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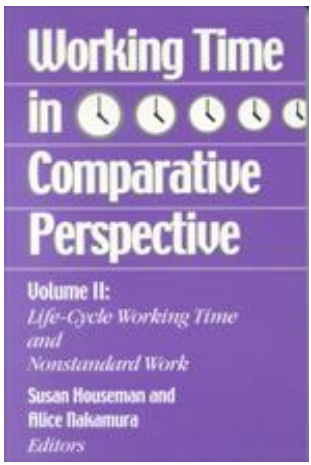

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Work Site and Work Hours
The Labor Force Flexibility of Home-Based Female Workers

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The postwar period has seen a steady, almost inexorable rise in the labor force participation rates of women, from 32.7 percent in 1948 to 58.9 percent in 1995 (U.S. President 1996, Table B-35). Nonetheless, women are still largely responsible for the care of family and home. This "second shift" adds about 20 hours to the total weekly work hours of women who are in the labor force, in contrast to just seven hours for comparable men (Hersch and Stratton 1994). The multiple responsibilities of employed women translate into a need for greater flexibility in all aspects of the employment arrangement. Indeed, in a recent survey of employees concerning their child and elder care responsibilities, work flexibility was a factor that significantly reduced the stress associated with performing their dual roles of earner and caretaker (Neal et al. 1993).

One way women achieve flexibility is by choosing to work shorter than usual weekly hours (part-time) or fewer than usual weeks per year (part-year). There are a number of papers that focus on women's part-time work and on variations in weeks worked (for example, Blank 1988, 1990; Sundt 1989; and Averett and Hotchkiss 1996, 1997). However, there is another important dimension of flexibility in the employment arrangement that has not been extensively explored—work location. Women have the option of choosing to work at home rather than at another location. In this chapter we analyze the determi-

nants of a woman's work site and explore the relationship between her choice of work site and work hours. In particular, we explore how labor force choices, work hours, and workweeks differ between women whose primary place of work is their own home—home-based workers—and women who work at an office or other place of business outside of the home—on-site workers—using data from the 1990 Public Use Microdata Samples (PUMS) of the Census of Population.

Although there are not at present a large number of people engaged primarily in home-based work, this type of work organization has been on the rise and is likely to continue to increase. Contributing to this trend are the steady improvements in both communication and computing technology, the continued rise in women's labor force participation and in two-career families, and the increased popularity of small business entrepreneurship. Data from the U.S. Censuses of Population show that the declining trend in the number of home-based workers from 1960 to 1980 was reversed in 1990, from 4.7 million in 1960, to 2.2 million in 1980, to 3.4 million in 1990. This represents an increase from 2.4 percent of the labor force in 1980 to 3.0 percent in 1990.[1]

An important reason why this type of work organization is attractive to women who desire greater flexibility is that the fixed costs of working, such as the time and out-of-pocket costs of commuting to work, are lower for home-based work than for on-site work. In addition, to the extent that female home-based workers provide their own child care, the marginal costs of home-based work may also be lower. These factors imply that both the reservation wage and the reservation hours for home-based and on-site work will differ, and also that the responsiveness of women's labor supply to wage changes and to variations in other socioeconomic factors will differ between home-based and on-site workers.[2]

In fact, our estimates of the effects of such fixed costs on the probability of labor force participation do differ dramatically between home-based and on-site workers. In particular, factors that are associated with higher fixed costs of working on site tend to have a smaller deterrent effect on home-based labor force participation than on on-site participation, confirming the importance of these costs. When we examine equations predicting weekly hours and annual weeks worked for each work site, we also find significant differences. The net effect

of these differences is that home-based workers are predicted to work on average fewer annual hours (both average weeks worked and average weekly hours are reduced) and that the dispersion of their predicted work hours is greater as compared to what they would be for on-site workers. This greater dispersion of predicted work hours for home-based workers indicates that they are better able to adapt their work schedules in response to variations in family circumstances. Overall, our results affirm the proposition that home-based work is an attractive and viable alternative for women who need a flexible employment arrangement to overcome their high fixed-costs of labor force entry.

HOW DO HOME-BASED FEMALE WORKERS DIFFER FROM OTHERS?

Table 1 presents the demographic and socioeconomic characteristics of home-based and on-site female workers and of women out of the labor force as computed from the 5 percent Public Use Microdata Sample (PUMS) of housing units from the 1990 Census of Population of the United States.[3] Included in our analysis are all women aged 25 to 55 years who were either employed or out of the labor force, who did not live in group quarters, who were not in the Armed Forces, and who were not in school.[4] Identification of home-based workers is derived from answers to the journey to work question (no. 23A), which asks, "How did this person usually get to work last week?"[5] Persons who responded that they "worked at home" are regarded as home-based workers. This means that our sample of home-based workers includes only those who worked primarily at home; women who work mainly on-site but do some work at home (like teachers, for example) are not classified in this study as home-based workers. We focus on workers in the prime working years, 25 to 55, so as not to confuse the work site decision with decisions regarding schooling and retirement. The majority of those in the 25- to 55-year age-group will have completed their schooling and will not yet have entered retirement. To obtain approximately equal sample sizes for all three groups, we include in our analysis all observations of home-based female workers from the 5 percent PUMS, while for women who are on-site workers or

Table 1 Socioeconomic Characteristics of Women Aged 25–55, by Work Status and Work Site[a,b]

Variable	Home-based workers	On-site workers	Out of labor force
Age distribution			
25–34 yr.	34.5	38.2	38.3
35–44 yr.	37.4	36.1	31.2
45–55 yr.	28.1	25.7	30.4
Mean age	39.01 (8.19)	38.25 (8.37)	38.90 (8.95)
Married, spouse present	80.4	63.5	75.9
With children under 6 yr.	29.9	15.1	29.7
With children 6–17 yr.	43.10	30.0	38.6
Not married or married without spouse present	19.60	36.5	24.1
With children under 6 yr.	1.60	2.9	5.2
With children 6–17 yr.	4.10	8.9	8.6
White, non-Hispanic	88.40	78.4	73.7
Black, non-Hispanic	3.50	11.7	11.5
Other race	2.90	3.6	4.4
Hispanic origin	5.30	6.3	10.4
Disabled	5.00	2.8	16.5
Urban residence	68.00	76.7	72.8
Rural residence	32.00	23.3	27.2
Farm	6.00	1.1	1.6
Nonfarm	26.00	22.2	25.6
Immigrant	8.00	9.3	14.1
Highest level of education completed			
Eighth grade or less	3.30	2.8	10.0
Some high school	8.30	8.9	19.6
High school degree	32.90	33.7	36.2
Some college	31.50	30.5	22.0
Bachelor's degree	17.70	16.1	9.4

Variable	Home-based workers	On-site workers	Out of labor force
More than Bachelor's degree	4.80	6.1	2.2
Mean years of schooling completed	13.38 (2.46)	13.40 (2.45)	12.01 (3.03)
Presence of person(s) over 65 in household	5.00	5.2	6.2
Mean family income ($)	50,787 (45,623)	46,222 (33,234)	38,804 (39,626)
Self-employed (%)	62.9	3.3	—
Mean annual earnings, 1989 ($)	10,273 (14,234)	18,469 (13,970)	—
Weekly hours worked			
Fewer than 35 hr.	42.0	20.8	—
35–45 hr.	36.0	69.2	—
More than 45 hr.	22.1	10.1	—
Mean hours worked per week, 1989	35.12 (17.34)	37.93 (10.52)	—
Mean weeks worked, 1989	43.53 (13.23)	46.59 (10.62)	—
Mean hourly wage, 1989[c] ($)	7.91 (13.38)	10.57 (9.03)	—
Spouse is a home-based worker (%)	11.3	1.0	1.6
Spouse has mobility or personal care limitations (%)	1.6	2.0	3.5
Number in sample	48,181	60,983	25,763
	(100%)	(100%)	(100%)

[a] The information in this table is computed from the 5% PUMS sample of the 1990 Census of Population and Housing. Workers in group quarters or institutions are excluded, as are those who report themselves as home-based during the Census week, but did not work in 1989. In addition, workers whose earnings information for 1989 was not consistent with their reported class-of-worker status (self-employed v. employee) in 1990 are excluded. The data for home-based workers are from the full 5% sample; the data for on-site workers are based on 0.04 sub-sample of the 5% sample (yielding a 0.002 sample of the on-site worker population).

[b] Standard deviations are in parentheses.

[c] Computed from annual earnings, weeks, and hours worked for 1989.

who are out of the labor force, we take a 0.04 subsample of the 5 percent PUMS, yielding a 0.2 percent sample of the population of on-site female workers and women out of the labor force.

Home-based female workers differ from on-site workers in critical ways. The two most striking differences are with respect to self-employment and work intensity (hours and weeks worked). Home-based workers are much more likely to be self-employed than are their on-site counterparts: 62.9 percent of the former are self-employed, whereas the corresponding value for the latter is 3.3 percent. Home-based workers are also much more likely to choose unusual work schedules, both with respect to weekly hours worked and weeks worked per year. The mean weekly hours worked by home-based workers is about three hours less than for on-site workers, but the distribution of hours differs much more dramatically, as can be seen by comparing the standard deviations of work hours: 17.34 for home-based workers versus 10.52 for on-site workers. Put differently, about two-thirds of on-site workers work between 35 and 45 hours per week, while only about one-third of home-based workers follow this common full-time schedule. Indeed, our data indicate that over 50 percent of on-site workers worked a standard 40-hour week, while only about one-quarter of home-based workers did so. Thus, it is clear that there is a much greater degree of hours flexibility for women who work at home as compared to those who work on-site. Home-based workers also exhibit greater flexibility with regard to weeks worked per year. As was the case for weekly hours worked, mean weeks worked per year is lower and the variance is greater for home-based workers as compared to on-site workers. For example, both on-site and home-based women specify 52 weeks per year as their most frequent choice, but only 48 percent of home-based workers choose 52 weeks, as compared to 64 percent of on-site workers.

Home-based female workers differ from their on-site counterparts in other significant ways. Home-based workers are much more likely to have a spouse who is also a home-based worker and to live in rural and rural-farm areas. Further, home-based female workers are more likely than are on-site workers to be married with a spouse present, to have children under the age of 18 years, and to be disabled. The family income of home-based workers is higher than that of on-site workers (whether or not their own earnings are included), though the average

hourly earnings of home-based workers are lower. Finally, the representation of nonwhites and Hispanics among home-based workers is less than their representation in the labor force at large.[6]

MODELING THE LABOR FORCE PARTICIPATION DECISION

Theoretical Issues

The most important difference between home-based work and on-site work is that the fixed costs associated with working (time costs associated with commuting, out-of-pocket commuting expenditures, clothing costs, and, to some extent, the costs of child [or other dependent] care[7]) are greatly reduced for home-based workers.[8] The model developed by Cogan (1981), which focuses on the role of fixed costs in labor force decisions, provides an appropriate starting point. Cogan shows that the existence of time fixed costs and money fixed costs of working raise the reservation wage relative to what it would be in the absence of these costs. The lower fixed costs of home-based work, therefore, imply that workers will have a lower reservation wage for home-based work than for on-site work.

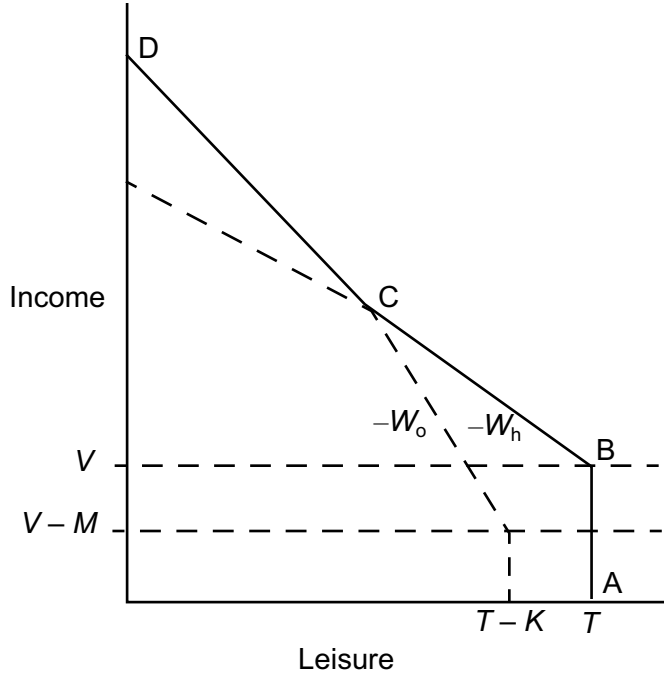
Applying this model directly to the case of home-based work, however, has one important drawback. The model implies that at any given wage rate, a worker's utility will be higher in home-based work than in on-site work, suggesting that most workers would choose home-based work over on-site work. However, we know from the census data that most workers are not home-based. The likely explanation for this apparent contradiction is that the demand for home-based workers is low relative to the demand for on-site workers and relative to the supply of people who would like to do home-based work, so that rather than the wage offer for such work being the same as for on-site work, it is substantially below.

There are several reasons why employers will make lower wage offers for home-based jobs. First, home-based jobs may simply not be available in certain types of industries—those that require large amounts of fixed capital or require workers to be on-site, for example.

Heavy manufacturing, retail trade, and elementary and secondary schooling are examples. Second, a worker's marginal product may be lower in home-based work because of synergies between workers. Third, a worker's marginal product may be lower at home because of a lack of monitoring or supervision. Finally, employers may simply hold a belief (or suspicion) that a worker's marginal product is lower when she is at home than when she is on site, possibly because of the difficulty in monitoring home-based employees.

Thus, a more appropriate model assumes a lower wage for home-based work than for on-site work, as is illustrated in Figure 1. In this diagram, V represents unearned income, T represents the total time available, M represents the monetary fixed cost of working on-site (e.g., commuting costs), and K represents the time costs of working on-site (e.g., commuting time). The (monetary and time) fixed costs of

Figure 1 Diagrammatic Model of Work Site Choice



home-based work are assumed to be zero. W_h and W_o represent the offering wages for home-based and on-site work, respectively, and the budget constraint is ABCD. Depending on the woman's indifference map, she may locate at point B and be out of the labor force, locate on the segment BC and be a home-based worker, or locate on the segment CD and be an on-site worker. As in the case with Cogan's model, the reservation wage and reservation hours will be lower for home-based work than for on-site work. However, this diagram makes clear the role of fixed costs in the choice between home-based and on-site work: the larger the fixed costs, the further to the left will be the on-site segment of the budget constraint (CD), and the less likely will a person with a given indifference map find it optimal to be on the on-site segment. Similarly, the lower the on-site wage relative to the home-based wage, the less likely is one to choose on-site work over home-based work.

To summarize, the implications of this model are as follows. Fixed costs of working are directly related to a worker's reservation wage and reservation hours. Consequently, a worker's reservation wage and reservation hours for work arrangements that require lower fixed costs, like home-based work, will be lower than for arrangements that require higher fixed costs, like on-site work. Thus, factors that increase a woman's fixed costs of working will be positively related to the likelihood that she will be in the labor force as a home-based worker rather than as an on-site worker. We also expect to observe that for women with a given set of socioeconomic characteristics, her choice of hours as a home-based worker will be lower than as an on-site worker. Further, to the extent that home-based female workers—more than half of whom are self-employed—are less likely than on-site workers to be affected by institutional constraints on work hours or workweeks, we expect them to exhibit greater variability in work hours and workweeks.

The Econometric Model

Our econometric model has four components. The first is a labor force participation equation. The second is a pair of wage equations that predict the "offering wage" a woman can expect for home-based work and for on-site work. The third component is a pair of equations

to predict her hours of work, conditional on her choice of labor force state. The last component is a pair of equations predicting weeks worked per year, again conditional on her choice of labor force state. It is assumed that the choice of work site, obtained by maximizing the indirect utility function, is predicated on the woman's having identified the optimal number of work hours associated with each work site.

The empirical model employed here is similar to that used in Hutchens, Jakubson, and Schwartz (1989), Blank (1990), and Hill (1989). The three work states from which women are assumed to choose are

State number	Description
1	Out of the labor force
2	On-site worker
3	Home-based worker

Following Hutchens, Jakubson, and Schwartz, we assume that a woman's utility function can be written as

(1) $U = U(C, L, \boldsymbol{Z})$,

where C is consumption, L is leisure, and $\boldsymbol{Z}$ is a vector of individual characteristics that affect preferences. The woman will choose the state k which maximizes her utility subject to a budget constraint of the form

(2) $C_k + W_k L_k \leq N + W_k (L^* - L^*_k) - FC_k, \quad k = 1,2,3,$

where W_k is the wage rate in work state k, N is nonlabor income, L^* is the total time available to divide between work and leisure, L_k is leisure time in work state k, L^*_k is the reduction in available time associated with work state k (the fixed time costs associated with that work state), and FC_k represents the monetary fixed costs of working in state k. Like Hutchens, Jakubson, and Schwartz (1989), we have normalized the consumption price to 1. As discussed earlier, W_k, L^*_k, and FC_k are assumed to vary with work site.

Let $T_k \equiv (\ln W_k, L^*_k, FC_k)$. The woman's problem is to choose the state k which maximizes her indirect utility function, written as

(3) $V_k = V(T_k|\boldsymbol{Z})$.

This formulation assumes that an individual's characteristics, $\boldsymbol{Z}$, are constant across work states (for example, her nonlabor income,[9] presence of preschool children, race, etc). Again following Hutchens, Jakubson, and Schwartz (1989), we assume that the indirect utility function of individual *i* can be written as the sum of a deterministic part involving T_k, $\boldsymbol{Z}$, and a stochastic error term and that the deterministic portion of the function is linear

(4) $V_{ik} = \beta_{1k} L_{ik}^* + \beta_{2k} FC_{ik} + \beta_{3k} \ln W_{ik} + \boldsymbol{Z}_i\alpha_k + u_{ik}, \quad k = 1,2,3.$

To estimate Eq. 4 directly, we would need, for each work state, measures of the wage rate and of the monetary and time fixed costs of working. Since estimates of the latter two factors are not available, we substitute for them using the following predicting equations:

(5) $L_{ik}^* = \boldsymbol{U}_i\rho_k + e_{1ik}$

(6) $FC_{ik} = \boldsymbol{U}_i\theta_k + e_{2ik}$,

where $\boldsymbol{U}_i$ is a vector of predicting variables, some of which may be contained in $\boldsymbol{Z}_i$. Substituting these into Eq. 4 gives us

(7) $V_{ik} = \beta_{3k} \ln W_{ik} + \boldsymbol{X}_i\gamma_k + v_{ik}$,

where $\boldsymbol{X}_i$ is the union of $\boldsymbol{U}_i$ and $\boldsymbol{Z}_i$; $\gamma_k = \alpha_k + \beta_{1k}\rho_k + \beta_{2k}\theta_k$, α_k is redefined to include zero coefficients for the variables in $\boldsymbol{U}_i$ which are not contained in $\boldsymbol{Z}_i$, and

(7a) $v_{ik} = \beta_{1k} e_{1ik} + \beta_{2k} e_{2ik} + u_{ik}$.

Further, since we do not have measures of the wage in each labor force state (women are observed in one state only), we predict these wages from estimates of the following equation:

(8) $\ln W_{ik} = \boldsymbol{Y}_i\delta_k + e_{3ik}, \quad k = 2,3,$

where $\boldsymbol{Y}_i$ represents a vector of variables that may overlap $\boldsymbol{X}_i$. Since Eq. 8 can be estimated only for those women who are actually in the relevant labor force state, the error terms do not satisfy the requirement that their expected value be zero. We adjust for potential selectivity bias by including a selectivity correction factor λ_{ik} as an explanatory variable in Eq. 8.[10] The resulting version of Eq. 8 is estimated with ordinary least sources (OLS), with the standard errors corrected according to the procedure outlined in Lee (1983). Using estimates of Eq. 8, we predict a home-based and on-site wage for each woman in the sample. We then substitute these predicted wages into Eq. 7 to obtain the following "structural" labor force participation equation,

(9) $V_{ik} = \beta_{3k} \ln W_{ik}^{*} + \boldsymbol{X}_i \gamma_k + v_{ik},$

where $\ln W_{ik}^{*}$ is the predicted offering wage for woman i in labor force state k.[11]

We estimate the model in Eq. 9, as well as the reduced form version of that equation (used to estimate λ_{ik}), using multinomial logit (see Maddala 1983). Note that instruments for all labor force states are included in the equations for each state. In this way, our econometric model resembles what Hutchens, Jakubson, and Schwartz (1989) refer to as the "universal logit" model. That is, the entire set of variables used to predict the fixed costs and the offering wage for both work states enter the logit function for each work state, and a different set of coefficients is estimated (on the common set of variables) for each work state. The resulting estimates of these coefficients are not affected by the nature of the error structure across labor force states.[12] The fundamental assumption required for this approach is that all of the labor force options are in principle available to all participants.[13]

Finally, we estimate equations to predict hours worked per week and weeks worked per year, conditional on the choice of labor force state. The equation for hours is

(10) $h_{ik} = \boldsymbol{X}_i \eta_k + \zeta_k \ln W_{ik}^{*} + \xi_k \lambda_{ik} + e_{4ik}, \quad k = 2,3,$

and for weeks,

(11) $w_{ik} = \boldsymbol{X}_i \psi_k + \omega_k \ln W_{ik}^{*} + \pi_k \lambda_{ik} + e_{5ik}, \quad k = 2,3.$

Eq. 10 is estimated with OLS using the relevant predicted wage and including the relevant selectivity correction factor, and the OLS standard errors are appropriately corrected (Lee 1983).[14] Eq. 11 is estimated using a tobit model because of the clustering of observations at the upper limit of 52 weeks worked per year.[15]

Explanatory Variables

All of the variables described below are listed in Appendix Table 1 with their precise definitions.

Choice of labor force state

Explanatory variables used in the multinomial logit estimates of the choice of labor force state (Eq. 9) are similar to those used in other studies of women's labor supply,[16] but are tailored to fit our focus on work site. They include unearned income, a set of variables to represent home productivity and tastes, a set of variables to proxy the fixed time and money costs of working on site, and the predicted wage in each labor force state.

The variables that represent unearned income and home productivity and tastes are as follows. For unearned income, we use family income less the earnings of the worker (OTHINC). To proxy differences in home productivity and tastes we include the woman's years of schooling (EDUC), her age (AGE), dummy variables that indicate whether she is married with spouse present (MSP), whether she has any children under 6 at home (CU6), whether she has any children between 6 and 17 at home (C617), whether there is someone over 65 in the household (OVER65), whether the woman has a disability that limits the kind or amount of work she can perform (DISAB), whether she is non-Hispanic black (BLACKNH), and whether she is a black or white Hispanic or of another nonwhite race (HISP&OTH) (the excluded class is non-Hispanic white). One additional measure included to represent a woman's home productivity is her husband's wage (S_WAGE) (if she has a spouse present). The higher the husband's wage (which is a measure of his cost of time), the less likely he will contribute to home production and the higher will be the woman's productivity at home.

The proxy measures that index the fixed costs of working on site include some of the home productivity variables described above as well as additional measures. The presence of young children in the household (CU6) is associated with a higher fixed cost of working on site, as is the presence of a disability (DISAB). The presence of older children (C617) or persons over 65 (OVER65) may be associated with either higher or lower fixed costs, depending on whether the older children or older persons in the household require care themselves or are providers of care for young children. Additional fixed cost variables are dummy variables that indicate whether the woman's husband has a mobility or personal care disability (if she has a spouse present) (S_LIM) and whether or not the woman lives in a rural (RURAL) or a rural-farm (FARM) locality. Women living in rural or rural farm areas will experience higher fixed costs of working on site because commuting time to work is likely to be greater in these locales than in urban areas. All of these fixed cost measures are predicted to have a larger deterrent effect on on-site labor force participation than on home-based labor force participation.

Two predicted wage measures are included in the labor force participation equations: the predicted log of the woman's wage in home-based work (LNWPREDH) and her predicted log wage in on-site work (LNWPREDO).[17] We expect LNWPREDH to be positively related to the odds of being a home-based worker and negatively related to the odds of being an on-site worker, and we expect the opposite relationships for LNWPREDO.

In addition to the predicted wage, there is another aspect of compensation that needs to be included in the labor force participation equations: nonwage compensation. An important difference between home-based and on-site work is that home-based workers—who are more likely to be part-time and to be self-employed—are less likely to receive fringe benefits as part of their compensation than are on-site workers.[18] However, the value they will place on any fringe benefits received on their job will depend on whether or not they already receive these benefits through a spouse. To hold constant differences in how women value nonwage compensation we include several proxy variables. MSP will partially capture the likelihood that a woman is receiving fringe benefits through her spouse, as will a dummy variable indicating whether or not the husband received any wage and salary

income in the previous year (S_EMP), since a husband with wage and salary income in the previous year is more likely to have received fringe benefits on the job. In addition, the husband's wage (S_WAGE) will be positively correlated with his probability of receipt of fringe benefits.

Finally, we include a dummy variable indicating whether the spouse is a home-based worker (S_HW). This variable may be positively or negatively related to the odds that a woman is a home-based worker. If the couple is engaged jointly in a home-based small business so that there are synergies between the work of the spouses, this variable will be positively related to the odds of being a home-based worker and negatively related to the odds that the woman is an on-site worker. On the other hand, if this variable is a proxy for the husband's (non)receipt of fringe benefits on his job, then it will be negatively related to the odds that the woman is a home-based worker and positively related to her odds of being an on-site worker.

The Conditional Hours and Weeks Equations

The conditional hours worked and weeks worked equations (Eqs. 10 and 11) include most of the same variables discussed above. There are, however, several differences. First, since these equations are conditional on the woman's having chosen the specified work site, we include only the wage specific to that work site. Second, to adjust for the potential selectivity bias we include in each equation the appropriate selectivity adjustment variable (LAMBDAH when the hours or weeks worked of home-based workers are being estimated, and LAMBDAO when the corresponding equations are being estimated for on-site workers), computed from the reduced form logit estimates of the choice of labor force state. Third, three spouse variables that are most relevant for choosing work site rather than hours are excluded from the hours equation: S_LIM, S_EMP, and S_HW. Finally, to allow for the possibility that the wage/hours and wage/weeks relationships can be positive, negative, or can vary in sign over the range of values of the wage, we include in addition to the predicted log wage variable, a squared term of the predicted wage (LNWPREDO2 or LNWPREDH2).

RESULTS

Estimates of the labor force participation equations appear in Table 2, while estimates of the hours worked and weeks worked equations appear in Table 4. (Estimates of the reduced form logits used to obtain the selectivity adjustments are shown in Appendix Table 2.) Because home-based workers are oversampled relative to on-site workers and to those out of the labor force and because the sampling procedure used in the PUMS is not simple random sampling, we use weights in obtaining all of our estimates.[19]

Labor Force Participation Equations

To make the coefficients easier to interpret, rather than presenting logit coefficients in Table 2, we present estimates of the marginal effects of each dependent variable on the probability that an average woman will be in each of the three labor force states (the logit coefficients from which these marginal effects are computed appear in Appendix Table 3). These marginal effects are computed at the overall sample mean values.[20] By construction, the coefficients in the three columns sum to zero (except for rounding error).

In the "On-site employment" column, marginal effects of the independent variables on the probability of on-site labor force participation are very similar to those in other studies of women's labor force participation (in which estimates are dominated by on-site workers, who greatly outweigh home-based workers). Women's on-site labor force participation is positively related to their education and expected wage, and negatively related to their age, their being married with a spouse present, their having children at home, and their having higher unearned income.

Our focus, however, is on showing how women's labor force decisions differ by work site, and the estimates in Table 2 illustrate that these differences are significant in both a statistical and economic sense. First, there is a significant difference in the set of logit coefficients on which the on-site and home-based employment columns are based; that is, the factors that affect the labor force participation decision have significantly different impacts on the two work-site choices. Second, the individual logit coefficients of most of the variables differ

Table 2 Marginal Effects of the Explanatory Variables on the Probability of Being on Each Work State—Structural Model[a]

Variable	Out of the labor force	On-site employment	Home-based employment
Constant[b]	0.148 (11.42)**[c]	–0.069 (–5.30)**	–0.078 (–14.83)**
AGE[b]	0.005 (26.35)**	–0.005 (–26.91)**	–0.0002 (–1.95)
EDUC[b]	–0.011 (–10.09)**	0.012 (10.44)**	–0.001 (–1.76)
MSP[b]	0.127 (23.71)**	–0.130 (–23.84)**	0.003 (0.87)
CU6[b]	0.227 (59.39)**	–0.238 (65.57)**	0.011 (2.12)*
C617[b]	0.039 (14.40)**	–0.042 (–15.45)**	0.003 (3.23)**
BLACKNH [b]	–0.012 (–2.44)*	0.027 (5.38)**	–0.015 (–7.65)**
HISPOTH	0.005 (1.14)	–0.004 (–0.82)	–0.001 (–0.95)
DISAB[b]	0.299 (43.25)**	–0.311 (–48.02)**	0.012 (1.74)
RURAL	–0.013 (–3.85)**	0.011 (3.36)**	0.001 (1.36)
FARM[b]	0.010 (0.92)	–0.020 (–1.70)	0.009 (4.42)**
OVER65	0.016 (2.79)**	–0.017 (–2.94)**	0.001 (0.76)
OTHINC[b]	0.002 (41.74)**	–0.003 (–45.04)**	0.0001 (2.43)*
S_LIM[b]	0.016 (2.00)*	–0.010 (–1.17)	–0.006 (–2.20)*
S_HW[b]	0.058 (5.23)**	–0.094 (–8.33)**	0.036 (19.60)**
S_WAGE	0.000 (2.84)**	–0.0002 (–2.15)*	–0.00004 (–0.53)

(continued)

Table 2 (continued)

Variable	Out of the labor force	On-site employment	Home-based employment
S_EMPL[b]	–0.076 (–16.94)**	0.082 (17.79)**	–0.005 (–2.54)*
LNWPREDO[b]	–0.479 (–23.94)**	0.444 (21.53)**	0.035 (2.75)**
LNWPREDH[b]	0.189 (12.82)**	–0.160 (–10.60)**	–0.029 (–4.59)**
Log likelihood		–79,280.01	

[a] *t*-statistics are in parentheses and are corrected for the preestimated selectivity correction. Marginal effects are computed at the means of the overall sample from the logit coefficients in Appendix Table 3. Estimates are weighted to adjust for choice-based sampling and the nonrandom nature of the 1990 PUMS.

[b] Variable has significantly different logit coefficients between the two work sites at the 5% level.

[c] * = significant at the 5% level in a two-tailed test.
** = significant at the 1% level in a two-tailed test.

significantly between the two work sites (variables with significantly different coefficients are indicated in Table 2 by the subscript letter "b"). Further, as was hypothesized, variables associated with the fixed costs of working on site tend to have significantly greater deterrent effects on on-site labor force participation than on home-based labor-force participation. Being disabled is associated with a 0.31 reduction in the probability of being in the labor force as an on-site worker but does not significantly affect the probability of being a home-based worker. Having a disabled spouse is negatively related to both types of labor force participation, but the negative impact is significantly larger for on-site participation than it is for home-based participation. Having children under 6 is associated with a 0.24 reduction on the probability of being an on-site worker, but with a 0.01 increase in the probability of being a home-based worker. The differential effects of having children aged 6 to 17, while not as great, operate in the same direction, as do the differential effects of having an elderly person living in the household. The location variables, RURAL and FARM, do not provide consistent results. Living in a rural farm area is associated with a

reduction in the probability of being in the labor force as an on-site worker as compared to being a home-based worker, but living in a rural nonfarm area yields the opposite result. Overall, however, these results strongly support our hypothesis that factors that are positively associated with the magnitudes of the fixed costs of on-site work will tend to discourage on-site labor force participation in favor of home-based participation.

Although subsidiary to the main focus of this chapter, interesting differences also emerge for the roles of unearned income, marital status, and age. Unearned income is negatively related to the probability of on-site participation but has a slight positive relation to home-based participation. This difference suggests that working at home is preferred to working on-site, and that women use unearned income to "purchase" this preferred work mode. Or, alternatively, working at home might be complementary with time spent in consumption. Put differently, the difference in the marginal effects of unearned income suggests that from a utility point of view, time spent working for pay at home is more similar to leisure than is time spent working outside of the home.[21] A similar implication may be drawn from differences in the marginal effects of marital status and age: the deterrent effects of both marital status and age are also significantly less for home-based work than for on-site work.

We also note differences in the effects of race and educational attainment. Of the two race variables, only BLACKNH has significantly different coefficients for the two work sites. Black non-Hispanic women are significantly more likely than white women to be in the labor force as on-site workers and significantly less likely than white women to be home-based workers.[22] The education effects for the two work sites are also significantly different, with an increase in educational attainment associated with an increase in the probability of on-site employment and a decrease in the probability of home-based employment.[23]

Of the three variables that reflect aspects of the husband's labor force status, two have statistically different coefficients between the two work sites and one does not. Having a husband who is a home-based worker is a significant deterrent to on-site participation but an encouragement to home-based participation. Clearly the issue of fringe benefits is outweighed by the possible synergies when both

spouses are home-based workers, possibly because they are joint participants in the same business. As expected, the husband's wage has a negative effect on the odds of working as either an on-site or a home-based worker, versus being out of the labor force. However, the coefficients are not statistically different in the two work sites. The results for the husband's receipt of wage and salary income are the opposite of what we would have expected, but perhaps reflect only the fact that this is an imperfect proxy for receipt of fringe benefits.

Finally, we consider the own wage effects on the choice of labor force participation at each work site. Both predicted wage variables are statistically significant in both labor force sites, but with signs that differ from what we hypothesized: the predicted log of the on-site wage (LNWPREDO) is positively related to the probability of both types of labor force participation, and the predicted log of the home-based wage (LNHPREDH) is negatively related to the probability of both types of labor force participation. The two predicted wage variables are likely to move together (in fact, the correlation between them is 0.93), but this fact does not provide a satisfactory explanation for our results. A more likely explanation is that the predicted wage is an inferior instrument for the actual wage in the case of home-based work than in the case of on-site work. In fact, the adjusted R^2 in the equation predicting the home-based wage is 0.099, as compared to 0.212 for the on-site wage. Further, the wage data used to estimate the earnings function for home-based workers are more likely to be reported with error than in the case of on-site workers.[24] Given these considerations, it is plausible that these unexpected results with regard to predicted wages are a result of relatively greater measurement error in the instrument for the home-based wage.[25]

In order to examine the effects of fixed costs on labor force participation more fully, we compute in Table 3 the effects of changes in these variables on the probabilities of being a home-based or an on-site worker for six prototypical women. The table shows for each prototype the percentage change in the probability of being in the labor force as a home-based or on-site worker associated with a change (from 0 to 1.0) in the value of each of the seven fixed cost proxies. We report the results of these computations for three women with a high school education and varying marital status and age (women 1–3), and for three corresponding women with a college education (women 4–6). Overall,

Table 3 Effect of Fixed-Cost Variables on Predicted Labor Force Participation, by Work Site, for Six Prototypical Women

	Woman 1[a]		Woman 2[b]		Woman 3[c]		Woman 4[d]		Woman 5[e]		Woman 6[f]	
Variable	On-site worker	Home-based worker	On-site worker	Home-based worker	On-site worker	Home-based worker	On-site worker	Home-based worker	On-site worker	Home-based worker	On-site worker	Home-based worker
Base probability	0.922	0.023	0.905	0.028	0.846	0.042	0.938	0.019	0.923	0.023	0.874	0.034
% change in base probability associated with a change in												
CU6	–14	+113	–17	+107	–25	+87	–12	+120	–14	+114	–21	+96
C617	–2	+26	–2	+258	–4	+23	–2	+26	–2	+26	–3	+24
DISAB	–21	+135	–25	+124	–35	+93	–18	+145	–21	+135	–30	+106
RURAL	+0	+6	+0	+6	+0	+6	+0	+6	+0	+6	+0	+6
FARM	–2	+74	–2	+74	–3	+72	–1	+75	–2	+74	–3	+73
OVER65	–1	+9	–1	+9	–1	+9	–1	+9	–1	+9	–1	+9
S_LIM	N/A	N/A	+0	–28	+0	–28	N/A	N/A	+0	–28	+0	–28

[a] Woman 1: Age 25, high school education, not married, or married without a spouse present, white, urban, no children <17, not disabled, no one > 65 in household. Income and predicted wage variables set at means for nonmarried women.

[b] Woman 2: Same as woman 1, except married, spouse present. Wage and predicted income variables set at means for married women.

[c] Woman 3: Same as woman 2, except age 40.

[d] Woman 4: Same as woman 1 except with a college education.

[e] Woman 5: Same as woman 2 except with a college education.

[f] Woman 6: Same as woman 3 except with a college education.

the patterns are quite similar for all six women. In all cases but SP_LIM, proxies associated with higher fixed costs translate into an increase in the probability of being a home-based worker, and in all cases except for RURAL and SP_LIM, into a decrease in the probability of being an on-site worker. Although the basic probability of being home-based is quite low for these prototypical women (between 2 and 4 percent), changes in fixed costs can have a dramatic impact on that probability. For example, for a married 25-year-old woman with a high school education, the presence of children under 6 years old increases the probability of being a home-based worker by 113 percent. For the same prototypical woman, being disabled increases the probability of being in the labor force as a home-based worker by 135 percent. For the comparable woman with a college education, the percentage increases in the probability of home-based labor force participation are also large. Overall, Table 3 supports our contention that the fixed costs of working on-site play a significant role in determining the work site choice of women.

The Conditional Hours Equations

The first and third data columns of Table 4 contain estimates of the conditional hours equations for on-site and home-based workers, respectively. Significant differences in coefficients between work sites in the hours equations are noted with the superscript letters "b" and "e" in the table. Factors that had significantly different coefficients in the labor force participation equations also have, for the most part, significantly different coefficients in the hours and weeks equations, but there is an important difference. Whereas many of the variables that related to family structure had significantly greater deterrent effects for on-site participation than for home-based participation, the sign of the difference between many of these coefficients changes for hours worked. For example, having a child under 6 was a much greater deterrent to labor force participation as an on-site worker than as a home-based worker, but its negative effect on hours worked, conditional on being in the labor force, is larger for home-based work than for on-site work. A similar difference is observed for unearned income and having a disability. In contrast, having an older person in the household, having a child between 6 and 17, and living in a rural farm area all act to

increase hours of home-based relative to on-site workers. The net effect of all the coefficient differences is that predicted hours for home-based work are lower on average than for on-site work (as is suggested by the theory) and are more variable. What this means is that women are better able to adjust their work hours in home-based work than in on-site work.

This greater flexibility is most easily demonstrated in Figure 2, which illustrates the distribution of predicted weekly hours for home-based workers, predicted alternately from the on-site hours equation and from the home-based hours equation. In generating these predicted distributions of hours worked (and weeks worked, below) in each work state, we include the appropriate LAMBDA among the predictors. In this way, we take each individual's unmeasured characteristics into account. The predicted hours distribution using the home-based hours equation has a wider spread than the distribution computed from the on-site hours equation: a greater proportion of observations are predicted to work fewer than 35 hours per week, or more than 40. For women who actually work at home, the average predicted hours as a home worker are 35.2 with a standard deviation of 4.5, while average predicted hours if the same women were an on-site worker are 36.4 with a standard deviation of 2.7. When we do the same computations for on-site workers or for women out of the labor force, the resulting distributions exhibit the same pattern. (For on-site workers, predicted hours as a home worker would be 36.8 on average, with a standard deviation of 4.2, while predicted hours on-site are 37.9 with a standard deviation of 2.6.) In all cases, the greater spread in the predicted hours distribution for home-based work than for on-site work indicates the greater ability of home-based workers to choose their desired work hours, even if that choice involves a nonstandard workweek.

The Conditional Weeks Equations

Estimates of the two conditional weeks equations appear in the second and fourth data columns of Table 4. The equations are estimated using a tobit specification because of the significant clustering of values at the upper limit of the dependent variable of 52 weeks.[26] Significant differences in the weeks equations are noted with the super-

Table 4 Estimates of Weeks and Hours Supplied, Conditional on Labor Force Participation[a]

	On-site employment		Home-based employment	
Variable	Weekly hours worked	Annual weeks worked	Weekly hours worked	Annual weeks worked
Constant[b,c]	51.615 (26.86)**[d]	18.532 (3.74)**	76.109 (47.08)**	63.623 (27.26)**
AGE[b,c]	0.050 (–8.04)**	0.074 (4.71)**	–0.107 (–8.90)**	0.124 (7.38)**
EDUC[b,c]	0.263 (7.20)**	–0.663 (–7.07)**	–0.308 (–6.35)**	–0.476 (–7.05)**
MSP[b,c]	–0.928 (–8.67)**	–0.940 (–3.35)**	–4.583 (–18.80)**	–2.306 (–6.80)**
CU6[b,c]	–2.784 (–14.36)**	–2.512 (–5.07)**	–5.505 (–25.60)**	–6.550 (–22.11)**
C617[b,c]	–1.946 (–21.52)**	–3.318 (–14.08)**	–1.284 (–7.61)**	–1.130 (–4.83)**
BLACKNH[b]	0.887 (6.27)**	–1.446 (–4.16)**	3.866 (8.04)**	1.988 (3.15)**
HISPOTH	1.754 (11.88)**	–2.149 (–5.77)**	1.775 (5.62)**	–1.111 (–2.62)**
DISAB[b,c]	–2.308 (–5.89)**	–1.129 (–1.14)	–3.746 (–9.87)**	–5.754 (–11.30)**
RURAL[b,c]	–0.066 (–0.63)	–0.959 (–3.33)**	–1.029 (–5.38)**	0.531 (1.93)*
FARM[b,c]	–0.336 (–0.92)	0.587 (0.57)	1.336 (3.34)**	5.396 (8.30)**
OVER65[c]	0.207 (1.11)	–1.259 (–2.55)**	0.770 (2.10)*	0.643 (1.21)
OTHINC[b]	–0.037 (–16.43)**	–0.018 (–3.12)**	–0.051 (–25.10)**	–0.014 (–4.80)**
S_WAGE	–0.006 (–2.55)*	–0.0003 (–0.01)	–0.008 (–4.72)**	–0.003 (–0.96)
LNWPREDO[e]	–11.806 (–7.02)**	48.313 (11.14)**	—	—
LNWPRDO2[e]	2.798 (7.77)**	–10.399 (–11.25)**	—	—

Variable	On-site employment		Home-based employment	
	Weekly hours worked	Annual weeks worked	Weekly hours worked	Annual weeks worked
LNWPREDH[e]	—	—	–15.202 (–10.34)**	7.748 (3.67)**
LNWPRDH2[e]	—	—	3.840 (8.63)**	–1.709 (–2.71)**
LAMBDAb[b,c]	–0.863 (–2.00)*	–8.701 (–7.84)**	–4.541 (–15.24)**	–2.188 (–9.54)**
Adj. R^2/log L	0.05964	–119,438.8	0.06784	–118,937.8

[a] *t*-statistics in parentheses and are corrected for the preestimated selectivity correction. Hours estimates are weighted to adjust for choice-based sampling and the nonrandom nature of the 1990 PUMS. Weeks equations are estimated using tobit, using the same weighting, but are not selectively corrected.

[b] Denotes significant difference in coefficients between work sites in the hours worked equations at the 5% level.

[c] Denotes significant difference in coefficients between work sites in the weeks worked equations at the 5% level.

[d] * = significant at the 5% level in a two-tailed test.
** = significant at the 1% level in a two-tailed test.

[e] Denotes significant difference in coefficients between work sites of corresponding wage variables in the hours and weeks worked equations at the 5% level.

script letters “c” and “e”. The results for weeks are similar to those for hours, although there are fewer variables with coefficients that differ significantly between work sites. As in the case of the hours equations, the net effect of the differences in the coefficients is that the mean of the distribution of predicted annual weeks worked as a home-based worker is lower than the mean of the distribution of predicted weeks worked as an on-site worker. Further, the dispersion of predicted weeks worked is greater for home-based than for on-site work. For example, using the sample of home-based workers, we find that average predicted weeks worked per year are 43.3 with a standard deviation of 2.5 for home-based work, compared to 45.6 with a standard deviation of 2.1 for the same individuals evaluated as on-site workers.

Figure 3 illustrates these differences for home-based workers. As in Figure 2, we show here the distribution of predicted weeks worked

Figure 2 Predicted Hours for Home-Based Workers

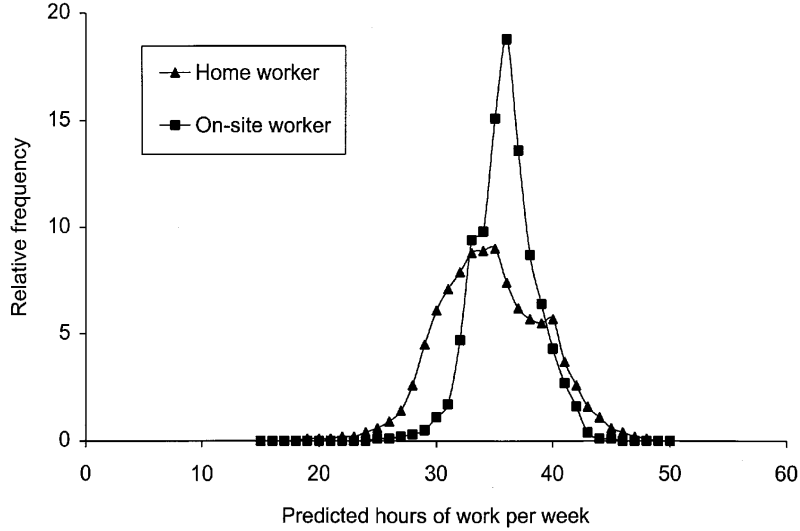
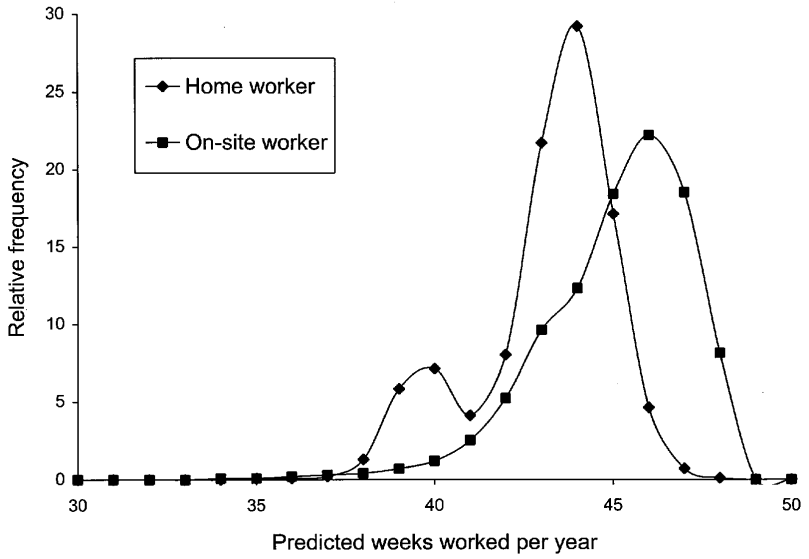


Figure 3 Predicted Weeks for Home-Based Workers



for home-based workers using alternatively the estimates in columns 2 and 4 from Table 4. The figure illustrates the greater spread of the distribution when the equation predicting weeks worked in home-based employment is used. When we do the same calculations for on-site workers or for women out of the labor force, the results are very much the same as in Figure 3. In all three cases, the predicted mean weeks worked is lower for home-based work, and the variability is greater compared to on-site work.

CONCLUSIONS

Home-based work offers women flexibility in work scheduling. The work-at-home option reduces the fixed costs of entering the labor market—the time and money costs of commuting, the costs of work clothing, and the costs of child care while commuting. The lower fixed costs associated with working at home translate into a lower reservation wage for home-based work, so that women who are likely to have large fixed costs associated with working outside of the home—women with young children, women with elderly relatives at home, women who are disabled, or women who live in rural areas that may require substantial commutes to an on-site work location—will be more likely to be in the labor market if they can be home-based workers.

Our estimates are consistent with this hypothesis. When we compute the partial effects of the proxy measures for fixed costs on the probability of being in each labor force state, we find that three of these variables are associated with large and significant increases in the probability of being a home-based worker—having children under 6, being disabled, and living in a rural-farm area. Put differently, the discouraging effect on labor force participation of these fixed costs variables are significantly greater for on-site work than for home-based work. In addition, women with higher levels of unearned income were also more likely to choose home-based versus on-site work, suggesting that this may be a preferred work option for some women.

Another implication of our theoretical discussion is that the lower fixed costs of working at home will result in lower reservation hours and weeks for home-based work. Our estimates provide indirect sup-

port for this hypothesis: the distributions of predicted weeks and hours for home-based work have lower means and greater dispersions than do the corresponding distributions for on-site work. It appears that home-based workers are better able to adjust their work schedules to accommodate those family circumstances which generate higher fixed costs of working. On average, home-based workers choose to work somewhat less, and they are more likely to choose nonstandard work schedules.

It is interesting to compare our results from the 1990 Census of Population with the views of 24 professional and clerical women in the New York City area who use some type of computer technology in their home-based work (Christensen 1985b). The advantages of home-based work cited by these workers were the flexibility and autonomy in structuring their work and the financial benefits associated with not going to an office. Strikingly, many of the mothers with young children said that they would not be in the labor force at all if they could not work at home.

Home-based work has its detractors. Many still view this as a form of work organization that causes workers to be exploited and mistreated. Even the women surveyed above cite some disadvantages, such as disruption of home and family and an inability to get away from one's work. But it is clear from the findings in this chapter that home-based work has a valuable place in the menu of work options available to women. Women who otherwise would not be able to enter the labor force, either because of home care responsibilities, inconvenient location, or physical disability, choose this option. These women are able to adapt their work schedules to a greater degree than are women working on-site. We believe that women's demand for this work arrangement will continue to grow in the future, especially if the current public concern about the welfare of children and families remains strong.

Notes

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1. The data for 1960 come from Silver (1989); the data for 1980 come from U.S. Bureau of the Census (1983, Table 122); and the data for 1990 come from U.S. Bureau of the Census (1993, Table 148).
2. One aspect of the choice of home-based work—that it often involves the simultaneous choice of being self-employed—is not investigated in this chapter, but it is treated explicitly in Edwards and Field-Hendrey (forthcoming).
3. The data and sampling procedure are fully described in U.S. Bureau of the Census (1992).
4. Unemployed women and women with a job but not at work last week are deleted from the sample because there is no way to determine if their desired labor force participation is as a home-based or on-site worker. We also exclude women whose class of worker information is not consistent with their reported earnings—for example, someone who reports herself as self-employed in 1990, yet reports wage and salary income for 1989—and women whose hourly earnings exceed $250.
5. Persons who used more than one mode of transportation were requested to identify the one used for most of the distance.
6. For a more complete discussion of how home-based and on-site workers differ, see Edwards and Field-Hendrey (1996).
7. Child (or other dependent) care costs are not, strictly speaking, a fixed cost of working since they vary with the number of hours worked. The component of these costs attributable to commuting time, however, is a fixed cost.
8. The hourly cost of dependent care may also vary with work site. This possibility could be incorporated into the model by using a "net" wage rate for each work site, net of the hourly cost of dependent care.
9. In this chapter, we treat the labor force decisions and resultant earnings of other family members as exogenous.
10. Our procedure for computing λ_{ik} follows Lee (1983). First we substitute the expression for the wage from Eq. 8 into Eq. 7 to obtain a reduced form multinomial logit equation predicting labor force status. We obtain the predicted probability of individual i being in labor force state k, P_{ik}, and use it to compute selectivity correction factors for each state, λ_{ik}, by the following procedure:

    (A) $H_{ik} = \Phi^{-1}(P_{ik})$

    (B) $\lambda_{ik} = \varphi(H_{ik}) / \Phi(H_{ik})$,

    where φ and Φ are the PDF and CDF of the standard normal distribution.
11. The procedure described here is similar to Killingsworth (1983, pp. 160–161), but our model has three work states rather than the two considered by Killingsworth.

Note that since the expected value of the offering wage in each work site is being predicted, λ_{ik} is not used as a predictor.

12. We are indebted to George Jakubson for this insight. The issue of correlated errors across labor force states was a concern to us because we have reason to believe that nonzero correlations are likely in our context. For example, Gerson and Kraut (1988), in a personality assessment test given to members of their sample of clerical workers, found that home-based workers had statistically significantly different values concerning gender roles and careers as compared to on-site workers. Views on such issues are just the type of unmeasured factor that create correlations in the errors across labor force states.
13. Hutchens, Jakubson, and Schwartz point out that the major drawback with this model is that it does not meet the condition of allowing one to combine existing estimates with information about a new alternative to make predictions about the probability of choosing that new alternative. This is not a drawback in the context of our problem, since we do not wish to make inferences about work arrangements other than those already discussed in this chapter.
14. We follow this four-step procedure, rather than estimating reduced form equations for the whole system jointly using maximum likelihood as does Blank (1990), in order to obtain explicit estimates of the effect of the on-site and home-based wages on labor force participation, hours, and weeks. This procedure allows us to separate the direct effect on these variables of factors related to fixed costs from the indirect effects that operate through the wage equation.
15. Although λ_{ik} is included as a regressor, so that the coefficient estimates are unbiased, the error variances are not corrected.
16. See, for example, Blank (1988, 1990), Averett and Hotchkiss (1996, 1997), Sorensen (1993), and Zabel (1993).
17. Variables to predict the woman's offering wage in on-site and home-based work are similar to those used by others (see, for example, Blank 1990; Averett and Hotchkiss 1996, 1997; and Neumark and Korenman 1994): age (AGE), age squared (AGE2), education (EDUC), education squared (EDUC2), an age and education interaction term (AGEEDUC), marital status (MSP), number of children (FERT), race (BLACKNH and HISP&OTH), location of residence (RURAL and FARM), whether the woman is disabled (DISAB), variables representing the region of the country (SOUTH, WEST, MW), the manufacturing wage in the state (MFGWAGE), and the unemployment rate in the state (UNEMP). In addition, we include a set of variables to capture the industrial distribution of employment in the state (their definitions are self-evident). One might expect offering wages to be lower in rural areas, at least for on-site work. However, to the extent that one industry that readily lends itself to home-based work, farming, is more prevalent in rural and rural/farm areas, it may be that the offering wage for home-based work will be relatively higher in such areas. Therefore, we include variables representing both residence in a rural area (RURAL) and residence in a rural/farm area (FARM). Precise definitions of all of these variables appear in Appendix Table 1. Also included in each wage predicting equation is the appropriate vari-

able to correct for selectivity bias (LAMBDAH for home-based workers and LAMBDAO for on-site workers), computed from the reduced form logit estimates of the choice of labor force state. For estimates and a detailed discussion of these wage equations, see Field-Hendrey and Edwards (2001).

18. Although there is no hard evidence, in the case of home-based employees, it has been suggested that these workers are less likely to have employer-provided fringe benefits (Christensen 1985a). In the case of the self-employed, Devine (1994) documents the much lower proportion of self-employed workers who received health benefits on their jobs, as compared to employees. Blank (1990) documents that part-time workers are much less likely to be included in company pension or health plans.
19. The Census Bureau provides weights to adjust for the nonrandom nature of the PUMS sample. In addition, we weight to take into account our sampling design, which results in home-based workers being 25 times more likely to be in our sample than are on-site workers or women out of the labor force.
20. Marginal effects are computed from the logit coefficients according to the following formula:

$$\delta_j = \partial P_j / \partial x = P_j\,(\beta_j - \beta),$$

where $\beta = \Sigma P_j \beta_j$.

These marginal effects are actually the derivatives of the probability of being in the specified labor force state with respect to each independent variable. This formula is correct for continuous variables, but not for dummy variables, for which one should compute the effect of a change in the value from 0 to 1.0 by computing the probability of being in the specified labor force state alternatively when the dummy equals 0 and when it equals 1.0, and subtracting the two probabilities. Greene (1997, p. 878) shows that the approximation obtained by simply taking derivatives for dichotomous variables, as we do in Table 2, is "often surprisingly good." We checked several of our dichotomous variables and found the results to be quite close to the approximation. In Table 3 we use the correct procedure for computing the effects of the dummy variables rather than the continuous approximation.

21. Yet another explanation may be that unearned income is an endogenous variable; that is, husbands and wives make labor force choices jointly, and in families in which there is a desire for women to do home-based work, men work longer hours to compensate for their wives' resultant lower earnings.
22. A possible explanation is that many home-based workers are self-employed, and it may be more difficult for black women to obtain the necessary capital.
23. Overall, these results are consistent with findings from the 1980 Census reported by Kraut (1988). He studies only nonfarm white collar employment and estimates a logistic equation to determine which variables were most important in women's choice of home-based work. He finds that the presence of preschool and older

children, especially for married women, and a work-limiting disability were powerful determinants of the odds of a woman's working at home. Age, education, other household income and residence in rural areas were also significant factors. He also finds that, even after holding these factors constant, black women had a lower probability of working at home than did white women.

24. The proportion of observations for which earnings are allocated by the Census Bureau, rather than being reported directly by the woman, is greater for home-based than for on-site workers. Thus, the hourly earnings figure reported in the census will be more subject to error for home-based workers than for on-site workers. This error is compounded by the fact that home-based workers are much more likely than on-site workers to be self-employed, and the earnings of the self-employed are notorious for errors in reporting (Devine 1992).
25. For example, Bound, Jaeger, and Baker (1995) show that if there is a low correlation between an endogenous variable and a potential instrument, even a small correlation between the instrument and the error in the basic equation being estimated can produce a larger inconsistency in the IV estimates than in the OLS estimates.
26. The standard errors in the weeks worked equation estimates are not corrected for the inclusion of the selectivity adjustment variable. In the case of the hours worked equations, we experimented by estimating with and without making the adjustment and found that there was very little difference in result.

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Table A1 Variable Definitions[a]

Variable	Definition
AGE	Age
AGE2	Age squared
EDUC	Years of schooling[b]
EDUC2	Years of schooling squared
AGEEDUC	Age times years of schooling
OTHINC	Total family income – earned income of individual
MSP	Dummy variable which equals 1 if woman is married with spouse present
FERT	Number of children
CU6	Dummy variable which equals 1 if one or more children under 6 years old is present in the household
C617	Dummy variable which equals 1 if one or more children between 6 and 17 years is present in the household
BLACKNH	Dummy variable which equals 1 if woman is black, non-Hispanic
HISP&OTH	Dummy variable which equals 1 if woman is Hispanic, Asian, or other non-white race
DISAB	Dummy variable which equals 1 if woman has a disability which restricts the kind or amount of work she can do
RURAL	Dummy variable which equals 1 if woman lives in a rural area
FARM	Dummy variable which equals 1 if woman lives in a rural farm area
OVER65	Dummy variable which equals 1 if there are person(s) over 65 years old in the household
S_HW	Dummy variable which equals 1 if the woman's spouse is a home-based worker
S_LIM	Dummy variable which equals 1 if the woman's spouse has a mobility or personal care limitation
S_WAGE	Spouse's average hourly earnings computed from 1989 annual earnings, weeks worked in 1989, and hours worked in the census week
S_EMPL	Dummy variable which equals 1 if the woman's spouse reported wage and salary income in 1989

(continued)

Table A1 (continued)

Variable	Definition
LNWPREDO	Log of predicted hourly earnings in on-site work
LNWPRDO2	Square of LNWPREDO
LNWPREDH	Log of predicted hourly earnings in home-based work
LNWPRDH2	Square of LNWPREDH
MW	Dummy variable which equals 1 if the woman lives in the Midwest
SOUTH	Dummy variable which equals 1 if the woman lives in the South
WEST	Dummy variable which equals 1 if the woman lives in the West
MFGWAGE[c]	Average hourly earnings in 1989 of production workers in manufacturing in the state
UNEMP[d]	Unemployment rate in the state in 1990
Industrial distribution of employment in 1990 by state (agriculture is excluded industry)[d]	
FORESTRY	Percentage of employment in forestry and fisheries
MINING	Percentage of employment in mining
CONSTRUC	Percentage of employment in construction
MFG	Percentage of employment in manufacturing
TRANS	Percentage of employment in transportation, communications and other public utilities
WHLESALE	Percentage of employment in wholesale trade
RETAIL	Percentage of employment in retail trade
FINANCE	Percentage of employment in finance, insurance, and real estate
SERVICES	Percentage of employment in services
PUBADMIN	Percentage of employment in public administration

[a] All variables taken from the 1990 PUMS unless otherwise indicated.
[b] This variable was coded as a continuous variable from the classes provided in the census.
[c] U.S. Department of Labor (1991, Table C-8).
[d] U.S. Bureau of the Census (1993, Tables 149 and 151).

Table A2 Reduced Form Logit Coefficients for Labor Force Choice[a,b]

Variable	On-site workers	Home-based workers
Constant	0.004	–5.046
	(0.01)	(–3.11)**
AGE	0.136	0.195
	(14.33)**	(6.60)**
AGE2	–0.002	–0.002
	(–15.40)**	(–6.82)**
EDUC	0.027	0.021
	(1.56)	(0.36)
EDUC2	0.009	0.008
	(19.35)**	(5.54)**
AGEEDUC	–0.001	–0.001
	(–3.31)**	(–1.06)
MSP	–0.628	–0.163
	(–23.26)**	(–1.97)*
CU6	–1.157	–0.334
	(–61.86)**	(–6.27)**
C617	–0.176	–0.036
	(–10.66)**	(–0.74)
FERT	–0.143	–0.037
	(–26.03)**	(–2.22)*
BLACKNH	–0.034	–1.024
	(–1.48)	(–9.32)**
HISP&OTH	–0.159	–0.475
	(–6.67)**	(–6.18)**
DISAB	–2.200	–1.253
	(–78.93)**	(–13.60)**
RURAL	–0.098	0.069
	(–5.76)**	(1.39)
FARM	–0.153	0.501
	(–2.58)*	(4.44)**
OVER65	–0.117	0.024
	(–3.81)**	(0.25)
OTHINC	–0.012	–0.002
	(–43.94)**	(–1.24)

(continued)

Table A2 (continued)

Variable	On-site workers	Home-based workers
S_LIM	–0.066 (–1.51)	–0.384 (–2.42)*
S_HW	–0.362 (–6.00)**	1.696 (19.58)**
S_WAGE	–0.001 (–3.34)**	–0.003 (–0.75)
S_EMPL	0.412 (17.13)**	0.039 (0.60)
MW	0.142 (4.55)**	0.308 (3.48)**
SOUTH	0.087 (2.24)*	0.119 (0.10)
WEST	–0.076 (–2.35)*	0.273 (2.94)**
MFGWAGE	–0.016 (–1.51)	–0.032 (–1.09)
UNEMP	–0.129 (–12.72)**	–0.173 (–6.05)**
FORESTRY	0.207 (4.99)**	0.294 (2.64)**
MINING	–0.005 (–0.34)	0.047 (1.02)
CONSTRUC	0.004 (0.27)	–0.050 (–1.24)
MFG	–0.008 (–1.41)	–0.178 (–1.20)
TRANS	0.079 (–6.07)**	–0.180 (–4.90)**
WHLESALE	0.034 (1.42)	0.151 (2.17)*
RETAIL	–0.032 (–3.13)**	–0.027 (–0.96)
FINANCE	–0.007 (–0.60)	–0.001 (–0.04)

SERVICES	0.014	0.019
	(1.71)	(0.93)
PUBADMIN	–0.018	0.033
	(–1.78)	(1.25)

[a] *t*-Statistics are in parentheses. All logit coefficients refer to the odds of being in the specified labor force category versus being out of the labor force. Estimates are weighted to adjust for choice-based sampling and the nonrandom nature of the 1990 PUMS.

[b] * = Significant at the 5% level in a two-tailed test.
** = Significant at the 1% level in a two-tailed test.

Table A3 Structural Logit Coefficients for Labor Force Choice[a,b]

Variable	On-site work	Home-based work
Constant[c]	–0.684 (–9.98)**	–4.825 (–24.43)**
AGE[c]	–0.026 (–27.00)**	–0.007 (–2.25)*
EDUC[c]	0.059 (10.35)**	0.002 (0.10)
MSP[c]	–0.684 (–24.30)**	–0.358 (–4.20)**
CU6[c]	–1.234 (–68.63)**	–0.320 (–6.23)**
C617[c]	–0.212 (–14.88)**	0.035 (0.86)
BLACKNH[c]	0.082 (3.27)**	–0.771 (–6.83)**
HISPOTH	–0.026 (–1.06)	–0.093 (–1.18)
DISAB[c]	–1.621 (–49.39)**	–0.533 (–4.98)**
RURAL	0.065 (3.75)**	0.121 (2.33)*
FARM[c]	–0.068 (–1.13)	0.451 (3.83)**
OVER65	–0.088 (–2.85)**	0.008 (0.08)
OTHINC[c]	–0.013 (–46.28)**	–0.002 (–1.40)
S_LIM[c]	–0.078 (–1.80)	–0.408 (–2.57)*
S_HW[c]	–0.360 (–6.05)**	1.704 (19.82)**
S_WAGE	–0.001 (–2.97)**	–0.003 (–0.71)
S_EMPL[c]	0.417 (17.45)**	0.019 (0.30)

Variable	On-site work	Home-based work
LNWPREDO[c]	2.524	3.829
	(23.75)**	(11.58)**
LNWPREDH[c]	–0.974	–2.322
	(–12.39)**	(–9.93)**
Log likelihood	–79,280.01	

[a] *t*-Statistics are in parentheses and are corrected for the preestimated selectivity correction. Estimates are weighted to adjust for choice-based sampling and the nonrandom nature of the 1990 PUMS. All logit coefficients refer to the odds of being in the specified labor force category versus being out of the labor force.

[b] * = Significant at the 5% level in a two-tailed test.
** = Significant at the 1% level in a two-tailed test.

[c] Denotes significant difference in coefficients between work sites at the 5% level.

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