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Mothers in the Military: Effect of Maternity Leave Policy on Take-Up

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ABSTRACT This study exploits changes in paid maternity leave offered by one of the United States' largest employers, the Department of Defense, to estimate the effect of such policies on mothers' leave-taking. Since 2015, the U.S. Marine Corps has shifted its maternity leave policy from 6 to 18 to 12 weeks. Leave expansions increased leave duration, whereas contractions decreased leave taken by active-duty service members. However, the policy changes crowded out other forms of leave: with an increase in maternity leave available, mothers increased use of maternity leave and stopped supplementing with additional annual leave. Although all mothers used the full 6 weeks of leave in the early period, it is the less advantaged mothers—those in the enlisted ranks, first-time mothers, and single mothers—who disproportionately used more of the additional leave than officers, experienced mothers, and married mothers. Pregnant officers, experienced mothers, and single women used less leave than nonpregnant women in the months leading up to birth, but expecting additional post-birth leave did not change average pre-birth leave-taking. Our results highlight the importance of optimally sizing family leave policies and provide evidence that the true cost of such programs may be lower than the raw count of weeks provided by additional maternity leave allowances.

KEYWORDS Maternity leave • Female labor supply • Military • Crowding out effect

Introduction

Nearly all developed countries offer some type of paid maternal or parental leave (Livingston and Thomas 2019). For most Americans, paid family leave (PFL) is accessed through employers and remains limited (National Partnership for Women and Families 2021). This study exploits recent changes in the paid maternity leave policy offered by one of the largest employers in the United States, the Department of Defense (DoD), to estimate the policy's effect on mothers' leave-taking.

Although our setting is the U.S. military, this study can also address first-order questions of maternity leave policies more generally. Does expanded paid leave increase women's time away from work, or does it simply crowd out other forms of leave? Which types of mothers are more likely to take longer leaves? One of the

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main arguments for paid maternity leave is that it enables mothers to take time off work to recover from childbirth and care for their newborn (Chatterji and Markowitz 2012; Rossin 2011; Staehelin et al. 2007). A significant crowding out of other leave types would indicate that expanded maternity leave results in little increased recovery time and parental time with children. Crowding out would also indicate that women can use other kinds of leaves for different purposes rather than saving them for post-pregnancy.

PFL policies generally aim to enhance maternal and child well-being and alleviate trade-offs between female employment and childbearing (Olivetti and Petrongolo 2017). PFL could potentially address demographic challenges of declining birth rates and growing elderly populations in industrialized countries by incentivizing fertility (Kalwij 2010; Lalive and Zweimüller 2009; Raute 2019). Conversely, PFL could lower women's future labor attachment and prove costly to employers, particularly if there is wide take-up of available leaves. In theory, PFL imposes employer costs that could lead to gender discrimination in the labor market, further widening gender gaps (e.g., Glass 2004). Thus, addressing the first-order questions of how much time off new mothers take and which types of mothers take more time off matters for understanding female labor supply and gender gaps.

Prior studies generally show that leave-taking increases with the adoption and expansion of PFL policies (e.g., Bartel et al. 2015; Baum and Ruhm 2016; Kleven et al. 2019; Rossin-Slater et al. 2013). Because maternity policies vary not only in duration but also in eligibility requirements, income replacement rates, and job protections, it is not always clear how and what aspects of maternity leave programs affect maternal leave-taking.

Our study clarifies the literature on parental leave policy in several important ways. First, our unique context—in which eligibility requirements, benefit amounts, and job protections remained constant while leave duration changed—focuses exclusively on how varying leave length affects leave usage. Second, we examine a leave expansion (from 6 to 18 weeks) and a contraction (from 18 to 12 weeks), permitting two quasi-experiments and allowing us to explore whether policy effects are asymmetric. Third, the leave lengths we examine are similar to current U.S. policy considerations, in contrast to more generous non-U.S. policies.

Our empirical design compares PFL and other types of leave taken by mothers who gave birth before and after policy expansions/contractions relative to leave taken by propensity score–matched comparison groups. By comparing changes in take-up by mothers with those of similar Marines, we account not just for time-invariant differences but also for time trends in leave-taking, operational tempo, and work demands. We focus on Marines because the Marine Corps consistently tracked leave during the period when leave policies changed. The Marine Corps also offers insight into both the enlisted (workers) and officers (managers/supervisors); like civilians, these two groups may have different degrees of career attachment and organizational commitment. The pool of mothers is also diverse in race, ethnicity, marital status, and their number of prior children. This diverse pool allows us to investigate whether leave-taking differs across groups, which is not possible if treated groups are more homogeneous.

Five findings are noteworthy. First, mothers almost uniformly used all of the maternity leave under the 6-week and 12-week policies. Relative to nonmothers,

most mothers also used additional leave in the year following birth during the implementation of the 6-week policy, indicating that mothers prefer more than 6 weeks of maternity leave.

Second, maternity leave expansions increased take-up of maternity leave, but mothers did not automatically use all leave. In particular, mothers seem to prefer taking leave immediately following birth rather than using flexible leave available several months after birth.

Third, maternity leave crowds out other forms of leave, even in our context with 100% income replacement. With an increase from 6 to 18 weeks of maternity leave, mothers increased their maternity leave by 11.1 weeks and decreased their annual leave by 1.7 weeks in the following year. The same pattern occurred to a lesser extent during the 12-week policy implementation. The crowding out of other leave and the partial take-up of maternal leave imply that mothers did not increase time spent at home by the increased number of weeks allowed.

Fourth, additional leave was taken up disproportionately by mothers who were of lower ranks (with lower earnings, less education, and less career attachment) and were new to motherhood, whereas single mothers had less leave crowd out. Lower ranked women's greater use of leave could be due to their lower incomes, which could limit their resources for childcare. Less advantaged mothers' greater use of leave also implies that policy expansions allowed them to spend more time recovering from childbirth and caring for their newborns. These findings are consistent with the literature on the motherhood penalty; higher skilled and higher earning mothers minimized losses in career continuity.

Finally, the policy changes did not affect leave taken toward the end of mothers' pregnancies. Some pregnant women—officers, experienced mothers, and single mothers—tended to save annual leave in the months before birth. However, these patterns remain largely consistent regardless of how many weeks of maternity leave pregnant women anticipate.

Given these behaviors, our results have implications for the duration of PFL policies being considered in the public sphere. For instance, Congress introduced a bill to increase military maternity leave to 18 weeks and secondary caregiver leave to 12 weeks (Shane 2021). The Marine Corps is considering a one-year maternity leave policy. Our study suggests that women would only partially take up the new leave and that younger, lower ranked, and less educated parents would be the most likely to increase take-up. Beyond the military, our findings suggest that more educated and high-earning women are likely to take shorter maternity leaves even when they have access to expanded, fully paid leaves. The military may differ from civilians in certain dimensions (e.g., more physically fit, younger, male-dominated), but the employment environment may provide particular insight into other heavily male-dominated sectors, such as law enforcement or engineering. The internal labor market also provides insights into professions with limited lateral entry, such as law or academia.

Background and Related Literature

Maternity leave and other policies, such as job flexibility and unpaid leave, predict whether a mother will return to work after childbirth (e.g., Glass and Riley 1998;

Hofferth 1996).[1] The transition to motherhood is often highlighted as the moment the gender wage gap widens over the life cycle (e.g., Gonalons-Pons et al. 2021). Budig and England (2001) estimated a motherhood wage penalty of 7% per child, which is even higher for high-skilled and high-earning White women (Budig and Hodges 2010; England et al. 2016). However, the availability and generosity of leave differ substantially by where women live and work.

Federal PFL Policies

Starting in October 2020, the U.S. federal government offered 12 weeks of PFL for civil servants. For nonfederal workers, the only national policy is the 1993 Family and Medical Leave Act (FMLA), which mandates that employers grant eligible workers 12 weeks of unpaid job-protected family leave with continued health insurance coverage. Klerman and Leibowitz (1999) estimated that only 60% of full-time working women return to their pre-pregnancy employer under FMLA.

Slightly more than half of U.S. private-sector workers are eligible, given FMLA firm size and work history requirements (Ruhm 1997). FMLA increased leave-taking by 23% among mothers of children under 1 year of age (Waldfogel 1999), with maternal leave-taking increasing by 13% during the birth month and by 16% during the month after birth, and increasing at a marginally significant level of 20% two months after birth (Han et al. 2009). Given limited coverage and a lack of effect on eligible men's leave, Han and Waldfogel (2003) concluded that FMLA has limited impact overall.

State-Level PFL

Eight states plus Washington, D.C., have enacted PFL. States pay benefits as a percentage of prior earnings up to an established ceiling. State policies vary in duration from 4 weeks (e.g., Rhode Island) to 12 weeks (e.g., Massachusetts).

Rossin-Slater et al. (2013) showed that California's six-week partially paid policy moved leave-taking from around three weeks to six or seven weeks for typical new mothers relative to various control group mothers in other states and mothers of older children in California. Baum and Ruhm (2016) found that leave duration increased by approximately five weeks for mothers and by less than one week for fathers under California's policy. Similar to our study, leave-taking in California particularly increased among mothers who were less advantaged (less educated, unmarried, or non-White) (Rossin-Slater et al. 2013). Although California mothers were 18 percentage points more likely to use paid leave, there were no positive effects on their long-run labor market outcomes (Bailey et al. 2019).

The Baum and Ruhm (2016) study is a useful comparison to the present one because it demonstrates the importance of the income effect: mothers took only five

[1] Increased maternity leave could increase fathers' work schedule flexibility (because their spouse is at home), improve fathers' mental and physical health, and lower family stress.

of the six weeks of leave with partial income replacement, but they took all six weeks with full income replacement. Following an increase in California's weekly benefit amount, leave duration did not increase, although more women returned to their pre-leave employer (Bana et al. 2020).

PFL Outside the United States

Outside the United States, PFL mandates have longer histories and generally more generous benefits. For example, Canadian expansion in job-protected PFL from six months to one year increased leave duration by three months among new mothers (Baker and Milligan 2008). Ruhm (1998) examined the impacts of PFL policy changes in Europe, where six of the nine study countries offered wage replacement rates of at least 80% as of 1993; the PFL policies were associated with higher ratios of female employment to population. Similarly, Germany's 1979 maternity leave expansion from two to six months led mothers to delay their return to work in the first year after childbirth (Guertzgen and Hank 2018). Dahl et al. (2016) studied PFL in Norway using a series of expansions from 18 to 35 weeks with full income replacement. The reforms did not crowd out unpaid leave, and parents increased time spent at home instead of at work. More similar to the United States, Australia introduced 18 weeks of paid leave for mothers in 2011 (Kalb 2018). Mothers' leave-taking increased in the first six months, and the return to work increased after the first year (Broadway et al. 2020; Martin et al. 2015).

In the absence of state or federal PFL, firms become de facto policymakers and need to know PFL costs to weigh them against the benefits. Studying such costs in Denmark, Brenøe et al. (2020) estimated the effect of a worker's PFL on firms and coworkers. They found no measurable effects on firm output, profitability, or survival, with negligible costs for coworkers.

Although these studies inform American considerations of PFL policies, the international context may not translate to the United States. These countries have relatively generous benefits and financing through government revenues rather than through direct employer contributions.

PFL and Health

Childbirth is a major medical episode, posing risks of infection, birth complications, postpartum depression, and changes in health behaviors (Bellows-Riecken and Rhodes 2008; Declercq et al. 2014; Hagen et al. 2013; O'Hara and Swain 1996). Maternal and child health may benefit from expanded PFL through increased recovery, bonding, and breastfeeding time, and these benefits may be largest for disadvantaged families (Rossin-Slater and Uniat 2019).

Norway's introduction of paid maternity leave improved mothers' body mass index, blood pressure, pain, mental health, and propensity to exercise and not smoke, with larger benefits for those with complications at delivery and mothers from less advantaged backgrounds (Butikofer et al. 2018). In the U.S. Army and Air Force, the expansion from 6 to 12 weeks of maternity leave was associated with fewer

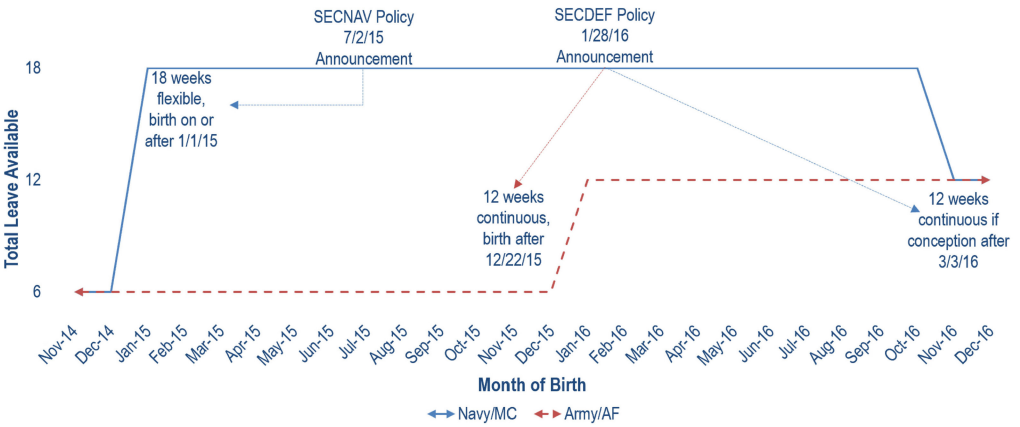

Fig. 1 Policy changes over time: total leave available to women by date of birth. The figure plots policy changes by branch—Navy/Marine Corps (MC) and Army/Air Force (AF)—based on changes from the Secretary of the Navy (SECNAV) and Secretary of Defense (SECDEF).

postpartum depression diagnoses, with possible benefits to mothers' self-rated pain and use of health care (Balser et al. 2020). California's PFL introduction increased breastfeeding by 10–20 percentage points three to nine months post-birth (Huang and Yang 2015). Child health benefits may extend through early elementary school. The introduction of California's PFL program was followed by lower rates of being overweight, ADHD diagnosis, and hearing-related problems, particularly for children from less advantaged backgrounds (Lichtman-Sadot and Bell 2017). Limited causal research on *pre*natal leave in the weeks before birth finds that it may slightly increase birth weight while decreasing premature birth and infant mortality (Rossin 2011; Stearns 2015).

The U.S. DoD Context

Almost 1% of the U.S. population is part of an active-duty family (U.S. Department of Defense 2019). Congress and DoD leadership frequently discuss the importance of increasing female representation in the military, and understanding parental leave policy is one component of making the military a more attractive option for women. Thus, patterns in the military are important in their own right, beyond potential implications for the civilian sector.

Figure 1 displays the timeline for the DoD maternity leave policies we examine. Active-duty service members earn 30 calendar days of annual leave per year. To take a full week of leave, individuals use seven days of leave. In July 2015, the Department of the Navy (DoN, comprising the Navy and Marine Corps) announced that it would increase maternity leave from 6 to 18 weeks.[2] The new 18-week policy included 6

[2] Our analysis covers a period of broadly expanding parental support in DoD policy (see Estes et al. 2015). Secondary caregiver leave remained constant at 10 days.

weeks of consecutive convalescent leave immediately following hospital discharge and 12 additional weeks that could be taken nonconsecutively within the first year of the birth. Eligibility was retroactive to mothers of babies born on or after January 1, 2015. Thus, some mothers who had returned to work following their original 6 weeks of leave were eligible to take 12 additional weeks before their child's first birthday.

In January 2016, the DoD announced a standardization to 12 weeks of consecutive paid maternity leave for all services. For DoN mothers, that reduced leave by 6 weeks and required the time to be taken consecutively. The policy applied to pregnancies that began (per doctor estimation) on or after March 3, 2016, which implies birth dates around November 2016 or later.

Marine mothers cannot immediately exit the labor market as their civilian counterparts can. Officers must submit their resignation 9–12 months in advance of the date they request to resign, whereas enlisted members are obligated to serve until their contract end dates. Military employment contracts are typically for four or six years of obligated service. Officers and enlisted members may request an administrative separation before the end of their contract for hardship related to pregnancy or childcare, but these requests are typically subject to even longer administrative processes.

The DoD offers childcare options for the military, mostly offered in on-base childcare centers for children ages six weeks to five years (Government Accountability Office 2020). Some childcare centers have waitlists that limit immediate access for infants (Jowers 2020). Childcare limitations may necessitate more leave for parents.

Balser (2020) examined the expansion of paid leave from 6 to 12 weeks in the U.S. Air Force and Army, finding that military mothers increased take-up by about 5 of the additional 6 weeks. The study, however, did not address crowd out, given its main focus on the policy impacts on employment and promotion.

Data and Empirical Approach

Data

Our data cover the population of active-duty Marines from January 2013 to August 2018. The primary data are nearly 13 million month-by-individual snapshots of each Marine's leaves, age, gender, race, ethnicity, pay grade, marital status, months of total service, number of children, unit location, occupational codes, education level, and cognitive test scores from the Armed Forces Qualification Test (AFQT) and General Classification Test (GCT). The data also include exact dependent dates of birth.

Leave Data

We define two leave categories: maternity leave and chargeable leave. The data include monthly leave used by type (e.g., sick, maternity, annual) for each Marine, as well as duty limitation type (see section A.1 of the online appendix). To capture the maximum amount of birth-related leave available to mothers, we define *maternity leave* as all recorded maternity, sick, permissive temporary additional duty (PTAD), and emergency leave. About 77% of what we call *chargeable leave* is annual accrued

vacation, as well as leave related to moving duty stations (17%), combat leave (5%), and special leave (less than 1%). An *all leave* variable captures the total leave used. For nonmothers, *all leave* is approximately 9% sick, PTAD, or emergency leave and 91% chargeable leave; for mothers in the year following birth, *all leave* is approximately 80% maternity, sick, PTAD, or emergency leave and 20% chargeable leave.

Most leave is recorded straightforwardly in a centralized system (see section A.1 of the online appendix), but some mothers' leave is not fully recorded. To minimize measurement error, we exclude such women from the main analysis; the missingness of leave data is unrelated to other observable characteristics. In a supplementary analysis, we impute a lower bound estimate using 6 weeks of leave and an upper bound estimate using the maximum leave available to ambiguously coded women to estimate a range of potential outcomes for the full sample. We call this the *imputation sample*.

For each observed month, we calculate the leave used in that month and the sum of leaves used in the following 12 months for maternity, chargeable, and total leave. We also define *pregnancy leave* as chargeable leave taken up to three months before the birth month.

Sample Restrictions

We limit our sample to Marines younger than 45 years to capture women of childbearing age. We exclude individuals stationed in a country or U.S. state where we never observe a female give birth (e.g., Alaska), given that the lack of births implies a type of assignment that was likely off-limits to pregnant women.[3] We exclude women who add a baby as a dependent but who do not give birth. These women do not receive maternity leave and therefore do not receive the treatment. Further, they are not representative of what would have happened to mothers in the absence of birth and thus are not a good control group.

Because eligibility for the 18-week policy versus the 12-week policy was based on the date of conception, it is not obvious which policy applies to babies born in November–December 2016. We therefore exclude births in these months. We also differentiate mothers who had returned to work before they received 12 additional weeks of leave in July 2015 from those who had not yet returned. Because May 2015 births include mothers who may have returned to work by July 2, we omit these births.

We retain individual-months only if we can follow their leave for at least 12 months after the birth month, so our last included birth is in August 2017. In supplementary analyses, we find no significant changes in female retention following changes to leave policy, as expected given contractual barriers to exit (see Table A2, online appendix).

Methodology

Naïve analyses that examine parental leave cannot be interpreted as causal because certain types of mothers (e.g., more advantaged mothers) may work at firms that

[3] The yearly leave calculation includes subsequent leave taken in these locations.

provide more leave. An examination of how maternity leave policies affect leave take-up requires external policy changes that apply broadly to many types of workers. The DoD policy change provides exactly the sort of natural experiment needed to examine what happens when leave unexpectedly expands for a broad range of workers while important characteristics—such as job security, income level, and benefits—remain constant.

Our identification strategy follows Marines over time, comparing leave take-up of mothers who gave birth under the 6-week policy with that of mothers who gave birth under more generous policies. In our first-difference approach, we first compare maternity leave take-up of four sorts of birth events: (1) births in December 2014 and earlier (to mothers who expected and received 6 weeks of leave); (2) births in January to mid-May 2015 (to mothers who expected to receive 6 weeks of leave, gave birth, and received 12 additional weeks of leave after returning to work); (3) births in mid-May 2015 to November 2016 (to mothers who knew they would receive 18 total weeks before returning to work); and (4) births in December 2016 to August 2017 (to mothers who knew they would receive 12 weeks of leave). We compare each of the more generous policy periods with the early policy as follows:

$$Y_{itjrl} = \beta_1 UnexpectedExtra12_{it} + \beta_2 ExpectedExtra12_{it} + \beta_3 ExpectedExtra6_{it} + \mu_m + \alpha_j + \gamma_r + \delta_l + \mathbf{X}_{it}\theta + \varepsilon_{itjrl}, \quad (1)$$

where Y_{itjrl} is the amount of a given leave category used in the year following a mother's birth event i in month-year t. The first-difference analysis is limited to mothers. The analysis includes month of birth (μ_m), military occupational categories (α_j), military rank (γ_r), and unit location (δ_l) fixed effects.[4] The model also includes controls for demographic characteristics in $\mathbf{X}_{it}$, which accounts for age at birth; age squared; test scores; and indicators for race (Black or Other relative to White), ethnicity (Hispanic relative to non-Hispanic), the prior number of children, marital status (married or divorced relative to single, never married), and education (some college or college relative to high school). We cluster robust standard errors by the individual to account for women with multiple birth events. The coefficients of interest—β_1, β_2, and β_3—provide an estimate of how mothers' leave take-up changed relative to the 6-week policy.

Our second strategy takes a difference-in-differences (DID) approach. The control group is otherwise similar individuals who did not give birth, comparing differences between mothers and nonmothers across policy periods as follows:

$$Y_{itjrl} = \beta_0 Birth_{it} + \beta_1 Birth_{it} \times UnexpectedExtra12_t + \beta_2 Birth_{it} \times ExpectedExtra12_t + \beta_3 Birth_{it} \times ExpectedExtra6_t + \tau_t + \alpha_j + \gamma_r + \delta_l + \mathbf{X}_{it}\theta + \varepsilon_{itjrl}. \quad (2)$$

The DID strategy accounts for changes in general leave-taking over time using month-year fixed effects (τ_t). β_0 provides an estimate of the differences between mothers and nonmothers in the 6-week policy period; β_1, β_2, and β_3 compare whether the mothers had a change in leave take-up beyond any changes observed in their nonmother comparisons. We cluster robust standard errors by the individual to account for women

[4] See section A.1 of the online appendix for details.

with multiple births over time and comparators who are matched to different birth events at multiple times. The model retains fixed effects and control variables $\mathbf{X}_{it}$ from Eq. (1).

If women expect to have more maternity leave available post-birth, they may feel less need to save leave and could instead increase their chargeable leave use *before* birth. We adapt Eq. (2) to assess pregnancy leave taken up to three months before birth, where treatment is based on the expected policy at the end of pregnancy:

$$Y_{itjrl} = \beta_0 Birth_{it} + \beta_1 Birth_{it} \times Expect18_t + \beta_2 Birth_{it} \times Expect12_t + \tau_t + \alpha_j + \gamma_r + \delta_l + \mathbf{X}_{it}\theta + \varepsilon_{itjrl}. \quad (3)$$

Women who gave birth in January 2015 could eventually take 18 weeks of leave, but during pregnancy, they anticipated only 6 weeks of maternity leave. Thus, women who gave birth in June 2015 or earlier are in the baseline group of mothers who thought they had 6 weeks of leave during pregnancy. Women who gave birth in August 2015 could take some of their chargeable leave during pregnancy, knowing that they had 18 weeks of maternity leave following birth. However, they did not have much time to act on the information, so we exclude women who gave birth immediately following the policy announcement. $Expect18_t$ is equal to 1 for births in October 2015–October 2016, again excluding November and December 2016 births because of ambiguity about the policy. $Expect12_t$ is equal to 1 for births in January 2016 or later; these mothers knew during pregnancy that they would have 12 weeks of maternity leave.

Assumptions and Limitations

We make two main identifying assumptions. First, we assume that after we implement our DID model, no factors other than the policy change will affect maternal leave take-up over the observed time. For instance, perhaps mothers who wanted more leave did not get pregnant until they knew they would have more leave available following the unexpected announcement of the 18-week policy. To confirm that such behaviors do not drive our results, we include a supplementary analysis that focuses on choice-limited mothers (and their comparators) who gave birth before March 2016 (see the online appendix). These mothers made the pregnancy decision before they knew the more generous policy was forthcoming. A similar test ensures that abortion decisions do not drive results. These results match our main results.

Second, we assume that in the absence of motherhood, our comparators serve as a valid counterfactual. Our DID estimates would be biased if systematic changes also occurred among nonmothers that affected only nonmothers. We test directly for differential trends between parents and nonparents using a series of event study–type figures. Additionally, we identify several potential comparison groups to ensure that our results hold across various counterfactual choices.

Finally, we acknowledge the somewhat limited time between policy changes, which could affect the interpretation of the estimates. It may take time for women to feel comfortable taking 18 weeks of leave, and a longer term follow-up (possible only if the more generous policy had remained in place) might show different results.

Identifying a Comparison Group

We identify several potential control groups. First, there is some concern that females, in general, may be affected by maternity policy changes, even if they do not yet have a child. Male Marines who did not have a baby during the study were not affected by this policy and are a potential control group. However, male Marines differ in a variety of ways from female Marines, and female Marines' behavior may be more similar to Marine mothers' behavior for unobserved and observed reasons. Thus, female Marines who did not have a baby during our study period constitute another potential control group.

Maternity leave-taking is on a one-year timescale, but our observations are at the monthly level. Further, estimating event studies requires defining a discrete point of comparison. One difficulty in such a strategy is that we are comparing mothers at the point of birth relative to potentially millions of monthly observations of every Marine in the military. To allow for a point-in-time comparison across similar individuals, we use a machine learning–based matching strategy to identify additional comparison groups who are similar to the new mothers on a variety of characteristics at the particular month of birth. We use this strategy to identify parents who are observably very similar to the mothers. We repeat this exercise for the imputation sample and the pre-pregnancy sample.

We begin the matching process by using an adaptive ridge least absolute shrinkage and selection operator (LASSO) model with 10-fold validation to predict who will have a baby among the given set of individuals. LASSO models can improve propensity score comparisons in high-dimensional data with a low share of treated observations (Goller et al. 2020). The LASSO models include new mothers as well as either males or females whom we do not observe adding a dependent baby to the home, who are not married to a military member, and who do not have a child under age 1 in their home.[5] The LASSO model includes all observable characteristics included as $\mathbf{X}_{it}$ in Eq. (3) and interactions between each of these variables. We aim to minimize deviance from the binomial prediction to identify a preferred model for each matching group. From this, we predict the probability that a given observation would have a baby in a given month. In the online appendix, Table A2 displays the coefficients included in the resulting LASSO models, and Figure A1 displays the distribution of propensity scores and common support.

We match each birth month-year for a mother to her five nearest neighbors with replacement, with the requirement that all matches are from the same month-year and the same rank group. Weight w_{it} for each potential comparator is $0.2 \times m_{it}$, where m_{it} is the number of times an individual i is matched to any mother in month t. Each birth event month for mothers has a weight of 1 for the 2,424 birth events in the main sample.[6] Most matches have $w_{it} = 0.2$. Our results are largely the same across all comparison groups; we display multiple comparisons for transparency.

[5] We exclude dual military families because sometimes child dependents are listed in only one parent's file. We want to avoid inadvertently including a new mother in the control group if the baby was listed under the father.

[6] Multiple births (e.g., twins) count as one birth event.

Descriptive Statistics

Table 1 reports summary statistics for mothers in the main (column 1) and imputed (column 2) samples, as well as various potential comparison groups. The average mother (observed at the birth event level) in our sample has a GCT score of 103 in both the main and the imputed sample, in contrast to an average of 110 for all Marines who did not have a baby over our study period (p value for the difference from the main mothers = .000 when robust standard errors clustered by the individual are used) and 105 for female Marines in general (p value of difference from mothers = .000). The number of observations for the unmatched groups in columns 3–4 is large because each comparator occurs up to 12 times per year over multiple years. Across all other variables, the unmatched samples are quite different from mothers.[7] Together, the variables in Table 1 are jointly statistically significant in predicting who is a mother ($p = .000$), indicating that the mothers substantially differ from the unmatched samples.

The final three columns use potential matched groups, which connect each birth event to five other Marines in the same month-year, in the same rank group, who are similar on observed characteristics. When matching the main 2,424 observations of births to 12,030 male observations (column 5), we find that the male matches are older, are more likely to be Hispanic, and have served longer. The F statistic on the test of joint significance is smaller than for the unmatched sample, although it remains statistically significant ($p = .000$). The female matches to the main sample (column 6) and imputed sample (column 7) are observably quite similar, and the variables are not jointly statistically significant. Overall, this points to a fairly observably similar group of individuals in the matched samples, especially for the female matches. Patterns are the same in the pregnancy leave sample (Table A3, online appendix).

Results

Leave Take-Up

We begin by examining the first-differences estimate of how policy changes correspond to changes in maternity leave usage. Figure 2 displays the pattern, with month of birth on the x-axis and average weeks of maternity leave taken in the year following birth on the y-axis. Thus, December 2014 indicates that, on average, mothers who gave birth in December 2014 took approximately 6 weeks of maternity leave in the year after birth. The figure includes a linear fit of the 6-, unexpected 18-, expected 18-, and 12-week policies.

We highlight several takeaways. First, mothers consistently took exactly 6 weeks of maternity leave during the 6-week policy. Second, a sharp increase is evident at the start of the 18-week policy in January 2015. The policy was announced in July 2015, well after mothers who gave birth in January had returned to work in February or March, so these early 2015 mothers went back on maternity leave after returning

[7] The unmatched sample of all Marines (shown in column 2) is 7.8% female. By construction, other columns of the table (including the unmatched sample of female Marines in column 3) are entirely male or female.

Table 1 Summary statistics

	Mothers		All Others		Potential Matched Groups		
	Main (1)	Imputed (2)	All (3)	Female (4)	Male (5)	Female (6)	Female (7)
Age at Birth	24.70	24.57	24.91	24.16	25.02	24.73	24.57
p			.052	.000	.006	.873	.952
Black	0.17	0.17	0.11	0.16	0.19	0.17	0.17
p			.010	.010	.132	.720	.729
Other[a]	0.13	0.13	0.08	0.11	0.13	0.12	0.11
p			.000	.594	.921	.360	.162
Hispanic[a]	0.26	0.26	0.18	0.25	0.29	0.26	0.27
p			.006	.133	.019	.926	.699
Officer	0.08	0.08	0.09	0.10	0.08	0.08	0.08
p			.000	.000	1.000	1.000	1.000
Warrant Officer	0.01	0.01	0.01	0.01	0.01	0.01	0.01
p			.041	.797	1.000	1.000	1.000
Time in Service	4.90	4.77	5.01	4.17	5.20	4.97	4.80
p			.000	.000	.005	.627	.786
Married	0.75	0.74	0.35	0.31	0.77	0.75	0.74
p			.000	.000	.081	.848	.844
Divorced	0.06	0.06	0.03	0.08	0.06	0.06	0.06
p			.000	.000	.926	.345	.522
Prior Number of Children	0.35	0.35	0.35	0.19	0.36	0.31	0.31
p			.000	.000	.431	.102	.049
Some College	0.05	0.04	0.03	0.04	0.05	0.05	0.04
p			.000	.959	.925	.970	.953
College	0.10	0.10	0.11	0.12	0.11	0.10	0.10
p			.000	.000	.538	.545	.788
AFQT Score[b]	59.66	59.56	64.74	63.20	58.89	59.73	59.62
p			.006	.000	.066	.911	.902
GCT Score[b]	102.99	102.95	110.16	105.46	103.02	103.07	103.05
p			.000	.000	.925	.845	.789
Comparison			Main	Main	Main	Main	Imputed
Gender			All	Female	Male	Female	Female
Number of Observations	2,424	2,955	9,823,488	763,263	12,030	10,657	12,750
Number of Individuals	2,235	2,692	326,028	27,433	9,984	3,797	4,291
F Test			1,705.13	109.20	3.03	0.70	0.70
p Value of *F* Test			.000	.000	.000	.780	.777

Notes: The observation period is January 2013 to August 2017. Columns under "Mothers" display characteristics for month of birth by birth event for the main sample and the imputed sample. All other columns display characteristics for multiple observations per individual across months within all Marines not observed having a baby ("All") and all female Marines not observed having a baby ("Female"). Columns under "Potential Matched Groups" display descriptive characteristics for the month of the match to mothers for males we do not observe having a baby matched to the main sample ("Male"), females not observed having a baby matched to the main sample ("Female"), and females not observed having a baby matched to the imputed sample ("Female"), weighted by match weights. The *p* values indicate the statistical difference relative to mothers as noted in the comparison row using robust standard errors clustered by the individual. The *F* test assesses whether the listed characteristics jointly predict motherhood for the given column and its noted mother comparison group.

[a] Other = non-White and non-Black. Hispanic = Hispanic ethnicity, captured separately from White/Black/Other.

[b] AFQT = Armed Forces Qualification Test. GCT = General Classification Test.

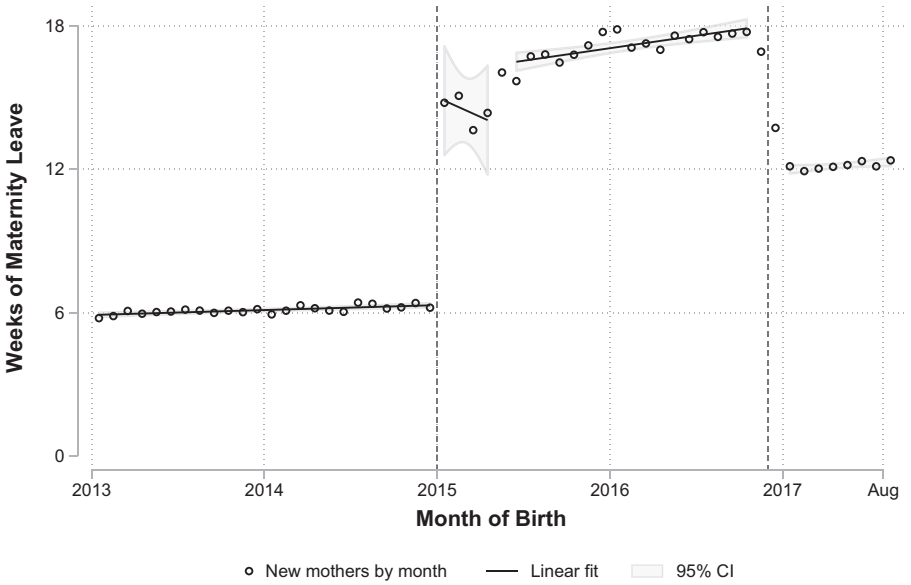

Fig. 2 Yearly average maternity leave used in the 12 months following birth, by month of birth. Vertical dashed lines indicate a change in maternity leave from 6 to 18 weeks (as of January 1, 2015) and from 18 to 12 weeks (around November to December 2016). The figure includes the linear fit of leave for 6 weeks, unexpected 18 weeks, expected 18 weeks, and 12 weeks, with a gap excluding May 2015 and November to December 2016.

to work between July and their child's first birthday. Third, maternity leave take-up increased throughout the 18-week policy period. Mothers who gave birth in the latter half of the 18-week policy period used nearly all 18 weeks of maternity leave. Finally, leave declined sharply for mothers who gave birth in December 2016. Perhaps some mothers with long gestation who were still eligible for the 18 weeks of leave pushed up the average. Maternity leave patterns stabilized at 12 weeks starting in January 2017. Going forward, we exclude November–December 2016 birth observations from the formal regression analysis.

Table 2 displays the change in maternity leave used 12 months after birth, conditional on the column-specific controls. Because nonmothers did not have maternity leave, we use Eq. (1), comparing mothers who had 6 weeks of leave with mothers who gave birth under more generous policies. In our preferred model in column 3, mothers who received an unexpected additional 12 weeks of leave after returning to work took approximately 8.4 additional weeks of leave. Those who expected the 12 extra weeks before returning to work averaged 11.1 additional weeks. Those who expected only 6 additional weeks (a total of 12) generally took the full amount of additional leave. These patterns do not substantively differ when we use the lower or upper bound estimates with larger sample sizes but less precision in the leave usage.[8]

[8] We prefer the main estimates because they are less subject to measurement error. The lower bound, where the command recorded only 6 weeks of immediate leave but did not include any additional leave, seems unlikely to have occurred with such frequency given patterns in the nonimputed sample. The upper bound, for which we allocate the full available leave for those with incomplete leave data, is too generous.

Table 2 Maternity leave used 12 months post-birth

	Main Mother Sample			Bounding	
	(1)	(2)	(3)	Lower (4)	Upper (5)
Unexpected +12 Weeks	8.366***	8.371***	8.387***	8.321***	8.508***
	(0.326)	(0.323)	(0.324)	(0.313)	(0.303)
Expected +12 Weeks	11.080***	11.106***	11.107***	10.291***	11.215***
	(0.110)	(0.109)	(0.111)	(0.133)	(0.097)
Expected +6 Weeks	6.066***	6.075***	6.093***	4.894***	6.113***
	(0.133)	(0.133)	(0.133)	(0.151)	(0.098)
Month Fixed Effects	X	X	X	X	X
Rank Group Fixed Effects			X	X	X
Location Fixed Effects			X	X	X
Job Type Fixed Effects			X	X	X
Controls		X	X	X	X
Number of Observations	2,424	2,424	2,424	2,955	2,955
Number of Individuals	2,235	2,235	2,235	2,692	2,692
R^2	.812	.816	.819	.717	.838
6-Week Policy Mean	6.121	6.121	6.121	6.113	6.117

Notes: Robust standard errors clustered by the individual are shown in parentheses. The reference group is female Marines who gave birth during the 6-week maternity leave policy period and received 6 weeks of maternity leave.

***$p < .001$

One important question for policymakers and firms is whether mothers who gave birth under the flexible 18-week policy used the flexibility or took all their leave immediately following birth. Figure 3 displays maternity leave by month since birth for each of the four policies. As expected and required, mothers took maternity leave continuously in the 6-week and expected 12-week policy periods. Not surprisingly, given the nature of the rollout, those who expected 6 weeks but received an unexpected additional 12 weeks after returning to work tended to space their leave over the full year. Those who expected 18 weeks generally used the leave continuously up front. That is, the mothers who expected a total of 18 weeks and could use the final 12 weeks flexibly over the subsequent year chose to use their leave much as if they had been required to use it all at once. In the online appendix, Figures A2 and A3 display the patterns by month of birth.

The Crowding Out of Other Leaves

We next examine whether maternity leave crowds out chargeable leave. We begin with panel a of Figure 4, which shows weeks of chargeable leave used by mothers (black circles) and matched female nonmothers (gray ×s). Under the 6-week policy, mothers always used more leave than nonmothers. Among all females, leave increased over time, possibly owing to the drawdown in Afghanistan, changes in the quality of leave recording, or changes in preferences for work and leisure. The

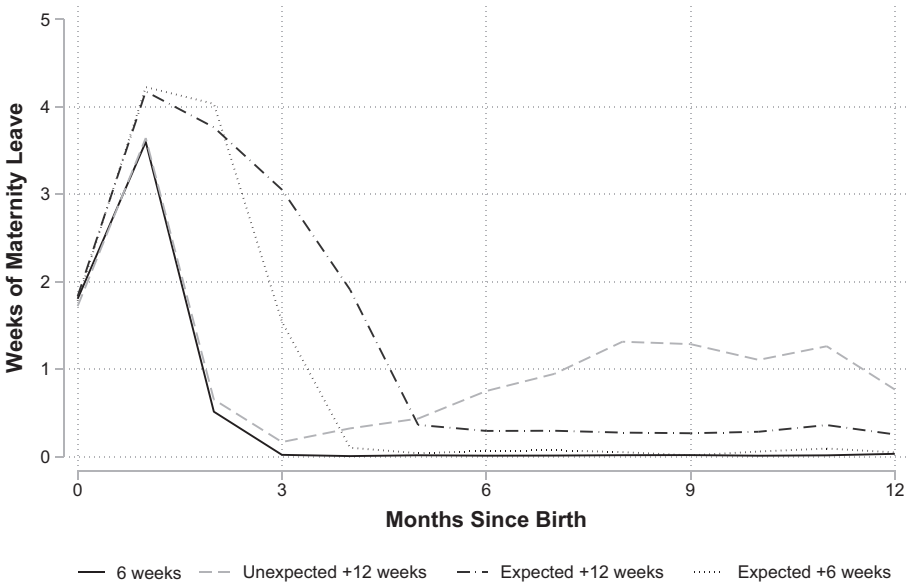

Fig. 3 Average monthly maternity leave used in each of the 12 months following birth, by policy. Data for May 2015 and November to December 2016 are excluded.

change in nonmothers was fairly steady over time, with no discernible jumps upon any of the key policy changes. Mothers' leave-taking paralleled that of nonmothers under the 6-week policy but decreased by more than a week upon the new policy implementation. Indeed, reversing the earlier pattern, mothers used less chargeable leave than nonmothers once they had 18 weeks of maternity leave. When the policy was reduced to 12 total weeks, nonmothers' leave remained stable, but mothers' leave usage increased to match the nonmothers.

Table 3 examines the change in chargeable (panel A) and total (panel B) leave used during each policy. Column 1 uses the fully specified first-difference approach (column 3 from Table 2). The average change from the 6-week policy to the 18-week policy is less than a week, although this is likely an underestimate; Figure 4 demonstrates an overall increase in chargeable leave recorded in 2013–2016 across all individuals. Thus, columns 2–5 use various potential comparison groups in the DID framework. Column 2 includes all females never observed having a baby as a control; column 3 uses the male matches never observed having a baby; column 4 uses the female matches; and column 5 uses the female matches from the expanded sample of mothers, with imputation for some maternity leave outcomes. Chargeable leave is not imputed for the imputation sample, but the sample size is larger.

The results are broadly the same across columns 2–5. Using column 4 as an example, the control females used an average of 3.2 weeks of chargeable leave. During the 6-week maternity leave policy, mothers supplemented their time away with 0.6 weeks more chargeable leave than nonmothers. More generous policies were associated with a substantial reduction in relative chargeable leave. When mothers expected the additional maternity leave, they used 1.2 fewer weeks of chargeable leave in the following year than nonmothers (calculated as 0.566 – 1.731; p value of the difference

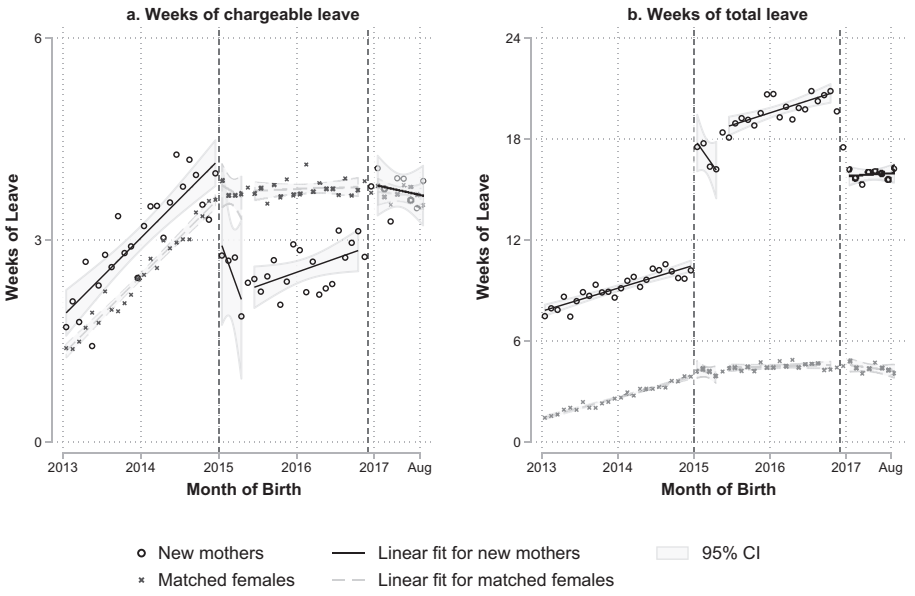

Fig. 4 Annual chargeable and total leave by month of birth for mothers and female comparisons. The figure plots average chargeable (annual) and total (maternity and chargeable) leave used in the 12 months following birth by month of birth or month of match. Vertical dashed lines indicate a change in maternity leave from 6 to 18 weeks (as of January 1, 2015) and from 18 to 12 weeks (around November to December 2016). The figure includes the linear fit of leave for 6 weeks, unexpected 18 weeks, expected 18 weeks, and 12 weeks, with a gap excluding May 2015 and November to December 2016.

between mothers and nonmothers = .000). Chargeable leave did not differ between mothers and nonmothers in the period with 12 total weeks ($p = .556$). In sum, relative to similar comparators, mothers used more chargeable leave under the 6-week maternity policy, equally used chargeable leave under the 12-week policy, and used less chargeable leave under the 18-week policy.

Because expanded maternity leave crowded out chargeable leave, the total increase in time away from work was lower than what would have been anticipated from changes to maternity leave take-up alone. Panel b of Figure 4 graphically displays total leave of any sort taken by mothers relative to nonmothers under each policy. Table 3 presents the results of a more formal analysis. For example, in the matched female control group, nonmothers tended to take a total of 3.6 weeks of all leave types across the analysis period. Under the 6-week policy, mothers used a total of 6.5 weeks more than nonmothers across all leave types; that is, mothers supplemented with additional leave relative to nonmothers beyond the allotted 6 weeks. When mothers received an unexpected 12 additional weeks of leave, their difference from the nonmothers increased by only 6.3 weeks (a 53% net utilization of the additional leave). In total, mothers' chargeable leave exceeded that of nonmothers by only 12.8 weeks (6.5+6.3) despite having 18 total weeks of maternity leave available. Those who expected the 12 extra weeks of maternity leave at birth had an 8.8-week relative increase in total leave (73% net take-up), for a total difference from nonmothers of 15.3 weeks. Those who expected a total of 12 weeks of maternity leave at birth had a

Table 3 Chargeable and total leave used 12 months post-birth

	Mothers	Females	Matched Comparators		Bounding	
	(1)	(2)	(3)	(4)	Lower (5)	Upper (6)
A. Chargeable Leave						
Birth	ref.	1.052***	0.456***	0.566***	0.429***	
		(0.068)	(0.074)	(0.082)	(0.077)	
Birth × Unexpected +12 weeks	−0.369*	−1.338***	−1.749***	−1.777***	−1.628***	
	(0.169)	(0.156)	(0.169)	(0.179)	(0.169)	
Birth × Expected +12 weeks	−0.594***	−1.866***	−1.667***	−1.731***	−1.580***	
	(0.093)	(0.091)	(0.098)	(0.110)	(0.104)	
Birth × Expected +6 weeks	0.705***	−0.791***	−0.436***	−0.497***	−0.368**	
	(0.126)	(0.121)	(0.131)	(0.143)	(0.127)	
R^2	.104	.243	.147	.170	.177	
Control mean	3.073	2.477	3.303	3.183	3.125	
p(birth + unexpected) = 0		.044	.000	.000	.000	
p(birth + expected 12) = 0		.000	.000	.000	.000	
p(birth + expected 6) = 0		.010	.861	.556	.548	
B. Total Leave						
Birth	ref.	6.961***	6.451***	6.499***	6.352***	6.351***
		(0.078)	(0.084)	(0.093)	(0.087)	(0.087)
Birth × Unexpected +12 weeks	8.017***	6.790***	6.434***	6.297***	6.541***	6.633***
	(0.370)	(0.355)	(0.360)	(0.376)	(0.359)	(0.353)
Birth × Expected +12 weeks	10.513***	8.626***	9.098***	8.814***	8.161***	9.100***
	(0.147)	(0.144)	(0.148)	(0.173)	(0.180)	(0.156)
Birth × Expected +6 weeks	6.798***	4.716**	5.324***	5.084***	4.105***	5.264***
	(0.183)	(0.177)	(0.184)	(0.201)	(0.201)	(0.170)
R^2	.711	.281	.852	.846	.805	.853
Control mean		2.877	3.567	3.643	3.573	3.573
p(birth + unexpected) = 0		.000	.000	.000	.000	.000
p(birth + expected 12) = 0		.000	.000	.000	.000	.000
p(birth + expected 6) = 0		.000	.000	.000	.000	.000
Match Gender			Male	Female	Female	Female
Month Fixed Effects	X					
Month-Year Fixed Effects		X	X	X	X	X
Rank Group Fixed Effects	X	X	X	X	X	X
Location Fixed Effects	X	X	X	X	X	X
Job Type Fixed Effects	X	X	X	X	X	X
Number of Observations	2,424	765,687	14,454	13,081	15,705	15,705
Number of Individuals	2,235	29,668	12,219	6,032	6,983	6,983

Notes: Robust standard errors clustered by the individual are shown in parentheses. The reference group is female Marines who gave birth during the 6-week maternity leave policy period and received 6 weeks of maternity leave for model 1; females with no birth events for model 2; the matched group of males with no observed birth events for model 3; the matched group of females with no observed birth events for model 4; and the matched group of females with no observed birth events with imputation for maternity leave for models 5 and 6. Chargeable leave is not imputed and is therefore the same for lower/upper bounding.

*$p<.05$; **$p<.01$; ***$p<.001$

Table 4 Total chargeable leave used 0–3 months pre-birth

	Mothers	Females	Matched Comparators	
	(1)	(2)	(3)	(4)
Birth	ref.	–0.107***	–0.151***	–0.063*
		(0.023)	(0.023)	(0.025)
Birth × 18 Weeks Announced	0.578***	0.149**	0.044	0.022
	(0.047)	(0.047)	(0.048)	(0.053)
Birth × 12 Weeks Announced	0.498***	0.011	–0.006	–0.037
	(0.045)	(0.044)	(0.042)	(0.044)
Match Gender			Male	Female
Month Fixed Effects	X			
Month-Year Fixed Effects		X	X	X
Rank Group Fixed Effects	X	X	X	X
Location Fixed Effects	X	X	X	X
Job Type Fixed Effects	X	X	X	X
Number of Observations	2,996	669,257	23,891	21,454
Number of Individuals	2,737	27,010	19,749	9,719
R^2	.124	.095	.113	.128
Control Mean	2.682	2.515	2.730	2.738
p(birth +18 weeks) = 0		.308	.013	.392
p(birth +12 weeks) = 0		.011	.000	.006

Notes: Robust standard errors clustered by the individual are shown in parentheses. The reference group is female Marines who gave birth believing they had the 6-week maternity leave policy period for model 1; females with no birth events for model 2; the matched group of males with no observed birth events for model 3; and the matched group of females with no observed birth events for model 4.

*$p<.05$; **$p<.01$; ***$p<.001$

5.1-week increase in total leave relative to the 6-week policy (85% net take-up), for a total difference from nonmothers of 11.6 weeks.

Patterns are broadly similar when we use alternative comparison groups or the mothers with imputed low or high maternity leave. Mothers in the 6-week maternity leave period always used more than 6 weeks of all leave above and beyond the leave that nonmothers took, and the change in the mother–nonmother gap was always smaller than the additional maternity leave granted under the more generous policies.

Leave During Pregnancy

If mothers with more maternity leave use less chargeable leave after birth, they may instead use that chargeable leave before the birth. Table 4 explores this possibility by examining the chargeable leave used in the zero to three months before birth by month of birth for the mothers and their matches across expected maternity leave. Table 4 (column 4) indicates that, on average, mothers used about 0.06 weeks (approximately half a day) less leave than similar women in the three months before birth. This pre-birth pattern did not change for mothers who knew they would have additional maternity leave available.

Heterogeneity of Impacts

We examine whether take-up and crowding out are similar across several groups: the enlisted (workers) versus officers (managers), first-time mothers versus experienced mothers, single versus married mothers, and White versus non-White mothers. Given findings about the gender composition of occupations and labor market outcomes (Budig 2002; England 1982), job types with different gender segregation may have different attitudes toward leave take-up. We thus examine individuals from job types with more versus fewer females. We also differentiate by O*NET-defined job physicality, determined by whether a Marine job requires physical skills that are above or below the average Marine job.[9]

We begin by examining the enlisted-officer difference in columns 1–2 in panel A of Table 5. Mothers' mean leave taken when they expected and received 6 weeks of leave was 6 weeks for both the enlisted and officers. The increase in maternity leave is larger for enlisted mothers than for officers when mothers received 12 additional weeks of maternity leave, regardless of whether the leave was unexpected (8.6 weeks for enlisted mothers vs. 5.7 weeks for officers, $p = .006$ using a test of coefficients across equations) or expected (11.2 weeks for enlisted mothers vs. 10.0 weeks for officers, $p = .000$). When leave dropped to 12 total weeks, there was again no statistical difference between the enlisted and officers. However, the findings suggest a substitution of chargeable leave post-pregnancy. Before birth, officer mothers-to-be used approximately 2.7 fewer days than the matched officer females, whereas enlisted mothers and nonmothers used approximately the same number of days. These patterns did not differ after additional maternity leave was granted. Overall, officer mothers used less leave before birth and used less of the 18 weeks of leave.

Under the 6-week policy, experienced mothers (who had dependent children before the observed birth event) saved some chargeable leave in the final three months of pregnancy relative to their matches, whereas new mothers did not. Both groups used 6 weeks of maternity leave, with about the same chargeable leave in the year following birth. Once mothers knew that maternity leave was more generous, experienced mothers stopped saving leave before birth but also used less of the additional maternity leave than new mothers. When the policy reverted to 12 total weeks, experienced mothers reverted to saving leave during pregnancy, the groups' maternity leave was similar, and there was no difference in post-birth chargeable leave crowding out.

Single or divorced mothers may also react differently to the policy than married mothers. In the 6-week policy, single mothers saved leave during pregnancy, and both groups used the full 6 weeks of maternity leave. There were no differences in pregnancy or maternity leave between the two groups as the policies changed. However, when mothers could plan ahead for the expected additional 12 weeks of leave, married mothers had larger crowding out of chargeable leave than single mothers (−2.1 weeks vs. −1.4 weeks, $p = .003$). That is, the most generous policy resulted in larger net increases in leave-taking for single mothers than for married mothers.

We find no consistent differences across policy periods for White versus non-White mothers, mothers in jobs types with more versus fewer females, or high versus low job physicality across pregnancy, maternity, or post-birth chargeable leave (see Table A4, online appendix).

[9] We characterize physicality as described in Bacolod and Rangel (2017) and Zunic (2018).

Table 5 Leave types used by subgroups 12 months post-birth

	Grade		Experience		Marital Status	
	Enlisted	Officer	New	Not New	Single	Married
A. Maternity Leave						
Unexpected +12 weeks	8.56***	5.66***	8.54***	7.85***	8.84***	8.14***
	(0.33)	(1.10)	(0.36)	(0.64)	(0.63)	(0.37)
Expected +12 weeks	11.20***	9.96***	11.25***	10.71***	11.25***	11.03***
	(0.12)	(0.38)	(0.13)	(0.22)	(0.22)	(0.13)
Expected +6 weeks	6.09***	5.69***	6.03***	6.22***	6.04***	6.06***
	(0.13)	(0.62)	(0.15)	(0.27)	(0.21)	(0.16)
Number of observations	2,214	210	1,778	646	610	1,814
p(diff., unexpected)		.006		.329		.330
p(diff., expected +12 weeks)		.000		.034		.359
p(diff., expected +6 weeks)		.457		.587		.905
B. Chargeable Leave						
Birth	0.57***	0.38	0.68***	0.29	0.24	0.74***
	(0.09)	(0.27)	(0.09)	(0.16)	(0.14)	(0.11)
Birth × Unexpected +12 weeks	−1.86***	−0.94	−1.74***	−2.14***	−1.74***	−2.16***
	(0.18)	(0.64)	(0.20)	(0.36)	(0.32)	(0.028)
Birth × Expected +12 weeks	−1.69***	−2.10***	−1.73***	−1.82***	−1.37***	−2.06***
	(0.12)	(0.34)	(0.12)	(0.22)	(0.19)	(0.17)
Birth × Expected +6 weeks	−0.53***	−0.05	−0.59***	−0.30	−0.22	−0.65*
	(0.15)	(0.54)	(0.16)	(0.32)	(0.26)	(0.25)
Number of observations	11,943	1,138	9,904	3,177	3,625	8,578
Comparison mean	3.129	3.745	3.093	3.479	3.154	3.192
p(diff., birth)		.452		.067		.002
p(diff., birth × unexpected)		.139		.502		.246
p(diff., birth × expected +12 weeks)		.265		.834		.003
p(diff., birth × expected +6 weeks)		.346		.330		.156
C. Pregnancy Leave						
Birth	−0.04	−0.39***	−0.01	−0.18***	−0.12**	−0.04
	(0.03)	(0.09)	(0.03)	(0.05)	(0.04)	(0.03)
Birth × 18 weeks announced	0.02	0.04	−0.06	0.20	0.10	−0.01
	(0.06)	(0.16)	(0.06)	(0.12)	(0.10)	(0.06)
Birth × 12 weeks announced	−0.05	0.09	−0.06	−0.03	0.06	−0.08
	(0.05)	(0.15)	(0.05)	(0.09)	(0.08)	(0.05)
Number of observations	19,856	1,591	16,543	4,904	6,355	15,095
Comparison mean	0.902	1.194	0.911	0.969	0.896	0.934
p(diff., birth)		.000		.014		.044
p(diff., birth × 18 weeks)		.886		.046		.240
p(diff., birth × 12 weeks)		.334		.648		.084

Notes: Robust standard errors clustered by the individual are shown in parentheses. For each regression, the treated and reference groups are limited to the category indicated by the column header. For panel A, the first-differences reference group is mothers who gave birth under the 6-week policy. For panels B and C, the difference-in-differences reference group is the matched controls to females.

*$p<.05$; **$p<.01$; ***$p<.001$

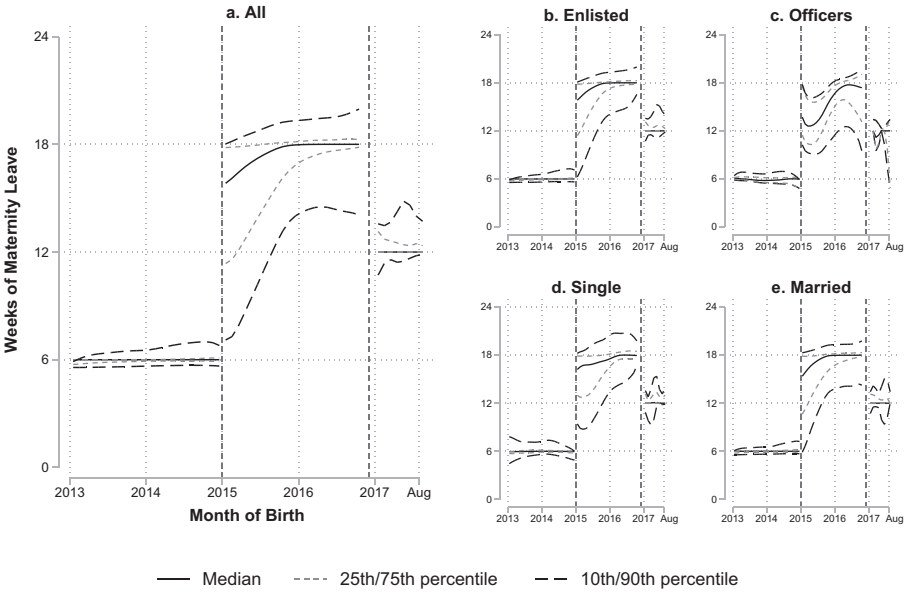

Fig. 5 Distribution of maternity leave used in the 12 months following birth, by month of birth. The figure plots average maternity leave used at the 10th, 25th, 50th, 75th, and 90th percentiles for a given month, as well as the median leave taken. Panel a shows data for all mothers; panels b and c split the sample into those who are enlisted and officers; and panels d and e split the sample into single and married women. Vertical dashed lines indicate a change in maternity leave from 6 to 18 weeks (as of January 1, 2015) and from 18 to 12 weeks (around November to December 2016). The figure includes the linear fit of leave for 6, 18, and 12 weeks, with a gap excluding May 2015 and November to December 2016.

The 18-week policy resulted in greater heterogeneity in leave use than was observed under the 6-week policy; the same is true of the 12-week policy, although to a lesser degree. Figure 5 graphs a locally weighted scatterplot smoothing line of the maternity leave used in the 12 months post-birth by the 10th, 25th, 50th, 75th, and 90th percentile for the given birth month. The 90–10 gap is small in the 6-week policy time frame: almost everyone took 6 weeks of leave. The lines spread out for the more generous policy: the 90–10 gap is over 10 weeks in the beginning of the 18-week policy. Although the gap narrows over time, it remains approximately 6 weeks by the end of the 18-week policy and around 2 weeks under the 12-week policy. This continued gap is largely driven by officers; enlisted mothers across all percentiles generally take the full maternity leave except in early 2015. Thus, our estimates for average leave use are driven by a long tail of women who underused leave under the more generous policies. The median woman generally took the full leave under all policies except when leave was added several months after she had given birth.

Conclusion

As the United States continues to consider a national maternity leave policy, we show how leave policies affect the use of various forms of paid leave. Our results indicate

that 6 weeks of maternity leave is inadequate in meeting most mothers' needs. Under the 6-week policy, mothers used all their maternity leave and supplemented with additional chargeable leave. In the absence of income effects, mothers would likely take more than 6 weeks of leave if available, even in a male-dominated setting. Consistent with this finding, Baum and Ruhm (2016) found that mothers in California took more leave under full income replacement.

Expanding maternity leave comes at a cost to either the government or employers. However, with more generous leave available, mothers did not use the full leave, indicating that program costs are likely lower than simply *weekly cost* × *available weeks of maternity leave*. For firms considering expanding leave, the additional time that firms will be short-staffed because of a birth is likely less than the amount of paid maternity leave provided; under the status quo, women often find ways beyond maternity leave to facilitate time away from work post-birth. Here, the expansion of maternity leave crowds out chargeable leave, and variation in leave used increases substantially across individuals. Firms that provide paid vacation and sick days are likely to see those days being crowded out with a maternity leave expansion.

Because we find that more generous leaves are taken up disproportionately by enlisted mothers and single mothers, firms with larger shares of less advantaged workers may also have different patterns of leave-taking than firms with more advantaged workers. With less advantaged mothers disproportionately using increased leave, maternity leave expansions could narrow socioeconomic disadvantages, given the health benefits of leave for mothers and children.

One concern with flexible leave options for new mothers is that mothers will take leave unpredictably. Federal workers can use their family leave within a year of birth, and Congress recently proposed a flexible policy for military parents (Shane 2021). Here, mothers demonstrate a strong preference for leave immediately following birth. Although some mothers may have reasons to use the more flexible leave, firms may not see sporadic leave use even if they provide flexible options.

Our context provides insight into how leave take-up might vary over the 6-, 12-, or 18-week options that are common in the U.S. labor market with 100% income replacement. The Marines Corps is potentially not representative of typical civilian firms. However, the employment environment of the military may provide insight into other heavily male-dominated occupations.

The internal labor market of the military at higher ranks is also similar to other professions, such as law and academia. There is no lateral entry, and Marines who are not selected for promotion to the next rank leave the service. Female officers' labor supply responses indicate that mothers in similar civilian professions may also choose their leave lengths to optimize their career continuity. More broadly, we find that mothers who have lower career attachment and are less advantaged in terms of family structure and education are the ones increasing leave take-up with policy expansions. Higher skilled and higher earning women take relatively shorter job interruptions for childbirth, consistent with the literature on the motherhood wage penalty. ■

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