



School quality signals and attendance in rural Guatemala

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ABSTRACT

This study analyzes school dropout in rural Guatemala using event history data and unusually detailed data on schools and teachers. Significant results for language of instruction, teacher education and fighting between students demonstrate the importance of accounting for school context influences on an outcome that has, historically, been analyzed mainly as a function of family background. Less support is found for the contention that dropout is lower in schools that are better at maximizing student achievement. Finally, using interaction analysis some of the school effects vary significantly by student gender and ethnicity. The various linkages between school features and dropout highlight the complicated reality of identifying the kinds of features of schools that are valued by poor families.

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For more than 30 years researchers have used household survey data to analyze variation in grade attainment and school enrollment rates in developing countries (Buchmann & Hannum, 2001; Chernichovsky, 1985). These studies have relied heavily on family background and community characteristics as predictors of attendance, and the most consistent explanation for why some young children are not in school is simply that their families are too poor to send them. This “poverty explanation” has helped justify a range of price-reducing interventions around the globe, including abolishing school fees (World Bank, 2009), building more schools, offering free meals in school, and providing families with targeted cash or in-kind transfers (Filmer & Shady, 2008).

The effectiveness of these efforts to make school more affordable for poor people is difficult to judge. One concern

with the historical research emphasis on family background is that the direct effect of socioeconomic status will likely be overstated if the distribution of school features is itself correlated with social class background, which seems likely. As a result, policymakers may feel pressure to make schooling *more affordable* for poor people instead of considering ways to make schools *more responsive* to their needs. This is not to say that abolishing fees or providing scholarships are ineffective: the evidence from scholarship programs like *Progresá* in Mexico (Shultz, 2004), and recent initiatives to abolish school fees in Africa (UNICEF, 2010), reinforces the potential for addressing the price of schooling. But a lingering concern is that researchers and policymakers may be missing some important school effects that help explain why some children are not in school, including the possibility that the school is not providing much in the way of learning.

Underlying this discussion is the central role of information when households are weighing expected benefits against costs, as in the forward-thinking human capital model of school attendance (Becker, 1967). For the

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average developing country household the challenges of evaluating the payoffs to schooling are considerable, beginning first with the actual learning that takes place inside the school walls. We know little about how households evaluate school quality and learning when deciding on attendance, and for poor parents with low levels of education the informational challenges would appear to be greatest. Researchers have been including more and more features of schools in large-sample analyses of attendance in developing countries (Lloyd, Mete, & Grant, 2009). For example, Case and Deaton (1999) find that school dropout is more likely in South Africa when class sizes are larger, while Fuller, Singer and Keiley (1995) show that desertion in Botswana is less likely when parental perceptions of school quality are higher. These kinds of results strongly suggest some form of interaction between the household and the local school, which in turn points to a number of important questions that require more attention. How do households decide which school features are important? How is this information collected? And how are these processes themselves mediated by variables like SES? With better data and more complete explanatory frameworks researchers can continue to fill in these gaps.

Accordingly, in this paper I bridge together elements of the family background and school effects research genres through analysis of event history data from rural Guatemala. The data include up to four years of information for roughly 850 children who were in first grade in 1999, and the year-specific multinomial dependent variable measures grade passing, failure and dropout. The independent variable set includes extensive information on student and family background together with time-varying measures of schools and teachers. The main finding is that primary school dropout in rural Guatemala is associated with school features such as fighting between students and the teacher's ethnicity. Additionally, through interaction analysis I find that the household's apparent responsiveness to certain features of schools varies significantly by the child's gender and family ethnicity. These linkages go beyond most studies of attendance and grade attainment in developing areas. They also help extend the analysis of the family and the ways in which parents manage their children's schooling to especially poor contexts where little is known about these processes.

The paper proceeds as follows. Section 1 adapts Glewwe's (2002) model of school attendance to a rural developing country setting, with an emphasis on the role of school quality signals. Section 2 discusses the Guatemalan context and data. Section 3 presents the empirical framework for testing the main hypotheses. Section 4 presents and discusses the results, and includes the concluding remarks.

1. Conceptual framework

Formal models of school attendance commonly begin with a two-period utility function where households (or more specifically parents) maximize present and (discounted) future consumption. The depiction here borrows heavily from Glewwe (2002) general model, and applies it to a poor rural developing country context. This begins with

a simple utility function with form $U = C_1 + \delta C_2$. Current consumption is equal to total (non child) family income Y'_1 the child's school investment (price p multiplied by total time devoted to school S) and the income generated by the child (Y_{1c}) in their non-school time. Future consumption is simply Y'_2 plus the k fraction of the child's earnings in the post-schooling (i.e. adult) period that accrues to the household. Substituting these into the utility function gives:

$$U = (Y'_1 + \delta Y'_2) - pS + (1 - S)Y_{1c} + \delta k(Y_{2c}) \quad (1)$$

The arguments in (1) are well known. School attendance comes with a current cost in the form of direct expenses (fees, etc.) and foregone child labor and provides future benefits via the child's (adult) earnings. This is a simplification of the decision making process, for several reasons,¹ but the function in (1) provides a useful framework for understanding the school attendance decision in places like rural Guatemala.

To solve for optimal S the payoffs to schooling in the second (adult) period are given by $Y_{2c} = \pi H$, which demonstrates that households need to evaluate both the child's human capital (H) as well as other factors (π) that determine the utility of these skills on the labor market (Glewwe's, 2002).² Total H is given by $H = \theta f(Q)g(S)$ where individual ability (θ) interacts with both the quantity (S) and quality (Q) of schooling. Glewwe (2002) gives Q and S functional forms $[(Q)^\beta(S)^\gamma]$ which makes it possible to show that the marginal utility of increasing school attendance is given by:

$$\frac{\partial U}{\partial S} = -p - (Y_{1c}) + \delta k \pi \theta (Q)^\beta \gamma (S)^{\gamma-1} \quad (2)$$

and with (2) solve for the optimum S :

$$S^* = \left[\frac{(\delta k \pi \theta (Q)^\beta \gamma)}{(p + Y_{1c})} \right]^{1/1-\gamma} \quad (3)$$

The motivation for this paper lies primarily in understanding how school characteristics affect the household's school attendance cost–benefit calculus. The function in (3) highlights two main areas where actions by policymakers can affect household schooling decisions. First, the household's sensitivity to the price p of schooling is consistent with a very large empirical literature linking household income with school attendance. This in turn supports price-reducing interventions that are fairly straightforward in implementation, meaning that the policy can be fully

¹ For example, the household is reduced to a single unitary actor (Alderman, Chiappori, Haddad, Hoddintot, & Kanbur, 1995), no attempt is made to deal with inter-generational dynamics (Socias, 2004), and credit markets are assumed to be non-existent (Brown & Park, 2001). I also only consider the case for a single child and parental valuation of education is restricted to its effect on the child's earnings with no consumption value or tastes for educated children (Schultz, 1963).

² These extensions are based on two additional simplifying assumptions. First, the child's wages in the first (i.e. non-adult) period are fixed and unaffected by his/her schooling. This is not unreasonable for young children in places like rural Guatemala where subsistence farming is prevalent and access to wage labor is limited for children under the age of 16 (INE, 2000). Second, human capital only comes from school attendance or school-related activities outside of school (homework). This rules out on-the-job learning or other activities that increase the child's skills.

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