**		
Land Holdings: Reference Category - Marginal Land Holdings								
Small							-0.072	
							[0.89]	
Medium							0.001	
							[0.06]	
Large							0.005	
							[1.02]	
Household Ownership of some selected Durables								
Bicycle								0.051
								[1.09]
Sewing Machine								0.217
								[4.31]**
Pseudo R2	0.2768	0.2888	0.2769	0.2830	0.2791	0.2820	0.2798	0.3034
Observations	1853	1853	1853	1853	1853	1853	1401	1457

Absolute value of z statistics in brackets
+ significant at 10%; * significant at 5%; ** significant at 1%

REFERENCE

Alderman, H., and P. Gertler (1997), Family Resources and Gender Differences in Human Capital Investments: The Demand for Children's medical care in Pakistan in L. Haddad, J. Hoddinott, and H. Alderman (Eds.). *Intrahousehold Resource Allocation in Developing Countries: Models, Methods and Policy*, Baltimore: Johns Hopkins University Press.

Basu, K., and P. H. Van (1998), "The Economics of Child Labour", *The American Economic Review*, 88: 412 – 427.

Becker, Gary S. (1967) 'Human Capital and the Personal Distribution of Income: An Analytical Approach' Woytinsky Lecture in Gary S. Becker (1975), *Human Capital*, second Edition, New York: National Bureau of Economic Research.

Behrman, Jere R. and James C. Knowles (1997), *How Strongly is Child Schooling Associated with Household Income?*, mimeo, University of Pennsylvania and Abt Associates.

Blackwood, D.L. and Lynch, R.G. (1994), "The Measurement of Inequality and Poverty: A Policy Maker's Guide to the Literature", in *World Development*, 22 (3): 567-578.

Blaug, Layard and Woodhall (1969), *The Causes of Graduate Unemployment in India*, London: Allen Lane, Penguin Books.

Brown, Philip H. and Albert, Park (2002), "Education and poverty in rural China", *Economics of Education Review*, 21: 523–541.

Browning, M. and P. A. Chiappori (1998), "Efficient Intra-household Allocations: A General Characterization and Empirical Tests", *Econometrica*, 66, 1241-78.

Cain, M (1981), "Risk and Insurance: perspectives on fertility and agrarian change in India and Bangladesh", *Population and Development Review* 7(3): 435-74.

Canagarajah S. and H. Coulombe (1997), "Child labour and schooling in Ghana", *The World Bank Working Paper*, Series No. 1844, Washington, D.C: The World Bank,.

Chaudhri, D. P. (1997), "A Policy Perspective on Child Labour in India with Pervasive Gender and Urban Bias in School Education", *The Indian Journal of Labour Economics* 40 (4): 789 – 808.

Chernochovsky, D. (1985), "Socioeconomic and Demographic Aspects of School Enrollment and Attendance in Rural Botswana", *Economic Development and Cultural Change*, 33, 319-32.

Cigno, A. and F.C. Rosati (2000), "Why do Indian Children Work, and is it Bad for Them?", IZA Discussion Paper No. 115.

Coonghé, Clarence James (2000), Introducing child labour in India, with special reference to the hazards child labourers face. Available at http://www.oikonomia.it

Dasgupta, P (1995), "Population, Poverty and the Local Environment", *Scientific American* 272(2): 26-31.

Deininger, Klaus (2003), "Does cost of schooling affect enrollment by the poor? Universal primary education in Uganda", *Economics of Education Review*, 22: 291-305.

Deolalikar, Anil B. (1997), *The Determinants of Primary School Enrollment and Household Expenditure in Kenya: Do They Vary by Income?*, Seattle: Department of Economics, University of Washington.

Dessy, S.E. (2000), "A Defense of Compulsive Measures against Child Labour", *Journal of Development Economics*, 62(1): 261-75.

Dreze, J. and G.G. Kingdom (2001), "School Participation in Rural India", *Review of Development Economics*, 5(1): 1 – 24.

Duraisamy, Malathy (2002), *Child Schooling and Child Work in India*, Working Paper No. 84, New Delhi: National Council of Applied Economic Research.

Filmer, D and Pritchett, L.H. (2002), "Environmental Degradation and the Demand for Children: searching for the vicious circle in Pakistan", *Environment and Development Economics* 7: 123-46.

Filmer, Deon and Pritchett, L.H. (1998), *Determinants of Education Enrollment in India: Child, Household, Village and State Effects*, mimeo, Washington, DC: DECRG, The World Bank.

Friedman, M (1957) *A Theory of the Consumption Function*, Princeton University Press.

Heckman, James (1979), "Sample Selection Bias As A Specification Error", *Econometrica*, 47: 153 – 161.

Government of Uttar Pradesh, Uttar Pradesh a Rainbow Land: Image of multi-hued India culture. Available at http://upgov.nic.in/upinfo/poli_hist.html

Grootaert, Christiaan and Kanbur, Ravi (1995), *Child Labor: A Review*, Policy Research Working Paper 1454, Washington DC: The World Bank.

Gupta, S., Davoodi, H. and Alonso-Terme, R. (1998), *Does corruption affect income inequality and poverty?,* International Monetary Fund Working Paper WP/98/76, Washington DC.

International Labour Organization (2006), The End of Child Labour: Within reach. Available at http://www.ilo.org

Jacoby, Hanan G. and Skoufias, Emmanuel (1997), "Risk, Financial Markets, and Human Capital in a Developing Country", *Review of Economic Studies*, 64, pp. 311-335.

Jayachandran, Usha (2002), *Socio-Economic Determinants of School Attendance in India*, Centre for Development Economics, Working Paper No. 103.

Kambhampati, U.S. and Pal, S. (2001), "Role of Parental Literacy In Explaining Gender Difference: Evidence From Child Schooling In India", *European Journal of Developmental Research,* 13 (2).

King, E. M., and Hill, A. M. (1993), *Women's Education in Developing Countries,* Baltimore: Johns Hopkins University Press for World Bank.

Kingdon, Geeta Gandhi (2002), "Gender Gap and Educational Attainment in India: How Much Can Be Explained?" *The Journal of Development Studies.* 35(1): 39-66

Kingdon, Geeta Gandhi (1998), "Does the labour market explain lower female schooling in India?", *The Journal of Development Studies*, 39(2): 25-53.

Kishore, S. (1993), "May God Give Sons to All! Gender and Child Morality in India", *American Sociological Review*, 247-65.

Kozel, Valerie and Parker, Barbara (1999) "Poverty In Rural India: The Contribution of Qualitative Research in Poverty Analysis", *WDR on Poverty and Development,* 2002/01.

Lillard, L.A. and Willis, R. J. (1996) "Motives for Intergenerational Transfers: Evidence from Indonesia and Malaysia", European Society for the Study of Population Economics, 10th Annual Meeting, Uppsala, Sweden, 1996.

Lloyd, C. B. and Blanc, A. K. (1996) 'Children's schooling in sub-saharan Africa: The role of fathers, mothers and others', *Population and development Review*, 22(2): 265-298.

National Sample Survey Organisation (1997), 'Economic Activities and School Attendance by Children of India, Fifth Quinquenniel Survey, NSS, 50th Round, 1993-94)', Report No. 412, New Delhi: NSSO.

Nerlove, M. (1991), "Population and the Environment: a parable of firewood and other tales", *American Journal of Agricultural Economics* 73(5): 1334-47.

Nielson, H.N. and A. Dubey (2002), "Child Labour in Rural India: A Micro-Economic Perspective", *The Indian Journal of Labour Economics*, 45 (3): 479 – 496.

Pal, S. (2004), '*Do Children Act as Old Age Security in Rural India? Evidence from an Analysis of Elderly Living Arrangements*', Mimeo, Department of Economics, Cardiff University.

Pal, S. (2003), *How Much of the Gender Difference in Child School Enrolment Can Be Explained? Evidence form Rural India*, Mimeo, Department of Economics, Cardiff University.

Parish, W. and Willis, R. (1993), "Daughters, Education, and Family Budgets: Taiwan Experiences", *Journal of Human Resources*, 28, 863-898.

Parson, D. and Goldin, C. (1989), "Parental Alturism and Self-Interest: Child Labour among Late Nineteenth Century American Families", *Economic Inquiry*, 637-659.

Patrinos, Harry Anthony (1997), "Differences in Education and Earnings across Ethnic Groups in Guatemala", *Quarterly Review of Economics and Finance*, 37, 809-821.

Portner, C.C. (2001), "Children as Insurance", *Journal of Population Economics*, 14, 19-36.

Psacharopoulos, G. (1994), "Returns to Investments in Education: A Global Update", *World Development*, 22, 1325-1343.

Psacharopoulos, G and Woodhall, M. (1995), *Education for Development: An Analysis of Investment Choice*, World Bank Publication, 5th ed, New York: Oxford University Press.

Rammohan, A. (2001), "Development of Financial Capital Markets and the Role of children as Economic Assets", *Journal of International Development*, 13, 45-58.

Ranjan, Priya (1999), "An Economic Analysis of Child Labor", *Economics Letters*, 64 (1), 99-105.

Raut, L.K. (1990), "Capital Accumulation, Income Distribution and Endogenous Fertility in an Overlapping Generations General Equilibrium Model", *Journal of development Economics*, 34, 123 – 150.

Ray, R (2000), "Child Labour, Child Schooling, and Their Interaction with Adult Labour: empirical evidence for Peru and Pakistan", *World Bank Economic Review* 14(2): 347-67.

Rosenzweig, M. R. and Evenson, R. (1977), "Fertility, Schooling, and the Economic Contribution of Children in Rural India: An Econometric Analysis", *Econometrica*, 45.

Schultz, T. P. (1993), *Investment in Human Capital Beings*, Chicago: University of Chicago Press.

Sen, Amartya K. (1983), "Poor Relatively Speaking", *Oxford Economic Papers*, No. 37, pp. 669–76, Reproduced in Sen, Amartya K. 1984, pp. 325–345.

Shapiro, David and Oleko Tambashe, B. (2001), "Gender, poverty, family structure, and investments in children's education in Kinshasa, Congo", *Economics of Education Review*. 20: 359–375.

Sharma, B. K. and Mittar, V. (1990), "Child Labour and the Urban Informal Sector", New Delhi:Deep and Deep Publications.

Streeton, P. (1990), "Poverty Concepts and Measurement", T*he Bangladesh Development Studies* (Dhaka), Vol. XVIII, No. 3, September.

Sawada,Y., and Lokshin, M. (2001), *Household Decisions in Rural Pakistan*, Policy Research Working Paper 2541, The World Bank.

Tansel, Avsit (1997), "Schooling Attainment, Parental Education, and Gender in Cote d'Ivoire and Ghana", *Economic Development and Cultural Change*, 45, 825-56.

Taubman, P. (1989), "Role of Parental Income in Educational Attainment", *AEA Papers and Proceedings*, 79 (2), May: 57-61.

Wahba, J. (2000), *Do Market Wages Influence Child Labor and Child Schooling?*, Social Protection Discussion Paper Series, 0024, Washington DC: The World Bank.

Woodhall, Maureen (1997), "Human Capital Concepts" in Halsey et.al. (Eds) *Education: Culture, Economy and Society,* Oxford: Oxford University Press.

Zimmerman, F.J. (2001), "Determinants of School Enrollment and Performance in Bulgaria: The Role of Income among the Poor and Rich", *Contemporary Economic Policy*, 19: 87-98.