NONPROFIT SECTOR AND PART-TIME WORK: AN ANALYSIS OF EMPLOYER–EMPLOYEE MATCHED DATA ON CHILD CARE WORKERS

H. Naci Mocan and Erdal Tekin*

Abstract—This paper uses a rich employer–employee matched data set to investigate the existence and the extent of nonprofit and part-time wage and compensation differentials in child care. The empirical strategy adjusts for workers' self-selection into the for-profit or the nonprofit sector and into full-time or part-time work, as well as for unobserved worker heterogeneity, using a discrete factor model. We find differences between the regimes (full-time for-profit, full-time nonprofit, part-time for-profit, part-time nonprofit) in the manner in which human capital characteristics of the workers are rewarded. There is substantial variation in wages as a function of employee characteristics, and there is variation in wages within sectors. The results indicate that part-time jobs are good jobs in center-based child care, and there exist nonprofit wage and compensation premia, which support the property-rights hypothesis.

I. Introduction

The nonprofit sector constitutes a significant and expanding segment of the U.S. economy. The number of private nonprofit organizations increased by almost 19% between 1989 and 1997, from 1,262,000 to 1,498,000 (Urban Institute, 2000). The number of national nonprofit associations increased by 56% between 1980 and 1997, reaching almost 23,000 in 1997 (U.S. Census Bureau, 2000). Employment in the nonprofit sector increased from 7.1 million full-time equivalent (FTE) paid workers in 1990 to 9.6 million in 1995; and in 1995 nonprofit employment accounted for 8.8% of the GDP in the U.S. (Salamon et al., 1999). There are theoretical reasons to believe that the economic behavior of nonprofit enterprises may be different from their for-profit counterparts (Lakdawalla and Philipson, 1998; Rose-Ackerman, 1996; Hansmann, 1980). One such difference pertains to wage-setting behavior. Nonprofit enterprises are expected to create rents for their workers, which would translate into wage markups. Alternatively, if nonprofit workers differ from for-profit workers in their altruism, this may translate into a nonprofit labor donation and lower nonprofit wages (Preston, 1989). The empirical evidence on nonprofit wage differentials is ambiguous. As explained in Section II below, the literature is far from having reached a consensus on the issue.

Around 17% of all workers and around one-quarter of all female workers work part time (Bureau of Labor Statistics, 2000). The fact that average wages of part-time workers are less than those of full-time workers with similar characteristics raises the question of whether part-time jobs are bad jobs (Blank, 1990).[1] The substantial size of part-time employment makes this an important, and as yet unresolved, question.

Using an extraordinarily detailed employer–employee matched data set, this paper addresses two questions: Are wages and compensation of workers who work in the nonprofit sector lower than their counterparts in the for-profit sector; and are part-time jobs bad jobs? We find that both answers are no for child care workers. We document substantial nonprofit premia in wages and compensation. Similarly, we find that part-time jobs are good jobs. These results are not likely due to some idiosyncratic characteristic of the child care industry. As we demonstrate in the paper, the raw full-time and nonprofit differentials observed in our data show similar patterns to those in a number of industries using the 1990 Census data.

Section II gives the background, and puts the contribution of this paper into perspective. Section III presents the model, section IV describes the data, and section V presents the results. Section VI includes the sensitivity analysis, and section VII is the conclusion.

II. Background

As summarized by Preston (1988), the theory of property rights predicts that nonprofit institutions may generate rents for their workers. This is partly because there is no owner to which the nonprofit manager is held accountable, which lessens the incentive for managers of nonprofit organizations to operate efficiently. As a result, there is reason to expect that nonprofit enterprises pay higher wages to comparable workers than their for-profit counterparts. On the other hand, it can be argued that nonprofit workers may have preferences that are different from for-profit workers. More precisely, some workers may be willing to work at nonprofit institutions at a lower wage and/or compensation than they could have obtained elsewhere. This labor donation may take place if nonprofit workers care about the social value of the good or service they produce more than for-profit workers (Preston, 1989).

However, the empirical evidence on the nonprofit wage differential is ambiguous. Most of this ambiguity seems to stem from inadequate data sets employed to address the question. The investigation of nonprofit wage differentials takes two general forms. The first one is the analysis of firm-level data, such as given by Preston (1988), who found that in the competitive segment of the day care industry,

[1] An investigation of whether certain jobs are bad jobs requires data on worker compensation as well as controls for job characteristics, which is not always possible because of the paucity of data. This issue is discussed below in more detail.

there is no significant difference in firm-level salaries between nonprofit and for-profit firms, whereas there is a 5%–10% nonprofit differential in the government-subsidized segment of the industry. Mocan and Viola (1997) investigated the determinants of wages and compensation in 398 child care centers. They found a positive nonprofit premium, which became statistically insignificant once sector breakdowns (for example, into religious centers and publicly funded centers) are controlled for.

A more refined investigation is done with micro data, where the determinants of worker wages are analyzed as a function of, among other factors, nonprofit status. Some analysts estimated wage regressions by including a dummy variable to indicate sector affiliation of the worker (for example, Shackett and Trapani, 1987; Borjas, Frech, and Ginsburg, 1983). The findings of these studies may be unreliable because of the potential endogeneity of the sector dummy. As argued above, it is conceivable that workers who choose to work in the nonprofit sector may be systematically different from workers who work in the for-profit sector. If unobservable worker characteristics which influence sector choice also effect workers' wages, one will obtain biased estimates of the sector impact. For example, Weisbrod (1983) estimated separate earnings functions for lawyers employed in public-sector firms and those employed in private firms. He reported that public-sector lawyers received lower wages than private-sector lawyers. Using the same data set and controlling for self-selection into sectors, Goddeeris (1988) found no evidence that public-sector lawyers accepted earning sacrifices, underlining the importance of selection bias.

There are only a few papers that address self-selection of workers into sectors. Holtmann and Idson (1993) and Preston (1989) used the two-stage approach developed by Lee (1978) and Heckman (1979). Ruhm and Borkoski (2000) exploited the panel component of the Current Population Survey outgoing rotation groups to control for self-selection.

For the most part, recent research on part-time wage differentials has paid attention to nonrandom selection into part-time work (Hotchkiss, 1991; Blank, 1990; Simpson, 1986). However, most of the work in this literature faced challenges pertaining to measurement error in key variables (such as wages and hours) and a failure to control for nonwage benefits and other job attributes. As explained by Montgomery and Cosgrove (1995), the data sets employed in these studies did not allow for detailed controls for firm effects, or even occupation effects. Whereas most papers reported a negative part-time wage differential (Montgomery and Cosgrove, 1995; Simpson, 1986), Blank (1990) found a wage differential in favor of part-time workers.

This paper brings together these two strands of literature: the wage-setting practices of nonprofit enterprises, and the investigation of relative wages of part-time workers in comparison with their full-time counterparts. The employer–employee matched data set used in the analysis not only includes very detailed characteristics of workers and firms, it also allows for measurement of variables with more precision than before. For example, most studies that used national data sets had to impute worker wages using annual wage or salary income and annual hours (Leete, 2001; Main and Reilly, 1992; Blank, 1990). They were also forced to impute certain human capital measures of the workers, such as experience. Similarly, data obtained from workers are likely to contain substantial error regarding the nonprofit status of the establishment they are working for (Leete, 2001; Ruhm and Borkoski, 2000). By contrast, in our data set the information pertaining to the firm is obtained from child care centers' directors and from their financial statements. All worker information, such as workers' experience in the field, experience outside the field, and tenure on the job, is obtained by surveying the workers directly.

Using the information on the types and dollar amounts of nonwage benefits offered by the centers, and the information on the type of staff which receives these benefits, we are able to calculate hourly compensation, and conduct the analysis for compensation as well. We allow for endogenous selection into sectors (nonprofit versus for-profit) as well as hours (part-time versus full-time). Controlling for unobserved individual heterogeneity, the model is estimated for both wages and compensation using full-information maximum likelihood.

III. Empirical Implementation

The model includes two selection equations and four sectoral wage equations. One selection equation allocates child care workers to the for-profit or the nonprofit sector; the other one allocates them to either full-time or part-time work. The cross-classification of these two selection rules partitions workers into four mutually exclusive categories.[2] The selection between the for-profit and nonprofit sectors and between full-time and part-time work can be summarized by the following equations:

$$PR_i^* = \mathbf{X}_i\boldsymbol{\beta} + \epsilon_i^{pr}, \tag{1}$$

$$FT_i^* = \mathbf{Y}_i\boldsymbol{\gamma} + \epsilon_i^{ft}, \tag{2}$$

where i represents workers. PR^* stands for unobserved sentiment that determines the attachment to the for-profit sector, and FT^* stands for the unobserved tendency to choose full-time work. Thus, $PR = 1$ (the worker chooses the for-profit sector) if $PR^* > 0$, and $PR = 0$ otherwise. Similarly, if $FT^* > 0$, then the worker chooses full-time work and the dichotomous variable FT takes the value 1, and $FT = 0$ otherwise. The vectors $\mathbf{X}$ and $\mathbf{Y}$ are variables

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[2] Another potential selection is into the labor force. We do not address it here because of the lack of data on nonworkers.

that determine the propensity to work in the for-profit sector and to work full-time, respectively.

We specify linear sectoral wage equations as follows.

$$W_i^{ft\text{-}np} = \mathbf{Z}_i \boldsymbol{\delta} + \epsilon_i^{ft\text{-}np}, \tag{3}$$

$$W_i^{pt\text{-}np} = \mathbf{Z}_i \boldsymbol{\zeta} + \epsilon_i^{pt\text{-}np}, \tag{4}$$

$$W_i^{ft\text{-}pr} = \mathbf{K}_i \boldsymbol{\pi} + \epsilon_i^{ft\text{-}pr}, \tag{5}$$

$$W_i^{pt\text{-}pr} = \mathbf{K}_i \boldsymbol{\lambda} + \epsilon_i^{pt\text{-}pr}, \tag{6}$$

where the superscript *ft* stands for full-time, *pt* for part-time, *np* for nonprofit, and *pr* for for-profit. W_i stands for the wage rate of the ith worker. The vector $\mathbf{Z}$ contains variables determining the wages in the nonprofit sector, and $\mathbf{K}$ is the vector of variables that determines wages in the for-profit sector. Although the model is identified through nonlinearities, to further facilitate identification the variables that represent family background such as household income, marital status of the worker, and the number of children are included in the selection equations, but they are omitted from the wage equations. To the extent that the latent variables that measure the propensity to work full time and the propensity to work in the for-profit sector are influenced by potential wages in these sectors, the variables that are included in $\mathbf{Z}$ and $\mathbf{K}$ should be included in $\mathbf{X}$ and $\mathbf{Y}$. However, variables that are affiliated exclusively with one sector (such as union status) are not included in the selection equations.

It is plausible to think that the error term of the sector selection equation may be correlated with the error term of the full-time selection equation. That is, workers' unobserved preferences for sector choice may affect their choice of full-time versus part-time work. These disturbances may also be correlated with the disturbances of the wage equations: unobserved worker characteristics which influence sector and full-time choice decisions may affect wages.

To account for this potential correlation in the errors of the equations, we model the error structure as

$$\epsilon_i^{pr} = u_i^{pr} + \sum_{j=1}^{2} \rho_j^{pr} v_j, \tag{7}$$

$$\epsilon_i^{ft} = u_i^{ft} + \sum_{j=1}^{2} \rho_j^{ft} v_j, \tag{8}$$

$$\epsilon_i^{ft\text{-}np} = u_i^{ft\text{-}np} + \sum_{j=1}^{2} \rho_j^{ft\text{-}np} v_j, \tag{9}$$

$$\epsilon_i^{pt\text{-}np} = u_i^{pt\text{-}np} + \sum_{j=1}^{2} \rho_j^{pt\text{-}np} v_j, \tag{10}$$

$$\epsilon_i^{ft\text{-}pr} = u_i^{ft\text{-}pr} + \sum_{j=1}^{2} \rho_j^{ft\text{-}pr} v_j, \tag{11}$$

$$\epsilon_i^{pt\text{-}pr} = u_i^{pt\text{-}pr} + \sum_{j=1}^{2} \rho_j^{pt\text{-}pr} v_j, \tag{12}$$

where $u_i^{pr}, \ldots, u_i^{pt\text{-}pr}$ are mutually independent disturbances with mean zero, and the v's are the common factors that affect the error terms ϵ. The factor loadings (ρ's) allow for the effects of the common factors to vary across equations. The u's and v's are independent of the explanatory variables. The v's are unobserved variables that generate worker heterogeneity. We allow for two such factors to take account of the correlations among equations. For example, one factor might represent unobserved motivation, and the other one tastes for work.

In principle, one can estimate this system by imposing a parametric joint distribution for the two sources of unobserved heterogeneity and integrating out over its distribution. The drawback to this approach is that it requires computing multidimensional integrals, which is not feasible with traditional methods. Furthermore, it requires strong assumptions about the exact distribution of the heterogeneity. In related contexts, it has been shown that the results can be sensitive to departures from multinormality (Goldberger, 1983; Arabmazar and Schmidt, 1982).

In this paper we use the discrete factor method (DFM), which, unlike standard selection corrections, estimates a semiparametric distribution to approximate the distribution among the error terms of the selection and wage equations. In this approach, the distribution of the v's is approximated with a step function and integrated out through a weighted sum of probabilities (Heckman and Singer, 1984). Following Mroz (1999), we assume that v is governed by a discrete distribution

$$\text{Prob}(v = \mu_k) = \psi_k, \quad \psi_k \geq 0, \quad k = 1, \ldots, K; \sum_k \psi_k = 1, \tag{13}$$

where μ_k are the points of support of the distribution, and ψ_k are the probability weights. The μ_k's, ψ_k's, and ρ's are parameters to be estimated. K is specified a priori, and the six equations are estimated jointly with full-information maximum likelihood.[3] Mroz (1999) demonstrates that when the true correlation of the error terms is multinormal, DFM performs well in comparison with estimators which assume multinormality; and DFM performs better than normality-based estimators when the underlying distribution is nonnormal. [See Blau and Hagy (1998), Hu (1999), and Mocan, Tekin, and Zax (2000) for applications of the discrete factor model.]

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[3] The likelihood function is presented in the Appendix.

IV.   The Data

We use a data set obtained from child care centers in California, Colorado, Connecticut, and North Carolina.[4] The data are based upon a stratified random sample of 398 day care centers (approximately 100 centers from each participating state), with equal representation of for-profit and nonprofit programs, providing full-time year-round care. They were obtained by actual visits to the centers during the spring of 1993. Data collectors gathered in-depth financial information on center costs and revenues; various nonwage benefits offered to teachers, aides, and part-time staff; ownership and union status, and a host of other center characteristics through on-site interviews and reviews of center records with center administrators or owners. In each of the 398 centers in the data set, two classrooms were randomly selected. Teaching staff in these classrooms were asked to complete a survey regarding their human capital characteristics, pretax hourly wages, weekly hours of work, family characteristics, and attitudes towards work in the child care industry. As a result, the extraordinary detail of the data allows for control of the job environment, as well as worker and firm characteristics, with precision.

Each center provided information about the total dollar value of their nonwage benefits. Each centers also provided detailed information about eleven different benefits provided for three worker categories (teacher, assistant teacher, and part-timer) that involve monetary costs to the center. For example, centers indicated whether fully paid or partially paid health insurance is provided for teachers, assistant teachers, and part-timers as a benefit. Other examples are at least partially paid dental insurance, paid vacations, paid maternity leave, paid health insurance for dependents, and paid sick or personal leave. For each center the total number of benefits provided for each worker category is counted. Because the job title and hours of work for each worker is known, the annual number of hours worked by full-time teachers, annual hours of full-time aides, and annual part-time hours can be calculated. Using this information, and center's total spending on benefits, as well as information on the proportion of line-item benefits provided to each worker group, the monetary value of hourly benefits that can be assigned to each group of workers is calculated. The hourly compensation for each worker is her reported hourly wage plus hourly nonwage benefits for her job category.

Raw full-time and nonprofit differentials are presented in Table 1. We ran linear regressions of the logarithm of wages and compensation on state dummies and a full-time dummy, separately for nonprofit and for-profit centers, to obtain the information displayed in the top half of the table. The

TABLE 1.—RAW FULL-TIME AND NONPROFIT WAGE AND COMPENSATION DIFFERENTIALS

Full-time Differential			
In Nonprofit Centers		In For-profit Centers	
$W^{ft} = W^{pt}$	$C^{ft} > C^{pt}$ (8.9%)	$W^{ft} > W^{pt}$ (5.2%)	$C^{ft} > C^{pt}$ (9.8%)
Nonprofit Differential			
For Full-time Workers		For Part-time Workers	
$W^{np} > W^{pr}$ (7.8%)	$C^{np} > C^{pr}$ (11.6%)	$W^{np} > W^{pr}$ (11.6%)	$C^{np} > C^{pr}$ (13.6%)

W stands for wage, C for compensation, ft for full-time, pt for part-time, np for nonprofit, and pr for for-profit.

logarithms of wages and compensation are run on state dummies and a for-profit dummy separately for full-time and part-time workers to obtain the information displayed in the bottom half of the table. The values in parentheses are percentage differences. According to Table 1, controlling for state differences, full-time wages are not different from part-time wages in nonprofit centers, but full-time compensation is greater than part-time compensation. In for-profit centers both wages and compensation are greater for full-time workers. The bottom half of the table demonstrates that there exist nonprofit markups in both wages and compensation.

Table 2 presents worker characteristics by type of worker. A star indicates that the means are statistically different between for-profit and nonprofit centers, or between full-time and part-time workers, at the 5% level or better. For example, nonprofit workers are older than for-profit workers (35 years of age versus 31 years), and they also have more tenure (45 months versus 30 months). The workers were asked about the main reason for their choice of work in the field of early education and child care. The alternatives given were: it was the highest-paying job at the time; it is a desirable job (pleasant job environment); low cost of working; flexible working hours; this is an important job that someone needs to do. If the worker chose the last alternative, then the dummy variable *Important job* takes the value of one; it is zero otherwise. This variable is a direct indicator of the intrinsic value to the individual of working in the child care sector. As such, it allows for a direct test of the labor-donation hypothesis; that is, all else the same, individuals with this attitude are expected to command lower wages, especially in the nonprofit sector.

Table 3 displays the descriptive statistics of center characteristics. *Publicly regulated* is 1 if the center receives public money, either from the state or federal government, tied to higher standards (above and beyond normal licensing regulations), and 0 otherwise. This group includes Head Start programs, centers where 20% or more of the enrollment constitutes special-needs children, special preschool programs sponsored by the state or federal department of education, and other special programs in Connecticut and California.

[4] The data were compiled with the collaboration of economists, psychologists, and child development experts from University of Colorado at Denver, Yale University, University of North Carolina at Chapel Hill, and UCLA. The details of the data and data collection can be found in Mocan (1997).

TABLE 2.—DESCRIPTIVE STATISTICS OF WORKER CHARACTERISTICS

Variable	Definition	For-profit Workers	Nonprofit Workers	Full-time Workers	Part-time Workers
Wage	Hourly pretax wage rate	6.531* (2.023)	7.303* (2.959)	6.798* (2.462)	7.182* (2.775)
Compensation	Hourly compensation	7.418* (2.392)	8.567* (3.709)	7.993 (3.152)	8.065 (3.289)
For-profit	Dummy = 1 if the worker works in a for-profit center	1.000 (0.000)	0.000 (0.000)	0.504* (0.500)	0.432* (0.496)
Full-time	Dummy = 1 if the worker works full time	0.681* (0.467)	0.615* (0.487)	1.000 (0.000)	0.000 (0.000)
Female	Dummy = 1 if female	0.978 (0.148)	0.959 (0.198)	0.969 (0.175)	0.967 (0.178)
Age	Age of the worker	31.392* (10.96)	35.093* (11.977)	32.324* (11.124)	35.148* (12.348)
Tenure	Tenure at the center (in months)	30.237* (40.751)	45.351* (53.82)	35.790* (45.311)	42.387* (53.861)
Experience	Years of experience in early education and child care (> 10 hours per week)	7.226* (6.299)	8.184* (6.649)	7.679 (6.346)	7.813 (6.776)
Other experience	Years of total work experience outside early education and child care	6.641 (6.592)	6.756 (6.630)	6.557 (6.500)	6.963 (6.804)
Less than high school	Dummy = 1 if no high school diploma	0.016* (0.126)	0.035* (0.184)	0.019 (0.138)	0.038 (0.192)
High school	Dummy = 1 if high school graduate or GED	0.190 (0.393)	0.183 (0.387)	0.188 (0.391)	0.183 (0.387)
Some college	Dummy = 1 if some college courses	0.331 (0.471)	0.346 (0.476)	0.339 (0.474)	0.339 (0.474)
Community college	Dummy = 1 if two-year college degree	0.131 (0.338)	0.152 (0.359)	0.149 (0.357)	0.128 (0.335)
College	Dummy = 1 if four-year college degree	0.232* (0.423)	0.150* (0.357)	0.196 (0.397)	0.178 (0.383)
Some graduate school	Dummy = 1 if some graduate school	0.053* (0.223)	0.083* (0.277)	0.064 (0.245)	0.077 (0.266)
Graduate degree	Dummy = 1 if graduate degree	0.046 (0.211)	0.044 (0.206)	0.040 (0.197)	0.055 (0.228)
No training	Dummy = 1 if no special training in early childhood education	0.141 (0.349)	0.137 (0.344)	0.136 (0.343)	0.145 (0.352)
Assistant teacher	Dummy = 1 if assistant teacher	0.386* (0.487)	0.461* (0.499)	0.360* (0.480)	0.544* (0.499)
Infant–toddler room	Dummy = 1 if the worker works in an infant–toddler room	0.410* (0.492)	0.243* (0.429)	0.357* (0.480)	0.260* (0.439)
Own kids	Number of children living with worker	0.857* (1.221)	1.102* (1.254)	0.892* (1.178)	1.153* (1.342)
Own kids at center	Dummy = 1 if any of worker's children is cared for in the same center	0.200* (0.400)	0.109* (0.312)	0.160 (0.367)	0.139 (0.347)
Organization	Dummy = 1 if the worker belongs to a professional organization	0.176* (0.381)	0.302* (0.459)	0.233 (0.423)	0.257 (0.437)
Important job	If the worker's main reason to choose employment in child care is "this is an important job that someone needs to do"	0.240 (0.428)	0.281 (0.450)	0.268 (0.443)	0.251 (0.434)
Single	Dummy = 1 if the worker is single	0.378 (0.485)	0.324 (0.468)	0.383* (0.486)	0.290* (0.454)
Married	Dummy = 1 if the worker is married or living with a significant other	0.535 (0.499)	0.554 (0.498)	0.511* (0.500)	0.607* (0.489)
White	Dummy = 1 if the worker is white	0.752* (0.433)	0.6222* (0.485)	0.679 (0.467)	0.694 (0.461)
Hispanic	Dummy = 1 if the worker is Hispanic	0.085* (0.279)	0.143* (0.350)	0.120 (0.325)	0.107 (0.309)
Black	Dummy = 1 if the worker is African-American	0.079* (0.270)	0.172* (0.378)	0.142* (0.349)	0.101* (0.302)
Asian	Dummy = 1 if the worker is Asian or Pacific Islander	0.028 (0.166)	0.020 (0.141)	0.018 (0.133)	0.036 (0.185)
Other race	Dummy = 1 if the worker is of some other race.	0.055 (0.227)	0.039 (0.194)	0.042 (0.200)	0.055 (0.228)
Household income 1	Dummy = 1 if the worker's last year's total before-tax household income <$10,000	0.188 (0.391)	0.169 (0.375)	0.194* (0.396)	0.148* (0.355)
Household income 2	Dummy = 1 if last year's total before-tax household income is between $10,000 and $19,999	0.234 (0.424)	0.243 (0.429)	0.277* (0.448)	0.169* (0.376)
Household income 3	Dummy = 1 if last year's total before-tax household income is between $20,000 and $29,999	0.152 (0.359)	0.191 (0.393)	0.185 (0.389)	0.148 (0.355)
Household income 4	Dummy = 1 if last year's total before-tax household income is between $30,000 and $39,999	0.154 (0.361)	0.144 (0.352)	0.138 (0.345)	0.169 (0.376)
Household income 5	Dummy = 1 if last year's total before-tax household income is between $40,000 and $49,999	0.085 (0.279)	0.098 (0.298)	0.082 (0.275)	0.109 (0.312)
Household income 6	Dummy = 1 if last year's total before-tax household income ≥ $50,000	0.188 (0.391)	0.156 (0.363)	0.124* (0.330)	0.257* (0.437)
N		495	540	669	366

*Statistically significant difference in means between for-profit and nonprofit or full-time and part-time workers

TABLE 3.—DESCRIPTIVE STATISTICS OF CENTER CHARACTERISTICS

Variable	Definition	Mean	Standard Deviation
For-profit	Dummy = 1 if the center if for-profit	0.478	(0.500)
National chain	Dummy variable = 1 if center is member of a national chain	0.123	(0.328)
On-site	Dummy variable = 1 if center is a worksite child care center	0.050	(0.219)
Publicly regulated	Dummy variable = 1 if center receives public money tied to higher standards	0.065	(0.246)
Publicly owned	Dummy variable = 1 if center is publicly owned and operated	0.081	(0.273)
Publicly supported	Dummy variable = 1 if center is not publicly owned or operated, but receives more than 50% of its revenue from public grants, fees, and USDA reimbursement	0.079	(0.270)
Religious	Dummy variable = 1 if center is religiously affiliated	0.213	(0.409)
Union	Dummy variable = 1 if center workers are unionized	0.059	(0.236)
Percent subsidized	The proportion of children that are subsidized	0.207	(0.307)
Center age	Number of years that center has been in operation	13.412	(13.824)
Part-week	Dummy = 1 if part-week program	0.800	(0.400)
Extended care	Dummy = 1 if part-day extended-care program	0.586	(0.493)
Head Start	Dummy = 1 if Head Start program	0.021	(0.144)
Before and after school	Dummy = 1 if center provides before- and after-school care	0.573	(0.495)
Summer camp	Dummy = 1 if center provides summer camp programs for school-agers	0.476	(0.500)
Evening care	Dummy = 1 if center provides evening care	0.041	(0.197)
Weekend care	Dummy = 1 if center provides weekend care	0.018	(0.134)
Sick care	Dummy = 1 if center provides sick care	0.029	(0.168)
24-hour care	Dummy = 1 if center provides 24-hour care	0.002	(0.044)
FTE children	Number of full-time equivalent children at the center	74.133	(47.104)
Unemployment	Unemployment rate in the city where the center is located (in 1992)	6.970	(2.060)
California	Dummy = 1 if the center is in California.	0.270	(0.444)
Colorado	Dummy = 1 if the center is in Colorado.	0.275	(0.447)
Connecticut	Dummy = 1 if the center is in Connecticut.	0.242	(0.429)
North Carolina	Dummy = 1 if the center is in North Carolina.	0.213	(0.409)

Publicly owned is set to 1 for centers that are owned and operated by public agencies. Examples include public colleges, hospitals, and city departments of family services. *Religious* is 1 if the center has a religious affiliation (for example, church-based centers), and 0 otherwise. *Union* is 1 if teachers and/or aides are unionized. There are 18 unionized centers in the sample, and all are nonprofit centers. Of these, 14 are publicly owned centers (*Publicly owned*), 2 are publicly supported centers (*Publicly supported*) and 2 are religious centers.

Percent subsidized represents the proportion of children that are subsidized by a government or other agency, such as the state or county department of social or human services, or United Way. Table 3 also displays information about various programs offered by centers, such as evening care, sick care, and before- and after-school care.

Following an extensive literature that investigates the effect of firm size on earnings (Troske, 1999; Main and Reilly, 1992; Brown and Medoff, 1989; Evans and Leighton, 1989), we include the size of the child care center, measured by full-time equivalent children (*FTE children*) in the wage and compensation equations. Local unemployment can depress wages through various noncompetitive mechanisms (Blanchflower and Oswald, 1994, chapter 3). Alternatively, there can be a positive relationship between wages and unemployment, because firms can provide compensating wage differentials to workers in the spirit of the Harris–Todero (1970) and Hall (1970) models. To investigate this effect, we include the unemployment rate in the models. *Unemployment* is the unemployment rate in the city where the center is located. The ZIP codes of the centers are

used to determine the city in which the center is located. The unemployment rates for the corresponding cities are obtained from the U.S. Bureau of Labor Statistics, Local Area Unemployment Division. For the cities where BLS figures were unavailable, the unemployment rates are imputed as the average unemployment rates of the neighboring cities within a 20-mile radius.

V. Results

Equations (1)–(6) are estimated jointly with full-information maximum likelihood under the error structure displayed by equations (7)–(12). The results are based on five points of support [$K = 5$ in equation (13)]. The estimated coefficients of the selection equations are not reported here, but are discussed in Mocan and Tekin (2000).[5]

Table 4 displays the estimated coefficients of the four wage equations. The dependent variables are the logarithms of wages. We observe that female part-time workers earn 11% and 4% less, respectively, in the for-profit and nonprofit sectors, than their male counterparts. Race is also a determinant of wages: blacks and Hispanics receive positive premia, and white and Asian part-time workers in the nonprofit sector command lower wages.

Table 5 presents the results of a series of hypothesis tests pertaining to the equality of the coefficients of human

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[5] These tables can also be downloaded from www.econ.cudenver.edu/ mocan or www.gsu.edu/~ecoext.

TABLE 4.—ESTIMATED WAGE EQUATIONS

Variable	For-profit Full-time	Nonprofit Full-time	For-profit Part-time	Nonprofit Part-time
Constant	1.551** (0.060)	1.561** (0.059)	1.564** (0.104)	1.696** (0.013)
Tenure	0.001** (0.0002)	0.0004* (0.0002)	0.002** (0.0003)	0.002** (0.0004)
Experience	0.003** (0.001)	0.010** (0.001)	0.003* (0.001)	0.006** (0.0003)
Other experience	0.003** (0.0005)	0.002* (0.001)	−0.001 (0.001)	0.005** (0.0001)
Female	0.009 (0.019)	−0.037 (0.021)	−0.110* (0.047)	−0.042** (0.006)
High school	−0.022 (0.021)	0.016 (0.029)	0.211** (0.029)	0.170** (0.006)
Some college	0.026 (0.023)	0.017 (0.025)	0.290** (0.030)	0.235** (0.005)
Community college	0.051* (0.020)	0.107** (0.029)	0.405** (0.035)	0.180** (0.006)
College	0.088** (0.022)	0.191** (0.034)	0.371** (0.029)	0.318** (0.007)
Some graduate school	0.147** (0.037)	0.179** (0.030)	0.386** (0.04)	0.253** (0.008)
Graduate degree	0.036 (0.030)	0.357** (0.041)	0.370** (0.040)	0.452** (0.007)
No training	−0.039* (0.020)	−0.074** (0.019)	−0.037* (0.018)	−0.086** (0.004)
White	0.063** (0.020)	0.055 (0.039)	0.025 (0.021)	−0.018** (0.006)
Hispanic	0.059* (0.025)	0.078* (0.037)	0.067 (0.038)	0.020** (0.006)
Black	0.068* (0.032)	0.052 (0.037)	0.074* (0.029)	0.025** (0.008)
Asian	−0.056 (0.056)	0.049 (0.071)	−0.058 (0.033)	−0.131** (0.009)
Organization	0.069** (0.014)	0.049** (0.015)	−0.028 (0.018)	0.085** (0.003)
Important job	0.024* (0.012)	−0.047** (0.014)	0.031 (0.021)	−0.024** (0.002)
Assistant teacher	−0.074** (0.012)	−0.092** (0.015)	−0.106** (0.014)	−0.146** (0.003)
Infant–toddler room	−0.022* (0.011)	−0.013 (0.014)	−0.060** (0.013)	−0.029** (0.005)
On-site	0.233** (0.070)	0.195** (0.030)	0.137** (0.037)	0.372** (0.007)
National chain	−0.057** (0.012)	—	−0.117** (0.018)	—
Publicly supported	0.012 (0.071)	−0.124** (0.025)	−0.026 (0.076)	0.062** (0.006)
Publicly owned	—	0.148** (0.029)	—	0.118** (0.006)
Publicly regulated	—	0.188** (0.030)	—	−0.031** (0.005)
Religious	—	−0.041* (0.017)	—	−0.029** (0.004)
Union	—	0.219** (0.035)	—	0.220** (0.003)
Unemployment	0.004 (0.004)	0.006 (0.004)	−0.010 (0.006)	−0.002* (0.001)
FTE children	0.001** (0.0001)	−0.0004** (0.0002)	0.0004* (0.0002)	−0.001** (0.0001)
Percent subsidized	−0.046 (0.054)	−0.081** (0.030)	−0.125* (0.062)	−0.139** (0.005)
Center age	−0.001 (0.001)	−0.001* (0.0004)	0.003** (0.001)	0.002** (0.0001)
Part-week	0.016 (0.023)	−0.051** (0.018)	−0.069 (0.043)	−0.069** (0.004)
Extended care	−0.018 (0.014)	0.058** (0.017)	−0.003 (0.029)	0.087** (0.003)
Head Start	—	−0.245** (0.029)	—	0.068** (0.013)
Before and After School	−0.067** (0.015)	0.009 (0.021)	0.054* (0.024)	0.009* (0.004)
Summer camp	−0.009 (0.012)	0.016 (0.017)	0.033 (0.020)	0.055** (0.004)
Evening care	−0.038 (0.029)	0.127** (0.029)	−0.243** (0.049)	0.106** (0.014)
Sick care	0.020 (0.114)	0.012 (0.029)	0.070 (0.086)	0.114** (0.011)
24-hour care	0.146 (0.156)	—	0.334** (0.095)	—
Own kids at center	0.015 (0.013)	0.009 (0.018)	−0.020 (0.014)	0.039** (0.005)
California	0.267** (0.021)	0.256** (0.026)	0.327** (0.031)	0.206** (0.007)
Colorado	0.059* (0.025)	0.071** (0.021)	0.154** (0.036)	0.042** (0.007)
Connecticut	0.273** (0.020)	0.243** (0.031)	0.247** (0.034)	0.234** (0.006)

N = 1,035
Log likelihood = −684.63

Estimated standard errors of the coefficients are in parentheses.
*Statistical significance between 5% and 1%.
**Statistical significance at the 1% level or better.

capital variables.[6] The sign of the calculated *t*-statistic reveals the direction of the difference between the coefficients under test. A positive *t*-statistic indicates that the first coefficient under the hypothesis is greater than the second one in magnitude.[7] For example, the first test reported in the table pertains to the hypothesis that the coefficients of tenure are equal to each other in for-profit and nonprofit sectors for full-time workers. The calculated *t*-value is

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[6] The hypothesis tests utilize the information reported in Table 4 along with the variance–covariance matrix of the estimated coefficients.
[7] The exception is the test pertaining to the coefficients of *Special training*. Because these coefficients are always negative, a positive *t*-statistic indicates that the first coefficient is smaller than the second one in absolute value.

3.627, which indicates that the coefficients are different from each other, and the for-profit coefficient is larger.

As Table 5 demonstrates, there are differences between for-profit and nonprofit centers regarding the manner in which human capital characteristics affect wages. For full-time workers, the return to tenure is higher in for-profit centers, but the returns to experience, to a college degree, and to a graduate degree are higher in nonprofit centers. Panel II shows that experience in the child care sector, other experience and a graduate degree are rewarded more heavily in the nonprofit than in the profit sector for part-time workers. Similarly, the lack of special training in child care lowers wages of part-time workers more in the nonprofit

TABLE 5.—TESTS FOR THE EQUALITY OF THE RETURNS
TO HUMAN CAPITAL BETWEEN GROUPS

Panel	Hypothesis	t-Statistic
I	For full-time workers, returns to:	
	Tenure (Pr) = *Tenure* (Np)	3.627
	Experience (Pr) = *Experience* (Np)	−4.129
	Other experience (Pr) = *Other experience* (Np)	0.599
	High school (Pr) = *High school* (Np)	−1.078
	Community college (Pr) = *Community college* (Np)	−1.671
	College (Pr) = *College* (Np)	−2.661
	Graduate degree (Pr) = *Graduate degree* (Np)	−6.521
	Special training (Pr) = *Special training* (Np)[a]	1.271
II	For part-time workers, returns to:	
	Tenure (Pr) = *Tenure* (Np)	0.863
	Experience (Pr) = *Experience* (Np)	−2.702
	Other experience (Pr) = *Other experience* (Np)	−4.913
	High school (Pr) = *High school* (Np)	1.379
	Community college (Pr) = *Community college* (Np)	6.287
	College (Pr) = *College* (Np)	1.761
	Graduate degree (Pr) = *Graduate degree* (Np)	−2.029
	Special training (Pr) = *Special training* (Np)[a]	2.582
III	In for-profit centers, returns to:	
	Tenure (Ft) = *Tenure* (Pt)	−0.972
	Experience (Ft) = *Experience* (Pt)	0.423
	Other experience (Ft) = *Other experience* (Pt)	2.599
	High school (Ft) = *High school* (Pt)	−6.348
	Community college (Ft) = *Community college* (Pt)	−8.584
	College (Ft) = *College* (Pt)	−7.558
	Graduate degree (Ft) = *Graduate degree* (Pt)	−6.488
	Special training (Ft) = *Special training* (Pt)[a]	−0.061
IV	In nonprofit centers, returns to:	
	Tenure (Ft) = *Tenure* (Pt)	−6.252
	Experience (Ft) = *Experience* (Pt)	2.820
	Other experience (Ft) = *Other experience* (Pt)	−2.980
	High school (Ft) = *High school* (Pt)	−5.231
	Community college (Ft) = *Community college* (Pt)	−2.444
	College (Ft) = *College* (Pt)	−3.735
	Graduate degree (Ft) = *Graduate degree* (Pt)	−2.239
	Special training (Ft) = *Special training* (Pt)[a]	0.683

Pr stands for for-profit, *Np* for nonprofit, *Ft* for full-time, *Pt* for part-time.
[a]Because the coefficient of special training is negative in all wage equations, a negative value for the *t*-statistic indicates that the first coefficient is greater than the second one in absolute value.

sector. On the other hand, a community college degree has a higher return in the for-profit sector. With the exception of *Other experience* in panel III and *Experience* in panel IV, all significant *t*-values have negative signs in panels III and IV of Table 5. This demonstrates that part-time coefficients are larger in magnitude than full-time coefficients in both for-profit (panel III) and nonprofit centers (panel IV), and indicates that the return to education is higher for part-time than for full-time workers in both sectors.

To the extent that the variable *Important job* is capturing the attitudes toward labor donation of nonprofit workers, its coefficient should be negative in the nonprofit wage equation. Table 4 shows that the coefficient of *Important job* is negative for both full-time and part-time workers in the nonprofit sector, with a bigger magnitude for full-time workers. It is positive in the for-profit sector, although statistically significant only for full-time for-profit workers. This is an interesting result, which provides support to the labor-donation hypothesis for nonprofit workers. It also

suggests that this particular attitude may be correlated with productivity, which is rewarded in the for-profit sector.[8]

Center characteristics have significant effects on wages. For example, wages in on-site centers are substantially higher for both full-time and part-time workers in both sectors. For-profit centers which are part of a national chain offer wages to full-timers and part-timers that are 6% and 12% lower, respectively, than in nonchain for-profit centers. Wages are 3%–4% lower in religious centers.

There is a substantial union wage premia in nonprofit centers. Unionized nonprofit centers provide a 22% wage premium to both full-time and part-time workers. The union variable in the analysis indicates whether or not the center is unionized. The effect of this union variable on part-time wages has two possible explanations. The first is that part-time workers are also covered by the union. The second is that part-time workers are not covered by the union, but there is a spillover effect.[9] Local unemployment has a negative effect on part-time nonprofit workers' wages. Larger for-profit centers pay a wage premium to both full-time and part-time workers, which is consistent with the literature on size differentials (Troske, 1999). On the other hand, there is a negative relationship between center size and wages in the nonprofit sector. In Table 6 we present the estimated coefficient compensation equations.[10] The results are similar to the ones obtained from wage regressions.

To understand the extent to which the observed wage and compensation differences are attributable to observable characteristics, we estimated wage and compensation equations identical to those reported in Tables 4 and 6 using OLS. These OLS regressions attempt to explain the variation in wages and compensation within sectors without regard to selection. The results, which are reported in rows (2) of Table 7, demonstrate that, for the most part, controlling for human capital and firm characteristics reduces the size of the observed wage and compensation gaps.

Our estimated model [equations (1)–(13)] enables us to investigate what a randomly chosen individual's wage and compensation would be under the four possible regimes (full-time, for-profit; full-time, nonprofit; part-time, for-profit; and part-time, nonprofit). Using the estimated parameters of the system and the estimated heterogeneity coefficients, we simulated the potential wages and compensation for all workers in the sample under the four possible

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[8] A more detailed discussion of the results on personal characteristics can be found in Mocan and Tekin (2000).

[9] We attempted to contact the unionized centers in the data set to ask whether part-time workers were also covered by the union in 1993. We could not reach four out of the twelve centers, either because they were not in operation any longer, or their phone numbers had changed. Four of the remaining eight centers indicated that part-time workers were also covered by the union. One center indicated that part-timers were not covered by the union, and three centers could not answer the question. So the channel through which the union affects part-time wages remains unclear.

[10] The results of the selection equations are reported in Mocan and Tekin (2000). They can also be obtained from www.econ.cudenver.edu or www.gsu.edu/~ecoext.

TABLE 6.—COMPENSATION EQUATIONS

Variable	For-profit Full-time	Nonprofit Full-time	For-profit Part-time	Nonprofit Part-time
Constant	1.466** (0.085)	1.564** (0.056)	1.202** (0.034)	1.99** (0.097)
Tenure	0.001** (0.0002)	0.001** (0.0002)	0.003** (0.0002)	0.001** (0.0002)
Experience	0.004** (0.001)	0.009** (0.001)	0.001 (0.001)	0.002 (0.002)
Other experience	−0.001 (0.001)	0.001 (0.001)	0.004** (0.001)	0.004* (0.002)
Female	0.041 (0.042)	0.020 (0.024)	0.015 (0.018)	−0.152** (0.058)
High school	0.025 (0.057)	−0.030 (0.026)	0.297** (0.023)	0.020 (0.044)
Some college	0.001 (0.056)	−0.015 (0.022)	0.439** (0.022)	0.106* (0.046)
Community college	0.025 (0.056)	0.081** (0.027)	0.534** (0.025)	0.143** (0.052)
College	0.166** (0.055)	0.078** (0.024)	0.475** (0.020)	0.099 (0.055)
Some graduate school	0.205** (0.071)	0.071* (0.031)	0.570** (0.028)	0.158** (0.06)
Graduate degree	0.057 (0.063)	0.261** (0.059)	0.398** (0.021)	0.323** (0.056)
No training	−0.056** (0.019)	−0.069** (0.019)	0.066** (0.014)	−0.011 (0.032)
White	0.089** (0.028)	0.056 (0.038)	0.109** (0.019)	−0.131** (0.041)
Hispanic	0.027 (0.032)	0.072 (0.043)	0.060* (0.029)	−0.132** (0.046)
Black	0.112** (0.034)	0.026 (0.037)	0.082** (0.022)	−0.178** (0.047)
Asian	−0.027 (0.040)	0.082 (0.052)	0.124** (0.023)	−0.029 (0.071)
Organization	0.054* (0.022)	0.056** (0.018)	0.027 (0.014)	0.049 (0.028)
Important job	0.003 (0.014)	−0.012 (0.016)	0.093** (0.014)	−0.009 (0.024)
Assistant teacher	−0.137** (0.015)	−0.166** (0.012)	−0.062** (0.011)	−0.158** (0.023)
Infant–toddler room	−0.065** (0.014)	−0.017 (0.015)	−0.035** (0.009)	0.021 (0.035)
On-site	0.254** (0.062)	0.223** (0.037)	0.303** (0.021)	0.277** (0.06)
National chain	−0.050** (0.015)	—	0.032* (0.013)	—
Publicly supported	−0.155* (0.064)	−0.085** (0.03)	−0.076 (0.053)	0.023 (0.054)
Publicly owned	—	0.199** (0.030)	—	−0.161** (0.056)
Publicly regulated	—	0.098* (0.045)	—	0.034 (0.038)
Religious	—	−0.057** (0.018)	—	−0.079** (0.029)
Union	—	0.245** (0.033)	—	0.211** (0.049)
Unemployment	−0.002 (0.005)	0.012** (0.004)	−0.002 (0.003)	0.007 (0.005)
FTE children	0.001** (0.0001)	0.00001 (0.0002)	0.0001 (0.0001)	−0.001** (0.0003)
Percent subsidized	−0.100 (0.055)	−0.066* (0.032)	−0.087 (0.053)	−0.073 (0.055)
Center age	−0.002* (0.001)	−0.002** (0.0004)	0.007** (0.001)	0.003** (0.001)
Part-week	−0.040 (0.020)	−0.071** (0.019)	−0.045* (0.019)	0.064 (0.042)
Extended care	0.062** (0.018)	0.030 (0.018)	0.058** (0.015)	−0.056* (0.027)
Head Start	—	−0.149** (0.048)	—	−0.112 (0.135)
Before and after school	−0.064** (0.020)	−0.005 (0.021)	0.002 (0.015)	−0.010 (0.029)
Summer camp	−0.001 (0.019)	0.039* (0.018)	−0.066** (0.014)	0.124** (0.034)
Evening care	−0.269** (0.042)	0.113** (0.034)	−0.019 (0.013)	0.118 (0.092)
Sick care	0.220** (0.075)	0.002 (0.040)	0.003 (0.027)	−0.004 (0.093)
24-hour care	0.170 (0.137)	—	0.240** (0.074)	—
Own kids at center	0.004 (0.015)	0.002 (0.021)	−0.095** (0.014)	0.064 (0.038)
California	0.412** (0.024)	0.242** (0.025)	0.316** (0.018)	0.353** (0.054)
Colorado	0.171** (0.023)	0.054** (0.021)	0.090** (0.023)	0.105* (0.047)
Connecticut	0.384** (0.027)	0.303** (0.031)	0.249** (0.024)	0.370** (0.046)

$N = 1,025$
Log likelihood =
  −723.66

Estimated standard errors of the coefficients are in parentheses.
*Statistical significance between 5% and 1%.
**Statistical significance at the 1% level or better.

regimes. That is, we calculated selection-corrected and heterogeneity-adjusted wages and compensation that each worker would earn if assigned to a particular regime. The prediction errors of wages and compensation are also calculated for each worker under each regime. This allows for the calculation of the standard errors of the means of predicted wage and compensation. Calculation of the 95% confidence intervals around the means indicate that we can reject the hypotheses of the equality of wages and compensation—with the exception of full-time and part-time wages in the for-profit sector, whose confidence intervals overlap.[11]

Rows (3) of Table 7 present the direction and the magnitudes of these markups. After controlling for selection effects and unobserved worker heterogeneity, full-time wages are 12.5% lower than part-time wages in nonprofit centers, and they are equal to part-time wages in for-profit centers. This is not a common result in the literature, but it is not without precedent. Blank (1990) also found that selection-adjusted wages of part-time workers were higher than those of comparable full-time workers. She was unable

[11] $\text{Var}(\Sigma \tau_i / n) = (1/n^2) \Sigma \text{Var}(\tau_i)$, where τ_i stands for the predicted wage or compensation, $\text{Var}(\tau_i) = \sigma^2 + X(X'X)^{-1} X'\sigma^2$, and σ^2 is the variance of the errors. The estimated standard errors for wage equations in *pr-ft*, *np-ft*, *pr-pt*, and *np-pt* are 0.0045, 0.0054, 0.0030, and 0.0009, respectively. They are 0.0024, 0.0019, 0.0013, and 0.0017 for compensation equations.

TABLE 7.—ADJUSTED FULL-TIME AND NONPROFIT WAGE AND COMPENSATION DIFFERENTIALS

	Full-time Differential			
	In Nonprofit Centers		In For-profit Centers	
(1) Observed difference	$W^{ft} = W^{pt}$	$C^{ft} > C^{pt}$ (8.9%)	$W^{ft} > W^{pt}$ (5.2%)	$C^{ft} > C^{pt}$ (9.8%)
(2) Human capital and firm controls (OLS)	$W^{ft} = W^{pt}$	$C^{ft} > C^{pt}$ (9.2%)	$W^{ft} > W^{pt}$ (3.1%)	$C^{ft} > C^{pt}$ (7.0%)
(3) Discrete factor model with heterogeneity	$W^{ft} < W^{pt}$ (−12.5%)	$C^{ft} < C^{pt}$ (−24.9%)	$W^{ft} = W^{pt}$	$C^{ft} < C^{pt}$ (−23.1%)
(4) Discrete factor model without heterogeneity	$W^{ft} < W^{pt}$ (−16.1%)	$C^{ft} < C^{pt}$ (−25.3%)	$W^{ft} < W^{pt}$ (−5.8%)	$C^{ft} < C^{pt}$ (−21.1%)
(5) Double selection	$W^{ft} < W^{pt}$ (−20.0%)	$C^{ft} < C^{pt}$ (−24.4%)	$W^{ft} < W^{pt}$ (−6.6%)	$C^{ft} < C^{pt}$ (−18.9%)

	Nonprofit Differential			
	For Full-time Workers		For Part-time Workers	
(1) Observed difference	$W^{np} > W^{pr}$ (7.8%)	$C^{np} > C^{pr}$ (11.6%)	$W^{np} > W^{pr}$ (11.6%)	$C^{np} > C^{pr}$ (13.6%)
(2) Human capital and firm controls (OLS)	$W^{np} = W^{pr}$	$C^{np} > C^{pr}$ (7.4%)	$W^{np} > W^{pr}$ (7.1%)	$C^{np} > C^{pr}$ (11.6%)
(3) Discrete factor model with heterogeneity	$W^{np} > W^{pr}$ (5.8%)	$C^{np} > C^{pr}$ (7.8%)	$W^{np} > W^{pr}$ (20.2%)	$C^{np} > C^{pr}$ (10.3%)
(4) Discrete factor model without heterogeneity	$W^{np} = W^{pr}$	$C^{np} > C^{pr}$ (2.4%)	$W^{np} > W^{pr}$ (11.4%)	$C^{np} > C^{pr}$ (8.1%)
(5) Double selection	$W^{np} > W^{pr}$ (15.5%)	$C^{np} > C^{pr}$ (14.6%)	$W^{np} > W^{pr}$ (34.8%)	$C^{np} > C^{pr}$ (23.0%)

W stands for wage, C for compensation, ft for full-time, pt for part-time, np for nonprofit, and pr for for-profit. Percentage differences are reported in parentheses and calculated as $\exp\{X^{ft} − X^{pt}\} − 1$ or $\exp(X^{np} − X^{fp}) − 1$, where X is the average wage or compensation for the relevant regime. Thus, the negative values for full-time differentials indicate that full-time wages and compensation are smaller than the corresponding part-time values.

to do her analysis using compensation because of lack of data. In nonprofit centers, the compensation markup is also in favor of part-timers, and larger than the wage markup in magnitude (24.9%). This indicates that not only are part-time workers' wages higher than full-time workers' wages in nonprofit centers, but part-time workers receive more benefits per hour worked than full-time workers.

Although part-time workers' wages are equivalent to full-time workers' wages in for-profit centers, the average compensation of part-time workers is 23% higher than that of full-time workers, indicating that, similarly to the pattern in nonprofit centers, for-profit centers provide more benefits to part-time workers. These results are in sharp contrast to the raw data displayed in Table 1, which are also displayed in rows (1) of Table 7.

Row (3) of the bottom panel of Table 7 demonstrates that full-time workers' wages are 5.8% higher in the nonprofit sector than what they would have earned in the for-profit sector. The nonprofit full-time markup in compensation is 7.8%. Part-time workers' wages and compensation are higher in the nonprofit sector than in the for-profit sector. However, the markup in compensation is smaller, suggesting that for-profit centers provide better benefits than nonprofit centers to part-time workers.

We also calculated selectivity-corrected markups, assuming no individual heterogeneity, which are reported in rows (4). The markups are somewhat larger in absolute value for part-time workers' wages, and smaller in the case of nonprofit differentials.

These results indicate that part-time jobs are good jobs in child care. The observed wage differences between full-time and part-time workers is not explained by differences in workers' human capital or by differences in firms' characteristics. The fact that the raw wage differences are in favor of full-time workers implies that, as suggested by Blank (1990), part-time workers may have earned lower wages even when they worked full time, due to additional unobserved worker attributes. For example, it is plausible that less productive or less ambitious workers, or workers who are not prepared to spend much job effort, are self-selected into part-time jobs. The results also support the property-rights hypothesis in that we uncover significant nonprofit wage and compensation differentials.

VI. Sensitivity Analysis and Representativeness of the Data

Our analysis included detailed worker and firm attributes. Examples are *Organization* and *Important job* for workers, and *Percent subsidized, Center age, Part-week, Extended care, Head Start, Before and after school, Summer camp, Evening care, Sick care,* and *24-hour care* for firms. To investigate the importance of controlling for these worker and firm characteristics, we omitted these variables from the system and reestimated the models. Omission of these variables implies 44 restrictions on the unrestricted models. The calculated likelihood ratio was 614.46 for the wage model and 652.6 for compensation, strongly rejecting the hypothesis that these worker and firm attributes are unimportant. Furthermore, with the omission of these variables both wage and compensation models provided different results regard-

TABLE 8.—1990 CENSUS: PUMS SAMPLE

Industry	Nonprofit Wage Premium	Full-time Wage Premium	Number of Observations	Proportion of Nonprofit Workers
Elementary and secondary schools	0.104 (0.005)	0.286 (0.006)	84,635	0.63
Colleges and universities	0.211 (0.006)	0.402 (0.006)	62,880	0.58
Educational services	0.001 (0.021)	0.252 (0.024)	5,339	0.48
Hospitals	0.187 (0.003)	0.005 (0.004)	202,636	0.44
Savings institutions, including credit unions	0.060 (0.012)	0.274 (0.014)	13,295	0.21
Research, development, and testing services	0.022 (0.012)	0.463 (0.017)	20,764	0.21
Nursing and personal care	0.115 (0.006)	−0.025 (0.006)	70,786	0.19
Bus service and urban transit	0.154 (0.020)	0.120 (0.014)	64,908	0.09

The dependent variable is the logarithm of wages, which is calculated as the ratio of wage or salary income to the product of usual hours worked per week and weeks worked. The entries are the coefficients of the nonprofit and full-time dummies. Robust standard errors are in parentheses. The regressions also include state dummies.

ing the markups from the ones reported in Table 7. More specifically, the nonprofit wage markup for full-time workers became −5.1% (as opposed to the +5.8% reported in Table 7). Similarly, the nonprofit compensation differential for full-time workers, reported as 7.8% in Table 7, is estimated as −2.1% in the restricted model.

In addition to the omitted variables mentioned above, we further reduced the models by omitting the following firm characteristics: *On-site, National chain, Publicly supported, Publicly owned, Publicly regulated,* and *Religious.* In other words, we made our models similar to those in other papers in the literature which included information on nonprofit status of the firm, but did not have additional information about the details of the ownership. These additional omitted variables generate 16 further restrictions. We found that these additional restrictions hurt the models even further. The calculated likelihood ratio was 235.4 for the wage system (the 1% critical value is 32 for 16 degrees of freedom), and 48.4 for the compensation system. The nonprofit wage differential for full-time workers was −4.7%, and the full-time markup in the for-profit sector was 6.2%. Once again, the results are different from the ones obtained from the original models. This exercise underscores the importance of detailed worker and firm characteristics, and highlights the incorrect inferences that can be made in their absence.

To investigate the sensitivity of the results to variations in empirical strategy, we performed two exercises. First, we estimated the models with different number of support points. The results reported in Tables 4 and 6 are based on 5 points of support of the unobserved common factors (v) in equation (13). We estimated both wage and compensation equations with five and four, with four and five, with four and four, and with six and six points of support. The estimated coefficients were unaffected. Furthermore, the calculated wage and compensation markups were very similar to those reported in Table 7 (based on five points of support).[12]

Second, we investigated the sensitivity of the results to the method of modeling selection. As an alternative to the discrete factor method, we used a double-selection proce-

dure (see for example Main and Reilly, 1992; Krishnan, 1990). In this procedure, the two selection equations are estimated using bivariate probits, which provide estimates for selection into full-time and for-profit. These selection terms for each individual are entered into the four wage (or compensation) equations as additional regressors. Selection-adjusted predicted wage and compensations are calculated for each individual, and their averages are reported in Table 7 in rows (5). The results obtained from this two-step procedure are consistent with those obtained from full-information maximum likelihood, although the markups obtained from the double-selection method are somewhat larger in absolute value.

Can these results be attributable to some anomaly of the child care industry? To entertain this question, we used the 5% Public-Use Micro-Sample (PUMS) of the 1990 Census. We extracted all workers with positive wages and salary income who worked in hospitals, nursing and personal care facilities, elementary and secondary schools, colleges and universities, educational services, bus service and urban transit, and research, development, and testing services. These industries have bigger nonprofit presence than the others. To investigate the raw nonprofit and full-time wage differentials in these industries we ran regressions of the logarithm of wages on nonprofit and full-time dummies as well as state dummies. The results are reported in Table 8. The nonprofit wage premium is positive in all cases, although not significant in educational services. The raw full-time wage markup is zero in hospitals and negative in nursing and personal care, but positive everywhere else. Thus, the descriptive information from the 1990 census shows that the raw nonprofit and full-time markups of the child care industry are similar to those observed in many other industries with a significant nonprofit presence, indicating that our results are not likely to be driven by some idiosyncratic structure of the child care industry.

VII.   Conclusion

This paper uses a rich employer–employee matched data set to investigate the existence and the extent of nonprofit and part-time wage and compensation differentials. Utilizing data exclusively on child care workers, we avoid potential contamination of results due to interindustry

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[12] Increasing the numbers of points of support beyond six and six imposes a computational burden and leads to instability of the system.

unobservables. The raw data reveal wage and compensation premia in favor of nonprofit workers. They also reveal the existence of wage and compensation premia in favor of full-time workers in for-profit centers, and compensation premia in favor of full-time workers in nonprofit centers. An analysis of the 1990 Census data shows that these raw differentials are similar to those found in many industries with significant nonprofit sector presence.

The empirical strategy adjusts for workers' self-selection into the for-profit or the nonprofit sector, as well as into full-time or part-time work. We also control for unobserved worker heterogeneity using a discrete factor model. The wage and compensation equations are estimated jointly with the selection equations using full-information maximum likelihood.

We find differences between the regimes (full-time for-profit, full-time nonprofit, part-time for-profit, part-time nonprofit) in the way in which human capital of the workers are rewarded. For example, in both for-profit and nonprofit sectors, the return to education is higher for part-time workers. For full-time workers, the return to tenure is higher in for-profit centers. In nonprofit centers, the return to experience in child care for full-time workers is higher than that of part-time workers, and in for-profit centers the return to experience outside child care is higher for full-time workers.

There is substantial variation in wages as a function of employee characteristics, and there is variation in wages within sectors. For example, unionization increases wages and compensation 20%–25%, and centers that are part of a national chain provide lower wages and compensation. Other examples are the job title of the worker and the age group of the children he/she is serving. Similarly, center characteristics—such as the age and the size of the center; whether the center is publicly supported, publicly owned, or regulated; and whether it is a religious center—affect wages and compensation. Along the same lines, various programs offered by the centers (e.g. sick care, evening care) have significant effects.

After estimating the models, we calculate the wage and compensation that each worker in our sample would have received under each regime after controlling for nonrandom selection and unobserved worker heterogeneity. We find that the potential wages of part-time workers are equivalent to those of full-time workers in the for-profit sector, and they are higher in the nonprofit sector. Part-time workers' compensation is higher than that of full-timers in both sectors, and the compensation markup is larger than the wage markup. This suggests that part-time workers receive more benefits in both sectors. We find evidence of positive non-profit wage differentials for both full-time and part-time workers. Compensation is also higher in the nonprofit sector for both types of workers.

The magnitudes of these differentials are substantial. For example, the nonprofit wage differential is almost 6% for full-time workers and 20% for part-time workers. The nonprofit compensation differential is 8% for full-time workers and 10% for part-time workers. Similarly, part-time workers earn wages that are 13% more than those of full-time workers in nonprofit centers. Part-time compensation is 25% more than full-time compensation in nonprofit centers, and 23% more in for-profit centers.

The same basic results are obtained when selection is modeled using a two-step procedure. These results underscore important points. First, it seems critical to control for the effect of worker self-selection into sector and into full-time work. Second, it is important to have detailed controls for both employer and employee characteristics, as they have significant effects.

The results indicate that part-time jobs are good jobs in center-based child care, and they show the existence of nonprofit wage and compensation premia, which supports the property-rights hypothesis.

REFERENCES

Arabmazar, Abbas, and Peter Schmidt, "An Investigation of the Robustness of the Tobit Estimator to Non-normality," *Econometrica* 50 (1982), 1055–1063.

Blanchflower, David G., and Andrew J. Oswald, *The Wage Curve* (Cambridge, MA: The MIT Press, 1994).

Blank, Rebecca M., "Are Part-Time Jobs Bad Jobs?" pp. 123–155 in Gary Burtless (Ed.), *A Future of Lousy Jobs? The Changing Structure of U.S. Wages* (Washington D.C.: Brookings Institution, 1990).

Blau, David M., and Alison P. Hagy, "The Demand for Quality in Child Care," *Journal of Political Economy* 106:1 (1998), 104–146.

Borjas, George J., H. E. Frech III, and Paul B. Ginsburg, "Property Rights and Wages: The Case of Nursing Homes," *Journal of Human Resources* 18:2 (1983), 231–246.

Brown, C., and James Medoff, "The Employer Size Wage Effect," *Journal of Political Economy* 101 (1989), 483–496.

Bureau of Labor Statistics, "Table 8: Employed and Unemployed Full-and Part-Time Workers by Age, Sex and Race," in *Employment and Earnings* (Washington, DC, 2000).

Evans, D. S., and L. S. Leighton, "Why Do Smaller Firms Pay Less?" *Journal of Human Resources* 24 (1989), 299–318.

Goddeeris, John H., "Compensating Differentials and Self-Selection: An Application to Lawyers," *Journal of Political Economy* 96:2 (1988), 411–428.

Goldberger, Arthur, "Abnormal Selection Bias," in S. Karlin and T. Amemiya (Eds.), *Studies in Econometrics, Time Series and Multivariate Statistics* (New York: Academic Press, 1983).

Hall, Robert E., "Why Is the Unemployment Rate So High at Full Employment?" *Brookings Papers on Economic Activity* 3 (1970), 8–41.

Hansmann, Henry, "The Role of Nonprofit Enterprise," *Yale Law Journal* 89:5 (1980), 835–901.

Harris, J., and M. P. Todero, "Migration, Unemployment and Development: A Two-Sector Analysis," *American Economic Review* 60 (1970), 126–142.

Heckman, James, "Sample Selection Bias as a Specification Error," *Econometrica* 47 (1979), 153–162.

Heckman, James J., and Burton Singer, "A Method for Minimizing the Impact of Distributed Assumptions in Econometric Models for Duration Data," *Econometrica* 52 (March 1984), 271–320.

Holtmann, A. G., and Idson, Todd L., "Wage Determination of Registered Nurses in Proprietary and Nonprofit Nursing Homes," *The Journal of Human Resources,* 28:1 (1993), 55–79.

Hotchkiss, Julie L., "The Definition of Part-Time Employment: A Switching Regression Model with Unknown Sample Selection," *International Economic Review* 32:4 (1991), 899–917.

Hu, Wei Yin, "Child Support, Welfare Dependency and Women's Labor Supply," *Journal of Human Resources* 34:1 (1999), 71–103.

Krishnan, Pramila, "The Economics of Moonlighting: A Double Self-Selection Model," *The Review of Economics and Statistics,* 72:2 (1990), 361–367.

Lakdawalla, Darius, and Tomas Philipson, "Nonprofit Production and Competition," NBER working paper no. W6377 (1998).

Lee, Lung-Fei, "Unionism and Wage Rates: A Simultaneous Equations Model with Qualitative and Limited Dependent Variables," *International Economic Review* 19:2 (1978), 415–433.

Leete, Laura, "Whither the Nonprofit Wage Differential? Estimates from the 1990 Census," *Journal of Labor Economics* 19:1 (2001), 136–170.

Main, Brian G. M., and Barry Reilly, "Women and the Union Wage Gap," *The Economic Journal* 102:410 (1992), 49–66.

Mocan, H. Naci, "Cost Functions, Quality and Efficiency in Day Care Centers," *Journal of Human Resources* 32:4 (1997), 861–891.

Mocan, H. Naci, and Erdal Tekin, "Nonprofit Sector and Part-time Work: An Analysis of Employer–Employee Matched Data of Child Care Workers," NBER working paper no. 7977 (2000).

Mocan, H. Naci, Erdal Tekin, and Jeffrey S. Zax, "The Demand for Medical Care in Urban China," NBER working paper no. 7673 (2000).

Mocan, H. Naci, and Deborah Viola, "The Determinants of Child Care Worker's Wages and Compensation: Sectoral Difference, Human Capital, Race, Insiders and Outsiders," NBER working paper no. 6328 (1997).

Montgomery, Mark, and James Cosgrove, "Are Part Time Women Paid Less? A Model with Firm Specific Effects," *Economic Inquiry,* 38 (1995), 119–133.

Mroz, Thomas A., "Discrete Factor Approximation in Simultaneous Equation Models: Estimating the Impact of a Dummy Endogenous Variable on a Continuous Outcome," *Journal of Econometrics* 92 (1999), 233–274.

Preston, Anne E., "The Effects of Property Rights on Labor Costs on Nonprofit Firms: An Application to the Day Care Industry," *The Journal of Industrial Economics* 36 (1988), 337–350.

———, "The Nonprofit Worker in a For-Profit World," *Journal of Labor Economics,* 7:4 (1989), 438–463.

Rose-Ackerman, Susan, "Altruism, Nonprofits, and Economic Theory," *Journal of Economic Literature* 34 (1996), 701–728.

Ruhm, Christopher, and Carey Borkoski, "Compensation in the Nonprofit Sector," NBER working paper no. W7562 (2000).

Salamon, Lester M., Helmut K. Anheir, Regina List, Stefan Toepler, S. Wojciech Sokolowski, and Associates, *Global Civil Society: Dimensions of the Nonprofit Sector* (Baltimore: Johns Hopkins Center for Civil Society Studies. 1999).

Shackett, Joyce R., and John M. Trapani, "Earnings Differentials and Market Structure," *The Journal of Human Resources* 22:4 (1987), 518–531.

Simpson, Wayne, "Analysis of Part-Time Pay in Canada," *Canadian Journal of Economics* 19:4 (1986), 798–807.

Troske, Kenneth R., "Evidence on the Employer Size Wage Premium from Worker–Establishment Matched Data," *Review of Economics and Statistics* 81:1 (1999), 15–26.

Urban Institute, Center on Nonprofits and Philanthropy, *Numbers of Nonprofit Entities in the United States, 1989–1997* (Washington, DC, 2000).

U.S. Census Bureau, *Statistical Abstract of the United States: 2000* (Washington, DC, 2000).

Weisbrod, Burton A., "Non-profit and Proprietary Sector Behavior: Wage Differentials among Lawyers," *Journal of Labor Economics* 1:3 (1983), 246–263.

APPENDIX

Likelihood Function

Conditional on the heterogeneity, the likelihood-function contribution for child care worker i is

$$
\begin{aligned}
L_i(\Theta|v_j) = & \left[\Pr\{Profit_i = 1|v_j\} \Pr\{Full\text{-}time_i = 1|v_j\} f(W_i^{ft\text{-}p}|v_j)\right]^{FT_i PR_i} \\
& \times \left[\Pr\{Profit_i = 0|v_j\} \Pr\{Full\text{-}time_i = 1|v_j\} \right. \\
& \left. f(W_i^{ft\text{-}np}|v_j)\right]^{FT_i(1-Pr_i)} \\
& \times \left[\Pr\{Profit_i = 1|v_j\} \Pr\{Full\text{-}time_i = 0|v_j\} \right. \\
& \left. f(W_i^{pt\text{-}p}|v_j)\right]^{(1-FT_i)(PR_i)} \\
& \times \left[\Pr\{Profit_i = 0|v_j\} \Pr\{Full\text{-}time_i = 0|v_j\} \right. \\
& \left. f(W_i^{pt\text{-}np}|v_j)\right]^{(1-FT_i)(1-PR_i)},
\end{aligned}
$$

where Θ is the vector containing the parameters to be estimated, $f(\cdot)$ is the density function of the distribution in the wage equations, conditional on the unobserved heterogeneity, FT is a dummy variable for full-time work, and PR is a dummy variable for for-profit sector.

Applying the discrete factor method, and using the case with two factors ($L = 2$), each with N points of support in its distribution, we have

$$
L_i(\Theta, \Gamma) = \sum_{l=l}^{N} \sum_{m=1}^{N} p_{1l} p_{2m} L_i(\Theta|v_{1li}, v_{2mi}),
$$

where p_{1l} is the probability that the first factor takes on the value v_{1l}, p_{2m} is the probability that the second factor takes on the value v_{2m}, and Γ is the vector containing the parameters of the discrete distributions (ρ's, p's, and v's).