Household Electrification, Child Labor and Education in India

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Abstract

Research on the socio-economic determinants of children's educational attainment has thus far provided us with a rich understanding of some of the important dynamics between individual, household, and infrastructure characteristics. However, developing countries like India are still trying to grapple with unacceptably low school enrollments, retention and progress. While school enrollment has been increasing over time in India, even today, 38 percent of boys and 53 percent of girls in the 5-14 age group remain out of schools (Chaudhari, 1997; Duraisamy, 2002). Among the factors that have been found to significantly influence children's education are parental education, household socio-economic status, family size, access to and quality of schooling (Blake, 1989; Coleman, 1966; Blau and Duncan, 1967, Duraisamy, 2000; Knodel et. al, 1990; Lloyd and Blanc, 1996; Montgomery and Lloyd, 1999, Sudha, 1997).

In recent years child labor has begun to attract increasing attention as a major culprit in keeping children from school (Weiner, 1991). Children in developing countries participate in wage labor, farm labor as well as household chores (Levinson and Moe, 1998; Basu, 1999; Lockheed, Fuller and Nyirongo, 1989; Chernichovsky, 1985). However, while it seems highly plausible that excessive demands on children's time may reduce school attendance as well as time for studying and homework, two conceptual debates prevent us from drawing these causal conclusions:

(1) It is often argued that parental decision to enroll their children in school is associated with perceived economic returns to schooling (Rosenzweig, 1977; Basu and Van, 1998; Fuller, Singer and Keiley, 1995). Thus, in economies where education brings low returns, particularly to girls, parents may be reluctant to invest in child schooling. However, once out of school children may help out their parents in domestic chores or farms, creating a spurious relationship between child labor and schooling.

(2) Poverty may lead to school dropout which then leads to increased child labor. Given the pervasive underemployment and unemployment in rural areas in many developing countries, particularly South Asia, adult work load is light enough that parents do not really "need" to rely on child labor (Bhatty, 1997; Sathar and Desai, 2000). However, where schools are of poor quality and teachers engage in discriminatory behavior towards poor children, children may suffer from low performance and drop out (The Probe Team, XXX). Once they drop out, there may be little for them to do except help their parents in domestic work or take on low paying jobs. However, even under these circumstances, many children fail to find work and hence remain both unemployed and out of school (Durrant, 1998). Thus, the causal relationship between child labor and schooling may run in the opposite direction.

However, underemployment on the part of adults may not always explain a need for child labor. In many cultures, child and adult labor markets are quite segregated. The activities that children engage in may be quite different from adult activities. For example, in gender segregated societies where women's physical mobility from the home is restricted, children may carry out errands that their mother can not. Similarly, looking after cattle or fetching fuelwood may be seen as children's job and these household chores may place significant demands on children's time, reducing time available for schooling.

These considerations make it difficult to draw causal connections from the observed correlation between dropping out of school out and children's participation in wage labor or in household chores. We suggest that rural electrification provides us with the analytical handle needed to tease out this causal relationship. In India, sunset occurs around 7 pm and dawn around 6 am. Most of the household and farm chores such as fetching water and fuelwood as well as grazing cattle have to be done during the day. Similarly, most of the wage labor activities such as working in sericulture factories, farm labor and peddling small household goods are largely carried out during daylight hours. However, electrification suddenly extends the time available to children for studying.

Schools in India usually run for five hours per day in two shifts; morning 7 to 12 or afternoon 12 to 5. Thus, even after attending school for a full day, children have a fair amount of time to carry out household chores or farm activities. What they don't have time for is homework and self study. Over years, as class sizes have increased from 30 to nearly 70 children per class, schools have begun to rely more and more on self study at home in the form of homework and private tutoring. Children who have large demands on their time for household chores and farm labor are unable to keep up with the homework. This failure may lead to higher rates of grade retention and subsequent drop out.

Availability of electricity changes this dynamics. Once a household has electricity, the first thing they do is invest in light bulbs, increasing the opportunity for children to study at night. Thus, it might be argued that if child labor and demands on children's time is the driving force leading to school withdrawal, it should be mitigated in villages and households that have electricity. In contrast, if school drop out associated with poor quality of schools and teacher discrimination leads to labor force withdrawal, presence or absence of electricity is likely to have little impact on children's school enrollment.

Since most household chores or work for pay have to be done during daylight hours, children have less time to focus on school or studying. In this context, household electrification may be a boon whereby children are able to devote the evening to school work. Research studies of the impact of electrification at a macro level have revealed positive implications for education levels, but research at the household level is still sparse (Barnes, 1998; Sen, 2000). Little is known about the benefits of household electrification to the members of a household in developing nations (Sen, 2000). In this paper, we explore the impact of access to electrification in a household on school

enrollment, given the competing demands on children's time and constraints on household resources.

It is important to note that in India, household electrification is affected to a great extent by electric connections to the village. Access to electricity for the village as a whole is a constraint to electrification in rural areas. Once power lines enter a village, even poor households are electrified. Enormous government subsidies are given to rural areas in pricing of the electricity. While all households pay about 3 cents per kilowatt hour, the distribution costs are much higher in rural areas (World Bank, 2002). Moreover, households frequently tap into the main electricity line illegally and never pay for electricity. However, while ongoing usage of electricity is highly subsidized, there is a modest cost involved in getting the initial electric connection. But this is a long-term one-time investment, not affected by day-to-day income and hence, a good exogenous variable for this analysis.

In adding household electrification to the nexus between child labor and schooling the following caveat must be considered. Electrification may have a positive impact on education by increasing time available for studying, regardless of the child labor relationship. Hence, the impact of electrification must be evaluated in the presence of factors that increase demand for children's participation in farm/wage labor, or household chores.

Hypotheses:

Child labor is a significant deterrent to child schooling if:

1. Holding income constant, household electrification is positively related to children's school enrollment.

2. Household electrification has a larger positive impact on school enrollment in households with larger demands for child labor, i.e. households with large number of livestock, farm owning households, small number of adults, areas where female seclusion is more common, where all adults are fully employed.

3. Household electrification has a larger positive impact on school enrollment of household members most subject to high labor demands, i.e. boys.

DATA AND METHODOLOGY

This research is based on the Human Development Profile data covering all of rural India in 1994 by the National Council of Applied Economic Research. The survey covered a wide range of issues such as income distribution, poverty and food security to details of household member health, morbidity, fertility and education. In all 33,230 households in 1765 villages of 16 major states were surveyed. Shariff (1999) explains the sampling

framework and database. The present study is restricted to 41,922 children in the 6-14 age group.

The data are analyzed using Logistic regression. The dependent variable here is the probability of being enrolled in school[1]. The main independent variables of interest are access to household electrification and whether children perform any labor. Interaction effects between these two terms will also be tested. The model will be controlled for most of the well researched factors affecting children's education, like gender, parental education, household income, caste, family size, distance to school, access to water and fuel and regional diversity.

[1] Unfortunately, the data do not allow for a dependent variable based on attainment or progess.

TABLE 1

Variables	Mean	Standard Deviation
Enrolled (Yes=1, No-0)	0.6719	0.4695
Reported working (Yes=1, No=0)	0.0458	0.2089
Not enrolled and not working (Yes=1, No=0)	0.2823	0.4501
Completed primary level for children aged 12-14 (Yes=1, No=0)	0.2705	0.4442
Sex (Male=1, Female=2)	0.5265	0.4993
Age (in years)	9.8353	2.5875
Age square	103.43	51.7612
Father's education dummy		
Illiterate	0.5367	0.4987
Below primary	0.1112	0.3149
Primary	0.1349	0.3417
Middle Secondary and	0.1277	0.3337
Above	0.0891	0.2848
Mother's education dummy		
Illiterate	0.7615	0.4262
Below primary	0.0672	0.2504
Primary	0.0897	0.2859
Middle	0.0521	0.2223
Secondary and Above	0.0293	0.1685
Household income ('000)	29.9609	40.0617
Caste (SC/ST=1, others=0)	0.3569	0.4791
Religion dummy		
Hindu	0.8248	0.3800
Muslim	0.1201	0.3251
Christian	0.0191	0.1369
Others	0.0359	0.1860
House electrified (Yes=1, No=0)	0.4818	0.4997
Middle School within the village (Yes=1, No=0)	0.3977	0.4894
State dummy		
Haryana	0.0575	0.2328
Himachal Pradesh	0.0352	0.1843
Punjab	0.0344	0.1823
Bihar	0.0738	0.2614
Uttar Pradesh	0.1480	0.3551
Madhya Pradesh	0.1365	0.3433
Orissa	0.0563	0.2304
Rajasthan	0.0735	0.2609
North-Eastern States	0.0337	0.1805
West Bengal	0.0477	0.2131
Gujarat	0.0430	0.2022
Maharashatra	0.0754	0.2641
Andhra Pradesh	0.0487	0.2151
Karnataka	0.0802	0.2717
Kerala	0.0294	0.1690
Tamil Nadu	0.0271	0.1622
Number of Observations	41922	

Source: NCAER-HDI 1994 Survey

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