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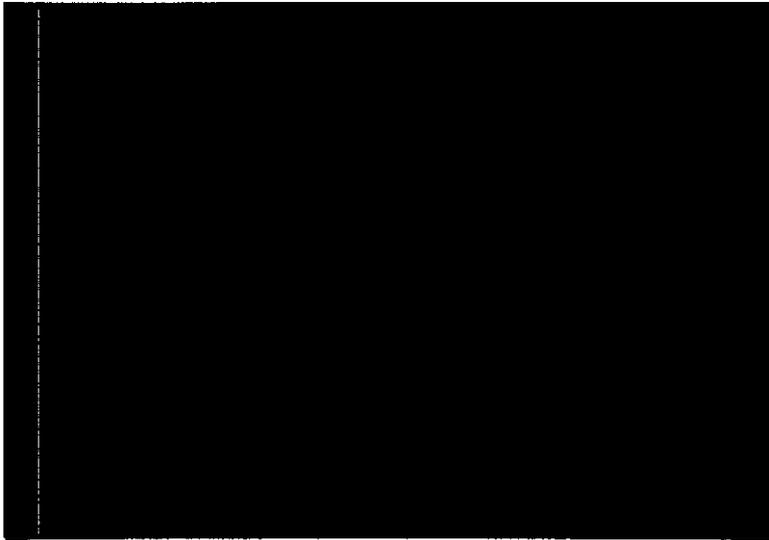
Discussion
Paper

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NLS Discussion Papers

**Women's Employment During Pregnancy and
Following Birth**

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February 1992
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Women's Employment During Pregnancy and Following Birth

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The Rand Corporation

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INTRODUCTION

During the last three decades, the "working mother" has become the norm rather than a rarity. In 1960, fewer than one in five mothers with children under age six (18.6 percent) were in the labor force. By 1987, this percentage had tripled, reaching 57 percent (U.S. Bureau of the Census, 1987, Table 624). Current participation levels for mothers of younger children are even more striking. Fifty-three percent of married mothers with children 1 year old or under are in the labor force (U.S. Bureau of the Census, 1987).

Previous research has consistently found that women with young children are less likely to participate in the labor force than those with only older children (Mincer, 1962; Gronau, 1973; Heckman, 1974). Today labor force activity reaches high levels soon after the birth of a child, and many women interrupt work for only short periods of time. Although half the new mothers have returned to work within a year after giving birth, the factors that affect the timing within that year are not well understood. Similarly, the factors that influence how long women work during their pregnancies have not been fully explored.

The analysis of women's increased work effort during pregnancy and rapid return to work after childbirth call for a research strategy using data that can distinguish among work patterns by month of return to work rather than by year. This paper uses panel data from the National Longitudinal Surveys of Youth (NLS-Y) to examine whether perinatal labor supply is positively related to women's real wages. We also expect to find a negative relation between mothers' work efforts and other household income.

This paper is organized into five sections: The first section reviews the previous work on this problem. The second section outlines a conceptual model of employment choice, and the third section describes the data and the empirical methods used. The fourth section presents results. Our conclusions are summarized in the final section.

LITERATURE REVIEW

Early Labor Force Participation (LFP) is a good predictor of labor force activity five to ten years after the first birth, even controlling for several demographic and economic predictors of LFP at the time of the first birth and for subsequent fertility (Mott and Shapiro, 1983). Mott and Shapiro suggest that either women differ in their underlying propensities to work, or that work during the time of the first birth indirectly stimulates market work by increasing work experience and hence market wage rates.

Even (1987) explicitly addresses the intrapersonal correlation in labor supply over time in his hazard estimation of data from the 1973 National Survey of Family Growth. He finds

that the aggregate probability that a woman reenters the labor force after the birth of a child falls rapidly as the length of the interruption rises. Even attributes this to the combined effects of structural duration dependence, unobserved heterogeneity, and observed characteristics.

The work reported here differs from most of the previous work because it examines continuous measures of labor supply, rather than labor force participation at a point in time before or after the birth. Unlike Even, we fit hazard models to labor supply both during pregnancy and after birth, and begin to address the correlation between the two decisions. In addition, our analyses relate to births occurring between 1979 and 1985. These data therefore cover the recent period of very high labor force participation immediately before and after birth.

BEHAVIORAL MODEL

This study investigates the determinants of labor supply behavior near the birth of a first child. We assume that the choice of labor supply during this period--as well as the choices of the number and spacing of children and expenditure (of time and money) on children--maximize a lifetime utility function subject to a lifetime budget constraint. Instantaneous utility is a function of consumption, labor supply, and the point in time relative to the birth of the child.

In general, the solution to the household's problem for labor supply near the birth of the first child can be expressed as a function of wages, $w(t)$, and the reservation wage, $r(t)$. The woman works whenever:

$$d(t) = w(t) - r(t) > 0 \quad \text{or simply} \quad w(t) > r(t)$$

This reservation wage is the value of time outside of the labor force. Formally, it is the wage such that if the woman were offered it, she would be indifferent between working and not working.

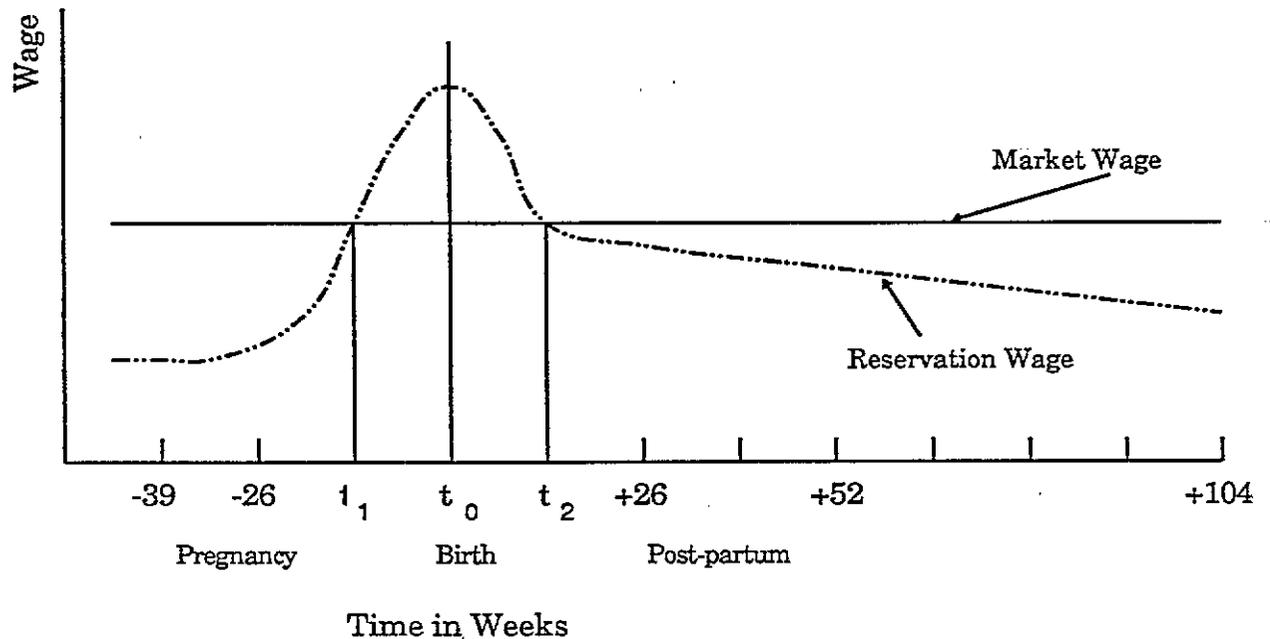


Fig. 1—Time Path of Reservation Wage

Since the utility of not working will vary with the point in pregnancy or, later, the age of the child, the reservation wage is a function of the child's age. As delivery nears, changes in the value of time at home generate observed labor supply behavior. Figure 1 presents a stylized illustration of the changes in the values of market and home time from the time of conception, through delivery at t_0 and finally, return to work.

As pregnancy progresses, a woman's productivity on the job may fall. This decline occurs earlier in jobs that require strenuous physical activity and later in jobs that are less physically demanding (See Desai and Waite, 1991). The substantial physical changes accompanying childbirth also lower market productivity in the immediate postpartum period. We have, nevertheless, drawn the wage as constant because it is illegal for employers to lower a woman's wages because she is pregnant (Pregnancy Discrimination Act of 1978).¹

¹This also abstracts from real wage growth due to accumulating experience. Over the short intervals under consideration here, this is unlikely to be a major distortion. At some point, market productivity reaches a minimum and begins to rise again. The relation of the new level after return to work relative to the pre-interruption level is the subject of an ongoing literature (see Mincer and Polachek, 1974; Mincer and Ofek, 1982).

The value of time not-working tends to rise near birth. During pregnancy, additional home time may be productive in averting a premature birth. After the delivery, the presence of an infant raises the value of the mother's time in the home (Gronau, 1973). Similarly, the belief that the mother's continuous presence during infancy is an important input to child quality can be interpreted as an increase in the subjective productivity of time at home (see Belsky, Lerner and Spanier, 1984)

Finally, the physical strains of pregnancy and delivery are significant. These strains increase the value of the additional rest that absence from the workplace allows. As the child progresses from newborn, to toddler, to preschooler, the marginal productivity of the mother's time in the home falls. Therefore, we illustrate the home productivity as eventually falling below the market wage (at t_2), and the woman returns to work.

The empirical work that follows estimates reduced form relations for the determinants of the date of leaving work during pregnancy $t_1 \leq t_0$ and the determinants of returning to work after delivery $t_2 \geq t_0$. In terms of the decision problem outlined above, the woman leaves work during pregnancy when the reservation wage (last) rises above the market wage:

$$t_1 = \max\{\tau: \tau \leq t_0 \text{ s.t. } d(\tau) = w(\tau) - r(\tau) > 0\}$$

and returns to work after delivery when the reservation wage (first) falls below the market wage:

$$t_2 = \min\{\tau: t_0 \leq \tau \text{ s.t. } d(\tau) = w(\tau) - r(\tau) < 0\}$$

Figure 1 relates to the problem for a given woman and emphasizes the crucial role of the market wage. We are interested in isolating the factors that shift the function $d(t)$. Previous studies in household production theory, female labor supply, and the medical/development literature suggest a number of variables.

The measures of home productivity include education, marital status, and family income other than the mother's earnings. We hypothesize that education has a differential effect on home productivity in the pre- and postnatal periods. There is evidence that education increases a woman's productivity in child rearing (Leibowitz, 1974). However, there is little reason to believe that education increases home productivity before the birth. Thus, education's positive relationship with labor supply during pregnancy (through its positive effect on market wages) will be offset after the birth by its positive effect on home

productivity. Therefore, we hypothesize that education will be less positively related to labor supply in the postnatal period than it is in the prenatal period.

Higher family income other than the mother's earnings provides more goods with which a woman can combine her time, and therefore implies a higher value of home time. The effect of income in discouraging women's labor supply has long been noted (Mincer, 1962; Gronau, 1973). Net of other family income, marriage should have a positive effect on labor supply after the child is born. We have argued in previous work that marriage provides access to additional child care, both from the husband and from other members of his family (Leibowitz, Waite, and Witsberger, 1987). In addition, marriage generally precludes access to AFDC, which provides a source of income apart from a woman's own earnings.

We also include a time trend in the analyses to account for the fact that attitudes about the productivity of women's home time with children and adjustment of labor market institutions may have been changing over the period studied.

Using this model, we will examine whether the panel data are consistent with any of the alternative hypotheses regarding early return to work: that it is positively related to women's wages, that it stems from lower other-family-income, or that it is merely related to changes in attitudes over time.

DATA

The empirical analyses that follow use data from the NLS Youth Cohort, which is a panel study of a nationally representative sample of individuals 14 to 21 years old in 1979, the initial survey year. The sample overrepresents blacks, Hispanics, and economically disadvantaged non-black and non-Hispanic youths, relative to their proportions in the population. We analyze the subsample of 1372 women who had a first birth between 1979 and 1986 and who worked during their pregnancy. We study only first births in order to simplify the problem by not considering birth intervals, which a study of higher order births would require. In addition, given the relative youth of the sample, we have considerably more observations for first births than for higher order births.

In 1979, a baseline interview collected detailed background information on the sample members. Annual interviews since that time have collected information on educational attainment, marital status, fertility, and employment histories. Rates of sample retention were about 95 percent in the early survey years and somewhat lower in more recent years.

The NLS-Y data contain a week-by-week work history for each member of the sample. These data were developed from annual questionnaires that asked for beginning and end dates for each job. In addition, respondents were asked the start and end dates of any gaps in

work occurring while they were employed by a given firm. They were told to list "(A)ny periods of a full week or more during which (they) did not work for employer, not counting paid vacations or paid sick leave" (Center for Human Resource Research, 1986). Merging this time-series with information on the birthdate of children allows us to construct a pre-delivery work history.

Because we do not know the exact gestational age of the child at delivery, we do not know the exact week in which the pregnancy began. We adopt the convention that all pregnancies are full term, lasting 39 weeks. To estimate the number of weeks worked during the pregnancy, we count backwards from the date of birth. This incorporates some error. However, 74 percent of deliveries occur between weeks 37 and 41 of the pregnancy (Guttmacher, 1956).

We define the events of interest as follows. For work during pregnancy (within the 39 weeks preceding delivery), we record the last week of work during pregnancy. Our sample consists only of women who have given birth, therefore there is no true censoring of work during pregnancy. For work after delivery, we record the first week of work following the birth. A considerable number of women had not returned to work by the time of the last interview.

The independent variables have been constructed to proxy the value of time in the market and at home, as described above. The hourly wage rate is the real wage rate in 1986 dollars at the job held one year before delivery. For women who did not report an hourly wage rate, we divide earnings per unit time by the number of hours worked in that unit of time. We also include a missing wage dummy. By construction, our sample only includes women who worked during pregnancy, so they should all have a wage. The NLS-Y, however, did not collect wage data for women whose usual time commitment to a job was less than 20 hours a week. In addition, we considered that among women for whom we had wage data, that a calculated real wage of less than \$1.00 an hour (in 1986 dollars) was misreported. For both sets of women, we substituted \$3.35 (the value of the minimum wage in 1986) for women in the sample who reported wages under \$1.00 and set the missing wage dummy to unity. Thus, the missing wage indicator also carries the interpretation of low wage.

The income effect is estimated by the coefficient on other income. The corresponding variable is the sum of income of the spouse in the calendar year prior to the birth (if the woman is unmarried, this is zero) and the woman's unearned income in the year prior to the birth (this includes rent, interest, etc.; set to zero if no such income).

We also include the following proxies for the reservation wage: an indicator for mothers who were less than 20 years old at the time of the birth; indicators for women with fewer

than 12 years of schooling, and for women with 16 or more years of schooling (women with 12-15 years of schooling are the comparison group); an indicator for married spouse present at the time of the birth. In addition, we include the calendar year in which the birth occurred. Means and standard deviations of the variables appear in Table 1.

Table 1.
Variable Means and Standard Deviations

	All Women		Women with Gaps in Employment	
	Mean	S.D.	Mean	S.D.
Ln Wage	1.669	.441	1.632	.431
Missing Wage	.034	.181	.036	.186
Other Income (\$000s)	14.893	14.938	14.389	14.896
Education < H.S.	.174	.379	.193	.394
Education 16+	.285	.451	.264	.441
Year of Birth (1979 = 1)	2.346	2.057	2.214	2.031
Age < 20	.210	.407	.232	.422
Married Spouse Present	.664	.472	.648	.478
N	1372		1121	

STATISTICAL METHODS

For the sample of women who were working 39 weeks before the delivery, we estimate weibull hazard models where the dependent variable is the week of gestation at which labor force participation ceased. This is an advance over previous statistical analyses that have independently estimated labor force participation in a period 6 to 12 months before the birth and in a period from 0 to 5 months before a birth (e.g., Mott and Shapiro, 1977). We also estimate hazards for the return to work following the birth.

Both hazards are assumed to be locally of the weibull form:

$$h(t; X, \alpha, \beta) = \alpha e^{X\beta} t^{\alpha-1}$$

with associated survivor function:

$$S(t; X, \alpha, \beta) = \exp[-e^{X\beta} t^\alpha]$$

and density:

$$f(t; X, \alpha, \beta) = h(t; X, \alpha, \beta)S(t; X, \alpha, \beta) = \alpha e^{X\beta} t^{\alpha-1} \exp[-e^{X\beta} t^\alpha]$$

where t is the time worked during pregnancy/not worked after delivery; X is a vector of independent variables, and α and β are parameters to be estimated.

In what follows, we estimate hazards over sub-periods from week a to week b . The contribution to the likelihood of an individual who had not "failed" (quit work during pregnancy/returned to work after childbirth) by time a , and failed at time c : $a < c < b$ is:

$$h(c; X, \alpha, \beta) \exp[-\int_a^c h(v; X, \alpha, \beta) dv] = \frac{f(c; X, \alpha, \beta)}{S(a; X, \alpha, \beta)}$$

The contribution of those who do not fail in (a, b) is:

$$\exp[-\int_a^b h(v; X, \alpha, \beta) dv] = \frac{S(b; X, \alpha, \beta)}{S(a; X, \alpha, \beta)}$$

Estimation is by maximum likelihood. The standard errors are computed using White's (1980) robust formula.

RESULTS

We present our empirical results in four parts. We begin with an examination of the two raw hazards for weeks worked during pregnancy and weeks not worked after delivery. This examination reveals important conceptual and data problems. In the second and third sections we discuss weibull regression results for the determinants of each of the two hazards. The analysis through the third section focuses on the marginal distributions of weeks worked during pregnancy and weeks not worked after delivery. The final section presents a preliminary analysis of the joint distribution of working times.

The Raw Hazards

As noted in the data section, the fineness of the NLS work histories allows us to present a considerably more detailed examination of work near pregnancy than previous research which analyzes work over quarter years (e.g. Even, 1987). Figures 2 and 3 present the raw

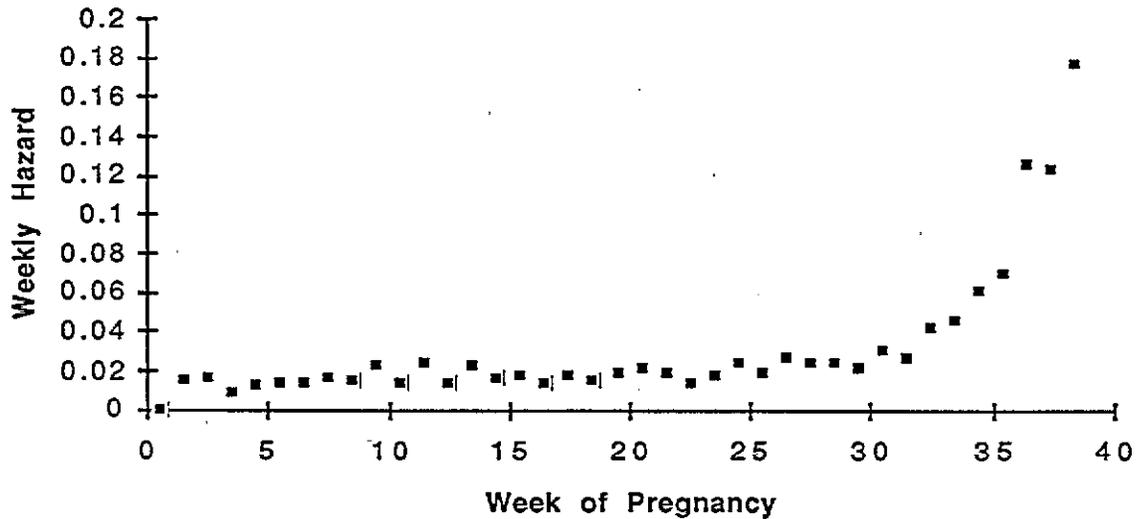


Fig. 2—Hazard for Leaving Work During Pregnancy

hazards--the percentage of women leaving/returning to work as a percentage of women working/not working up to that moment.

The hazards correspond quite closely to the hypothesized stresses of pregnancy and postpartum recovery. Through the first two trimesters, the rate of leaving work drifts up from about 1-1/2 percent a week to about 2-1/2 percent per week. During the final trimester, as a woman's sleep and mobility are more seriously affected, the hazard jumps from 2-1/2 percent to over 15 percent per week.

The pattern immediately after childbirth also corresponds quite closely to physiological expectations. The hazard in weeks two through five is quite low: under 3 percent of the women return to work in those weeks. Starting in the sixth week, the hazard rises sharply, peaking above 6 percent somewhere around the eighth or ninth week.

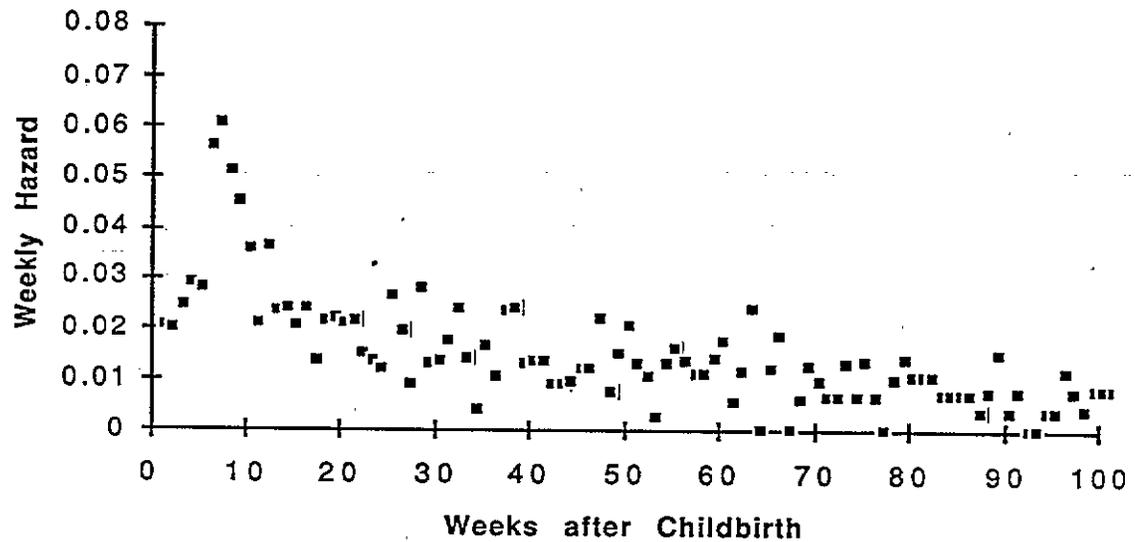


Fig. 3—Hazard for Return to Work After Childbirth

By the twenty-sixth week, the hazard is again below 3 percent. Thereafter, it drifts slowly down to a level well below 1 percent. We interpret this long slow decline in the hazard after about twenty-six weeks as an effect of heterogeneity. As women with greater attachments to the labor force return to work, they leave behind a pool of women with weaker and weaker labor force attachments. This is an issue to which we will return in the fourth section of the results.

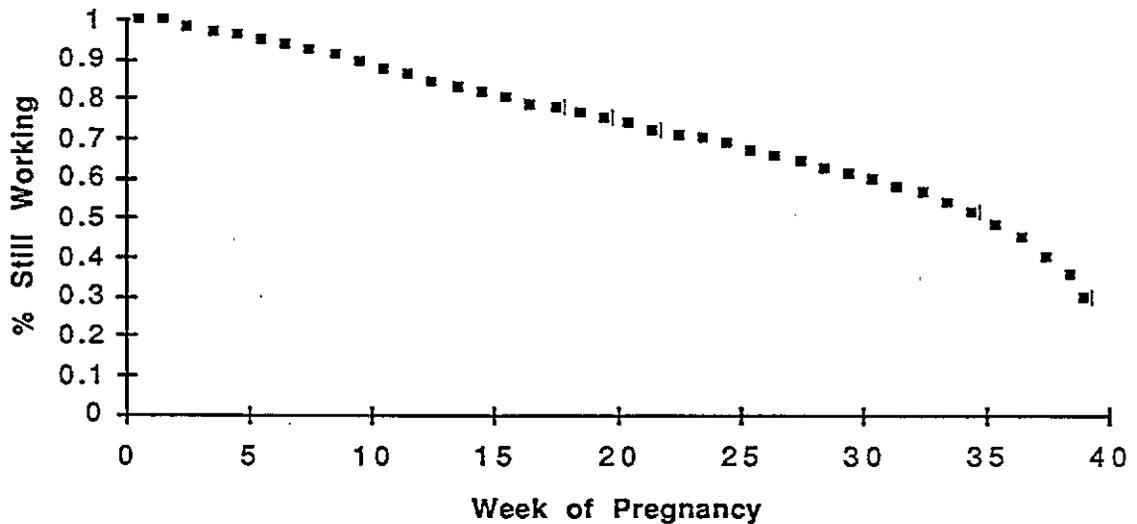


Fig. 4—Survival Curve for Still Working During Pregnancy

The survival curves, Figs. 4 and 5, plot the percentage of women still at work/who have not yet returned to work in each week. They suggest that a third of the women are still working in the week of delivery. Furthermore, over one-fifth of the women report that they returned to work in the week immediately following delivery and the overlap between the two groups is substantial. Table 2, which we discuss in more detail below, presents the joint distribution of work during pregnancy and return to work after childbirth. The lower left corner tabulates the overlap between those working until delivery and those who claim to work in the week following delivery. Nearly all the women who report that they worked in the first week after birth also report that they worked until the last week in pregnancy. That is, they appear to have continuous work experience. It seems unlikely that 20 percent of the sample actually took less than a week off from work. The wording of the question regarding gaps in employment instructed women not to count vacation or sick leave as a gap in employment. Thus, many of the women reporting continuous employment may have returned to their jobs after taking paid vacation, sick leave or maternity leave at the time of delivery.

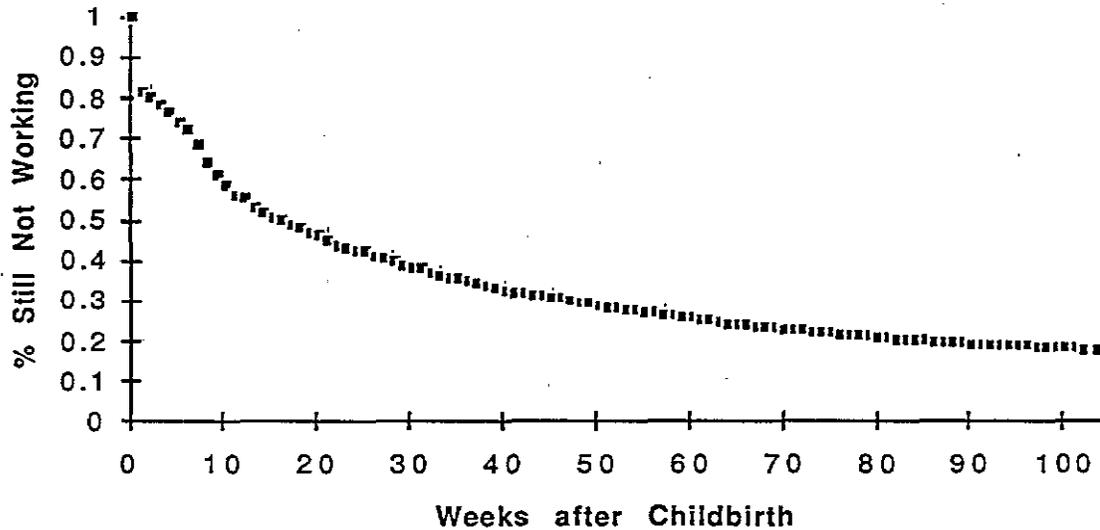


Fig. 5—Survival Curve for Not Yet Working After Childbirth

A special NLS-Y interview in 1983 allows us to gain some insight into the behavior of women who report working in the week immediately before and after delivery. In that year, the NLS asked each woman whether her employer offered maternity leave, the date at which she began maternity leave, and the age of her child when she returned to work. Comparing the more specific data from the 1983 survey with responses to the annual work history survey for the women who reported on both questionnaires sheds light on the interpretation of the work history data. For those women whose longitudinal work history data show that they worked in the week immediately preceding and following birth, only 24 percent report in the Maternity Leave Survey in 1983 that their maternity leave began with delivery. Thus, three-quarters of the women who report in the work history that they were employed in the week preceding delivery, actually began their maternity leave earlier. The inconsistency may actually be smaller than it appears. A woman could work on Monday, take maternity leave on Tuesday and deliver on Wednesday. In that case she would have worked in her "39th" week and have had her maternity leave begin before delivery. Nevertheless, this is unlikely to explain all of the cases in which women report that they were employed in the week of delivery and that their maternity leave began before delivery.

Table 2
Week of Leaving Work in Pregnancy and Week of Return to Work After Delivery

Weeks Left in Pregnancy		Week of Return to Work Following Birth				Total
		Within First Week	2-13	14-52	53-104	
1-13	Overall %	0.26	2.42	6.37	8.41	17.47
	Row %	1.51	13.87	36.48	48.14	100.00
	Col %	1.39	8.35	25.76	30.85	
14-26	Overall %	0.04	3.83	6.80	6.64	17.30
	Row %	0.20	22.14	39.29	38.36	100.00
	Col %	0.18	13.20	27.48	24.35	
27-38	Overall %	0.77	16.24	9.54	10.06	36.61
	Row %	2.11	44.36	26.06	27.48	100.00
	Col %	4.07	55.96	38.56	36.90	
39	Overall %	17.90	6.53	2.03	2.16	28.61
	Row %	62.57	22.81	7.09	7.53	100.00
	Col %	94.36	22.49	8.20	7.91	
	Total	18.97	29.02	24.74	27.27	100.00
	Row %	100.00	100.00	100.00	100.00	

NOTE: The sample is limited to those who reported the birth of the child at or before the 1985 interview. This should allow us to observe the full 104 months following birth for each child. The table includes three cases where the pattern of interviews implied that only 102 or 103 months were observed.

Comparisons of the two data sources lead to similar conclusions for work after pregnancy. Only 9 percent of the women who report in the work history data that they were employed one week after delivery, actually returned to work in the week following delivery, according to the 1983 data. Nevertheless, according to the 1983 interview, new mothers do return to work relatively quickly. Almost three-quarters have returned by two months, and almost 95 percent by three months.

The discrepancy is conceptual. The maternity leave data specifically asks about time on leave. The work history data which we use included probes specifically instructing the woman not to count vacation or sick leave as time not worked. Thus, strictly speaking, the work history data reports the probability/hazard of "paid employment." Paid leave is counted as employment. The concept therefore corresponds to labor force participation, except that the unemployed are not included.

Because this conceptual problem affects one quarter of the sample, in the work that follows we first analyze the probability of continuous employment, which is nearly

equivalent to taking some form of paid leave. We then analyze the time to return to work for those who had some period away from work for which they were not compensated.

Table 3 presents a logistic regression based on the longitudinal data of the determinants of whether a woman reported working in the 39th week of pregnancy (column 1) and returning to work in the week following delivery (column 2).² As we determined for a subsample of these women who gave birth before 1983, most probably did take time off from work. However, the 1983 data also suggest that they generally took off only limited amounts of time. This would be consistent with limited amounts of vacation, sick leave, and maternity leave.

Table 3
Determinants of Work Proximate to Delivery
Logit Coefficients and Standard Errors

Variable	<u>Work until 39th Week</u>		<u>Return in Week of Delivery</u>	
	Beta	s.e	Beta	s.e.
Intercept	-3.065**	0.344	-3.234**	0.357
Ln Wage	1.045**	0.181	0.931**	0.192
Missing Wage	0.689*	0.352	0.444	0.409
Other Income (\$000s)	-0.009	0.006	-0.006	0.007
Education < H.S.	-0.451**	0.211	-0.443**	0.231
Education 16+	0.095	0.153	-0.048	0.165
Year of Birth (1979 = 1)	0.066	0.036	0.105**	0.039
Age < 20	-0.549*	0.214	-0.554*	0.238
Married Spouse Present	0.282	0.176	0.288	0.190

NOTE: *.05 > p > .01

** .01 >= p

The results indicate that women with higher wages are significantly more likely to work to the end of pregnancy and to return to work immediately after pregnancy. There is no evidence of an income effect. Teenagers are less likely to return to work immediately after pregnancy. Relative to those with 12–15 years of schooling, high school dropouts are less likely to work near delivery. Finally, the time trend in the second logistic regression suggests that employment in the week immediately following childbirth is becoming more common (holding everything else constant).

²From Table 2 we see that this latter group is essentially the group of women who worked without a gap.

Work During Pregnancy

Table 4 presents maximum likelihood estimates of the parameters of a weibull hazard model for leaving employment during the first 38 weeks of pregnancy. Women reporting working into the 39th week are treated as censored at 39 weeks. It also reports hazards computed separately for the first two trimesters and for the third trimester. The hazard is clearly upward sloping. Over the entire period, the point estimate for α , the shape parameter, is 1.90 with a standard error of 0.07. For $\alpha = 2$, the weibull hazard is a straight line through the origin. For $\alpha > 2$, it is convex. The convex pattern is confirmed by the piecewise hazards. For the first two trimesters, the hazard is significantly but weakly increasing ($\alpha = 1.27$, with a standard error of 0.05). For the final trimester, $\alpha = 9.95$ with a standard error of 0.52, confirming the qualitative description of the raw hazard given in the first part of this section.

Table 4
Last Exit From Work During Pregnancy
Hazard Regression Coefficients and Standard Errors

	Weeks 1 to 38		Weeks 1 to 26		Weeks 26 to 38	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Intercept	-6.140**	0.284	-4.272**	0.260	-35.680**	1.904
Ln Wage	-0.340**	0.073	-0.377**	0.112	-0.419**	0.100
Missing Wage	0.016	0.148	0.120	0.184	-0.344**	0.263
Other Income (\$000s)	0.005	0.004	0.010*	0.005	0.001	0.004
Education < H.S.	0.223**	0.080	0.325**	0.116	0.126	0.126
Education 16+	-0.168**	0.063	-0.455**	0.129	-0.008	0.092
Year of Birth (1979 = 1)	-0.022	0.015	-0.013	0.025	-0.047*	0.022
Age < 20	0.235**	0.077	0.295**	0.119	0.202	0.122
Married Spouse Present	-0.216**	0.078	-0.479**	0.124	-0.019	0.106
Shape Parameter	1.900**	0.070	1.270**	0.052	9.952**	0.518
N	1372		1372		879	

NOTE: * .05 > p > .01
 ** .01 >= p

Sample includes only women who had a job during pregnancy and who reported a job leaving date in pregnancy (854 women).

We turn now to the effects of the covariates. Higher wages significantly lower the hazard of leaving the job during pregnancy, increasing the length of time a woman stays at work. Other household income (income from a spouse and unearned income) has only a weak effect and only in weeks 1-26. High school dropouts leave work sooner (over the entire period and in weeks 1-26, but not significantly so in weeks 26-39), college graduates leave

work later (again, over the entire period and in weeks 1–26, but not significantly so in weeks 26–39). Finally, married women leave the workplace later (again, the pattern is significant over the entire period and in weeks 1–26, but not in weeks 26–39). We believe that this is related to the availability in some states of AFDC during pregnancy for unmarried women. In future work, we will test this hypothesis by interacting the marriage dummy with an indicator of the availability of AFDC during pregnancy.

It is interesting to note that the effect of covariates is concentrated in the first two trimesters. In the final trimester, only the wage effect approaches statistical significance. This decline in significance is not due solely to the decline in the population at risk from 836 to 410, which decreases the precision of the estimates; the point estimates themselves are consistently smaller in absolute value.

Return to Work after Delivery

Using the sample of women who do not return to work immediately following delivery, the overall hazard of returning to work is falling ($\alpha = 0.80$, see also Table 5, column 1). This overall pattern masks two phases. As in the analysis of the raw hazard, after including covariates the hazard rises sharply in the first quarter following delivery ($\alpha = 1.45$) and falls off sharply thereafter ($\alpha = .51$). We will return to the analysis of the effect of the sample selection on the shape of the hazard in the final section.

The change in hazard may be due to the increased use of maternity leave. There is a strong wage effect throughout. Higher wages cause women to return more quickly. Also in accord with neo-classical labor supply theory, there is a consistent and significant effect of other income. High school drop-outs return more slowly. Those with some college return more quickly (though the significance of the latter is weak). There is a weak time effect concentrated in the first period. Women in later cohorts return to work more quickly. Surprisingly, women less than 20 years old return to work more quickly (again the significance is weak). Finally, married women return to work more quickly.

Table 5
Return to Work Following Birth
Hazard Regression Coefficients and Standard Errors

	<u>Weeks 1 to 104</u>		<u>Weeks 1 to 13</u>		<u>Weeks 13 to 104</u>	
	Coeff.	s.e.	Coeff.	s.e.	Coeff.	s.e.
Intercept	-3.722**	0.187	-5.163**	0.276	-2.234**	0.464
Ln Wage	0.330**	0.096	0.353**	0.126	0.260**	0.116
Missing Wage	-0.409*	0.180	-1.042*	0.426	-0.190	0.200
Other Income (\$000s)	-0.024**	0.004	-0.026**	0.006	-0.019**	0.006
Education < H.S.	-0.358**	0.099	-0.392**	0.149	-0.290*	0.120
Education 16+	0.259**	0.092	0.168	0.119	0.311*	0.123
Year of Birth (1979 = 1)	0.015**	0.021	0.063*	0.027	-0.027	0.027
Age < 20	0.206*	0.097	0.069	0.143	0.282*	0.119
Married Spouse Present	0.470**	0.104	0.548**	0.143	0.354**	0.134
Shape Parameter	0.803**	0.017	1.450**	0.059	0.510**	0.076
N	1119		1119		712	

NOTE: * .05 > p > .01
 ** .01 >= p

Sample includes women who reported a job leaving date in pregnancy and who did not report to work in the week of delivery.

Joint Distribution

We conclude this paper with a preliminary discussion of the joint distribution of the two hazards. In his work on return to work after pregnancy, Even (1987) included as a regressor the number of months prior to delivery that a woman quit work. Not surprisingly, it is a good predictor of return to work behavior. Our analysis of the NLS-Y data suggest that work before pregnancy is endogenous.

The relationship between early job-leaving in pregnancy and later return to work after delivery is clear from the cross-tabulations reported in Table 2. The rows represent when the women quit work during pregnancy, (1-13, 14-26, 27-38, and 39 weeks respectively); the columns represent when the woman returned to work after pregnancy (1, 2-13, 14-52, 53-104 weeks). There is still considerable weight on the inverse diagonal.

Among women who quit work in the first trimester of pregnancy, 15 percent (1.51 + 13.87) returned to work in the first quarter year after the birth. Of women who left work in the second trimester, 22 percent (0.20 + 22.14) had returned in the first quarter. But among women who worked 27 to 37 weeks into their pregnancies, fully 45 percent (2.11 + 44.36) returned to jobs in the first quarter after the birth.

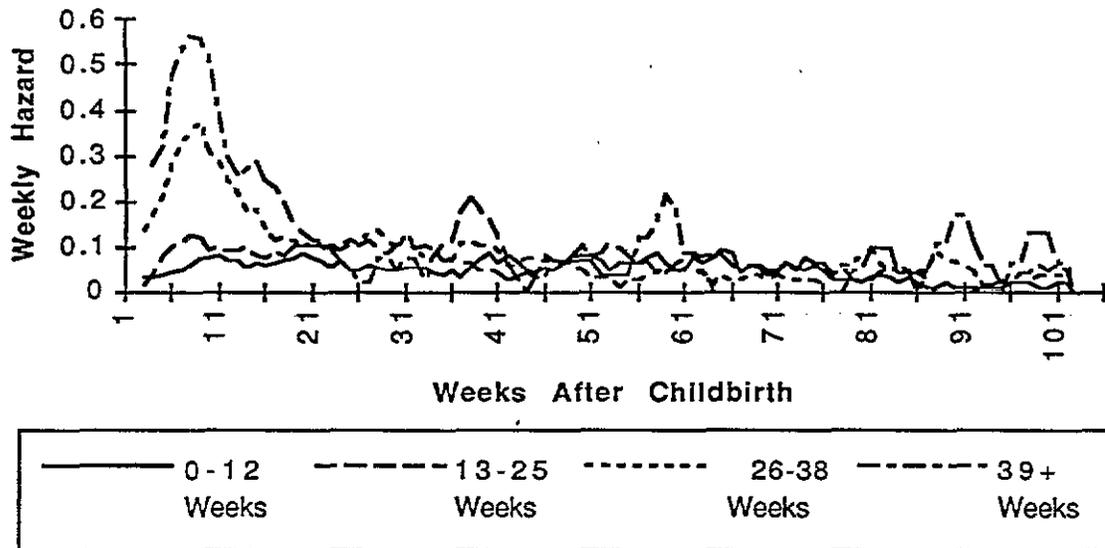


Fig. 6—Hazard for Return to Work after Childbirth Stratified by Weeks Worked During Pregnancy

Figure 6 provides a complementary perspective. The four lines plot the hazard functions for return to work after delivery for each of four groups:³ those who left work in weeks 1–13, 14–26, 27–38, and 39 weeks of pregnancy. The figure shows that women who work latest into pregnancy return to work most quickly after childbirth. It is interesting to note that all of the plots share a common shape. The hazard begins at a low level in the first week, rises to a peak near the end of the first quarter, and declines slowly thereafter. This result suggests that the proportional hazard specification used in the hazard regressions is correct. The joint behavior of the two hazards is the subject of ongoing research.

DISCUSSION

Labor supply by pregnant women and recent mothers has expanded rapidly in the last quarter century, and particularly in the past 10 years. The expansion has been greatest for the mothers of the youngest children. This paper is the first to examine data for the 1980's, a period during which major changes in labor force behavior of new mothers have occurred.

³The plots have been smoothed using the simple average of the five points closest to each point.

Three hypotheses have been proposed to explain this increased work by pregnant women and new mothers: the growth of women's wages (substitution effect), the decline of other family income, and secular change. We find evidence that higher wages are associated with increased work near childbirth. The evidence for an income effect is somewhat weaker. Finally, birth year as a measure of cohort and secular change has only limited effects. Thus, trends in LFP are consistent with a behavioral response to rising women's wages and stagnant or falling men's wages over the period studied.

Unlike previous studies that use quarterly or annual intervals since the birth, we have analyzed employment at weekly intervals. As women remain at work longer in pregnancy and return to work sooner after birth, such finer intervals of data collection become increasingly important. These more detailed data yield some interesting additional findings. First, while we have found some evidence to support the implications of neo-classical economic theory, the effects are not uniform. The effects are strong in some quarters around birth and nonexistent in others. Analyses without detailed information on exactly when women exit and enter the workforce will miss the time-varying effects of these economic variables.

The low hazard of return to work in the immediate post-partum period suggests that part of the wage effect is mediated through the effect of maternity leave. As women move into higher paying jobs they are more likely to have maternity leave, sick leave, and vacation time that allow time away from work, as well as employment continuity. The various forms of maternity leave allow women to preserve continuous labor force attachment while remaining home during the crucial early postpartum period. Such leave may be particularly valuable to high wage women, who have job-specific training.

Our future work will more completely analyze the interrelation of maternity leave, employment, and actual time at the job. In addition, we plan to continue to explore the non-monotonicity of the hazard and the time-varying effects of the covariates in models that exploit the correlation in the unobservables across the two decisions.

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