

AGENCY FOR INTERNATIONAL DEVELOPMENT WASHINGTON, D. C. 20523 <b>BIBLIOGRAPHIC INPUT SHEET</b>		FOR AID USE ONLY BATCH # 41
1. SUBJECT CLASSIFICATION	A. PRIMARY Food production and nutrition	AE50-0000-G635
	B. SECONDARY Rural sociology--India	
2. TITLE AND SUBTITLE		
A socioeconomic model of school attendance in rural India		
3. AUTHOR(S)		
Shortlidge, R.L.		
4. DOCUMENT DATE 1976	5. NUMBER OF PAGES 23p.	6. ARC NUMBER ARC
7. REFERENCE ORGANIZATION NAME AND ADDRESS		
Cornell		
8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)		
(In Occasional paper no.86)		
9. ABSTRACT		
<p>To determine the factors influencing school attendance by Indian children, an analysis was made of social and economic data collected in a household survey conducted by Cornell University and the G. B. Pant University of Agriculture and Technology in 14 villages located in two districts of western Uttar Pradesh state between March and August of 1971. The analysis was restricted to a sample of 295 households containing 570 persons who were between five and 21 years of age, and who were either enrolled in school or had never attended school. In low-income Indian families, children are often not sent to school because their labor contributes to the economic welfare of the household. They work in fields, or care for livestock, or care for younger brothers and sisters. The value of primary-school-age children was estimated in this study to be 135 rupees annually; the value of intermediate-school-age children was estimated at 672 rupees. This opportunity cost accounts for more than half of all schooling costs through the 12th grade. Regression analyses were conducted on 19 different characteristics relating to sibling position, sex, land owned, caste, income, parental education, attitudes and preferences, community characteristics, and so forth. The findings showed that the ability of a family to purchase labor-saving equipment and to absorb the costs of sending a child to school were major determinants of school attendance. Sex was also important; four times as many boys as girls attended school. However, this ratio was much lower (3:2) in households in which both parents had attended school. The study results show that while more than two-thirds of all India's villages have primary schools, universal literacy may hinge more on economic reforms than on the presence of schools and teachers.</p>		
10. CONTROL NUMBER PN-AAC-744	11. PRICE OF DOCUMENT	
12. DESCRIPTORS Education India Motivation Schools	13. PROJECT NUMBER	
	14. CONTRACT NUMBER AID/ta-C-1131 Res.	
	15. TYPE OF DOCUMENT	
16. TYPE OF DOCUMENT		

AD 10-1-76  
10-1-76

January, 1976

NOV 23 1976

**A SOCIOECONOMIC MODEL OF SCHOOL ATTENDANCE**

**IN RURAL INDIA**

**By**

**Richard L. Shortlidge, Jr.**

**Occasional Paper No. 86  
Technological Change in Agriculture Project  
Department of Agricultural Economics  
Cornell University**

**Research supported by Contract No. AID/ta-c-1131  
"Analysis of Direct and Indirect Effects of Technological Change in Agriculture"  
Cornell University and the United States Agency for International Development**

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The author is presently at the Center for Human Resource Research, College of Administrative Science, The Ohio State University. However, the research on which this paper is based was carried out by the author while at Cornell University. A special word of thanks is extended to Arvil V. Adams, Carol L. Jusenius, Andrew I. Kohen, Michael Lipton, John W. Mellor, Theodore W. Schultz, and Vladimir Stoikov for their valuable encouragement and criticisms. Only the author is responsible for errors remaining in the paper.

A Socioeconomic Model of School Attendance  
in Rural India

by

Richard L. Shortlidge, Jr.

Becker's theory of household choice serves as the conceptual framework for this analysis of school attendance in rural India.<sup>1</sup> While the literature dealing with the causal relationship between school attendance and socioeconomic variables in India is considerable, it is based mainly on tabular analyses of gross associations between attendance and variables such as location of residence, age, sex, and caste.<sup>2</sup> The only study which attempts a more sophisticated modeling of school attendance is one recently completed by Rosenzweig and Evenson (1975) based on aggregate district level data from the 1961 Census of India. Using a system of simultaneous equations, Rosenzweig and Evenson examined the factors likely to determine jointly a family's decision with respect to fertility, school attendance, and the employment of children in agriculture. Although the study employs Becker's theory of the allocation of time, the nature of the data precludes a direct test of this paradigm. Since the theory is designed to explain household and individual decisions about how time is spent in market, nonmarket, and leisure activities, households and individuals should be the units of observation.<sup>3</sup>

This paper is divided into three sections. The first develops the theoretical and conceptual framework. This section also contains a brief description of the data. The second section reports the regression results and the third discusses the findings within the context of their policy implications.

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<sup>1</sup>Becker (1965).

<sup>2</sup>See for example Bhagwati (1973), Blaug, et al. (1969), Laxminarayan (1968), Lewis (1965), Myrdal (1968), Naik (1970), Sharma and Sapra (1969), Sundaram (1973), and Wyon and Gordon (1971).

<sup>3</sup>Despite the complexity and sophistication of the Rosenzweig and Evenson model, some of the findings raise serious questions about the appropriateness of aggregate district data for the study of school attendance within the Becker framework. For example, they find a negative effect for the average amount of agricultural land owned in the district on school attendance which is the opposite of the direction that would be predicted by economic theory. Thus, such district data may be influenced by complex cultural and socioeconomic characteristics not controlled for by the model.

## I. A MODEL OF SCHOOL ATTENDANCE

In his imaginative 1965 article in the Economic Journal, Becker develops a theory of household behavior analogous to the behavior of the firm.<sup>4</sup> A household is assumed to maximize its own utility through the production of goods and services. It is from these outputs, rather than the production process itself, that the household derives satisfaction or utility. The household's production process is constrained by the limited resources of time, income, and wealth. This framework has proved of immense value in analyzing female labor force participation, migration, and fertility.<sup>5</sup> To date, it has not often been employed to study the decision to send children to school.<sup>6</sup> Since the model's applications have been generally within the context of western high income societies characterized by universal literacy and child labor laws, the absence of school attendance studies is quite understandable. However, in India where the majority of the population has never attended school and is employed in the agricultural sector, Becker's model provides a valuable and useful framework within which to analyze the process of deciding who goes to school. Although the decision to send a child or children to school is circumscribed by a household's values, needs, and constraints, the decision is made with reference to particular individuals. Therefore, individual children, rather than households, are used as the unit of observation.

Briefly, the data for this analysis comes from a household survey conducted by Cornell University and G. B. Pant University of Agriculture and Technology in 14 villages located in 2 districts of western Uttar Pradesh state.<sup>7</sup> The survey occurred between March and August of 1971 and was composed of a sample of 295 households.<sup>8</sup> This analysis is restricted to the 570 persons in these households who were between 5 and 21 years of age in 1971 and who were either enrolled in school

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<sup>4</sup>Becker's theory represents a concise presentation of earlier work in the area of household production. For example, see Reid (1934).

<sup>5</sup>For examples refer to De Tray (1973), Leibowitz (1974), and Sandell (1975).

<sup>6</sup>The exception in the Indian case is the study by Rosenzweig and Evenson referred to earlier.

<sup>7</sup>The two districts were Badaun and Nainital.

<sup>8</sup>The primary sampling unit was the household. To ensure adequate representation of households from the various socioeconomic strata of village society, all households were classified by means of a complete pre-survey census into 5 major land holding categories. Within each of these categories, a random sample of 15 percent of the Badaun and 33 percent of the Nainital households was selected. The distribution of the households comprising the sample is given in Appendix Table 1.

during the 1970-1971 school year or had never attended school. Seventy-eight persons in the relevant age group were removed because they had attended school prior to the 1970-1971 school year but were not currently enrolled. Their inclusion would have created difficulties in logically inferring that events and circumstances in 1970-1971 affected their decision to attend school.

In rural India, much of the production of basic commodities still occurs within the family setting. With low capital-labor ratios, labor, and hence time, is the principal resource available to the family. The time of household members is allocated among such diverse activities as the cultivation and preparation of farm lands, the transformation of lentils and grains into edible flours, the production of animal by-products, the shepherding of livestock, and the construction and maintenance of agricultural and household structures and equipment. In other words, in addition to the typical household functions of cooking, cleaning, maintenance, and sewing; the average rural Indian household is heavily involved in the production of inputs that are generally purchased in high income countries. In the absence of labor saving devices for farm and domestic activities, these activities are extremely labor intensive, requiring substantial investments of time by adults as well as children. Children not only care for their younger brothers and sisters, they also tend to the needs of livestock and perform household errands. As they age their economic value to the household increases. For example, heads of households from the 14 surveyed villages were asked about the month to month activities of all household members under 21 years of age who were not enrolled in school. They were asked to estimate the market wage which would have been paid if these services had been performed by hired individuals of the same ages. The school year value of children's time by level of education is presented in Table 1. As can be readily seen, the economic value of children to the family is substantial. It increased from Rs. 135 for children of primary school age to Rs. 672 for children of intermediate school age.

Under such circumstances, school attendance by a child involves a major opportunity cost to the family, over and above any direct cost. Although the direct cost of sending a child to school increases as a proportion of the total cost the higher the level of school attending, (see Table 1), the opportunity cost still accounts for more than half of all schooling costs through the 12th grade. Therefore, it seems reasonable to assume that a family will send a child to school, only if the present value of expected pecuniary and psychic benefits exceeds the present value of both direct and indirect costs.

To measure the effect of factors influencing the opportunity cost of going to school, 6 independent variables are introduced into the model (see Table 2). First, the actual number of days in which adult

TABLE 1  
 AVERAGE ANNUAL DIRECT AND INDIRECT COST OF SCHOOLING  
 IN RURAL INDIA BY LEVEL OF SCHOOLING

Level of Schooling	Average direct cost per school year <sup>1</sup> (Rs.)	Average opportunity cost per school year <sup>2</sup> (Rs.)	Total average annual cost (Rs.)	Ratio of average cost to cost of primary school
Primary (1-5)	33	135	168	1.0
Middle (6-8)	120	224	344	2.0
High School (9-10)	219	431	650	3.9
Intermediate (11-12)	522	672	1194	7.1

<sup>1</sup>Includes actual expenditures for tuitions, fees, other school charges, books, clothing, and any private tutors.

<sup>2</sup>The opportunity cost of sending a child to school was estimated by asking the head of the household to estimate the cost of hiring someone to work at the task performed by the child. The work performed by children was collected on a monthly basis. The total yearly cost was divided by 12 and then multiplied by 10 to arrive at a cost approximating the school year in this part of India.

TABLE 2  
VARIABLE DEFINITIONS, MEANS, AND STANDARD DEVIATIONS

Variables	Definitions	Means	Standard Deviations
<u>Individual Characteristics</u>			
First born child	Dummy variable: 1 if first born	0.291	0.454
Female child	Dummy variable: 1 if sex is female	0.381	0.486
<u>Family Characteristics</u>			
<u>Income Effects</u>			
Land owned by household	Continuous variable: actual amount of land in acres	5.930	7.912
Income relative to caste	Ratio: per capita family income/per capita caste income	1.008	0.700
Scheduled caste	Dummy variable: 1 if household's caste scheduled in U.P.	0.125	0.330
Government civil servant	Dummy variable: 1 if employed by U.P. or Central Government	0.074	0.261
<u>Substitution Effects</u>			
<u>(Opportunity Cost)</u>			
Days worked in agricultural labor	Continuous variable: actual days in last crop year (Rabi and Kharif Seasons 1970-1971)	43.100	88.520
Child less than six	Dummy variable: 1 if a child under 6 is in household	0.614	0.487
Extended family	Dummy variable: 1 if household is extended or joint	0.493	0.500
Own some livestock	Dummy variable: 1 if own any pigs, cattle, buffalo, or horses	0.583	0.355
Female household member works outside household	Dummy variable: 1 if a female member works either in someone else's home or on someone else's land	0.054	0.227
Child's age	Continuous variable: actual age of child at time of survey	11.31	3.676

TABLE 2--CONTINUED

Variables	Definitions	Means	Standard Deviations
<u>Attitudes and Preferences</u>			
Opposed to the education of girls	Dummy variable: 1 if oppose educating girls	0.191	0.393
Educated member of household lives outside village	Dummy variable: 1 if some member of the household who has some education works outside village	0.077	0.267
Both parents educated	Dummy variable: 1 if both parents have some education	0.042	0.201
Only father educated	Dummy variable: 1 if only father has some education	0.274	0.446
<u>Community Characteristics</u>			
Average educational attainment of caste members under 21 years	Continuous variable: actual average years	1.273	2.074
Primary school in village	Dummy variable: 1 if primary school in village	0.733	0.442
Living in Nainital district	Dummy variable: 1 if household resides in Nainital district	0.168	0.374
<u>Probability of Attending School</u>			
	Dummy variable: 1 if attends or attended school (children 5-21)	0.411	0.492
<u>Total Sample Size</u>			570

household members worked on the land during the 1970-1971 crop year is expected to affect negatively the probability of school attendance.<sup>9</sup> As the household allots more time to its agricultural operations, the time available for its household and market activities diminishes. Therefore, the necessity of relying on children to assist in the performance of these other functions increases.<sup>10</sup> Second, since children may care for younger siblings, it is hypothesized that the existence of a child under six is negatively related to school attendance. Third, extended or joint families are expected to be more likely than nuclear families to send their children to school, since there are more adult household members to share in the household activities of the family reducing the need to depend on children. Fourth, children are often entrusted with the shepherding and care of livestock during the day. Thus, the ownership of any livestock is expected to reduce the probability of school attendance.<sup>11</sup> Fifth, the employment of an adult female household member as a domestic servant or agricultural laborer on someone else's land is hypothesized to lower the likelihood of school attendance, since children may be called upon to assist the family in the performance of her household chores.<sup>12</sup> Sixth, the information on opportunity cost by level of schooling in Table 1 suggests that age may exert a strong negative effect on school attendance. Therefore, the older the child the lower is the probability that he or she will attend school.<sup>13</sup>

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<sup>9</sup>This variable refers to household members 21 years and older. Obviously the more land owned by the household, the fewer the number of days worked as agricultural labor by the household, since households tend to substitute family members with hired labor. Although this relationship exists, the size of the simple correlation coefficient (-.30) does not suggest a strong degree of collinearity.

<sup>10</sup>This variable does not control for the number of adult household members. In an earlier formulation of the equation, the actual days worked on the land were divided by the number of adult household members. The statistical behavior of this specification of the variable suggested that it was poorer than one simply based on the actual days of agricultural labor.

<sup>11</sup>This variable assumes the value of one if the household owns any livestock and a value of zero otherwise. The simple correlation coefficient between this variable and land owned is +.28.

<sup>12</sup>The simple correlation coefficient between this variable and land is -.14.

<sup>13</sup>This variable may also be viewed as a proxy for vintage. That is, school attendance has been increasing in India with the passage of time. Older children did not attend school because of more unfavorable conditions when they were of a younger school age and of less economic value to the family. Even though conditions may have improved they are unlikely to attend school in the reference year for this analysis because of greater opportunity cost as well as psychic cost of being in a grade with younger children.

Besides the time constraint, the household faces both an income and wealth constraint. The household's production function is conditional on its ability to purchase both physical and human capital in the market. For example, a household may purchase such capital inputs as a mechanical thresher or a tubewell. These inputs would increase the productivity of labor by allowing a greater output to be produced from a given unit of labor or the same output with fewer units of labor. Thus, labor may be shifted to other activities without diminishing the family's total utility. Education is analogous to physical capital in the sense that it may enhance the productivity of the family's human resources assuming other inputs are fixed, a worker effect.<sup>14</sup> Perhaps more important is its impact on the ability of individuals to synthesize information and restructure the production process itself to achieve a higher level of total output, an allocative effect.<sup>15</sup> However unlike physical capital investments, investments in education involve a substantial "setup" time during which the family is incurring a direct expenditure of its financial resources and diminished output from its labor diverted to education. The higher a family's income and wealth the greater its ability to purchase physical capital or labor inputs in the market. These expenditures lessen the need to depend on the labor time of both children and female members in the household's agricultural operations. Although women and children work on the land along with men in rural India, it is out of economic necessity rather than preference. A family can increase its social status if it is able to forego its dependency on young children and women to help cultivate the land. For example, whereas 12 percent of the agricultural laboring households and 7 percent of the households with less than 5 acres of land admitted that their women folk worked on the land, none of the larger land holding classes did so. Because of the cultural stigma attached to such activities, these proportions no doubt significantly undercount the actual proportions.

The above argument establishes a raison d'être within the household's agricultural operation for justifying an expenditure on education. Beyond its potential impact on agricultural productivity, educational investments represent an important means of acquiring future income security and upward social mobility in rural India. Furthermore, education may diminish pressure on the family to subdivide its land holdings among several male offspring if some of them have access to

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<sup>14</sup> For a general discussion of the worker and allocative effects see Welch (1970) and with specific reference to India see Chaudhri (1968).

<sup>15</sup> Schultz (1975) represents an important contribution to human capital theory by developing the linkage between education and the acquisition of entrepreneurial skills.

gainful employment outside the agricultural sector. Thus, an Indian family has these additional motivations for wishing to invest in education. Yet its capacity to do so is limited by its ability to maintain the level of household production and absorb the opportunities and direct costs of sending children to school.

Several variables are included in the model to act as proxies for the family's income and wealth constraints. The first is the amount of land owned by the household. In an agricultural setting, land is a better proxy for family income than income from a particular calendar or crop year. Crop year income is subject to the vagaries of nature. Since educational investments require a commitment of several years, they are more likely to be influenced by a measure of a family's permanent rather than transitory income. Therefore, the greater the quantity of land owned, the greater is the family's ability to purchase labor substitutes in the market and absorb the opportunity and direct costs of sending a child to school. The second is a measure of the family's actual crop year income in 1970-1971 relative to the average 1970-1971 crop year income of other households in its caste community. This may be viewed as a proxy for transitory income. Although the vagaries of nature may indiscriminately affect farms within a particular region, farmers have different entrepreneurial skills in responding to these events. Since educational investments are more likely to be related to permanent income, it is hypothesized that transitory income will have no net independent effect on the probability of going to school. The third variable is a measure of the extent to which government subsidies to offset the direct costs of school attendance affects the likelihood that a child will attend school. In India, some low status individuals are given preferential access to government employment as well as subsidies to attend school. Historically these individuals were from communities which were outside the traditional caste system. Such individuals are often referred to as "untouchables" or harijans. To assist states and localities in identifying individuals eligible to receive these subsidies, there is an authorized list of "scheduled caste." Therefore, it is hypothesized all else being equal, that a household whose caste is scheduled in Uttar Pradesh state, will be more likely than one whose caste is not scheduled to send its children to school.<sup>16</sup> A fourth variable is included to reflect employment as a government civil servant in the village. These households

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<sup>16</sup> Information on "scheduled castes and tribes" for Uttar Pradesh was available from the Report of the Advisory Committee on the Revision of the Lists of Schedule Castes and Scheduled Tribes, 1965. More recent anthropological work in India suggests that the traditional social ostracism associated with being a harijan does not extend to the school environment. See Bhagwati (1973) for a discussion of this point.

include school teachers and personnel working in rural agricultural development. Although their numbers are small, they represent an important social and economic elite within rural society.

The decision to send a child to school is made with reference to the attributes of a particular child. Therefore, it is dependent on the family's perception of the benefits and costs associated with the education of a specific individual. Among the factors likely to affect both costs and benefits are sex and birth order. An Indian family can anticipate fewer long run benefits from the education of its female, as opposed to its male, offspring.<sup>17</sup> Since a female child will grow up to spend most of her adult life in her husband's household, any long run gain in household productivity from her education will accrue to her husband's family. However, an important rationale for sending a girl to school can be found in the dowry system without resorting to altruism. A family improves its bargaining position at the time of negotiating a daughter's marriage if she has been educated. This particular point was made repeatedly by villagers as a primary reason for sending their daughters to school. A growing number of empirical studies has established a correlation between intellectual development and birth order.<sup>18</sup> That is, first-born children exhibit significantly greater intellectual skills than second-, third-, etc., born children. Thus, a family can maximize its expected benefits by investing in its first-born children. Furthermore, since first-born children have higher social status within an Indian family, a family with several children and limited resources may simply prefer to invest more in the education of its first-born son or daughter.

The value a family attaches to education is influenced by its own attitudes and those of its community. During the interview, villagers were asked if they opposed the education of girls. It is hypothesized that an affirmative response to this question indicates per se a negative attitude toward education.<sup>19</sup> In a study of primary schools in Uttar Pradesh, Newman (1972) found that educated villagers ascribed more

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<sup>17</sup> See Bhagwati (1973) and Wyon and Gordon (1971). The effect of being a female extends even to the nurturing received as a small child and affects the incidence of female mortality and morbidity. For example see Levinson (1972). A higher incidence of infant female than male mortality and a tendency not to report female children probably explain the fact that only 38 percent of the sample is female (refer to Table 2).

<sup>18</sup> For example of a recent study see Zajonc and Markus (1975).

<sup>19</sup> This hypothesis was made after earlier analyses of the data suggested that such an attitude was negatively correlated with school attendance among both boys and girls.

positive qualities to education than uneducated villagers did. Furthermore, educated villagers exhibited a greater awareness of events occurring beyond the village community. Since educated parents are more likely to perceive the monetary and psychic benefits to be derived from education, it seems reasonable to expect that a child with such parents will have a higher probability of being sent to school. In addition a family's awareness of employment opportunities within the nonagricultural sector for educated individuals is expected to be enhanced if an educated individual from the family already works in this sector. In other words, the cost to the family of acquiring relevant labor market information has been reduced.

To measure the effects of community, three variables are included in the model. First, conformity to the community's norms or positive reinforcement from significant others in the community may influence the behavior of individuals within the community. For most rural households in India, a proxy for their relevant social community is their caste affiliation. Since an educated caste community is likely to assign positive attributes to school attendance, it is expected that a measure of the caste's general level of educational attainment, such as the average educational attainment of its young people, will positively affect the probability that a particular child within the community goes to school. Second, the location of a primary school within the village is a source of community pride which may influence the likelihood that a household will send its children to school. Of course, an alternative interpretation is that the cost of education is decreased by the presence of the primary school, since transit time to and from school is reduced. Third, since average educational attainment and income are higher in Nainital than Badaun district, it is hypothesized that residing in a Nainital village will positively affect the probability of school attendance.

## II. THE REGRESSION RESULTS

Since the dependent variable is dichotomous, assuming the value of one if the child attends school, Logit estimation procedures are utilized.<sup>20</sup> Because of the nature of the estimated coefficients, it is often easier to display the impact of the significant independent variables within the format of a contingency table. Therefore, the Logit equation is presented in Table 3 and the estimated probabilities of attending school for individuals with particular characteristics in Table 4.

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<sup>20</sup>Logit rather than Probit was used because of Probit's more restrictive normality assumptions. For a discussion of the statistical properties of Logit, refer to Goldberger (1964) and Theil (1971).

TABLE 3  
REGRESSION RESULTS: LOGIT ANALYSIS OF PROBABILITY  
OF ATTENDING SCHOOL

Variable	Coefficient	t-statistic
<u>Constant</u>		
<u>Individual Characteristics</u>		
First born child	-1.212*	-1.89
Female child	0.329	1.26
	-2.012**	-6.92
<u>Family Characteristics</u>		
<u>Income Effect</u>		
Land owned by household	0.129**	4.40
Income relative to caste	0.340	1.46
Scheduled caste	0.096	0.26
Government civil servant	2.538**	3.29
<u>Substitution Effect (Opportunity Cost)</u>		
Days worked in agricultural labor	-0.004**	-2.45
Child less than six	0.385	1.50
Extended family	0.188	0.76
Own some livestock	-0.686*	-1.86
Female household member works outside household	-0.424	-0.62
Age	-0.072*	-2.18
<u>Attitudes and Preferences</u>		
Opposed to education of girls	-0.603*	-1.91
Educated member of household lives outside village	-0.697	-0.96
Both parents educated	2.585*	2.03
Only father educated	0.751**	2.67
<u>Community Characteristics</u>		
Average educational attainment of caste members under 21	0.251**	2.79
Primary school in village	1.213**	3.87
Living in Nainital District	0.952**	2.33
N		570
Likelihood ratio test		289.99
Pseudo R <sup>2</sup>		0.538

\* Significant at  $.01 < \alpha \leq .05$ .

\*\* Significant at  $\alpha \leq .01$ .

TABLE 4  
ESTIMATED PROBABILITIES OF ATTENDING SCHOOL  
BY SELECTED CHARACTERISTICS<sup>1</sup>

Characteristic	Badaun									
	Male					Female				
	Socioeconomic Status <sup>2</sup>					Socioeconomic Status <sup>2</sup>				
	All	OAC	5AC	10AC	GOVT	All	OAC	5AC	10AC	GOVT
<u>TOTAL: All Families</u>	57	34	49	65	87	15	6	12	20	4
<u>Days Worked in Agricultural Labor</u>										
None	61	38	54	69	88	17	7	13	23	50
40 Man Days	57	34	50	65	87	15	6	12	20	47
80 Man Days	53	31	46	62	85	13	6	10	18	43
120 Man Days	49	27	42	58	83	12	5	9	15	39
160 Man Days	45	24	38	54	80	10	4	8	13	35
<u>Ownership of Livestock</u>										
Own Some	54	32	47	63	85	14	6	11	18	44
Do Not Own Any	70	48	64	77	93	24	11	19	31	61
<u>Age of Child</u>										
6 Years	66	43	59	73	90	21	9	16	27	56
8 Years	63	39	55	70	89	18	8	14	24	52
10 Years	59	36	52	67	88	16	7	13	21	49
12 Years	56	33	48	64	86	14	6	11	19	45
14 Years	52	30	44	60	84	13	5	10	17	42
16 Years	49	27	41	57	82	11	5	8	15	38
18 Years	45	24	38	53	80	10	4	7	13	35
20 Years	41	21	34	50	78	9	4	7	12	32
<u>Feeling Toward the Education of Girls</u>										
Opposed	45	24	37	53	80	10	4	7	13	35
Not Opposed	60	36	52	68	88	17	7	13	22	49
<u>Education of Parents</u>										
Neither Educated	49	27	42	58	82	11	5	9	15	39
Only Father Educated	67	44	60	74	91	21	10	17	28	57
Both Parents Educated	93	83	90	95	98	63	40	56	71	89
<u>Average Educational Attainment of Other Caste Children Under 21</u>										
None	49	27	41	57	82	11	5	9	15	39
Primary School (5 yrs)	77	57	71	83	94	31	15	25	39	69
<u>Existence of Primary School in Village</u>										
Yes	65	41	57	72	90	20	9	15	26	54
No	35	17	29	43	73	7	3	5	9	26

TABLE 4-CONTINUED

Characteristic	Nainital									
	Male					Female				
	Socioeconomic Status <sup>2</sup>					Socioeconomic Status <sup>2</sup>				
	All	OAC	5AC	10AC	GOVT	All	OAC	5AC	10AC	GOVT
<u>TOTAL: All Families</u>	77	57	72	83	94	31	15	25	39	69
<u>Days Worked in</u>										
<u>Agricultural Labor</u>										
None	80	61	75	85	95	35	17	29	43	73
40 Man Days	78	57	72	83	94	32	15	25	39	69
80 Man Days	75	53	68	81	94	28	13	23	36	66
120 Man Days	72	49	65	78	92	25	11	20	32	62
160 Man Days	68	45	61	75	91	22	10	17	29	58
<u>Ownership of Livestock</u>										
Own Some	76	54	69	81	94	29	14	23	37	67
Do Not Own Any	86	70	82	90	97	45	24	38	54	80
<u>Age of Child</u>										
6 Years	83	66	79	88	96	40	21	33	48	77
8 Years	81	63	76	86	96	37	18	30	45	74
10 Years	79	59	73	84	95	33	16	27	41	71
12 Years	77	56	71	82	94	30	14	24	38	68
14 Years	74	52	67	80	93	27	13	22	35	65
16 Years	71	49	64	77	92	25	11	19	31	61
18 Years	68	45	61	75	91	22	10	17	28	58
20 Years	65	41	57	72	90	20	9	15	26	54
<u>Feeling Toward the</u>										
<u>Education of Girls</u>										
Opposed	68	45	61	75	91	22	10	17	28	58
Not Opposed	79	60	74	84	95	34	17	27	42	72
<u>Education of Parents</u>										
Neither Educated	71	49	65	78	92	25	11	20	32	62
Only Father Educated	84	67	80	88	96	41	21	34	50	78
Both Parents Educated	97	93	96	96	99	82	63	77	86	96
<u>Average Educational</u>										
<u>Attainment of Other</u>										
<u>Caste Children Under 21</u>										
None	71	49	65	78	92	25	11	20	32	62
Primary School (5 yrs)	90	77	87	92	98	54	31	46	62	85
<u>Existence of Primary</u>										
<u>School in Village</u>										
Yes	83	65	78	87	96	39	20	32	47	76
No	58	35	51	66	87	16	7	12	21	48

<sup>1</sup>Probabilities estimated from LOGIT coefficients in Table 4 and the means in Table 3. The variables in the model are evaluated at their mean when they are not used as a criterion variable

<sup>2</sup>Refers to land owned in acres (AC) or government employment (GOVT).

Separate equations for boys and girls were estimated to test for structural differences in the behavior of the independent variables conditional on the child's sex. However, the results of this F-test indicated that there were no significant interactions between sex and the other independent variables. In view of Rosenzweig and Evenson's findings of a significant sex interaction, this finding came as a surprise. Since neither the data nor the dependent variables are comparable between the two studies, it can only be concluded that within the context of each analyses both findings are statistically correct. Whether structural differences in general exist in India remains open to further empirical work using micro-data rather than macro-data.

Considering that micro-data were utilized in this analysis, the overall performance of the estimated equation is impressive. The equation was significant with a likelihood of ratio test of 289.99 and explained 54 percent of the variance associated with the probability of attending school in rural India. These results provide valuable empirical evidence of the powerfulness of the Becker model of household decision making.

Of the 6 independent variables measuring the opportunity cost of attending school, 3 were found to be significant. School attendance was negatively related to the number of days worked in agricultural labor, owning livestock, and the child's age (see Table 3). For example, among families living in Badaun district, 57 percent of the boys and 15 percent of the girls attended school if the family spent 40 man-days working in the field (see Table 4). However the proportion declined to 53 percent and 13 percent respectively if the number of man-days doubled. In addition, 70 percent of the boys and 24 percent of the girls were enrolled in school if a family in the district did not own any livestock. With the ownership of livestock the proportions diminished to 54 percent and 14 percent respectively. Furthermore, 66 percent of the boys and 21 percent of the girls who were 6 years old were attending school, but only 52 percent and 13 percent respectively were doing so if they were 14 years old.

The ability of a family to purchase labor saving equipment and to absorb in general the costs of sending a child to school were major determinants of school attendance. The significance of the amount of land owned coupled with the lack of significance for relative family income suggests that school attendance is affected by permanent rather than transitory income. Since being a "scheduled" caste did not significantly influence the likelihood of school attendance, it would appear that school attendance in India is not strongly influenced by the direct costs of education. Thus, it seems reasonable to conclude that opportunity costs weigh more heavily in the family's schooling decision than direct costs do. For a comparison of these various effects see Table 4.

The sex of the child was an important determinant of whether he or she went to school. However, this decision did not appear to be significantly influenced by birth order. In Badaun district, boys were on average 4 times more likely to attend school than girls (57 percent versus 15 percent). In Nainital district, they were 2.5 times more likely to do so (77 percent versus 31 percent). Thus, the absence of a long run direct pay off for the family from the education of girls significantly affects the probability that a young woman will be educated.

A family's attitudes toward education were significant in the decision to attend school. Opposition to the education of girls lowered the likelihood that a child would attend school.<sup>21</sup> For example in Badaun district, 60 percent of the boys and 17 percent of the girls were enrolled in school if the family did not object to the education of girls. The proportions declined to 45 percent and 10 percent respectively if it did object. Furthermore, parental education had a pronounced impact on the probability of attending school. Whereas 49 percent of the boys and 11 percent of the girls in Badaun attended school if their parents were not educated, 93 percent of the boys and 63 percent of the girls did so if both parents were educated.

All of the community and environmental variables proved to be significant. The probability that a child would attend school was positively associated with the general level of educational attainment of other children from its caste in the village, the presence of a primary school, and residing in Nainital district.

### III. POLICY IMPLICATIONS

Both present and future rural school attendance in India is affected by economic and educational policies. Although the infrastructure for education is important, as illustrated by the effect of a village primary school on attendance, the fact that over two-thirds of all India's villages have primary schools suggests that the emphasis on providing schools and teachers will have limited future success unless it is matched by an economic policy designed to substantially improve the income position of low income households. Thus, the achievement of universal literacy in India may hinge more on the success of its economic policy than its educational one.

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<sup>21</sup>It is worth noting that in the separate equations computed for the Chow test, both the magnitude and the signs of the coefficients for this variable were almost identical for boys and girls.

The findings in this study support those who would advocate land redistribution in India. Ignoring for the moment the possible effects on agricultural production, it would appear that substantial increases in school attendance might result from such a policy. The gain in school attendance among low income households would more than offset any decrease in attendance among high income households.

Without a substantial change in the distribution of political power in India, a policy of land reform is unlikely to be successful. A more viable approach to improve the accessibility of education to low income families would be through the capital market. The rate of interest paid on borrowed capital in rural India is inversely related to family income. Since the findings in this study argue that it is the opportunity cost rather than the direct cost that affects school attendance, a policy designed to increase access to low interest capital for educational use would also have to encourage capital substitution in agricultural and home production activities to decrease the necessity of relying on child labor.

Furthermore, the importance of parental and community attitudes in the decision to attend school supports a policy designed to provide information about the social and economic values of education. One means of achieving an increase in school attendance would be an expansion of adult literacy programs in India. If parents perceive a personal benefit from literacy, they are also likely to encourage their children to attend school.

To increase the school attendance of young women is perhaps the most challenging and complex task ahead for Indian planners. Success is contingent on a myriad of economic and social forces. The involvement of women in rural development schemes in other than menial jobs may be an important avenue to improve the status of working women in rural India. To overcome the social and economic barriers to the employment of women will require the dedication and perservance of a cadre of women who are willing to undergo the physical hardships of rural life in India as well as the mental hardships of working with people whose initial reaction is likely to be one of hostility. But until a revolutionary change occurs in the traditional rural attitude toward the social and economic role of women, the school attendance of females will remain substantially below that of males.

APPENDIX TABLE 1  
HOUSEHOLDS IN THE VILLAGE SURVEY BY AMOUNT  
OF LAND OWNED AND DISTRICT

Amount of Land Owned	Badaun District <sup>a</sup>		Nainital District <sup>b</sup>	
	Number of Households in Sample	Percent	Number of Households in Sample	Percent
No Land	41	17	23	49
Less than 2.5 Acres of Land	92	37	1	2
2.5 Acres to 7.4 Acres of Land	79	32	4	9
7.5 Acres to 15 Acres of Land	22	9	2	4
More than 15 Acres of Land	14	6	17	36
TOTALS	248	100.0	47	100.0

<sup>a</sup>There were 12 villages in Badaun District from Bisauli and Wazirganj Blocks. Sample size equalled 15 percent of households.

<sup>b</sup>There were two villages in Nainital District from Rudrapur Block. Sample size equalled 33 percent of households.

## REFERENCES

- Becker, Gary S. "A Theory of the Allocation of Time." The Economic Journal 75 (September 1965): 493-517.
- \_\_\_\_\_. Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education. New York: Columbia University Press, 1964.
- Becker, Gary S., and Chiswick, Barry R. "The Economics of Education: Education and the Distribution of Earnings." American Economics Review 56 (Supplement: December 1966): 358-69.
- Bhagwati, Jagdish N. "Education, Class Structure, and Income Equality." World Development 1 (May 1973): 21-36.
- Blaug, Mark; Layard, P.R.G., and Woodhall, Maureen. The Causes of Graduate Unemployment in India. London: Allen Lane, The Penguin Press, 1969.
- Burgess, Tyrrell; Layard, Richard, and Pant, Pitambar. Manpower and Educational Development in India: 1961-1986. Edinburgh: Oliver and Boyd, 1968.
- Chaudhri, D.P. "Education and Agricultural Productivity in India." Ph.D. Dissertation, University of Delhi, 1968.
- Denison, Edward F. The Sources of Economic Growth in the United States And the Alternatives Before Us. New York: Committee for Economic Development, 1962.
- DeTray, Dennis N. "Child Quality and the Demand for Children." Journal of Political Economy 81 (March/April 1973): S70-95.
- Goldberger, Arthur S. Econometric Theory. New York: John Wiley and Sons, Inc. 1964.
- Harbison, Frederick, and Myers, Charles A. Education, Manpower and Economic Growth. New York: McGraw Hill, 1964.
- Huq, Muhammand Shamsul. Education, Manpower, and Development in South And Southeast Asia. New York: Praeger Publishers, 1975.
- Laska, John A. Planning and Educational Development in India. New York: Teachers College Press, Columbia University, 1968.

- Laxminarayan, H. Primary Education in Rural India: Participation and Wastage. Delhi: Agricultural Economics Research Centre, 1968.
- Leibowitz, Arleen. "Home Investments in Children." Journal of Political Economy 82 (March/April 1974): 511-231.
- Levinson, James. "The Morinda Experience: An Economic Analysis of the Determinants of Malnutrition Among Young Children in Rural India." Ph.D. Dissertation, Cornell University, June 1972.
- Lewis, Oscar. Village Life in Northern India. New York: Random House, 1965.
- Maslow, Abraham H. Motivation and Personality. New York: Harper and Row, 1954.
- Mincer, Jacob. "Labor Force Participation of Married Women: A Study of Labor Supply," in Aspects of Labor Economics. New York: National Bureau of Economic Research, 1962. pp. 63-105.
- \_\_\_\_\_. "Market Prices, Opportunity Costs, and Income Effects." in Carl F. Christ, et al. Measurement in Economics: Studies in Mathematical Economics and Econometrics in Memory of Yehuda Grunfeld. Stanford: Stanford University Press, 1963. pp. 67-82.
- Myrdal, Gunnar. Asian Drama: An Inquiry into the Poverty of Nations: Volume III. New York: Pantheon, A Division of Random House, 1968.
- Naik, J. P. Report of the Education Commission: 1964-1966. New Delhi: Ministry of Education and Youth Services, 1970.
- Newman, Robert Samuel. "Environment and Organization Effectiveness: A Study of Three Indian Primary Schools." Ph.D. Dissertation, Cornell University, May 1972.
- Reid, Margaret Gilpin. Economics of Household Production. New York: John Wiley and Sons, 1934.
- The Report of the Advisory Committee on the Revision of the Lists of Scheduled Castes and Scheduled Tribes. New Delhi: Department of Social Security, Government of India, 1965.
- Rosenzweig, Mark R. and Evenson, Robert. "Fertility, Schooling and The Economic Contribution of Children in Rural India." Paper Presented at the Third World Congress of the Econometric Society, August 22, 1975.

- Sandell, Steven H. "The Economics of Family Migration." In Parnes et al., Dual Careers, Volume 4, Forthcoming, 1976.
- Schultz, Theodore W. "The Value of the Ability to Deal with Disequilibria." Journal of Economic Literature 13 (September 1975): 827-846.
- Sharma, R. C. and Sapra, C.L. Wastage and Stagnation in Primary and Middle Schools in India. New Delhi: National Council and Educational Research Training, 1969.
- Sundaram, D. "Education and Class Structure: Further Evidence from India." World Development 1 (May 1973): 37-40.
- Theil, Henri. Principles of Econometrics. New York: John Wiley and Sons. 1971.
- Welch, Finis. "Education in Production." Journal of Political Economy 78 (January/February 1970): 35-59.
- Wyon, John B. and Gordon, John E. The Khanna Study: Population Problems in Rural Punjab. Cambridge: Harvard University Press, 1971.
- Zajonc, R. B. and Markus. "Birth Order and Intellectual Development." Psychological Review 82 (January 1975): 74-88.