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FAMILY LEAVE AFTER CHILDBIRTH AND THE HEALTH OF NEW MOTHERS

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ABSTRACT

In the United States, almost a third of new mothers who worked during pregnancy return to work within three months of childbirth. Current public policies in the U.S. do not support long periods of family leave after childbirth, although some states are starting to change this. As such, it is vital to understand how length of family leave during the first year after childbirth affects families' health and wellbeing. The purpose of this paper is to examine the association between family leave length, which includes leave taking by mothers and fathers, and behavioral and physical health outcomes among new mothers. Using data from the Early Childhood Longitudinal Study - Birth Cohort, we examine measures of depression, overall health status, and substance use. We use a standard OLS as well as an instrumental variables approach with county-level employment conditions and state-level maternity leave policies as identifying instruments. The results suggest that longer maternity leave from work, both paid and un-paid, is associated with declines in depressive symptoms, a reduction in the likelihood of severe depression, and an improvement in overall maternal health. We also find that having a spouse that did not take any paternal leave after childbirth is associated with higher levels of maternal depressive symptoms. We do not find, however, that length of paternal leave is associated with overall maternal health, and we find only mixed evidence that leave length after childbirth affects maternal alcohol use and smoking.

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I. Introduction

In contrast to most industrialized countries, where paid maternity leave can extend to more than a year (European Industrial Relations Observatory, 2004), in the United States, almost a third of new mothers who worked during pregnancy return to work within three months of childbirth (Klerman & Leibowitz, 1994). Although the Family and Medical Leave Act (FMLA) of 1993 guarantees 12 weeks of leave for eligible parents (both mothers and fathers), only about 46% of the private sector workforce is entitled to FMLA benefits, and the mandated leave is unpaid (Kammerman, 2000; Cantor, Waldfogel, Kerwin, Wright, Levin, Rauch et al., 2001). As a result, many families, particularly low-income families, cannot take advantage of this policy. Moreover, changes in the Earned Income Tax Credit (EITC) and other tax policies, and the passage of welfare reform legislation in 1996, explicitly encourage low-income mothers of infants to enter the workforce (Ruhm, 2004).

Given that public policies in the U.S. do not support long periods of family leave after childbirth, particularly for low-income families, it is critical to understand how length of family leave during the first year after childbirth affects families' health and wellbeing. If employment detracts from the quality and quantity of time parents spend caring for their families and for themselves, returning to work during the first year, particularly after a short leave, may have detrimental effects on the health and wellbeing of both mothers and children. Alternatively, if employment brings psychic benefits to the parent and additional income to the family, mothers and children may benefit through increases in material resources and higher quality of time spent together.

Recent studies indicate that short maternity leave, and, more generally, full-time maternal employment during the first year of life, detract from children's health, cognitive development, and behavioral outcomes (Baum, 2003; Blau & Grossberg, 1992; Brooks-Gunn, Han & Waldfogel, 2002;

Waldfogel, Han & Brooks-Gunn, 2002; Baydar & Brooks-Gunn, 1991; Desai, Chase-Lansdale & Michael, 1989; Ruhm, 2004; Berger, Hill & Waldfogel, 2005; James-Burdumy, 2005; Ruhm, 2000; Ruhm, 2004; Winegarden & Bracy, 1995; Belsky & Eggebeen, 1991; Han, Waldfogel & Brooks-Gunn, 2001). Much less is known, however, about how early parental employment affects the health and health behaviors of the mothers themselves. Particularly for infants, maternal wellbeing and child wellbeing are inextricably linked (Belsky, 1988). The mother's health and health behaviors can be important routes, perhaps the most important routes aside from child care arrangements, through which infants are affected by parents' employment decisions.

The purpose of this paper is to examine the association between family leave length (leave taking by mothers and fathers after childbirth) and behavioral and physical health outcomes among new mothers. Data come from the Early Childhood Longitudinal Study – Birth Cohort (ECLS-B), a nationally representative sample of 14,000 children born in 2001 and followed until kindergarten entry. We focus on a sample of ECLS-B mothers from the first wave of the survey who had worked during pregnancy and who had returned to work by the time of first follow-up interview, which was conducted about 9 months after childbirth. When examining the effects of paternal leave, we further restrict this sample to mothers who were married at the time of the first follow-up interview. The maternal health outcomes of interest are measures of depression, overall health status, and substance use. We use a standard OLS as well as an instrumental variables approach with county-level employment conditions and state-level maternity leave policies as identifying instruments. The IV approach accounts for the possibility of reverse causality (e.g., post-partum health affecting parental leave decisions) and also for the possibility that employment decisions after childbirth are correlated with unobserved factors that influence maternal health outcomes.

Our OLS findings indicate that for mothers who worked prior to childbirth and who return to work in the first year, longer maternity leave length is associated with reductions in depressive symptoms as well as improvements in overall health status. The magnitudes of these effects are small, most likely because health outcomes are measured about 9 months after childbirth when many mothers may have started to recover from early health problems. Our findings suggest that doubling total maternal leave length from 9 weeks (the sample average) to 18 weeks (a length more typical of European nations) would reduce maternal depressive symptoms by about 5 percent, would reduce the likelihood of mothers' experiencing severe depression by 1 percent, and would reduce the likelihood of mothers' reporting overall poor/fair health status by 1 percent. We report similar results for the length of paid maternal leave. Among married mothers, we find that having a spouse that did not take any paternal leave after childbirth is associated with higher levels of maternal depressive symptoms. We do not find, however, that length of paternal leave is associated with maternal health, and we find only mixed evidence that family leave length after childbirth affects maternal alcohol use and smoking behaviors.

II. Maternity leave length and maternal and child outcomes

A. Early maternal employment, maternity leave length, and children's outcomes

There are several distinct literatures on the effects of maternal employment during the first year on child outcomes. One literature, which assesses the effects of working in the first year versus working later or not working, includes two sub-sets – studies based on econometric models that address selection issues, and studies based on psychological models that focus more on process and measurement. Studies from both these literatures generally indicate that working full-time in the first 9 to 12 months of a child's life increases the frequency of child behavior problems as well as detracts from the child's long-term cognitive outcomes, such as school readiness, verbal ability, and test

scores Baum, 2003; Blau & Grossberg, 1992; Brooks-Gunn, Han & Waldfogel, 2002; Waldfogel, Han & Brooks-Gunn, 2002; Baydar & Brooks-Gunn, 1991; Desai, Chase-Lansdale & Michael, 1989; Ruhm, 2004; Berger, Hill & Waldfogel, 2005; James-Burdumy, 2005; Ruhm, 2000; Ruhm, 2004; Winegarden & Bracy, 1995; Belsky & Eggebeen, 1991; Han, Waldfogel & Brooks-Gunn, 2001). A much smaller set of studies poses the question of whether or not mandatory maternal employment during the first year -- such as that imposed by welfare policy – has similar effects on children's outcomes (The Future of Children, 1997). While a few studies indicate that maternal employment appears to benefit children in low-income families that are likely to be welfare eligible (Vandell & Ramanan, 1992), effects may differ if employment is mandatory rather than voluntary.

Finally, there is a small, growing body of work that focuses specifically on the effects of differences in the length of maternity leave among mothers who return to work during the first year of life. In cross-country comparisons, longer paid maternity leave in Europe has been associated with reductions in infant and child mortality (Ruhm, 2000; Winegarden & Bracy, 1995). Maternity leave of 12 or fewer weeks, particularly if it involves full-time return to work, is associated with lower cognitive test scores, lower rates of well-child care, immunizations, and breastfeeding, and higher rates of externalizing behavior problems (Baum, 2003; Berger, Hill & Waldfogel, 2005). Several other studies suggest that shorter maternity leave length detracts from breastfeeding initiation and duration (Visness & Kennedey, 1997; Roe, Whittington, Fein & Teisl, 1999; Chatterji & Frick, 2005). In a recent study based on Canadian data, however, increases in job-protected leave were not associated with infant mortality or low birth weight (Baker & Milligan, 2005).

In sum, prior research generally presents a negative picture of the effects of early maternal employment on children. Studies based on the NICHD Study of Early Child Care and other data, however, suggest that the overall effect of maternal employment and child care on children's

outcomes depends critically on the quality of the care in both those environments – high quality child care and sensitive parenting attenuate the adverse effects of early maternal employment (NICHD Early Child Care Research Network, 1997, 1998). There also is evidence of important variation in effects by demographic sub-groups, with boys and children of white, more educated, and married mothers showing the most negative impact (Brooks-Gunn, Han & Waldfogel, 2002; Waldfogel, Han & Brooks-Gunn, 2002; Ruhm, 2004; James-Burdumy, 2005; Ruhm, 2004). Finally, the intensity and type of maternal work appears to make a difference -- longer maternal working hours are associated with worse outcomes in some cases (Brooks-Gunn, Han, & Waldfogel, 2002; Waldfogel, Han & Brooks-Gunn, 2002; Ruhm, 2004), and there is new evidence that non-standard work schedules are associated with adverse effects for children (Han, 2005).

B. Maternal employment after childbirth and maternal health outcomes

Almost all prior research has focused on the effects of early maternal employment on children's health and wellbeing, and there is much less research on how mothers' own health and health behaviors may be affected as well. In the present study, two of our maternal outcome measures are depression. We focus on depression as a maternal health outcome because of the high prevalence of this condition among new mothers, and because of its important effects on children's health and wellbeing.

About 10-20 percent of mothers of infants develop depression within six months of delivery (Miller, 2002). Depression rates among poor mothers are estimated to be more than twice as high as those among non-poor mothers (Shokoff & Phillips, 2000). Numerous studies show that clinical depression in mothers as well as self-reported depressive symptoms, anxiety, and psychological distress, are important risk factors for adverse emotional and cognitive outcomes in their children, particularly during the first few years of life (Gray, Indurkhya & McCormick, 2004; NICHD Early

Child Care Network, 1999; Petterson & Albers, 2001). Depressed mothers of infants are less interactive with and less responsive to their children (Campbell, Cohn & Meyers, 1995), and are less likely to seek appropriate health care for their children (Minkowitz, Strobino, Scharfstein, Hou, Miller, Mistry et al., 2005). Compared to infants of healthy mothers, infants of depressed mothers are more negative and less playful (Cohn, Matias, Tronick, Connell, & Lyons-Ruth, 1986; Field, 1984) have more behavior problems during childhood (Barry, Dunlap, Cotton, Lochman & Wells, 2005; Essex, Klein, Miech & Smidar, 2001; Lyons-Ruth, Easterbrooks & Cibelli, 1997; Hay, Pawlby, Angold, Harold & Sharp, 2003), and they are more likely to eventually develop psychopathology during childhood and adulthood (Downey & Coyne, 1990; Kim-Cohen, Moffitt, Taylor, Pawlby & Caspi, 2005).

To the best of our knowledge, in the economics literature the only paper that focuses on maternal employment and maternal health is our own prior work on the effect length of maternity leave on maternal wellbeing, which is based on a sample of mothers who were employed prior to childbirth and who returned to work during the first year (Chatterji & Markowitz, 2005). Data for this study come from the 1988 National Maternal and Infant Health Survey (NMIHS). Two measures of depression and a measure of outpatient health visits are used to represent maternal health. Ordinary least squares models provide baseline estimates, and instrumental variables models, with state-level maternity leave policies as identifying variables, account for the potential endogeneity of maternity leave length. The findings suggest that longer maternity leave is associated with a reduction in the number or frequency of maternal depressive symptoms. There is suggestive but inconclusive evidence that longer maternity leave also is associated with mother's lower probability of being a likely case of clinical depression, and a lower likelihood of having frequent outpatient visits during the first six months after childbirth.

In the public health literature, a few studies have explored the impact of returning to work on the mother's health. In regards to physical health, employed postpartum women have higher rates of respiratory infections, breast symptoms, and gynecologic problems compared to postpartum women who are not employed (Gjerdingen et al. 1995, Gjerdingen et al. 1993). This research on physical health is based on a sample of 436 first-time mothers in Minnesota. In regards to mental health, there is some mixed evidence that among employed mothers, returning to work earlier increases depressive symptoms. Hyde et al. (1995b), for example, uses a sample of 570, mostly white mothers in Wisconsin to explore the postpartum employment experience. They find that among mothers who are back at work four months postpartum, short length of maternal leave increases the probability of depression, but only among mothers who also have marital concerns and mothers who feel their jobs are unrewarding. Gjerdingen et al. (1994), based on a sample of 436 married, employed, first-time mothers in Minnesota, find that returning to work within 24 weeks after childbirth, as well as longer work hours, are associated with poor mental health. These studies are based on small, non-representative samples. Moreover, it is not clear whether or not the association between shorter maternity leave and increased depressive symptoms is causal.

McGovern et al. (1997) address some of these problems by using a larger sample of 654 employed mothers in Minnesota, and by accounting for the possibility that the timing of the return-to-work decision is endogenous. They find that maternity leave length has a positive effect on mothers' wellbeing, measured at about seven months postpartum using a generic measure of mental health, vitality and role function. As identifying instruments, these researchers use a set of variables that measure the infant's health endowment (birth-weight and gestation, congenital anomalies), the infant's race, health insurance, maternal leave policies, child care arrangements and job characteristics. These variables are shown in the analysis to be reasonably adequate predictors of

maternal leave length. However, it seems unlikely that they can be validly left out of the maternal health equation. For example, there is evidence from other studies that infant health and child care arrangements affect maternal stress and depression (McLennan et al. 2001, Mandl et al. 1999, Gjerdingen et al. 1995). No results from over-identification tests are shown to justify these exclusions.

The present study builds on prior work, including our own, in two ways. First, this study is more informative for current policy decisions regarding family leave since it is based on recent data collected post-FMLA (in 2001) while all prior work is based on data collected in the 1980's and early 1990's. Second, unlike prior studies, including our own, we are able to examine several aspects of family leave in this study – the total length of length of maternal leave, the total length of paid maternal leave, and the total length of the father's leave.

III. Modeling the Return- to-Work and Maternal Health Relationship

Models of household production and the production of health (Becker 1965, Grossman 1972) can be used to conceptually motivate why family leave length may affect maternal health outcomes. Although we consider the effects of both maternal and paternal leave in the empirical work, in this section, for clarity, we focus on the effects of maternal leave. Consider an employed mother with a newborn infant who derives utility from her own health and the health of her child, subject to her preferences. The mother produces maternal health and child health using market goods, time, and a production technology. The inputs in the maternal and child health production functions may overlap; for example, spending time playing with a child may benefit both maternal health and child health. To choose the optimal amounts of maternal and child health, the mother maximizes utility subject to budget and time constraints, where time is divided between time spent in the labor market, time spent investing in the health and well-being of her child, and time spent investing in her own physical and

mental health. The optimal quantities of child health and maternal health chosen by the mother depend on the marginal utilities and the shadow prices of maternal and child health.

While this framework suggests that the mother's return to work is likely to affect the inputs to health, as well as maternal health itself, the direction of these effects is indeterminate. When the mother returns to work, the opportunity cost of her time increases, which in turn increases the shadow prices of both maternal health and child health since time is likely to be an important component of both these prices. The effects of returning to work on maternal health, however, depend on: (1) what the mother chooses to do with increased income from returning to work (in the case of unpaid leave, which is the norm in the US); and (2) how she reallocates the time and market good components in the production of the health commodities when she returns to work.

Theory suggests that the increase in income that occurs when the mother returns to work would increase the demand for both maternal and child health, thus potentially also increasing positive health behaviors, quality parenting practices, and other inputs. However, holding other factors constant, if child health is more time-intensive to produce relative to maternal health, the mother might substitute market good inputs for time inputs (to the extent possible) to produce a given level of child health when she returns to work. For example, she may substitute child care for her own time with her child. On the other hand, if maternal health is more time-intensive to produce than child health, the mother might substitute away from time-intensive activities and towards market goods that improve her own health.

Therefore, the net effect of the mother's return to work on maternal health will depend on many factors including: (1) the relative time intensity of child health and maternal health production; (2) how readily market goods and time can be substituted for each other in producing maternal and child health; (3) the conditions of leave (e.g., weeks of leave, paid versus unpaid). As a result, the

directions of the effects of maternity leave length on maternal health are theoretically ambiguous and must be studied empirically.

The study focuses on estimating the maternal health production function, represented by the equation below (Eq.1):

$$MH_i = a_0 + a_1 W_i + a_2 X_i + u_i + e \qquad \text{Eq. 1}$$

This equation is specific to the mother/child pair (i). The dependent variable MH is a measure of maternal health – depression, self-reported overall health or substance use. The main independent variable of interest is W, a measure of family leave length after childbirth (e.g., total weeks of maternity leave). The vector X includes observed maternal factors that may affect maternal health, such as the mother's age, marital status, number of children, and education, and observed child-specific factors that may influence maternal health, such as the child's health endowment. Specific details about the variables included are discussed below. In addition to these measured variables, unobserved, individual-level factors may exist that are associated with both maternal health status and length of leave after childbirth. These unobserved factors are represented by u in Equation 1, and e is a random disturbance term.

Initially, we use a standard ordinary least squares (OLS) model to estimate equation 1. Estimating equation 1 by OLS, however, can lead to biased and inconsistent estimates if a problem of reverse causality exists (for example, postpartum health affects length of leave) or if unobserved, mother-specific factors exist that influence both maternal health and leave decisions (e.g. u is correlated with W and MH). It is difficult to predict the direction of the bias. If reverse causality is an issue (postpartum health drives leave decisions), some mothers experiencing depressive symptoms and other health problems may return to work later, in an effort to overcome postpartum health

problems or in order to retain health insurance and other benefits.[1] Similarly, if unobserved heterogeneity exists, there are plausible reasons to think mothers who return later may have unmeasured traits that are correlated with higher levels of health, such as strong family support, but one can also make an argument that mothers who return later may have unmeasured factors that may be associated with lower levels of health, such as family stress.

Given these potential issues, in this paper we estimate OLS models, and then apply IV methods to address the possible bias from unobserved heterogeneity and reverse causation. Angrist (2001) and Wooldridge (2002, pg. 622) argue that researchers can, and in many cases should, use two-stage least squares (2SLS) even when the endogenous and outcome variables are binary. Thus, we present 2SLS estimates in the paper with Huber/White corrected standard errors to adjust for heteroskedasticity. We also tested IV models using a two-step GMM estimator, which is analogous to 2SLS but uses a weighting matrix that makes it efficient in the presence of heteroskedasticity (e.g. Greene, 2003, 201–207; 400–401). Our 2SLS results are nearly identical to those of GMM (results not shown). For all models, we use the Durbin-Wu-Hausman test to test the endogeneity of maternal leave length with respect to maternal health. Our IV approach depends critically on the validity and relevance of the identifying instruments. Consequently, we test the validity of the over-identifying restrictions using Hansen's *J* statistic, the minimized value of the GMM criterion. As suggested by Staiger & Stock (1997), we use the *F*-statistic of the joint significance of the identifying instruments to gauge their relevance.

IV. The Early Childhood Longitudinal Study – Birth Cohort (ECLS-B)

The ECLS-B is a nationally representative sample of 14,000 children born in 2001 and followed until kindergarten entry. The sample includes over-samples of racial/ethnic minority

[1] Although the FMLA mandates that firms continue to provide health insurance during unpaid leave, only about 46% of the private sector workforce is entitled to FMLA benefits

children, twins, and low and very low birth weight infants. The data are collected from children, families (both mothers and fathers), teachers and schools, providing unusually rich information on children's development as well as maternal employment, work characteristics, and maternal health outcomes. The parent interviews are conducted with the child's primary caregiver, usually the mother. The interviews are computer-administrated at the child's home by a trained assessor, and are available in both English and Spanish.

Our main analytic sample is limited to 3,366 adult ECLS-B respondents who: (1) were the biological or adoptive mother of the child; (2) had worked either part-time or full-time during pregnancy; and (3) had returned to work either part-time or full-time by the 9-month interview. The sample includes mothers who had returned to work at some point before the 9-month interview, but were not currently working when the 9-month interview was conducted. In cases of twins, we randomly selected one twin for inclusion in the sample. Observations were dropped if an observation had missing information on any dependent or independent variables used in the study. When examining effects of paternal leave, we limit the main analysis sample to 2,181 mothers who were married at the time of the 9-month ECLS-B interview.

The FMLA only applies to parents who return to the same employer after childbirth. From a policy perspective, therefore, it is interesting to test whether our results persist in sample of mothers who return to the same employer after childbirth. Previous research by Klerman and Leibowitz suggests that most mothers who worked full-time during pregnancy continued to work for the same employer after childbirth (Klerman and Leibowitz 1999). Nevertheless, in sensitivity analyses, we re-estimated all models based on a sample that is restricted to 2,496 mothers who appear to have returned to the same job after childbirth. Although we do not have information regarding whether or not the mother returned to the same employer, this sample excludes two groups of mothers who

potentially may be returning to different jobs: (1) mothers who report not taking maternity leave because they quit their jobs during pregnancy (although they retuned to work after childbirth); and (2) mothers who report a maternity leave length that is more than 6 weeks shorter than the child's age in weeks when the mother returned to work. Results based on this sample were qualitatively very similar to those shown in the paper and are not discussed here.

B. Dependent Variables

1. Center for Epidemiologic Studies Depression Scale

The ECLS-B survey includes a 12-item version of the Center for Epidemiologic Studies Depression Scale (CES-D) to measure depressive symptoms in the past week. The CES-D is one of the most widely used psychiatric scales and captures mood, somatic problems, problems in interactions with others, and issues with motor functioning, such as "I felt lonely," "my sleep was restless," and "I could not get going." The respondent is asked to respond to each item according to a 4-point Likert scale, with higher values corresponding to higher frequency of the item in the past week. For example, for the item "I felt lonely," mothers responded either "less than 1 day" (zero points), "1-2 days" (1 point), 3-4 days (2 points), or 5-7 days (3 points).

For the 12-item scale, the final CES-D score is computed by: (1) subtracting 1 from each item so that the range for each item is 0 to 3; (2) assigning missing CES-D scores to any respondent with more than 3 missing responses; and (3) summing the responses for non-missing individuals. The maximum possible score is 36 (12 items x maximum of 3 points per item). The U.S. Department of Education recommends using a cut-point of 15 or higher to define severe depression for this modified

CES-D scale. The CES-D scale does not correspond to a DSM-IV diagnosis of major depression. It is used primarily as a screening tool for depression, not as a diagnostic tool (Eaton et al. 2003).[2]

We create two measures of depression from the CES-D scale, a continuous measure of symptoms and a dichotomous indicator of severe depression. Because the CES-D is skewed to the right in these data, we use the natural log of the total CES-D score as the continuous measure.[3] The dichotomous measure is a dummy variable indicating whether or not the respondent's CES-D score is equal to or exceeds 15. This dummy variable is not equivalent to a psychiatric diagnosis of depression, but it does capture respondents who are experiencing many symptoms of depression, or several symptoms with high frequency, in the past week (Eaton et al. 2003).

Ideally, we would have liked to measure depression at the same point in time for all mothers in relation to when they returned to work. For example, if depression was measured for all the mothers when they been back at work for one month, we could isolate the effect of maternity leave length on maternal health, controlling for the child's age at the time of the interview and how long the mother has been back at work. Unfortunately, this approach is not possible since ECLS-B respondents completed the 9-month survey when their children were between 6 and 22 months old, regardless of when and whether they returned to work.

Although we control for the age of child at the interview date in all models, the length of maternity leave cannot be disentangled from how long the mother has been back at work. By

[2] About 50% of mothers experience increases in emotional reactivity for up to several weeks following the birth of a child (Miller 2002). This period of "postpartum blues" is transient and should be distinguished from postpartum depression, a mental disorder that affects nearly 10 to 20% of mothers in the US within six months of delivery (Miller 2002). Postpartum depression is defined as major depression that has its onset during the postpartum period, which lasts for up to six months after delivery (American Psychiatric Association 1994). The CES-D cannot be used to diagnose depression but it captures some symptoms associated with this condition. Since all ECLS-B respondents were interviewed after 6 months (most after 9 months) this postpartum time period is well outside the period during which postpartum blues is prevalent, but some mothers may be experiencing postpartum depression.

[3] In this variable and in others where log values are used, the zeros are replaced with a value of 0.5.

construction, mothers who take longer leaves will have been back at work for shorter periods of time when the interview is conducted compared to mothers who took shorter leaves. For example, consider two employed mothers both interviewed when their children are 7 months old – one mother has taken a 3 month maternity leave, while the other has taken a 6 month maternity leave. If longer leave is associated with better health, the mother with the longer leave may be expected to be in better health, but this mother also has returned to work more recently than the mother who took the 3-month leave, and therefore may be adjusting to employment, which could negatively affect health. We selected a stringent threshold for our depression indicator and for our poor health indicator so that for these two outcomes, this issue is unlikely to affect our findings. Short-term adjustments to employment are unlikely to induce severe depression and large reductions in overall health. This issue remains a limitation of the analysis, however, when we examine the continuous measure of depressive symptoms.

2. Self-reported health

All ECLS-B respondents are asked to report whether their health in general is excellent (1), very good (2), good (3), fair (4), or poor (5). We use this scale as a dependent variable, combining the fair and poor categories since only 7 mothers in the main sample reported being in poor health. We use an ordered probit to analyze this outcome. We also consider a dichotomous indicator that equals one if the mother reports her health in general is fair or poor. Since the question does not specify physical or emotional health, these variables may capture both physical and mental illness. The ECLS-B does not include any measures of post-partum physical health conditions.

3. Substance use

We consider two measures of substance use: (1) whether or not the mother reports at least one binge drinking episode in the past month; and (2) whether or not the mother reports current smoking.

The binge drinking measure is based on two questions related to alcohol. ECLS-B respondents are asked "do you currently drink any alcoholic beverages?" and if the respondent reports yes, she is asked "in the last month, how many times did you drink four or more alcoholic beverages in the same sitting?." The indicator of current smoking is based on the question: "do you smoke cigarettes now?" Substance use is analyzed because these behaviors may be correlated with, and may be manifestations of stress and depression experienced by new mothers (US DHHS, 2001; Brady & Stone, 1999).

C. Independent Variables

1. Family leave after childbirth

The main independent variables of interest in this study are measures of maternal and paternal leave after childbirth. For maternal leave, we consider two measures in alternative specifications: (1) total length of maternity leave in weeks; and (2) weeks of paid leave in weeks. Length of maternity leave in weeks is created based on the question: "did you take any maternity leave, either paid or unpaid, from your job while you were pregnant or right after your child was born?" This question includes a probe that specifies that maternity leave is taken from a job to which one expects to return, at least at the time of the leave. Respondents who report taking any maternity leave are then asked "in total, how many weeks of maternity leave, paid or unpaid, did you take?" Respondents who took maternity leave were then asked the total number of weeks of paid maternity leave they took. This question specifies that paid leave includes pay received through maternity benefits, sick time, vacation time and other kinds of paid leave.

Respondents who report that they did not take any maternity leave are asked why and provided with the following possible reasons: (1) not employed during pregnancy; (2) employed but quit before delivery; (3) leave not provided/self-employed; (4) could not afford to take it; and (5)

other reason. In addition, all ECLS-B respondents, regardless of whether they took maternity leave, were asked if they had worked since the child was born and the age of the child when they returned to work. Our main analytic sample excludes mothers who were not employed during pregnancy. In sensitivity analyses, we estimate all models on a sample that excludes mothers who quit before delivery as well as mothers who report maternity leaves more than 6 weeks longer than the reported age of the child when they returned to work. Results are very similar to those presented below.

2. Individual and family factors affecting maternal health

In addition to maternal employment, maternal depressive symptoms and self-reported health are likely to be influenced by numerous other personal and family-level factors. Previous research suggests that important predictors of postpartum depression include poor prenatal mental and physical health, low social support, concerns about child care arrangements, young maternal age, socioeconomic stresses, insurance status, poor infant health and low income. (Gjerdingen and Froberg 1991; Gjerdingen et al. 1993; Gjerdingen and Chaloner, 1994; Gjerdingen et al. 1995; McGovern et al. 1997; Deal and Holt, 1998; Chaudron et al. 2001 Mandl et al. 1999; McLennan et al. 2001). Some of these factors, however, are possibly endogenous to the return-to-work decision. We estimate all models with a set of presumably exogenous characteristics that are likely to be associated with maternal health outcomes. This set includes: (1) mother's age in years; (2) mother's education (dummy indicators with less than high school graduate as the baseline, high school graduate, some college completed, four-year college degree or more); (3) race/ethnicity (dummy indicators with white as the baseline, African-American, Hispanic, other); (4) age of child at time of interview; (5) the number of siblings; (6) a dummy variable indicating whether or not the mother is married; (7) indicator of whether the child has a twin; (8) a dummy indicator for urban residence; (9) whether or not the mother has ever received welfare since the child's birth; (13) indicators for low and very low

birth-weight; and (14) an indicator of whether the child was born prematurely. In addition to these variables, to further reduce unobserved heterogeneity, we include several variables related to the mother's childhood and family background: (15) whether the mother ever repeated a grade in school; (16) whether the mother lived with her biological mother from birth until age 16; (17) whether the mother lived with her biological father from birth until age 16; and (18) the number of years of education that the mother's mother completed.

D. Identifying Instrumental Variables

In this study, following Baum (2003) and our prior work, we use cross-sectional variation in local labor market conditions, local cost of living, and state policies related to maternity leave as identifying instrumental variables. These variables are expected to be correlated with maternal employment decisions after childbirth, but not directly related to maternal health after accounting for individual-level characteristics. To proxy local labor market conditions and local cost of living, we use the following variables: (1) median gross rent in the county; and (2) percent of county residents who are employed outside the county. These variables come from the Area Resource File. In addition, we include an indicator of whether the mother lives in a state that had any kind of family leave policy that pre-dated the FMLA.[4]

In most cases, we merged county-level characteristics to child records by the county of residence listed on the child's birth certificate, and state-level characteristics are merged according to the mother's state of residence at the 9-month interview. However, in cases where the county of residence was missing on the birth certificate, or if the state on the birth certificate was not consistent

[4] The FMLA does not include provisions for paid leave, and only applies to employees are those who have worked for their current employer for at least 1,250 hours in the past year at a firm with 50 or more employees (Department of Labor, 2007). The ECLS-B does not include information on firm size, but we experimented with county-level indicators of firm size as instruments. These instruments performed poorly empirically, however, so we did not include them in the final models presented in the paper.

with the state of residence at the 9-month interview, we used state-level averages of county-level variables according to the state reported at the 9-month interview.

IV. Results

Table 1 displays means and standard deviations for the main sample used in the paper. In terms of mental health, the average CES-D score is 4.86, and 6 percent of the respondents had a CES-D score of at least 15, which is considered to be a severe rate of depressive symptoms that may be indicative of clinical depression. This rate of depression is somewhat lower than the estimated 12-month prevalence rate for major depression for women in the US, which is estimated to be about 11 percent (Marcotte et al. 1999). The sample appears to be in fairly good physical health overall, with only six percent of the sample report that their overall self-reported health is poor or fair. Smoking and drinking are not very prevalent. Ten percent of the sample report binge drinking at least once in the past month, and 18 percent are current smokers.

On average, these employed mothers take 9.43 weeks of maternity leave, and just under 5 weeks of this leave was paid. Mothers are an average of about 29 years old, with a 10 month old child at the time of the interview. The sample is 17 percent African-American, 12 percent Hispanic, and 20 percent are in the other race category. The full sample includes fairly large proportions of low birth-weight infants (12 percent) and very low birth-weight infants (9 percent) because the ECLS-B over-sampled these groups. Eighty four percent of respondents live in an urban area and 5 percent received welfare.

Table 2 shows regression results for the full sample, which includes all mothers who worked in the year prior to childbirth. These models focus on the effect of total weeks of maternity leave (both prior to and after childbirth) and paid weeks of leave on maternal mental health. This table shows findings for the two different outcome – depressive symptoms as measured by the log of the

CES-D score and an indicator for severe depression. For each outcome, we show OLS followed by IV results.

The OLS results indicate that longer maternity leave lengths are associated with lower levels of depressive symptoms and a lower probability of depression. Both the total length of maternity leave and the weeks of paid leave appear to be beneficial. A ten percent increase in weeks of maternity leave (which translates to just under one additional week) is associated with a 0.4 or 0.5 percent reduction in the CES-D score. For severe depression, the OLS models show that a ten percent increase in weeks of leave reduces the probability of being classified as severely depressed by 0.1 percentage points. The magnitudes of these effects are small, but this is perhaps not surprising, given that we are measuring maternal health outcomes about 9 months after childbirth. Many mothers who had been experiencing health problems early on may have started to recover by this point, and re-adjust to employment.

These OLS associations may not reflect a causal relationship if the length of maternity leave is endogenous. For this reason, we also show the corresponding IV results for each OLS specification. In these models, we use three instruments to predict length of leave: a dummy indicator of whether or not the mother's state of residence had any family leave policy that pre-dated FMLA; median gross rent in county of residence; and percentage of county residents who work outside the county of residence (the first stage regressions are shown in Appendix Table 1). The coefficients on the maternity leave variables are negative in all models, but are only statistically significant at conventional levels in the log CES-D score models. Note that in all models the joint *F* statistic on the instruments is reasonably high, ranging from 7 to 10. The over-identification statistics are not statistically significant indicating the instruments are uncorrelated with the error term and are properly excluded from the second stage equation. But according to the Hausman test, we fail to

reject the consistency of OLS in all of the models. Given that the instruments appear trustworthy, endogeneity does not seem to be a critical problem and we will rely on the OLS results to draw conclusions.

Table 3 considers the effects of leave length on two measures of overall maternal health. The first panel shows the effects of maternity leave length on the probability of being in fair or poor health. Only the coefficients on total weeks and paid weeks are shown for brevity. The results are strikingly similar to that of Table 2. The OLS results show that longer weeks are statistically associated with improvements in overall health. For example, columns 1 and 3 show that a ten percent increase in leave length is associated with a 0.1 percentage point reduction in the probability of being in fair or poor health. The corresponding IV models confirm the OLS results in sign and significance. The magnitude, however, is much larger (although still small relative to the mean). The test statistics on the instruments point to their validity, and based on the Hausman test we cannot reject the consistency of the OLS coefficients.

The bottom panel in Table 3 considers the categorical version of the question as to the state of the woman's overall health. Ordered probit models are used to analyze the effects of maternity leave length on the probability of being in different categories of health. We are not concerned with the endogeneity of maternity leave length in this model, given the results found for the dichotomized version of the overall health question. The results here confirm the previous results where longer leaves (both total weeks and paid weeks) are associated with higher probabilities of being in excellent health and lower probabilities of being in very good, good, or poor health.

Table 4 considers two health-related behaviors, binge drinking and smoking. Here, we consider the effects of leave length on the probability of any binge drinking in the past month and of being a current smoker. These health behaviors are examined because excessive alcohol use and

smoking are highly correlated with and may be manifestations of stress and depression. The results consistently show a negative relationship between weeks of leave and drinking or smoking. The effects are small in size, however, and not statistically significant in some cases. As before, the instruments appear to be valid and relevant, and, based on the Hausman test, we would conclude that the OLS estimates are the preferred estimates.

The length of paternal leave may be a contributing factor in determining maternal health outcomes. In Table 5, we restrict the sample to married women in order to evaluate the marginal effects of paternity leave, holding maternity leave constant. Paternity leave is typically short-- less than 2 weeks, although 87 percent of fathers take some level of leave. We measure paternity leave first as a dichotomous indicator for whether or not the father took any leave, and second, the log number of weeks taken by the father. Given the previous results showing that OLS models are preferred, only OLS results are shown for these models. These models include all the maternal and family characteristics previous discussed. We also add father's education, age, and occupational prestige score to these models.

Including paternity leave does not change the conclusions regarding the mother's own maternity leave, where longer lengths of maternity leave are associated with improved health outcomes. The presence of a paternity leave of any length appears to have a positive influence above and beyond the mother's own leave when the CES-D score is considered. The length of this leave, however, is not statistically related to higher CES-D scores. The coefficients on paternity leave are also positive in the model for severely depressed, but do not achieve statistical significance at conventional levels. Similarly, paternity leave is not associated with the probability of being in fair or poor health, nor with the probability of being a current smoker. Strangely, the coefficients on no

leave by the father are negatively related to binge drinking in the past month, but this association does not persist once the length of paternal leave is considered.

V. Conclusions

In 2008, New Jersey became the third state (following California and Washington) to approve paid family leave for up to six weeks to care for a newborn or a seriously ill family member. In the past decade, paid leave bills have been introduced in at least 28 states. States are considering a variety of different options to finance paid family leave, including using general funds from state budgets, giving tax credits to employers who provide paid leave, extending existing temporary disability systems and expanding unemployment insurance programs to families with newborn children (National Partnership for Women and Families 2004). All of these policy initiatives are intended to help families actually take advantage of the FMLA, which currently guarantees 12 weeks of unpaid leave.

To understand the net impact of these policies, states need information on the benefits of parental leave for families. Previous economic research on maternal employment has focused on understanding how maternal employment after childbirth impacts children's health and development. This study extends this literature by examining the effects of both maternal and paternal leave after childbirth on the health of mothers. The results suggest that longer maternity leave from work, both paid and un-paid, is associated with declines in depressive symptoms, a reduction in the likelihood of severe depression, and an improvement in overall maternal health. The magnitudes of these effects are small since health outcomes are measured about 9 months after childbirth. It is notable, however, that the benefits of longer leave appear to persist well into the first year after childbirth.

Currently, much remains unknown about the effects of early maternal employment on families, despite the large number of women in the U.S. who balance employment with the care of an

infant. Until now, we have almost no information on whether paternal leave benefits families. The findings from this paper suggest both maternal and paternal leave after childbirth do matter for maternal health, as has been found for infant health and wellbeing in the case of maternal leave. This research provides some new insights into this under-studied area.

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Table 1: Means and Standard Deviations

	Full Sample	
	N = 3,366	
	Mean	SD
CES-D score	4.86	5.04
Mother is severely depressed (1=yes, 0=no)	0.06	0.23
Mother's overall health rating (1=excellent; 2=very good; 3=good; 4=fair or poor)	1.99	0.91
Mother is in fair or poor health(1=yes, 0=no)	0.06	0.23
Mother binge drank in past month	0.10	0.30
Mother currently smokes	0.18	0.39
Total number of weeks of maternal leave	9.43	8.74
Number of weeks of paid maternal leave	4.90	5.66
Child's age in months	10.47	1.80
Mother's age	29.36	6.01
Mother is married	0.71	0.46
Number of siblings the child has	0.94	1.04
Child is a twin	0.09	0.28
Mother is African-American	0.17	0.37
Mother is Latino	0.12	0.33
Mother is other race	0.20	0.40
Mother is a high school graduate	0.26	0.44
Mother has vocational training	0.02	0.16
Mother has some college	0.29	0.46
Mother is college graduate or higher educated	0.15	0.36
Child was premature	0.23	0.42
Child was low birth-weight	0.12	0.33
Child was very low birth-weight	0.09	0.29
Urban location	0.84	0.37
Mother received welfare at any time since child was born	0.05	0.22
Mother lived with biological mother until age 16	0.87	0.33
Mother lived with biological father until age 16	0.64	0.48
Mother repeated a grade	0.11	0.31
Number of years of education of grandmother	13.30	4.15
State had a family leave policy that pre-dates FMLA	0.29	0.45
Percent of county that is employed outside the county	22.93	17.31
Median gross rent in the county in dollars	610.53	167.35

Table 2: Effects of maternal leave length on maternal depression

	Log CES-D Score				Severely depressed			
	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log total number weeks	-0.049	-0.455			-0.010	-0.062		
	(-3.04)	(-2.10)			(-2.86)	(-1.54)		
Log total number paid weeks			-0.039	-0.352			-0.007	-0.050
			(-2.62)	(-2.18)			(-2.41)	(-1.62)
Child's age	-0.012	-0.017	-0.012	-0.015	0.003	0.002	0.003	0.002
	(-1.05)	(-1.34)	(-1.03)	(-1.20)	(1.06)	(0.78)	(1.08)	(0.88)
Mother's age	-0.008	0.009	-0.008	0.009	0.001	0.003	0.001	0.003
	(-2.00)	(0.91)	(-1.95)	(0.96)	(1.12)	(1.65)	(1.03)	(1.72)
Married	-0.279	-0.169	-0.279	-0.171	-0.042	-0.028	-0.043	-0.028
	(-5.46)	(-2.07)	(-5.47)	(-2.20)	(-3.64)	(-1.71)	(-3.73)	(-1.74)
Number of siblings	0.028	-0.009	0.028	-0.012	0.013	0.008	0.013	0.008
	(1.33)	(-0.30)	(1.31)	(-0.40)	(2.60)	(1.39)	(2.61)	(1.26)
Child is a twin	0.063	0.230	0.058	0.189	0.010	0.031	0.009	0.026
	(0.82)	(1.87)	(0.77)	(1.79)	(0.57)	(1.33)	(0.49)	(1.24)
Black	0.092	0.156	0.093	0.163	0.008	0.016	0.008	0.017
	(1.58)	(2.18)	(1.59)	(2.27)	(0.55)	(1.03)	(0.55)	(1.12)
Latino	-0.145	-0.136	-0.142	-0.109	0.007	0.008	0.008	0.012
	(-2.20)	(-1.86)	(-2.16)	(-1.52)	(0.53)	(0.59)	(0.56)	(0.86)
Other race	0.059	0.076	0.063	0.110	-0.004	-0.002	-0.003	0.003
	(1.12)	(1.31)	(1.19)	(1.82)	(-0.36)	(-0.15)	(-0.31)	(0.28)
High school	0.123	0.144	0.119	0.111	0.009	0.011	0.008	0.007
	(2.22)	(2.35)	(2.16)	(1.90)	(0.73)	(0.92)	(0.67)	(0.56)
Vocational Tech.	0.109	0.132	0.092	-0.016	0.022	0.025	0.019	0.004
	(0.88)	(0.99)	(0.74)	(-0.11)	(0.72)	(0.80)	(0.61)	(0.12)
Some college	0.161	0.226	0.158	0.194	0.011	0.019	0.010	0.015
	(3.19)	(3.49)	(3.12)	(3.42)	(1.06)	(1.58)	(0.98)	(1.36)
College graduate or more	-0.056	-0.029	-0.052	0.003	-0.001	0.003	0.000	0.008
	(-0.88)	(-0.41)	(-0.82)	(0.04)	(-0.05)	(0.26)	(0.00)	(0.64)
Premature	0.085	0.145	0.083	0.121	-0.007	0.000	-0.008	-0.003
	(1.34)	(1.88)	(1.31)	(1.76)	(-0.59)	(0.02)	(-0.64)	(-0.20)
Low birth-weight	-0.037	-0.066	-0.032	-0.014	-0.001	-0.004	0.001	0.003
	(-0.54)	(-0.84)	(-0.46)	(-0.19)	(-0.04)	(-0.28)	(0.04)	(0.21)
Very low birth-weight	-0.019	-0.058	-0.017	-0.039	0.011	0.006	0.011	0.008
	(-0.21)	(-0.56)	(-0.19)	(-0.41)	(0.54)	(0.28)	(0.57)	(0.40)
Urban	-0.036	-0.045	-0.037	-0.050	-0.011	-0.012	-0.011	-0.013
	(-0.69)	(-0.78)	(-0.70)	(-0.87)	(-0.97)	(-1.03)	(-0.98)	(-1.09)
Welfare	0.249	0.013	0.257	0.089	0.092	0.062	0.095	0.072
	(2.63)	(0.08)	(2.71)	(0.68)	(3.07)	(1.62)	(3.16)	(2.12)
Lived with mother until 16	-0.050	-0.046	-0.051	-0.058	0.003	0.003	0.003	0.002
	(-0.83)	(-0.71)	(-0.85)	(-0.91)	(0.21)	(0.24)	(0.19)	(0.12)
Lived with father until 16	-0.115	-0.115	-0.114	-0.103	-0.008	-0.008	-0.007	-0.006

	(-2.62)	(-2.39)	(-2.59)	(-2.19)	(-0.80)	(-0.77)	(-0.77)	(-0.60)
Repeated grade	0.135	0.108	0.133	0.088	0.003	0.000	0.003	-0.003
	(2.21)	(1.52)	(2.17)	(1.25)	(0.22)	(-0.02)	(0.21)	(-0.20)
# yrs education of grandmother	0.002	0.006	0.002	0.004	0.002	0.002	0.002	0.002
	(0.37)	(0.97)	(0.34)	(0.77)	(1.54)	(1.85)	(1.49)	(1.74)
r2	0.06		0.06		0.03		0.03	
First stage R2		.11		.15		.11		.15
F test on identifying instruments		7.22		10.61		7.22		10.61
(p-value)		(0.00)		(0.00)		(0.00)		(0.00)
Over identification test statistic		1.99		2.09		.98		.77
(p-value)		(0.37)		(0.35)		(.61)		(.68)
Wu-Hausman test statistic		3.53		3.79		1.67		1.96
(p-value)		(0.94)		(0.95)		(0.80)		(.84)

Notes: The sample size is 3,366. The dependent variables are the log of the CES-D score and a dichotomous indicator of whether the CES-D score was 15 or higher (severely depressed). The table shows OLS coefficients and IV coefficients (estimated using TSLS) with T-statistics below. T-statistics are based on robust standard errors. The identifying instruments are: a dummy indicator of whether or not the mother's state of residence had a maternity leave policy that pre-dated FMLA; median gross rent in county of residence; and percentage of county residents who work outside the county of residence.

Table 3: Effects of maternal leave length on maternal general health

PANEL A	Dichotomous Indicator: Mother is in poor or fair health			
	OLS (1)	IV (2)	OLS (3)	IV (4)
Log total weeks	-0.01 (-2.62)	-0.07 (-1.75)		
Log paid weeks			-0.01 (-2.80)	-0.06 (-1.85)
R2	0.04		0.04	
First stage R2		0.11		.15
F test on identifying instruments (p-value)		7.37 (0.00)		10.65 (0.00)
Over identification test statistic (p-value)		5.24 (.072)		5.39 (0.07)
Wu-Hausman test statistic (p-value)		2.31 (0.87)		2.58 (.89)
PANEL B	Ordered Probit Marginal Effects			
Log total weeks				
Health is excellent	0.014 (2.33)			
Health is very good	-0.001 (-2.15)			
Health is good	-0.009 (-2.32)			
Health is fair or poor	-0.004 (-2.30)			
Log paid weeks				
Health is excellent	0.013 (2.31)			
Health is very good	-0.001 (-2.14)			
Health is good	-0.008 (-2.31)			
Health is fair or poor	-0.003 (-2.28)			

Notes: Panel A shows OLS coefficients and IV coefficients (estimated using TSLS). T-statistics are based on robust standard errors. The identifying instruments are: a dummy indicator of whether or not the mother's state of residence had a maternity leave policy that pre-dated FMLA; median gross rent in county of residence; and percentage of county residents who work outside the county of residence. All models include the full set of variables shown in Table 2. Panel B shows marginal effects indicating the change in the probability of being in the health category from a one percent change in weeks. Robust T-statistics in parentheses. Models include the full set of variables shown in Table 2.

Table 4: Effects of maternal leave length on maternal substance use

		Any binge drinking in past month					Mother currently smokes			
		OLS (1)	IV (2)	OLS (3)	IV (4)		OLS (5)	IV (6)	OLS (7)	IV (8)
Log total weeks		-0.001 (-0.23)	-0.12 (-2.02)				-0.003 (-0.60)	-0.15 (-2.23)		
Log paid weeks				-0.003 (-0.85)	-0.09 (-2.02)				-0.01 (-2.49)	-0.12 (-2.39)
R2		0.03		0.03			0.14		0.15	
First stage R2			0.11		.15			0.11		.15
F test on identifying instruments (p-value)			7.37 (0.00)		10.65 (0.00)			7.37 (0.00)		10.65 (0.00)
Over identification test statistic (p-value)			2.01 (.37)		2.39 (.30)			1.85 (.40)		1.58 (.45)
Wu-Hausman test statistic (p-value)			4.02 (.96)		3.82 (.95)			4.81 (.97)		4.67 (.97)

Notes: The table shows OLS coefficients and IV coefficients (estimated using TSLS). T-statistics are based on robust standard errors. The identifying instruments are: a dummy indicator of whether or not the mother's state of residence had a maternity leave policy that pre-dated FMLA; median gross rent in county of residence; and percentage of county residents who work outside the county of residence. All models include the full set of variables shown in Table 2.

Table 5: Effects of maternal and paternal leave on mother's health – Married Sample

	Log CES-D	Severely Depressed	Fair or poor health	Binged in past month	Currently smokes
			Panel A		
Log total weeks maternal leave	-0.04	-0.01	-0.01	-0.002	-0.002
	(-1.81)	(-2.79)	(-1.52)	(-0.36)	(-0.27)
Father took no leave	0.12	0.01	0.01	-0.03	0.03
	(1.70)	(1.05)	(0.52)	(-2.03)	(1.18)
			Panel B		
Log paid weeks maternal leave	-0.03	-0.004	-0.01	-0.01	-0.01
	(-1.56)	(-1.18)	(-1.94)	(-1.33)	(-1.36)
Father took no leave	0.12	0.02	0.01	-0.03	0.02
	(1.76)	(1.19)	(0.57)	(-2.07)	(1.15)
			Panel C		
Log total weeks maternal leave	-0.03	-0.01	-0.003	-0.004	-0.008
	(-1.42)	(-2.47)	(-0.67)	(-0.68)	(-1.17)
Log total weeks paternal leave	0.004	0.002	-0.004	0.01	0.01
	(0.09)	(0.28)	(-0.67)	(1.05)	(1.13)
			Panel D		
Log paid weeks maternal leave	-0.03	-0.003	-0.004	-0.004	-0.01
	(-1.43)	(-0.88)	(-1.20)	(-0.76)	(-1.57)
Log total weeks paternal leave	0.003	0.001	-0.004	0.01	0.01
	(0.08)	(0.16)	(-0.64)	(1.14)	(1.14)

Notes: The sample size is 2,181. The table shows OLS coefficients with T-statistics below. T-statistics are based on robust standard errors. All models include the full set of variables shown in Table 2. Models also include categories for father's education, age, and occupational prestige score.

Appendix Table 1: First Stage Results

	Log total number of weeks of maternal leave	Log number of weeks of paid maternal leave
Child's age	-0.01	-0.01
	(-0.97)	(-0.70)
Mother's age	0.04	0.05
	(9.22)	(11.29)
Married	0.26	0.33
	(4.86)	(5.73)
Number of siblings	-0.09	-0.12
	(-3.81)	(-4.95)
Child is a twin	0.41	0.41
	(4.99)	(4.64)
Black	0.16	0.22
	(2.49)	(3.29)
Latino	-0.005	0.66
	(-0.080)	(0.870)
Other race	0.005	0.10
	(0.080)	(1.60)
High school	0.06	-0.01
	(1.07)	(-0.15)
Vocational Tech.	0.06	-0.34
	(0.44)	(-2.33)
Some college	0.17	0.14
	(3.18)	(2.31)
College graduate or more	0.05	0.16
	(0.070)	(2.08)
Premature	0.14	0.12
	(2.07)	(1.59)
Low birth-weight	-0.07	0.06
	(-0.87)	(0.77)
Very low birth-weight	-0.09	-0.06
	(-0.95)	(-0.62)
Urban	-0.06	-0.10
	(-0.97)	(-1.42)
Welfare	-0.58	-0.53
	(-5.83)	(-4.98)
Lived with mother until 16	0.01	-0.02
	(0.07)	(-0.23)
Lived with father until 16	-0.01	0.03
	(-0.10)	(0.55)
Repeated grade	-0.06	-0.14

	(-0.91)	(-1.86)
# yrs education of grandmother	0.01	0.008
	(1.7)	(1.38)
State had family leave policy prior to FMLA	0.10 (2.13)	0.15 (2.81)
% county residents who work outside county	0.003 (2.47)	0.004 (2.70)
Median gross rent in county	0.0003 (2.06)	0.0004 (2.54)
F-statistic on identifying instruments (p-value)	7.22 (0.000)	10.61 (0.000)
R-squared	.11	.15