2002

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2002 No. 165

50 YEARS 1952–2002
Population Council

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Abstract

This study investigates the effects of childcare on work and earnings of mothers in the slums of Guatemala City. Recognizing that mother's work behavior may depend on the availability of childcare, the modeling approach allows participation in the labor force and use of formal daycare to be jointly determined. We also investigate whether a mother's "status" within her household (as measured by the value of the assets she brought to her marriage) influences her entry into the labor force. Finally, we explore the impact of childcare prices on a mother's earnings, conditional on her decision to work.

The study uses a survey of 1,363 randomly selected mothers (working and non-working) with preschool children carried out in 1999 by the International Food Policy Research Institute. In this sample, 37 percent of mothers with preschoolers worked for pay in the 30 days before the survey. Mothers were employed in a variety of occupations and sectors and used an assortment of different informal and formal childcare arrangements. Our results indicate that participation in the labor force and use of formal daycare are in fact joint decisions for mothers. Life-cycle and household demographic factors have important effects on both decisions. Maternal education is an important determinant of use of formal daycare, but does not have large effects on whether a mother works for pay or not. Higher household wealth reduces her chances of working. However, the higher the value of assets she brought to her marriage, the more likely she is to be working. Greater travel time from home to formal daycare reduces its use. Controlling for endogeneity of labor market participation and formal daycare use, childcare prices have no impact on maternal earnings. This suggests that policies to increase the availability of formal daycare in poor urban areas have the potential to raise labor force participation rates of mothers in such neighborhoods, but not necessarily their earnings conditional upon their entry into the labor force.

High rates of urbanization and increasing levels of female participation in the labor force are beginning to increase the demand for nonparental childcare in Latin America. Emerging shifts in the structure of urban production toward more manufacturing and industry mean that employment opportunities for women are expected increasingly to occur in settings that are not compatible with the care of children. Market work and caring for one's children are activities that will become more separate and compete for a mother's time. Rural-to-urban migration often means moving away from extended family, which decreases access to informal childcare givers.

This situation is especially pronounced in Guatemala. Between 1990 and 1994, the urbanization rate was 3.9 percent, compared to 2.7 percent for Latin America overall (Inter-American Development Bank 1997). Increasing urbanization has been accompanied by an increase in the number and percentage of households headed by single women. Approximately one-fifth of urban households in Guatemala and in Latin America overall are headed by women (Facultad Latinoamericana de Ciencias Sociales 1995; Instituto Nacional de Estadística and Macro International 1996). This phenomenon is the result of several related trends: a decline in the proportion of multigenerational households and an increase in the number of single-parent families because of divorce and widowhood.[1] Moreover, half of urban female-headed households in Guatemala are poor and one-quarter are indigent, making this one of the most disadvantaged groups in all of Latin America (Economic Commission for Latin America and the Caribbean 1995).

This situation is fueled by a number of factors. First, such households have a small number of potential labor market participants (Sedlacek, Gutierrez, and Mohindra 1993). Second, levels of education and literacy are low. Guatemalan women have an average of 5.9 years of education and only 73 percent are literate (Economic Commission for Latin America and the Caribbean 1995)—both figures are low compared with Latin American averages.[2] Among urban heads of households, female heads have an average of 1.5 fewer years of education than male heads, affecting their chances of obtaining employment, their sector of work, and their earnings. Among working household heads, the gender education gap alone translates into 15–20 percent lower earnings for women with otherwise similar characteristics to their male counterparts (Arends 1992; Funkhouser 1996). Third, urban female heads have lower levels of economic activity compared to male heads, partly be-

cause of gender education deficits that reduce female job opportunities. Finally, sectoral and occupational segregation result in many women working in the informal sector[3]—accounting for approximately 63 percent of urban female employment in Guatemala—where earnings are one-third those in the formal sector (Funkhouser 1996) and in lower-paying occupations that are identified as typically female.

Higher unemployment rates and fewer working hours observed for female compared with male urban heads are hypothesized to be due in part to coordination difficulties between hours and location of work and the availability of childcare. One study in Brazil (Deutsch 1998), for example, finds a lack of childcare options given as a primary cause of unemployment among urban women. The scarcity of childcare options is especially crucial for women without spouses, who often must choose informal-sector jobs for their flexibility despite their low returns.

Does provision of childcare have an impact on women's work and earnings? This study attempts to answer the question by analyzing work, childcare arrangements, and earnings of mothers in the urban slums of Guatemala City. The study, designed by the authors, is based on data from a random sample of 1,363 mothers with preschool children residing in one *colonia* of Guatemala City in 1999. Data were collected as part of an impact evaluation of the *Hogares Comunitarios* government-sponsored daycare program by the International Food Policy Research Institute (IFPRI).[4] The study is different from previous studies on childcare choice that take mothers' labor force participation as given. Although those who demand childcare are, for the most part, working mothers, if a mother's work status is influenced by the availability of childcare, an examination of the determinants and consequences of childcare choice should not be conditioned upon her work status. Information on a woman's current situation, family background, current household, children, and community was solicited from working and nonworking mothers so that care choices could be examined in conjunction with a mother's labor force activities.

Our results indicate that participation in the labor market and use of formal daycare are joint decisions of mothers. Life-cycle and household demographic factors appear to have important effects on both decisions. Maternal education is an important determinant of use of formal daycare, but does not have large effects on whether or not a mother

works for pay. Higher household wealth reduces a mother's chances of working, presumably via an income effect. However, the higher the value of assets she brought to her marriage, the more likely she is to be working. Greater travel time from home reduces use of formal daycare. Controlling for endogeneity of labor market participation and formal daycare use, daycare prices do not have a significant impact on earnings. This suggests that interventions to increase the availability of formal daycare in poor urban areas have the potential to raise labor force participation rates of mothers residing in such neighborhoods, but not necessarily their earnings conditional upon their having entered the labor force.

CONCEPTUAL MODEL OF WORK AND CHILDCARE CHOICE

To anticipate the discussion, we present a brief model of women's labor supply and childcare choice. Suppose, for simplicity, that the decisionmaker is a woman who is choosing whether or not to work and what form of childcare she will use. Her household's utility function can be characterized as:

$$U = U(X_p, X_h, L), \tag{1}$$

where X_p refers to market-purchased goods, X_h refers to "home-produced" goods such as child health and nutrition, and L is leisure. Now suppose that home-produced goods can be produced using either household labor supply t_h or substitutes thereof, such as childcare services t_c, that is,

$$X_h = f(t_h, t_c). \tag{2}$$

Suppose that the household receives income from wage labor and from asset earnings. For simplicity, take the income of the woman's husband Y_h as exogenous to her own decision whether to enter the labor force. Let us assume, similar to Gustafsson and Stafford (1992), that an hour of a woman's market time requires the substitution of childcare services for her own time, at the price p_c. Thus, the net return to a woman's time on the labor market is given by $(w - p_c)$. The household's income constraint can then be written as:

$$p_a \cdot A + (w - p_c) \cdot t_w + Y_h = pX_p, \tag{3}$$

where $p_a \cdot A$ is the value of asset earnings or unearned income, $(w - p_c) \cdot t_w$ is income from wage labor net of childcare costs (where w is the market wage rate, t_w is time spent

in the labor market, and p_c is the price of a unit of childcare), and Y_h is the husband's income. Household income is spent on purchases of the market-produced good, X_p.[5]

The time of individuals in the household is allocated to time in the labor market, time producing home goods, and leisure. Thus, the household time constraint is as follows:

$$T = t_w + t_h + L. \tag{4}$$

Incorporating the household time constraint into the income constraint, the full income constraint can be written as

$$pX_p + w \bullet L = wT + (p_h X_h - w \bullet t_h - p_c t_c) + p_a \bullet A + Y_h. \tag{5}$$

That is, total consumption, including the value of time spent in leisure, cannot exceed full income. Full income is the value of time available to all household members, "profits" from "home production" (less childcare costs), nonlabor income, and husband's income. Maximizing (1) subject to the full income constraint yields reduced-form demand functions for goods x and leisure L, which can be written as a function of prices, wages, and unearned income, given the household's asset levels A and husband's income Y_h.

$$x = x(p, w; A, Y_h) \tag{6}$$

$$L = l(p, w; A, Y_h). \tag{7}$$

Because leisure is a normal good, we expect that leisure increases with wages (because of an income effect), asset earnings, and husband's income. Conversely, the woman's time supplied to the labor market,

$$t_w = T - t_h - L = l'(p, w; A, Y_h), \tag{8}$$

would increase with own wages, and decrease with asset holdings and husband's income. However, recall that the net return to a woman's time in the labor market is not the market wage but $w - t_c$. So, we expect that while a woman's time on the labor market will increase with w, it will decrease with childcare costs t_c.

PREVIOUS STUDIES ON MATERNAL WORK AND CHILDCARE CHOICE

Demand for childcare services

The preceding exposition obviously simplifies the many dimensions of the demand for childcare by working mothers by assuming there is a one-for-one match be-

tween work time and childcare time. In fact, several sets of factors influence the demand for various types of childcare arrangements. These include the need for mother substitutes for care, whether or not her work is in her home or at a remote location, and the number and ages of her preschool children. The availability, price, and quality of various mother-care substitutes will influence her choice. Conditional on her being in the labor force, a higher wage, greater household income, and greater number of work hours should each increase demand for all forms of nonparental childcare through positive income effects. A mother's earning potential is expected to raise demand for daycare services because it increases the opportunity cost of her leisure time. Demand for higher-quality, more reliable services is expected to respond positively to household income and maternal education. Ethnicity and family background variables may capture differences in cultural preferences and attitudes regarding acceptable forms of childcare.

Much of the literature on the demand for daycare is from more-developed countries (Hotz and Kilburn 1995; Johansen 1990; Johansen, Leibowitz, and Waite 1996; Lehrer 1988; Leibowitz, Waite, and Witsberger 1988; Robins and Spiegelman 1978; Waite, Leibowitz, and Witsberger 1991); however, some results are available for low-income countries (Connelly, DeGraff, and Levison 1996; Deutsch 1998; Lokshin 2000; Lokshin, Glinskaya, and Garcia 2000).

Daycare choice is often modeled as a multidimensional outcome variable by type or location of care. Not surprisingly, higher own-price lowers the probability of that particular type of care being used (Lokshin 2000; Lokshin, Glinskaya, and Garcia 2000). Greater household income increases demand for formal, center-based, as opposed to home-based, informal services (Hofferth and Wissoker 1992). Mother's education has a similar effect, most likely because center-based care is perceived to have stronger educational components than care in a private home setting (Leibowitz, Waite, and Witsberger 1988). Evidence on the effect of quality of care on demand is lacking because of the dearth of information on characteristics of care settings and caregivers. If quality is included in the model, either it is not modeled directly (Michalopoulos, Robins, and Garfinkel 1992) or it may be represented by proxy measures such as child-to-provider ratios (Hofferth and Wissoker 1992). Child age has been shown to be an important de-

terminant of type of arrangement used; the demand for nonrelative and center-based formal care increases during the child's second year of life, while informal relative and home-based care is preferred for infants (Leibowitz, Klerman, and Waite 1992; Leibowitz, Waite, and Witsberger 1988). The presence of alternative caregivers in the home has been shown to reduce the demand for formal childcare services. A study from urban Brazil (Deutsch 1998) shows, in fact, that the presence of older children and adults in the household is the only significant determinant of demand for formal care; their presence reduces it. Another analysis of demand for childcare in urban Brazil using a different data source indicates that females ages 10 and older in the household are a major source of daycare; males in the household, however, are not (Connelly, DeGraff, and Levison 1996).

Impact of childcare availability on mothers' labor force behavior

A mother's decision to work will be influenced by her earning potential, her own characteristics, and those of her household. The presence of young children imposes a constraint to her work because they must be cared for at all times. Therefore, the price and availability of childcare are expected to affect her decision to seek employment. Moreover, if a mother's preferences for work are related in unobservable ways to her preferences for childcare, then the choice of her work status could be made simultaneously with her childcare decision. For example, one mother may have stronger preferences for child health and education investments than another. Such factors influencing childcare preference may also affect her decision to enter the labor force. In other words, the menu of possible childcare arrangements could affect her entry into the labor force; if certain mothers work only when the "right" type of childcare is available, then factors affecting selection into work could also influence choices for care. We will address this possible source of selection bias by employing an estimation approach that allows for the labor force entry and childcare decisions to be related, as described below.[6]

Numerous investigations of maternal labor market behavior have considered the effect that young children have on work. Only relatively recently, however, have childcare availability and cost been explicitly considered in such models. In developing countries, care availability is often measured by the presence of other individuals in the household

who can potentially act as a substitute for the mother's care. The evidence consistently shows that the presence of other females in the household increases the probability of a mother's working (Connelly, DeGraff, and Levison 1996; Deutsch 1998; Pitt and Rosenzweig 1990; Tiefenthaler 1997; Wong and Levine 1992). There are usually no direct costs associated with this form of care, and the opportunity cost of provision of care by these individuals is normally not incorporated into the analysis. One important difference between poor and rich countries is the age of these potential care providers; in developing countries girls as young as age 6 have been shown to increase mother's work when there are younger children in the home who need care; in more-developed countries, this effect is usually observed with the presence of other adult females in the home, often a child's grandmother.

The effect of costs of nonrelative daycare on maternal labor supply has been examined by several studies of women in industrial countries. Availability of formal childcare centers, as measured by regional dummies to capture variation in the geographical density of daycare centers, has been found to positively affect mother's participation in the work force in the United States (Leibowitz, Waite, and Witsberger 1988). Childcare tax credits have a similar effect on labor market re-entry for mothers of very young children (Leibowitz, Klerman, and Waite 1992). Ribar (1992) finds large negative effects of market childcare costs on married women's employment status; Michalopoulos, Robins, and Garfinkel (1992), however, find only very small positive responses in hours worked to a childcare subsidy among both married and single mothers. Gustafsson and Stafford (1992) find that married women's labor supply increases in response to subsidies for high-quality childcare services only.[7] Gelbach (2002) finds that access to free "childcare" (defined as eligibility for school enrollment among five-year-olds) has a positive and significant influence on single mothers' labor force participation and hours worked.

Evidence from low-income countries is provided by Lokshin (2000), Lokshin, Glinskaya, and Garcia (2000), and Deutsch (1998).[8] The first two studies find that mother's labor force participation and work hours in Russia and Kenya, respectively, decrease in response to rising childcare costs. Deutsch finds no significant effect of community-level daycare costs on mother's labor supply and work hours in urban Brazil.[9]

Impact of childcare availability and choice on mothers' earnings

Earnings are determined by wages and labor hours. Choices made by mothers regarding their childcare arrangements can affect not only whether they work, but the type of work they engage in and the amount of time they spend in paid work. Access to reliable daycare may enable mothers to participate in types of work that are not compatible with simultaneously caring for their children, such as jobs in manufacturing and industrial settings that often pay more than traditional forms of employment for poor urban women. Greater availability of childcare may therefore influence a mother's wage by expanding the types of jobs she is able to apply for and maintain. It could also potentially increase the number of hours she spends working. Conversely, higher childcare prices may reduce labor hours by increasing the opportunity cost of working.

We are aware of only one other study that examines the effect of women's work and childcare choices on earnings in a developing-country setting. For poor, urban Brazilian women, Deutsch (1998) models the influence of labor force participation on earnings, then separately models the influence of childcare decisions on earnings. The simultaneous influences of both decisions are not modeled because of a lack of separate instrumental variables for labor force entry and childcare choice; the same variables are used to estimate both selection equations separately. In both versions of the earnings equation, hours are assumed to be exogenous, and underlying reduced-form determinants of wages are used instead of predicted wages.[10] As described below, we are able to model both the decision to work and the decision to use formal daycare simultaneously in our earnings equations.

DATA AND EMPIRICAL SPECIFICATION

Sampling methodology

The study was carried out in Guatemala City and included all households located in Mixco, one of three urban zones in which the *Hogares Comunitarios* program was operating in 1999 (the zones were Mixco, Villa Nueva, and Zone 18). Mixco was selected for the study for several reasons. The area was entirely urban; the operations evaluation results (Ruel, de la Brière, Hallman et al. 2002) did not reveal any significant differences in the acceptability of the program, quality of services offered, length of

time children spent in the program, and other operational aspects; and this zone had the fewest security problems likely to endanger the field study team.

A random sample was drawn from households having resident children ages 0–7 years. The outcome variable of interest for calculating the sample size for the random sample was women's labor force participation. Using information from the 1995 Guatemala National Survey of Maternal and Child Health, we found that a difference of 25 percent would be a reasonable assumption for the effect that the program could have on motivating women to enter the labor force. Twenty-five percent is the magnitude of the difference between the labor force participation of poorly educated women with children ages 0–6 years and similarly educated women with no preschool children. For this magnitude of difference, a sample of 1,266 households was needed; the actual sample size is 1,363 households.

As described in the Appendix table, the household survey collected data on childcare arrangements, mother's work, household demographic and socioeconomic characteristics, family background and social networks of the mother, and nutritional status of mother and children. The data, questionnaires, and description of the study are available upon request from IFPRI's Web site (www.ifpri.org).

Joint estimation of maternal use of formal childcare and labor force participation

The preceding discussion suggests that the decision to enter the labor force and the use of formal childcare (as opposed to informal care or care by the mother herself) are interrelated decisions. One approach would have been to model the childcare decision as conditional on the woman's labor force participation, using a probit model with selectivity. The approach we use here better reflects the decisionmaking process by estimating both choices jointly using a bivariate probit model. That is, we assume that the underlying model is given by

$$
\begin{aligned}
y_1'^* &= \Xi'_1 x_1 + \gamma_1, \qquad y_1 = 1 \text{ if } y_1^* > 0, \text{ 0 otherwise,} \\
y_2'^* &= \Xi'_2 x_2 + \gamma_2, \qquad y_2 = 1 \text{ if } y_2^* > 0, \text{ 0 otherwise,} \\
&\mathrm{E}[\gamma_1] = \mathrm{E}[\gamma_2] = 0, \\
&\mathrm{Var}[\gamma_1] = \mathrm{Var}[\gamma_2] = 1, \\
&\mathrm{Cov}[\gamma_1, \gamma_2] = \Delta.
\end{aligned}
\tag{9}
$$

Labor force participation y_1 is also modeled as a binary variable. It is a function of a vector of exogenous variables x_1 that includes the mother's personal characteristics (education, age, age squared, and ethnicity), which are also likely to influence her wage; the household's age and sex composition, which would capture the need for childcare, the presence of other potential income earners, and the availability of substitutes for mother's time in childcare; the availability and price of formal care; the availability and price of informal care; the value of household productive assets (those that can be used to earn income in an urban slum environment); and instrumental variables for labor force participation, including the value of assets that the woman brought to her marriage (or union), as an indicator of her status or "bargaining power" within the household, family background variables that may have shaped her labor force behavior during adolescence and early adulthood (composition of her natal household and her mother's work behavior when this woman was a child), and local labor market opportunities (community median of the female wage and the proportion of mothers working).

Choice of formal care y_2 is a latent variable that takes on the observed values 0 and 1 and is a function of a vector of exogenous variables x_2 that includes the mother's own characteristics (education, age, age squared, and ethnicity); the need for childcare (number of preschoolers in the household and the age of the youngest child); the availability and price of formal care; the availability and price of informal care; the value of household productive assets; and instrumental variables for formal care choice, including family background variables such as whether her mother used nonfamily or formal daycare when the woman was a child. Availability and price of formal care are assumed to be exogenous and are captured by a number of variables: the community median price of formal care, the distance from home to formal care, and the distance from work to formal care. The distance variables are an attempt to account for the time costs due to travel time to the childcare facility. Similarly, the price of informal care includes variables that capture both monetary and time costs—the community median price of informal care, and travel time from home to the caregiver and from caregiver to work. The number of nonpreschoolers in various age and sex categories, particularly adult females, is an indicator of the availability of informal care.

The test that both equations are interdependent is equivalent to testing whether the null hypothesis of $\Delta = 0$ can be rejected.

In the alternative specification,[11] we examine the joint and perhaps interrelated decisions of using formal childcare and number of hours worked, including zero hours. Here the use of formal daycare, y_2, is still a latent variable taking the observed values 0 and 1, but now y_1 is hours worked and is modeled as a continuous variable, taking both zero and positive values, and potentially affected by y_2. That is,

$$y_1' = \Xi'_1 x_1 + \delta y_2 + \gamma_1, \qquad (10)$$

$$y_2'^* = \Xi'_2 x_2 + \gamma_2, \qquad y_2 = 1 \text{ if } y_2^* > 0, \text{ 0 otherwise,}$$

where γ_1 and γ_2 are bivariate normal with mean zero and covariance matrix

$$\begin{bmatrix} \sigma & \Delta \\ \Delta & 1 \end{bmatrix}$$

The test that the equations are interdependent is again equivalent to testing whether the null hypothesis of $\Delta = 0$ can be rejected.

Impact of childcare availability and choice on maternal earnings

Controlling for mother's choices to work and to use formal daycare, we examine the impact of childcare price on earnings. As laid out in the conceptual model, earnings comprise two parts: hours worked and wages. Estimated wages, hours, and earnings equations include a selectivity correction for participating in the labor force and the predicted probability of choosing formal childcare, mother's characteristics, household socioeconomic status, price of formal and informal care, and household size and demographic composition. Household size and demographic variables are included in the three regressions, as it is possible that these may influence the number of hours worked, even after conditioning on the choice to work.

Given the difficulties of estimating an earnings equation even without the double control for selection into the labor force and into type of childcare, we experiment with two approaches to estimate maternal earnings. We first use a "quasi-reduced-form" equation; here the reduced-form determinants of wage and hours are included along with a selection term for entry into the labor force and the predicted probability of using formal daycare. We

then employ an intermediate strategy by estimating the two components of earnings separately. Hours and wage equations are estimated separately, controlling for the two selection factors each time. This is intended to lend insights into the pathways through which childcare prices influence maternal earnings; if the influence is through wages, mothers may have greater earning potential without having to sacrifice more time (leisure and other types).

RESULTS

Demographic, labor force, and socioeconomic characteristics of mothers

Characteristics of mothers in the sample (all mothers, working mothers, and nonworking mothers) are presented in Table 1. Thirty-seven percent of mothers worked for pay in the month before the survey. A number of significant differences are observed between working and nonworking mothers. On average, working mothers are nearly three years older and are more likely to be indigenous (defined as speaking a Mayan language or customarily wearing indigenous clothing). Their civil status also differs: Working mothers are more likely to be single, separated, divorced, or widowed instead of currently married or in a consensual union. Working mothers are also more likely to reside in single nuclear households that are smaller and are less likely to have a male household head. Each of these factors is likely to be associated with less socioeconomic security and a greater need for wage employment among current household members.

Working mothers have fewer resident preschoolers, and the preschoolers they have are older. This is consistent with evidence cited above regarding child age and maternal reentry into the labor force after a child's birth. Households with working mothers have a larger number of other females who may act as substitute caregivers, similar to the findings of Connelly, DeGraff, and Levison (1996) and Connelly, DeGraff, Levison, and McCall (1996).

Asset positions also vary between households that have mothers who work and those that do not. Households with working mothers have lower per capita asset values. They also have fewer assets that can be classified as productive (i.e., that can be used to earn income), implying that wage labor is most likely to be an important livelihood strategy for these households.

Table 1 Characteristics of mothers with preschoolers: All mothers, working mothers, and nonworking mothers

	All mothers		Working mothers		Nonworking mothers		Difference test: Working = nonworking
	Mean	SD	Mean	SD	Mean	SD	
Mother's characteristics							
Age (yrs)	28.77	7.90	30.50	7.64	27.75	7.88	0.00
Years of schooling	5.85	3.71	5.97	3.90	5.78	3.59	0.37
Literate (yes/no)	0.89	0.31	0.88	0.32	0.90	0.30	0.22
Indigenous	0.10	0.30	0.13	0.34	0.08	0.28	0.01
Single	0.06	0.23	0.09	0.29	0.03	0.18	0.00
Married or cohabiting	0.83	0.37	0.70	0.46	0.91	0.29	0.00
Separated, divorced, widowed	0.11	0.31	0.21	0.40	0.06	0.23	0.00
Household headship							
Male head present	0.83	0.38	0.70	0.46	0.91	0.29	0.00
Household structure							
Nuclear	0.32	0.47	0.37	0.48	0.29	0.46	0.01
Compound, relatives	0.37	0.48	0.34	0.48	0.39	0.49	0.11
Compound, nonrelatives	0.24	0.43	0.23	0.42	0.25	0.43	0.35
Compound, mixed	0.37	0.48	0.34	0.48	0.39	0.49	0.11
Household structure and alternate caretakers							
Household size	5.16	2.13	5.34	2.26	5.06	2.04	0.02
No. preschoolers	1.60	0.74	1.51	0.69	1.66	0.77	0.00
Age youngest child (yrs)	2.04	1.80	2.43	1.84	1.81	1.74	0.00
No. females >7 yrs	1.88	1.28	2.13	1.43	1.72	1.15	0.00
No. males >7 yrs	1.62	1.06	1.65	1.17	1.61	0.99	0.50
No. sisters >15 yrs	2.24	2.93	2.22	1.67	2.26	3.47	0.81
Woman's mother alive	0.82	0.39	0.80	0.40	0.82	0.38	0.27
Woman's mother resides with her	0.23	0.42	0.28	0.45	0.21	0.41	0.03
Woman's mother resides in capital city	0.29	0.45	0.27	0.44	0.30	0.46	0.14
Employment status/childcare							
Worked for pay in last month	0.37	0.48	1.00	0.00	0.00	0.00	0.00
Years potential experience	13.12	8.82	14.08	9.37	12.45	8.36	0.00
Received formal training	0.31	0.46	0.35	0.48	0.29	0.45	0.01
Child in *Hogar Comunitario*	0.01	0.10	0.03	0.17	0.00	0.00	0.00

continued

Table 1 *continued*

	All mothers		Working mothers		Nonworking mothers		Difference test: Working = nonworking
	Mean	SD	Mean	SD	Mean	SD	
Asset position							
Value/capita	9,098.3	14,813.5	8,157.9	10,577.2	9,651.8	16,796.6	0.07
Value household (hh) total	41,757.6	60,576.9	39,164.1	48,713.7	43,284.1	66,558.5	0.23
Value hh productive type	4,458.2	9,989.9	3,788.8	8,062.1	4,852.2	10,952.7	0.06
Value hh nonproductive type	37,299.4	56,083.1	35,375.2	45,950.9	38,431.9	61,265.9	0.33
No. observations	n=1,363		n=505		n=858		

Employment, jobs, and remuneration of working mothers

Primary employment situations of working mothers are presented in Table 2. Half have salaried positions, around 40 percent are self-employed, and the remainder work for a daily wage or on a piece-rate basis. Total employment hours worked in the month preceding the survey average 153. In the table, hours are converted to standardized eight-hour days for ease of comparison of wages between employment types. Standardized days worked per month average around 19; however, mothers in daily wage/piece-rate jobs work fewer hours.

Earnings per standardized eight-hour work day (our wage measure) are low for the daily wage/piece-rate group and for the self-employed. Earnings for a standardized day are highest for mothers in salaried government jobs; however, only 3 percent of working mothers in the sample are in this type of employment. Mothers in salaried private-enterprise jobs—about one-half of the sample mothers who work—have daily and monthly earnings well above the sample mean.

Job type data, shown in Table 3, reveal that a large percentage of mothers work in service-sector positions: one-quarter work as domestics, one-quarter as itinerant vendors, 6 percent as police or soldiers, and another 13 percent as either childcare, clerical, or education workers. Twenty-nine percent of mothers work in a factory, a small business, or as artisans. The number of standardized days worked in the previous month does not vary greatly among the more prevalent job types: the mean is 19 eight-hour

Table 2 Type of employment and earnings: Working mothers only (n=502)

	Percent	Hours past month	Standardized (8-hour) days worked past month	Earnings past month (1999 quetzals)	Earnings per 8-hour day (1999 quetzals)
Salaried work, private enterprise	50.60	150.00	18.75	765.83	41.27
Salaried work, government	3.19	164.16	20.52	1,101.94	57.37
Daily wage/piece-rate	7.97	122.16	15.27	442.62	31.72
Self-employed	37.85	163.68	20.46	479.86	30.37
Unpaid work	0.20	160.00	20.00	0.00	0.00
Mean		153.12	19.14	640.03	37.45

Table 3 Type of job: Working mothers only (n=502)

	Percent	Standardized (8-hour) days worked past month	Earnings past month (1999 quetzals)	Earnings per 8-hour day (1999 quetzals)
Childcare worker	2.59	23.15	430.77	19.27
Nonagricultural laborer	0.20	12.00	480.00	40.00
Domestic worker	23.51	18.55	484.43	32.69
Itinerant vendor	26.49	18.70	519.78	37.59
Artisan	6.97	19.11	549.57	29.01
Factory/small business worker	22.11	20.09	738.22	37.59
Police/soldier, etc.	6.37	18.48	686.66	51.27
Clerical worker	8.37	20.02	1,367.98	59.81
Teacher	1.99	18.50	541.30	29.58
Mean		19.14	640.03	37.45

days per month. Highest-paying jobs per standardized day (and per month since hours do not vary greatly across job type) are clerical worker and police/soldier, and the lowest-paying is childcare (although this job is likely to be associated with having a more flexible schedule).

Daycare arrangements for working mothers

Table 4 displays the childcare arrangements of working mothers; there are seven major types. These include public formal daycare (the *Hogares Comunitarios* facilities) (3% of the total), private formal daycare (22%), care of the child by the mother

Table 4 Childcare arrangements for working mothers

	Formal childcare		Informal childcare				
	Public formal daycare (*Hogares Comunitarios*)	Private formal daycare	Mother herself	Other resident household member	Non-resident relative	Neighbor/ other	Child left alone
Percentage of working mothers who use this type of care[a]	3	22	42	29	21	7	2
Number of care types used by mothers who use this type of care	1.36	1.97	1.31	1.44	1.50	1.54	1.82
Price/hour of care[b]	0.23	0.85	0.00	0.36	0.70	1.02	0.00
Hours of care/child/day[c]	10.95	4.59	8.77	9.11	8.55	9.58	9.96
Typical monthly/child expense for this type of care[d]	54.58	84.55	0.00	71.07	129.69	211.75	0.00

[a] Sum of percentages exceeds 100 because one-quarter of working mothers use more than one type of care.
[b] Equals cash payments plus the value of in-kind payments.
[c] A small proportion of women with rotating or irregular schedules do not report care hours per day and are excluded from this statistic. If the mother watches the child while working or the child is left alone, childcare hours are set equal to mother's work hours. If the same type of care is used twice in a single day, care hours are summed for that day.
[d] Based on a five-day care week at mean price and hours. Typical monthly per-child expense = (mean care hours/day) × (mean price/hour) × (21.67 weekdays/month).

herself while working (42%), care by a resident household member who is not the mother (29%), care by a nonhousehold resident relative (21%), care by a neighbor or other nonrelative (7%), and leaving the child alone (2%). In the models estimated here, formal care comprises the first two categories, and informal care the other five. Childcare supply is assumed exogenous. A full one-quarter of working mothers use more than one type of daycare arrangement during the Monday–Friday work period. Price per hour of childcare (cash plus the value of in-kind payments) is lowest when the child is cared for by the mother while working, and when the child is left alone. Aside from these two categories, the *Hogares Comunitarios* public daycare is the lowest-priced alternative. The most expensive type of care is that provided by a neighbor or other unrelated individual. Hours of care per child per day are greatest for children in public formal daycare.[12]

Determinants of labor force participation and use of formal childcare

Table 5 presents the regression results from (1) a bivariate probit model of a mother's joint decision to use formal childcare and to work and (2) an endogenous treatment effects model of a mother's joint decision to use formal childcare and the number of hours she works. In each model, the determinants of whether or not to use formal care were virtually identical; therefore, only the bivariate probit results are displayed in the table. The dependent variables in the bivariate probit model are a binary variable for the use of formal daycare (versus informal daycare or care by the mother herself) and a binary variable for working for pay in the past 30 days (versus not working for pay). In the treatment effects model, the dependent variables are a binary variable for the use of formal daycare and a continuous variable for hours worked (including zero hours).

In the bivariate probit model, we reject the null hypothesis that the decisions to use formal childcare and to enter the labor force are independent (the Wald test shows that Δ is significantly different from zero).

A woman's education and age positively and significantly affect her choice of formal daycare. Use of formal care also increases with the number of children she has between 3 and 7 years of age; this is the age group that is usually accepted by formal daycare providers and is in fact the target age group of the *Hogares Comunitarios* program. While none of the price variables is significant at the 5 percent level, time costs (which are part of the implicit price of daycare) influence a woman's choice of formal care. The median time from her home to the provider for formal care has a negative effect on her choice of formal care.

We find that life-cycle and demographic factors are important variables in a woman's decision to work, more so than her education. Age, age squared, and ethnicity figure significantly in the labor force participation equation. Among household characteristics (excluding the category females ages 30–45), we find that the presence of female infants under age 3 decreases the probability that a woman will work. A woman is more likely to work if there are substitute female caregivers; among females ages 7–14, 15–18, 19–29, and 45–64, the largest and most significant effect is from women be-

Table 5 Joint determinants of use of formal daycare and (1) labor force participation and (2) hours worked

	Uses formal daycare		Worked for pay in past 30 days		Hours worked in past 30 days	
	Coefficient	**z**	**Coefficient**	**z**	**Coefficient**	**z**
Woman's personal characteristics						
Educational attainment	0.06	**4.31**	0.02	1.54	–0.35	–0.33
Age (yrs)	0.09	**2.61**	0.20	**5.06**	8.65	**3.65**
Age squared	0.00	**–2.15**	0.00	**–4.54**	–0.11	**–3.40**
Years lived in capital city	0.01	1.34	0.00	–0.97	–0.51	–1.38
Indigenous	–0.02	–0.10	0.41	**3.19**	25.83	**2.46**
Household (hh) characteristics						
Log hh size	–0.30	–0.62	–0.36	–0.83	–17.84	–0.59
No. males age 0–2 yrs	0.03	0.23	–0.11	–0.88	–10.47	–1.28
No. females age 0–2 yrs	–0.07	–0.49	–0.30	**–2.23**	–14.76	–1.76
No. males age 3–6 yrs	0.71	**5.62**	–0.04	–0.39	–7.54	–0.86
No. females age 3–6 yrs	0.73	**5.93**	0.04	0.34	–1.97	–0.22
No. males age 7–14 yrs	0.05	0.42	0.07	0.70	2.96	0.40
No. females age 7–14 yrs	–0.07	–0.64	0.17	1.73	6.70	0.95
No. males age 15–18 yrs	–0.01	–0.04	0.17	1.28	3.52	0.36
No. females age 15–18 yrs	–0.16	–1.12	0.26	**2.10**	14.02	1.51
No. males age 19–29 yrs	–0.05	–0.36	–0.29	**–2.33**	–22.80	**–2.75**
No. females age 19–29 yrs	–0.08	–0.79	0.16	1.79	3.21	0.49
No. males age 30–44 yrs	0.06	0.39	–0.22	–1.52	–30.42	**–3.08**
No. males age 45–64 yrs	–0.16	–0.88	–0.29	–1.66	–22.44	–1.78
No. females age 45–64 yrs	–0.02	–0.12	0.59	**3.66**	36.27	**3.06**
No. males age 65 yrs and older	0.02	0.08	0.05	0.20	–7.68	–0.38
No. females age 65 yrs and older	0.08	0.29	0.20	0.77	24.71	1.22
Value of productive assets/ 1,000 (quetzales)	0.00	–0.54	–0.02	**–2.81**	–0.52	–1.60
Community characteristics						
Median price/hour formal care	1.11	1.70	—	—	—	—
Median price/hour informal care	0.92	1.76	0.31	0.55	32.43	0.75
Median travel time from care to work for formal care	0.01	0.50	0.00	0.20	–0.19	–0.17
Median travel time from care to work for informal care	0.00	0.37	0.00	–0.32	0.27	0.34
Median travel time from home to care for formal care	–0.04	**–2.47**	0.02	1.13	1.26	0.34
No. formal preschools	–0.01	–0.21	—	—	—	—
Median female earnings/hour	—	—	–0.07	–0.32	–4.34	–0.25
Proportion working mothers	—	—	4.07	1.86	409.32	1.81

continued

Table 5 *continued*

	Uses formal daycare		Worked for pay in past 30 days		Hours worked in past 30 days	
	Coefficient	**z**	**Coefficient**	**z**	**Coefficient**	**z**
Family background variables						
Nonrelative care used by woman's mother	0.15	0.58	—	—	—	—
Value of woman's preunion assets/ 1,000 (quetzales)	—	—	0.05	**2.41**	–0.13	–0.06
Woman was only female in her hh as teenager	—	—	–0.04	–0.39	–1.45	–0.19
Only mother lived at home when teenager	—	—	0.17	0.95	13.58	0.95
Woman was eldest child at home when teenager	—	—	0.06	0.66	2.56	0.35
Mother of woman worked for pay when woman was child	—	—	0.11	1.43	6.30	0.99
Predicted use of formal daycare					2.79	0.11
Constant	–3.72	**–4.05**	–4.94	**–3.62**	–189.43	–1.55
Number of observations	—		1,271		1,274	
Log likelihood	—		–1,252.77		–8,276.21	
Wald (chi-square)	—		341.11		92.01	
p-value	—		0.000		0.000	
Wald test of rho=0	—		9.77		—	
p-value	—		0.0018		—	
LR test of rho=0	—		—		0.38	
p-value	—		—		0.5397	

Note: Regressions are with robust standard errors; z statistics in bold are significant at 5% or better.

tween 45 and 64 years of age. Conversely, the presence of adult males slightly decreases a woman's probability of working for pay.

Wealth and a woman's bargaining power are important determinants of her labor force participation. Women whose households have more productive assets are less likely to work outside the home, but a woman who brings more assets to her marriage is more likely to work. The bulk of asset values brought by women to their unions were land and a house, which no doubt result in stronger bargaining power in the use of their own time. This is the only family background variable that is significant in the labor force participation decision.

Table 6 Determinants of wages, hours worked, and earnings (OLS with robust standard errors)

	Wage per hour		Hours worked		Earnings	
	Coefficient	**t**	**Coefficient**	**t**	**Coefficient**	**t**
Woman's personal characteristics						
Educational attainment	0.45	**2.11**	–3.10	–1.11	18.80	1.63
Age (yrs)	0.27	0.32	–12.37	–1.13	41.23	0.95
Age squared	0.00	–0.24	0.17	1.10	–0.58	–1.00
Indigenous	–0.47	–0.29	–2.09	–0.08	38.81	0.44
Household (hh) characteristics						
Log hh size	–3.24	–0.69	63.88	1.03	115.67	0.50
No. males age 0–2 yrs	0.11	0.11	–6.31	–0.40	–30.40	–0.47
No. females age 0–2 yrs	1.68	1.01	0.14	0.01	–90.42	–1.05
No. males age 3–6 yrs	3.53	**2.11**	–16.81	–0.71	–29.08	–0.39
No. females age 3–6 yrs	4.76	**1.99**	–25.99	–0.97	–48.69	–0.57
No. males age 7–14 yrs	0.64	0.66	–9.35	–0.59	–37.78	–0.72
No. females age 7–14 yrs	0.09	0.07	–19.31	–1.14	–3.71	–0.06
No. males age 15–18 yrs	2.13	1.09	–11.73	–0.52	–32.12	–0.49
No. females age 15–18 yrs	1.19	0.76	–18.75	–0.82	2.42	0.03
No. males age 19–29 yrs	–0.05	–0.03	–6.69	–0.35	–96.85	–1.23
No. females age 19–29 yrs	–1.08	–0.86	–12.84	–0.84	–57.07	–0.98
No. males age 30–44 yrs	0.76	0.67	–28.72	–1.51	–183.85	**–2.21**
No. males age 45–64 yrs	–1.27	–0.65	–25.25	–0.96	–126.82	–1.00
No. females age 45–64 yrs	–0.56	–0.27	–14.12	–0.42	91.14	0.64
No. males age 65 yrs and older	0.70	0.48	–19.58	–0.49	–246.45	–1.67
No. females age 65 yrs and older	0.63	0.42	–35.32	–1.21	128.35	0.72
Value of productive assets (quetzales)	4.44	0.82	–2.35	–0.05	–225.48	–1.32
Community characteristics						
Median price/hour formal care	0.21	0.07	–3.04	–0.05	–122.43	–0.76
Median price/hour informal care	0.00	1.16	0.00	–0.43	0.01	1.56
Predicted use of formal care	–11.51	–1.27	–7.35	–0.07	–56.42	–0.17
Selectivity correction	3.26	0.76	–44.38	–0.68	94.77	0.38
Constant	–5.31	–0.34	453.57	**2.08**	–93.96	–0.10
Number of observations	342		357		434	
F value	1.48		0.94		1.12	
Prob > F	0.0683		0.555		0.32	
R-squared	0.0781		0.0503		0.1136	

Note: t statistics in bold indicate significance at 5% or better.

In the treatment effects model, we cannot reject the null hypothesis that the decisions to use formal childcare and the number of hours to work (unconditional on entering the labor force) are independent. This suggests that use of formal childcare is related to a mother's decision to work but not to the number of hours worked once she has

decided to participate in the labor force. Most of the life-cycle and demographic factors that affect labor force entry also influence unconditional hours worked.

Determinants of earnings

Table 6 presents wage, hours, and earnings equations, estimated only on the sample of working women, but with the labor force selectivity correction and formal care probabilities estimated using coefficients from the bivariate probit regressions. Once selection into the labor force and formal care choice are accounted for, a woman's education and the presence of children ages 3–7 years in the household are the only significant determinants of wages. None of the determinants of hours worked is found to be statistically significant once we control for selection into the labor force and the predicted use of formal care. For earnings, the number of adult and elderly males in the household has a strong negative effect, indicating that women may earn less in households where a male is the primary income earner. While the price of formal care has a negative effect, the coefficient is not significant. Thus it appears that use of formal care and the availability of formal care affect only the decision to work, and not wages, hours worked, or earnings conditional on a woman's participation in the labor force.

CONCLUSION

Reducing barriers to obtaining employment is crucial for helping alleviate poverty among women in the urban slums of Guatemala. Across Latin America, higher labor force participation rates of women are associated with higher household incomes (Sedlacek, Gutierrez, and Mohindra 1993). Among the obstacles limiting the employment options of poor women is residence in households with high dependency ratios that are often headed by women. Finding reliable and affordable childcare is a challenge for mothers who reside in urban slums. Because many are migrants from rural areas, they may be far away from extended family and have less access to informal alternative caregivers. Over 40 percent of randomly sampled mothers working in the slum area of Guatemala City cared for their children themselves while they were working in paid jobs. Changes in the structure of urban production toward more manufacturing and industrial settings means employment opportunities for women will occur increasingly in

settings that are not compatible with the care of children: market work and caring for one's children are activities that will become more separate and as such will compete for a mother's time. This trend is expected to increase the demand for nonparental childcare in urban Guatemala. Lack of availability and high prices for childcare may decrease the earning potential of poor mothers.

This study investigated whether interventions to increase the availability and lower the price of childcare to poor working mothers increase their total earnings, conditional on their decision to work. Recognizing that a mother's work status may depend on the availability of childcare, participation in the labor market and use of formal daycare are modeled as joint decisions. Our results indicated that these are in fact joint decisions for poor working mothers. Life-cycle and household demographic factors have important effects on both decisions, while mother's education is an important determinant of use of formal daycare. Higher household wealth reduces a mother's chances of working; however, her status within the household (as proxied by the value of assets she brought to her marriage) increases the likelihood of her working. Higher time costs of using formal daycare reduce use of formal care. Controlling for endogeneity of labor market participation and formal daycare use, the price of formal daycare has negative but insignificant effects on mother's earnings. This suggests that interventions to increase the availability and lower the time costs of formal daycare in poor urban areas have the potential to raise labor force participation rates of mothers residing in such neighborhoods, but not necessarily their earnings conditional upon their having entered the labor force.

Appendix Description of the *Hogares Comunitarios* government-sponsored daycare program in Guatemala

The Community Daycare Centers Program of the Secretary of Social Works of the First Lady of the Republic of Guatemala (*Programa de Hogares Comunitarios de la Secretaria de Obras Sociales de la Esposa del Presidente de la República*) was created to alleviate poverty and to promote integrated child development in poor communities. The program was initiated in 1991 as a response to the deteriorating socioeconomic situation of the country, reflected in high rates of childhood malnutrition (the prevalence of stunting was as high as 50 percent nationally) and the scarcity of preschool education and early stimulation programs for children 3–6 years old. The program was launched as a pilot project that established 20 daycare centers in the capital city. The successful pilot project was followed by expansion of the program to various municipalities within six departments of the country. By 1996, the program covered all 22 departments of Guatemala. By January 1998, the program had established 1,200 community daycare centers throughout the country that provided care for approximately 10,000 children ages 0–7 years.

The official program documentation describes the community daycare centers, or *Hogares Comunitarios*, as a nontraditional alternative to ensure the care of children of working parents in communities characterized by poverty and extreme poverty and lack of access to alternative childcare. In these communities, a local woman is selected by a group of parents to become the *madre cuidadora*, or the program caregiver mother. In her home, she is responsible for caring for a set of ten children under the age of 7 years from 6:00 A.M. to 6:00 P.M., Monday–Friday. During their hours in the *hogar*, the children receive affection and care, proper hygiene, security, and food (i.e., breakfast, a morning snack, lunch, and an afternoon snack). In addition, educational activities are offered by the *madre cuidadora* to stimulate child development and to "foment the formation of values and good personal hygiene habits."

In addition to providing initial training of the *madres cuidadoras*, the program initially provides each *hogar* with furniture, cooking and feeding equipment, and supplies for ten children. On a monthly basis, the program offers the equivalent of approxi-

mately $0.55 per child per day to the program caregivers to purchase food for the children, $0.03 per child per day for educational material, and $0.03 per child per day for cooking fuel. Caregivers also receive an incentive of $3.33 per child per month for their work. Parents of the children are expected to provide monthly supplies of sugar, Incaparina (weaning cereal mix), toothpaste, toilet paper, and hand-washing soap, and to pay $5.00 per month to the program caregiver for each participating child. Each daycare center receives monthly donations of food commodities from the World Food Program (usually 44 pounds of maize, one gallon of cooking oil, and 13 pounds of black beans or six cans of fish).

The program is one of the few currently operating in urban Guatemala to target women, particularly working mothers with children under 7 years of age. Most programs in the country with a gender component are located in rural former conflict zones of the country's long civil war. (IFPRI 1998 provides a short description of these programs.)

Although the *Hogares Comunitarios* program covers all departments of the country, in 1999 the urban slums of Guatemala City hosted almost 25 percent of all *hogares*. The program was promoted in this area in recognition that many women there are single mothers or household heads who are under increased pressure to work outside the home in income-generating activities. Childcare alternatives are likely to be a major constraint to the employment opportunities of these women.

Other daycare programs in Latin America

There are a number of child daycare programs in Latin America, many of which are structured along a home-based community model similar to the *Hogares Comunitarios* program in Guatemala. They include the *Programa Integrado por Desarrollo Infantil* in Bolivia; the *Hogares Comunitarios de Bienestar* in Colombia; the *Wawa Wasi* program in Peru; and the *Programa de Cuidado Diario* in Venezuela. IFPRI (1998) describes each program and its characteristics.

Appendix table Modules and data collected for random sample (N=1,363 households)

Data collection module	Type of information collected
Household roster	Identification, names, age (date of birth), gender, relation to household (hh) head, civil status, occupation (whether or not hh member works, goes to school, etc.), schooling (years achieved), resident status (past month)
Mother's labor force participation	
Mother's employment experience and training	Age started working for pay and training type received (if any)
Mother's current employment	How found job, how long in job; occupation, type/size of employer, sector, hours worked/schedule; earnings, wages, benefits; how many days worked in past month; how many days of work missed in past month; reasons why work was missed; other employment (up to 3 total)
Childcare arrangements	
For everyone	Current childcare arrangements, including date started with this arrangement, hours/schedule of use, compared to official schedule; price paid; additional arrangements during weekdays; time to travel to daycare and to work; mother's trust of caregiver, reason for using this arrangement; personal acquaintance with caregiver before starting
If not in the *Hogares Comunitarios* program	Knowledge of program; desire to enter in such a program (hypothetically); whether or not on a waiting list; any *madre cuidadora* known personally; would child have necessary papers to enter program
Household assets	Asset ownership and values (physical and financial)
Family history and social networks	
Mother of respondent mother	Civil status, family situation, worked outside the home, used daycare alternatives
Respondent mother	Birth order, age left her family, age married or in union the first time
Migration	Where born, when migrated to city (if applicable), how long resident in Guatemala City, how long resident in this particular community
Social networks	Number of relatives in Guatemala City (gender, do women relatives work outside the home), number of relatives in neighborhood, how often are they visited, person who would help if help needed
Child and mother anthropometric measurements	Weight and height
Household hygiene characteristics	Observations of conditions; availability of water, electricity, garbage collection, and other services

Notes

1 The latter is particularly prevalent in Guatemala because of the deaths of males that resulted from the country's protracted civil conflict. The violence in rural areas led to urban migration of women who had lost husbands or other family members (Steel 1993).

2 What is more, these averages mask large differences by age and ethnicity. Younger and nonindigenous women have greater access to schooling and thus higher education levels. Many older and indigenous women who migrated to urban areas as adults were raised in rural areas, where schools are not widely available or accessible.

3 Funkhouser (1996) defines the informal sector as all self-employed workers and workers in firms with four or fewer employees who are not professional, technical, or administrative.

4 The project, funded by the U.S. Agency for International Development Office of Women in Development, was a collaborative effort between the IFPRI, the Community Daycare Centers Program of the Secretary of Social Works of the First Lady of the Republic of Guatemala, and the Institute of Nutrition of Central America and Panama/Pan American Health Organization (INCAP/PAHO). The overall objective of this study was to identify constraints to the implementation and impact of the *Hogares Comunitarios* program (designed to serve poor working mothers with preschool children; see Appendix for a full description), provide recommendations for improving the program, and design specific activities to strengthen particular components of the program. The project included three phases: (1) qualitative and operational research evaluation, which was carried out by IFPRI between February and July 1998; (2) technical assistance provided by INCAP to the *Hogares Comunitarios* program, initiated in February 1998; and (3) impact evaluation carried out by IFPRI.

5 Alternatively, one could include childcare as a component of the bundle of goods and services that the household consumes, but it is easier to treat it as a "cost" of participating in the labor force.

6 Two studies have attempted to address this issue by estimating childcare and labor supply decisions jointly. Ribar (1992) and Connelly, DeGraff, and Levison (1996) each use a recursive approach. Determinants of labor force entry are estimated, then estimated coefficients from this equation are used to correct for sample selection in the childcare demand equation. Connelly, DeGraff, Levison, and McCall (1996) estimate a similar model, but take on the additional challenge of treating recent births as endogenous.

7 This may indicate that there are factors common to mother's work and childcare preferences, as mentioned in our discussion of demand for childcare.

8 The small number of studies is most likely due to the fact that formal childcare is only beginning to become available in developing countries. Furthermore, for services that are available, data on use and characteristics are lacking.

9 Price is defined here as the community median expenditure per hour of care used for each care type. A discussion of issues in specifying the price of childcare can be found in Gelbach's (2002) study. Various measures of price have been used: expenditure per hour of care, expenditure per mother hour worked, wages for childcare workers, average cost for care in the state or community, among others (Averett, Peters, and Waldman 1997; Barrow 1996; Berger and Black 1992; Blau and Robins 1988; Gelbach 2002; Meara 1996). The use of own expenditure as price is problematic because it is endogenous and does not accurately reflect the menu of available "prices" because of the selection bias resulting from only certain types of individuals actually purchasing each type of care. It could also be influenced by differences in quality of care, which are often unmeasured and therefore not controlled for. One approach has been to attempt to estimate a predicted childcare price to use in the childcare demand equation. This approach is fraught with difficulties, however, mainly because of the need to exclude variables from the labor supply equation to use as instruments for childcare expenditure, even when these variables (1) are unlikely to be good instruments for childcare expenditure, and (2) can often be expected to directly affect labor supply itself. The use of community-level median prices avoids most of these problems.

10 In estimating an earnings equation for Guatemalan women, Arends (1992) controls for selection into the labor force (but not choice of childcare), treats hours as exogenous, and uses reduced-form determinants of the wage.

11 Examining the joint outcomes of using formal daycare and mother's work hours was suggested by an earlier reviewer.

12 Given the low hourly price, the high number of service hours (12) available per day, and the high degree of parental satisfaction with the *Hogares Comunitarios* program found in the operations evaluation component (Ruel, de la Brière, Hallman et al. 2002), it might seem surprising that more parents do not make use of the program. The low rates of use, however, stem from supply constraints. At the time of the survey in 1999, the program was still in a pilot phase and was focusing on improving the quality of care in the *hogares* before expanding the number available. It appears that filling slots in future *Hogares Comunitarios* will not be difficult. This perception is reinforced by a finding in the operations evaluation that when a child drops out of an *hogar*, the caregiver mother is normally able to fill the slot with another child within 24 hours (Ruel, de la Brière, Hallman et al. 2002).

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