

# Appendix F: Data and methods in FMLA and paid FML research evidence

Availability of data can influence which aspects of a policy are evaluated, the quality of research evidence and its interpretation. At this time, there are no randomized controlled trials (RCTs) of the impacts of the FMLA or state paid family leave policies. As a result, to analyze FMLA effects on specific employee and family outcomes, researchers must rely on secondary data sources which were not specifically designed to evaluate the causal impact of FMLA on employment or health outcomes. The Department of Labor has commissioned descriptive surveys on FMLA implementation and experiences, but these cannot be used to determine causal relationships. Here, we present the data and methods of a select group of studies detailed below. We begin with an implementation study and then present the articles in chronological order.

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## FMLA IMPLEMENTATION STUDIES

The Department of Labor (DOL) Worksite and Employee Surveys are separately collected surveys that were carried out in 1995, 2000, and 2012 to capture employer and employee experiences with family leave and the FMLA, such as leave eligibility and usage. Each survey is cross-sectional and can be used for descriptive analyses only.<sup>1</sup> A 2019 study is currently in progress.

## FMLA IMPACT STUDIES

No randomized controlled trial, or experimental studies, of the effects of the FMLA has been conducted to date. Instead, quasi-experimental difference-in-difference (DD) studies take advantage of differences in state-level policies to compare the pre-post effects of the FMLA on workers in states that did not have preexisting leave policies (treatment) to workers in states that did have preexisting leave policies (comparison). These studies take advantage of the fact that prior to the FMLA, some states already had maternity leave laws or other programs providing temporary leave from work for expectant or new mothers. This state variation resulted in a 'natural experiment' when the FMLA was enacted in 1994, whereby workers in some states that did not provide any prior family leave were more affected by the new law than workers in other states that already had leave policies. The studies compare differences in outcomes between states with prior maternity leave laws and states without, before and after the passage of the FMLA. This method is called a difference-in-difference (DD) approach.<sup>2, 3</sup> Studies also add in another layer by also examining the difference between mothers or parents who are estimated to be eligible vs. not eligible for FMLA leave, between states with prior maternity leave laws and states without, before and after the passage of the FMLA (a difference-in-difference-in-difference (DDD) approach).<sup>4, 5</sup>

There are several rigorous studies that analyze the effects of the FMLA on leave-taking, employment and health outcomes.<sup>2, 4, 5</sup> These studies use a variety of secondary data sources, such as the Current Population Survey, the Bureau of Labor Statistics' Employee Benefits Survey and the National Center for Health Statistics Vital Statistics. None of these data sources were specifically designed to evaluate the FMLA, so there are limitations inherent in each.

## STATE FAMILY LEAVE POLICIES IMPACT STUDIES

There is a growing number of rigorous studies that analyze the effects of state paid leave policies on a variety of outcomes including employment, maternal and child health, breastfeeding rates and nursing home usage. These studies rely on various secondary data sources such as Current Population Survey, the National Immunization Survey and the Survey of Income and Program Participation.

Similarly, researchers use DD and DDD designs to study state paid leave policies. One difference-in-difference design for state paid FML policy analysis compares the differences in outcomes before and after a paid FML policy's implementation (treatment) with pre-post differences in outcomes in states without paid FML policies (comparison). Another design is to evaluate differences in outcomes of groups before and after paid leave implementation in California (e.g., treatment group is women with young children and comparison group is men and women with older kids).

## SELECT EXAMPLES

The data and methods used for a select group of studies are detailed below. Many of the studies use alternate model specifications to account for different comparison groups, control variables, and policy trends. We describe all of the main models, but do not include every model specification (used primarily to conduct sensitivity analysis).

### Klerman, et al. (2012). Department of Labor 2012 Worksite and Employee Surveys

In 2012, the Department of Labor commissioned Worksite and Employee Surveys to capture

employer and employee experiences with family leave and the FMLA. Between February and June of 2012, a random sample of 1,812 private worksites and 2,852 private or public employees were surveyed about their experiences with family and medical leave.<sup>1</sup> The Worksite Survey included both FMLA-covered worksites as well as non-FMLA-covered worksites and likewise, the Employee Survey included both FMLA-eligible and FMLA-ineligible employees. This [survey](#) is currently ongoing, and a fourth wave is expected to be released in 2019.

### Survey methods

- The 2012 Employee Survey was conducted from February to June 2012 by random-digit dial to landlines and cell phones. The sampling universe represented all employees with either a landline or a cell phone, but excluded self-employed respondents. The survey had a 15% response rate. The sample included both private-and public-sector employees and can be divided into four groups:
  - Employees who took leave (either paid or unpaid): 1,133 completed interviews, 16.3% of the weighted sample.
  - Employees who needed but did not take leave: 219 completed interviews, 3.5% of the weighted sample.
  - Employees who both took leave and needed but did not take leave (had an unmet need in addition to taking a leave): 199 completed interviews, 3.1% of the weighted sample.
  - Employees who neither took nor needed to take leave: 1,301 completed interviews, 77.2% of the weighted sample.
- The 2012 Worksite Survey was conducted between March and June 2012. The sampling universe consisted of all branch locations (not just headquarters) listed in the 2012 Dun's Market Identifiers file. The sampling universe excluded self-employed respondents, government and quasi-government worksites, so that the sample includes only private-sector employers. The worksite survey had a 21% response rate. The final report tabulates results from the Worksite Survey for:
  - All worksites
  - Worksites that self-reported FMLA-coverage
  - Worksites that have 50 employees within 75 miles, and therefore by law are FMLA-covered

These surveys are cross-sectional (capture only a single point in time) and descriptive and therefore cannot be used to determine causality. However, some results can be compared with results from the 1995 and 2000 surveys to examine changes over time, such as in rates of leave-taking.

### Waldfoegel. (1999). *The impact of the Family and Medical Leave Act*

This study examined the effects of the FMLA on leave coverage overall, as well as on mothers' leave-taking, employment and wages using quasi-experimental data.<sup>4</sup>

### Data and sample

- To investigate whether the FMLA is associated with increased leave coverage (research question 1), the author used two descriptive surveys:
  - The Bureau of Labor Statistics' Employee Benefits Survey from 1988 to 1995 is representative of all private industry firms. These surveys provided information about unpaid/paid maternity and paternity leave coverage at small firms (fewer than 100 employees) and medium to large firms (100 or more employees).
  - The 1994 Westat survey of small, medium, and large firms was conducted for the

Family and Medical Leave Commission. This survey used a national, random sample of private- sector employers of diverse size. It provided information on whether surveyed firms were covered by the FMLA and whether covered firms changed their leave policy in response to the FMLA.

- To investigate the FMLA’s effects on mothers’ leave-taking, employment, and wages (research questions 2, 3 and 4), the author used the March supplement of the Current Population Survey (CPS), a nationally representative sample of the non-institutionalized U.S. population ages 16 and older. The CPS is the basis of the U.S. Department of Labor’s national employment and income estimates. It provides information on whether employed respondents work for small (25 to 99 employees), medium (100 to 499) or large (over 500) firms. For this study, the 1992 and 1993 March CPS provide two years of data pre-FMLA (that is, prior to the implementation of the FMLA in August 1993) while the 1994 and 1995 March CPS provide two years of data post-FMLA. The sample included full-time employees only, and excludes part-time workers and the self-employed.

### Dependent variables

- Leave coverage: Defined as the percentage of full-time employees whose employers provide maternity or paternity leave. A second variable used to examine coverage was the percentage of FMLA covered employers who reported having to change their leave policies as a result of the FMLA.
- Leave-taking: Defined as the percentage of employees who have a job but are absent from work during the CPS survey week<sup>6</sup> (the number with a job but not at work during the survey week/total number with a job that week). Therefore, leave-taking was not specific to leave being paid or unpaid, and is not limited to leave qualifying under FMLA (e.g. maternity leave or caregiving leave for a family member’s or employee’s own serious medical conditions).
- Employment: Defined as being employed as of the CPS survey week.
- Wage: Calculated by dividing last year’s earnings by last year’s hours worked (estimated as the product of weeks worked last year and usual weekly work hours). Wages were reported in 1995 dollars.

### Empirical strategy

To investigate whether the FMLA is associated with increased leave coverage (research question 1), the study used descriptive methods.

- The author examined trends from 1988 to 1995 in the percentage of full-time employees whose employers provided any type of maternity or paternity leave, by firm size. The author also examined the percent of FMLA covered employers who reported that they had to change their leave policies in response to the FMLA. This is a descriptive analysis (i.e. it does not include any control variables).

To investigate the FMLA’s effects on mothers’ leave-taking, employment, and wages (research questions 2, 3 and 4), the study took advantage of the natural experiment arising from state differences in pre-FMLA maternity leave policies. Prior to the FMLA, 11 states and Washington, D.C. had maternity leave laws, while 39 states did not. Using this natural variation, the author conducted a series of DD and DDD models. Specifically, the author compared differences in outcomes before vs. after the enactment of the FMLA in states with vs. without prior maternity leave laws, for the treatment groups (women with children or infants) vs. the comparison groups (childless women, older women or men). For analysis of leave-taking and wage effects, self-employed and part-time workers are excluded from the analysis. All analyses, except

employment analyses, were run separately by firm size (small, medium, large) to detect whether effects varied. Employment analyses were not run by firm size because this variable could not apply to the unemployed.

- Leave-taking: The treatment groups were (1) women aged 19-45 with children under 18 and (2) women aged 19-45 with an infant under one year old. The comparison groups were childless women aged 19-45 and men aged 19-45. These two comparison groups were chosen as they may be suitable substitutes for the treatment groups in the labor market, but would be less likely to use FMLA leave. The study used probit models to estimate leave-taking.
- Employment: The treatment groups were (1) women aged 19-45 with children, (2) women aged 19-45 with an infant and (3) childless women aged 19-45. The comparison groups were men aged 19-45 and women aged 46-60. For the employment and wage analyses (see below), the author treated childless women as a treatment group and created an alternative comparison group, women aged 46-60, because the FMLA may have affected the employment and wages of childless women aged 19-45 since they are of childbearing age. The study used probit models to estimate employment.
- Wages: The treatment groups were (1) women aged 19-45 with children, (2) women aged 19-45 with an infant and (3) childless women aged 19-45. The comparison groups were men aged 19-45 and women aged 46-60. The study used Ordinary Least Squares (OLS) regression models to estimate wages.

All models controlled for age, education, marital status, number of children and race. The employment models also controlled for other household income.

### Han, et al. (2009). Parental leave policies and parents' employment and leave-taking

This study assessed the effects of federal and state parental leave legislation on parents' employment and leave-taking immediately after the birth of a child. Authors examined outcomes separately for mothers and fathers between 1987 and 2004 using quasi-experimental data.<sup>2</sup> The study included three types of parental leave laws: the FMLA, state unpaid parental leave legislation (in seven states) and paid leave through state Temporary Disability Insurance (TDI) programs (in five states).

#### Data and sample

The study used June Current Population Survey (CPS) Fertility Supplements, merged with other months of the CPS, from 1987 to 2004. This survey provided data on the month and year that mothers gave birth. While fertility data were available for all mothers regardless of marital status, these data were only available for fathers who were married to and cohabiting with the child's mother. Therefore, estimation of paternal leave-taking and employment does not apply to single or non-cohabiting fathers.

#### Dependent variables

Parental labor force status was determined up to 12 months before and after a child's birth month and was measured in the week prior to the survey. Labor force outcomes were coded as:

- Employed: parents with a job regardless of whether or not they were working.
- Employed but absent (on leave): parents with a job but not at work.
- Employed but absent for other reasons (on leave for other reasons): parents with a job but not at work for reasons besides vacation, own illness, bad weather, labor dispute or layoff or because they were waiting for a new job to begin.

The data did not include information specifically on maternity/paternity leave, so the authors inferred that this type of leave was best captured under the “leave for other reasons” category.

### Key independent variables

Parental leave potential eligibility/need was determined as follows for each of the three types of leave legislation:

- FMLA: Parents of children born as of August 1993 were coded as potentially eligible for 12 weeks of FMLA leave. The data did not contain the information necessary to determine whether a parent was eligible for FMLA leave according to the federal criteria.
- State unpaid parental leave laws: Parents of children born as of the state law’s enactment date were coded as potentially eligible for state parental leave. The data did not contain the information necessary to determine whether a parent was eligible for leave according to state criteria.
- The State TDI programs: Paid leave related to the birth of a new child only applied to working mothers, but not fathers, under state TDI programs. Therefore, mothers of children born when the state’s TDI program was in effect were coded as being potentially eligible for six weeks of paid leave.

Note that a full sample of new parents was included to examine effects of leave policies on employment; however, the sample was limited to employed parents when examining the effects of leave policies on leave-taking.

Parental leave legislation was coded using two different monthly variables: (1) whether federal and state parental leave laws were in effect for each month or (2) the length of leave entitlement (weeks) guaranteed by the legislation. These monthly variables were created for the same time frame as the CPS data: from 1987 to 2004.

Data for the dependent and key independent variables were merged together (that is, parental leave variables were merged with the CPS sample of parents). Additionally, information on state monthly unemployment rates was included in the data set. Lastly, welfare and EITC reforms occurred during the study period. To isolate the effects of parental leave legislation, the authors controlled for (1) whether the state had an approved welfare waiver program prior to TANF enactment in 1996, (2) when a state implemented TANF, (3) the length of welfare work exemptions for mothers of infants and (4) the generosity of EITC benefits (measured as the natural log of the cash value of the maximum refundable benefit for a family with at least two children).

### Empirical strategy

To estimate impacts of parental leave legislation on parental labor force outcomes defined above, the study took advantage of the natural variation that arose from differences in parental leave policies across states and time. The authors ran a series of DD models that examined (1) the difference in labor force outcomes (employment and leave-taking) for new parents in states with vs. without parental leave legislation, and compared this to (2) the difference in labor force outcomes for soon-to-be parents (who would have a birth in about one year) in states with vs. without parental leave legislation. Regressions were run separately for mothers and fathers because the outcomes (employment and leave-taking) may be differentially affected by parental leave legislation. Authors ran both probit and linear probability regression models, which yielded similar marginal effects.

- Outcomes: separate regressions were run for the three outcomes: “employed,” “employed but not working” and “employed but absent for other reasons.” The latter two

were only estimated for the subsample of employed parents, and so represent leave-taking conditional on employment.

- Presence of parental leave legislation: a dichotomous variable was included in the model to indicate whether any parental leave law was in effect during the survey month.
- Potential leave eligibility/need (based on birth of new child): dummy variables were added to flag the birth month and three following months. The reference group consisted of survey respondents who were going to have a birth 11 to 12 months after the survey date. This group served as a control group because the behavior of these respondents is expected to be similar to that of new parents, but they are not subject to leave legislation in the survey week.
- Interactions: An interaction term between potential leave eligibility/need (flags for the birth month and three following months) and the presence of parental leave legislation during the specified month. The interaction was created to capture whether new parents living in states with parental leave entitlements during the birth month or three following months experienced different employment and leave-taking outcomes than parents not living in states with parental leave entitlements.
- Fixed effects: the regression models included state and year fixed effects to control for all time-invariant and state-specific determinants of employment.
- Additional controls: the regression models included covariates for parents' age, education and race/ethnicity, whether the child is a firstborn, number of children in the household, as well as welfare and EITC policies and state monthly unemployment rates.
- Model specifications: results from linear probability models were presented, but authors first ensured that the magnitudes and statistical significance of marginal effects were similar to those obtained from probit models.

The authors also estimated models using the duration of leave (weeks) guaranteed by legislation rather than the dichotomous "presence of parental leave legislation" variable. Lastly, they estimated separate models by parental education (no college vs. some college or more) and mothers' marital status (married vs. single).

### Rossin. (2011). *The effects of maternity leave on children's birth and infant health outcomes*

This study examined the effects of unpaid FMLA maternity leave on child birth and infant health outcomes using quasi-experimental methods.<sup>5</sup>

#### Data and sample

- To measure birth outcomes, the study used birth records from 1989 to 1997 from the National Center for Health Statistics Vital Statistics natality data.<sup>7</sup> To measure infant mortality rates, the study used 1989 to 1998 Vital Statistics mortality data for children under 1 year of age.<sup>8</sup> These data were collapsed into groups by county, year and birth month and then merged together.
- An estimate of maternity leave eligibility was calculated using data from the County Business Patterns (CBP)<sup>9</sup> for 1989–1997. The CBP provides the total employment and the number of firms in various size categories for each county and year, but has no information on individual workers' gender, fertility or children. Data from the CBP were used to estimate the likelihood (conditional probability) that a person in a given county and year is employed in a firm with 50 or more employees. Notably, the data did not allow for an estimation of the likelihood that a *woman* in a given county and year is employed in a firm with 50 or more employees. Given data constraints, the author's

calculations were the closest available approximation of the probability that a woman would be eligible for FMLA maternity leave in a particular county and year. The data were grouped by county and year so that each group had its own conditional probability for FMLA eligibility. The author calculated the median conditional probability across all groups, and then designated groups with a probability above the median as “likely FMLA eligible,” and groups with a probability below the median as “likely FMLA ineligible.” The author then linked these groups to the birth outcomes and infant mortality data by county and year, and split the sample into likely eligible and likely ineligible mothers.

### Empirical strategy

To investigate the FMLA’s effects on child birth and infant health outcomes, the study took advantage of the natural experiment that arose from state differences in pre-FMLA maternity leave policies. Using this natural variation, the author conducted a series of DD and DDD models, as follows:

- The study first assessed the impact of the FMLA on child birth and infant health outcomes using a DD model. The model examined the difference in health outcomes of children born before vs. after the passage of the FMLA in 1993, in states that had prior maternity leave policies (comparison states) vs. states that did not (treatment states). However, this DD model may underestimate the true effects of the FMLA since it does not account for the fact that not all mothers are eligible for FMLA maternity leave.
- Due to the potential bias in the DD model, the study next assessed the impact of the FMLA on child birth and infant health outcomes using a DDD framework. The model examined the difference in health outcomes of children born to mothers who were likely FMLA eligible vs. likely FMLA ineligible, before vs. after the passage of the FMLA in 1993, in comparison states vs. treatment states. The DDD model was also used to examine the effects of the FMLA on parity.<sup>10</sup> The DDD model is preferable to the DD model since by examining the health outcomes of children born to likely FMLA eligible mothers before and after the passage of the Act, it estimates more precisely the true effect of FMLA maternity leave on child health outcomes.

Both models controlled for child and maternal characteristics, county-level demographic characteristics, including percent of women employed and percent married, county-level controls, state unemployment, as well as fixed effects for the state, year-of-birth, and birth month.

### Rossin-Slater, et al (2013). The effects of California’s Paid Family Leave program on mothers’ leave-taking and subsequent labor market outcomes

This study examined the effects of the California paid FML program, implemented in July 2004, on mothers’ leave-taking, employment, work hours and wages.<sup>3</sup>

### Data and sample

This study used 1999 to 2010 data from the March Current Population Survey (CPS) Annual Demographic Supplement. The sample was limited to the state of California’s civilian population ages 15-64 years old. To analyze the effects of the California paid FML on maternal employment, work hours and wages, outcomes of all working women with children up to three years of age were compared to working women with children of other ages, childless women, and men. In the CPS, questions about leave taking are asked only of individuals who report employment but were absent from their job in the week before the survey. If a respondent confirms they missed work in the last seven days, they are asked what form of leave they took (e.g, parental, sick,



vacation, etc.). CPS data do not disclose precise childbirth dates nor women's employment status during a pregnancy.

### Empirical strategy

The study assessed the impact of the California paid FML program on maternal leave-taking, employment, work hours and wages using a DD model. The model examined the difference before and after California paid FML program implementation in the outcomes of all employed mothers with infants or young children (treatment groups) compared to the difference in outcomes before and after for various comparison working groups including (1) all women with older children, (2) all childless women, (3) all men with non-infant children or (4) all new mothers in other states (comparison groups).

The primary analysis measured the effects of the California paid FML on maternal leave-taking:

- The treatment group was defined as employed women with an infant (less than one year old at the survey date) (N=2,482).
- The primary comparison group was employed mothers with a youngest child between five and 17 years old (N=18,593). This primary comparison group is based on the assumption that women with older children are likely to have similar labor market behavior as women with infants, but will not be as influenced by the availability of paid family leave.
- The study did not choose working women with toddlers as a comparison group because these women are more likely to be expecting or planning for an additional child and so their behavior may be affected by California's paid FML program.<sup>11</sup>
- The results was tested against three other comparison groups: working women in California with no children (N=33,790), working mothers with infants residing in the next three largest states – Florida, New York and Texas (N=4,000), and working mothers with infants residing in all states other than California (N=28,605).
- The model also tested changes in other types of leave (such as vacation and sick leave) as use of these types of leave should not be impacted by California's paid FML program.

Because of potential errors classifying women in the treatment group (those based on employment), the study also performed a sensitivity test to examine the impact of the California paid FML program on leave-taking for *all* women with infant children, regardless of their employment in the prior year.

Secondary analyses examined the impact of California's paid FML program on maternal labor market outcomes; specifically mothers' employment, work hours and wages.

- Measures are as follows: mother worked any hours during the last week, number hours worked last week, log hours worked last week, mother worked any usual hours during the last year, number of usual hours worked last year, log usual hours last year, wage income last year and log wage income last year.
- Mothers with children aged one, two, three, or seven and above are classified into different treatment groups, and for each group, the analysis drops the CPS survey year for children who were born in 2005 (the year of California FML implementation). In other words, it is not possible to know if a child born in 2005 was born before or after California FML implementation. Therefore, there were different post-treatment periods depending on the child's age.

The empirical methods consisted of a "standard difference-in-difference (DD) design comparing

changes in leave-taking for eligible California mothers of infants, surveyed pre- and post-2005 relative to corresponding differences for comparison groups unlikely to be affected by [California FML].” The models controlled for individual characteristics including age of mother, race/ethnicity, education, marital status and US birth. Models using new mothers in other states as a comparison group included state-fixed effects and state-year unemployment rates. Models examining the effect of California FML on maternal labor market outcomes include controls for the ages of other children in the household.

### **Das & Polachek. (2015). Unanticipated effects of California’s Paid Family Leave program**

This study examined the effects of the California paid FML program, implemented in July 2004, on women’s labor force participation rates, unemployment rates and unemployment duration.<sup>12</sup> Outcomes were compared by gender, age group and geographic location both before and after CA FML implementation.

#### **Data and sample**

The authors utilized March CPS data from 1996–2002 to comprise the pre-policy period, and from 2003–2009 for the post-policy period. The sample consisted of 34,270 observations. A unit of observation is defined as a state, gender, age group and year average value; parents are not analyzed individually. Groups are defined as follows:

- Gender: Women and men
- Age: Younger than 42 and 43 and older. This was chosen because a small percentage of the population gives birth after the age of 39, and the authors allow women two years after giving birth to take advantage of California paid FML.
- State: Residing within California, or a state other than California.

#### **Empirical strategy**

Using a quadruple DD model, the authors compared the labor market outcomes of California vs. all other states, young vs. old workers, female vs. males, and before and after the legislation’s implementation. The authors consider all Californians as the treatment group, but note that different groups of Californians will experience the policy different (based on gender and age). This approach allows for a comparison between young California women (the treatment group) to the remaining population in California (men and older women) and in the rest of the country (the entire population) before and after paid FML implementation. There were three state-level outcomes: labor force participation rates, unemployment rates and unemployment duration. The model controlled for average education, the proportion married, per capita state income, the proportion self-employed, age, year fixed-effects and cohort and time effects.

The authors tested the model by developing two additional estimation models: (1) a woman-only model, which compared young Californian women to older Californian women and all women residing outside of California; and (2) an age model, which compared all young Californian women to young Californian men and all young adults outside of California. In addition to estimating a model using group level data, the authors also estimated the model using individual level observations in order to compare their results with other studies.

### **Byker. (2016). Paid parental leave laws in the United States: Does short-duration leave affect women’s labor-force attachment?**

In contrast to studies that draw on cross-sectional cohorts, this longitudinal panel study estimated the impacts of California and New Jersey’s paid FML programs on mothers’ labor market attachment.<sup>13</sup>

### Data and sample

The author used the Survey of Income and Program Participation (SIPP) panel data from 1996-2008. The SIPP is a series of nationally representative 48-month panel surveys and includes questions on births and work trajectories. The sample included all women ages 25-45 who gave birth during one of the four year panels (1996, 2001, 2004 and 2008). Estimates of employment outcomes before and after paid FML implementation were compared between women who gave birth in California and New Jersey (N=1,259) to a comparison group of women who gave birth in Texas, Florida and New York (N=1,557).

### Empirical strategy

The article used an event-study DD strategy to estimate the work trajectories of women 24 months before and 24 months after a birth, both before and after the implementation of California and New Jersey paid FML program relative to women who gave birth in Texas, Florida and New York. The study's main outcome is changes in mothers' monthly labor force participation before and after birth for women exposed to California and New Jersey paid FML relative to women who gave birth in other states and who were not exposed to paid FML. Byker first estimates labor force participation. The analysis shows three labor force trajectories for women around birth: stay attached, take a prolonged exit or exit briefly and return to labor force within a year. The analysis further decomposes labor force status for those who are in the labor market between those who have a job or are looking for a job. Separate models are run by mothers' education level. The model includes individual and state fixed effects as covariates.

### Lichtman-Sadot & Bell. (2017). Child health in elementary school following California's paid family leave program

This article assessed whether California paid FML affected children's health outcomes in early elementary school.<sup>14</sup> Specifically, the authors hypothesized that California paid FML is associated with a reduction of adverse health conditions amongst children, such as obesity, attention deficit/hyperactivity disorder (ADHD) and ear infections. The authors hypothesized that the positive impacts on health outcomes operate through the positive impacts on breastfeeding, but did not have breastfeeding outcomes to test this moderating effect. They also note positive impacts on health could be due to greater prenatal care during infancy or reduced parental stress.

### Data and sample

This study uses three cohorts from the Early Childhood Longitudinal Study (ECLS) to assess the impact of California's paid FML on children's health outcomes in early elementary school. The three cohorts are the ECLS 1998-1999 and 2010-2011 kindergarten cohorts and the ECLS-B birth cohort of infants in 2001 that were followed through kindergarten. The ECLS-K1999 covers 21,000 kindergartners in the 1998/1999 school year born late 1992 through 1993, prior to the implementation of California's paid FML. The ECLS-B covers 7,022 kindergartners who were born in 2001, and were in kindergarten shortly after paid FML was implemented (the 2006/2007 or 2007/2008 school years). The ECLS-2011 covers 18,000 kindergartners born late 2004 to 2005.

The sample only included children who enrolled in kindergarten on-time based on their local kindergarten entry cutoff date, which resulted in a consistent age composition and allowed the authors to exclude mothers who may have timed to have their children just after paid FML was implemented in July 2004 in California (this is relevant for the ECLS-2011 survey which includes children born in late 2004 – 2005). The sample was limited to children of five and six years of

age, with a reported state of residence, born in the U.S., who do not have a twin, are residing with their biological mother and have no missing health outcome variables. Two subsamples were generated: kindergarten children who resided in California pre and post-paid FML implementation (ECLS-K1999 and ECLS-B pre-implementation N=2,666; ECLS-K2011 post implementation N=1,159), and kindergarten children who resided in all other states (ECLS-K1999 and ECLS-B pre-implementation N=14,339; ECLS-K2011 post-implementation N=8,273). In the latter subsample of comparison states, 2,000 children from eight states and Washington, D.C. were excluded due to incomplete data, and another 5,000 cases were excluded from any of the cohorts due to missing health outcomes; however, the main results were not sensitive to these case exclusions. Frequent ear infections is not available as a health outcome in the ECLS-B, so all results for this outcome are based only on the ECLS-K surveys. For subgroup analyses with ADHD as the outcome variable, the authors only use first grade data from the ECLS-K surveys in order to increase statistical power (ADHD diagnosis rates increase greatly between kindergarten and first grade).

### Empirical strategy

To compare health outcomes of children ages five and six before and after California paid FML's implementation, the authors used a DD approach which compares outcomes between children born in California prior to paid FML and children born in California after paid FML's implementation. The authors estimated probit regression models for five dichotomous outcomes and OLS regression for the final outcome, a standardized general health measure. (The authors used linear probability models for the subgroup analyses). Data from children outside of California during the study periods were used as a comparison group. Five child health outcomes were self-reported by mothers and BMI/overweight was measured by interviewers. The six child health outcomes included:

- Overweight
- ADHD
- General health condition
- Hearing problems
- Communication problems
- History of frequent ear infections

The models controlled for individual characteristics such as mother's education level, ESL or first language, child's gender, mother's age, child's race, child's month of birth, child's age at start of kindergarten, mother's marital status, number of older siblings a child has, and household income.

During the study period, there was a national initiative to increase routine hearing screenings amongst newborns. Knowing this, the authors explored an alternative explanation that effects in the hearing problems outcome could be related to this initiative. To do so, they included a regression specification for hearing problems as an outcome variable while controlling for the share of newborns screened for hearing problems in each state and year. This variable was constructed using the Directors of Speech and Hearing Problems in the State Health and Welfare Agencies (DSHPSHWA) and CDC Early Hearing Detection and Intervention (EHDI) annual survey data, which is only available starting in 1999. Thus, this check can only be done in regressions that use the ECLS-B and ECLS-2011 data (ECLS-1999 children were born in 1993).

## Arora & Wolf. (2018). Does paid family leave reduce nursing home use? The California experience

The authors hypothesized that utilization of California paid FML is associated with decreased nursing home usage in the state due to affording workers the opportunity to manage family and elder care without risking job loss.<sup>15</sup> They focused on nursing homes since they account for the largest proportion of long-term care costs in the U.S.

### Data and sample

Arora and Wolf created a longitudinal, state-level dataset making use of nursing home utilization data from the Centers for Medicare and Medicaid Services Nursing Home Compendium series from 2000 to 2009 (which cover the years 1999 to 2008). Nursing home utilization – the outcome measure – equals the proportion of a state’s older population that resides in a nursing home at any time during a calendar year. The numerator of nursing home utilization was drawn from the Nursing Home Compendium. These data represented only CMS certified nursing homes, which accounted for 98.5% of all nursing facilities and 98.8% of all nursing home beds in 2004. The denominator was drawn from the estimated state- and year-specific count of people age 65 and older as of July 1 from the U.S Census.

The authors merged state-level economic, demographic and policy data to the nursing home utilization data. Some examples of data sources include the U.S. Census Bureau, AARP, the Urban Institute, the Kaiser Family Foundation, the National Partnership for Women and Families, and the National Center for Health Statistics.

California’s paid FML program was implemented in July 2004. In order to account for FML’s implementation period (i.e., the start of treatment), all 2004 cases were excluded from the analysis.

Since the treatment group was not randomly assigned, cluster analysis was employed to construct state-level comparison groups. The comparison groups were as follows:

- “California cluster” – states with similar population characteristics
- “Family friendly cluster” – states with laws that exceed minimum characteristics of FMLA
- All states and the District of Columbia

### Empirical strategy

The empirical method included DD regression models to estimate the effect of California’s paid FML program. The model compares changes in nursing home utilization in California before and after paid FML compared to nursing home utilization in comparison group states. The different state comparison groups test the robustness of findings. Fixed effects and time-varying covariates were included.

The authors controlled for variables that potentially impact the supply of or demand for nursing home care. Covariates that may have impacted the supply of nursing home care include whether a state constrains the growth of the nursing home market with a certificate of need (CON) or construction regulations, the state’s average daily Medicaid reimbursement rate, the state’s average private pay rate for nursing home providers and the presence of a “Medically Needy” Medicaid option in a state. Covariates that may have impacted the demand for nursing home care include the availability of PCS State Plan and whether FML policy in a state expanded the FMLA definition of family to include parents-in-law. Other covariates included median hourly wage of personal care aides, Home Health visits per capita and availability of CMS Skilled Nursing

Facility days per capita. The model also controlled for economic characteristics of a state including reserve funds, per capita income, child poverty rate and the proportion of the 65+ population that is female, 85 years or older, black, Hispanic and other racial groups.

### Hamad, Modrek & White. (2018). Paid family leave effects on breastfeeding: A quasi-experimental study of U.S. policies

This study examined changes in breastfeeding practices before and after the implementation of paid FML policies in California and New Jersey using the 2003-2015 National Immunization Survey (NIS).<sup>16</sup>

#### Data and sample

The NIS is a nationally representative cross-sectional survey of parents conducted annually that includes questions on breastfeeding their children. The analytical sample was measured at the child level; the treatment group was defined as children born in California and New Jersey before and after the respective states' paid FML program was implemented (i.e., after 2004 in California and after 2009 in New Jersey). The author compared pre-post change in California and New Jersey (treatment group) with pre-post change in the remaining 48 states and the District of Columbia without paid leave (control group).

Since parents were surveyed when their children were 19-35 months old, the sample included children born from 2001-2013. Since the survey does not include a question about children's state of birth, the sample was restricted to children who had not moved since birth and to children living in the 50 states and the District of Columbia. Children were not included if they had less than one breastfeeding outcome reported. Birthdates in the NIS are reported as categorical variables; since each wave of the NIS is conducted during particular timeframes (e.g., January 2006 to February 2007 comprise the 2006 wave), the authors calculated the earliest and latest possible birthdate for each child remaining in the sample. Finally, children that could have been born during outside of the range of pre- and post-policy dates were excluded, resulting in a final sample of 306,266 children.

#### Empirical strategy

The main research question is whether paid FML changed breastfeeding practices. The authors used a DD approach to assess average changes in breastfeeding practices before and after paid FML implementation in California and New Jersey (combined) compared to states without paid FML. Seven outcomes were measured:

- Ever breastfed
- Whether the child remained exclusively breastfed at 3 months
- Whether the child remained exclusively breastfed at 6 months
- Whether the child was still breastfed at 6 months
- Whether the child was still breastfed at 12 months
- Duration of exclusive breastfeeding (days)
- Duration of any breastfeeding (days)

Exclusive breastfeeding is defined by the World Health Organization (WHO) and United Nations Children's Fund as infant solely consuming breastmilk (including milk expressed or from a wet nurse) and no other food or drink (including water), with the exception of vitamins, minerals or medicines. Therefore, non-exclusive breastfeeding includes supplementing breastfeeding with the assistance of any other food or drink, including water and formula.

The authors estimated models using linear regression and ran alternate model specifications using logistic regression for the binary outcomes and Poisson regression for continuous outcomes. The model adjusted for individual- and time-varying state-level factors, fixed effects and year indicators to account for secular trends. Covariates included child's age, race and gender; mother's age, marital status and educational attainment; household size; and income group. Time-varying state-level covariates included the proportion of the population with less than a high school education, the unemployment rate and gross domestic product per capita. Due to data limitations, there are no control variables for parental employment.

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7. The data are based on birth certificates. State laws require birth certificates to be completed for all births, and federal law mandates national collection and publication of births and other vital statistics data.
8. The 1989 to 1998 Vital Statistics mortality data for children under 1 year of age are based on death certificates, representing all dying in the U.S.
9. The CBP is a series of annual surveys conducted by the Bureau of the Census, providing an economic profile of counties, states, and the United States. Data include employment, payroll, and number of establishments by industry. The data generally represent the types of employment covered by the Federal Insurance Contributions Act (FICA). Data for employees of establishments totally exempt from FICA are excluded, as are self-employed persons, domestic service workers, railroad employees, agricultural production workers, most government employees, and employees on ocean borne vessels or in foreign countries.
10. The author examined the first-time births to mothers compared to second-time births or higher.
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