Youth Education and Work in Mexico

DEBORAH LEVISON
University of Minnesota, Minneapolis, Minnesota, USA

KARINE S. MOE
Macalester College, St. Paul, Minnesota, USA

and

FELICIA MARIE KNAUL *
World Health Organization, Geneva and University of Lausanne, Switzerland

Summary. — A holistic approach to schooling in developing countries—considering schooling in conjunction with labor force work, child care, and other household responsibilities—is necessary to construct policies that will encourage greater educational attainment, especially for children and youth in poor families. Using data from the Encuesta Nacional de Empleo Urbano (ENEU), we jointly estimate the determinants of studying and working, doing both, or doing neither for 12- to 17 year-olds in urban Mexico. We consider the implications of defining work to include both labor force employment and household domestic work, in contrast to the traditional definition of market-based employment. Results based on the traditional definition indicate that girls are 13.8 percentage points more likely than boys to specialize in school, while those based on the more inclusive measure of work indicate that girls are 7.7 percentage points *less* likely than boys to specialize in school. © 2000 Elsevier Science Ltd. All rights reserved.

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1. INTRODUCTION

Much of the vast literature on schooling in developing countries is limited by its reliance on educational enrollment and attainment data without accompanying information on children's and adolescents' alternatives to formal education. In recent years, researchers have begun to recognize that a more holistic approach, considering schooling in conjunction with labor force work, child care, and other household responsibilities, is necessary to construct policies that will encourage greater educational attainment, especially for children and youth in poor families. [1] Housework, in particular, has been neglected as a potential impediment to schooling (Levison & Moe, 1998). Moreover, treating market and nonmarket work differently means that researchers have implicitly ignored much of the effect of work on girls, who are substantially more likely to be engaged in household work. How has this gendered definition of work

affected our understanding of work/school interactions? The main contribution of this paper is its consideration of the implications of defining work more broadly by including both paid and unpaid employment and both labor force and household domestic work. We contrast results using our inclusive measure of work with results using the more traditional definition. We conclude that appraisals of the degree to which work impedes educational attainment are sensitive to the definition of "work." Furthermore, the conclusions reached using the different measures vary substantially by gender.

In this paper, we jointly estimate the determinants of studying, working (in the labor force and/or in the household), both studying and working, or doing neither, for 12- to 17-year-olds in urban Mexico. Because we are concerned with impediments to studying, which have implications for educational attainment, lifetime earnings and well-being, and—in the big picture—economic development and poverty reduction in Mexico, our analysis focuses on time periods when school is in session. [2] We hypothesize that both labor force work and household responsibilities affect youths' schooling, and we expect both to be a function of family composition and resources. Connelly, DeGraff, and Levison (1996), for example, suggest that family composition influences the employment and child care choices of adult women in Brazil; it is likely, therefore, that activities of youth are also affected by the presence of younger and older siblings as well as adults in the household.

Child and youth work encompasses very heterogenous activities. In addition to doing domestic chores, many young people combine labor market activities with schooling (e.g., Levison, 1991; Knaul, 1995; Barros, Fox, & Mendonca, 1997). Others undertake seasonal work, where seasonality may arise due to changes in employment status resulting from either demand factors or school vacations (Knaul, 1995; Flórez, Knaul, & Méndez, 1995; Knaul & Parker, 1998).

Traditional definitions of work typically mask or misrepresent the scale and nature of gender differentials among young workers. Data generally suggest that child and youth work is much more common among males, because work is defined as market-based activity. This is a standard finding in most countries of Latin America as well as other parts of the world (CEPAL, 1996; UNICEF, 1997). The traditional definition of employment includes work undertaken inside or outside of the home in the production of marketable goods or services, with or without remuneration. Below, we contrast results under this traditional definition with results using an inclusive definition that also counts domestic work undertaken in the child's own home that does not directly lead to the production of commercial goods or services. The terms "housework," "household work," "household chores" and "home-based domestic work" are used to refer to this latter form of labor. The inclusive definition substantially increases the

rates of work activity among girls. Hence, it presents a much more widespread picture of the phenomenon of child and youth labor, as well as much higher absolute numbers of children and youth who devote long hours to activities that might impede their school attendance and educational attainment.

One might argue that it is appropriate to maintain a separation of household and labor market work. After all, the remuneration aspect of labor market work is important. Furthermore, to be effective, policies addressed to employers and families must be structured differently. Both of these objections apply, however, to the standard definition of labor force work, which includes some unpaid work (e.g., in family businesses) and some work that takes place within the household (e.g. preparation of grains for market, or outsourced clothing assembly). The fact that most data sources only include measures of labor force work often makes consideration of broader definitions of work impractical; this reality makes it even more important to identify the biases inherent in such measures and their implications when appropriate data do exist.

Among the many reasons for defining work more broadly than has been traditional, we highlight three. [3] First, we avoid the kind of *ad hoc* judgements that hide strong assumptions about individuals' preferences. For example, a given individual may or may not evaluate cooking at home and cooking in a restaurant differently in his utility function. While the rewards to cooking may vary by location, a standard economic approach defers to the individual to evaluate the relative utility gained in the two situations. Yet standard definitions of work imply that the two situations are completely distinct, and, furthermore, one should be "counted" and the other ignored. As Anker (1983, p. 713) notes, "At present, the distinction between economic (i.e. labor force) and non-economic (i.e. non-labor force) activities is often illogical or impracticable." That such distinctions are strongly gendered should make us wary about the implications of their use.

Second, if education enhances the productivity of home-based work, researchers potentially ignore part of the returns to schooling by overlooking productive work in the household. The demographic literature on the effect of women's education on children's health and survival provides strong evidence that such productivity gains exist (Hill & King, 1995).

Third, the standard definition of work misrepresents the opportunity cost of schooling, especially for girls, by excluding the value of household production and child care. This point is a primary motivation of this paper. As others have noted, "Statistics have a powerful influence on perceptions, and thus on development plans and the allocation of resources" (Anker, Khan, & Gupta, 1988, p. v). Policies based on a more accurate understanding of youth responsibilities will be more likely to succeed at promoting educational attainment.

The following section of this paper briefly reviews the relevant literature for Mexico. We then present our theoretical framework, estimation methods, data and variables, and results. We conclude with policy implications.

2. MEXICAN EVIDENCE ON CHILD AND YOUTH ACTIVITIES

Data on school enrollment and on educational efficiency suggest that Mexico is lagging behind expectations given its level of economic development (IADB, 1996). This educational deficit coincides with relatively high rates of child and youth labor force participation (Knaul & Parker, 1998). There is also a considerable amount of variation in child and youth activities in Mexico due to a fairly high level of poverty, coupled with sizeable income inequality within regions, as well as substantial regional disparities in standards of living. Further, there are important gender differentials in the nature of labor force participation and in patterns of school attendance (Knaul, 1998a; Parker & Pederzini, 1998).

In theory—by Mexican law—children under 14 are not permitted to work. Those ages 14 and 15 may work for a maximum of six hours per day but only in work that is not defined as dangerous or does not prevent them from completing a secondary education. Youth ages 16 and over are covered by basically the same labor laws as are adults. Household domestic work is not covered by these labor laws, so girls engaged in household work are protected only via laws on the right to education (Knaul, 1999). In any case, both labor and education laws are widely violated.

A number of studies have evaluated the determinants of child and youth schooling and labor force participation in developing countries. [4] A variety of factors related to family resources (such as wealth and parental education) and household structure are generally found to be pertinent. Child and youth activities have been relatively little-studied in Mexico, in spite of their potential importance in explaining educational attainment and poverty among future generations of Mexicans. In particular, few studies of Mexico exist which include quantitative research on child and youth labor force participation and its interaction with schooling. We discuss pertinent studies as follows.

Christenson and Juarez (1987) find that education of parents, family income, family size and female headship increase the likelihood of child employment, but they do not analyze schooling. Binder and Scrogin (1998) examine the work experiences of primary school children in Western Mexico. Their results suggest that labor force hours come mostly at the expense of leisure; while both labor force work and household work hours reduce "human capital investment hours," working children "do not appear to suffer relative to their nonworking counterparts in terms of available measures of academic performance and desired schooling" (manuscript p. 25). Kandel and Post (1999) also conclude that, with appropriate controls, there is no relationship between paid child labor and academic outcomes in the state of Zacatecas, suggesting that children's labor mediates the effect of family resources. Abler, Rodríguez, and Robles (1998), using the National Household Income and Expenditure Survey of 1992, show that female youth who work in their homes have lower school attendance rates than other groups of young workers. They also find that, in general, full-time school attendance rates declined while labor force participation rates increased during 1984–92. Mier-y-Teran Rocha and Romero (1999), looking over the longer period during 1970–90, document declining participation rates and increasing school attendance and grade attainment for both boys and girls.

Knaul and Parker (1998) exploit longitudinal data to consider the short-term links between school attendance and work among Mexican children and youth: labor force participation rates increase in the summer months when children are out of school, and many of these children return to school in the winter months. Still, workers are more likely to be behind in school, and hours spent studying are lower among children who work longer hours.

Specific work on gender differentials in child and youth work in Mexico is also scarce. Barreiro García *et al.* (1997) present a detailed study of sex segregation in the work of young males and females in the Central de Abasto of Mexico City. They show that within broad occupational groups such as services, the work of young women and girls is very different than that of young men and boys: the former are concentrated in food preparation and prostitution while the latter tend to work as carriers, packers and car washers. For rural contexts, López and Mercedez (1996) and Moreno Mena (1996) suggest that there has been a recent feminization of agricultural work that extends to young women.

Knaul (1998a,b) and Knaul and Parker (1998) highlight the importance of considering household work in the calculation of overall figures for work activity among children and youth. They find that a definition of child and youth work that includes home-based domestic work shows (a) that young women are as likely to undertake work activities as males and (b) that the phenomenon of child and youth work is much more prevalent than suggested by estimates based on traditional definitions of employment. Traditional definitions tend to understate both the extent and intensity of work undertaken by children and youth but are especially problematic for young women. The inclusive definition implies a doubling of the rates of work activity rates among female children and youth. With respect to intensity, girls and young women tend to have more arduous schedules than boys when unpaid work in the home is counted.

Descriptive analysis of our data (described below) from April, May, and June of 1996 indicates how 12- to 17-year-old girls and boys in urban Mexico spend their time. Figure 1 shows that weekly hours of studying—including both time in school and home study time—decline steadily from just above 30 hours per week on average for 12-year olds to roughly 20 hours per week for 17-year olds for both boys and girls. As girls move through the teen years, they spend substantially more time performing household duties, and slightly more time in the labor force. Boys, on the other hand, spend substantially more time in the labor force but, on average, do not change the number of hours spent in household work.

Inspection of the cumulative average study hours, labor force hours, and household work hours per week for girls and boys between the ages of 12 and 17 provides additional descriptive information. [5] These distributions indicate that boys and girls spend roughly comparable amounts of time studying as they age. For example, slightly more than half of all 17-year old boys and girls spend any time studying, while only 5% of 12-year old girls and boys spend no time studying. Roughly 70% of 12-year old girls and boys study more than 30 hours per week, while 50% of 16 year olds and 40% of 17 year olds study more than 30 hours per week. The major difference between girls and boys lies in their allocation of time between labor force work and household work. For example, half of all 12-year old boys work more than 20 hours per week in the labor force, while only 30% of 12-year old girls are employed at all. Roughly 50% of 17-year old girls work more than 20 hours per week in the household, while only 10% of boys of any age work more than 20 hours per week at home.

3. THEORETICAL FRAMEWORK

The theoretical framework for this analysis is derived from a standard Becker (1965) household production model. [6] Becker's household production framework has been widely used to study the joint allocation of time within the family. A formal presentation of the application of the household production function to encompass the multiple activities of children in developing countries is given in Rosenzweig and Evenson (1977). Levison (1991) provides a detailed discussion of the application of this model to child labor force participation and schooling. Empirical work stemming from this framework highlights the importance of factors related to: the individual characteristics of the child such as gender and age; family structure and the relative position in terms of gender and age of the child within the family; poverty, family income and parental labor force participation; community infrastructure such as the supply of schooling and day care; and, labor market conditions such as the wages of children and adults, industrial conditions and legislative norms. Continuing in this tradition, we use a general utility-maximizing framework to model the choices regarding youth school and work activities as a function of individual, parental, and household characteristics. We do not claim that youth are making such choices independently. Rather, given the structure of Becker-type household production models, we must
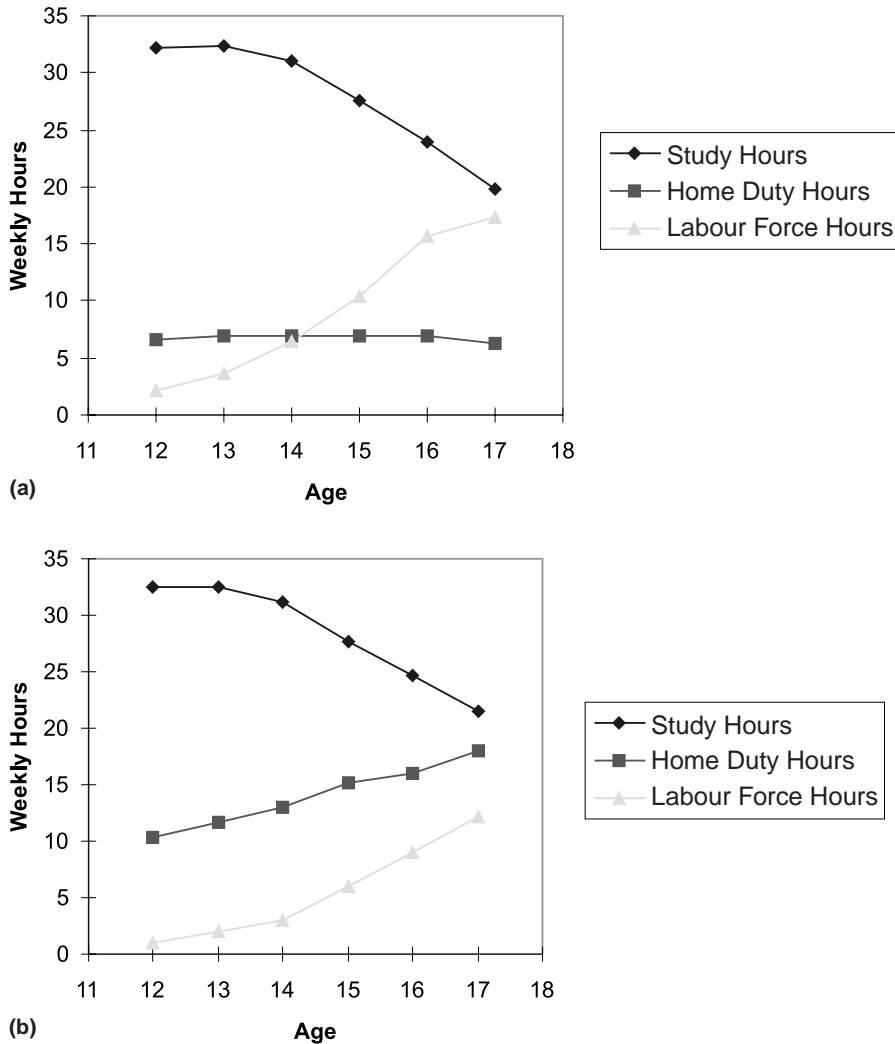
Figure 1. *(a) Average weekly hours of activity: boys ages 12–17, urban Mexico, 1996; (b) average weekly hours of activity: girls ages 12–17, urban Mexico, 1996.*

assume either complete agreement regarding such choices among family members or the existence of an altrustic dicator, such as a parent. [7] The youth's activities are constrained by household resources and time. We assume that the youth either specializes in schooling, specializes in work, combines work and schooling, or does neither activity. [8] Work is defined using two separate definitions. One follows the traditional definition, including only labor force employment, while the other defines work more broadly by including both paid and unpaid labor force work as well as household domestic work.

We expect that the time use of the youth will be determined by the youth's age, with older children spending less time in school and more time working. We also expect that children of the household head may allocate time differently from youth in the household who are reported to be other relatives of the household head. The youth's time use options are also influenced by parental characteristics, including whether or not the parents are living in the household. We expect that youth with more educated parents or parents who can earn higher wages will spend more time in school and less working. Similarly, wealthier

households should be less resource constrained, so we expect that youth in wealthier households will work less and go to school more. On the other hand, the existence of a family business may increase the likelihood that the youth works (or combines work with schooling).

The household's composition may have an important effect on the time allocation of youth. In particular, the presence of other individuals in the household may either provide substitutes for, or create more, household work. Of course, other household members may also generate income, thus relieving pressure on the youth to work. The implication of this general utility-maximizing framework is that decisions regarding the time use of all household members may be jointly determined. In order to keep the model tractable, we assume that household composition is exogenous. [9] We assume that the time-use allocation decision of the youth is a short-run decision, while the household composition decision is long-run, i.e., fixed in the current time period. We expect that the presence of young children in the household will lead to a higher probability of working (where work includes domestic labor), while the presence of older children and other adolescents may increase a youth's work if more work is created, or decrease work, if the other children act as substitutes. Differences in labor market conditions and educational opportunities across metropolitan regions are also expected to affect the time-use decisions of the youth.

Wages of the youth, as well as the wages of his or her parents, will affect the youth's choice of time allocation between work and school. We assume that father's work status and wages are exogenous to the model. The youth's own wages and the mother's wages, however, are likely to be endogenous. In other words, the time-use activities of the youth may affect the labor force participation (and thus the wages) of the mother and vice versa. Higher youth wages may encourage the adolescent to work more, but increased work time (and experience) on the part of youth may increase his or her wages. Increased mother's wages will have an income and a substitution effect: higher income should enable the youth to spend more time in school, but if the mother is working the youth may have to spend more time in the household to substitute for mother's time. We address these issues further in the estimation section.

4. ESTIMATION

We employ a multinomial logit method to estimate simultaneously the determinants of participation in work, school, both, or neither for urban Mexican youth. Levison and Moe (1998) found household work to be a significant obstacle to schooling for adolescent girls in Peru. The preliminary analysis of the ENEU data indicates that this is likely to be true also in Mexico. In order to accurately model these theoretical relationships, a multivariate analysis is required. We use a multinomial logit approach to allow us to see how definitional changes in the dependent variable cause youth to shift among its categories, thus affecting the results and their interpretation. The remainder of this section outlines the estimation procedure.

For the purposes of estimation, we assume that the youth time-use function can be approximated in a linear form:

$$T = \beta_0 + \beta_1 W_y + \beta' X_1 + \epsilon_1,$$

where T is the categorical dependent variable representing alternative uses of the youth's time. We categorize the primary use of youth time into four categories: attend school, work, both attend school and work; and neither attend school nor work. The independent variables include the youth's imputed wage, W_y, and a vector X_1 of individual, household, and locational variables. The parameters of the time use model are represented by β_0, β_1, and β', and ϵ_1 is the error term.

We observe hourly wages only for persons who are working and who report their earnings. For many youth and their mothers, actual hours worked in the paid labor market are zero, and sample selection issues and endogeneity call for the imputation of their wages. For youth, for example, we first derive an estimated wage for all youth based on a wage equation that controls for the sample selection bias. We specify the youth wage equation as follows:

$$\ln W_y = \alpha_0 + \alpha_1 X_2 + \sigma\lambda + \epsilon_2,$$

where X_2 is a vector of individual and regional characteristics thought to affect wages, λ is the sample selection term, and ϵ_2 is the error term. We estimate the wage equation for the subsample of working youth who report positive wages. The sample selection correction term, λ, is derived from a reduced-form probit estimation of youth's labor force employment for all

youth in the sample. The predicted probability of participating in the labor force is calculated for each of the youth and then is included in the wage equation as λ in order to generate an imputed wage for all youth. A similar procedure is used to impute wages for mothers.

We treat the father's employment status, and thus his earnings, as exogenous to the model. Since 11.2% of the fathers who are working decline to report their earnings, however, we estimate a predicted wage for those fathers who work, but do not report their earnings. We specify the father's wage equation as follows:

$$\ln W_f = \gamma_0 + \gamma_1 X_3 + + \epsilon_3,$$

where X_3 is a vector including characteristics affecting father's wages and ϵ_3 is the error term. We then use this predicted wage for any of the fathers who fail to report their earnings. [10]

5. DATA AND VARIABLES

The data source for this paper is the *Encuesta Nacional de Empleo Urbano* (National Urban Employment Survey—ENEU). The ENEU has been conducted on a quarterly basis by INEGI (Instituto Nacional de Estadística Geografía e Informatica) since 1987; in this paper we use the cross-section from the second quarter of 1996. We chose the second quarter because it has the fewest weeks where children are typically out of school. The ENEU is the most reliable Mexican labor market survey, and Mexico's official employment statistics come from this data. In 1996, the ENEU included 41 metropolitan regions and over 80,000 households.

The ENEU includes information on time use, education, as well as a standard set of detailed questions regarding education, employment, unemployment, and labor market withdrawal for each household member over the age of 11. In addition, the survey includes information on family structure and dwelling characteristics.

The data on time use are especially rich as they include weekly hours spent on household work in one's own home and time spent studying, in addition to the usual information on hours spent working in the labor market. The wording of the question on time use lists the following as the activities that refer to household domestic work: housework in your own home, child care, and care of the sick or the aged, when undertaken without pay (*quehaceres de su hogar, atención de niños,*

ancianos o enfermos, sin pago alguno). The ENEU interviewer's manual defines household work as including activities undertaken for personal or familial benefit and not for the production of goods or services for the market. Economic activity, on the other hand is identified based on a positive response to either of two options: engagement in work to sustain one's family or cover one's own expenditures at least one hour last week (*trabajó para sostener a la familia o cubrir alguno de sus propios gastos, al menos una hora*); or, work without pay in a business or on a farm/land of a relative or of another person (*ayudó a trabajar sin pago en un negocio (o en las tierras) de un familiar u otra persona*). Unremunerated work is included as an economic activity if it is undertaken for the production of goods and services, including agricultural work for personal consumption.

Although the data are rich and allow us to broaden the definition of "work" to include household work, the ENEU collects no labor force information on household members under the age of 12. Further, there is no explicit question on school attendance or drop-out. The time-use questions ask how many hours the household member spends studying, but the survey does not ask how that time is divided between school and study at home. School attendance, then, can only be inferred from a positive number of hours spent studying.

Because many students do not attend school during the two-week Easter holidays, we dropped all households interviewed during this two-week interval. [11] Also excluded were 163 households that identified multiple heads of households or multiple spouses of household heads. We further restrict our sample to adolescents between the ages of 12 and 17, who are not household heads and for whom the relevant variables are nonmissing. Our resulting subsample is 38,449 adolescents from 25,338 households. The variable definitions and the corresponding sample means and standard deviations are listed in Table 1.

We estimate multinomial logit models using two different categorical dependent variables. For each dependent variable, we set 15 hours per week to be the level that determines primary activity. In other words, for a youth to be categorized as specializing in school, she must study for at least 15 hours per week and work for fewer than 15 hours. In order to be categorized as combining work and school, the youth must spend at least 15 hours per week studying and 15 hours per week working. A

Table 1. *Variable names and definitions, means and standard deviations (standard deviations in parentheses under the means) youth ages 12–17, Mexico, second quarter of 1996*

Variable name	Total	Female	Male
Categorical dependent variables			
Defining work to include household work			
Attends school only[a]	0.579	0.536	0.621
	(0.494)	(0.499)	(0.485)
Works only[b]	0.176	0.184	0.169
	(0.381)	(0.387)	(0.375)
Attends school and works[c]	0.213	0.260	0.166
	(0.409)	(0.439)	(0.372)
Neither attends school nor works[d]	0.032	0.020	0.044
	(0.176)	(0.141)	(0.205)
Defining work to exclude household work			
Attends school only[a]	0.728	0.755	0.701
	(0.445)	(0.430)	(0.458)
Works only[b]	0.117	0.085	0.148
	(0.321)	(0.279)	(0.355)
Attends school and works[c]	0.063	0.041	0.085
	(0.244)	(0.198)	(0.280)
Neither attends school nor works[d]	0.092	0.119	0.065
	(0.289)	(0.324)	(0.246)
Independent variables			
Youth's characteristics			
Female	0.494	1	0
	(0.500)	(0)	(0)
Age of youth	14.460	14.433	14.485
	(1.698)	(1.701)	(1.696)
Age of youth, squared	211.950	211.203	212.681
	(49.249)	(49.270)	(49.218)
Daughter/son of head (*vs.* other relative)	0.900	0.890	0.909
	(0.300)	(0.312)	(0.287)
Natural log of youth's hourly imputed wage	5.964	5.918	6.009
	(0.384)	(0.382)	(0.381)
Household characteristics			
Mother present	0.973	0.975	0.971
	(0.162)	(0.155)	(0.169)
Father present	0.830	0.826	0.833
	(0.376)	(0.379)	(0.373)
Max (mother's, father's) years of education	8.176	8.158	8.193
	(4.633)	(4.628)	(4.637)
Household characteristics			
Natural log of mother's imputed wage[e]	6.718	6.716	6.719
	(0.478)	(0.479)	(0.476)
Natural log of father's wage[f]	7.330	7.327	7.330
	(0.765)	(0.761)	(0.769)
Father employed in formal sector[g]	0.279	0.277	0.280
	(0.448)	(0.448)	(0.449)
Father employed in family business	0.285	0.282	0.289
	(0.452)	(0.450)	(0.453)
Dwelling characteristics (*wealth proxies*)			
Sewage disposal access	0.953	0.954	0.952
	(0.211)	(0.209)	(0.213)
Telephone in dwelling	0.417	0.413	0.422
	(0.493)	(0.492)	(0.494)
Private bathroom in dwelling	0.947	0.948	0.946
	(0.224)	(0.222)	(0.225)
Dwelling has dirt floors	0.034	0.035	0.034
	(0.182)	(0.183)	(0.181)

Table 1—*continued*

Variable name	Total	Female	Male
Dwelling has concrete floors	0.439	0.438	0.441
	(0.496)	(0.496)	(0.496)
Family structure			
Number of children < age five	0.328	0.339	0.316
	(0.630)	(0.641)	(0.618)
Number of children age 5–9	0.537	0.549	0.524
	(0.742)	(0.746)	(0.737)
Number of girls ages 10–14	0.367	0.374	0.362
	(0.590)	(0.594)	(0.586)
Number of girls ages 15–19	0.365	0.366	0.365
	(0.600)	(0.602)	(0.598)
Number of women ages 20–64	1.292	1.296	1.287
	(0.669)	(0.676)	(0.663)
Number of women > age 64	0.064	0.066	0.063
	(0.251)	(0.253)	(0.248)
Number of boys ages 10–14	0.366	0.366	0.367
	(0.586)	(0.587)	(0.585)
Number of boys ages 15–19	0.379	0.381	0.376
	(0.605)	(0.606)	(0.603)
Number of men ages 20–64	1.120	1.119	1.120
	(0.724)	(0.735)	(0.712)
Number of men > age 64	0.050	0.052	0.048
	(0.220)	(0.225)	(0.216)
(40 region dummy variables)			
Number of observations = 38,269			

[a] "Attends school only" if study hours $\geqslant 15$ h per week and work hours <15 h per week.

[b] "Works only" if study hours <15 h per week and work hours $\geqslant 15$ h per week.

[c] "Attends school and works" if study hours $\geqslant 15$ h per week and work hours $\geqslant 15$ h per week.

[d] "Neither attends school nor works" if study hours <15 h per week and work hours <15 h per week.

[e] In the regression, this variable = 0 if the person is missing, i.e., it is interacted with a dummy indicating mother's or father's presence.

[f] If the father is present but does not report earning, they are imputed.

[g] "Formal sector" is identified by membership in the IMSS or ISSSTE social security systems.

youth who specializes in work must spent at least 15 hours per week working but fewer than 15 hours per week studying. In constructing the dependent variables, we chose the 15-hour cutoff as follows. Given the arbitrary nature of any cutoff, we wanted to be as inclusive as possible in recognizing the activities of youth. For example, in examining the distribution of hours spent studying we find evidence of heaping at zero hours and then in multiples of five hours. Binder and Scrogin (1998) report school day lengths of four and five hours for nine urban day schools in Mexico. So our cutoff would count youth who attend a four-hour shift for at least four days per week as attending school. Only 1% of youth in our sample reporting positive hours of studying fall below this cutoff. The distributions of labor force and household work also lack natural breaks, aside from heaping on multiples of five and seven.

For all three of the underlying variables, hours spent studying, hours spent on chores, and hours spent in the labor force, we would exclude a very small fraction of the sample by moving the cutoff up to 20 hours per week. We decided not to do this because of the very real possibility of miscategorizing children who are actually in school, incorrectly defining them as not attending school.

The two dependent variables are based on the two alternative definitions of work discussed above: one is the traditional measure of paid (and unpaid) labor force work, while the other more inclusive measure counts household duties as well as labor force work. Each is estimated for boys and girls jointly as well as separately by sex.

The explanatory variables include measures of the youth's characteristics, characteristics of the youth's parents, household characteristics,

and family structure. In addition, we include dummy variables for 39 regions, omitting Mexico City. [12] The youth's characteristics include his/her age, age-squared, sex, and whether or not the youth is the son or daughter (*vs.* other relative) of the household head.

The "parent" variables are labelled as such for convenience, but readers should note that in some cases, the adults whose characteristics we measure are not the parents of the observed youth. In particular, we are unable to match children who are not daughters or sons of the household head to their parents. For the 12% of our observations which fall in this category, we proxy parental information with information on head of the household and his/her spouse. For the remainder of the paper, when we refer to the father or mother, we mean to refer to either the real parent or the proxy.

For parent characteristics, we include a variable indicating the maximum of the father's and mother's years of completed schooling, since a substantial percentage of youth do not live with two parents. [13] Another variable indicates whether or not the father receives formal sector employment benefits. We do not include a dummy indicating whether or not the mother works in the formal sector, since that is likely to be endogenous. Dummy variables indicate whether the father and/or the mother resides in or is absent from the household.

Household characteristics comprise a variety of proxies for the wealth and standard of living of the household. These include dummy variables for the existence of piped sewage disposal, a telephone, a private bathroom, and the flooring (dirt, concrete or other) material in the dwelling. Household composition variables are included, as discussed above, because different family members either may act as substitutes for the youth in household duties or may create more work for the household to complete. As a crude check for potential endogeneity of household composition, we re-estimate the model excluding all such variables; the estimates are robust to this change.

Wages of the youth, as well as the wages of his or her parents, may affect the youth's choice of time allocation between work and school. As discussed above, sample selection bias and endogeneity call for the imputation of youth and mother's wages, and we also impute father's wages where they are unreported.

(a) *Estimation of mother's wage*

We impute wages for all of the mothers by performing a standard Heckman (1974) correction procedure. [14] The dependent variable of the first stage probit equation is a dichotomous measure of whether or not the mother works in the labor force for at least 15 hours per week. The independent variables include the characteristics of the mother, such as mother's age, age-squared, years of education, and years of education squared. Dummy variables indicate the presence of a father in the household, the existence of a family business, and the region in which the household is located; the wealth proxies described above are also included. The average wage of adult women by municipality is included to reflect employment opportunities. We also control for the region by including the region dummies. Finally, we include household composition variables.

The dependent variable of the second-stage ordinary least squares (OLS) equation is the natural logarithm of the mother's wage. The independent variables are comprised of the mother's age, age-squared, years of education, years of education squared, the average wage of adult women by municipality, and a proxy to indicate the existence of a family business. In addition to the lambda created using the probit results, we also include the region dummies. The probit is identified by a variable indicating the father's presence or absence, a set of wealth proxies, and household composition variables. We then calculate a predicted wage for each mother in the sample.

(b) *Estimation of father's wage*

In most cases, the father's wage variable is constructed from his reported earnings and hours worked. Where fathers are present and decline to report earnings, we impute their wages by regressing the natural log of the father's wages on the father's age, age squared, years of education, years of education squared, and occupational and regional dummy variables. Based on this regression, we predict wages for each of these fathers. The father's wage variable is then interacted with a variable indicating father's presence or absence, such that this variable equals zero when the father is not a member of the household.

(c) *Estimation of youth's wage*

We impute the wages for youth using the same procedure as for the mothers. The dependent variable of the probit equation is a dichotomous measure of whether or not the youth works more than 15 hours in a normal week. The independent variables of the probit include characteristics of the youth (sex, age, age-squared, relationship to head) and of the parents (education, whether or not the parents are present in the household, and their imputed wages). We also include the average wage of young workers (ages 12–24) by municipality, the wealth proxies, and whether or not there is a family business, as well as family composition variables and the regional dummies.

The dependent variable for the OLS wage equation is the natural logarithm of the hourly wage the youth would earn in a normal week. The independent variables include the sex, age, and age-squared of the youth, the average wage of young workers (ages 12–24) by municipality, a dummy variable indicating whether or not there is a family business, and the lambda generated by the probit. The probit is identified by the variables measuring parent characteristics and the family composition variables.

6. RESULTS

There are six sets of MNL results, since we use two different dependent variables and consider each of them for boys and girls together, then for boys separately and girls separately. Estimated coefficients, t-statistics, and partial derivatives for these results are presented in Tables 2–7. [15] Partial derivatives for continuous variables are evaluated at their sample means, while dummy variables are evaluated for a change from either zero to one or from one to zero, depending on the dummy variable. [16]

(a) *Youth characteristics*

Consider first the effect of gender in the combined sample of boys and girls. We see a significant difference in the effect of gender which changes depending on whether housework is considered "work" or not. When we exclude household work (Table 5), the results indicate that girls are 13.8 percentage points more likely to specialize in school than are boys. [17] Girls are 10.9 percentage points less likely than boys to specialize in work; and they are 7.2 percentage points less likely than boys to combine work and schooling. They are also 4.3 percentage points more likely than boys to be neither studying nor working. Thus, results based on the conventional measure of work tell a clear story of girls' advantage in schooling *vis-à-vis* boys, and of boys' greater commitment to labor force work, to the detriment of their education.

When we switch to the measure of work that includes housework, the results tell a very different story about the effect of gender (Table 2). Now, girls are 7.7 percentage points *less* likely to specialize in school than boys. With this broader conception of work, girls are still less likely than boys to specialize in work, but only by 2.6 percentage points, and now they are 14.1 percentage points more likely than boys to combine work and school. They also become 3.8 percentage points less likely to be neither working nor studying than boys, now that the effect of regular household work (of at least 14 hours per week) is removed from the "neither study nor work" category.

Older youth are more likely to work. Youth who are sons or daughters of the household head, as opposed to being 12- to 17 year-old relatives living in the household, are more likely to specialize in schooling and less likely to specialize in work or to combine work and school. The largest effect with respect to work is for girls, using the inclusive measure (Table 3): daughters are 8 percentage points less likely than female relatives to specialize in work (of any kind). An increase in the youth's imputed wage is almost always associated with a decrease in the likelihood that the youth specializes in work. This negative relationship probably arises because factors that drive up the imputed wage also increase the likelihood of school attendance. In the results for girls alone, however, an increase in youth wages has a positive effect on the likelihood that girls combine school and work (Table 3).

(b) *Parent characteristics*

The mother and father present variables are interacted with the appropriate imputed wages. Accounting for this interaction, we find that having a mother present decreases the likelihood that a youth specializes in work and increases the likelihood she or he will go to school. The effect on work is much stronger when we use the inclusive rather than the

Table 2. *Multinomial logit results for youth activities, defining work to include household work, boys and girls ages 12–17, urban Mexico, second quarter of 1996, ENEU coefficients, t-statistics, and partial derivatives*

Variable names	Work only			School and work			Neither		
	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial
Female	-0.040	-0.150	-0.026	0.705	3.250	0.141	-0.893	-1.639	-0.038
Age	4.016	2.409	0.307	0.260	0.193	-0.044	1.451	0.430	0.027
Age squared	-0.076	-2.190	-0.006	-0.004	-0.155	0.001	-0.013	-0.188	0.000
Son/daughter	-0.372	-6.302	-0.055	0.025	0.463	0.017	-0.163	-1.468	-0.006
Kid's wage[a]	-5.019	-1.415	-0.396	0.530	0.184	0.220	-3.845	-0.533	-0.093
Mother present	4.522	7.937	0.156	1.058	2.799	0.094	0.159	0.169	-0.012
Father present	2.362	10.023	0.137	1.064	5.923	0.092	1.337	3.244	0.037
Parent education	-0.104	-13.373	-0.008	-0.014	-2.408	0.000	-0.061	-4.446	-0.001
Mom's wage[a]	-0.735	-8.492	-0.054	-0.197	-3.533	-0.020	-0.069	-0.480	0.001
Dad's wage[a]	-0.351	-10.757	-0.023	-0.187	-7.682	-0.025	-0.203	-3.595	-0.003
Dad-formal employment	-0.222	-4.522	-0.026	-0.029	-0.728	0.002	-0.068	-0.806	-0.002
Dad-family business	-0.140	-0.857	-0.023	0.213	1.606	0.041	-0.183	-0.556	-0.011
Piped sewage	-0.100	-1.293	-0.023	0.297	3.842	0.042	0.076	0.530	0.002
Telephone	-0.769	-17.467	-0.073	-0.157	-4.670	-0.001	-0.619	-7.888	-0.022
Private bathroom	-0.379	-5.006	-0.052	0.053	0.700	0.025	-0.489	-3.712	-0.029
Dirt floor	0.892	9.909	0.124	0.281	3.170	-0.006	0.857	5.810	0.043
Concrete floor	0.401	9.767	0.056	0.087	2.571	-0.002	0.148	2.017	0.003
Children 0–4	0.391	15.105	0.029	0.069	2.853	0.003	0.170	3.580	0.003
Children 5–9	0.152	6.645	0.011	0.071	3.604	0.010	-0.006	-0.147	-0.001
Females 10–14	0.066	2.404	0.005	0.015	0.625	0.001	0.043	0.857	0.001
Females 15–19	0.092	3.364	0.009	-0.101	-4.218	-0.021	0.146	3.084	0.004
Females 20–64	-0.238	-8.874	-0.016	-0.127	-5.494	-0.017	-0.131	-2.695	-0.002
Females 65+	-0.501	-6.618	-0.034	-0.245	-4.037	-0.033	-0.095	-0.759	0.000
Males 10–14	0.065	2.359	0.004	0.048	1.997	0.007	0.032	0.613	0.000
Males 15–19	0.212	7.861	0.016	0.011	0.483	-0.003	0.143	2.970	0.003
Males 20–64	-0.009	-0.363	0.000	-0.064	-2.696	-0.012	0.119	2.653	0.004
Males 65+	-0.317	-3.892	-0.024	-0.083	-1.198	-0.009	0.120	0.875	0.004
(region dummies)									
Constant	-12.472	-2.663	-0.840	-7.376	-1.988	-1.091	3.154	0.342	0.160
Log likelihood	-33089								
N	38269								

[a] We have not transformed the partial derivatives here: they report $dP/d \ln W$ rather than dP/dW.

Table 3. *Multinomial logit results for youth activities, defining work to include household work, girls ages 12–17, urban Mexico, second quarter of 1996, ENEU coefficients, t-statistics, and partial derivatives*

Variable names	Work only			School and work			Neither		
	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial
Age	0.910	0.393	0.119	-2.064	-1.159	-0.487	6.490	1.091	0.122
Age squared	-0.015	-0.319	-0.002	0.042	1.124	0.010	-0.119	-0.961	-0.002
Son/daughter	-0.553	-6.942	-0.080	0.017	0.239	0.032	-0.151	-0.765	-0.001
Kid's wage[a]	1.973	0.400	0.033	5.743	1.512	1.219	-14.931	-1.175	-0.293
Mother present	5.238	6.447	0.136	1.113	2.208	0.150	0.359	0.218	-0.002
Father present	2.291	6.784	0.117	1.125	4.618	0.156	0.014	0.019	-0.011
Parent education	-0.100	-9.015	-0.008	-0.011	-1.360	0.001	-0.060	-2.445	-0.001
Mom's wage[a]	-0.817	-6.606	-0.061	-0.231	-3.091	-0.026	-0.032	-0.130	0.002
Dad's wage[a]	-0.352	-7.481	-0.024	-0.193	-5.825	-0.031	0.002	0.021	0.002
Dad-formal employment	-0.139	-2.003	-0.015	-0.014	-0.272	0.003	-0.114	-0.764	-0.002
Dad-family business	0.054	0.238	-0.007	0.321	1.828	0.073	-0.714	-1.230	-0.013
Piped sewage	-0.154	-1.394	-0.033	0.326	3.077	0.071	-0.119	-0.498	-0.005
Telephone	-0.716	-11.390	-0.062	-0.093	-2.074	0.007	-0.665	-4.693	-0.010
Private bathroom	-0.425	-3.929	-0.057	0.025	0.246	0.029	-0.478	-2.057	-0.012
Dirt floor	0.823	6.371	0.105	0.264	2.213	0.002	0.726	2.802	0.014
Concrete floor	0.470	8.060	0.058	0.124	2.741	0.002	0.134	1.044	0.000
Children 0–4	0.433	11.926	0.034	0.047	1.429	-0.002	-0.027	-0.295	-0.001
Children 5–9	0.127	3.930	0.009	0.059	2.243	0.009	0.014	0.194	0.000
Females 10–14	0.047	1.212	0.004	-0.003	-0.085	-0.002	-0.059	-0.635	-0.001
Females 15–19	0.084	2.167	0.010	-0.121	-3.784	-0.028	0.122	1.476	0.003
Females 20–64	-0.362	-9.401	-0.026	-0.149	-4.873	-0.021	-0.112	-1.287	-0.001
Females 65+	-0.587	-5.533	-0.043	-0.205	-2.579	-0.026	-0.175	-0.754	-0.001
Males 10–14	0.068	1.735	0.005	0.039	1.188	0.006	0.031	0.346	0.000
Males 15–19	0.255	6.686	0.020	0.052	1.647	0.004	0.040	0.453	0.000
Males 20–64	0.104	2.880	0.009	-0.029	-0.902	-0.009	0.092	1.093	0.002
Males 65+	-0.155	-1.379	-0.012	-0.026	-0.288	-0.003	0.281	1.181	0.005
(region dummies)									
Constant	-21.557	-3.503	-1.442	-13.401	-2.889	-2.294	15.980	1.046	0.383
Log likelihood	-16624								
N	18913								

[a] We have not transformed the partial derivatives here: they report $dP/d \ln W$ rather than dP/dW.

Table 4. *Multinomial logit results for youth activities, defining work to include household work, boys ages 12–17, urban Mexico, second quarter of 1996, ENEU coefficients, t-statistics, and partial derivatives*

Variable names	Work only			School and work			Neither		
	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial
Age	7.357	3.030	0.480	3.677	1.750	0.439	0.072	0.018	−0.044
Age squared	−0.143	−2.816	−0.009	−0.073	−1.676	−0.009	0.015	0.175	0.001
Son/daughter[a]	−0.125	−1.385	−0.016	0.004	0.046	0.006	−0.146	−1.068	−0.006
Kid's wage[a]	−12.317	−2.386	−0.791	−6.960	−1.552	−0.851	−0.518	−0.059	0.065
Mother present	3.846	4.762	0.149	1.083	1.863	0.106	0.069	0.060	−0.016
Father present	2.424	7.282	0.134	0.996	3.697	0.094	1.978	3.931	0.041
Parent education	−0.107	−9.813	−0.007	−0.017	−1.922	−0.001	−0.064	−3.844	−0.002
Mom's wage[a]	−0.667	−5.447	−0.046	−0.167	−1.956	−0.015	−0.075	−0.429	0.000
Dad's wage[a]	−0.351	−7.641	−0.022	−0.182	−5.022	−0.020	−0.298	−4.322	−0.008
Dad-formal employment	−0.311	−4.402	−0.035	−0.039	−0.640	0.003	−0.068	−0.659	−0.001
Dad-family business	−0.358	−1.513	−0.042	0.027	0.129	0.014	0.001	0.002	0.002
Piped sewage	−0.041	−0.370	−0.015	0.264	2.314	0.039	0.186	1.034	0.007
Telephone	−0.821	−13.176	−0.074	−0.234	−4.579	−0.014	−0.604	−6.362	−0.018
Private bathroom	−0.362	−3.372	−0.049	0.056	0.491	0.026	−0.488	−3.020	−0.025
Dirt floor	0.958	7.564	0.134	0.278	2.064	−0.011	0.959	5.270	0.045
Concrete floor	0.339	5.794	0.046	0.047	0.914	−0.006	0.146	1.626	0.004
Children 0–4	0.351	9.324	0.023	0.111	2.999	0.010	0.243	4.298	0.007
Children 5–9	0.182	5.553	0.012	0.089	2.934	0.011	−0.010	−0.187	−0.001
Females 10–14	0.088	2.259	0.006	0.040	1.099	0.004	0.097	1.602	0.003
Females 15–19	0.099	2.523	0.008	−0.078	−2.109	−0.014	0.155	2.668	0.006
Females 20–64	−0.113	−2.981	−0.006	−0.114	−3.158	−0.014	−0.120	−2.022	−0.003
Females 65+	−0.425	−3.896	−0.026	−0.329	−3.422	−0.042	−0.053	−0.356	0.002
Males 10–14	0.073	1.848	0.004	0.061	1.659	0.008	0.032	0.511	0.001
Males 15–19	0.170	4.383	0.012	−0.037	−1.021	−0.009	0.172	2.980	0.006
Males 20–64	−0.130	−3.494	−0.008	−0.103	−2.805	−0.014	0.105	1.946	0.005
Males 65+	−0.483	−4.014	−0.032	−0.181	−1.651	−0.020	0.011	0.062	0.003
(region dummies)									
Constant	−3.281	−0.480	−0.263	2.331	0.402	0.407	−2.369	−0.212	−0.092
Log likelihood	−16196								
N	19356								

[a] We have not transformed the partial derivatives here: they report $dP/d \ln W$ rather than dP/dW.

Table 5. *Multinomial logit results for youth activities, defining work to exclude household work, boys and girls ages 12–17, urban Mexico, second quarter of 1996, ENEU coefficients, t-statistics, and partial derivatives*

Variable names	Work only			School and work			Neither		
	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial
Female	-1.530	-4.814	-0.109	-1.297	-3.593	-0.072	0.277	0.910	0.043
Age	6.979	3.527	0.251	3.455	1.544	0.161	1.729	0.915	0.080
Age squared	-0.141	-3.408	-0.005	-0.070	-1.504	-0.003	-0.028	-0.703	-0.001
Son/daughter	-0.227	-3.326	-0.013	-0.015	-0.176	0.004	-0.482	-7.495	-0.047
Kid's wage[a]	-9.993	-2.380	-0.359	-5.603	-1.174	-0.266	-2.332	-0.579	-0.103
Mother present	4.237	6.246	0.077	3.090	4.681	0.060	2.920	4.617	0.088
Father present	1.966	7.243	0.066	0.133	0.463	-0.002	1.629	6.117	0.073
Parent education	-0.118	-12.930	-0.004	-0.024	-2.520	-0.001	-0.070	-8.030	-0.004
Mom's wage[a]	-0.680	-6.566	-0.024	-0.399	-4.104	-0.018	-0.457	-4.750	-0.026
Dad's wage[a]	-0.276	-7.319	-0.010	-0.069	-1.772	-0.002	-0.255	-6.887	-0.016
Dad-formal employment	-0.388	-6.708	-0.023	-0.259	-3.801	-0.012	-0.044	-0.790	0.000
Dad-family business	-0.380	-1.968	-0.024	0.130	0.591	0.011	-0.068	-0.363	-0.004
Piped sewage	-0.197	-2.275	-0.014	0.004	0.034	0.002	-0.158	-1.828	-0.013
Telephone	-0.853	-16.495	-0.041	-0.275	-5.066	-0.010	-0.585	-11.490	-0.036
Private bathroom	-0.532	-6.323	-0.043	-0.158	-1.377	-0.004	-0.346	-4.100	-0.027
Dirt floor	0.764	7.710	0.060	0.078	0.580	-0.007	0.837	8.617	0.085
Concrete floor	0.348	7.360	0.025	0.055	1.021	-0.001	0.320	6.755	0.027
Children 0–4	0.394	13.586	0.014	0.181	4.937	0.008	0.314	10.964	0.019
Children 5–9	0.168	6.452	0.006	0.091	2.948	0.004	0.054	2.043	0.003
Females 10–14	0.164	5.369	0.006	0.137	3.707	0.007	-0.024	-0.734	-0.003
Females 15–19	0.159	5.052	0.006	0.013	0.336	0.000	0.109	3.501	0.007
Females 20–64	-0.146	-4.840	-0.005	-0.106	-2.883	-0.004	-0.240	-7.574	-0.015
Females 65+	-0.445	-5.020	-0.015	-0.340	-3.299	-0.016	-0.318	-3.810	-0.018
Males 10–14	0.106	3.407	0.004	0.126	3.444	0.006	0.010	0.307	0.000
Males 15–19	0.191	6.136	0.007	0.019	0.494	0.000	0.207	6.864	0.013
Males 20–64	-0.089	-3.009	-0.004	-0.097	-2.527	-0.005	0.138	4.892	0.010
Males 65+	-0.372	-3.960	-0.013	-0.245	-2.094	-0.012	-0.109	-1.208	-0.005
(region dummies)									
Constant	-12.464	-2.206	-0.445	-3.912	-0.633	-0.155	-6.266	-1.196	-0.359
Log likelihood	-26205								
N	38269								

[a] We have not transformed the partial derivatives here: they report $dP/d \ln W$ rather than dP/dW.

Table 6. *Multinomial logit results for youth activities, defining work to exclude household work, girls ages 12–17, urban Mexico, second quarter of 1996, ENEU coefficients, t-statistics, and partial derivatives*

Variable names	Work only			School and work			Neither		
	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial
Age	5.653	1.827	0.143	0.388	0.099	0.005	1.025	0.430	0.064
Age squared	−0.119	−1.830	−0.003	−0.007	−0.090	0.000	−0.015	−0.296	−0.001
Son/daughter	−0.273	−2.739	−0.010	0.165	1.170	0.009	−0.651	−8.173	−0.076
Kid's wage[a]	−6.387	−0.974	−0.165	0.926	0.111	0.0393	−0.354	−0.070	−0.016
Mother present	5.441	4.954	0.051	3.901	3.384	0.035	3.591	4.278	0.100
Father present	1.680	3.859	0.041	−0.281	−0.556	−0.018	1.354	3.890	0.074
Parent education	−0.107	−7.299	−0.003	−0.007	−0.432	0.000	−0.082	−7.100	−0.006
Mom's wage[a]	−0.817	−4.853	−0.019	−0.503	−2.973	−0.015	−0.521	−4.068	−0.036
Dad's wage[a]	−0.240	−3.947	−0.006	−0.028	−0.410	0.000	−0.215	−4.430	−0.016
Dad-formal employment	−0.420	−4.608	−0.017	−0.327	−2.737	−0.009	0.007	0.101	0.004
Dad-family business	−0.446	−1.474	−0.018	0.275	0.713	0.012	0.015	0.066	0.002
Piped sewage	−0.279	−2.097	−0.013	−0.079	−0.398	−0.001	−0.298	−2.698	−0.029
Telephone	−0.787	−9.430	−0.026	−0.179	−1.900	−0.003	−0.621	−9.287	−0.043
Private bathroom	−0.636	−4.911	−0.038	−0.100	−0.505	0.000	−0.350	−3.193	−0.031
Dirt floor	0.666	4.281	0.033	0.307	1.420	0.006	0.764	6.027	0.085
Concrete floor	0.397	5.310	0.019	0.162	1.751	0.003	0.384	6.270	0.037
Children 0–4	0.409	9.378	0.010	0.156	2.525	0.004	0.361	9.851	0.026
Children 5–9	0.131	3.262	0.003	0.057	1.076	0.002	0.074	2.195	0.005
Females 10–14	0.174	3.712	0.005	0.071	1.108	0.002	−0.045	−1.086	−0.004
Females 15–19	0.186	3.811	0.005	0.002	0.029	0.000	0.105	2.603	0.008
Females 20–64	−0.194	−4.112	−0.004	−0.019	−0.328	0.000	−0.329	−7.923	−0.025
Females 65+	−0.494	−3.574	−0.011	−0.277	−1.591	−0.008	−0.458	−4.155	−0.033
Males 10–14	0.130	2.710	0.003	0.147	2.357	0.005	0.016	0.382	0.000
Males 15–19	0.186	3.815	0.004	0.037	0.578	0.000	0.227	5.829	0.017
Males 20–64	−0.013	−0.287	−0.001	−0.061	−0.942	−0.003	0.182	4.988	0.014
Males 65+	−0.113	−0.815	−0.002	−0.216	−1.061	−0.007	−0.105	−0.901	−0.007
(region dummies)									
Constant	−21.20076	−2.506	−0.511	−13.272	−1.301	−0.41	−10.281	−1.639	−0.696
Log likelihood	−12068								
N	18913								

[a] We have not transformed the partial derivatives here: they report $dP/d \ln W$ rather than dP/dW.

Table 7. *Multinomial logit results for youth activities, defining work to exclude household work, boys ages 12–17, urban Mexico, second quarter of 1996, ENEU coefficients, t-statistics, and partial derivatives*

Variable names	Work only			School and work			Neither		
	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial	Coefficient	t-statistics	Partial
Age	8.165	3.134	0.398	5.079	1.845	0.338	2.125	0.669	0.065
Age squared	−0.162	−2.977	−0.008	−0.103	−1.793	−0.007	−0.034	−0.520	−0.001
Son/daughter	−0.174	−1.835	−0.016	−0.103	−0.955	−0.006	−0.107	−0.934	−0.006
Kid's wage[a]	−13.042	−2.357	−0.630	−9.125	−1.553	−0.615	−3.773	−0.556	−0.119
Mother present	3.503	4.024	0.107	2.670	3.297	0.089	2.026	2.080	0.071
Father present	2.133	6.065	0.095	0.365	1.042	0.013	2.029	4.821	0.072
Parent education	−0.125	−10.653	−0.006	−0.033	−2.829	−0.002	−0.052	−3.823	−0.002
Mom's wage[a]	−0.599	−4.529	−0.029	−0.346	−2.900	−0.022	−0.378	−2.569	−0.017
Dad's wage[a]	−0.295	−6.078	−0.014	−0.090	−1.901	−0.004	−0.315	−5.437	−0.016
Dad-formal employment	−0.366	−4.863	−0.029	−0.233	−2.786	−0.015	−0.125	−1.418	−0.005
Dad-family business	−0.363	−1.431	−0.031	0.060	0.223	0.011	−0.167	−0.534	−0.010
Piped sewage	−0.126	−1.087	−0.015	0.069	0.472	0.007	0.055	0.376	0.005
Telephone	−0.893	−13.438	−0.059	−0.314	−4.701	−0.016	−0.533	−6.672	−0.028
Private bathroom	−0.468	−4.180	−0.046	−0.173	−1.216	−0.005	−0.396	−2.908	−0.028
Dirt floor	0.847	6.466	0.092	−0.023	−0.131	−0.023	0.936	6.047	0.086
Concrete floor	0.315	5.099	0.032	−0.003	−0.040	−0.006	0.225	2.961	0.015
Children 0–4	0.388	9.852	0.019	0.191	4.147	0.012	0.230	4.743	0.010
Children 5–9	0.195	5.644	0.010	0.116	2.994	0.008	0.019	0.434	0.000
Females 10–14	0.159	3.905	0.007	0.174	3.822	0.012	0.016	0.306	0.000
Females 15–19	0.142	3.423	0.007	0.020	0.417	0.000	0.127	2.544	0.006
Females 20–64	−0.117	−2.947	−0.005	−0.151	−3.210	−0.010	−0.098	−1.961	−0.004
Females 65+	−0.440	−3.765	−0.021	−0.386	−2.985	−0.027	−0.097	−0.752	−0.002
Males 10–14	0.098	2.362	0.004	0.125	2.736	0.009	0.019	0.361	0.000
Males 15–19	0.191	4.679	0.009	0.008	0.169	−0.001	0.167	3.397	0.008
Males 20–64	−0.150	−3.798	−0.008	−0.123	−2.583	−0.009	0.081	1.766	0.005
Males 65+	−0.546	−4.271	−0.027	−0.273	−1.883	−0.018	−0.052	−0.359	0.000
(region dummies)									
Constant	−6.798	−0.919	−0.354	0.812	0.106	0.102	−1.995	−0.227	−0.090
Log likelihood	−13946								
N	19356								

[a]We have not transformed the partial derivatives here: they report dP/d ln W rather than dP/dW.

exclusive definition of work. For example, for girls, the effect of having a mother present decreases the likelihood that she specializes in work by 27 percentage points; using the exclusive measure reduces that effect to 8 percentage points. For boys, the effect drops from 16 to 9 percentage points. This suggests that both boys and girls substitute for their mothers' work when their mother is absent, although the effect is much stronger for girls. The positive effect of having a mother present on the likelihood of specialization in school, on the other hand, is robust to the definition of work used.

The effect of having a father present, for the most part, increases the probability of attending school and decreases both the likelihood of working and of combining work and school. The sizes of these effects are small relative to the effects of the mother's presence. The sizeably larger impact of the mother's presence is consistent with evidence from other countries showing that when mothers have more decision-making power (as in the absence of fathers), children and youth receive more education. [18]

Where significant, increases in parental education reduce work and also reduce combining school and work, while increasing specialization in school. The magnitude of these effects at the margin for the average youth are, however, surprisingly small.

The effect of an increase in parents' wages on the likelihood of attending school does not depend on which parent's wage increases or on which definition of work is used. For example, in the sample with boys and girls together, the effect of a one standard deviation increase in the imputed log wage of either the mother or the father increases the likelihood of school specialization by 8 percentage points. With regard to work, under either the inclusive or exclusive definitions of work, a one standard deviation increase in the father's imputed log wage leads to a 3 percentage point decrease in the probability of specializing in work. The effect of the mother's wage under the exclusive work measure is roughly equal to that of the father's, but the effect is twice as big under the inclusive measure of work.

If the father is employed in the formal sector, the probability that the youth will work or combine work with school is decreased, where significant; these youth are also more likely to specialize in school. If the father is employed in a family business, the probability that the youth will combine school and work increases, where

significant. There is also a small positive effect on the probability of specialization in school, except in the case of girls using the inclusive work measure; family businesses apparently cause girls' time to shift into housework, to the detriment of their schooling.

(c) *Wealth proxies*

With one exception, all the effects of wealth proxies are either insignificant or in the expected direction. The presence of a telephone, a private bathroom, and flooring other than dirt or concrete is positively associated with studying. Piped sewage has no effect when the traditional work measure is used, but it has an unexpected positive effect on the probability of combining school and work under the inclusive work measure; the effect on girls (7 percentage points) is almost double the effect on boys (3.9 percentage points).

(d) *Household composition*

The presence of very young children (ages 0–9) in the household consistently decreases the likelihood of a youth specializing in schooling. This is consistent with our expectations that young children who need constant supervision and tending generate work for youth. The effects of additional teenage girls in the household is mixed. This is not surprising since these girls may be substitutes for and/or complements to the observed child. Adult females (ages 20+) and males over the age of 64 increase the likelihood that girls will specialize in school and decrease their participation in work under either definition. For boys, the presence of any adults ages 20+ increases the probability of school specialization and reduces their engagement in work. These adults are apparently doing the household and labor market work which girls and boys take on in the absence of such substitute workers.

In contrast, men appear to generate household work for girls. The presence of males ages 15–64 is associated with decreased studying and increased work on the part of girls. For example, under the traditional definition of work, the presence of males ages 15–19 or 20–64 has a significant positive impact on the probability that girls undertake neither school nor work—that is, girls appear to be at increased risk of being out of school and out of the labor force. Under the inclusive measure of work, however, we find that the presence of young and adult

male family members has a positive effect on the probability that girls specialize in work (broadly defined).

(e) *Simulations*

To explore the implications of the multinomial logit estimates for poor children, we calculate overall predicated probabilities for youth under various scenarios, all based in the urban setting of Mexico City for purposes of comparison. In each case we apply the coefficient estimates from the entire sample to characteristics of children in the poorest quintile of the sample. Since income measures are not available, we proxy for income using the bottom quintile of parental education. We use the average characteristics of children, parents and households in this quintile as starting points for each simulation. [19]

The predicted probabilities show a clear change in status for poor children as they move from age 14 to age 16, even under the traditional definition of work: the probability of specializing in school drops from 84% to 13%, while the probability of specializing in market work increases from 2% to 71%. For boys, the comparable shifts are from 76% to 4% and from 8% to 89%, respectively.

The remaining simulations consider a change of characteristics for 14-year-olds. Under the traditional definition of work, most of the simulated changes in vector of explanatory variables have the greatest impact on the probability of being in the "neither" category. For example, this increases from 12% for girls and 9% for boys to 18% and 12%, respectively, if the youth is a relative rather than a daughter or son of the head. A change in the number of 0–4 year olds from the mean (0.32) to two 0–4 year olds present has an almost identical effect. If the 14-year-old girl or boy lives in slum-like conditions with a dirt floor and no piped sewage or toilet in the dwelling, the probability of neither working nor studying becomes 27% or 17%, respectively. This final scenario also has a substantial impact on the probabilities that girls and boys specialize in school, causing a reduction of 18 and 20 percentage points, respectively.

Under the more inclusive measure of work, the probability of neither working nor studying is not sensitive to changing conditions; instead, we see these changes in the other three categories. The base probabilities for poor 14-year-olds in Mexico City are as follows: 63% of girls specialize in school, 10% specialize in work, and 24% combine study and work, while for boys the comparable figures are 70%, 12%, and 13%. Adding two 0–4 year olds to the household increases specialization in work to 17% for girls and 20% for boys. Again, the largest impact among the scenarios we examined came from changing the youth's living conditions to those of a slum. In that case, for both girls and boys, the probability of specializing in school drops to 54%, while specialization in work increases to about 24%.

7. CONCLUSIONS AND POLICY IMPLICATIONS

The results of this study demonstrate that the traditional definition of work masks the degree to which Mexican girls' household responsibilities interfere with their education. Gender differentials in schooling and work which, under the traditional definition, appear to favor girls and young women, are transformed into female disadvantage under the more inclusive definition of work. Results based on the traditional definition indicate that girls are 13.8 percentage points more likely than boys to specialize in school, while those based on the more inclusive measure of work indicate that girls are 7.7 percentage points *less* likely than boys to specialize in school.

Because a large proportion of the work undertaken by girls occurs in their own homes, policies and projects designed to contact young workers in the street or workplace will not reach working girls. Specific efforts are required to contact girls and young women in their own homes and communities. Another important avenue of contact is the school, yet these efforts would necessarily have to be undertaken before the point when girls and young women begin the process of abandoning their studies. The PROGRESA program, which pays the mothers of children and youth to keep them in school, is showing promise along these lines. Preliminary evaluation of PROGRESA, which began in 1997 and provided benefits to 2.7 million families in rural Mexico by 2000, shows that it significantly reduces girls' time dedicated to domestic work (Gómez de Leon & Parker, 2000).

Burra (1989) and Black (1993) emphasize that laws and policies are often directed toward the protection of children and youth who have an identifiable employer, whose working

conditions can be regulated and whose wages can be fixed. These efforts may actually have the perverse effects of intensifying discrimination in terms of family resource allocation. By assigning resources and rights to occupations in which male labor is more common, policies and laws reinforce the undervaluation of female work.

Education policy makers have tools other than child labor legislation at their disposal. Adjusting school schedules to minimize interference with domestic activities with inflexible schedules—possibly meal preparation, for example—may make combining household work and study more feasible for many girls. Public preschool and child care programs adjacent to schools, providing meals, and functioning on the same schedules may have even more impact. Currently, state-provided child care is available primarily for formal sector workers; its expansion to the informal sector could make it available to parents whose child care is now provided by daughters. The simulations suggest that targetting poor children living in slum-like conditions will be especially effective in increasing youth schooling.

NOTES

1. E.g., see DeGraff and Bilsborrow (1993), Grootaert and Patrinos (1999), Knaul (1999, 1995), Levison (1991), Patrinos and Psacharopoulos (1993), Psacharopoulos and Arriagada (1989), and Skoufias (1994).

2. Very different patterns may exist for work undertaken while school is in session versus work undertaken during school vacations.

3. We do not attempt to review the literature on measuring unpaid household work but refer the reader to the writings of Goldschmidt-Clermont (1982, 1987) and the contents of *Feminist Economics* 2(3), Fall 1996, which includes, for example, Benería (1996).

4. Among references not cited elsewhere in this paper, we refer readers to Alessie, Baker, and Blundell (1992), De Tray (1983), Duryea (1997), Hill and King (1993), Knaul (1993), Knaul and Parker (1997), Lam and Schoeni (1993), Lloyd (1994), Parish and Willis (1992), and Patrinos and Psacharopoulos (1997, 1995).

5. In the interest of brevity, these figures were not included.

6. While we recognize the limitations of this model—in particular its neglect of intrahousehold bargaining and power relations—empirically tractable alternatives do not yet exist. Game theoretic models are quite unwieldy, even with only two players and one decision.

7. A number of studies show that this assumption is problematic: the bargaining power of family members affects the allocation of time and other resources within families. Quisumbing, Brown, Feldstein, Haddad, and Penã (1995) summarize evidence showing that men and women allocate resources under their control in systematically different ways. We are unable to address these important issues in this analysis.

8. The ''neither'' category is often labelled ''idle.'' This terminology can be misleading since, for females, the category primarily includes girls and women engaged in ''nonproductive'' household work. The category may also include illicit activities, other nonmarket work, and idleness. For this reason, we call the category ''neither'' (work nor school).

9. Connelly, DeGraff, Levison, and McCall (1998) address concerns about the endogeneity of fertility in household models. Below, we conduct a crude test for the endogeneity of household composition.

10. Of the 52,441 ''fathers,'' 333 (0.006%) are unpaid workers reporting zero earnings. We leave their earnings at zero.

11. The Easter holidays took place in weeks 1 and 2 of the second quarter in 1996. Since the reference period for hours spent in various activities is the prior week, we drop households interviewed in weeks 2 and 3 of the second quarter—about 15% of the sample. It is not possible to use youth information for this holiday period because no hours are spent in school. The excluded youth did not differ in age or gender from the youth included in the sample. We have no reason to believe that households interviewed during weeks 2 and 3 differ systematically from households interviewed in other weeks.

12. Estimated coefficients for the region dummies are available upon request to the authors.

13. We have excluded from our sample those youth from households where neither a head nor a spouse is identified; we are unable to fix such coding errors.

14. These results, as well as those produced in estimating fathers' and youths' wages, are included in an appendix which is available to readers upon request.

15. Analysis was conducted using Stata 6.0; partial derivatives were evaluated using publicly available ado files written by J. Scott Long (http://www.indiana.edu/~jsl650).

16. If the sample mean of the dummy variable was less than 0.5, we evaluated its partial derivative for a change from zero to one. Conversely, if the sample mean was greater than 0.5, the partial was evaluated for a change from one to zero.

17. Partial derivatives for the omitted category, "school only," can be derived from the partial derivatives for the other three categories, since the four partial derivatives for each regressor have to sum to zero.

18. Such evidence is summarized in Quisumbing *et al.* (1995).

19. For example, continuous variables such as parental education are assigned the quintile sample average (2.6 years in this case), while dummy variables take on one or zero depending on whether the quintile mean is above or below 0.50.

REFERENCES

Abler, D., Rodríguez, J., & Robles, H. (1998). *The allocation of children's time in Mexico and Peru*. Population Research Institute Working Paper 98–08, Pennsylvania State University.

Alessie, R., Baker, P., & Blundell, R. (1992). The working behavior of young people in rural Côte d'Ivoire. *World Bank Economic Review, 6*(1), 139–154.

Anker, R. (1983). Female labour force participation in developing countries: a critique of current definitions and data collection methods. *International Labour Review, 122*(6), 709–723.

Anker, R., Khan, M.E., & Gupta, R.B. (1988). *Women's participation in the labour force: A methods test in india for improving its measurement*. Geneva: International Labour Organisation.

Barros, R., Fox, L., & Mendonca, R. (1997). Female-headed households poverty, and the welfare of children in urban Brazil. *Economic Development and Cultural Change, 45*(2), 231–257.

Becker, G. S. (1965). A theory of the allocation of time. *Economic Journal, 75*, 493–517.

Benería, L. (1996). Thou shalt not live by statistics alone but it might help. *Feminist Economics, 2*(3), 139–142.

Binder, M., & Scrogin, D. (1998). Labor force participation and household work of urban school children in Mexico: characteristics and consequences. *Economic Development and Cultural Change*.

Black, M. (1993). *Street and working children*. Florence, Italy: UNICEF.

Burra, N. (1989). Out of sight out of mind: working girls in India. *International Labour Review, 128*(5), 651–660.

CEPAL (1996). *Panorama Social de América Latina*. Santiago, Chile: United Nations.

Christenson, B. A., & Juarez, F. (1987). *Household economy and the labor force participation of male and female children in Mexico*. Paper presented at the annual meetings of the Population Association of America, Chicago.

Connelly, R., DeGraff, D., Levison, D., & McCall, B. (1998). *Tackling endogeneity: Alternatives for analysis of women's employment and fertility*. Manuscript.

Connelly, R., DeGraff, D., & Levison, D. (1996). Women's employment and child care in Brazil. *Economic Development and Cultural Change, 44*(3), 619–656.

DeGraff, D. S., & Bilsborrow, R. E. (1993). Female-headed households and family welfare in rural Ecuador. *Journal of Population Economics, 6*(4), 317–336.

De Tray, D. (1983). Children's work activities in Malaysia. *Population and Development, 9*(3), 437–455.

Duryea, S., (1997). *Children's advancement through school in Brazil: The role of transitory shocks to household income*. Manuscript. Washington, DC: Inter-American Development Bank.

Flórez, C. E., Knaul, F., & Méndez, R. (1995). Ninos y Jóvenes: Cuántos y Dónde Trabajan? Bogotá, Colombia: Tercer Mundo Editores and Ministerio de Trabajo y Seguridad Socialy CEDE/Facultad de Econumía, Universidad de los Andes.

Goldschmidt-Clermont, L. (1987). *Economic evaluations of unpaid household work: Africa, Asia, Latin America and Oceania*. Geneva: International Labour Organisation.

Goldschmidt-Clermont, L. (1982). *Unpaid work in the household*. Geneva: International Labour Organisation.

Gómez de Leon, J. & Parker, S. (2000). *The impact of anti-poverty programs on children's time use: The case of PROGRESA in Mexico*. Paper presented at the 2000 meetings of the Population Association of America.

Grootaert, C., & Patrinos, H. A. (Eds.). (1999). *The policy analysis of child labor: A comparative study*. New York: St. Martin's Press.

Heckman, J. (1974). Shadow prices market wages and labor supply. *Econometrica, 42*(4), 679–694.

Hill, A. M., & King, E. (1995). Women's education and economic well-being. *Feminist Economics*, *2*, 21–46.

Hill, A. M., & King, E. (1993). Women's education in the Third World: an overview. In E. King, & M. A. Hill, *Women's education in developing countries: Barriers, benefits, and policies* (pp. 1–50). Baltimore, MD: Johns Hopkins University Press.

Inter-American Development Bank (IDB) (1996). *Economic and social progress in Latin America*. Washington, DC: Inter-American Development Bank.

Kandel, W., & Post, D. (1999). *After-school work in Mexico: competing for children's time and Success*? Manuscript, Pennsylvania State University.

Knaul, F. (1999). *Incorporating home-based domestic work into estimates of child and youth labor: The Mexican case*. Manuscript.

Knaul, F. (1998a). *Behind closed doors: Domestic labor and domestic service among young female workers in Mexico*. Manuscript.

Knaul, F. (1998b). *Early entry into the labor force, school drop out and returns to human capital in Mexico*. Manuscript.

Knaul, F. (1995). *Young workers, street life, and gender: The effect of education and work experience on earnings in colombia*. Unpublished dissertation, Cambridge: Harvard University.

Knaul, F. (1993). *Menores en circunstancias especialmente difíciles: Su vinculación escolar*. Planeación y desarrollo, 24 (Edición Especial), 201–224, December. Bogotá: Departamento Nacional de Planeación.

Knaul, F., & Parker, S. (1998). *Patterns over time and determinants of early labor force participation and school drop out: Evidence from longitudinal and retrospective data on Mexican children and youth*. Paper presented at the 1998 meetings of the Population Association of America, Chicago.

Knaul, F., & Parker, S. (1997). *Female labor force participation and earnings in Mexico: The impact of domestic service*. Paper presented at the 1997 meetings of the Population Association of America.

Lam, D., & Schoeni, R. (1993). Effects of family background on earnings and returns to schooling: evidence from Brazil. *Journal of Political Economy*, *101*(4), 710–740.

Levison, D. (1991). *Children's labor force activity and schooling in Brazil*. Unpublished dissertation, University of Michigan, Ann Arbor.

Levison, D., & Moe, K. S. (1998). Household work as a deterrent to schooling: an analysis of adolescent girls in Peru. *Journal of Developing Areas*, *32*(3), 339–356.

Lloyd, C. (1994). *Investing in the next generation: The implication of high fertility at the level of the family*. Research Division Working Paper No. 63. New York: Population Council.

López, L., & Mercedez, G. (1996). El Trabajo Infantil en la 'Globalización' y la Agricultura de Exportación. In A. Brizzio, *El Trabajo Infantil en México*. Mexico: UNICEF.

Mier-y-Teran Rocha, M., & Romero, C. R. (1999). *Condiciones de vida de los niños en Mexico, 1960–1995: El entorno familiar, la escolaridad y el Trabajo*. Manuscript, Facultad Latinoamericano de Ciencias Sociales–FLASCO, Mexico City.

Moreno Mena, J.A. (1996). Empleo infantil en el sector agrícola del valle de mexicali: Algunas características socioeconómicas. In A. Brizzio, *El Trabajo Infantil en México*. Mexico: UNICEF.

Parker, S.W., & Pederzini, C. (1998). *Gender differences in education in Mexico: Patterns, trends and determinants*. Manuscript.

Parish, W. L., & Willis, R. (1992). Daughters education and family budgets: Taiwan experiences. *Journal of Human Resources*, *28*(4), 863–898.

Patrinos, H., & Psacharopoulos, G. (1997). Family size schooling and labor in Peru—An empirical analysis. *Journal of Population Economics*, *10*(4), 387–405.

Patrinos, H., & Psacharopoulos, G. (1993). *Educational performance and child labor in Paraguay*. Washington, DC: The World Bank.

Patrinos, H., & Psacharopoulos, G. (1995). Educational performance and child labor in Paraguay. *International Journal of Educational Development*, *15*(1), 47–60.

Psacharopoulos, G., & Arriagada, A. M. (1989). The determinants of early age human capital formation: evidence from Brazil. *Economic Development and Cultural Change*, *37*(4), 683–704.

Quisumbing, A. R., Brown, L. R., Feldstein, H. S., Haddad, L., & Penã, C. (1995). *Women: The key to food security*. Washington, DC: The International Food Policy Research Institute.

Rosenzweig, M. R., & Evenson, R. (1977). Fertility, schooling and the economic contribution of children in rural India: an econometric analysis. *Econometrica*, *45*(5), 1065–1079.

Skoufias, E. (1994). Market wages, family composition and the time allocation of children in agricultural households. *Journal of Development Studies*, *30*, 335–360.

UNICEF (1997). *El estado mundial de la Infancia*. New York: UNICEF.