CONTINUOUS FEMALE WORKERS: HOW DIFFERENT ARE THEY FROM OTHER WOMEN?

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INTRODUCTION

Many economists have argued that women, on average, earn less than men because they have less commitment to the workforce than men [Mincer and Polachek, 1974; Smith and Ward, 1984]. In essence it is argued that because of gender differences in biology and socialization, women focus upon their maternal role and deemphasize market work, while men do the opposite [Fuchs, 1988]. These disparate roles are the reason for the gender pay disparity. A number of examples have been given that supposedly reflect the different priorities women give to market work and family life. For instance, it is argued that most young women are less likely than men to invest in wage-enhancing human capital while in school. This is reflected in women's choice of major and their reluctance to enter advanced degree programs in business, medicine, and law [Blakemore and Low, 1984]. It is also asserted that women are more likely than men to accept lower wages in exchange for shorter and more flexible hours, a job location near home, and limited out-of-town travel so that they can meet the demands of their families [Polachek, 1975].

Perhaps the most important way in which women deemphasize their work outside the home is that they tend to leave the labor market for extended periods of time during childbirth and when their children are young. These interruptions reduce women's future earnings because their skills depreciate during their time out of the labor force. Furthermore, they are not acquiring the training and work experience that lead to higher earnings in the future. On the other hand, men remain in the labor market throughout their adult life, gaining the necessary human capital to enhance their earnings. This difference between female and male lifetime labor force participation is typically identified as the most glaring example of how women are less committed to the workforce than men [Fuchs, 1988].

A number of studies have attempted to estimate the extent to which intermittent labor force participation reduces women's earnings relative to those of men. Mincer and Polachek [1974], among the first to study this issue, found that 35 percent of the male/female earnings gap could be attributed to differences between women's and men's work experience and time at home. Others argued that intermittent work behavior explained little of the pay disparity between women and men [Corcoran and Duncan, 1979]. These studies were followed by others that estimated the extent to which intermittency depreciated human capital [Mincer and Ofek, 1982; Corcoran, Duncan, and Ponza, 1983]. More recent studies have predicted that practically all of the earnings disparity between women and men can be explained by differences in accumulated human capital [Paglin and Rufolo, 1990].

All of these studies, however, contrast the earnings of women and men, which may overstate the influence of differing proclivities toward market work between women and men on the gender pay gap. Labor market discrimination may affect gender differences in pay, which, in turn, could contribute to differences in labor force experience. If employers discriminate against women, their salaries will be lower than those of men with the same productivity characteristics [Becker, 1957]. Since discrimination reduces women's pay, it may be that families respond to these differences in pay by assigning women responsibility for the home while expecting men to provide financial support for the family. If discrimination causes women to spend less time in the labor market, then differences in labor force experience between women and men are affected by discrimination and are not determined solely by different proclivities toward market work.

More recent research has attempted to examine the effect of labor force intermittency on earnings by analyzing women's work patterns over different cohorts of women, but these studies also fail to exclude discrimination as an explanation for persistent differences in earnings between women and men [Smith and Ward, 1984; Goldin, 1989; Hill and O'Neill, 1990]. Smith and Ward [1984] find that the work experience of employed women did not increase between 1920 and 1980. Hill and O'Neill [1990] used different data and examined a shorter time frame — 1968 to 1983 — but they too find the same phenomenon. Goldin [1989], on the other hand, examines an earlier period — 1875 to 1950 — and finds increases in women's work experience among working married women. All three authors conclude that their findings are consistent with the male/female earnings ratio during the period of their study. Although these studies contribute to our understanding of how women's work experience has changed over successive cohorts, they cannot exclude discrimination as an alternative explanation for their results. Their findings are also consistent with the argument that discrimination persisted throughout the period, causing gender differences in pay to remain unchanged.

This study examines the effect of labor force intermittency on earnings exclusive of discrimination by examining the earnings of women who work continuously and comparing their labor market outcomes to those of women who work intermittently. By comparing the earnings of continuous and intermittent female workers, one can determine the extent to which working intermittently affects women's pay independently of discrimination. This pay gap, between continuous and intermittent female workers, then can be compared to that found between women and men.

This paper uses data from the National Longitudinal Survey of Young Women and focuses on women between the ages of 34 and 41 in 1985. It describes the demographic, economic, and attitudinal characteristics of women who work continuously and contrasts them to the characteristics of other women. It then estimates a bivariate probit selection model that specifies the following two decisions: whether or not to work continuously and whether or not to work currently. It estimates earnings equations for intermittent and continuous female workers after correcting for these possible selection biases. Implications for the role of labor market discrimination are then discussed.

THEORETICAL MODEL

The Oaxaca Decomposition

The Oaxaca method for analyzing the gender pay disparity is to decompose the mean difference in pay between women and men into two parts: (1) that which is due to mean differences in productivity-related characteristics; and (2) that which is due to differences in estimated coefficients [Oaxaca, 1973]. The following equation describes this decomposition:

$$\overline{W}_m - \overline{W}_f = \boldsymbol{B}_m'(\overline{\boldsymbol{X}}_m - \overline{\boldsymbol{X}}_f) + \overline{\boldsymbol{X}}_f'(\boldsymbol{B}_m - \boldsymbol{B}_f)$$

where:
the subscripts m and f refer to men and women, respectively;
$\overline{W}$ represents the mean wage;
$\overline{\mathbf{X}}$ represents a vector of mean values for the productivity factors included in the analysis; and
$\overline{\mathbf{B}}$ represents a vector of estimated coefficients for $\mathbf{X}$.

The first term on the right side of the equation measures the mean differences in the productivity factors (evaluated at the estimated coefficients from the men's equation). The second term measures the difference in estimated coefficients from the men's and women's equations (evaluated at the mean value of the female $\mathbf{X}$'s).

The second term is a conventional measure of labor market discrimination [Cain, 1986]. Previous research on the earnings disparity between women and men has produced varying estimates of these two components of the sex pay gap, but several authors have attempted to summarize these findings [Treiman and Hartmann, 1981; Cain, 1986; Blau and Ferber, 1987]. Blau and Ferber [1987], for example, concluded that 51 to 87 percent of the sex pay gap is unexplained by mean differences in characteristics and could be attributed to discrimination.

Some researchers object to this characterization of the second term, however, pointing out that it only measures the portion of the sex pay gap that is unexplained by mean differences in productivity factors included in the analysis [Goldin and Polachek, 1987]. These researchers argue that most studies of the gender pay gap include insufficient measures of productivity characteristics and job amenities in their regression analysis. Thus, they argue that actual differences in productivity are being attributed to discrimination. According to these authors, a key difference between women and men that is generally omitted from these analyses is their different commitments to lifetime labor force participation.

The purpose of this research is to estimate the portion of the second term of the sex pay gap that may be due to differences in lifetime labor force participation. As I explain below, this is accomplished by using a bivariate probit selectivity model to estimate the earnings differences between women who are employed continuously and intermittently. By focusing the analysis on women, I can determine the extent to which the pay

disparity between continuously and intermittently employed women is attributable to unexplained productivity differences. I then compare this estimate to the estimates of the unexplained component in male/female earnings analyses.

Correcting for Selectivity Biases

Selectivity bias that may result from an individual's decision whether or not to work already has been taken into account by Blau and Beller [1988] when they analyzed male/female pay differences using the Oaxaca method. Gronau [1974] and others argue that when examining employer treatment of two groups, the focus of the research should be on wage offers rather than on observed wages. Since observed wages are influenced by individuals' decisions about whether or not to accept paid work, analyses of them may yield biased estimates of mean wage offers to individuals as well as biased estimated coefficients in the earnings equation. The technique suggested by Heckman [1979] to correct for this selectivity bias is to include the inverse of the Mills' ratio as an explanatory variable in the wage regression. The inverse of the Mills' ratio is obtained from a probit equation that predicts whether or not an individual decides to work for pay. Earnings equations are then estimated using ordinary least squares with the inverse Mills' ratio as another explanatory variable. The Oaxaca decomposition is applied to these estimated equations.

Another source of possible selectivity bias, however, still exists for women who decide to work. Whether to work continuously or intermittently is another underlying decision that a woman makes. If this decision is correlated with the error term in the earnings equation, a wage equation that corrects only for the bias that results from the work decision will not address this other potential bias, yielding inconsistent parameter estimates. The decision to work continuously and the wage equation error term are most likely correlated, because the unmeasured characteristics that enhance earnings such as self-motivation and intelligence are also likely to influence a woman's decision to work continuously.

To correct for these possible selection biases, I employ a bivariate probit selection model. According to this model, an individual makes two sequential decisions. First, they decide whether or not to work continuously. Then they decide whether or not to select a paid job currently. One expects these decisions to be correlated because women who decide to work continuously are probably more likely to be working currently. A bivariate probit model allows for correlation between these two decisions. There is full information on the outcomes of these two decision rules, giving four distinct cells: (1) a woman could have chosen to work continuously in the past and decided to work currently; (2) a woman could have chosen *not* to work continuously in the past, but decided to work currently; (3) a woman could have chosen to work continuously in the past, but decided *not* to work currently; and (4) a woman could have decided *not* to work continuously in the past and *not* to work currently. These equations are estimated using a full-information maximum likelihood function, which depends upon the bivariate normal distribution. Maximizing this function produces estimates that can be used to determine the double selection analogs of the inverse Mills' ratio [Tunali, 1986].

Earnings equations are estimated for the first two groups of women after correcting for these two sources of possible bias. This is accomplished by adding the double selection analogs of the inverse Mills' ratio to the earnings equations and estimating these equations using ordinary least squares [Sorensen, 1989]. The Oaxaca decomposition method is then applied to determine how much of the earnings disparity between continuously and intermittently employed women is due to mean differences in measured characteristics and how much remains unexplained.

DATA SOURCE

This study uses data from the National Longitudinal Survey (NLS) of Young Women, a nationally representative sample of women who were between the ages of 14 and 24 in 1968 and were interviewed regularly in subsequent years. This survey was selected because it asks a large sample of women (5,159 in 1968) detailed questions about their actual work experience. Interviews from 1985 were the most recent data available at the start of this study, during which time the women were 31 to 41 years old. The sample was further restricted to those women between the ages of 34 and 41 to narrow the focus to those least likely to give birth while still preserving a sample size large enough to conduct the analysis.[1] This, and other minor restrictions, reduced the sample to 1,844 women.[2]

A key variable in this analysis is a woman's actual work experience, which is measured by the number of years a woman works at least six months. This is the only consistent measure of work experience available from the NLS of Young Women. During the first 6 years of the survey, it asked respondents how many weeks they had worked the previous calender year. After 1973, however, the survey tended to be administered every two years, and no question was asked about a woman's work experience during the intervening year. Hence, by 1978 two years had gone by — 1973 and 1975 — during which the survey had not inquired about the number of weeks worked. A question was added therefore to the 1978 survey that asked women how many years they had worked at least six months during the past five years. This question can be used to replace the missing work experience information for 1973 and 1975, but work experience cannot be measured by the number of weeks worked. (After 1978, the survey corrected its questionnaire so that respondents were asked how many weeks they had worked since the last interview.)

It was also necessary to construct a variable indicating whether a woman has worked continuously or intermittently during her adult life. This was done by creating a variable called *home-time*, which represents the number of years an adult is not working or going to school. To construct this variable, I started with a woman's age and subtracted (1) the number of years of formal education she had completed, (2) the number of years in which the woman had worked at least six months and (3) five additional years since people generally start school at age 5. If this variable is greater than one, the woman is considered an intermittent worker. If this variable is less than or equal to one, she is said to have worked continuously.

The other variables used in the analysis are defined in Table 1. They include conventional demographic characteristics such as education, age, marital status, and fertility as well as detailed labor market characteristics such as actual work experience, employer tenure, and time spent out of the workforce. Unconventional variables in this study consist of attitudinal variables about work and family in the NLS. The first attitudinal variable asks respondents about their future plans at age 35, and was originally asked in 1968 when these women were between the ages of 17 and 24. The

TABLE 1
Variable Names and Definitions

Variable Names	Definitions
Demographic Characteristics	
Education	Number of years of schooling completed.
Married	1 if married, zero otherwise.
Single	1 if single, zero otherwise.
No. of Children	Number of children under 18 at home.
Children under 3	1 if a child under 3 lives at home, zero otherwise.
Children between 3 and 5	1 if a child between 3 and 5 lives at home, zero otherwise .
Children over 5	1 if a child over 5 lives at home, zero otherwise.
Black	1 if black, zero otherwise.
Central City	1 if lives in central city of a Standard Metropolitan Statistical Area (SMSA), zero otherwise.
Other SMSA	1 if lives in a SMSA but not in the central city, zero otherwise.
South	1 if lives in the south, zero otherwise.
Disabled	1 if health limits the amount or kind of work respondent is able to perform, zero otherwise.
Other Family Income	The dollar amount of family income other than respondent's labor income.
Age	Age of the individual.

TABLE 1 (Cont.)
Variable Names and Definitions

Variable Names	Definitions
Attitudinal Characteristics	
Plan to Work at 35	1 if planned to work at age 35 when respondent was between 18 and 22, zero otherwise.
Negative Views on Women Working	1 if agreed with the statement "A woman's place is in the home, not in the office," zero otherwise.
Labor Market Characteristics	
Work Experience	Number of years employed.
Employer Tenure	Number of years worked for current employer.
Union Contract	1 if wages are set by collective bargaining, zero otherwise.
Home-time	Age minus Actual Work Experience minus Education minus 5.

Source: National Longitudinal Survey of Young Women [1985].

second attitudinal variable asks women whether they believe that a woman's place is in the home rather than the office and was asked in 1972 when these women were between the ages of 21 and 28.[3]

EMPIRICAL RESULTS

The bivariate probit selectivity model has four equations to be estimated. The first equation examines the factors influencing the decision whether or not to work continuously. The second analyzes the determinants of the work decision. Separate earnings equations are then estimated for continuous and intermittent workers. They are estimated using ordinary least squares analysis after the two selection-correction variables generated from the bivariate probit analysis are included in the earnings equations. Before examining the results of this model, I present descriptive characteristics of the women who work continuously and intermittently as well as of the women who are currently not working and have not worked continuously in the past.

Descriptive Characteristics

Table 2 presents the average characteristics of women who were between the ages of 34 and 41 in 1985. It has three columns, each of which corresponds to a different cell from the double selection rule described above. The first column includes those women who have worked continuously and are working currently; the second column includes

TABLE 2
Characteristics of Women Aged 34 to 41 in 1985

Characteristics	Women Who Are At Work And Have Worked Continuously	Women Who Are At Work But Have Not Worked Continuously	Women Who Are Not At Work And Have Not Worked Continuously
Educational Characteristics			
Average years completed	15.6	12.9	12.3
Educational Distribution			
Less than 4 yrs. of H.S.	1%	11%	21%
4 yrs. of H.S.	11%	49%	46%
1-3 yrs. of college	29%	25%	18%
4 yrs. of college	27%	10%	11%
More than 4 yrs. of college	33%	5%	4%
Demographic Characteristics			
Average age	36.0	37.8	37.5
Marital Status			
Married	59%	67%	80%
Single	21%	6%	5%
Other	20%	27%	15%
Percent w/o children	43%	11%	9%
Attitudinal Characteristics			
Plan to work at 35	33%	31%	25%
Agree that woman's place is in the home	18%	36%	45%
Labor Market Characteristics			
Hourly Pay	$11.12	$7.82	-
Average yrs. of Work Exp.	16.0	11.1	5.9
Average yrs. at Home	0.3	8.8	14.3
Sample Size	295	951	582

Source: National Longitudinal Survey of Young Women [1985].

those who chose not to work continuously, but are currently working; the third column includes those who decided not to work continuously or currently. The fourth group of women — those who decided to work continuously but are not working currently — contained only 16 individuals. The characteristics of this small group are not reported here.

There are a total of 1,844 women in the sample, two-thirds of whom are working. Among those who are working, 76 percent have worked intermittently and 24 percent have worked continuously. Thus, in this age group (34-41), women who have decided to work continuously and are currently employed represent a small minority of women (16 percent). Their demographic characteristics are also quite different from other working women, as seen in the differences shown in the first two columns of Table 2. Women who have worked continuously have acquired considerably more education than other working women, averaging 16 years of education compared to 13 years. Sixty percent of these women have completed college compared to only 15 percent of other working women. Continuous female workers are also much more likely to have remained single and childless. About 20 percent of these women have never married. Among other working women, only 6 percent remain single. Forty-three percent of the women who work continuously never have had children; 11 percent of other working women remain childless.

The attitudes of these women toward work and family were also quite different at an early age. Among those who have worked continuously, only 18 percent, asked when they were between the ages of 21 and 28 (in 1972), agreed that a woman's place was in the home. In contrast, 36 percent of women who are currently working but have worked intermittently, when asked at that age, agreed that a woman's place was in the home when they were that age. In addition, the proportion who planned to work at age 35 when they were between the ages of 17 and 24 is higher for women who work continuously than for those who work intermittently. Thirty-three percent of women who have worked continuously said they planned to work at age 35 when they were young. This proportion declines to 31 percent among those women who are currently working and have worked intermittently.

The labor market characteristics of women who work continuously and intermittently also vary greatly. Women who have worked continuously have acquired much more work experience than other women, even though the former tend to be about two years younger. Women who have worked continuously in this sample average 36 years of age and have 16 years of work experience. In contrast, other working women are about 38 years old and have about 11 years of work experience. Women who have worked intermittently have spent an average of 9 years out of the labor force, while women who work continuously have spent practically no time out of the labor force. Finally, the women in the first group earn considerably more per hour than other working women. In 1985, they made $11.12 per hour; other working women made $7.82 per hour.

It is important to note, however, that although women who work continuously look quite different from other working women, they also look quite different from the average male worker. According to data from the Panel Study of Income Dynamics, the average 36-year-old male worker has 14 years of education and 17 years of work experience compared to the 16 years of each for continuous female workers. Furthermore, the average male worker is more likely to be married with children than the average continuous female worker. Eighty-two percent of the 36-year-old male workers were

married, and three-fourths had children. Among the continuous female workers, 59 percent were married and 40 percent had children.

The second and third columns of Table 2 highlight the demographic and economic differences between intermittent female workers and women out of the workforce. This comparison shows that women who are out of the workforce have slightly less education and are more likely to be married and have children than women who are currently working. For example, women out of the workforce have an average 12 years of education, and only 33 percent have attended college. In contrast, women working intermittently have 13 years of education, on average, and 40 percent have attended college. Furthermore, 80 percent of women out of the workforce are married, but among intermittent female workers only 67 percent are married. Finally, women out of the workforce have much less work experience than working women, averaging 6 years compared to 11 years for intermittent female workers and 16 years for continuous female workers.

The attitudes of those women not in the labor market toward working women are also quite different from those working for pay. Forty-five percent of women who are not currently working, asked when they were young (between the ages of 21 and 28), agreed with the statement that "A woman's place is in the home". In contrast, only 36 percent of women who have worked intermittently, asked when they were young, agreed with this statement. Similarly, only 25 percent of the women who were not at work planned to work when they were 35, whereas 31 percent of the women who had been working intermittently had these plans.

Bivariate Probit Model Results

The bivariate probit selectivity model has four equations to be estimated. The first two equations are the two decision rules: whether or not to work continuously and whether or not to work currently. They are estimated using a bivariate probit model. The last two equations are the earnings equations, the results of which are discussed in the next section.

The first equation in the bivariate probit model estimates the decision concerning whether or not to work continuously. This decision is characterized as a dichotomous variable that equals one if the woman decides to work continuously, and zero otherwise. The explanatory variables include human capital, demographic, and attitudinal characteristics. Their precise definitions are given in Table 1. It is anticipated that women with greater investments in human capital are more likely to work continuously. It is also hypothesized that women who work continuously are more likely to be single and without children. Finally, it is hypothesized that women with positive attitudes toward working women will be more likely to work continuously than women with negative attitudes.

The second equation in the bivariate probit model describes the work decision, which is characterized as a dichotomous variable that equals one if the woman is working, and zero otherwise. The explanatory variables included in this equation are of three types: those measuring human capital investments, demographic characteristics, and family income. It is hypothesized that women with greater amounts of human capital are more likely to be working than women with smaller human capital investments; married women and women with children are less likely to be working than single

women and women without children; and the presence of other sources of income will reduce the likelihood of women working.

The bivariate probit results are presented in Table 3. The first noteworthy result is the estimated correlation between the error terms of these two equations, or RHO, which is .320 with a standard error of .098. This means that the error terms in these two equations are significantly positively correlated, as expected. Presumably, women who decided to work in a particular year are more likely to have worked continuously in the past than women who decided not to work. The characteristics that encourage women to work in a particular year are similar, indeed identical in many instances, to the characteristics that encourage women to work continuously.

The results from the decision concerning whether or not to work continuously offer evidence in support of the previously stated hypotheses. For example, large investments in education increase the likelihood that a woman will work continuously. Women who never marry and remain childless are also significantly more likely to work continuously than other women. In addition, more children increases the chances that a woman will not work continuously. Finally, the variable measuring a woman's negative attitude toward women working outside the home has a significantly negative effect on the decision to work continuously.

The estimated coefficients for the determinants of the work decision are consistent with neoclassical theory. The empirical evidence, for example, supports the hypothesis that larger human capital investments increase the chances that a woman will decide to work. Increased education and work experience enhance the likelihood of working. Furthermore, women with children under three years old are significantly less likely to work than women with older children or no children. Having other sources of income also decreases the chances that a woman will work.

Results from the Earnings Equations

The third and fourth equations of the bivariate selectivity model are the earnings equations for women who work continuously and women who work intermittently. These two equations are estimated once the two selectivity-correction variables generated from the bivariate probit model are included in the analysis.

The explanatory variables in this analysis include human capital and demographic variables, geographic factors, and union status. Human capital characteristics are measured by education, actual work experience, and employer tenure. It is hypothesized that greater human capital investments will increase earnings.[4] Demographic characteristics include race, marital status, and the presence of children in the home. Black women may earn less than non-black women even after controlling for other factors, and this pay differential may reflect racial discrimination against black women. It also may be that women who are single earn more than ever-married women and that the presence of children reduces women's earnings. Three geographic factors are also included: whether an individual lives in the South, in a central city, or in a metropolitan area (but not in the central city). Women who live in the South or rural areas are expected to earn less than women who live outside of the South or live in urban areas. Finally, union status is also included as an explanatory variable. Belonging to a union is expected to increase the earnings of women.

TABLE 3
Determinants of the Work Decision and the Decision to Work Continuously (standard errors in parentheses)

Variable	Decision to Work Continuously	Decision to Work Currently
Constant	4.264[a]	-2.101[a]
	(.962)	(.302)
Education	.343[a]	.100[a]
	(.025)	(.019)
Married		.201
		(.106)
Single	.274	
	(.167)	
No. of Children	-.198[a]	.019
	(.050)	(.033)
Children under 3	.040	-.359[a]
	(.171)	(.165)
Children btwn 3 & 5	-.249	-.258
	(.200)	(.180)
Children over 5	-.415[a]	.349[a]
	(.157)	(.143)
Black	.182	-.035
	(.111)	(.103)
Central City		.067
		(.103)
Other SMSA		.113
		(.087)
South		-.170[a]
		(.080)
Disabled		-.300[a]
		(.105)
Other Family Income		-.00002[a]
		(.000003)
Work Experience		.146[a]
		(.009)
Age	-.257[a]	
	(.030)	
Plan to Work at 35	.048	
	(.098)	
Negative Views on Women Working	-.230[a]	
	(.112)	
RHO	.320[a]	
	(.098)	
-2*(Log-Likelihood)	2,535.6	
Sample Size	1844	

[a] Significant at the 5 percent level (two-tailed tests).
Source: National Longitudinal Survey of Young Women [1985].

TABLE 4
Log Earnings Regression Results with Selectivity Bias Corection (standard errors in parentheses)

Variables	Continuous Workers	Intermittent Workers
Constant	1.436[a]	.228
	(.433)	(.168)
Education	.045[a]	.073[a]
	(.018)	(.010)
Work Experience	-.014	.046[a]
	(.018)	(.006)
Employer Tenure	.001[a]	.002[a]
	(.0004)	(.0002)
Single	.032	-.153[a]
	(.062)	(.057)
No. of Children	-.035	-.015
	(.028)	(.012)
Black	-.115[b]	-.097[a]
	(.062)	(.037)
Central City	.294[a]	.101[a]
	(.060)	(.036)
Other SMSA	.327[a]	.128[a]
	(.055)	(.033)
South	-.067	-.156[a]
	(.051)	(.031)
Union Contract	-.026	.102[a]
	(.048)	(.033)
lambda-1	.121	
	(.095)	
lambda-2	.112	
	(.239)	
lambda-3		-.106[b]
		(.058)
lambda-4		.280[a]
		(.070)
Adjusted R^2	.156	.322
Sample Size	295	951

[a] Significant at the 5 percent level (two-tailed tests).
[b] Significant at the 10 percent level (two-tailed tests).
Source: National Longitudinal Survey of Young Women, 1985.

Table 4 reports the results of the estimated earnings equations. This table shows that the earnings structures of intermittent and continuous female workers are quite different. For example, continuous female workers have very large estimated intercept terms and insignificant rates of returns on work experience. These results are consistent with the argument that continuously employed women have had a steep earnings profile earlier in their careers but currently have reached a flatter portion of their age-earnings profile. More likely, however, these results reflect that actual work experience varies slightly among these women. The work experience of continuously employed women varies only by their age, which is restricted in this study to range between 34 and 41. Since work experience has little variation for continuously employed women, it is not surprising that it explains very little of the earnings variation for this group. Intermittent female workers, in contrast, have a much smaller estimated intercept term and a larger rate of return on work experience. These results are consistent with the argument that their human capital had depreciated during periods out of the workforce, but now that they have returned to work, their human capital is being restored.

The rates of return on education are also quite different for continuously and intermittently employed women. The estimated coefficient for education is .045 for continuously employed women and .073 for intermittently employed women. This means that continuously employed women's pay increases, on average, 4.5 percent for each additional year of education, but intermittently employed women's pay increases, on average, 7.3 percent. It is interesting to note that the rate of return for continuously employed women is also much lower than that found for male workers during this time period. Sorensen [1991] estimates the rate of return for education among male workers is .062 in 1985.

Most demographic attributes and geographic variables have similar effects on the earnings of continuously employed and intermittently employed women. Table 4 shows that black women earn significantly less than non-black women whether or not they work intermittently or continuously. Similarly, the number of children a woman has does not significantly affect her earnings for either group of women. Both groups of women earn less if they live in rural areas or in the South, but the region variable is only significant for intermittently employed women.

One difference between the two groups of women regards the effect of marital status on earnings. For those who have worked intermittently, the earnings of single women are significantly lower than ever-married women, but among those working continuously, single women's earnings are not significantly different from that of ever-married women. These latter results are surprising and suggest that single women are not necessarily more work-oriented than ever-married women once differences in the decision to work continuously and currently as well as other factors are taken into account.

Union status significantly increases the earnings of intermittently employed women, but it does not increase the earnings of continuously employed women. This difference may reflect the types of workers that belong to unions within continuously and intermittently employed women. Most continuously employed women are professionals, but one of the only professions that employs a large number of women and is heavily represented by unions is teaching. This profession may reward workers less than other professions for the same levels of education and work experience despite the presence of unions. Thus, it may appear that unions have less impact among continuously employed women because union members are probably concentrated among the teaching profession.

The estimated coefficients for the selectivity variables provide consistent evidence supporting the hypothesis of positive selection, but significant results are found only for intermittent female workers. Positive selection means that women are offered higher wages for their actual work decisions — whether they decide to work in the market or to work continuously — than would have been offered to other women with similar measured characteristics had they selected that same work choice. Women earn more in the employment situation of their choice than other women would have if they subsequently had made that choice because of unmeasured differences in characteristics between these women.

The first selectivity variable measures the possible selectivity bias due to the decision whether or not to work continuously. I found that women who worked continuously were paid more than would have been offered to intermittently employed women with similar measured characteristics had they decided to work continuously. The same result was also found for women who worked intermittently. (Since the value of this variable is positive for women who work continuously and negative for women who work intermittently, positive selectivity exists when the coefficient for the selectivity variables is positive for women who work continuously and negative for women who work intermittently.)

The second selectivity variable measures the possible selectivity bias from the work decision. In this case, I found that women who choose to work have higher wage offers than non-working women with similar measured characteristics. The estimated coefficients are significant, however, only in the equation for intermittent workers.

Estimated Pay Differentials

The mean value of the logarithmic wage for women (aged 34 to 41) who worked continuously in 1985 is 2.300; for women who worked intermittently it is 1.887. Thus, the difference between the mean values is 0.413. This means that the average pay of continuously employed women is 34 percent higher than the average pay of intermittently employed women. This pay differential is sizable and similar in magnitude to the gross pay differential between women and men. It suggests that a large portion of the pay differential between women and men is due to their different attachments to the labor force, but as I will show below, this gross differential is somewhat misleading.

As explained earlier, the total pay differential between continuously and intermittently employed women may be divided into two parts: that which is explained by differences in explanatory variables and that which is explained by differences in estimated coefficients. The following equation describes this decomposition:

$$g = \overline{lnW}_{CE} - \overline{lnW}_{IE} = \boldsymbol{B}_{CE}'(\overline{\boldsymbol{X}}_{CE} - \overline{\boldsymbol{X}}_{IE}) + (\boldsymbol{B}_{CE} - \boldsymbol{B}_{IE})'\overline{\boldsymbol{X}}_{IE} + (a_1 - a_2)\lambda_3 + (a_3 - a_4)\lambda_4$$

where:

g is the total pay gap between continuously and intermittently employed women; CE and IE represent continuously and intermittently employed women, respectively; $\overline{ln\,W}$ is the mean of the logarithm of hourly wages; $\overline{\mathbf{X}}$ is a vector of mean characteristics included in the analysis; $\mathbf{B}$ is a vector of estimated coefficients; the λ's are the mean values of the selectivity variables; and the a's are the estimated coefficients for the selectivity variables.

The last two terms are referred to as the unexplained pay disparity between continuous and intermittent female workers. In other words, the unexplained portion of the pay differential is equal to the difference in the estimated coefficients in the two wage equations, weighted by the mean value of the explanatory variables for intermittent female workers. The corresponding percentage pay differential is

$$G = e^g - 1.$$

To interpret this result, consider the following conceptual experiment. From a sample of women who have decided to work intermittently, pick at random an individual with the average characteristics of women in this category. Then predict a logarithmic wage for this individual if she worked intermittently and continuously. The percentage difference between these two wages is then equal to G. That is, G is based upon a conditional experiment in which women already have opted for intermittent employment.[5]

In this case, G is equal to .141, meaning that women who work intermittently earn about 14 percent less than they would if they had decided to work continuously. This portion of the pay gap, which is unexplained by characteristics in the analysis, represents 34 percent of the total pay gap. Presumably, it exists because of differences in unmeasured productivity-related characteristics.[6] It cannot be attributed to sex discrimination as is commonly done, since both groups consist of women. On the other hand, 66 percent of the gross pay differential is explained by mean differences in characteristics between these two types of workers. Most of the mean difference in measured characteristics stems from the difference in education. The mean difference in this variable explains 30 percent of the total pay differential between these two groups of women.

As I explained above, previous research on the earnings disparity between women and men generally finds that at least one-half of the sex pay gap is unexplained by factors included in the analysis [Blau and Ferber, 1987]. This study shows that about one-third of the pay gap between continuously and intermittently employed women remains unexplained after taking into account differences in characteristics and potential selection biases. Thus, this study finds a smaller unexplained component than previous research that focused on women and men. This suggests that some of the unexplained pay gap between women and men can be attributed to unmeasured productivity differences that result from differences in lifetime labor force participation, but it cannot be fully accounted for by these differences. Part of the unexplained pay gap between women and men may reflect discrimination.

CONCLUSION

This study finds that only 16 percent of women between the ages of 34 and 41 in 1985 worked continuously. Furthermore, the demographic and economic characteristics of these women are quite different from those who work intermittently. For example, they have acquired considerably more education and work experience than other women, averaging 16 years of each. Intermittent female workers, on the other hand, have acquired an average of 13 years of education and 11 years of work experience. Continuously employed women are also much more likely to have remained single and childless. About 20 percent of these women have never married and 43 percent have remained childless. In contrast, only 6 percent of other working women remain single

and 11 percent have not had children. I also find that continuously employed women's attitudes toward working women are quite different from other women. Only 18 percent of continuously employed women, asked when they were young (aged 21 to 28), agreed with the statement "A woman's place is in the home," but 36 percent of intermittently employed women and 45 percent of women not at work, when asked at that age, agreed with this statement.

The earnings of continuous and intermittent female workers are also quite different. Women who work continuously earn, on average, about 34 percent more than intermittent female workers. Two-thirds of this pay differential is due to differences in characteristics such as education. The mean difference in education, for example, explains 30 percent of the total pay differential between these two groups of women. Women do gain a wage premium, however, if they work continuously. It is estimated that the hourly pay of a woman who works intermittently would increase by 14 percent if she worked continuously. This wage premium accounts for about one-third of the total pay differential between continuous and intermittent female workers. This suggests that part of the unexplained disparity between women and men may result from differences in lifetime labor force participation, but not all of it can be explained by these differences. Thus, labor market discrimination may affect women's earnings even after accounting for differences in lifetime work experience.

NOTES

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1. Ideally, I would have had a sample of women who were about 10 years older than the group examined here (34 to 41) to ensure that their childbearing years were completed. But, a large survey of women that asks detailed questions such as the NLS of Young Women during the late 1980s does not exist for this age group.
2. Two additional restrictions were made to facilitate the analysis. First, any respondent who did not report her total family income was deleted from the sample. Second, anyone who was self-employed was deleted. Family income other than a woman's labor income is a key factor for predicting whether or not a woman will work. Hence, this analysis deleted those cases without this information. The NLS does not ask people who are self-employed how much they earn from this line of work. Hence, self-employed people were also deleted.
3. The exact wording of the two attitudinal variables are as follows: (1) "What would you like to be doing when you are 35 years old?" The answers are categorized as (a) planned to be working, (b) planned to be married and raising a family, (c) don't know, or (d) other; (2) "Please indicate your agreement with the following statement: 'A woman's place is in the home, not in the office or shop.' " They could answer (a) strongly agree, (b) agree, (c) disagree, (d) strongly disagree, or (e) undecided.
4. The square of work experience is not included in this analysis because the range for this variable is so small in this sample.
5. It is also possible to estimate this pay differential without including the selectivity variables. In other words, $g = (B_2 - B_1)'\overline{X}_1$. This definition corresponds to a different conceptual experiment, which is less appropriate for these purposes. In this case, the conceptual experiment is to select *any* woman with the average characteristics of intermittent female workers. Then predict a logarithmic wage for this woman if she were employed continuously or intermittently. In other words, this definition is based upon an unconditional experiment in which the underlying decision processes are modeled in addition to specifying the earnings structures for the two types of workers. But I am not interested in measuring the size of the pay gap between women who work continuously and intermittently for the *average* woman. Instead, I want to measure the extent to which *intermittently employed women* earn less than continuously employed women because of their decision to work intermittently. For a more complete discussion of these various definitions, see Duncan and Leigh [1980].
6. The formula is $.46 = g / .393$, where .393 is the gross pay differential (g).

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