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Maternity leave and the employment of new mothers in the United States

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Abstract. We use data from the National Longitudinal Survey of Youth to examine the relationships between maternity leave coverage and U.S. women's post-birth leave taking and employment decisions from 1988 to 1996. We find that women who were employed before birth are working much more quickly post-birth than women who were not. We also find that, among mothers who were employed pre-birth, those in jobs that provided leave coverage are more likely to take a leave of up to 12 weeks, but return more quickly after 12 weeks. Our results suggest that maternity leave coverage is related to leave taking, as well as the length of time that a new mother stays home after a birth.

JEL classification: I3, J00

Key words: Maternity leave, women's employment

1. Introduction

Although maternity leave policies have been significantly expanded in the United States over the last two decades, new mothers in the U.S. still tend to have shorter periods of job protected leave and less access to paid leave than women in other advanced industrialized countries (Kamerman 2000; Waldfogel 2001b). New mothers in the U.S. also differ from their peers in other

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nations in that they tend to return to work much more quickly after birth (Gustafsson et al. 1996; Smith and Bachu 1999). The fact that women return to work so much more quickly in the U.S. than in other nations is probably the result of a combination of preferences, social norms, and opportunities, as well as employer and government policies (Hofferth 1996). However, there is no definitive evidence regarding the relative importance of maternal characteristics, employment characteristics, and maternity leave policies in determining the rate at which new mothers begin or resume work after giving birth in the U.S. Thus the extent to which maternity leave expansions in the U.S. may influence the rate at which women in that country return to work post-birth is unclear from the research to date.

In this paper, we use data from the National Longitudinal Survey of Youth (NLSY) to examine the links between maternity leave coverage and women's post-birth leave taking and employment decisions from 1988 to 1996. In particular, we are interested in the extent to which maternal characteristics, pre-birth employment, and pre-birth maternity leave coverage are associated with the number of weeks women remain at home after childbirth. To briefly preview the results, we find that employment prior to birth has a strong relationship with post-birth work, with women who were employed before birth working much more quickly post-birth than women who were not. We also find that, among mothers who were employed pre-birth, those in jobs that provided leave coverage are more likely to take maternity leave of up to 12 weeks. But, after 12 weeks (the limit of coverage provided by many policies, including the federal Family and Medical Leave Act), these women resume work more quickly than mothers who are not covered. These results suggest that maternity leave coverage is related to the length of time that a new mother stays home after a birth.

2. Background

2.1. Policy context

The United States did not have a national maternity leave policy until 1993 (although employers who offer temporary disability coverage to employees have been required to offer the same coverage for maternity leave since the passage of the 1978 Pregnancy Discrimination Act). Prior to that time, maternity leave coverage was generally the result of state law, collective bargaining agreements, and employer policies. Only 12 states (California, Connecticut, Maine, Massachusetts, Minnesota, New Jersey, Oregon, Rhode Island, Tennessee, Vermont, Washington, and Wisconsin) and the District of Columbia required at least some private sector employers to offer maternity leave coverage prior to the passage of the Family and Medical Leave Act (FMLA) (Waldfogel, 1999a). Six of these states (Maine, New Jersey, Oregon, Tennessee, Vermont, and Wisconsin) and the District of Columbia did not enact maternity leave coverage policies prior to 1988. Thus, the period from which our sample is drawn (1988 to 1996) includes substantial changes in maternity leave policy at both the state and federal level.

The passage of the FMLA in 1993 represents the first job protected national maternity leave policy in the U.S. The law requires employers with 50 or more employees to provide 12 weeks of unpaid leave to employees who

have worked at least 1,250 hours in the previous 12 months.[1] Due to the limited scope of the law, only about 60% of private sector employees work for employers who are required to offer leave, and only about 45% qualify for coverage based on their accumulated work hours over the previous year (Commission on Family and Medical Leave 1996; Cantor et al. 2001).

In addition to being limited in its reach, the FMLA has been criticized on several other grounds (see Kamerman 2000; Waldfogel 2001a, b). First, it is much less generous than maternity leave policies in most other industrialized countries. The average length of job protected maternity leave coverage in the 19 OECD countries is 10 months, while the FMLA provides less than 3 months. Furthermore, several European countries offer parenting leaves that extend up to two or three years post-birth. For example, Sweden provides a total of 18 months of maternity and parenting leave, Germany a total of 39 months, and Great Britain a total of 7 months (Waldfogel 2001b). Second, the FMLA offers only unpaid leave. Thus, those employees who either lack paid leave altogether or have paid leave for less than the 12-week period of guaranteed job protection offered by the FMLA may return to work prematurely for financial reasons (Cantor et al. 2001). Although there is some evidence that lengthy periods of maternity leave may harm the overall position of women in the labor market (Ruhm 1998), there is also evidence that such policies are associated with better health outcomes for children, perhaps as a result of longer periods of breast-feeding (see Winegarden and Bracy 1995; Lindberg 1996; Ruhm 2000a; Berger et al. 2002).

Given current U.S. maternity leave policy, it is perhaps not surprising that maternity leave patterns among American mothers are quite different from those of mothers in other industrialized countries. Half of all mothers in Sweden, Germany, and Great Britain take maternity leaves for longer than 15, 24, and 36 months, respectively, and only about five percent of mothers in any of these countries return to work within three months of giving birth (Gustafsson et al. 1996). In contrast, about a third of all U.S. mothers return to work within three months of giving birth, and half return within four to six months (Klerman and Leibowitz 1990, 1994, 1999; Smith and Bachu 1999). As a result, among all mothers of infants (under age one) in the U.S., fully 55% are in the labor force (Bachu and O'Connell 2001).

2.2. Prior evidence

There is a considerable amount of evidence that both pre-birth work patterns and maternity leave policies are associated with women's post-birth employment decisions in the U.S.[2] Most recently, Smith et al. (2001), analyzing data on over 50,000 first births from the early 1960s to the early 1990s in the Survey of Income and Program Participation (SIPP), found that women who worked during pregnancy were much more likely to work after birth, and returned to work sooner after birth, than women who did not work during pregnancy. Having used maternity leave was also associated with earlier returns to work post-birth in this study (actual maternity leave coverage was not available in the data). Prior research also reports a strong link between pre-birth employment and women's post-birth employment, as well as links with other pre-birth characteristics of the woman and her family. Hofferth

(1996), using a sample of 613 mothers from the 1990 National Child Care Study, found that women who worked during pregnancy were at 12 times greater risk of returning to work in the year after birth than women who did not work during pregnancy. She also reports that, among mothers working pre-birth, those in families with higher other family incomes were less likely to return to work than other mothers. In regard to policy variables, the availability of part-time work and liberal leave policies were associated with earlier returns to work for mothers working pre-birth.

Leibowitz et al. (1992), using data from the NLSY, report that women with higher other family incomes return to work at slower rates, but that women with higher own wages return more quickly. Desai and Waite (1991), also utilizing data from the NLSY, find that occupational characteristics that result in higher opportunity costs of withdrawal from the labor force (e.g., jobs that pay higher wages and/or require greater levels of education or specialized training) decrease the probability that a new mother will stay at home. They report positive effects of higher education, higher wages, and job-specific training on return to work. O'Connell (1990), using data from the 1984 and 1985 panels of the SIPP, for women having a first birth between 1980 and 1984, finds that mothers who worked pre-birth are more likely to return to work quickly, as are African-American, unmarried, and less educated women, and women who received maternity benefits. Greenstein (1989) in a study of 736 married women from the National Longitudinal Survey of Labor Market Experience of Young Women, who gave birth between 1968 and 1983, in the National Longitudinal Survey of Labor Market Experience of Young Women, reports that new mothers' pre-birth work experience, income, education, and age at first marriage are all positively related to earlier returns to work.

Turning to leave coverage, there is some empirical evidence linking coverage to leave taking, leave length, and women's returns to work at their pre-birth jobs. In a pre-FMLA study, Klerman and Leibowitz (1998a) utilized 1980 and 1990 U.S. Census data and found an association between state maternity leave statutes and longer leave taking for mothers covered by these laws. Their results suggest that women covered by state job protected leave policies take maternity leaves that are approximately two weeks longer than those taken by uncovered mothers. In other pre-FMLA studies, Waldfogel (1998) using a sample of 1,347 mothers from the NLSY found that women were more likely to return to employers who provided leave coverage than those who did not; Glass and Riley (1998), in a study of 324 randomly selected pregnant women in north central Indiana in 1991 and 1992, reported that, post-childbirth, women were more likely to return to those employers who offered longer periods of maternity leave; and Joesch (1997) analyzing data from the 1988 National Survey of Family Growth found that women with paid maternity leave benefits were more likely to take leave, but that they also returned to work more quickly.

There have been three studies of relationships between leave coverage and new mothers' employment post-FMLA. Waldfogel (1999b), in analyses of women with infants in the 1992 to 1995 March Current Population Survey (CPS), reports that women who gained leave coverage under the FMLA were more likely to be on leave. Ross (1998), using data from the 1990 to 1995 panels of the SIPP, reports that women who gained coverage under the FMLA took approximately six weeks more unpaid leave post-birth. Han and

Waldfogel (2003) use SIPP data from a longer time period (1990 to 1998) and find that women who gained coverage under the FMLA took about three weeks more unpaid leave post birth.

Our study expands upon previous research by including more detailed information regarding entry and reentry into the labor force, data on both paid and unpaid leave-taking, and a very recent cohort of mothers. Using NLSY data for women giving birth between 1988 and 1996, we analyze the links between maternal and family characteristics, pre-birth employment, pre-birth job characteristics, and leave policies and the number of post-birth weeks a mother spends at home. We extend prior research in three specific ways.

First, our analysis of post-birth employment considers weekly activity in the year after birth. In contrast, previous studies have been limited to analyses of whether a woman was on leave, but not the length of leave (Waldfogel 1999b), or have analyzed the duration of leave in months but not in weeks (Hofferth 1996; Klerman and Leibowitz 1998b). Our ability to track leave length in weeks is a considerable extension of existing research because U.S. leave policies generally provide a specific number of weeks allowed for parental leave (as opposed to longer periods, such as months) and because women's leave taking behaviors are much more likely to be affected in terms of weekly units than longer periods of time. For example, temporary disability coverage typically allows women 6 weeks of leave, which would not be precisely estimated in models that used month of return as the outcome of interest. Empirically, we also see that, in this sample, women are most likely to return in weeks 1, 7, 8, 9, 10, 11, and 12. Distinctions between these return periods would be missed by coarser outcome measures, especially considering that there appear to be weekly differences in the likelihood of return to work for mothers with leave coverage as opposed to those without (see Table 2).

A second advantage of the present study is that we have data on both paid and unpaid leave-taking. This allows us to track the total length of time that women are out on leave. Studies that track only one type of leave-taking may miss associations between leave policies and total leave-taking, if relationships between policies and unpaid and paid leave differ. This is an important limitation of the SIPP studies mentioned above (Ross 1998; Han and Waldfogel 2003), which track only unpaid leave-taking and, therefore, can not analyze relationships between leave coverage and total leave-taking.

A third advantage of this study is that we use a very recent cohort of mothers. Most of the prior work on this topic has studied mothers who gave birth in the 1980s, except for the SIPP studies which, as noted, provide only a partial view of leave usage, and the CPS study which did not consider leave duration. Thus, ours is the first study to examine the connection between maternity leave coverage and total leave duration for women post-FMLA.

It is important to note that this analysis is limited by our inability to show that the relationships between leave coverage and leave length are causal. It is possible that, rather than leave coverage affecting women's leave taking behaviors, women who value maternity leave simply select into jobs that provide leave coverage and, possibly, jobs that provide coverage which allows a leave of their preferred length. While our empirical models can not distinguish between these two stories, they provide direct evidence that there are associations between leave coverage and women's leave taking and employment behaviors. Thus, these analyses point to important relationships that can be the subject of further research. Moreover, prior research has estab-

lished that legislative maternity leave expansions over the period that we study were associated with employers' expanding their leave coverage (see, for instance, Waldfogel 1999a). The evidence that we provide on the links between employer policies and new mothers' post-employment behavior may therefore be policy-relevant.

3. Theoretical framework

In order to estimate associations between leave policies and other factors and women's decisions about taking leave and (re)entering work, we begin with the theoretical framework developed by Klerman and Leibowitz (1998b). In the Klerman and Leibowitz model, the amount of time that a woman spends at home after a birth is a function of the length and type of leave coverage provided by the employer and of her preferences about when to return to work. A woman can not choose to remain on leave indefinitely, or to receive pay during a leave indefinitely; rather, the date by which a woman must return to work if she is to keep her job, and the length of leave time for which she will be paid, are determined by her employer and/or by public policies. Thus, those policies may enter into a woman's decision as to whether or not to return to work at any point in time. Additionally, a woman who is employed pre-birth will have an added incentive to return to work within the permitted leave period (rather than to quit her job) because, all else equal, she will typically receive a higher wage by returning to her pre-birth employer than she would by seeking new employment. However, returning to work within the permitted leave period may require a woman to take a shorter leave than she would otherwise prefer to take, particularly in the U.S. context where the job protection period may be as little as six weeks and is not often more than 12 weeks. The woman's decision will be affected by a number of economic factors including her wages in her pre-birth job, the characteristics of her pre-birth job, her potential wages upon returning to work, and current family wealth or financial need (Hofferth 1996; Lindberg 1996; Ondrich et al. 1996; Klerman and Leibowitz 1998a, 1998b, 1999). It will also be affected by less tangible factors such as her preferences regarding providing care herself versus using non-maternal child care, and regarding breast-feeding versus bottle-feeding.

An important feature of the model is that a woman will have to choose between returning to the same job within the leave length permitted by the employer or public policies, or quitting her job to remain home for a longer period (and to then potentially return to a new job at a lower wage). For some women, the length of leave that they would prefer to take will fall within the permitted leave period. For others, the length of leave that they would prefer to take will fall outside the permitted leave period; for some subset of these, the combination of financial incentives will lead them to return within that period anyway, while for another subset, the combined incentives will not.

The model generates some specific predictions as to how certain characteristics will affect women's return to work decisions. For instance, women with greater labor force attachment and higher pre-birth wages and/or greater financial need should, all else equal, return to work more quickly. Most critical for our analysis, women who were employed pre-birth and had leave

coverage should be more likely to return to their pre-birth employer and to return to work within the permitted maternity leave period, which we assume to be generally at least 6 weeks (the usual period of medical disability) but not more than 12 weeks (the limit of coverage provided by many policies, including the FMLA).[3]

4. Data and methods

We use data from the Geographic Micro-Data, Children and Young Adults, and Work History files of the National Longitudinal Survey of Youth (NLSY). Our sample consists of births between 1988 and 1996. We chose these years because it is not possible to accurately identify beginning and ending dates of maternity leave periods in the NLSY prior to 1988 and because 1996 was the latest year for which work information in the year after birth was available. This time period is well suited for analysis, since it includes a relatively recent cohort of births and was a period of considerable changes in state and federal legislation related to maternity leave, including the passage of the FMLA.

The NLSY includes a national population sample of young women who were 14 to 21 years old in 1979. While the sample is representative of these women, it is not necessarily representative of their births, as this cohort's fertility is ongoing. Thus, some births, particularly those that will occur for older women, who are also more likely to have higher levels of income and education, will not be included in this sample. However, Ruhm (2000b) argues that, by the end of 1995, the NLSY data cover about 80% of childbearing for this cohort; furthermore, while these sample selection issues should not be ignored, these data are more representative than those used in most other studies of this nature.

As the primary focus of this paper is maternal work in the year after birth, we estimate a series of models for the number of weeks that a woman began or resumed working after giving birth. In order to construct this measure, we began with each birth in our sample period and linked each child to his or her mother in the main NLSY file, as well as in the Work History file. We then created employment histories spanning the period of 12 weeks prior to birth to 52 weeks post-birth for each mother. These employment histories allowed us to determine whether a mother was employed within the three months before birth and whether she returned to work within the first year after birth, as well as the amount of time she spent at home. Specifically, we identified maternity leave periods for each mother who worked both pre- and post-birth, using four sets of variables: (1) maternity leave variables from the main NLSY file; (2) employment "gap" data from the Work History file; (3) weeks before and after birth maternity leave started/ended variables from the Child and Young Adult file; and (4) weeks worked in the quarters before and after birth data from the main file. These variables allowed us to determine if a mother took any maternity leave, as well as the date that each leave period began and ended.[4] The data also allow us to determine when a mother completed a period of leave and returned to the same job, and when she began a different job. Of the 3,258 births between 1988 and 1996 in the NLSY Children and Young Adults file, we found 2,004 mothers who were employed pre-birth, 1,967 mothers

Table 1. Employment, leave coverage, and leave-taking for mothers in the NLSY, 1988 to 1996

Panel A: Mothers' employment pre- and post-birth

	N	% Of all births
1) All births	3,258	100.0
2) Mother employed pre-birth	2,004	61.5
3) Mother worked pre- and post-birth	1,745	53.6
a. Same job pre-and post-birth	1,542	47.3
b. Different job, or can't determine	203	6.3

Panel B: Leave coverage of mothers employed pre-birth

	N	% By leave coverage category	% Of all mothers working pre-birth
1) Mother employed pre-birth	2,004		100.0
2) Mother had leave coverage	1,498	100.0	74.8
a. Returned to same job post-birth	1,192	79.6	59.5
b. Started different job post-birth	119	7.9	5.9
c. Did not work within 12 months	164	11.0	8.2
d. Can't tell if working at same job	23	1.5	1.1
3) Mother did not have leave coverage	234	100.0	11.7
a. Returned to same job post-birth	147	62.8	7.3
b. Started different job post-birth	30	12.8	1.5
c. Did not work within 12 months	53	22.7	2.6
d. Can't tell if working at same job	4	1.7	0.2

Note: Tabulated by the authors from the NLSY. For Panel A, there are 34 cases for which we can not determine whether the mother returned to the same job post-birth. Panel B includes all 2,004 births to NLSY respondents between 1988 and 1996, where the mother was employed prior to the birth. Leave coverage status is unknown for 13.6 % these women.

working after birth, 1,745 working both pre- and post-birth, and 1,542 in the same job pre- and post-birth (see Table 1).

We use Cox proportional hazards models to estimate the rate at which mothers begin or resume work during the first year after the birth of a child. Cox proportional hazards models have been widely utilized in analyses of post-birth employment behavior (see, for example, Gustafsson et al. 1996; Hofferth 1996; Ondrich et al. 1996), and offer the advantage of not having to specify the distribution of the hazard. Because our period of observation ends at 52 weeks, mothers not working at any time between birth and 52 weeks are considered right censored.[5] We test separate models of rate of return to work for all mothers and for mothers working pre-birth.

One limitation of the Cox model is that it assumes that the effects of all of the covariates are time invariant. That is, it assumes that the change in the hazard rate associated with covariates is proportional throughout the analysis time. We tested this assumption using methods outlined in Grambsch and Therneau (1994)[6] and found that several of our predictor variables violated this assumption. In particular, pre-birth employment and leave coverage status were found to have different associations with the risk of working at different points in time. For example, we found that having leave coverage is associated with a decreased risk of return early on, but an increased risk of return later in the year (see Fig. 4). In order to account for these time-varying effects, we interact these variables with time in our model. Specifically, we

split our data at 7 and 13 weeks allowing us to estimate risk of return for mothers in three distinct time periods. For each birth, we then have 3 potential observations of the mother's work behavior (at 0 to 6 weeks; 7 to 12 weeks; and 13 to 52 weeks). This allows us to estimate relationships between maternity leave coverage and work during each of these time periods.

We chose these particular time periods for two reasons. First, they are both policy and theoretically relevant. A large proportion of women will be entitled to at least 6 weeks of leave under medical disability coverage. Another group of women will be entitled to 12 weeks of leave under employer or state policies, or under the FMLA. Coverage is much less likely to extend for 13 or more weeks (although it may in some cases). Our second reason for choosing these particular time periods is empirically motivated – we observe substantial changes in the survival rate of covered and uncovered women between 7 and 13 weeks (see Table 2). For example, at 7 weeks, women with coverage have a greater survival rate (i.e., rate of remaining on leave) than women without coverage. After 8 weeks, women with coverage have a lower survival rate, and by 13 weeks, they are much less likely to remain at home.[7]

Each model includes four sets of predictor variables: employment/coverage variables, maternal/family variables; child variables; and a set of dummy variables representing the years 1989 to 1996 (1988 is the reference category). The latter allow us to control for year effects, whether due to changes over time in state and federal policies, norms or attitudes about women working, or other factors that might affect women's employment decisions.

As we are primarily interested in relationships between employer provided leave coverage and post-birth work, we model several employment/coverage related variables. Specifically, we include whether a mother was employed pre-birth and, if so, whether her pre-birth job offered leave coverage or whether her leave coverage status was unknown (not having leave coverage is the reference category) [8]. These variables allow us to estimate the associations between pre-birth employment, employer-provided leave coverage, and post-birth employment behavior.

Maternal/family variables included in the models are: mother's age; mother's education; parity (whether the child is her first); race/ethnicity (controls for being African-American or Hispanic, with the reference category being non-Hispanic white or other); mother's marital status (controls for not married, with the reference category being currently married); and the natural log of other family income (i.e., not including the mother's earnings) in the year prior to the birth. Finally, we control for the child's sex (whether the child is female) and low-birthweight (i.e., whether the child weighed 5.5 pounds or less at birth)[9].

5. Results

5.1. Descriptive statistics

As shown in Panel A of Table 1, about 62% of women in the NLSY who gave birth between 1988 and 1996 were working prior to the birth. Over half (54%) were working both before and after the birth, with nearly half (47%) in the same job both before and after the birth. Among women who were working prior to the birth, 75% had maternity leave coverage (Panel B).

Table 2. Kaplan-Meier survivor function estimates of the proportion of women remaining home after birth

	All mothers	All mothers by pre-birth employment status		Mothers employed pre-birth by return to same job		Mothers employed pre-birth by leave coverage status	
Week:	(1)	(2) Not employed pre-birth	(3) Employed pre-birth	(4) Did not return to same job	(5) Returned to same job	(6) No leave coverage	(7) Had leave coverage
1	0.9317	1.0000	0.8885	1.0000	0.8546	0.8289	0.9137
2	0.9224	0.9984	0.8744	0.9953	0.8375	0.8202	0.9036
3	0.9095	0.9976	0.8537	*	0.8105	0.7763	0.8888
4	0.8943	0.9960	0.8300	*	0.7796	0.7500	0.8646
5	0.8767	*	0.8012	*	0.7421	0.7237	0.8363
6	0.8480	0.9952	0.7548	0.9930	0.6822	0.7018	0.7898
7	0.8106	0.9944	0.6942	0.9860	0.6053	0.6711	0.7190
8	0.7611	*	0.6135	0.9836	0.5007	0.6184	0.6314
9	0.7203	*	0.5469	0.9790	0.4151	0.5833	0.5566
10	0.6802	0.9919	0.4828	0.9720	0.3336	0.5658	0.4805
11	0.6489	0.9863	0.4354	0.9626	0.2743	0.5263	0.4313
12	0.6252	0.9839	0.3981	0.9603	0.2263	0.5132	0.3861
13	0.6054	0.9815	0.3673	0.9579	0.1868	0.4956	0.3484
19	0.5467	0.9758	0.2750	0.9089	0.0803	0.4605	0.2406
25	0.5216	0.9629	0.2422	0.8738	0.0474	0.4035	0.2129
31	0.5022	0.9516	0.2175	0.8271	0.0283	0.3728	0.1873
37	0.4886	0.9363	0.2048	0.8037	0.0184	0.3246	0.1792
43	0.4731	0.9137	0.1937	0.7687	0.0138	0.3070	0.1685
49	0.4589	0.8944	0.1826	0.7336	0.0092	0.2982	0.1570
52	0.4499	0.8806	0.1766	0.7150	0.0066	0.2895[a]	0.1509

* No failures (i.e., returns to work) during this week.

[a] This figure is the Kaplan-Meier estimate at 51 weeks as there were no failures (i.e., returns to work) at 52 weeks for this group of mothers.

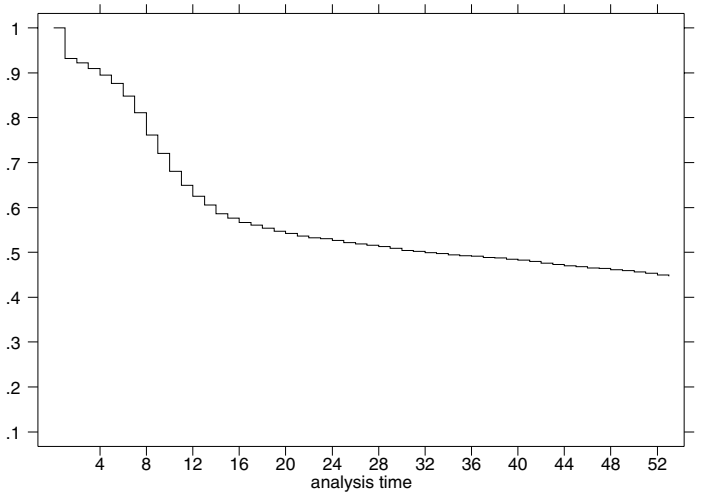

Fig. 1. Kaplan-Meier survivor function of the proportion of women remaining home after birth, by week

Separate analyses by year of birth (not shown in the table) indicate that the rate of coverage in our sample increases over the period, from 72% for mothers giving birth in 1988 to 89% for mothers giving birth in 1996. Women who had coverage were more likely to return to the same job post-birth (80%) than those who did not have coverage (63%).

5.2. Kaplan-Meier estimates

Kaplan-Meier estimates of the survivor function for time at home (i.e., not working in the labor market) for all mothers are displayed in Fig. 1. These estimates, summarized in Column 1 of Table 2, reveal that about 93% of all mothers did not work in the first week after birth, 85% did not work at 6 weeks after birth, 63% did not work at 12 weeks after birth, and 45% did not work at 52 weeks.

However, in Fig. 2 (see also Columns 2 and 3 of Table 2), we see that the survivor functions are quite different for mothers who were employed pre-birth and those who were not. None of the mothers who were not employed pre-birth worked in the first week after birth, while about 11% of mothers who were employed pre-birth were working during that week. At 6, 12, and 52 weeks, 0.5, 1.6, and 12% of mothers who were not employed pre-birth were working, as compared to 25, 60, and 82% of employed mothers. These estimates suggest that the risk of return increases over time for all mothers, but that mothers who were employed during pregnancy are both more likely to work after birth and to begin working more quickly.

In the NLSY data, we know not only whether a woman was working post-birth but also whether she returned to the same job that she had held prior to the birth. As expected, mothers who are returning to their pre-birth jobs begin working much more quickly post-birth than other mothers (see Fig. 3, and columns 4 through 6 of Table 2).

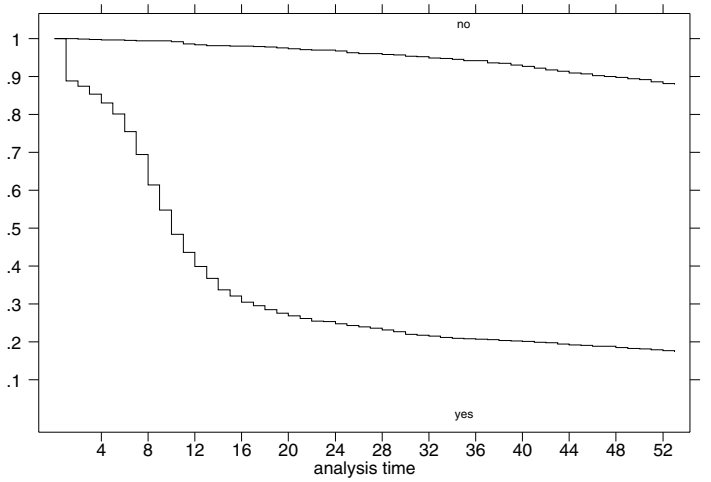

Fig. 2. Kaplan-Meier survivor function of the proportion of women remaining home after birth, by week, and by pre-birth employment status

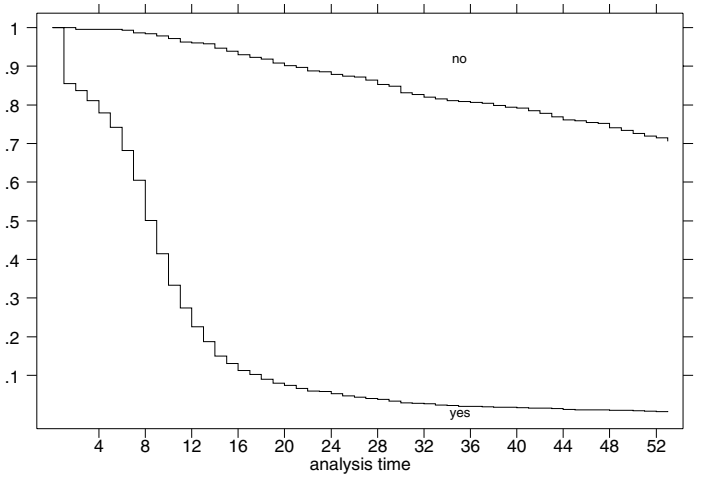

Fig. 3. Kaplan-Meier survivor function of the proportion women employed pre-birth remaining home after birth, by week, and by return to same job

Our primary interest is in whether women who had leave coverage pre-birth return to work at a different rate than other women. The estimates displayed in Fig. 4 (and Columns 6 and 7 of Table 2) suggest that they do. Women with leave coverage initially begin working more slowly than other women, but these women are at greater risk of returning to work after week 9.

These figures suggest that women's post-birth work behaviors differ by whether they were employed pre-birth and by whether their pre-birth jobs provided leave coverage. However, women who were employed prior to the birth, as well as those who worked in pre-birth jobs that provided maternity

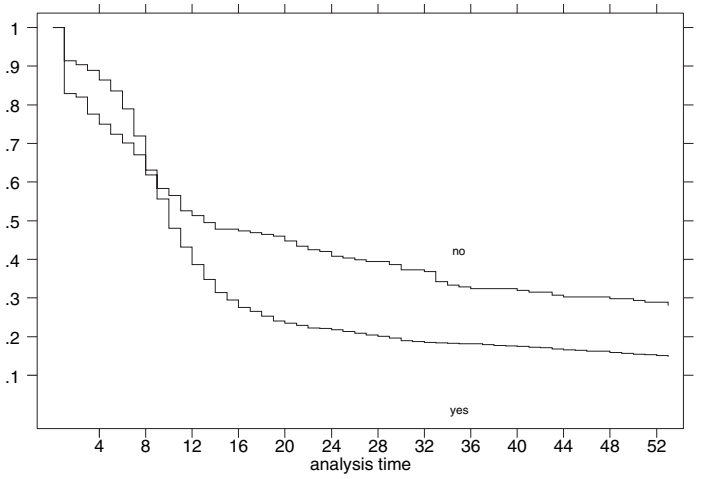

Fig. 4. Kaplan-Meier survivor function of the proportion of women employed pre-birth remaining home after birth, by week, and by leave coverage status in pre-birth job

leave coverage, may differ from other women on a number of characteristics that might be associated with maternity leave-taking or post-birth work behavior. Therefore, we next estimate a series of proportional hazards models that control for other characteristics.

5.3. Proportional hazards estimates

We begin by estimating the links between pre-birth employment and the timing of post-birth work. Table 3 displays results of a set of Cox proportional hazards models used to estimate the rate of beginning or returning to work for all mothers. We find that, among all mothers, those who were employed pre-birth are at 14.5 times greater risk of working within the first year than are those who were not employed prior to the birth (Model 1). However, because pre-birth employment appears to have a different relationship with a woman's chances of returning to work at different points in time, we estimate Model 2, in which we interact pre-birth employment with three periods of analysis time (0–6 weeks, 7–12 weeks, and 13–52 weeks). Here, we see that the association with being employed pre-birth is particularly pronounced in the first six weeks: compared to women who were not employed in the three months prior to giving birth, women who were employed are 61.5 times as likely to work during the first six weeks after birth, 46.4 times as likely to work in weeks 7 through 12, and 7.3 times as likely to work in weeks 13 through 52. The large associations observed for weeks 0 through 12 reflect extremely different post-birth behaviors among women who were employed pre-birth, as compared to those who were not. The raw data reveal that less than 2% of women who were not employed in the three months prior to giving birth began working in the first 12 weeks after birth, while more than 70% of those mothers who were employed pre-birth are back at work by week 12 (see Table 2). Overall, the results of these models suggest

Table 3. Risk of returning to work in the first year after birth (all mothers)

	Model 1		Model 2	
	Hazard ratio	Coeff. (S.E.)	Hazard ratio	Coeff. (S.E.)
Employed pre-birth	14.462*	2.672*	–	–
		(0.089)		
Employed pre-birth*0–6 weeks	–	–	61.460*	4.118*
				(0.381)
Employed pre-birth*7–12 weeks	–	–	46.378*	3.837*
				(0.254)
Employed pre-birth*13–52 weeks	–	–	7.278*	1.985*
				(0.107)
Mother's age	1.010	0.010	1.009	0.009
		(0.012)		(0.011)
Mother's education: high school degree	1.121	0.114	1.120	0.113
		(0.094)		(0.092)
Mother's education: some college or more	1.240*	0.215*	1.233*	0.210*
		(0.095)		(0.093)
Child first birth	0.837*	−0.178*	0.838*	−0.176*
		(0.053)		(0.051)
Hispanic	1.037	0.036	1.031	0.031
		(0.065)		(0.063)
African-American	1.008	0.008	1.004	0.004
		(0.065)		(0.064)
Other family income (ln)	0.991	−0.009	0.991	−0.009
		(0.007)		(0.007)
Not married	1.061	0.059	1.061	0.059
		(0.072)		(0.070)
Low birth weight (5.5 lbs. or less)	0.839	−0.176	0.841	−0.173
		(0.095)		(0.092)
Child female	1.062	0.060	1.062	0.060
		(0.048)		(0.046)
Observations	3222		3222	
Log Likelihood	−12947.244		−12899.465	
Chi-Square (df)	1110.52 (23)		762.79 (25)	

* Indicates statistically significant at $p < 0.05$.

Note: Standard errors are corrected to account for clustering by mother (since women may be in the sample for more than one birth). Sample includes all women for whom we have complete pre- and post-birth work and leave data. Omitted categories: not working pre-birth; mother education: less than high school; white/other race; and married. Models also include dummy variables for year and for missing values on income, education, marital status, and birth weight.

that mothers who were employed prior to the birth are much more likely to work in the year following birth, and that the connection between pre-birth employment and post-birth employment decreases over time. The only other covariates that are significant in these models are maternal education and birth order. Women with greater than a high school degree work sooner and first time mothers work later.

Table 4 presents our estimates of the association between leave coverage and leave length for mothers who were employed in the three months before giving birth. Model 1 suggests that women with leave coverage are at a 40% higher risk of returning to work post-birth than mothers without leave cov-

Table 4. Risk of returning to work in the first year after birth (mothers employed pre-birth)

	Model 1		Model 2	
	Hazard ratio	Coeff. (S.E.)	Hazard ratio	Coeff. (S.E.)
Pre-birth job provided leave coverage	1.395*	0.333* (0.090)	–	–
Pre-birth job provided leave coverage*0–6 weeks	–	–	0.795	−0.229 (0.127)
Pre-birth job provided leave coverage*7–12 weeks	–	–	0.439*	−0.823* (0.170)
Pre-birth job provided leave coverage*13–52 weeks	–	–	1.688***	0.524*** (0.151)
Observations	1982		1982	
Log Likelihood	−11442.012		−11409.617	
Chi-Square (df)	59.61 (24)		120.6 (28)	

* Indicates statistically significant at $p < 0.05$.

Note: Standard errors are corrected to account for clustering by mother (since women may be in the sample for more than one birth). Sample includes all women who were employed three months pre-birth and for whom we have complete pre- and post-birth work and leave data. Omitted category: pre-birth job did not provide leave coverage. Models also control for leave coverage in pre-birth job unknown (interacted with time in Model 2), mother's age, mother's education, child first birth, Hispanic, African-American, other family income, marital status, low birth weight, and child female, as well as dummy variables for year and for missing values on income, education, marital status, and birth weight.

erage. Again, however, the relationship between leave coverage and a mother's chances of returning to work differs at various points in time. Thus, Model 1 is not well specified. We therefore estimate Model 2, which includes interactions between leave coverage and time periods. Here, we see that, compared to mothers without leave coverage, mothers with coverage are about 20.5% less likely to return to work during the first 6 weeks after birth (marginally significant at the 10% level) and 56.1% less likely to return during weeks 7 through 12. In weeks 13 through 52, however, these mothers have a 68.8% greater risk of return. These findings suggest that leave coverage allows mothers greater opportunities to remain at home during the first 12 weeks following birth, but that it is also associated with their being more likely to return to work later in the year.

In the context of the descriptive statistics presented earlier, this finding suggests that leave coverage may function in different directions for different groups of women. In Table 2 (and Fig. 4), we saw that mothers who worked before the birth were more likely to remain at home for the first 8 weeks after birth when they had leave coverage. But, by week 9, these mothers were slightly more likely to return to work than those mothers who worked pre-birth and did not have coverage. This may imply that, for those women who, in the absence of leave coverage, would have returned to work quickly, leave coverage may be associated with an increase in the amount of time they remain at home. At the same time, those women who, in the absence of leave coverage, would have stayed at home longer (and, presumably, returned to a different job) may return more quickly if they are covered. We saw earlier (Table 1) that nearly 80% of women with leave coverage returned to their pre-birth employer (and less than 8% started a new job), compared to just under 63% of uncovered women (about 13% of whom started a new job).

Furthermore, women who worked pre-birth but did not have leave coverage were about twice as likely to remain at home 12 months after birth as were covered women (22.7% versus 11.0%).

On the whole, the proportional hazards results support the suggestion in the raw data that leave coverage is associated with women remaining away from work during approximately the first 12 weeks after giving birth, but with their returning to work later that year. In other results, not shown in the table, we find that older mothers, first time mothers, and mothers with low birth weight babies return more slowly, while unmarried mothers return faster.

6. Conclusions

The results presented here provide new evidence regarding the relationship between pre-birth employment, employer provided leave coverage, and the amount of time mothers remain at home after birth. We briefly summarize the evidence on each of these points below.

With regard to pre-birth employment, we find, as expected, that this is an extremely strong predictor of earlier return to work. Women who were employed during pregnancy go to work more quickly after giving birth than women who were not employed during pregnancy. These findings indicate that women who are employed during pregnancy have a stronger attachment to the labor force than those who are not employed during pregnancy, even after controlling for differences in other characteristics.

Turning to our leave coverage results, we find that, in general, women in pre-birth jobs with leave coverage return to work more quickly than women without leave coverage. This result is consistent with the theory, which predicts that the right to a maternity leave will bring some women back to work sooner. This is not the whole story, however. When we examine interactions between coverage and time, we find that women with leave coverage are more likely to be at home for up to 12 weeks post-birth than women who were employed pre-birth but lacked leave coverage. This finding suggests that leave coverage may be effective in allowing women to stay out longer than the six weeks typically allowed for the period of medical disability associated with childbirth.

At the same time, however, our results indicate that women with leave coverage are considerably less likely to take a leave of more than 12 weeks. This result makes sense, given that the FMLA and most other leave policies in the U.S. do not allow leaves of more than 12 weeks. Thus, in the U.S. context, a woman with job-protected maternity leave coverage would most likely have to return within 12 weeks if she were to keep her job.

Together, these results provide evidence that women who have maternity leave coverage at their pre-birth jobs are more likely to take a leave of 6 to 12 weeks post-birth, but less likely to take a leave that extends beyond 12 weeks. We can not know whether these relationships are causal – it may be that leave coverage is affecting women's behavior, or it may be that women select jobs with such leave coverage because this is the leave length that they prefer in the first place (or it may be that both things are true). But the pattern of results suggests that there might be an impact of leave coverage on women's

behavior and, as such, points to the importance of further research on the relationship between leave coverage and women's behavior.

There are two other questions on which further research would be helpful. First, because the NLSY data do not specify the number of days of leave to which a woman is entitled, we are unable to estimate the relationship between maternity leave *extensions* and maternity leave-taking. Thus, we do not know what effect providing longer periods of leave might have on the length of time that new mothers stay home after a birth. Our data are also silent on *paternal* leave-taking. Although it is true that fathers in the U.S. take very little paternity leave, the FMLA did lead to a very sharp increase in paternity leave coverage (Waldfogel 2001a). Estimating the links between coverage and men's leave-taking, and between men's leave-taking and women's leave-taking, is another important direction for further research.

Endnotes

[1] The FMLA allows an employee to take up to 12 weeks of leave per year, however, these weeks need not be taken consecutively. Thus, a new mother could choose to return to work in less than 12 weeks and keep some leave time in reserve. (We are grateful to an anonymous reviewer for making this point).

[2] Although we focus on the United States, there is also considerable empirical evidence that leave coverage affects women's employment and leave taking behavior in other industrialized countries. See, for instance, Gustafsson et al. (1996); Ondrich et al. (1996, 1998); Ruhm and Teague (1997); Ruhm (1998); Waldfogel (1998).

[3] It is important to note that the model is ambiguous as to how leave extensions, rather than the granting of leave coverage per se, will affect return to work decisions. When the period of job-protected leave is extended, this may induce some women to take a longer period of leave, but might induce others to return to work within the new leave period (rather than quitting the job and staying out of work longer). Thus, Klerman and Leibowitz (1998b) emphasize that the net effect of leave extensions is not clear a priori (see also Blau and Ehrenberg 1997, for a useful discussion on this point).

[4] Because short periods of vacation or sick leave that are not official "maternity leave" may be counted as time at work in the NLSY, we coded women who began a leave period in the first quarter (13 weeks) after birth as beginning that leave period at birth.

[5] Of the 3,222 women for whom we have complete pre- and post-birth job and leave data, 1,432 (44%) had not returned to or begun work within 52 weeks after birth. These women were coded as not returning to work and as right censored in our hazard models. Additionally, we do not consider repeat spells in these analyses, for two reasons. First, we code failures as being mothers' first returns to work after giving birth, regardless of whether they take additional leave thereafter. Second, our unit of analysis is a birth. Therefore, for women who give birth multiple times, each birth is considered a separate case in our sample, rather than a repeat spell for the same mother.

[6] We tested this using the "stphtest" function in STATA.

[7] Alternatively, we could have interacted the covariates with a continuous analysis time measure or split the data at other points. For example, we could have split the data at each analysis week in which case the interaction terms would give us an estimate of the effects of the particular covariate on return to work in each week. We prefer the specification used here because of the empirical and policy relevance of the six-week and twelve-week points.

[8] We drew the data for the leave coverage question from the mother's interview in the year prior to birth. We define leave coverage as being unknown for mothers who responded that they did not know whether they had leave coverage, as well as for mothers who did not respond to the question or had missing data.

[9] In separate analyses, we also estimate these models controlling for a host of other covariates including the woman's years of work experience, whether she was working part-time, whether her mother worked when she was a child, the type of occupation she was in,

whether she was in a union job, whether she was in a government job, her firm size, the local unemployment rate, and whether she returned to her pre-birth job after giving birth. Our results regarding pre-birth work and leave coverage do not differ in terms of direction or significance when these variables are included in the models (results available from the authors).

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