WHY DO PARENTS DISCRIMINATE AGAINST THEIR DAUGHTERS?

by

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ABSTRACT

WHY DO PARENTS DISCRIMINATE AGAINST THEIR DAUGHTERS?

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In an exploration of household gender bias in India, this dissertation uses a two-period model of intra-household resource allocation with uncertainty to address two questions: If parents love their children, then why do they discriminate against their daughters? Are cultural reasons of discrimination separate from economic reasons, or are they inter related?

In India, resource constrained households without pension funds and with limited access to capital markets give preferential treatment to sons over daughters. Lower labor force participation of women and the norm that daughters belong to their husbands' families reduce the probability that a daughter will provide for her parents in their old age. Dowry practices also reduce the marginal return from investment in daughters. Although money price of investment is the same, the opportunity cost of investment in daughter is higher because of her need to do housework, such as cooking, and taking care of younger siblings. A combination of low probability, low marginal return and high price of investment result in lower investment in daughter relative to son.

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Chapter 1

Introduction and Literature Review

This paper is a contribution to the existing literature on gender bias in India. I utilize a two period model of intra household resource allocation with uncertainty to explore the household gender bias in India. Two key questions are addressed: First, if parents love their children, why do they discriminate against their daughters? Second, are cultural reasons of discrimination separate from economic reasons, or are they inter related?

A two period model of utility maximization under uncertainty is used to explain why in India, resource constrained households without pension funds, and with limited access to capital markets give preferential treatment to sons over daughters. In the pure investment model with zero savings, parents' utility depends on first period consumption and future expected returns on child investment (expected utility). Parents allocate investment between children so as to maximize utility subject to a budget constraint and investment constraints. Intra household resource allocation depends on the probability of filial devotion that is subjectively assigned to each child, the marginal productivity

of investment, and the price of investment. Higher probability of filial devotion, higher marginal return, and lower price imply more investment in the child relative to sibling.

The predictions of the investment model explain why intra household resource allocation discriminates against daughters. Lower labor force participation of women and the norm that daughters belong to their husbands' families reduce the probability of return. Dowry practices reduce the marginal return from investment. Although money price of investment is the same, the opportunity cost of investment in daughter is higher because of her need to do housework, such as cooking, and taking care of younger siblings. A combination of low probability, low marginal return and high price result in lower investment in daughter relative to son.

1.1. Background and Motivation

According to theory of intra household resource allocation, parents produce child health by investing in nutrition, medical treatment, and vaccines. Parents produce future earnings potential of children by investing in education. Thus, parental investments in children affect their health and earnings capacity throughout life.

Parents allocate investment and consumption resources amongst children, subject to income, time, and endowment constraints. Parents' derive utility from family consumption, number of children, and quality of children. Parents face two constraints: budget constraint and child quality production function. Child quality is a function of endowment of each child, and investment made by parents in each child. Child endowment consists of health, intelligence, and ability.

Given that children are born with certain endowment, the first question is whether parents "reinforce" or "compensate" endowment differences through investments (as in Behrman (1997)). The second question is whether parents have any preference for some children over others, i.e. the question of "equal concern".

Becker (1993) concludes that affluent parents (or parents in affluent societies) equalize income of children (although earnings may differ due to endowment gaps) by providing non-human capital (gifts, bequests) to children. However, parents reinforce differences in endowments by investing more in better endowed children. Hence, earnings differ, but incomes don't.

In poorer families, the results are ambiguous, since parents invest only in human capital. In such families, there is a trade off between efficiency and equity. Incomes of children differ because parents are assumed to not invest at all in non human capital. However, in an altruistic setting, if the abler child agrees to be altruistic towards their siblings, then parents will gain by investing more in abler children. When children help their siblings (either because they are altruistic or because they have an agreement with parents), income gaps are reduced. Thus, poor parents will invest more in abler children.

Becker and Tomes (1976) agree that poorer parents give children only negligible amounts of non-human capital (and sometimes even negative amounts). However, they would still invest in human capital needs of children. The assertion is that selfish children would have the incentive to agree to take care of their siblings (i.e. the rotten kid theorem). Parents would then have an incentive to invest in them. Returns from rotten kids do not come until after investment is complete,

and parents are not sure that they (or younger siblings) will receive the agreed upon returns. The solution is indirect, through implicit contracts which are binding due to social norms.

One concern of the altruistic model is its applicability in the context of poor parents or more broadly, in the context of less developed countries. Behrman (1997) notes that in developed societies, parents may not have sufficient wealth, and also they may not be "sufficiently altruistic" i.e. all children may not get equal weight in parents' utility function. Allocation of resources need not be privately or socially efficient, and other types of preference parameters may come into play.

Behrman (1988) studies the allocation of nutrients amongst different pairs of children. "Child endowment" may include not just health, intelligence or ability, but can be extended to gender. "Being born" with a gender may be considered as "less endowment". Second, parents' gender preference is reflected in differential weights placed on investment outcomes, including health and earning ability.

Considerable literature exists on gender disadvantage of children, household gender bias, and child quality. Successive authors have discussed the root causes of household gender bias, the pattern of resource allocation as result of gender bias, and the impact of gender bias on child quality. For example, Rosenzweig and Schultz (1982) have concluded that in some societies, such as India, children who are expected to be more successful economically are considered to be better endowed and hence receive a larger share of household resources.

The literature on gender bias falls into three broad categories: attempts to explain the root cause of gender bias, attempts to document the forms that gender bias takes and attempts to assess the effect of public policy on gender bias. These three strands are discussed in the sections that follow.

1.2. The Root Cause of Gender Bias in India

Rosenzweig and Schultz (1982) note that intra-family resource allocation reinforces market signals. A rise in the expected adult employment rate exacerbates the survival differential in favor of boys, other things being equal, while the female employment rate reduces the differential. Children who are expected to be more successful economically receive a larger share of parental resources, and also stand a higher survival chance.

Sen (1990) voiced concern over an increasing shortage of women in a number of continents and geographic regions. Using Sub Saharan Africa as benchmark (where the female to male ratio was 1.022), his estimate ranged from 44 million missing women in China, to 37 million in India, and an overall total of 100 million missing women spread over Asia and North Africa. Introducing the concept of missing women, Sen (2001) views the household as a unit of "inequality and internal discrimination" and studies the deeply unequal sharing of burden of adversities between men and women. Sen also discussed seven types of gender inequalities: mortality, natality, basic facility, special opportunity, professional, ownership, and household.

Sen (2003), he notes that female survival rates are lower than male survival rates in Asia and Africa because women receive less medical care, social services and nutrition than men do. He attributes female deprivation in social well-being and survival to economic, social and cultural factors.

Other authors argue that cultural bias plays a stronger role than economic factors however. For example, Das Gupta (1987) argues that the root cause of gender bias is the culture in which

girls are of low value to parents and that the patrilineal system (i.e. the system in which a wife is an outside entrant into her husband's family) leads to weak decision making power at home and exclusion from property rights. The flow of resources is from men of the woman's family to the woman's husband. Dowry is just one of these resources.

In an attempt to identify the most important cultural factors underlying gender bias, Rahman and Rao (2004) use a multivariate analysis to re-examine three main reasons put forward for differences in gender between North and South India: (1) cultural differences as put forward by Dyson and Moore (1983). Specifically, their theory was that North India has a culture of exogamous marriage while South India has a culture of endogamous marriage. This makes the South Indian woman more autonomous. (2) more female opportunity for farm work in South India (3) state policies formulated to promote female equality differ between North and South.

Dyson and Moore conclude that because women are "out-marries," parents can expect little help from their daughters after marriage, whereas sons will remain at home. In India, one way in which the lower value of women manifests itself is in the lower marriageable age of women. Parents who want to economically unburden themselves marry their daughters off at younger ages.

The authors conclude that while culture exerts influence on women's autonomy, improving women's economic opportunities and investing in village infrastructure could go far toward increasing women's role in rural India.

It is important to remember that India is a heterogenous country however. In their examination of dowries, Dalmia and Lawrence (2005) note that North India follows a patrilocal, patrilineal, and

exogamous system and exclusion of property rights, while South India follows endogamy isogamy and recognizes female property rights.

These cultural differences may generate differences in the health status of women in North and South India. Bourne and Walker (1991) note that poverty does not provide a simple explanation of excess female mortality in North India. It is even less adequate to explain why it is females who are at a greater disadvantage. They argue that we should look instead at the low value of females relative to males in Indian society, where sons are considered to provide the best assurance of security in parents' old age and also needed to perform death rites. The effects of sex preferences on India's demography cannot be separated from the cultural context in which they originate.

1.3. The Manifestation of Gender Bias in Intra-Household Resource Allocation

The theoretical model discussed in the next chapter examines how parents divide their available resources for the human capital investment in their children. One particularly important form of investment is in a child's health and nutrition.

In a pair of recent papers, Oster studies the relationship between gender inequality and access to health investment (vaccination camps) (2006b) and concludes that up to age five, fifty percent of gender imbalance (driven by excess female mortality) can be explained by vaccination, food, and treatment (2006a).

Hill and Upchurch (1995) finds that societies that discriminate against females in education also have higher female mortality rates and that the bulk of female mortality is due to neglect such as nutrition and proper medical care.

Bhuiya and Streatfield (1991) argue that sex bias is manifested through differential treatment of diseases and through bias in nutrition and food. Mother's education reduces mortality risk of both sexes, but due to the overall inferior position of women, increases in a mother's education reduced boys' mortality rate more than it reduces the mortality rate of girls.

Parents may also use nutrition and health investment to affect the composition of their children. Das Gupta (1987) argues that if parents have unfulfilled desire for quantity of male children, then they may try to achieve the desired composition by neglecting heavily female children, especially of higher birth order.

Similarly, Pande (2003) studies the effect of sex composition of lower birth order children on the health and nutrition investment in children of higher birth order. Both boys and girls of higher birth order suffer from lack of nutrition. However, boys still do better, and in fact, a boy born after several daughters has the best outcome.

1.4. The Role of Public Policy in Reducing Gender Bias

Despite having moderate income and moderate access to medical facilities, Kerala (a state in Southern India), Costa Rica, and Sri Lanka achieved low levels of mortality. Caldwell (1986) attributes this reduction to the position of women in those societies. In his view, a higher degree of female

autonomy helps girls remain in school. When they become mothers, their education enables them to be better care givers and enables them to better manipulate the modern world.

According to Caldwell, a higher degree of female autonomy helps mothers tend to sick children and themselves. Under such circumstances, mothers are more inclined to see their sons and daughters as equals and provide them with equitable amounts of nutrition and medical care. "[The] position of women plays a fundamental role in how the health, education, and possibly political systems work and may well be a basic cultural factor and not a product of decisions and events of the last century or so" (p. 182).

Higher rates of female labor force participation may also reduce gender bias. Murthy, Guio, and Dreze (1995) argue however the mechanism through which this happens is unclear. They point out higher rates of female labor force participation could reduce bias:

- by raising the return to investment in girls,
- by raising the status of women in society,
- by lowering the dowry levels,
- by making women less dependent on adult sons for old age security and/or
- by raising the bargaining power of adult women and enabling them to resist male pressure to discriminate in favor of boys.

Chapter 2

Theoretical Model

In Becker's (1993) agreement model, siblings need not be the only ones who enter into agreements in poor households. Parents also have incentive to invest in better endowed children who agree to take care of them in their old age. In such a framework, norms determine who is more likely to provide a return (e.g. the burden of supporting elderly parents may fall on sons and not daughters). Such norms do not guarantee returns however. After all, ingratitude or bad luck in the labor market may also play a role in determining whether or not a child provides the promised return.

In combination, poverty and norms may provide answers to the following questions:

- If parents love their children, why do they discriminate?
- Are cultural reasons separate from economic reasons of discrimination, or are they inter-related?

Answering the first question requires making a distinction between child quality as consumption good and as an investment good. This applies particularly to poverty stricken households without pension or social security. This implies future uncertainty. Parents have a self protection motivation for raising children. This motivation manifests in a conditional altruistic behavior. Parents invest in child quality under condition (implicit or explicit) that children will give "returns" to parents in their old age out of gratitude. Such contracts are non-binding. When the time comes, children may not honor the agreement. Parents "hope" that children will support them and hence "expect returns".

Intra-household resource allocation depends on the subjectively assigned probability of filial devotion to each child, the marginal productivity of investment, and the price of investment. Higher probability of filial devotion, higher marginal return, and lower price imply more investment in the child.

The above outline answers the question: if parents love their children, why do they discriminate? Why do parents with low income and uncertain future "choose" between children for investment, especially if the investment in question is generally expensive, such as education? The answer is that if child endowment is an indicator of future earning capacity, then parents may choose to invest more in better endowed children, because the investment in the better endowed child is a better self protection for future.

Parents may consider their daughters to be less endowed relative to their sons if it is more costly to invest in daughters and/or if they expect little if any return on from daughters.

The predictions of the pure investment model explain why intra-household resource allocation discriminates against daughters. The lower labor force participation of women and the norm that daughters belong to their husbands' families reduce the probability of filial devotion. An example is the custom of exogamy in North India. Even if daughters enter the labor force, their earnings belong to their husband's family.

Under such circumstances, the prospect of parents receiving any share in their daughter's earnings is very bleak. Dowry practices reduce the marginal return from investment. Although money price of investment is the same, the opportunity cost of investment in daughter is higher because of her need to do housework, such as cooking. A combination of low probability, low marginal return and high price result in relatively lower investment in daughter.

Customs have profound influence on costs of investment and probabilities of filial devotion. "Economic decision of the ... household is a result of the established culture and norms. ...parental allocation of resources reinforce market forces, which operate to change sex differences in the net pecuniary contributions of offspring to the household" (Rosenzweig and Schultz, 1982).

2.1. Parental Love and Investment

The discussion above suggests that a theoretical model explaining intra-household resource allocation of investment, especially in poor families, needs to take into account the pure "love" aspect, and the "investment" aspect of having children. Such a model is analogous to Grossman's (2000) division of health into a consumption and investment good.

To build such a model, I use a two period utility function that is linearly separable in the first period investment subfunction and the future returns subfunction. To incorporate the love aspect, I assume that parents derive utility from investment in each child. The investment aspect is incorporated by assuming an expected utility function consisting of all possible states in the second period: parents' expectation from children are fulfilled, partially fulfilled or not fulfilled at all. Parents are aware that one of these states will eventually materialize, and hence, calculate "expected utility" from future returns

Parents choose investment between pairs of children so as to maximize utility subject to one investment expenditure constraint, and two investment constraints.

I also make the following simplifying assumptions:

- A household consists of a husband and wife. They have two children: a son and a daughter.
- In period one, parents make all decisions regarding investment in children. Children are "passive" in the first period. In the second period, children are the decision makers, while parents are passive. Parents cannot influence the decisions of children in second period, but can only use the predicted probabilities to calculate expected returns from children.
- Children receive investment in first period, but give any returns, if any, in second period.

Given the framework outlined above, one can represent parents' utility in the first period as a function of investment in daughter, I_D, and investment in son, I_S:

$$U = U(I_D, I_S) \tag{2.1}$$

Investment in children includes all investment made by parents to create child quality. This includes cost of food, nutrition, education, tutoring, vaccination, medical care, recreation, sports training, and any other expenditure that improves child quality. For simplicity, I use a composite investment variable. This, when multiplied by the price of composite investment, gives the investment expenditure in children.

Investment made in children will lead to higher "child quality," but subject to diminishing marginal returns. Since old age support depends on child quality, the returns are a direct function of investment in children. Assuming a child provides a return to his/her parents in the second period, that return is a function of the amount his/her parents invested:

$$D = D(I_D) \tag{2.2}$$

$$S = S(I_S) \tag{2.3}$$

In the second period, parents derive utility from "consumption", as represented by the total return from son and daughter.

$$V = V(D(I_D) + S(I_S)) \tag{2.4}$$

By assumption, both utility subfunctions exhibit diminishing marginal returns in their arguments.

For simplicity, it is assumed that children either provide returns or they do not, so parents' second period consumption will be one of four possible states:

- daughter and son give returns: $C_2 = D + S$
- only daughter gives returns: $C_2 = D$

- only son gives returns: $C_2 = S$
- neither daughter nor son gives returns: $C_2 = 0$

The state-contingent utility function can therefore be written as:

$$\begin{aligned} u \quad = U(I_D, I_S) \quad & + \frac{\pi_D \pi_S V(D+S) + \pi_D (1-\pi_S) V(D)}{1+\beta} \\ & + \frac{(1-\pi_D) \pi_S V(S) + (1-\pi_D)(1-\pi_S) V(0)}{1+\beta} \end{aligned} \tag{2.5}$$

where β is the rate of time preference and π_D and π_S are the subjectively determined probabilities of filial devotion from daughter and son.

Parents maximize their utility with respect to investment in each child subject to the constraint that total investment expenditure "E" must equal the sum of investment expenditure in daughter and son:

$$E = P_D I_D + P_S I_S \tag{2.6}$$

The first-order condition for optimal investment in each child therefore is:

$$\frac{P_D}{P_S} = \frac{U_{I_D} + \left(\pi_S V_{(D+S)} + (1-\pi_S) V_D\right) \frac{\pi_D}{1+\beta} D'}{U_{I_S} + \left(\pi_D V_{(D+S)} + (1-\pi_D) V_S\right) \frac{\pi_S}{1+\beta} S'} \tag{2.7}$$

where the term on the left is the slope of the budget constraint and the term on the right is the slope of the indifference curve. Intuitively, parents allot investment between children to the point where the relative marginal utility of investment in daughter is equal to the relative of price of investment in daughter.

The term U_{I_D} reflects the "love" aspect of having daughters. This is the satisfaction that parents get from loving and nurturing daughters, while $\left(\pi_S V_{(D+S)} + (1-\pi_S) V_D\right) \frac{\pi_D}{1+\beta} D'$ reflects the "investment" aspect of having children, and is the expected utility from future returns from current investment in daughters. This is the self protection aspect of having a daughter.

U_{I_S} and $\left(\pi_D V_{(D+S)} + (1-\pi_D) V_S\right) \frac{\pi_S}{1+\beta} S'$ are likewise interpreted for son.

2.2. Why do Parents Discriminate Against Their Daughters?

The optimization problem described above indicates that optimal investment in daughter and son are functions of the probabilites of filial devotion, the investment prices and total expenditure on investment. The optimal investments can be written as:

$$I_D{}^* = I_D{}^*(\pi_D, \pi_S, P_D, P_S, E) \tag{2.8}$$

$$I_S{}^* = I_S{}^*(\pi_D, \pi_S, P_D, P_S, E) \tag{2.9}$$

2.2.1. Influence of Tradition on Parental Preference

In the previous chapter, we saw that lower labor force participation, dowry system, and the tradition that daughters' income (if any) "belongs" to her husband's household lead to low prospects of return from daughters. On the other hand, traditionally, sons provide old age support to their parents. Parents who are influenced by such traditions would therefore assign a low probability of filial devotion to daughters and a high probability of filial devotion to sons.

In the extreme case, suppose that parents are not only influenced by tradition, they invest in children only for old age returns and derive no satisfaction whatsoever from loving children. They assign the following probabilities:

$$\begin{aligned} \pi_D &= 0 \\ \pi_S &> 0 \end{aligned}$$

and the pure investment assumption implies that:

$$U_{I_D} = U_{I_S} = 0$$

Under such conditions, the indifference curves between ID and IS are horizontal and a corner solution is obtained, in which parents only investment in their son. An identical result is also obtained if we assume instead that the marginal return from investment in daughter is zero (i.e. $D' = 0$), while the marginal return from investment in son is positive (i.e. $S' > 0$).

In extreme cases, such gender bias manifests itself in female infanticide, sex selective abortion or excessive female infant mortality rates.

A more common type of household gender bias occurs when parents love both son and daughter and yet invest more in son. To show this result, I assume that parents love both son and daughter

$$\begin{aligned} U_{I_D} &> 0 \\ U_{I_S} &> 0 \end{aligned}$$

but are heavily influenced by tradition

$$\begin{aligned} \pi_D &= 0 \\ \pi_S &> 0 \end{aligned}$$

Under such circumstances, the first order condition would be:

$$\frac{P_D}{P_S} = \frac{U_{I_D}}{U_{I_S} + V_S \frac{\pi_S}{1+\beta} S'}$$

The optimal amounts of investment in each child would then be found at a tangency between a convex and downward sloping indifference curve and the budget constraint. Thus, despite between influenced by tradition and with no future expectations from daughters, parents would nonetheless invest in daughters out of sheer love.

A similar result is also possible if parents assign positive probabilities to each child, but believe that the marginal return from investment in son is positive (i.e. $S' > 0$), while the marginal return from investment in daughter is zero (i.e. $D' = 0$).

Such a situation would arise if parents knew that their daughter (out of sheer love and gratitude) would give old age security, but, because of existing traditions, increased investment in her will not enable her to provide a higher return.

Parents who love both children equally and are less influenced by tradition will assign a positive probability of filial devotion to daughter. This will make the indifference curve between ID and IS

steeper, and increase investment in daughter. In general, the steeper the indifference curve between I_D and I_S, the more invested in daughter.

Reverse discrimination is theoretically possible if parents love their daughter much more than they love their son (i.e. $U_{I_D} \gg U_{I_S}$).

2.2.2. Factors that Influence the Budget Constraint

Even though the money price of investment is same for sons and daughters, parents, especially in rural or impoverished households attach opportunity (time) costs to certain kinds of investments, such as schooling and medical care. For example, sending children to school will hamper household chores like taking care of younger siblings, cooking, washing etc. The opportunity cost can increase if the mother works for wages in order to support family income, and if the family income is not high enough to support hiring domestic help.

Whether this increases the price of investing in son or daughter depends on the nature of opportunity cost. Typically, the necessity of participating in household chores increases the opportunity cost of investment in daughter. On the other hand, if parents send their children to work for wages, such as farms or even factories, then the opportunity cost of investment in son may increase.

Households that attach larger opportunity cost of investment in daughter will have steeper budget constraints. (Since the relative price of investing in daughter, P_D/P_S, will increase). Equilibrium investment in daughter will reduce. The impact on investment in son is ambiguous.

To summarize this section and chapter, equilibrium investment depends on parental preference and budget constraint. Love, probability of filial devotion from investment, and marginal return from investment influence parental preference. The lower the probability of filial devotion, the marginal return from investment and the "love" aspect, the lower is the relative investment in daughter. Opportunity cost of investment influences the budget constraint. Higher opportunity cost of investment increases the price of investment and reduces relative investment in daughter. Despite following tradition, parents invest in daughters out of sheer love. However, bias in investment exists if parents attach importance to tradition, and expect sons to be better old age security than daughters.

Chapter 3

Empirical Investigation

In the previous chapter, I outlined a theoretical model of household gender bias in India. Gender bias occurs if parents give preferential treatment to son over daughter in matters of intra household resource allocation. The model focused on the linkage between economic and social reason for discrimination. Parents love both sons and daughters and get happiness from nurturing children of both genders. Parents, especially in poor, rural households don't have much retirement savings, if any. Nor do they have access to capital market savings instruments. Hence, there is an economic incentive for bias in investment allocation. With uncertain future, parents maximize the sum of utility from nurturing and expected utility from old age support by investing more in children who are more likely to have filial devotion. Optimal investment allocation is influenced by the tradition that sons will be old age care giver, while daughters will become a part of her husband's family. Tradition reduces the expected filial devotion from daughters and the marginal return from investment in her, thus giving the social reason for discrimination.

An important extension of the above is whether affluence cancels the impact of culture i.e. are affluent parents in India pure altruists in the Beckerian (1993) sense, and treat son and daughter equal, or are they influenced by tradition too? For example, do dowry payments increase with socio-economic status (like a snob effect), so that even rich parents with sufficient savings nonetheless discriminate against daughters? Is the impact of tradition so much that it prevents even affluent households from becoming pure altruists?

To illustrate the above case, let us assume that affluent parents do not consider expected future returns when they invest in children, the prices of investment in son and daughter are equal and that only the love aspect matters. In that case, the modified condition for optimal investment in children is as follows:

$$U_{I_D} = U_{I_S}$$

Intuitively, parents will invest more in the lesser endowed child, (for example, more medical attention for sicker child, or extra tutoring for the child who is less successful in school), irrespective of gender. Parents will allot investment up to the point where the marginal utility from investing in both children is equal, so that additional resource for less endowed child reduces the marginal utility form investing in the child, while the opposite is true for better endowed child (investing less so that the marginal utility increases).

Parents who are affluent and yet influenced by tradition will have the first order condition 2.7, and hence will be biased in allotting resources.

This paper is an empirical contribution to the literature on gender bias in India. Specifically, I examine gender bias in households. Hence, the household is the unit of analysis. I test the hypotheses that economic and social backgrounds have an impact on optimal investment decision of parents. (For an example, see Behrman (1997) on parental investment that compensates or reinforces child endowment).

Investment is a function of income, efficiency parameters, and social/household variables. The income, labor force participation, and education variable are used to test the economic incentive for discrimination. Demography, social background, household composition and female empowerment are used to test the impact of culture on household gender bias.

3.1. Dataset

Two waves of the Demographic and Health Survey (India): 1998-99 and 2005-2006 were used. The household is the sample unit. I use the individual recode file and the household member recode.

Data is collected from each household member under the following heads: Demography, education, health status, lifestyle, labor force participation, household asset ownership, household hygiene, and other amenities. This data is called the "household member recode". The average household size is 5.5.

The individual recode file contains data only on eligible woman of the household. Eligibility criteria are ever married women between ages 15-49 are eligible. Information categories related to

women include demography (education, religion, region, ethnicity), partner/husband's education, labor force participation status, domestic violence, empowerment, awareness of AIDS, use of birth control methods, and information on fertility history. Questions related to children include birth and death history, vaccination, breastfeeding, pre natal care, post natal care, medical treatment for illnesses, abortions or still births between births.

The 1998-99 individual recode file consists of 90,303 respondents. Only respondents who were either head of their household or were wife of head of household were included in the analysis. The final sample size was 59,145. The average age of respondents was 34 years. More than 64 percent were married by the age of fifteen. Fifty four percent of the respondents had no education. 67.5 percent were from rural areas. More than 32 percent of households had a low standard of living, while 47 percent had a medium standard of living. 77 percent respondents are Hindus, 12 percent are Muslims, and 6.45 percent are Christians.

Importantly, respondents had 1.47 live daughters and 1.59 live sons on average, yielding a sex ratio of 924 females per 1000 males. Average total was 3.5 children.

Around 60 percent respondents were housewives. Most working women were agricultural workers.

More than 56 percent respondents justified that the husband has the right to strike his wife. 62 percent required permission to go to the market, while 70 percent needed permission to visit friends or relatives. Almost 40 percent respondents had no access to any kind of media.

In terms of literacy, 31 percent of respondents had illiterate husbands. Around 36 percent husbands were agricultural workers, while 21 percent were unskilled manual workers. The average age of husband was 40 years.

3.2. Dependent Variable: Child's Education

The probability that a child is attending school and the probability that a child ever attends school were chosen as the dependent variables. The DHS data captures responses on current school going status and also whether the family member ever attended school. I restricted the sample to children aged 6 to 18 years, who are unmarried and living with their parents.

Among males, 74 percent were currently attending school and 90 percent had ever attended school. Among females, only 68 percent of female children were still in school and only 82 percent had ever attended school.

3.3. Explanatory Variables

3.3.1. Economic Causes of Gender Preference

One hypothesis is that gender preference is influenced by economic factors. Accordingly, higher income should be associated with lower gender preference. To test this hypothesis, a composite index of household standard of living index is used, which is a weighted average of ownership of household goods was used in the regressions.

Efficiency variables allow us to test the hypotheses that higher education reduces household gender preference, older parents are more biased and higher age at first marriage reduces gender bias. To test these hypotheses, parents' years of education, parents' occupation, parents' ages and mother's age at first marriage were used in the regressions.

3.3.2. Cultural Causes of Gender Preference

As discussed in the first chapter, the research of Dyson and Moore (1983) suggests that demography and society may also influence gender bias. The impact of tradition and norms should be well captured by region, religion and ethnicity variables. Of particular interest is the social gap between north-south, and between south and other regions.

To account for these factors, the regressions controlled for respondents' religion (i.e. Hindu, Muslim, Christian, Sikh or other), if the respondent lives in an urban or rural area, where in India the respondent lives (i.e. south, north, west, east, north-east or central) and ethnicity.

Ethnicity includes affiliation to a scheduled caste or tribe. Shortly after India gained its independence, the government created scheduled castes and tribes as part of the affirmative action program in education and government service. The previously "low caste" ethnic groups were designated as scheduled castes and tribes. In order to improve their economic condition, the government has a system of quotas for citizens belonging to these categories.

Empowerment of the mother is expected to reduce gender preference and, to test this hypothesis, variables capture the attitude towards women in the household were included in the regressions.

The set of female empowerment variables are divided into ten aspects of female empowerment.

1. Economic empowerment is measured by whether or not a woman is allowed to set money aside for herself.
2. Fertility empowerment is measured by whether or not a woman has ever used any contraceptive method.
3. Health decision empowerment is measured by how much autonomy a woman has to make decisions about her health issue. The variable takes a value of 2 if she has complete autonomy, 1 if decisions are made jointly and 0 if that other members of the household or her husband makes the decisions.
4. Empowerment of movement is measured by whether a woman needs permission to go to the market and whether she she needs permission to visit friends/relatives.
5. Measures of the power to self-indulge follow up on the work of Alaka, Basu, and Koolwal (2005) and include whether a woman has the authority to purchase jewelry and whether she can decide whether to stay with household or elsewhere.
6. Information empowerment is measured by awareness of the disease AIDS and by use of television, radio, newspaper and movies.
7. Household responsibility is measured by her authority to make decisions about what to cook.
8. Domestic violence is measured by whether or not she has been beaten since age 15.
9. Women's relationship with their husbands is measured by her acceptance of domestic violence. Even if a woman has never faced her violence, her self esteem and attitude towards the relationship between husband and wife is reflected by her opinion to the set of questions in

the survey that present to the respondent, several situations and whether a husband is justified in beating his wife in that situation. If her answer is “yes” to even one of these questions, I assume that the wife accepts an inferior status to her husband.

10. Communication with her husband is measured by whether or not she has ever discussed family planning with her husband.

3.3.3. Household Composition

Finally, the regressions included measures of household composition to test the hypothesis that the gender of household head has an impact on household gender bias. The regressions also included the number of household members because the influence of other household members may become more relevant as the household grows in size, thereby affecting gender bias.

Opinions on gender preference and years of education are expected to be influenced not only by income, norms, and tradition, but also by mother’s fertility experience. The sex composition of current family, psychological cost of child death and recent child birth will have an influence on opinion (De Tray, 1973). To account for the effect of a mother’s fertility experience, the regressions included the number of living sons, the number of living daughters, the number of sons who have died, the number of daughters who have died and the gender of last born child.

3.4. Methodology and Summary of Results

Logit regressions were run for the two gender preference variables. Results of the regression are presented in Tables 3.1, 3.2, 3.3 and 3.4. Coefficients for only income and efficiency variables are presented. In the interest of brevity, the rest of the variables are suppressed.

I ran five regressions, of which the first three were for all India sample, and the last two were for the rural sub sample and urban sub sample. In all regressions of ever school attendance and current school going status, male children have a significant advantage in education. Mother's education increases the probability of school attendance significantly. However, mother's labor force participation has no significant impact. In fact, in some specifications, labor force participation, especially in agricultural setting, reduces the probability significantly. Father's education has a positive and significant impact. Father's labor force participation is mostly not significant, although some professions such as clerical and sales job have a positive and significant impact. Household standard of living increases the probability significantly. The incidence of child labor reduces the probability of school attendance significantly.

3.4.1. Regressions by Six Regions

In all six regions (East, West, North, South, Central, Northeast), gender bias is significant and male children have significant advantage in each region (see Tables 3.2 and 3.4). Mother's education has a positive and significant impact in only two regions: northeast and West. Mother's labor force participation is mostly not significant. However, in northeast India, mother's labor force

participation has a negative and significant impact. Father's education has a positive and significant impact, although father's labor force participation is mostly not significant. Household standard of living has a positive and significant impact.

Table 3.1

Table 3.1 – Logit Model
dependent variable: Probability that Child Aged 6-18 Years is Attending School

	India # 1	India # 2	India # 3	Rural India	Urban India
Gender	0.89	0.80	0.85	0.96	0.67
(base: Female)	(22.39)	(44.30)	(41.51)	(21.02)	(8.07)
Child Working	−4.81	−4.67	−4.73	−4.90	−4.72
(base: Not Working)	(−41.90)	(−68.01)	(−68.01)	(−36.74)	(−20.32)
Urban	−0.20		−0.09		
(base: Rural)	(−3.67)		(−3.35)		
Household's	0.31	0.43	0.39	0.31	0.36
Std. of Living	(7.93)	(26.32)	(21.87)	(6.64)	(4.63)
		Mother:			
Education	0.06	0.13	0.10	0.09	0.05
	(3.40)	(17.23)	(12.82)	(3.63)	(1.93)
Professional	0.49	0.17	0.08	0.61	0.26
	(1.01)	(1.81)	(0.85)	(1.05)	(0.29)
Clerk	0.43	0.22	0.08	0.35	0.29
	(0.85)	(1.23)	(0.42)	(0.54)	(0.32)
Sales	0.24	−0.06	−0.23	0.35	−0.04
	(0.51)	(−0.97)	(−3.66)	(0.63)	(−0.05)
Agriculture	0.35	0.04	−0.10	0.38	0.26
(Self-Employed)	(0.70)	(1.61)	(−3.60)	(0.67)	(0.29)
Agriculture	0.27	0.02	−0.12	0.31	0.01
(Employee)	(0.58)	(0.61)	(−3.98)	(0.56)	(0.01)

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Table 3.1 continued – Logit Model
dependent variable: Probability that Child Aged 6-18 Years is Attending School

	India # 1	India # 2	India # 3	Rural India	Urban India
Domestic	−0.06	−0.30	−0.40	−0.16	−0.12
	(−0.14)	(−3.81)	(−4.96)	(−0.28)	(−0.14)
Service	−0.08	−0.29	−0.39	0.30	−0.23
	(−0.16)	(−2.24)	(−2.97)	(0.48)	(−0.25)
Skilled	0.31	0.01	−0.05	0.39	0.14
Manual	(0.66)	(0.18)	(−1.07)	(0.69)	(0.15)
Unskilled	0.18	−0.08	−0.22	0.20	0.13
Manual	(0.39)	(−1.84)	(−4.62)	(0.36)	(0.14)
			Father:		
Education	0.13	0.13	0.12	0.16	0.06
	(10.67)	(22.09)	(20.22)	(10.10)	(2.64)
Professional	−0.10	0.18	0.15	0.28	−0.44
	(−0.67)	(2.37)	(2.04)	(1.32)	(−1.82)
Clerk	0.07	0.21	0.18	0.06	0.06
	(0.45)	(2.71)	(2.30)	(0.25)	(0.24)
Sales	0.14	0.15	0.24	0.35	0.01
	(1.10)	(2.30)	(3.48)	(2.06)	(0.05)
Agriculture	0.01	0.12	0.07	0.16	0.21
(Self-Employed)	(0.10)	(1.92)	(1.05)	(1.12)	(0.91)
Domestic	0.08	0.00	−0.06	0.44	−0.20
	(0.23)	(−0.01)	(−0.34)	(0.91)	(−0.39)

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Table 3.1 continued – Logit Model

dependent variable: Probability that Child Aged 6-18 Years is Attending School

	India # 1	India # 2	India # 3	Rural India	Urban India
Service	−0.10	0.24	0.19	0.09	−0.19
	(−0.69)	(3.15)	(2.50)	(0.44)	(−0.85)
Skilled	0.17	0.17	0.20	0.40	−0.07
Manual	(1.47)	(2.69)	(3.10)	(2.73)	(−0.34)
Unskilled	−0.04	0.02	0.01	0.11	−0.16
Manual	(−0.35)	(0.32)	(0.11)	(0.74)	(−0.79)
Mother's Economic Contribution:					
Less than Half	−0.01			0.05	−0.10
	(−0.09)			(0.62)	(−0.81)
Half	−0.01			0.06	−0.13
	(−0.15)			(0.69)	(−0.99)
Greater than Half	−0.03			−0.08	0.11
	(−0.38)			(−0.84)	(0.63)
All	−0.08			−0.04	−0.11
	(−1.02)			(−0.43)	(−0.69)
Observations	24419	93696	92638	17615	6804
Pseudo-R^2	0.34	0.27	0.28	0.34	0.35
χ^2-statistic	10601	30171	30918	7832	2624
p-value	0.000	0.000	0.000	0.000	0.000
Log Likelihood	−10298	−40276	−39220	708	483

z-scores in parenthesis

Table 3.2

Table 3.2 – Logit Model
dependent variable: Probability that Child Aged 6-18 Years is Attending School

	East India	West India	North India	Northeast India	Central India	South India
Gender	1.09	0.94	1.15	0.46	1.11	0.69
(base: Female)	(12.39)	(8.36)	(9.67)	(4.09)	(12.28)	(7.57)
Child Working	−4.16	−4.49	−5.63	−4.22	−5.19	−5.29
(base: Not Working)	(−14.69)	(−19.10)	(−10.86)	(−13.25)	(−14.27)	(−24.45)
Urban	−0.18	−0.25	−0.37	−0.55	−0.12	0.09
(base: Rural)	(−1.24)	(−1.62)	(−2.52)	(−3.50)	(−0.92)	(0.69)
Household's	0.31	0.14	0.46	0.85	0.33	0.22
Std. of Living	(2.65)	(1.30)	(3.92)	(7.07)	(3.73)	(2.64)
			Mother:			
Education	0.05	0.09	0.00	0.14	0.08	−0.01
	(0.91)	(2.02)	(0.08)	(2.89)	(1.73)	(−0.36)
Professional	1.99	0.03	−0.41	−11.75	0.64	−2.03
	(1.80)	(0.04)	(−0.34)	(−6.10)	(0.61)	(−0.39)
Clerk	1.64	−0.26	−0.33	−11.63		−2.39
	(1.05)	(−0.27)	(−0.26)	(−5.92)		(−0.46)
Sales	1.46	−0.17	−0.32	−12.04	0.18	−2.03
	(1.36)	(−0.18)	(−0.26)	(−6.29)	(0.18)	(−0.40)
Agriculture	1.59	−0.04	−0.47	−12.12	0.65	−1.18
(Self-Employed)	(1.49)	(−0.04)	(−0.38)	(−6.33)	(0.64)	(−0.23)
Agriculture	1.45	0.25	−0.14	−12.72	0.44	−1.85
(Employee)	(1.37)	(0.28)	(−0.12)	(−6.61)	(0.43)	(−0.36)

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Table 3.2 continued – Logit Model
dependent variable: Probability that Child Aged 6-18 Years is Attending School

	East India	West India	North India	Northeast India	Central India	South India
Domestic	1.38	−0.06	−1.06	−12.53	0.37	−2.84
	(1.28)	(−0.07)	(−0.87)	(−6.43)	(0.35)	(−0.55)
Service	0.15	−0.47	−0.82	−12.43	1.41	−2.57
	(0.13)	(−0.51)	(−0.66)	(−6.25)	(1.24)	(−0.50)
Skilled	1.62	0.02	−0.40	−12.07	0.37	−1.97
Manual	(1.52)	(0.02)	(−0.33)	(−6.29)	(0.36)	(−0.38)
Unskilled	1.24	−0.10	−0.30	−12.57	0.58	−1.88
Manual	(1.16)	(−0.11)	(−0.25)	(−6.50)	(0.57)	(−0.37)
			Father:			
Education	0.25	0.11	0.12	0.21	0.14	0.05
	(7.69)	(3.14)	(3.27)	(5.66)	(4.76)	(1.61)
Professional	−1.18	−0.03	−0.39	0.30	0.25	0.09
	(−2.45)	(−0.07)	(−1.05)	(0.80)	(0.59)	(0.24)
Clerk	−0.98	−0.36	0.50	0.37	0.61	0.24
	(−2.10)	(−0.91)	(1.28)	(0.94)	(1.21)	(0.54)
Sales	−0.58	−0.05	0.63	1.00	0.14	0.29
	(−1.80)	(−0.13)	(1.74)	(2.53)	(0.45)	(0.92)
Agriculture	−0.55	−0.37	0.30	0.61	−0.09	0.06
(Self-Employed)	(−1.86)	(−1.22)	(0.92)	(1.99)	(−0.33)	(0.22)
Domestic	−1.17	−0.95	0.40	1.24	0.89	
	(−1.44)	(−1.32)	(0.54)	(1.22)	(0.82)	

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Table 3.2 continued – Logit Model

dependent variable: Probability that Child Aged 6-18 Years is Attending School

	East India	West India	North India	Northeast India	Central India	South India
Service	0.04	−0.71	0.96	0.40	−0.14	−0.46
	(0.08)	(−1.98)	(2.40)	(1.06)	(−0.34)	(−1.37)
Skilled Manual	−0.44	−0.29	0.49	0.91	0.09	0.35
	(−1.45)	(−0.99)	(1.56)	(2.74)	(0.32)	(1.28)
Unskilled Manual	−0.44	−0.49	0.30	0.53	−0.09	0.00
	(−1.41)	(−1.61)	(0.94)	(1.58)	(−0.32)	(−0.01)
Mother's Economic Contribution:						
Less than Half	−0.13	0.30	−0.27	0.46	−0.18	−0.06
	(−0.86)	(1.75)	(−1.53)	(2.20)	(−1.47)	(−0.33)
Half	−0.09	0.16	−0.11	0.46	−0.04	−0.19
	(−0.53)	(0.84)	(−0.55)	(2.09)	(−0.27)	(−0.92)
Greater than Half	−0.10	0.27	−0.14	0.57	−0.23	−0.49
	(−0.52)	(1.09)	(−0.60)	(2.30)	(−1.19)	(−2.00)
All	−0.17	−0.37	0.04	0.15	−0.24	0.09
	(−0.99)	(−1.21)	(0.20)	(0.60)	(−1.46)	(0.41)
Observations	3962	3668	3210	3426	4060	6068
Pseudo-R^2	0.27	0.38	0.35	0.31	0.29	0.44
χ^2-statistic	1473	1667	1306	1155	1596	3372
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Log Likelihood	−2010	−1376	−1197	−1271	−1926	−2124

z-scores in parenthesis

Table 3.3

Table 3.3 – Logit Model dependent variable: Probability that Child Aged 6-18 Years Ever Attends School					
	India # 1	India # 2	India # 3	Rural India	Urban India
Gender (base: Female)	1.06 (46.49)	1.16 (44.08)	1.16 (24.36)	1.21 (23.55)	0.90 (6.87)
Child Working (base: Not Working)	−1.36 (−44.18)	−1.55 (−47.09)	−1.64 (−30.52)	−1.72 (−29.29)	−1.29 (−8.79)
Urban (base: Rural)		0.17 (4.61)	0.07 (0.96)		
Household's Std. of Living	0.88 (41.02)	0.78 (32.55)	0.64 (12.8)	0.59 (10.75)	0.89 (6.83)
		Mother:			
Education	0.45 (28.21)	0.37 (22.64)	0.29 (8.88)	0.34 (8.2)	0.31 (4.73)
Professional	0.48 (2.19)	0.21 (0.95)	1.58 (2.83)	1.76 (2.79)	1.41 (1.02)
Clerk	0.91 (1.49)	0.52 (0.83)	1.43 (1.82)	2.24 (1.89)	0.27 (0.19)
Sales	0.02 (0.28)	−0.30 (−3.58)	1.03 (2.03)	1.51 (2.6)	−0.25 (−0.21)
Agriculture (Self-Employed)	−0.11 (−3.55)	−0.30 (−9.2)	1.01 (2.01)	1.27 (2.22)	−0.01 (−0.01)
Agriculture (Employee)	0.12 (3.94)	−0.23 (−6.72)	1.02 (2.05)	1.25 (2.2)	0.38 (0.32)

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Table 3.3 continued – Logit Model

dependent variable: Probability that Child Aged 6-18 Years Ever Attends School

	India # 1	India # 2	India # 3	Rural India	Urban India
Domestic	0.06	−0.41	0.75	0.91	0.16
	(0.59)	(−3.99)	(1.47)	(1.53)	(0.13)
Service	0.61	0.06	1.23	2.98	−0.09
	(2.47)	(0.23)	(2.09)	(3.07)	(−0.07)
Skilled Manual	0.18	−0.01	1.15	1.39	0.27
	(3.3)	(−0.18)	(2.28)	(2.42)	(0.22)
Unskilled Manual	−0.06	−0.40	0.86	1.04	0.24
	(−1.31)	(−7.73)	(1.71)	(1.83)	(0.20)
Father:					
Education	0.22	0.21	0.26	0.28	0.17
	(26.08)	(22.92)	(14.56)	(14.25)	(3.85)
Education squared		−0.01			
		(−9.07)			
Professional	0.06	0.12	0.41	0.59	0.08
	(0.51)	(1.04)	(1.64)	(1.95)	(0.18)
Clerk	0.67	0.69	0.72	0.53	1.23
	(4.42)	(4.46)	(2.36)	(1.48)	(1.84)
Sales	−0.11	0.12	0.11	0.28	0.11
	(−1.22)	(1.24)	(0.70)	(1.49)	(0.35)
Agriculture (Self-Employed)	−0.14	−0.11	0.13	0.27	0.29
	(−1.66)	(−1.29)	(1.01)	(1.79)	(0.85)
Domestic	0.10	−0.03	0.05	0.30	−0.64
	(0.43)	(−0.11)	(0.11)	(0.59)	(−0.76)

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Table 3.3 continued – Logit Model

dependent variable: Probability that Child Aged 6-18 Years Ever Attends School

	India # 1	India # 2	India # 3	Rural India	Urban India
Service	0.23	0.19	0.23	0.17	0.54
	(2.08)	(1.64)	(1.10)	(0.67)	(1.34)
Skilled Manual	−0.06	0.05	0.23	0.44	−0.07
	(−0.77)	(0.58)	(1.70)	(2.77)	(−0.23)
Unskilled Manual	−0.16	−0.07	0.11	0.28	−0.06
	(−1.87)	(−0.80)	(0.83)	(1.79)	(−0.21)
Mother's Economic Contribution:					
Less than Half			−0.01	0.03	−0.02
			(−0.17)	(0.33)	(−0.12)
Half			−0.02	0.01	0.06
			(−0.27)	(0.09)	(0.30)
Greater than Half			−0.04	−0.01	−0.15
			(−0.40)	(−0.10)	(−0.57)
All			−0.21	−0.19	0.00
			(−2.43)	(−1.99)	(−0.01)
Observations	93966	92904	24480	17660	6820
Pseudo-R^2	0.25	0.30	0.32	0.30	0.37
χ^2-statistic	18901	21900	7377	5454	1273
p-value	0.000	0.000	0.000	0.000	0.000
Log Likelihood	−27672	−25643	−7707	−6508	−1105

z-scores in parenthesis

Table 3.4

Table 3.4 – Logit Model
dependent variable: Probability that Child Aged 6-18 Years Ever Attends School

	East India	West India	North India	Northeast India	Central India	South India
Gender	1.38	0.96	1.67	0.84	1.35	0.90
(base: Female)	(14.69)	(6.37)	(10.26)	(5.50)	(12.88)	(8.10)
Child Working	−1.37	−1.34	−1.70	−1.75	−1.57	−2.09
(base: Not Working)	(−11.47)	(−8.55)	(−9.07)	(−7.84)	(−13.18)	(−19.53)
Urban	0.02	−0.18	0.16	−0.32	0.17	0.33
(base: Rural)	(0.15)	(−0.78)	(0.76)	(−1.08)	(1.12)	(1.80)
Household's	0.76	0.58	0.97	1.36	0.58	0.51
Std. of Living	(5.55)	(3.74)	(6.42)	(7.27)	(5.70)	(4.74)
			Mother:			
Education	0.26	0.38	0.22	0.40	0.13	0.35
	(1.99)	(3.61)	(2.27)	(4.58)	(1.78)	(4.33)
Professional	3.29	1.72	0.77	−11.09	1.03	2.71
	(2.08)	(0.92)	(0.56)	(−4.23)	(0.93)	(0.84)
Clerk			0.44			0.44
			(0.27)			(0.14)
Sales	1.95	0.07	−0.11	−11.40	1.20	1.78
	(1.39)	(0.06)	(−0.08)	(−4.40)	(1.15)	(0.58)
Agriculture	1.78	0.54	0.19	−11.93	1.33	3.11
(Self-Employed)	(1.27)	(0.45)	(0.15)	(−4.62)	(1.31)	(1.02)
Agriculture	1.89	0.68	0.47	−12.65	1.02	2.48
(Employee)	(1.36)	(0.58)	(0.38)	(−4.87)	(1.01)	(0.82)

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Table 3.4 continued – Logit Model
dependent variable: Probability that Child Aged 6-18 Years Ever Attends School

	East India	West India	North India	Northeast India	Central India	South India
Domestic	1.71	0.29	−0.37	−11.93	1.50	1.19
	(1.21)	(0.24)	(−0.29)	(−4.60)	(1.37)	(0.39)
Service	0.20	1.35	1.01	−11.94	2.15	2.10
	(0.13)	(0.86)	(0.69)	(−4.25)	(1.65)	(0.67)
Skilled Manual	2.08	0.21	0.15	−11.39	1.26	2.01
	(1.49)	(0.17)	(0.12)	(−4.39)	(1.24)	(0.66)
Unskilled Manual	1.64	0.07	0.27	−12.14	1.09	2.11
	(1.18)	(0.06)	(0.22)	(−4.64)	(1.07)	(0.70)
Father:						
Education	0.31	0.24	0.31	0.40	0.29	0.08
	(8.16)	(4.41)	(5.14)	(7.05)	(7.48)	(1.65)
Professional	−0.89		0.43	1.14	1.59	0.00
	(−1.35)		(0.77)	(1.74)	(2.29)	(0.01)
Clerk	−0.71	0.03	2.24		0.62	0.01
	(−1.13)	(0.03)	(2.58)		(0.98)	(0.01)
Sales	−0.80	−1.53	1.58	1.87	0.32	0.36
	(−2.24)	(−2.29)	(2.95)	(3.45)	(0.92)	(0.85)
Agriculture (Self-Employed)	−0.35	−0.90	0.68	1.21	0.53	−0.36
	(−1.08)	(−1.61)	(1.80)	(3.13)	(1.83)	(−1.15)
Domestic	−0.42	−2.56	0.98	0.64	0.79	
	(−0.46)	(−2.33)	(0.82)	(0.54)	(0.70)	
Service	−0.53	0.10	1.64	0.62	1.43	−0.42
	(−0.98)	(0.12)	(2.75)	(1.20)	(2.20)	(−0.87)

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Table 3.4 continued – Logit Model

dependent variable: Probability that Child Aged 6-18 Years Ever Attends School

	East India	West India	North India	Northeast India	Central India	South India
Skilled Manual	−0.26	−0.68	0.89	1.42	0.58	−0.07
	(−0.78)	(−1.22)	(2.37)	(3.19)	(1.94)	(−0.22)
Unskilled Manual	−0.41	−1.10	1.18	1.27	0.45	−0.33
	(−1.21)	(−1.98)	(3.10)	(3.03)	(1.50)	(−0.96)
Mother's Economic Contribution:						
Less than Half	−0.13	0.19	−0.24	1.05	−0.28	0.14
	(−0.76)	(0.81)	(−1.02)	(4.01)	(−2.00)	(0.65)
Half	−0.07	0.23	0.08	0.73	−0.18	0.00
	(−0.38)	(0.87)	(0.30)	(2.69)	(−1.17)	(0.01)
Greater than Half	−0.10	−0.10	−0.56	0.88	0.05	0.01
	(−0.46)	(−0.3)	(−1.83)	(2.75)	(0.23)	(0.05)
All	−0.28	−0.63	−0.17	0.47	−0.33	0.11
	(−1.54)	(−1.19)	(−0.71)	(1.43)	(−1.76)	(0.45)
Observations	3966	3380	3001	3063	4075	6072
Pseudo-R^2	0.27	0.29	0.38	0.39	0.24	0.34
χ^2-statistic	1438	657	883	920	1047	1576
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Log Likelihood	−1907	−811	−733	−727	−1632	−1508

z-scores in parenthesis

Bibliography

G. B. Alaka, M. Basu, and Koolwal. Two concepts of female empowerment: Some leads from DHS data on women's status and reproductive health. *A Focus on Gender: Collected papers on gender using DHS data.*, Aug. 2005.

G. S. Becker. *A Treatise on the Family.* Harvard University Press, 1993.

G. S. Becker and N. Tomes. Child endowments and the quantity and quality of children. *Journal of Political Economy*, 84(4):S143–S162, Aug. 1976.

J. R. Behrman. Intra household allocation of nutrients in rural India: Are boys favored? Do parents exhibit inequality aversion? *Oxford Economic Papers*, 40(1):32–54, Mar. 1988.

J. R. Behrman. Intra household distribution and the family. In M. R. Rosenzweig and O. Stark, editors, *Handbook of Population and Family Economics.*, volume 1A, chapter 4. Elsevier, Apr. 1997.

Bhuiya and K. Streatfield. Mother's education and survival of female children in a rural area of Bangladesh. *Population Studies*, 45(2), July 1991.

K. Bourne and G. Walker. The differential effect of mother's education on mortality of boys and girls in India. *Population Studies*, 45(2), July 1991.

J. Caldwell. Routes to low mortality in poor countries. *Population and Development Review*, 12 (2), June 1986.

S. Dalmia and P. G. Lawrence. The institution of dowry in India: Why it continues to prevail. *Journal of Developing Areas*, 38(2), Mar. 2005.

M. Das Gupta. Selective discrimination against female children in rural Punjab, India. *Population and Development Review*, 13(1), Mar. 1987.

D. De Tray. Child quality and demand for children. *Journal of Political Economy*, 81(2 (part 2)), Mar. 1973.

T. Dyson and M. Moore. On kinship structure, female autonomy, and demographic behavior in India. *Population and Development Review*, 9(1), Mar. 1983.

M. Grossman. The Human Capital Model. In A. J. Culyer and J. P. Newhouse, editors, *Handbook of Health Economics*, volume 1A. Elsevier, 2000.

Hill and D. M. Upchurch. Gender differences in child health: Evidence from the Demographic and Health Surveys. 21(1), Mar. 1995.

M. Murthy, A. C. Guio, and J. Dreze. Mortality, fertility, and gender bias in India. *Population and Development Review*, 21(4), Dec. 1995.

E. Oster. Proximate causes of population gender imbalance in India. NBER draft, Oct. 2006a.

E. Oster. Does increased access increase equality? Gender and child health investments in India. NBER draft, Oct. 2006b.

R. Pande. Selective gender differences in childhood nutrition and immunization in rural India: The role of siblings. *Demography*, 40(3), Aug. 2003.

Rahman and V. Rao. The determinants of gender equity in India: Examining Dyson and Moore's thesis with new data. *Population and Development Review*, 30(2), June 2004.

R. Rosenzweig and T. P. Schultz. Market opportunities, genetic endowments, and intra-family resource distribution: Child survival in rural India. *American Economic Review*, 72(4), Sept. 1982.

A. Sen. More than a hundred million women are missing. *New York Review of Books*, 20 Dec. 1990.

A. Sen. Many faces of gender inequality. *Frontline*, 18(22), 2001.

A. Sen. Missing women – revisited. *British Medical Journal*, Dec. 2003.