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MAQUILADORAS AND MARKET MAMAS: WOMEN'S WORK AND CHILDCARE IN GUATEMALA CITY AND ACCRA

Agnes R. Quisumbing, Kelly Hallman, and Marie T. Ruel

Food Consumption and Nutrition Division

International Food Policy Research Institute
2033 K Street, N.W.
Washington, D.C. 20006 U.S.A.
(202) 862–5600
Fax: (202) 467–4439

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Abstract

This study analyzes work, childcare arrangements, and earnings of mothers in the poor neighborhoods of Guatemala City and Greater Accra, Ghana, two urban areas where formal- and informal-sector work differ in importance. Unlike previous studies on childcare that take mother's work status as given, this paper treats childcare choice and labor force participation of women as joint decisions. Our empirical results indicate that participation in the labor market and use of formal day care are, in fact, jointly determined. In both Guatemala and Accra, life cycle and household demographic factors, notably child age, appear to have important effects on both decisions. In both cities, higher household wealth reduces the mothers' chances of working, presumably via an income effect. Controlling for endogeneity of labor market participation and formal day-care use, in Guatemala, day-care prices do not have significant impacts on earnings; neither does the number of day-care centers within a 10-minute walk affect earnings in Accra. In Guatemala, maternal education is an important determinant of utilization of formal day care, but does not have large effects on whether she works for pay or not. In contrast, in Accra, maternal education does not affect either the demand for formal care or the decision to work. In Guatemala, greater travel time from home to the day-care center reduces utilization of this type of care, but a larger supply of day-care centers in the community does not affect use of formal care in Accra. The lack of importance of formal day-care supply variables in Accra—compared to the effect of some variables such as travel time to day-care centers in Guatemala—suggests that provision of formal day care may not be as critical an intervention to increase mothers' labor force participation rates in cities where the informal sector dominates, such as in Accra. In more urbanized settings like Guatemala City, where the formal sector generates a higher proportion of jobs for women, formal day care is more important to mothers' decision to work.

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Agnes R. Quisumbing and Marie T. Ruel
International Food Policy Research Institute

Kelly Hallman
Population Council

1. Introduction

High rates of urbanization and increasing levels of female participation in the labor force are beginning to increase the demand for nonparental childcare in many developing countries. In many urban settings where formal-sector work predominates, market work and caring for one's children are often separate activities that compete for a mother's time. Moreover, rural-to-urban migration often means moving away from extended family, another source of informal childcare. Higher unemployment rates and fewer working hours observed for female heads of households, compared with male heads, are hypothesized to be partly due 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 a spouse, who often choose informal-sector jobs for their flexibility, despite their low returns.

Would provision of subsidized childcare increase women's labor force participation and earnings in developing countries? While often discussed as a solution to women's work and childcare dilemmas, subsidized childcare may not be a universal solution since the situation in urban areas of developing countries is by no means uniform. In cities where the informal sector accounts for the bulk of women's employment, market work and childcare can often be combined. Guatemala City and Greater Accra, Ghana, represent two different points along the spectrum with regard to the importance of formal and informal work, and thus the demand for formal versus informal childcare. In Guatemala, the percentage of urban women working for income rose from 23 percent in 1990 to 28 percent in 1999 (World Bank 2001). While the majority of workingwomen (61 percent of the female labor force in Guatemala) hold jobs in services, opportunities in manufacturing and other industrial employment are increasingly available to women (electronics, apparel, food processing, and other export industries) (World Bank 2001). Women factory workers—*maquiladoras*—often work

six-day weeks with inflexible schedules, but with higher pay and benefits than their informal-sector counterparts. Rapid urbanization in Guatemala has also 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 (FLACSO 1995). Moreover, half of urban female-headed households in Guatemala are poor and one-quarter are indigent, making this one of the worse-off groups in all of Latin America (ECLAC 1995).

In Greater Accra, the percentage of households headed by women is much higher—35.1 percent—partly due to cultural norms of the indigenous Ga population, in which men and women traditionally live in separate houses after marriage (Maxwell et al. 2000). Similar to female-headed households in Guatemala City, female-headed households in Accra have lower per capita incomes, higher dependency ratios, and a significantly lower number of income-generating activities than male-headed households (Levin et al. 1999). The informal sector is, however, more important in Accra. It accounts for 71.9 percent of female employment, and income from self-employment (predominantly petty trading and street-food vending) contributes 38 percent of income for female-headed households, while male-headed households rely more heavily on wage labor (Levin et al. 1999).

This study analyzes work, childcare arrangements, and earnings of mothers in the urban slums of Guatemala City and Greater Accra, Ghana. The Guatemala analysis is based on data from a random sample of 1,363 mothers with preschool children residing in one zone of Guatemala City in 1999, collected as part of an impact evaluation of the *Hogares Comunitarios* government-sponsored day-care program by the International Food Policy Research Institute.[1] The data for the Ghana analysis come from an integrated household survey in greater Accra covering 559 households as part of the Accra Urban Food and Nutrition Study (AUFNS) conducted by the International Food

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[1] See Ruel et al. 2002 for a fuller description of the study and Hallman et al. 2002 for a related paper on women's work and childcare arrangements.

Policy Research Institute in collaboration with the Noguchi Memorial Institute for Medical Research and the World Health Organization.[2]

The specific contribution of this paper is its examination of the joint decisions of childcare choice and labor force participation of women in two urban areas where formal- and informal-sector work differ in importance. Previous studies on childcare choices have taken mother's work status as given. Most studies assume that a mother decides to return to work after having a child, then proceeds to look for a suitable childcare arrangement. However, it is possible that a mother's decision to work may depend on the availability of appropriate childcare. If a mother's work status is influenced by the availability of childcare, any examination of the determinants and consequences of childcare choice should not take her work status as given. Both surveys contain data to address this difficult issue. Information on a mother's current situation, her background, her current household, her children, and her community was solicited from *all* mothers, both working and nonworking, so that care choices could be examined in conjunction with a mother's decision to participate in the labor force.

Our results indicate that participation in the labor market and use of formal day care are, in fact, joint decisions of mothers. In both Guatemala and Accra, life-cycle and household demographic factors, notably child age, appear to have important effects on both decisions. In both cities, higher household wealth reduces the mothers' chances of working, presumably via an income effect. Controlling for endogeneity of labor market participation and formal day-care use, in Guatemala, day-care prices do not have significant impacts on earnings; neither does the number of day-care centers within a 10-minute walk affect earnings in Accra. The lack of importance of formal day-care supply variables in Accra—compared to the effect of some variables such as travel time to day-care centers in Guatemala—suggests that provision of formal day care may not be as critical an intervention to increase mothers' labor force participation rates in cities where the informal sector dominates, and where work and childcare can be combined. In more

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[2] See Maxwell et al. 2000 and Levin et al. 1999 for a more detailed description of the study.

urbanized settings like Guatemala City, where the formal sector generates a higher proportion of jobs for women, formal day care may be more important to mothers' decision to work.

2. Work and Childcare Choice as Joint Decisions[3]

Demand for Childcare Services

Several sets of factors influence the demand for various types of childcare arrangements. These include the need for substitutes for the mother's care, her place of work (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. For women who are already in the labor force, a higher wage, greater household income, and work hours should each increase demand for all forms of nonparental childcare through positive income effects. Mother's earning potential is expected to raise demand for day-care 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.

Day-care 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 (Loshkin 2000; Loshkin, Glinskaya, and Garcia 2000; among others). Greater household income increases demand for formal center-based care, 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 private home settings (Leibowitz, Waite, and Witsberger 1988). However, evidence on the effect of quality of

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[3] See Hallman et al. (2002) for a detailed exposition of a theoretical model of joint childcare and work decisions and a more extensive review of the literature.

care on demand is lacking because of the dearth of information on characteristics of care settings and caregivers.

Child age is also an important determinant of the type of childcare arrangement. 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, and it has a negative effect. Another analysis of demand for childcare in urban Brazil, using a different data source, indicates that females age 10 and over in the household are a major source of childcare; males in the household, however, are not (Connelly, DeGraff, and Levison 1996a).

Impact of Childcare Availability on Mother's 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 is expected to affect her employment decision. Moreover, if the mother's preferences for work are related in unobservable ways to her preferences for childcare, then the choice of her work status could be simultaneous with her childcare decision. For example, certain mothers may have stronger preferences for child health and education investments than others. 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.[4]

The presence of alternate caregivers also affects the decision to work. 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 work (Deutsch 1998; Connelly, DeGraff, and Levison 1996; 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 in 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 six have been shown to increase mother's work when there are younger children in the home that need care; whereas, in more developed countries, this effect is usually observed with the presence of other adult females in the home, often a grandmother of the child.

The effect of costs of nonrelative day care 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 geographical density, 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; Michalopolous, 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

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[4] A couple of 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 et al. (1996) estimate a similar model, but take on the additional challenge of treating recent births as endogenous.

married women's labor supply increases in response to subsidies for *high quality* childcare services only.[5] 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 Loshkin (2000), Loshkin, Glinskaya, and Garcia (2000), and Deutsch (1998).[6] The first two studies find that mother's labor force participation and work hours in Russia and Kenya, respectively, decrease in response to childcare costs. Deutsch finds no significant effect of community-level day-care costs on mother's labor supply and work hours in urban Brazil.[7]

Impact of Childcare Availability and Choice on Mother's 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 spent working for pay. Access to reliable day care may enable mothers to participate in types of work that are not compatible with simultaneously caring for their children, such as jobs in manufacturing

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

[6] The small number of studies is most likely driven by the fact that formal childcare is only beginning to become available in developing countries. Furthermore, for services that are available, there is still a lack of data on utilization and characteristics.

[7] As described below, price is defined for the Guatemala analysis 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 (2002). Various sources 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. 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 selection bias due to 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 wrought with difficulties, however, mainly do to 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.

and industrial settings that are often higher-paying than traditional forms of employment for poor urban women. Greater availability (as reflected by a lower price or shorter travel time) 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; higher care prices may reduce labor hours by increasing the opportunity cost of working. Conversely, where the informal sector predominates in urban women's employment, and where mothers can bring their children to work with them, the demand for formal day care may be less.

There are very few studies that examine the effect of women's work and childcare choices on earnings in developing country settings. 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 she lacks separate instrumental variables for labor force entry and for 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).[8] We discuss our empirical approach to estimating the impact of childcare provision on earnings in the next section.

3. Data and Empirical Specification

Sampling Methodology

Table 1 presents the characteristics of the Guatemala City and Accra studies. The Guatemala study included a random sample of 1,363 women with a child aged 0-7 years located in Mixco, one of the three urban zones where the *Hogares Comunitarios* program was operating in 1999. The outcome variable of interest for calculating the sample size

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

for the random sample was women's labor force participation. Using information from the 1995 Guatemala Demographic and Health Survey (INE et al. 1996), we found that a difference of 25 percent would be a reasonable assumption for the effect that the *Hogares Comunitarios* 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 who have children aged 0-6 years and similarly educated women who do not have preschool children (INE et al. 1996). For this magnitude of difference, a sample of 1,266 households was needed; the actual sample size is 1,363 households.

Table 1 Characteristics of Guatemala City and Accra studies

Study location and year	Guatemala City, 1999	Accra, 1997
Focus of study	Evaluation of government-sponsored community day-care program (*Hogares Comunitarios* program)	Survey of urban household livelihood, food security, and nutrition
Sample selection	Random sample of one zone (Mixco)	Random sample of 559 households in six enumeration areas in Greater Accra
Sample size	N=1,363 households	N=559 households
Population	Households with children < 7 years of age	Households with children < 36 months
Choice of woman included in the study	Mother of child <7 years of age	Primary caregiver of child < 36 months of age
Topics included in questionnaire	- Household demographics - Socioeconomic characteristics (value of assets, quality of housing, availability of water, sanitation) - Maternal characteristics (age, education, etc.) - Maternal employment characteristics (type of employment (up to 3 jobs), hours worked, cash brought home) - Childcare arrangements (type, hours, cost) - Maternal and child anthropometry (weight, height) - Maternal family background and social networks	- Household demographics - Socioeconomic characteristics (income/expenditure, number of assets, quality of housing, availability of water, sanitation) - Maternal characteristics (age, education, etc.) - Maternal employment characteristics (type of employment, hours worked, earnings) - Childcare arrangements (type) - Maternal and child anthropometry (weight, height) - Household coping and adaptive strategies

The household survey collected data on household demographic and socioeconomic characteristics, maternal characteristics and employment, childcare arrangements, maternal family background and social networks, and maternal and child anthropometry (see Table 1).

The data for the Greater Accra analysis come from an integrated household survey in greater Accra covering 559 households distributed among 16 enumeration areas. The Accra Urban Food and Nutrition Study (AUFNS) was carried out in Accra, Ghana, from January through April 1997. The sampling frame included 879 urban and 33 peri-urban Enumeration Areas in the Greater Accra area. Enumeration areas were then selected using a systematic sample from a random start, with a calculated sample size of 36 households in each of 16 primary sampling units, for a total of 576 households. The sample is representative of households with children under 36 months, so the descriptive statistics are not necessarily a representative picture of all households in Accra. The questionnaire modules covered information on household demographic and socioeconomic characteristics (including income and expenditure, transfers and credit), maternal characteristics and employment patterns, childcare arrangements (much less detailed than in the Guatemala survey), coping and adaptive strategies, and maternal and child anthropometry (see Table 1).

Joint Estimation of Maternal Work and Formal Childcare Decisions

The discussion in Section 2 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 in this paper better reflects the actual decisionmaking process by estimating both choices jointly using a bivariate probit model. That is, we assume that the underlying model is given by

$$y_1'^* = \beta'_1 \mathbf{x}_1 + \varepsilon_1, \qquad\qquad y_1 = 1 \text{ if } y_1^* > 0, \ 0 \text{ otherwise}, \qquad\qquad (1)$$

$$y_2'^* = \beta'_2 \mathbf{x}_2 + \varepsilon_2, \qquad\qquad y_2 = 1 \text{ if } y_2^* > 0, \ 0 \text{ otherwise},$$

$$E[\varepsilon_1] = E[\varepsilon_2] = 0,$$

$$\mathrm{Var}[\varepsilon_1] = \mathrm{Var}[\varepsilon_2] = 1,$$

$$\mathrm{Cov}[\varepsilon_1, \varepsilon_2] = \rho.$$

Choice of formal care, y_1, is a latent variable that takes on the observed values 0 and 1, and is a function of a vector of exogenous variables, $\mathbf{x}_1$, 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); availability and price of formal care; availability and price of informal care; the value of household assets; and instrumental variables for formal care choice. Such instrumental variables are hypothesized to affect only the choice of formal care, but not participation in the labor force.

Labor force participation, y_2, is also modeled as a binary variable. It is a function of a vector of exogenous variables, $\mathbf{x}_2$, which includes the mother's personal characteristics such as education, age, age squared, and ethnicity that 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; availability and price of informal care; the value of household assets; and instrumental variables for labor force participation. Similarly, the instruments only affect the work decision, but not the choice of childcare type.

Because the Guatemala study was designed to focus on the demand for various childcare alternatives, data on the availability and price of various childcare alternatives are richer than in the Ghana study, which emphasizes mothers' caregiving behavior. Outcome variables, determinants, and instrumental variables used in both studies are described in Table 2. In the Guatemala study, availability and price of formal care are captured by a number of variables: the community median price of formal care, the

Table 2 Comparison of outcome, determinant, and instrumental variables, Guatemala City and Accra

Variables	Guatemala City	Accra	Comments
Joint determination of labor force participation and use of formal day care			
Outcome variables			
Labor force participation	Whether the woman worked for pay in the last 30 days	Whether the woman worked for pay in the last 30 days	
Use of formal care	Whether the child was in a day-care center (private or government-subsidized under the *Hogares Comunitarios* Program)	Whether the child was in a crèche	
Determinants	- **Child** (age and sex of youngest) - **Woman** (education, age, age squared, years in capital city, indigenous or not) - **Household** (log of household size, number different age-sex categories, value of assets)	- **Child** (age and sex of youngest) - **Woman** (education, age, age squared, years in capital city, indigenous or not) - **Household** (log of household size, number different age-sex categories, number of assets)	Guatemala study obtained value of assets; Accra study used an index based on the presence of seven types of assets in the woman's household
Instruments for day-care choice	- **Community median** prices: formal care, informal care - **Time to work**: for formal care, for informal care - **Community median** availability: number of formal preschools - **Woman's family background**: non-relative care used by own mother	- **Community median** availability and use: number of day-care centers within 10 minutes' walk, number of modern medical facilities - **Community percentage**: index children taking vitamin supplements, index children immunized	Accra study did not collect day-care prices or travel times, but has more detailed information on care and health practices regarding the index child
Instruments for labor force participation	- **Community median**: earnings per hour - **Community proportion** of working mothers - **Woman's family background**: value of woman's preunion assets, whether she was the only female in her household, whether only her mother lived at home, whether she was the eldest child at home, whether her mother worked for pay when she was a child	- **Community median**: earnings per hour, - **Community proportion** of working mothers	Accra study did not collect family background information
Selectivity corrected regressions on wages, time worked, and earnings			
Outcome variables			
Wages, time worked, earnings	Earnings per day; days worked; earnings in the past 30 days	Earnings or wages per hour; hours worked; earnings in the past 30 days	
Determinants	- **Woman** (education, age, age squared) - **Household** (log of household size, number different age-sex categories) - **Community median**: price of formal and informal care - **Predicted use of formal care** - **Selectivity correction**	- **Woman** (education, age, age squared) - **Household** (log of household size, number different age-sex categories) - **Community median**: number of day-care centers in community within 10 minutes' walk; price of formal and informal care - **Predicted use of formal care** - **Selectivity correction**	

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. In the Ghana study, the community median number of day-care facilities within a 10-minute walking distance is our proxy for childcare availability outside the household. No price or cost data on childcare were collected. The number of nonpreschoolers in various age and sex categories, particularly adult females, is an indicator of the availability of informal care.

Because the data collected in both surveys are not exactly comparable, we use different identifying instruments in the Guatemala and Accra regressions (see Table 2). In the Guatemala analysis, instruments for childcare choice include the price of formal care and family background variables such as whether her mother used nonfamily or formal day care when the woman was a child. In the Ghana analysis, we use the community median of the following variables as instruments in the formal day-care choice equation: the number of day-care centers within a 10-minute walk, the number of modern medical facilities, the percentage of index children receiving vitamin supplements, and the percentage of index children immunized against measles. The health facilities variable acts as a proxy for the supply of services related to child health while the percentages receiving supplements and immunized are indicators of community demand for child health. In the Guatemala regressions, instruments for labor force participation include 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). In the Ghana study, our instruments are indicators of local labor market opportunities—the community median of female daily earnings and the proportion of mothers working.

The test that both equations are interdependent is equivalent to testing whether $\rho = 0$. The likelihood ratio test is performed by comparing the likelihood of the full bivariate model with the sum of the log likelihoods for the univariate probit models.

Impact of Childcare Availability and Choice on Maternal Earnings

Earnings are composed of two parts: hours worked and wages. Because it is difficult to identify factors that affect only wages or hours worked, but not the other, we follow a "quasi-reduced form" approach to analyzing the effect of childcare availability and choice on earnings. We estimate total earnings as well as both components of earnings separately as a function of the reduced-form determinants of wage and hours, as well as a selection term for entry into the labor force and the predicted probability of using formal day care. This approach provides 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 leisure time or time spent in other activities. Aside from the selectivity correction for participating in the labor force and the predicted probability of choosing formal care, the regressors include the mother's characteristics, household socioeconomic status, indicators of the price or availability of formal and informal care, and household size and demographic composition. Household size and demographic variables are included in the three regressions, since it is possible that these may influence the number of hours worked, even after conditioning on the decision to work.

4. Results

Demographic, Labor Force, and Socioeconomic Characteristics of Mothers

Characteristics of mothers in the Guatemala City and Accra samples are presented in Table 3. In Guatemala, 37 percent of mothers worked for pay in the month before the survey. On average, working mothers are nearly three years older than nonworking

Table 3 Characteristics of mothers with preschoolers, Guatemala City and Accra: All mothers, working mothers, and nonworking mothers

	All mothers		Working mothers		Nonworking mothers		Difference test: p-value Working = nonworking
	Mean	SD	Mean	SD	Mean	SD	
Guatemala City	(n=1,363)		(n=505)		(n=858)		
Mother characteristics							
Age (years)	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
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 structure and alternate caregivers							
Female headed	0.17	0.38	0.30	0.46	0.09	0.29	0.00
Household size	5.16	2.13	5.34	2.26	5.06	2.04	0.02
Number preschoolers	1.60	0.74	1.51	0.69	1.66	0.77	0.00
Age youngest child (years)	2.04	1.80	2.43	1.84	1.81	1.74	0.00
Number of females > 7 years	1.88	1.28	2.13	1.43	1.72	1.15	0.00
Number of males > 7 years	1.62	1.06	1.65	1.17	1.61	0.99	0.50
Employment status/childcare							
Worked for pay in last month	0.37	0.48	1.00	0.00	0.00	0.00	0.00
Uses formal day care	0.09	0.29	0.25	0.43	0.00	0.00	0.00
Asset position							
Value Per capita	9,098.3	14,813.5	8,157.9	10,577.2	9,651.8	16,796.6	0.07
Value household total	41,757.6	60,576.9	39,164.1	48,713.7	43,284.1	66,558.5	0.23
Accra	(n=553)		(n=365)		(n=188)		
Mother characteristics							
Age (years)	29.74	7.76	30.49	7.90	28.27	7.29	0.00
Years of schooling	8.72	5.40	8.64	5.60	8.88	4.99	0.62
Single	0.09	0.28	0.10	0.30	0.06	0.25	0.17
Married or cohabiting	0.85	0.36	0.83	0.38	0.89	0.32	0.07
Separated, divorced, widowed	0.06	0.24	0.07	0.26	0.05	0.21	0.29
Household structure and alternate caregivers							
Female headed	0.35	0.48	0.35	0.48	0.34	0.48	0.81
Household size	4.97	2.27	4.93	2.28	5.03	2.25	0.63
Number preschoolers	1.62	0.75	1.58	0.71	1.70	0.81	0.08
Age youngest child (years)	1.07	1.27	1.19	1.22	0.85	1.33	0.00
Number of females > 7 years	2.05	1.26	2.02	1.24	2.09	1.31	0.55
Number of males > 7 years	1.30	1.13	1.33	1.17	1.24	1.07	0.38
Employment status/childcare							
Worked for pay in last month	0.66	0.47	1.00	0.00	0.00	0.00	0.00
Uses formal day care	0.10	0.30	0.13	0.33	0.04	0.20	0.00
Asset position							
Number of assets per capita	0.56	0.53	0.54	0.55	0.59	0.50	0.32
Number of assets, household total	2.42	2.02	2.38	2.10	2.51	1.87	0.47

mothers. Working mothers are also more likely to be single, separated, divorced, or widowed instead of currently married or in a consensual union. They are more likely to reside in single nuclear households of smaller size and more likely to be female-headed than nonworking mothers. 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 re-entry into the labor force after a child's birth. In households with working mothers, there is also a larger number of other females who may act as substitute child caregivers, similar to the findings of Connelly, DeGraff, and Levison (1996) and Connelly et al. (1996). Asset positions also vary between the households that have mothers who work and those that do not. Households with working mothers have lower per capita asset values.

A much greater percentage of mothers in the Accra sample were working at the time of the survey compared to the Guatemala sample—66 percent, as compared to 37 percent. Working mothers were also about two years older than nonworking mothers. Unlike working mothers in Guatemala City, working mothers in Accra are slightly more likely to be married or cohabiting. Also unlike Guatemala, neither female headship nor type of living arrangement (e.g., whether the mother lives in a compound household or not) is significantly associated with being in the labor force. Neither do asset positions nor unearned income vary significantly between working and nonworking mothers. Working mothers have slightly fewer preschoolers at home than nonworking mothers but the significance is only different at 10 percent. However, the youngest child is more likely to be older than among nonworking mothers. We return to this issue later.

Employment, Jobs, and Remuneration of Working Mothers

The primary employment situations of working mothers in Guatemala City are presented in Table 4. Half of the mothers 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 8-hour days for ease of comparison of wages between employment types. Overall, standardized days worked per month average around 19, but mothers in daily-wage/piece-rate jobs work fewer hours than mothers involved in other types of jobs.

Table 4 Type of employment and earnings, Guatemala City: Working mothers only (n=502)

	Percent	Hours past month	Standardized (8-hour) days worked in past month	Earnings past month	Earnings per 8-hour day
				(1999 quetzals)	(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

Earnings per standardized 8-hour workday (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 the working sample mothers are involved in this type of employment. Mothers in salaried-private enterprise jobs—about one-half of our sample of working mothers—have daily and monthly earnings well above the sample mean.

Job type data, shown in Table 5, reveal that a large percentage of mothers work in the service-sector: one-quarter work as domestics, one-quarter as itinerant vendors, 8 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 nineteen 8-hour 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 taking care of children (although this job is likely to be associated with having a more flexible schedule).

Table 5 Type of job, Guatemala City: Working mothers only (n=502)

	Percent	Num. 8-hour days past month	Earnings past month	Earnings per 8-hour day
		(1999 quetzals)	(1999 quetzals)	(1999 quetzals)
Taking care of children	2.59	23.15	430.77	19.27
Nonagricultural labor	0.20	12.00	480.00	40.00
Domestic work	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 work	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

In contrast to Guatemala City, a much higher percentage of working mothers in Accra are self-employed (Table 6). Almost 80 percent of the mothers in our sample are self-employed, while about 14 percent and 5 percent are wage earners in the private sector and civil service, respectively. Around 2.5 percent are unpaid workers. Workingwomen worked a total of 20 days in the past month, on average, with little variation among categories of paid workers. Reflecting the privileged position of workers in the protected civil service sector, where wages are paid regularly and workers are protected by civil service legislation or by trade union representatives (Maxwell et al. 2000, based on Harriss, Kannan, and Rodgers 1990), earnings in the past month of civil service workers were twice those of who are the self-employed and roughly 1.5 times

Table 6 Type of employment and earnings, Accra: Working mothers only, by type of primary job (n=359)

	Percent	Days in the past month	Earnings in the past month	Earnings per day
Wage/private sector	13.65	20.65	89,424.49	4,460.03
Wage/civil service	5.29	21.47	133,599.20	5,895.05
Self-employed	78.55	21.00	57,532.02	2,963.16
Unpaid	2.51	17.44	0.00	0.00
Mean		20.32	72,835.29	3,293.27

more than that of wage earners in the private sector.[9] Because days worked in the past month do not vary much across the paid work categories, earnings per day follow a similar pattern.

Job type data in Table 7 show that almost half (46.8 percent) of workingwomen work as petty traders, while almost 20 percent work as street food vendors. Street food vendors work the most number of days per month, at 23.1 days, compared to the mean of 20.3. Earnings from petty trading and street food vending, however, are low. Although they are higher than earnings of unskilled and casual laborers, they are much lower than earnings in small- and large-scale business, skilled labor, and professional and clerical categories. The highest paying jobs are, in descending order, large-scale business, clerical work, small-scale business, professional work, and skilled labor. However, these categories only account for a small percentage of employed women. Large-scale business, which offers the most remuneration, accounts for only 0.8 percent of employment. Clerical work accounts for 4.5 percent; small-scale business, 8.4 percent; professional work, 3.1 percent; and skilled labor, 8.6 percent.

Table 7 Type of job, Accra: Working mothers only, by type of primary job (n=359)

	Percent	Days in the past month	Earnings in the past month	Earnings per day
Agricultural	0.84	17.00	57,500.00	4,123.81
Petty trading	46.80	21.52	36,088.27	2,046.63
Street food vending	19.22	23.09	83,468.12	3,515.44
Small-scale business	8.36	21.97	122,970.00	5,294.83
Large-scale business	0.84	14.00	520,000.00	38,863.64
Skilled labor	8.64	16.48	66,670.97	4,619.42
Unskilled labor	3.62	18.77	33,023.08	1,687.37
Casual labor	2.51	20.56	27,222.22	1,294.12
Professional	3.06	20.91	115,272.70	4,861.30
Clerical	4.46	17.81	129,149.10	6,626.21
Other	1.67	13.67	-29,166.67	-1,291.95
Mean		20.32	72,835.29	3,293.27

[9] Workingwomen in the "other" category reported average losses in the past 30 days.

Day-Care Arrangements for Working Mothers

Table 8 displays the seven major types of childcare arrangements used by working mothers in Guatemala City. These include public formal daycare (the *Hogares Comunitarios* facilities) (3 percent of total), private formal day care (22 percent), care of the child by the mother herself while working (42 percent), a resident household member who is not the mother (29 percent), a nonhousehold resident relative (14 percent), a neighbor or other nonrelative (14 percent), and the child being left alone (2 percent). In the model estimated here, the first two categories comprise formal care, and the other five are classified as informal care. A full one-quarter of working mothers use more than one type of day-care arrangement during the Monday-Friday work period. Aside from mothers taking care of their child or the child being left alone at home, both of which are free, the cheapest childcare alternative (including cash plus the value of in-kind

Table 8 Childcare arrangements for working mothers, Guatemala City (n=502)

	Formal childcare		Informal childcare				
	Public formal daycare (*Hogar Comunitario*)	Private formal daycare	Mother herself	Other resident household member	Nonresident relative	Neighbor/ Other	Child left alone
Percentage of working mothers who use this type[a]	3	22	42	29	21	7	2
Number of different care types used by mothers who use this type	1.36	1.97	1.31	1.44	1.50	1.54	1.82
Price per hour of care[b]	0.23	0.85	0.00	0.36	0.70	1.02	0.00
Hours of care per child per day[c]	10.95	4.59	8.77	9.11	8.55	9.58	9.96
Typical monthly per 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] Note: A small proportion of women with rotating or irregular schedules do not report care hours per day and are excluded from these statistics. 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 5-day care week at mean price and hours. [Typical monthly per child expense = (mean care hours per day)*(mean price per hour)*(21.67 weekdays days per month)].

payments) is the *Hogares Comunitarios* government-sponsored program. The most expensive type of care is that by a neighbor or other unrelated individual. Hours of care per child per day are greatest for children in public formal day care.[10] Note that relatives—either living at home or elsewhere—are often not a free childcare alternative, and are actually more expensive, on average, than the *Hogares Comunitarios* program.

Table 9 presents a breakdown of childcare arrangements used by working mothers in Accra, depending on their place of work. In total, the predominant childcare arrangement (57 percent) is that the mother works and looks after the child. The next most important category is a single caregiver (33 percent), followed by the crèche (15.4 percent)—the only formal day-care alternative. Only 6.4 percent of working mothers rely on multiple caregivers for childcare.

Table 9 Childcare arrangements for working mothers, Accra (n=355)

	Percent of working mothers	Mother works and looks after child	Single caregiver	Multiple caregivers	Crèche
Percentage of working mothers who use this type[a]		57.0	33.0	6.4	15.4
Use of childcare, by mother's workplace					
Home	34.4	85.2	10.6	1.6	7.4
Garden or farm	0.6	100.0	50.0	0.0	0.0
Market	17.2	47.5	41.0	6.6	9.8
Streets	25.9	43.5	40.2	9.8	7.6
Shop	6.2	50.0	18.2	4.5	3.6
Factory	0.3	0.0	100.0	0.0	0.0
Office	5.4	5.3	36.8	5.3	47.4
Other	10.1	44.4	30.6	2.8	19.4

[a] Sum of percentages exceeds 100 because 12 percent of working mothers use more than one type of care.

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[10] With the low hourly price, the high number of service hours available per day (12 hours), and the extremely high degree of parental satisfaction with the HC program found in the operations evaluation component (Ruel et al. 2002), it might seem surprising that more parents do not use the *Hogares Comunitarios* program. The low rates of utilization, however, stem from supply constraints: at the time of the survey in 1999, the HC program was still in a pilot phase and was focusing on improving the quality of care in the HCs before expanding the number available. It would appear that filling slots in future *Hogar Comunitarios* will not be problematic. This is further reinforced by a finding in the operations evaluation that when a child drops out of an HC, the caregiver mother is normally able to fill the slot with another child within 24 hours.

The choice of childcare arrangement is closely linked to the type of work. More than a third (34.4 percent) of working mothers work at home, and not surprisingly, 85 percent of these mothers work and care for their child. Among street vendors, who account for 25.9 percent of working mothers, 43.5 percent work and look after the child, while 40.2 percent rely on a single caregiver. Market vendors, who comprise 17.2 percent of working mothers, have similar childcare arrangements: 47.5 percent work and look after the child, and 41 percent use a single caregiver. Formal care (crèche) is used predominantly by office workers. Forty-seven percent of office workers rely on a crèche for day care, while 36.8 percent use a single caregiver. However, office workers account for only 5.4 percent of working mothers. It is not surprising that women in occupations that entail a sharp division between work and childcare use more formal childcare arrangements, while those in the informal sector can bring children to work with them. Since we did not collect data on costs of childcare, we cannot rank these alternatives in terms of costs.

Regression Results for Guatemala

Table 10 presents the regression results from a bivariate probit equation that models a mother's joint decision to work and to choose formal day care. The dependent variables are a binary variable for working for pay in the last 30 days (versus not working for pay) and a binary variable for the use of formal day care (versus informal day care or care by the mother herself). Marginal effects from single-equation probit regressions are found on the right-hand panel of Table 10.

We reject the null hypothesis that both decisions are independent (the Wald test shows that ρ is significantly different from zero). We find that life-cycle and demographic factors are important in a woman's decision to work, more so than her education. Age, age squared, and whether she is indigenous (defined as speaks a Mayan language or customarily wears indigenous clothing) are significant in the labor force participation equation. Among household demographics (females 30-45 is the excluded category), we find that female infants under three decrease the probability that a woman

Table 10 Determinants of labor force participation and use of formal daycare, Guatemala City, bivariate probit

| | Bivariate probit results | | | | Single-equation probit results | | | |
| | Worked for pay last 30 days | | Uses formal day care | | Worked for pay last 30 days | | Uses formal day care | |
	Coef.	Z	Coef.	Z	Marginal effect	Z	Marginal effect	Z
Sex of youngest child	0.07	0.46	0.11	0.68	0.03	0.52	0.03	0.73
Woman's personal characteristics								
Woman's educational attainment	0.01	1.16	0.06	**4.40**	0.01	1.54	0.01	**4.40**
Woman's age in years	0.20	**5.10**	0.09	**2.62**	0.07	**5.04**	0.02	**2.51**
Woman's age squared	0.00	**-4.62**	0.00	**-2.18**	0.00	**-4.52**	0.00	**-2.03**
Years lived in capital city	0.00	-0.83	0.01	1.39	0.00	-0.98	0.00	1.26
Woman is indigenous	0.41	**3.18**	-0.02	-0.10	0.16	**3.16**	0.00	-0.08
Household characteristics								
Log hh size	-0.37	-0.86	-0.29	-0.59	-0.13	-0.85	-0.07	-0.61
Number of males age 0-3 years in household	-0.13	-0.97	0.02	0.17	-0.04	-0.87	0.01	0.23
Number of females age 0-3 years in household	-0.29	**-2.09**	-0.07	-0.49	-0.11	**-2.20**	-0.02	-0.55
Number of males age 3-7 years in household	-0.04	-0.41	0.70	**5.57**	-0.02	-0.41	0.16	**5.52**
Number of females age 3-7 years in household	0.04	0.38	0.73	**5.89**	0.01	0.35	0.17	**5.80**
Number of males age 7-15 years in household	0.08	0.76	0.05	0.42	0.03	0.73	0.01	0.43
Number of females age 7-15 years in household	0.17	**1.75**	-0.07	-0.65	0.06	**1.74**	-0.02	-0.68
Number of males age 15-19 in household	0.18	1.36	-0.01	-0.06	0.06	1.31	0.00	-0.07
Number of females age 15-19 in household	0.25	**1.99**	-0.17	-1.15	0.10	**2.11**	-0.04	-1.14
Number of males age 19-30 years in household	-0.29	**-2.32**	-0.05	-0.38	-0.10	**-2.33**	-0.01	-0.39
Number of females age19-30 years in household	0.15	1.72	-0.08	-0.80	0.06	**1.76**	-0.02	-0.83
Number of males age 30-45 years in household	-0.23	-1.56	0.06	0.39	-0.08	-1.51	0.01	0.30
Number of males age 45-65 years in household	-0.28	-1.59	-0.15	-0.82	-0.10	-1.64	-0.03	-0.81
Number of females age 45-65 years in household	0.61	**3.76**	-0.02	-0.11	0.23	**3.65**	0.00	-0.12
Number of males over age 65 years in household	0.01	0.04	0.03	0.09	0.02	0.24	0.00	0.04
Number of females over age 65 years in household	0.23	0.86	0.09	0.30	0.08	0.77	0.02	0.22
Value of household assets	0.00	**-2.09**	0.00	-0.96	0.00	**-2.80**	0.00	-0.57
Community characteristics								
Community median price/hour formal care			1.11	**1.70**			0.25	**1.67**
Community median price/hour informal care	0.44	0.79	0.95	**1.81**	0.12	0.56	0.22	**1.82**
Community median time care to work for formal care	0.00	0.20	0.01	0.47	0.00	0.18	0.00	0.47
Community median time care to work for informal care	0.00	-0.40	0.00	0.36	0.00	-0.29	0.00	0.33
Community median time home to care for formal care	0.02	1.25	-0.04	**-2.45**	0.01	1.16	-0.01	**-2.51**
Number of formal preschools in community			-0.01	-0.23			0.00	-0.29
Community median female earning per hour	-0.09	-0.45			-0.02	-0.29		

	Bivariate probit results				Single-equation probit results			
	Worked for pay last 30 days		Uses formal day care		Worked for pay last 30 days		Uses formal day care	
	Coef.	Z	Coef.	Z	Marginal effect	Z	Marginal effect	Z
Community proportion of working mothers	3.92	**1.80**			1.58	**1.97**	0.04	0.63
Family background variables								
Nonrelative care used by woman's mother			0.15	0.58			0.04	0.63
Value of women's pre-union assets	0.00	**1.86**			0.00	**2.35**		
Woman was only female in her household as teenager	-0.03	-0.34			-0.02	-0.43		
Only mother lived at home when teenager	0.16	0.87			0.06	0.85		
Woman was eldest child at home when teenager	0.05	0.53			0.03	0.84		
Mother of woman worked for pay when she was a child	0.11	1.41			0.05	1.56		
Constant	-4.73	**-3.47**	-3.71	**-4.04**				
Number of observations			1,271		1,271		1,271	
Log likelihood			-1,256.00		-746.12651		-511.41747	
Wald (chi-square)			337.31		145.39		203.97	
p-value			0.00		0.00		0.00	
Wald test of rho=0			9.74					
p-value			0.00					

Note: z-values in bold indicate statistical significance at 10 percent or better.

works. A woman is more likely to work if there are potential substitute female caregivers in her household: females age 15-19 and 45-65, with the largest and most significant effect coming from women between 45-65 years of age. Conversely, the presence of adult males slightly decreases a woman's probability of working for pay.

Wealth and a woman's own bargaining power are important determinants of labor force participation. Women whose households have more assets are less likely to work outside the home, but a woman who brings more assets to her marriage is more likely to work. This probably reflects her stronger bargaining power with respect to the use of her own time. Women are also more likely to work in communities with higher proportions of workingwomen.

In contrast to the labor force participation decision, a woman's education is positively and significantly associated with choosing a formal day-care arrangement. Use of formal care also increases with children between 3-7 years of age. Both day-care price variables are positive, but only weakly significant at 10 percent. While higher prices of informal care may encourage substitution towards formal care, the positive coefficient of the formal care price may well reflect a quality premium. Time costs, which are part of the implicit price of day care, are also important. The median time from her home to the provider for formal care has a negative impact on her choice of formal care. Marginal effects for both equations reveal that the magnitude of these effects, while statistically significant, is small.

Table 11 presents wage, hours, and earnings equations, estimated only on the sample of workingwomen, using both OLS and OLS with the selectivity correction and formal care probabilities estimated from the bivariate probit regressions. Neither the selection correction nor predicted formal care choice are significant in these regressions, although the magnitudes of the coefficients on the other regressors are larger once selection and day-care choice are considered. Qualitatively, however, the results from the OLS regressions and the selection-corrected regressions are similar. Only the woman's education and the presence of children age 3-7 years in the household are significant determinants of wages. None of the determinants of hours worked are found

Table 11 Determinants of wages, hours worked, and earnings, Guatemala City, OLS with robust standard errors

	Wage per hour				Hours worked				Earnings			
	OLS		OLS with predicted care and work		OLS		OLS with predicted care and work		OLS		OLS with predicted care and work	
	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t
Woman's personal characteristics												
Woman's educational attainment	0.28	**2.82**	0.53	**2.29**	-3.18	**-1.65**	-3.04	-1.14	24.03	**2.98**	26.25	**2.39**
Woman's age in years	-0.27	-0.57	0.71	0.92	-6.35	-0.86	-9.58	-0.95	31.52	1.17	45.37	1.18
Woman's age squared	0.00	0.57	-0.01	-0.83	0.09	0.80	0.13	0.94	-0.46	-1.19	-0.63	-1.21
Woman is Indigenous	-1.17	-1.30	0.44	0.31	8.69	0.40	2.02	0.08	17.07	0.29	43.34	0.51
Household characteristics												
Log hh size	-1.19	-0.26	-4.56	-1.05	47.23	0.86	55.51	0.91	149.65	0.64	105.50	0.45
Number of males age 0-3 years in household	0.37	0.42	-0.09	-0.09	-9.39	-0.61	-7.79	-0.50	-17.37	-0.28	-23.55	-0.35
Number of females age 0-3 years in household	2.00	1.60	0.96	0.70	-6.19	-0.36	-1.70	-0.08	-84.24	-1.19	-101.47	-1.25
Number of males age 3-7 years in household	1.34	1.34	3.60	**2.00**	-17.29	-1.12	-13.61	-0.57	-47.50	-0.70	-33.85	-0.46
Number of females age 3-7 years in household	2.08	**1.84**	5.11	**1.85**	-23.55	-1.63	-21.27	-0.78	-85.03	-1.23	-61.07	-0.72
Number of males age 7-15 years in household	0.23	0.26	0.94	1.04	-6.01	-0.41	-7.79	-0.49	-47.61	-0.88	-38.77	-0.71
Number of females age 7-15 years in household	-0.20	-0.18	0.54	0.51	-13.23	-0.93	-16.96	-1.01	-16.56	-0.32	-3.55	-0.06
Number of males age 15-19 in household	1.44	0.75	2.57	1.38	-5.24	-0.25	-8.48	-0.37	-51.66	-0.83	-36.77	-0.53
Number of females age 15-19 in household	0.76	0.64	1.78	1.09	-10.78	-0.59	-15.57	-0.72	-9.19	-0.13	6.59	0.08
Number of males age 19-30 years in household	0.61	0.55	-0.69	-0.43	-14.18	-0.89	-9.81	-0.51	-73.48	-1.21	-90.90	-1.16
Number of females age19-30 years in household	-1.08	-1.24	-0.65	-0.63	-7.55	-0.58	-11.28	-0.75	-66.12	-1.34	-56.74	-0.95
Number of males age 30-45 years in household	1.03	1.00	0.33	0.25	-36.10	**-2.18**	-31.60	-1.63	-152.95	-1.99	-165.27	-1.86
Number of males age 45-65 years in household	0.08	0.05	-1.99	-0.85	-34.60	-1.49	-30.17	-1.12	-86.17	-0.78	-109.77	-0.89
Number of females age 45-65 years in household	-1.90	-1.43	0.67	0.40	3.24	0.15	-6.32	-0.20	64.84	0.60	101.98	0.79
Number of males over age 65 years in household	0.66	0.48	1.12	0.77	-19.62	-0.52	-20.39	-0.53	-189.20	-1.36	-185.96	-1.35
Number of females over age 65 years in household	-0.02	-0.02	0.81	0.57	-29.24	-1.04	-31.74	-1.11	93.65	0.53	106.44	0.59
Community characteristics												
Community median price/hour formal care	2.31	0.44	5.13	0.91	1.79	0.04	1.14	0.02	-236.14	-1.38	-208.88	-1.25
Community median price/hour informal care	-0.15	-0.04	-0.02	-0.01	-6.47	-0.11	-3.53	-0.06	-142.61	-0.85	-142.82	-0.87
Predicted use of formal care			-12.72	-1.29			-19.33	-0.18			-82.13	-0.24
Selectivity correction			6.75	1.51			-25.80	-0.42			101.20	0.42
Constant	6.84	1.08	-15.31	-0.95	323.72	**2.58**	394.08	**1.96**	140.33	0.30	-168.73	-0.21
Number of observations	342		342		357		357		434		434	
F value	1.15		1.03		0.98		0.92		1.15		1.12	
Prob > F	0.29		0.42		0.49		0.57		0.29		0.32	
R-squared	0.06		0.08		0.05		0.05		0.08		0.08	

Note: t-statistics in bold indicate significance at 10 percent or better.

to be statistically significant, which indicates that demographic variables do not have an additional impact on hours worked, once a woman has decided to participate in the labor force. For earnings, the only significant variable is women's education, which has a positive and significant effect similar to that found in the wage regression. 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 only affect the decision to work, and not wages, hours worked, or earnings conditional on the woman's participating in the labor force.

Regression Results for Greater Accra

Regression results showing the determinants of the joint decision to work and to use formal childcare (crèche) in Greater Accra are presented in Table 12, with marginal effects presented in the right-hand panel. Similar to Guatemala, we reject the null hypothesis that both decisions are independent (the Wald test shows that ρ is significantly different from zero). One of the most important determinants of *both* the decision to work and the use of formal day care is the age of the youngest child: the older the child, the more likely the woman is to work and to use formal care.

Aside from the age of the youngest child, the woman's own age and her ethnicity affect her decision to work. Relative to other ethnic groups, Ewe women and Akan women are more likely to work. Similar to the Guatemala sample, less wealthy women, as indicated by the number of assets in the household, are more likely to work, but unlike the Guatemala example, household demographic characteristics have a limited effect on the decision to work. The proportion of working mothers in the community, one of our instruments for labor force participation, is positive and significant in the labor force participation equation.

Turning now to childcare choice, we find that mothers in households that have young children (girls less than 3 years old and boys 3-7 years old) are less likely to use formal care. The presence of adult males has a negative influence on the use of formal day care, perhaps because the few adult males in these households serve a childcare

Table 12 Joint determinants of labor force participation and use of crèche, Accra, bivariate probit (regressions with robust standard errors)

	Bivariate probit results				Single equation probit results			
	Worked for pay last 30 days		Uses crèche		Worked for pay last 30 days		Uses crèche	
	Coeff.	z	Coeff.	z	Marginal effect	z	Marginal effect	z
Age of youngest child	0.16	**2.53**	0.32	**4.57**	0.06	**2.45**	0.02	**4.66**
Sex of youngest child	-0.22	-0.64	0.47	1.06	-0.08	-0.64	0.03	1.05
Woman's personal characteristics								
Woman's educational attainment	0.00	0.35	0.02	1.07	0.00	0.36	0.00	1.23
Woman's age in years	0.09	**1.97**	0.03	0.55	0.03	**1.97**	0.00	0.67
Woman's age squared	0.00	-1.34	0.00	-0.45	0.00	-1.35	0.00	-0.54
Years lived in capital city	0.00	0.32			0.00	0.31		
Ethnicity of woman								
Gha/Adanbe	0.22	1.04	0.33	0.93	0.08	1.00	0.02	0.91
Akan/Fanti/Ashante	0.39	**1.89**	0.50	1.48	0.13	**1.84**	0.04	1.44
Ewe	0.59	**2.85**	0.14	0.37	0.20	**2.87**	0.01	0.20
Household characteristics								
Log hh size	-0.42	-0.99	1.16	**1.91**	-0.16	-1.02	0.09	**2.12**
Number of males age 0-3 years in household	-0.08	-0.32	-0.46	-1.45	-0.03	-0.29	-0.04	**-1.69**
Number of females age 0-3 years in household	-0.06	-0.22	-1.11	**-2.28**	-0.02	-0.21	-0.08	**-2.45**
Number of males age 3-7 years in household	-0.15	-1.08	-0.93	**-3.92**	-0.05	-1.02	-0.07	**-4.00**
Number of females age 3-7 years in household	-0.06	-0.44	-0.33	-1.29	-0.02	-0.45	-0.02	-1.39
Number of males age 7-15 years in household	0.24	**1.97**	-0.36	**-1.93**	0.09	**1.98**	-0.03	**-2.11**
Number of females age 7-15 years in household	0.12	1.00	-0.11	-0.56	0.05	1.02	-0.01	-0.82
Number of males age 15-19 in household	-0.21	-1.01	-0.09	-0.32	-0.07	-1.01	-0.01	-0.54
Number of females age 15-19 in household	-0.16	-1.02	0.14	0.60	-0.06	-1.01	0.01	0.58
Number of males age 19-30 years in household	-0.06	-0.44	-0.56	**-2.12**	-0.02	-0.41	-0.04	**-2.19**
Number of females age19-30 years in household	0.15	1.25	-0.22	-1.27	0.05	1.28	-0.02	-1.39
Number of males age 30-45 years in household	0.23	1.34	-0.58	**-2.18**	0.08	1.33	-0.04	**-2.33**
Number of males age 45-65 years in household	0.31	1.43	-1.15	**-2.89**	0.11	1.46	-0.04	**-2.98**
Number of females age 45-65 years in household	-0.07	-0.40	-0.23	-0.70	-0.02	-0.36	-0.02	-0.85
Number of males over age 65 years in household	-0.06	-0.18	-1.10	-1.28	-0.02	-0.16	-0.03	-1.29
Number of females over age 65 years in household	-0.59	**-1.87**	-0.40	-0.80	-0.22	**-1.85**	-0.02	-0.96
Number of assets (count)	-0.08	**-2.36**	0.17	**2.87**	-0.03	**-2.34**	0.01	**2.92**
Community characteristics								
Median number of daycare facilities nearby			-0.08	-1.52			-0.01	**-1.68**
Median number of modern health facilities			-0.10	**-1.74**			-0.01	**-2.03**
Median percentage of children receiving vitamins			0.28	0.92			0.02	0.81
Median percentage of children immunized			1.88	**2.52**			0.14	**2.54**
Community median female earning per day	0.00	0.62			0.00	0.65		
Community proportion of working mothers	0.99	**2.04**			0.35	**1.97**		
Constant			-5.06	-3.65				
Number of observations			553					
Log likelihood			-448.91		-323.17		-128.91	
Wald (chi-square)			148.18		58.48		89.13	
p-value			**0.00**		**0.00**		**0.00**	
Wald test of rho=0			7.32					
p-value			**0.01**					

Note: z statistics in bold are significant at 10 percent or better.

function since they are often unemployed. Formal care, however, seems to be the choice of wealthier women—as indicated by the positive and significant coefficient on assets—which is consistent with the descriptive results that indicate that users of formal care are likely to be employed in higher-paying office work.[11] The presence of day-care and modern health facilities in the community has surprising negative, though weakly significant, effects on formal care choice. The significance of these effects diminishes once the jointness of labor force participation and formal care choice are considered. Lastly, the percentage of children who are immunized has a positive effect on formal day-care choice. Table 13 presents wage, hours, and earnings equations, estimated only on the sample of workingwomen, using both OLS and OLS with the selectivity correction and formal care probabilities estimated, using coefficients from the bivariate probit regressions. Predicted use of formal care and selection into the labor force significantly affect days worked, but neither earnings per day nor total earnings. Only the woman's educational attainment has a significant effect on both total earnings and earnings per day—neither household demographic characteristics nor day-care availability are important. However, life-cycle and demographic characteristics, choice of formal care, and selection into the workforce affect days worked significantly. There are clear life-cycle effects on days worked, and mothers with more males and females between the ages of 15 and 19 in the household—i.e., potential alternative caregivers—work more days. Interestingly, the number of females between 19 and 30 years of age decreases days worked, probably due to job-sharing in the informal, street foods sector. Owing to limited space for preparing street foods, which have to be prepared round-the-clock, adult women take turns sleeping and working. The predicted use of formal day care decreases days worked, possibly because this is associated with office work, one of the categories in which women work fewer days each month, though the effect is only weakly significant. The indicator of day-care availability—the number of day-care centers

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[11] This phenomenon is not due to the possibility that formal sector workers may be less likely to live in compound households—the difference in the percentage living in compound households was not significantly different between formal- and informal-sector workers (p = 0.42).

Table 13 Determinants of earnings per day, days worked, and earnings, Accra: OLS with robust standard errors

	Earnings per day				Days worked				Earnings			
	OLS		OLS with predicted care and work		OLS		OLS with predicted care and work		OLS		OLS with predicted care and work	
	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t	Coeff.	t
Woman's personal characteristics												
Woman's educational attainment	341.29	**2.39**	284.49	**2.00**	-0.04	-0.51	0.04	0.45	7,811.05	**2.13**	7,703.65	**2.26**
Woman's age in years	37.90	0.09	-55.56	-0.10	-0.42	**-1.70**	-0.87	**-3.19**	605.16	0.05	-1,932.62	-0.14
Woman's age squared	-0.71	-0.14	0.32	0.05	0.01	**2.34**	0.01	**3.55**	-18.17	-0.14	6.81	0.04
Ethnicity of woman												
Gha/Adanbe	1,235.62	0.80	703.47	0.48	0.28	0.19	-0.23	-0.15	29,736.24	0.82	23,413.07	0.69
Akan/Fanti/Ashante	1,442.78	0.84	403.65	0.32	-1.62	-1.03	-2.67	-1.59	13,291.37	0.39	895.56	0.03
Ewe	1.64	0.00	-247.66	-0.18	-1.15	-0.76	-3.79	**-2.12**	13,396.90	0.58	73.31	0.00
Household characteristics												
Log hh size	2,932.89	0.83	1,587.00	0.37	-2.41	-0.93	2.43	0.83	60,740.85	0.77	71,162.84	0.75
Number of males age 0-3 years in household	-234.05	-0.11	887.57	0.45	0.84	0.47	0.68	0.39	7143.03	0.22	14,306.82	0.42
Number of females age 0-3 years in household	-2,215.05	-0.98	-929.94	-0.49	1.16	0.64	1.32	0.74	-32,694.68	-0.84	-23,088.42	-0.67
Number of males age 3-7 years in household	-963.96	-0.65	94.36	0.08	0.37	0.31	0.20	0.16	-9,787.01	-0.30	-3,224.92	-0.13
Number of females age 3-7 years in household	-1,109.77	-0.83	-845.86	-0.64	0.82	0.77	0.99	0.90	-33,748.04	-1.30	-31,261.43	-1.28
Number of males age 7-15 years in household	6.28	0.01	439.50	0.35	0.89	1.06	-0.86	-0.89	-4,888.21	-0.24	-9,048.10	-0.32
Number of females age 7-15 years in household	343.10	0.24	401.14	0.24	0.93	0.99	-0.37	-0.35	18,912.23	0.63	13,876.80	0.38
Number of males age 15-19 years in household	2,314.80	0.66	2,294.98	0.65	2.60	**1.70**	3.38	**2.22**	79,429.11	0.89	82,846.27	0.91
Number of females age 15-19 years in household	499.85	0.40	237.85	0.18	2.41	**2.56**	3.10	**3.28**	29,479.38	1.20	30,405.44	1.23
Number of males age 19-30 years in household	4,200.97	**1.79**	4,717.26	**1.98**	0.05	0.07	0.10	0.12	79,322.81	1.64	83,171.93	**1.68**
Number of females age19-30 years in household	-486.51	-0.40	-287.57	-0.22	-0.63	-0.77	-1.72	**-1.96**	-6,848.71	-0.26	-10,080.83	-0.36
Number of males age 30-45 years in household	-878.11	-0.67	-550.04	-0.39	1.74	1.61	0.60	0.53	-34,197.45	-1.20	-36,729.68	-1.30
Number of females age 30-45 years in household	-182.35	-0.10	684.46	0.35	1.11	0.85	-1.02	-0.68	-12,173.32	-0.33	-14,781.30	-0.39
Number of males age 45-65 years in household	-2,635.10	-1.51	-2,483.87	-1.38	0.96	0.76	0.72	0.59	-43,999.15	-1.16	-43,638.19	-1.13
Number of females age 45-65 years in household	-2,972.94	**-1.67**	-3,286.94	-1.61	2.74	1.15	1.46	0.64	-66,729.99	**-1.68**	-74,924.01	**-1.65**
Number of males over age 65 years in household												
Number of females over age 65 years in household	-1,037.62	-0.44	-348.98	-0.16	-0.76	-0.56	1.99	1.11	-16,506.24	-0.36	-712.04	-0.02
Community characteristics												
Number of daycare centers nearby	155.49	0.37	188.74	0.44	0.35	**1.81**	0.21	1.09	4,460.12	0.49	4,178.48	0.46
Predicted use of crèche			8,420.84	1.03			-5.91	**-1.68**			38,268.62	0.27
Selectivity correction			-183.69	-0.04			-11.47	**-3.10**			-48,650.88	-0.56
Constant	-3,853.34	-0.52	-2,171.39	-0.22	28.01	**5.82**	40.21	**6.82**	-97,850.60	-0.54	-33,866.15	-0.14
Number of observations	317		317		342		342		320		320	
F	1.50		1.26		2.69		2.84		1.79		1.64	
p-value	0.07		0.19		**0.00**		**0.00**		0.02		0.03	
R-squared	**0.12**		0.12		0.09		0.11		0.12		**0.12**	

Note: t-statistics in bold indicate significance at 10 percent or better.

within 10 minutes' walk—weakly increases hours worked, but only when day-care choice or labor force selectivity are not considered. Thus it seems that formal day care is relatively unimportant, given the role of the informal sector, the large percentage of women who take children to work, and the presence of alternate caregivers within the traditional compound setting.

5. Conclusions

This study found that participation in the labor market and use of formal day care are joint decisions in both Guatemala City and Accra. Also in both cities, life-cycle and household demographic factors have important effects on these two decisions, particularly the presence of young children under 3 years of age. Higher household wealth was also found to reduce the chances of mothers working in both cities.

Because the determinants of maternal decision to work and her choice of childcare differ in importance in these two settings, we argue that a uniform policy to provide subsidized childcare to increase women's employment and earnings will not be effective. In Guatemala, better-educated women are more likely to use formal day care, while in Accra, formal day-care use is associated with higher socioeconomic status. In Guatemala, higher time costs of using formal day care reduce its utilization, and controlling for endogeneity of labor market participation and formal day-care use, the price of formal day care has negative but insignificant impacts on mother earnings. This suggests that interventions to increase the availability and lower the time costs of formal day care 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. In contrast, in Accra, the availability of day care does not have a significant effect on the use of formal care, nor on earnings and days worked once choice of formal care and selection into the labor force are considered. Subsidizing formal day care in urban Ghana would be more likely to benefit wealthier

women who use such facilities, at least in the short run, since formal-sector work accounts for only a small proportion of women's employment.

Reducing barriers to women's employment is crucial for helping lift women in the poor neighborhoods of Guatemala and Accra out of poverty. However, it is clear that the type of intervention will vary across these vastly different urban settings. 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. 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. This trend is expected to increase the demand for nonparental childcare in urban Guatemala. Thus, lack of and high prices for childcare may decrease the earning potential of poor mothers.

In Greater Accra, however, the challenges for workingwomen are very different. A much larger proportion of mothers participates in the labor force, and concerns that limit women's labor force participation are more related to their responsibilities to provide care for children. Indeed, many mothers return to the labor force only because of economic necessity. Because the informal sector accounts for a greater proportion of employment, and because the formal sector is relatively small, provision of formal day care is not likely to be the most important intervention to reach the majority of poor workingwomen in Accra. Indeed, what may be more important would be increasing returns or job security in the sectors where most women are employed. For example, two major areas of contention between Accra residents and local governments have to do with the regulation of the petty trading and street foods sectors—the sectors that account for the bulk of women's employment (Maxwell et al. 2000). While local governments claim that petty trading only increases congestion in the central business district, relocating petty traders to new markets away from the city center has proved unsuccessful. Possible interventions in the petty trading sector could include setting aside certain areas in the

central business district for pedestrians and petty traders only, as well as strengthening the capacity of nascent traders' associations.

Street foods are another area of regulatory concern because of perceived threats to public health due to food contamination. However, street foods are also an important source of food for consumption, a key coping strategy, and a livelihood for a large number of women in Accra. Local area associations of street food vendors that can self-inspect and regulate hygienic conditions would be good for business and for public health, and would also strengthen the security of income from this source.

The results from this comparative exercise suggest that women's employment and childcare are complex and interrelated decisions, but that interventions to improve conditions of workingwomen will have to be tailored to the particular urban setting.

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