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THE BENEFITS AND COSTS OF PAID FAMILY LEAVE

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ABSTRACT

National paid family leave programs have been repeatedly proposed in the United States in recent years. To inform policy discussions, we provide a benefit-cost analysis of introducing such a program. We systematically identify high-quality, quasi-experimental studies on the impact of paid leave on infants and parents. Using the most conservative estimates or the mean estimates from this literature, we estimate that every $1,000 investment in paid parental leave would generate, respectively, $7,275 or $29,406 in present discounted net social benefits. We use these estimates to conduct a microsimulation of benefits and costs of two policy proposals with different eligibility and wage replacement rates. The first, a 4-week program, would have an initial fiscal cost of under $2 billion and net social benefits of $13 (conservative) or $55 billion (mean). The corresponding figures for the 12-week program are about 3.7 times larger, suggesting that either version would likely generate high returns.

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Background

The United States (U.S.) is unique among OECD countries because it does not have government policies guaranteeing paid leave at the national level. At the national level, the Family and Medical Leave Act (FMLA) provides some workers with unpaid leave to address health and caregiving needs for up to 12 weeks per year. This unpaid job-protected leave covered by the FMLA is taken by relatively privileged women following a birth (Waldfogel, 1999), while the introduction of California's Paid Family and Medical Leave (PFML) policy led to increased leave-taking by less advantaged workers (Rossin-Slater et al., 2013).

Some employers choose to provide their workers with paid parental leave. Under the Pregnancy Discrimination Act of 1978, employers who provided paid leave or disability benefits for some medical conditions had to cover pregnancy and childbirth as well (Boyens et al., 2021). Studies have found, however, that employer-provided leave is inequitably distributed, and low-income workers are often excluded, exacerbating racial and ethnic disparities (A. P. Bartel et al., 2019; Davison & Blackburn, 2023; Goodman et al., 2022). Just prior to the implementation of paid leave in California, employers who provided family and medical leave benefits tended to be unionized, were large firms, and employed a large number of professional, managerial, and technical employees (Milkman & Appelbaum, 2004).

Some state and local governments have implemented Temporary Disability Insurance (TDI) programs and Paid Family Leave (PFL) policies, with extensive variation in generosity and protections across states (A Better Balance, 2023b). TDI provides partial income replacement when an employee cannot work due to illness or injury – including pregnancy and post-birth. TDI programs generally do not include job protection. PFL programs provide leave to bond with and care for a new child, care for family members with serious health conditions, or address some military and domestic violence-related needs. Some states — Colorado, Washington DC, Maryland, and Minnesota[1] — combine PFL and medical leave into one policy. There has been consistent momentum toward implementing a national PFL policy (A Better Balance, 2023a) since 2013, when the FAMILY Act was first introduced (Boyens et al., 2022), informed by the evidence observed via the implementation of California's PFL policy in 2006 (A. Bartel et al., 2023b; Rossin-Slater & Uniat, 2019). While many states have since passed policies over the objections of the business community (US Chamber of Commerce, 2020), concerns about PFL's costs have remained a consistent barrier to enacting a national policy. Other opponents of PFL worry that paid leave might lower job attachment or could lead to discrimination against women of reproductive age (Rossin-Slater, 2018).

While PFL programs can be used for several purposes (A. Bartel et al., 2023b), we focus on estimates of the benefits and costs of PFL to bond with a child after birth (paid parental leave). Evidence from the literature is most robust on paid parental leave focused on the gestational parent – most often mothers. In our analysis, we concentrate on leaves taken by mothers because of the relative absence of causal literature on leaves taken by fathers or the use of paid leave for the care of other family members. This limited our ability to include the costs and benefits for policies focusing on both parents.

Our analysis is based on a systematic review of studies documenting the effects of PFL policies on infant and mother outcomes. The studies contributing to the analysis are quasi-experimental evaluations of the initial introduction of paid leave policies in California in 2004 - the first paid family leave policy in the United States - and in Norway in 1977. Paid leave leads to increases in mothers' health and infant health, education, and future earnings in adulthood.

[1] Colorado benefits begin Jan 1, 2024. Maryland and Minnesota benefits begin Jan 1, 2026.

Mothers taking leave reduce earnings while taking paid leave and may also experience changes in earnings in the long term. We also estimate the benefits and costs of paid leave to taxpayers. We standardize all benefits to represent the impacts of a $1,000 investment in paid parental leave. Based on the most conservative estimates and the mean estimates from the paid leave literature, we find that a $1,000 investment in paid parental leave results in net social benefits of respectively $7,275 (most conservative) and $29,406 (mean) for society. These may be underestimates, given that our calculations do not factor in evidence from the cash benefits literature showing that increases in health and earnings are associated with other benefits to society that have not been measured directly in the paid leave literature.

We also estimate the benefits and costs of two recently proposed national paid parental leave programs that vary in generosity and estimated cost. The more limited policy was the first paid leave policy to be passed in the House of Representatives as part of President Biden's 2021 Build Back Better Program. It would have provided four weeks of paid leave with an average weekly benefit of $768 (Boyens et al., 2022). We compare these estimates to a second, more generous, program based on the paid leave policy proposed in the federal Family and Medical Insurance Leave (FAMILY) Act. The FAMILY Act would provide workers with 12 weeks of paid leave at an income replacement rate of 66 percent of monthly pay, up to $4,000 per month.

This paper proceeds as follows. Section 2 describes the conceptual framework for estimating the benefits and costs of paid leave. Section 3 summarizes the paid leave literature, describes our standardization procedures, and estimates the benefits to parents and infants per $1,000 of paid leave expenditure. Section 4 describes the two paid parental leave programs that we evaluate in more detail, describes our simulation methodology, and estimates the social benefits and costs of these two paid parental leave programs in the U.S. Section 5 provides sensitivity analysis. Section 6 summarizes and concludes.

Expected Monetary Benefits and Costs of Paid Leave

Theoretically and empirically, paid leave is expected to benefit parents and infants. Table 1 describes the hypothesized monetary benefits and costs of a paid parental leave program. (See Appendix A for a discussion of the nonmonetary benefits and costs of paid leave). Direct benefits and costs accrue to the children and their parents (program participants) from paid leave that the family receives at birth. Indirect benefits and costs accrue to everyone in society (taxpayers), mainly via changes in taxes. Total benefits and costs are the net sum of direct and indirect benefits and costs. Note that most program participants are also taxpayers (in the case of children's parents) or will eventually be so (in the case of infants). This approach of artificially dividing the population into participants or taxpayers serves to clarify the distinction between direct benefits that accrue to program participants and indirect benefits that accrue to the entire population. Each row in the table provides a conceptual description of a potential benefit or cost. A plus (+) indicates a benefit, and a minus (-) indicates a cost. The main objective of a benefit-cost analysis is to attach dollar values to each benefit and cost listed in the table. Benefit-cost analyses typically focus on the last column, i.e., the benefits and costs to society overall. The benefits and costs of paid leave to employers are discussed separately at the end of this section.

Table 1. Conceptual table of monetary benefits (+) and costs (-) of paid leave

	Direct Participants	+	Indirect Taxpayers	=	Total Society
Direct empirical evidence of impacts from paid leave literature					
A. Paid leave benefits	+		−		0
B. Increased parents' health	+		0		+
C. Increased infants' health	+		0		+
D. Increased future earnings of infants	+		0		+
E. In-program reductions in earnings of parents	−		0		−
F. Post-program changes in earnings of parents	?		0		?
G. Increased expenditures and foregone earnings due to increased educational attainment of infants	-		−		−
H. Administrative costs	0		−		−
Near-certain secondary impacts from direct empirical evidence of impacts					
I. Increased future tax payments by infants	−		+		0
J. In-program reductions in tax payments by parents	+		−		0
K. Post-program changes in tax payments by parents	?		?		0
L. Excess burden on taxpayers	0		-		-
M. Deadweight loss for participant parents	−		0		−
N. Avoided expenditures on infants' and parents' health care costs	+		+		+
Inferred evidence of impacts from theory and other empirical research					
O. Avoided judicial expenditures and victim costs of crime	0		+		+
P. Avoided expenditures on foster care	0		+		+
Q. Avoided expenditures on other cash or near-cash transfers	−		+		0
R. Increased longevity of infants and parents	+		0		0
S. Increased payment due to increased infants' and parents' longevity	+		−		0
T. Increased benefits to other family members	+		0		+

We also distinguish in the table between benefits and costs for which we have direct evidence from the paid leave literature on impacts, impacts that are near certain secondary impacts given the impacts for which we have direct evidence, and inferred evidence of impacts from theory and other empirical evidence. The inferred impacts are treated as zero in our empirical analysis, but they can provide a guide to future research.

Row A reflects the costs of the paid leave program. Cash benefits of one dollar are worth a dollar to beneficiaries, and the cost to taxpayers equals one dollar. The net direct cost of a cash transfer to society is zero. However, these transfers are not costless to society because of administrative costs (Row H), excess burden for taxpayers (Row I), and deadweight loss for participant parents (Row T) which are discussed below.

Row B indicates paid leave is expected to increase mothers' health. Paid leave encourages expectant mothers to take more leave both before and after birth (A. P. Bartel et al., 2018; Han et al., 2009; Han & Waldfogel, 2003; Rossin-Slater, 2017). Giving birth is both physically and mentally taxing for mothers, requiring time to physically recover and maximize future health. Most women in the year after giving birth experience at least one health problem (Alford et al., 2021; Cheng & Li, 2008). Bütikofer et al. (2021), in a quasi-experimental study, documented improvements in a variety of aspects of maternal health at around age 40 after the implementation of Norway's policy (Bütikofer et al., 2021). In the US, quasi-experimental studies of California's paid leave policy find direct empirical evidence that PFL reduces postpartum readmissions to hospital (Van Niel et al., 2020), decreases postpartum depression (Doran et al., 2020), and improves long-term mental health (Lee et al., 2020).

Row C indicates that paid leave is expected to increase the infant's health. Leave prior to birth improves birth outcomes, reducing both neo-natal mortality and low birthweight (Stearns, 2015). Comparative studies of policies in Europe and the OECD countries find that paid leave policies improve birth outcomes and child health (Khan, 2020; Ruhm, 2000; Tanaka, 2005)). In the US, quasi-experimental studies of California's paid leave policy have found increased breastfeeding (Pac et al., 2019) and reduced infant hospitalizations (Phil & Basso, 2019) and deaths (Chen, 2021). Where fathers are eligible for paid leave, paternal bonding with the child is also enhanced (Nepomnyaschy & Waldfogel, 2007; Petts, Knoester, & Li, 2020; Petts, Knoester, & Waldfogel, 2020). Early effects on child health are expected to carry over to the rest of childhood and adulthood (Case et al., 2005; Currie, 2009), and two quasi-experimental studies find direct evidence of improved child health outcomes (Bullinger, 2019; Lichtman-Sadot & Bell, 2017).

Row D indicates that the earnings of infant beneficiaries when they become working-age adults are also expected to increase. Increased future earnings of infants are of direct benefit only to them. Taxpayers get nothing directly from beneficiaries' earnings — hence the zero in the taxpayers' column. (Increased taxes are discussed below in I). Better health leads to more education, and both better health and more education increase earnings (Currie, 2009). There is also direct quasi-experimental evidence that paid leave both increases the child health of infants (Bullinger, 2019; Lichtman-Sadot & Bell, 2017), and their education and earnings as adults (Carneiro et al., 2015).

Row E indicates that paid leave reduces earnings in the short term as a consequence of increasing leave. We refer to this loss of earnings as in-program declines in the earnings of paid leave beneficiaries. It is a loss to the beneficiaries and society. Row G — in-program declines in tax payments by beneficiaries — is a benefit to the beneficiaries but a loss for the taxpayers.

Parents may gain or lose earnings after taking paid leave. We refer to such changes in earnings as post-program changes in earnings. Row F—post-program changes in the earnings of paid leave beneficiaries — could be either positive or negative depending upon whether earnings increase or decrease after taking paid leave. Post-program earnings may increase/decrease for various reasons: 1) parents are more/less likely to return to work. 2) parents work more/less hours. 3) parents are more/less productive.

As described above, there is direct evidence that paid leave increases educational attainment (Carneiro et al., 2015). Row G describes the costs of this increase in education. The cost to participants of increases in education is a short-term reduction in earnings and increase in tuitions and fees. The cost to taxpayers is a short-term loss in taxes plus the extra fiscal cost of the extra education.

Rows H, administrative costs, describes one of the costs of transfers. Administrative costs of transfers do not benefit beneficiaries but must be paid for by taxpayers. As described below, we use state data on paid leave programs to estimate administrative costs.

Rows I, J, and K, reflect taxes that arise from increases or decreases in earnings. Row I indicates that increases in infant beneficiaries' future earnings lead to higher tax payments, which are a cost to beneficiaries and an indirect benefit to taxpayers — either in the form of more public goods or lower taxes. The zero in the last column indicates that the loss for beneficiaries in terms of increased taxes paid is exactly equal to the gain to taxpayers. This reduction/increase in taxes is a benefit/cost to beneficiaries but a cost/benefit to taxpayers. While paid leave's causal effect on earnings of the infant in adulthood will mechanically increase taxes paid, we have no direct evidence of the magnitude of this increase, and for this reason label these benefits and costs as near certain. The same logic applies to Rows J and K. The ambiguity of row K derives from the ambiguity of the impacts on post program earnings of the mothers.

The excess burden of taxation in row L refers to the social welfare loss from the distortion in prices from taxation. Income taxes, for example, distort the incentive to earn more income and reduce the incentive to report income. These distortion costs are borne by taxpayers. Excess burden is an impact, like taxes, that arises from taxation. Note, however, that excess burden for taxpayers depends not only on the initial taxation for financing the paid leave, but also on the present discounted value of future increases and decreases in taxes and transfers.

The deadweight loss for beneficiaries denoted in M arises from a distortion in prices that confront beneficiaries. Paid leave subsidizes both the costs of not working and the costs of having children, giving rise to deadweight loss that is borne by beneficiaries relative to a grant of the same amount that was not tied to either not working or to the beneficiary's number of children. On the other hand, Jacoby (2013) argues that mothers may experience welfare gains from the public provision of paid leave insurance (Jacoby, 2013a).

Row N indicates that improvements in the health of both mothers and their infants lead to reductions in healthcare costs. The benefit to taxpayers comes from reductions in taxes and private health insurance costs.[2] Beneficiaries also benefit because their out-of-pocket health expenditures will decline as their health improves. As in the case of taxes, we have no direct evidence that paid leave reduces health care costs. Reductions in health care costs as a result of improvements in health may be somewhat less certain than increases in taxes as a result of increases in earnings. But there is empirical evidence that better health is associated with lower health expenditures (Beam et al., 2020).

There is no direct empirical evidence of the expected benefits and costs discussed in Rows O through T. In the empirical analyses, we assume that these benefits and costs are equal to zero. Nonetheless, it is worth discussing each of them because such discussion suggests fruitful avenues for future research.

Row O reflects reductions in the costs of crime. Reduced crime benefits taxpayers both by reducing criminal justice costs such as for police, judges, and jails and by reducing the costs to victims of crimes. It is plausible that treated infants will commit fewer crimes as teenagers and young adults as a result of paid-leave-induced increases in their health, education and earnings. While there is no direct empirical evidence that paid leave reduces future crime rates of infants,

[2] Health insurance premiums are functions of average rather than individual health and therefore accrue to the collective rather than the individual whose health has changed; changes in out-of-pocket health expenditures, by contrast, accrue directly to the individual beneficiary.

criminal conduct is negatively associated with educational attainment and earnings, and causal evidence from the rollout of food stamps demonstrates that receipt of resources from that program in childhood increase educational attainment and earnings and reduce crime (M. J. Bailey et al., 2020). Given the evidence that PFL also increases educational attainment and earnings, we infer that PFL is likely to reduce crime. The same holds for the conceptualized reduction in Child Protective Services costs in Row P.

Row Q — avoided expenditures on other cash or near-cash transfers — include a cost to beneficiaries that is exactly equal to the savings for taxpayers, leading to zero losses for society. While there is no direct evidence for this effect, some decline in transfers is highly plausible.

Row R denotes the value of increased longevity both for mothers and their infants and for society as a whole; there is no value to taxpayers. While there is no direct evidence for increased longevity, increases in health are highly likely to lead to some increase in longevity. The increased longevity, while of value to beneficiaries, is not without a fiscal cost, represented by Row S. Due to increased longevity, taxpayers finance the costs of additional health care and Social Security payments. Because these transfers are of equal value to beneficiaries, the cost to society is zero. [3]

Row T—Benefits to other family members almost certainly exist, especially for other children and spouses. While the birth of a newborn is celebrated in all cultures, it is a stressful time for mothers, fathers, and older children, most especially for mothers; improvements in the mother's physical and mental health will likely positively affect the well-being of fathers and older children.

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[3] The value of the benefits to recipients of health insurance may be less than the cost of the insurance. (See Finkelstein et al., 2019).

In terms of employer costs, we expect these costs to be small. Few studies assess the impacts of paid leave on employers using causal designs (A. Bartel et al., 2023b). While studies based in the US (A. Bartel et al., 2023a; Bennett et al., 2020) find no adverse impacts and some small benefits, studies of employer costs of paid leave programs in Europe (Brenøe et al., 2020; Gallen, 2019; Ginja et al., 2023; Huebener et al., 2022) have mixed findings. However, these studies may be less applicable to the US context because of their relative generosity. Thus, we treat these costs as 0 in the analysis. We discuss the literature on employers in more detail in Appendix B.

The non-monetizable benefits and costs — such as poverty reduction, violation of the Protestant work ethic, and increased freedom (from not being incarcerated) — are not unimportant; however, they are not the focus of this paper (see Appendix A).

Measuring Impacts: Study Data, Methods, Findings, and Standardization

To measure impacts, we include only causal, quasi-experimental studies of the effects of paid leave. We searched for studies that examined the impacts of paid leave on all the outcomes listed in Table 1 with the exceptions of taxes, excess burden on taxpayers, and deadweight loss for participant parents, and found studies on the impacts of paid leave on parents' self-reported health and earnings, on infants' health in childhood (ages 0-21) and future earnings, and on the fiscal and administrative costs of paid leave. We also found studies of the impacts of paid leave on infants' birthweight and educational attainment, and the mental health of mothers (Bullinger, 2019; Bütikofer et al., 2021; Doran et al., 2020; Lee et al., 2020). However, we do not include these three outcomes in the social benefits of paid leave to avoid double-counting benefits. [4] We

[4] The impacts on infants' birthweight and educational attainment will show up in the impacts on infants' future earnings. The impacts on mothers' mental health will show up in the impact on mother's self-reported health.

reference them because they provide evidence of mechanisms for later improvements in infant health and earnings and in the case of mothers, another health outcome. The selected studies evaluate the introduction of paid leave policies in California and Norway. While we also identified other studies of paid leave programs in European countries, we excluded them because they evaluate expansions to already generous paid leave policies; this context differs significantly from the U.S. case, where most states have not passed or enacted paid leave policies, and those in place are of limited lengths of 12 weeks or less (A Better Balance, 2023b). Still, it is worth noting that these studies of paid leave programs in European countries find no positive effects for extending the length of leave beyond about 15-18 months (Rossin-Slater & Uniat, 2019).

Using our inclusion criteria, there are a limited number of studies for each outcome, which results in less certainty in the estimates. Our approach to reviewing the literature maintains few prior assumptions beyond that the studies pass our criteria of causal identification. Generally, the larger the number of high-quality studies informing an estimate, the higher our confidence in the results, and so our preferred estimate of an effect is the mean of the causal impact estimates. Using only one study, e.g. the one with the most conservative result, is only preferred in the case of extremely strong prior assumptions. We present both the most conservative—for readers who prefer it--and mean estimates based on available studies that meet our inclusion criteria.

Additionally, the studies we rely on here rely on single time-point implementation of a policy with one treated group - with no staggered implementation or phase-in period. Similarly,

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However, we do count the reduced expenditures from reduction in low birthweight of infants as social benefits, and we do count the increased education costs and foregone wages from increase in infants' educational attainment.

the studies we rely on were limited to those examining the first implementation of a policy and we excluded studies – particularly those in Europe – that examine the impacts of expanding a policy through extending the length of leave available or changing the level of income replacement. This approach has been determined through recent debates (Callaway & Sant'Anna, 2021; Goodman-Bacon, 2021) to be of less concern than much of the other older difference-in-differences literature, as it does not introduce bias through staggered implementation of policies across multiple sites over time.

Additionally, little is known about the interaction between publicly provided benefits and private plans for paid family and medical leave (Boyens et al., 2021). While some employers who voluntarily offered programs more generous than the new policy may continue to do so to recruit and retain staff (Boyens et al., 2021), these additional impacts would be present in both the pre- and post-policy period and therefore controlled for in the two-way fixed effects (TWFE) model, allowing for the identification of the effect of the CA PFLA to be isolated. Thus, the estimated effects for CA are likely to be unbiased. However, if employer-provided benefits in other states are either higher or lower than in CA, the effects of public provision could be different. We take account of this source of uncertainty as well as other sources in our sensitivity analysis.

Cost of paid leave programs in Norway and California

Our literature review identified studies based on policies in Norway and California – each providing different levels of government investment. California's 2004 paid leave policy provided six weeks of partially paid leave. According to the Employment Development Department of California (2022), the average weekly benefit was $415 in 2004, the equivalent of $643.4 in 2022 dollars, resulting in a total cost of $3,860 per mother for the six weeks of paid leave benefits. The 1977 reform of a maternity leave entitlement in Norway introduced four months of paid leave. We calculate the cost of this paid leave benefit as 18 weeks of pre-birth wage income based on the average income of 94,088 NOK pre-1977-reform (Carneiro et al., 2015). We divide such annual income by 52 to obtain weekly income (1,809 NOK) and multiply weekly income by 18 to obtain a rough estimate of paid leave benefits: 32,579 NOK. After adjusting for inflation and the exchange rate, we estimate the total expenditure for the policy to be $6,587 per mother in 2022 US dollars. To standardize benefits and costs from the literature into benefits and costs associated with a $1,000 paid leave investment, we scale estimated costs and benefits in each study by the ratio of $1,000 over total costs of leave ($3,860 for California study and $6,587 for Norwegian study).

The Economic Value of Increases in Health

We first describe how the health impacts are valued in dollars. (Below we describe the standardization of health and other impacts.) We follow the standard practice to measure the monetary value of improvements in health using quality-adjusted life-years (QALY). The World Health Organization (WHO) recommends that the QALY of an individual in perfect health be valued at one to three times the value of GDP per capita (Marseille et al., 2015). GDP per capita was $76,330 in the U.S. in 2022 (The World Bank, 2022). Thus, according to WHO, the value of a QALY for a person in perfect health in the US should fall between $76,330 and $228,990. The midpoint of the WHO recommendation range is $152,660. A second estimate begins with a consensus value of a statistical life (VSL) used by government agencies and recommended by the widely used benefit cost textbook by Boardman et al., (2018): $11.3 million in 2022 dollars. (Both QALYs and VSL are based on willingness to pay for one or more years of a healthy life). We convert the VSL to a value of a life-year for newborns. Given that life expectancy in the U.S is 78 years (Kochanek et al., 2020) we divide $11.3 million by 78, yielding the value of $145,397. The value of QALY may be either higher or lower for older people, including parents, as individuals may value an extra year of perfect health either more or less as they age. Thus, to simplify we assume that the QALY for parents is also $145,397. A third estimate is the midpoint of the range $100,000 to $150,000 for the value of a QALY in the US recommended by the Institute for Clinical and Economic Review (Institute for Clinical and Economic Review, 2020) or $125,000. We convert this $125,000 from 2019 to 2022 dollars and arrive at $143,527. Our main estimate uses the lowest figure of the three estimates, $143,527.

A QALY estimate for a given year ranges in our analysis from $143,527 for perfect health to zero for death. We assume that the change in the value of a year of life as one moves from perfect health to death is linear. In the sensitivity analyses, we allow the value of health to vary from 10% to 190% of $143,257. This wide range should capture any non-linearities that exist (in which fractions of a quality-adjusted life-year at different levels of health have values above or below the average) as well as concerns that our overall estimated value of a quality-adjusted life year is too high or too low.

It is also worth noting here that we use mother-reported measures of their own and their child's overall health status as our key measure of health impacts. Other measures available are consistent with the mother-reported measures, but mother's reports are the only measures that are common to all of the studies we use. Self-reports of health status such as we are using have also been documented to be a good predictor of longevity (McGee et al., 1999; Miilunpalo et al., 1997). Overall health status is reported as either excellent, very good, good, fair, or poor, with excellent health having a rating of 5 and poor health a rating of 1. We add another status, "death", with a rating of 0, for self-reported health to fully capture the value of QALY. Excellent health corresponds to a full QALY value of $143,527 and death corresponds to a QALY value of $0. We assume that the distance between the health status (0-5) is equal, so going from one category of health to another corresponds to 1/5th of the full value of QALY. As discussed above this assumption is dealt with in the sensitivity analysis.

In the rest of this section, we briefly describe the studies of the impacts, explain how we standardize them into the benefits associated with each $1,000 investment in paid leave, and use the standardized benefits to calculate the present discounted value of life-long benefits.

Impact of paid leave on mothers' health

We identified two studies that estimate the impact of paid leave on mothers' health – one based on the introduction of the 4-month paid leave policy in Norway (Bütikofer et al., 2021), and the other focused on California's PFL policy (Lee et al., 2020). Specific outcomes included metabolic syndrome (Bütikofer et al., 2021) and self-reported general health (Bütikofer et al., 2021; Lee et al. 2020). Bütikofer et al. (2021) use administrative and health survey data from Norway and a difference-in-regression discontinuity model and find that exposure to paid leave led to a 0.054 standard-deviation improvement (SE=0.014) in the self-reported health status and a 0.164 (SE=0.028) standard-deviation decrease in metabolic syndrome among of mothers when they are 40 years old. Lee et al. (2020) rely on data from the Panel Study of Income Dynamics and a difference-in-differences model and find that CA's PFL policy led to an 0.11 (95% CI: 0.052, 017) or 11 percentage-points increase in reporting their health as excellent or very good.

Health improvements are monetized using the QALY-based approach described above. This process results in estimates that value the improvement in parent health at $396[5] (Bütikofer et

[5] We standardize the results on metabolic syndrome and self-rated general health. We first scale both results by the ratio of (1000/6587), then we monetize both results by adopting Garfinkel et al. (2022)'s assumption that one

al., 2021) and $1,248[6] (Lee et al., 2020) per year for every $1,000 increase in government spending on paid leave, respectively. To calculate the present discounted value, we assume that parents are age 29 at childbirth (Centers for Disease Control and Prevention, 2021) and that benefits in parental health extend throughout the remainder of the parents' lives, from 29 to 78 years old. The values for the two studies of the increase in parents' health over the lifetime equal respectively $10,491 and $33,063. We use both the lower value and the mean of the two studies, $21,777.

Impact of paid leave on infants' health in childhood

We identified two studies that estimate the impact of the 2004 California paid leave policy on infants' health in childhood (Bullinger, 2019; Lichtman-Sadot & Bell, 2017). Both studies use a difference-in-differences model, compare infants in California to infants in multiple control groups (including those generated through a synthetic method approach), and rely on parent-reported general health status as a comprehensive measure that encompasses any specific health conditions analyzed. Both studies find positive impacts on parents' reporting of general health status as excellent or very good. Bullinger (2019) found an increase of 0.019 (p value=0.208) to 0.052 (p-value= 0.018), or 1.9 to 5.2 percentage-point. Lichtman-Sadot & Bell (2017) found an increase of 0.056 (SE=0.017) or 0.056 standard deviations.

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standard deviation of the metabolic syndrome/general health index equals one-sixth of the value of QALY. Taking an average of the two results, we obtain an increase of $396 in parental health per year.

[6] We first scale the result by the ratio of (1000/3860). Then we monetize the change in self-rated health. We assume that Lee et al. (2020) were measuring the increase of one unit of health quality-from good health to very good/excellent health. An increase of one unit of health quality captures one-fifth of the value of QALY. We obtain a $1,248 increase in parental health per year.

Based on our estimate of the costs of the California policy at $3,860 per mother taking leave (above), we estimate the health impacts of a $1,000 increase in government spending on paid leave. Estimates from these two studies suggest that a $1,000 increase in government spending on paid leave results in an increase in childhood health worth $503[7] and $582[8] per year, respectively. Assuming that the health benefits from paid leave last through childhood (ages 0-21), we estimate the present discounted value of health improvements over childhood to be $8,260 and $9,557 respectively. The mean value for the two studies is $8,909.

Increased future earnings of infants

To estimate the impact of paid leave on infants' future earnings, we rely on one study from Norway (Carneiro et al., 2015). The authors use administrative data and a combined regression discontinuity with differences-in-differences design, finding that introducing a four-month paid maternity leave policy led to an increase of 0.050 (SE=0.016) or a 5 percent increase in earnings later in life when the infant turns 30 years old. Based on the above estimate of the value of Norway's paid leave benefits of $6,587 per mother, to estimate the impact of a $1,000 increase in government spending on paid leave, we scale the 5 percent increase in future earnings by the

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[7] Given the increases in health status of 5.2%, 1.9%, and 5% found by Bullinger (2019), we calculate an average increase of 4.03%. Having scaled the 4.03% by the ratio of (1000/3860) and divided by a take-up rate of 59.6% (Rossin-Slater et al., 2013), we obtained a 1.8% increase. We monetize this increase in health by assuming that Bullinger (2019) is measuring one-unit increase of health quality, which corresponds to 1/5th the value of QALY. A 1.8 percentage point increase in the chances of having very good/excellent health is thus worth $503.

[8] Having scaled the 0.056 standard deviations by the ratio of (1000/3860) and divided by a take-up rate of 59.6%, we obtained a 0.024 standard deviation increase. Following Garfinkel et al. (2022), we assume that one standard deviation of increase in overall health equals 1/6th of the full value of QALY. A 0.024 standard deviation increase in overall health per year thus corresponds to a $582 increase in children's health per year.

ratio of ($1000/$6587), arriving at a 0.76 percent increase in future earnings. The Norwegian policy had a take-up rate of 100 percent (Carneiro et al., 2015); thus, the 0.76 percent is a treatment-on-the-treated effect. We convert the percentage increase in earnings into a dollar value based on the average earnings of the analysis sample in Norway, which translates to average earnings of $50,568 in 2022 US dollars. Multiplying the 0.76 percent increase in earnings by $50,568, we conclude that a $1,000 increase in government spending on paid leave would lead to a $384 increase in infants' future earnings per year. Assuming that increased future earnings occur at every age from 22-64 and a social discount rate of 3 percent, we conclude that the present discounted value of increased future earnings due to a $1,000 increase in government spending on paid leave is $4,949 for infants. The increased earnings partially come from increased work hours, which reduces the worker's utility. According to Altonji et al., (2022), who studied increased earnings from increased education, up to 25 percent of the increase in earnings resulting from more education comes from increased hours worked. We assume that this 25 percent of increased earnings from increased hours worked brings zero utility to workers. Thus, we count only 75 percent of the $4,949 increased earnings — $3,712.

Reductions in parent earnings while on leave

By providing some income replacement, paid leave policies are expected to increase the length of leaves taken compared to when parents can only access unpaid leave; however, these increases in leave length entail a corresponding decrease in earnings during the leave period. To estimate the increase in the length of leave – and thus the additional time where parents encounter decreased earnings – we rely on a study of the introduction of the California paid leave policy by Rossin-Slater et al. (2013). Using data from the Current Population Survey (CPS) and a difference-in-differences design, the authors infer an increase in length of leave of 3.1 to 3.3

weeks based on an increase in the proportion of women with infants who are on leave during the reference week, which we translate to an increase of 0.805 weeks for each additional $1,000 investment in paid leave. If we multiply the 0.805-week increase in weeks of leave taken by the average weekly wages of mothers claiming benefits ($1,170), we obtain a $942 decrease in parents' earnings while taking paid leave.

Changes in parent earnings after return to work

Several studies assess the impact of PFL policies on parents' earnings after taking paid leave (M. Bailey et al., 2024; Baum & Ruhm, 2016; Bütikofer et al., 2021; Carneiro et al., 2015; Rossin-Slater et al., 2013) providing mixed results and a wide range of estimates dependent in part on how long after birth earnings are measured and on the birth-order. For instance, Bailey et al. (2024) find very large negative treatment effects on earnings beginning 1 year after birth and extending to 12 years after birth for first-time mothers. First-time mothers experience a $11,600 (SE= 5260) decrease in total earnings 1-3 years post-childbirth, a $12,300 (SE= 9720) decrease in total earnings 4-8 years post-childbirth, and a $20,400 (SE= 9140) decrease in total earnings 9-12 years post-childbirth. Mothers who are treated by the introduction of PFL at the time of a higher-order birth, by contrast, experience a $3,260 (SE= 5150) decrease in total earnings 1-3 years post-childbirth, a $11,400 (SE= 9330) increase in total earnings 4-8 years post-childbirth, and a $6,170 (SE= 8660) increase in total earnings 9-12 years post-childbirth. [9]

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[9] The authors explain the positive effects on earnings for higher-order birth mothers as likely due to selection of these mothers into eligibility for paid leave. Those with weak attachment to the labor force drop out to become full-time mothers after their first births and thus they are no longer eligible for paid leave for subsequent births. Those who remain in the labor force after their first births are more attached to the labor force and a paid leave can enhance that attachment.

We utilize the separate results for first and higher-order births. Following our standardization procedure, we calculate the changes in earnings per $1,000 investment in paid leave. According to our estimates, on average, California mothers receive $3,860 in paid leave benefits. If the changes in earnings were attributed to $3,860 of paid leave investment, then for new mothers, a $1,000 paid leave investment would lead to $3,005 (11600*1000/3860) decrease in total earnings 1-3 years post-childbirth, a $3,186 (12300*1000/3860) decrease in total earnings 4-8 years post-childbirth, and a $5,285 (20400*1000/3860) decrease in total earnings 9-12 years post-childbirth. We then convert total changes in earnings to changes in earnings per year. For instance, if new mothers lose a total of $3,005 in earnings from 1-3 years post-childbirth, a 3-year period, then on average, new mothers lose $1,002 (3005/3) in earnings per year. In conclusion, per $1,000 investment in paid leave, new mothers would lose $1,002 in earnings per year in the short-term, $637 in earnings per year in the medium-term, and $1,321 in earnings per year in the long-term.

We follow the same process to calculate changes in earnings per $1,000 investment in paid leave for mothers with higher-order births. Per $1,000 investment in paid leave, higher-order-birth mothers would lose $281 in earnings per year in the short-term, gain $591 in earnings per year in the medium-term, and gain $400 in earnings per year in the long-term. We then use the separate standardized estimates for new and higher-order birth mothers to calculate a weighted standardized estimate for all mothers. According to (Hamilton et al., 2024), in 2023, total fertility rate was 1,616.5 births per 1,000 women, implying that around 62% of births were first-born and 38% were non-first-born (a substantially lower share than during the period when

California's PFL was introduced, meaning that we estimate more negative effects on total earnings than were produced by that policy). We thus assign standardized estimates of new mothers a weight of 0.62 and estimates of higher-order-birth mothers a weight of 0.38. Per $1,000 investment in paid leave, mothers of all births would lose $728 (-1002*0.62 -281*0.38) in earnings per year in the short-term, lose $171 (-637*0.62 + 591*0.38) in earnings per year in the medium-term, and lose $667 (-1321*0.62 + 400*0.38) in earnings per year in the long-term. We calculate the present discounted value of lifelong changes in earnings, using a social discount rate of 3%, and assuming that the $667 decrease in annual earnings in the long term persist until the end of mothers' work lives (age 64). We adjust all numbers to 2022 dollars. We conclude that per $1,000 increase in paid leave investment per year, the present discounted value of the decrease in mothers' lifelong earnings is $13,433.

We follow the same procedure to standardize results of the other four studies. We estimate that 1-3 years after taking paid leave, the present discounted value of changes in mothers' earnings range from -$2,226 (Bailey et al. 2024) to $4,689 (Rossin-Slater et al. 2013), with an average of $524. We estimate that 4-8 years after paid leave, changes in mothers' earnings range from -$773 (Bailey et al. 2024) to $2.59 (Bütikofer et al. 2021), with an average of -$277. We estimate that 9 years after paid leave and beyond, changes in mothers' earnings range from -$10,434 (Bailey et al. 2024) to $8.79 (Bütikofer et al. 2021), with an average of -$5,213. Summing up the minimum estimates at different years, we arrive at -$13,433. Summing up the mean estimates at different years, we arrive at $4,966.

Increased expenditures and foregone earnings due to increased education of infants

Even though we do not count increased education as a benefit (to avoid double counting, as we are already counting increased earnings, which should capture the financial benefits of increased education), increased costs brought by increased education should be counted. We follow the assumption and method of Garfinkel et al. (2022), who estimated based on Abel & Deitz (2014) that an increase of one year of schooling would increase costs paid by children in the form of tuition by $2,880 ($2019), increase costs paid by children in the form of lost wages in the labor market by $25,778, and increase costs paid by taxpayers in the form of grants and scholarships by $6,856. We found through one paid leave article (Carneiro et al., 2015) that following a $1,000 increase in paid leave, infants' years of schooling would increase by 0.02 years. [10] We convert all these expenditures and lost wages into 2022 dollars and multiply them by 0.02 years. Assuming that the increased education and the increased costs occur at age 18, the present discounted value of increased education cost shouldered by infants would be $340, and the present discounted value of increased education cost shouldered by taxpayers would be $81.

Administrative costs

We use CBO's evaluation of the FAMILY Act to estimate the percentage of costs that are administrative costs. CBO estimates that the FAMILY Act would distribute $521 billion in benefits from 2020-2030 and incur $27 billion of administration costs (Congressional Budget Office, 2020). Thus, we have estimated ongoing administrative costs to be 5.18 percent of benefits disbursed.

[10] Carneiro et al. (2015) found that exposure to paid maternity leave in Norway at birth increased years of schooling by 0.116 (SE=0.053) or 0.116 years. Adjusting this educational result by the increase in paid leave benefits and take-up rate of paid leave (100 percent according to authors), we conclude that a $1,000 increase in government spending on paid leave would increase years of schooling by 0.02 years per year.

Increased future tax payments of infants

The direct paid leave literature demonstrates that infants' earnings would increase in adulthood, leading them to pay more taxes as adults. We follow Garfinkel et al. (2022), who, based on Wamhoff & Gardner (2019), assumed that tax payments would be 21 percent of earnings (Wamhoff & Gardner, 2019). In the previous section, we estimate that due to a $1,000 increase in government spending on paid leave, infants' future earnings would increase by $4,949 over their lifetimes. 21 percent of $4,949 is around $1,039. We thus conclude that a $1,000 increase in government spending on paid leave would increase infants' future tax payments by $1,039.

Changes in tax payments of parents during the program and post-program

We use the same 21 percent we have used for infants' future tax payments to calculate parents' tax payments. In the previous sections, we estimate that as a result of a $1,000 increase in government spending on paid leave, the present discounted value of decreased in-program earnings of parents is $942, and the present discounted value of decreased post-program earnings of parents is $13,433. Using the 21 percent figure, we calculate that parents' in-program tax payments would decrease by $198 (942*0.21), and parents' post-program tax payments would decrease by $2,821 (13433*0.21).

Avoided expenditures on infants' healthcare costs

We follow the same assumptions and method of Garfinkel et al. (2022) in calculating reductions in infant healthcare expenditures.

Using the results of Stearns (2015), we have obtained a 3.7 percent decrease in low birthweight following a $1,000 paid leave investment.[11] To convert the improvement in health

[11] Stearns (2015) found that states that introduced paid maternity leave through their Temporary Disability Insurance programs (TDI) saw a 0.00218 (SE=0.000414) or 0.218 percentage-point decrease in the proportion of low

into a decrease in health expenditures, we first multiply the percentage change by 8.3 percent (the percentage of live births that were low birthweight in 2017, according to Beam et al., 2020). Then, we multiply the percentage-point change by Garfinkel et al.'s estimate based on Beam et al. (2020): that low birthweight increases health expenditure by $5,449-$11,426 in 2019 dollars, or $6,257-$13,120 in 2022 dollars. We conclude that following a $1,000 increase in government spending on paid leave, healthcare expenditures related to birthweight would decrease by $19-$41, with a mean of $30. This reduction does not need to be discounted because it occurs upon receipt of paid leave.

In previous sections, we have calculated standardized estimates of increases in infants' health in childhood. To convert increases in health into reductions in healthcare expenditures, we follow Garfinkel et al., (2022), who, based on Chern et al., (2002); DeSalvo et al., (2009); Lima & Kopec, (2005), calculated an elasticity of 0.84 (meaning that for a one percent increase in health, healthcare expenditures would decrease by 0.84 percent). To evaluate the percentage changes in healthcare expenditures, we use healthcare expenditures from Garfinkel et al. (2022),

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birthweight births. The authors did not specify the amount of paid leave benefits parents received. According to the authors, the maximum weekly TDI benefit in 1978 ranged from $522 in California to $325 in Rhode Island, and the duration of leave ranged from four weeks before birth and six weeks after birth in California and New Jersey to six or eight weeks on either side of birth in the other three states. We assume that, on average, parents received $423.5 (the midpoint of the range of benefits in 2013 dollars, which is the equivalent of $534 in 2022 dollars) and took six weeks of paid leave before birth (the midpoint of the range of entitlement before birth), yielding a total paid-leave benefit of $3,200 in 2022 dollars before childbirth (we ignore post-birth leave because we believe it does not influence birthweight). We adjust the 0.218 percentage-point increase by the ratio of (1000/3200) and by the take-up rate, which according to the authors, is 0.27. Finally, we divide the increase by the mean of 6.76 percent and obtain a 3.7 percent decrease in the share of low birthweight per year.

who, based on the statistics of Centers for Medicare & Medicaid Services (2019), calculated that that average healthcare spending is $5,007 among children, $6,102 among adults aged 19-44, $11,551 among adults aged 45-64, and $21,883 among adults aged 65-78. We convert all spending into 2022 dollars and discount reductions in health expenditures from ages 1-78 using a social discount rate of 3 percent.

Using the most conservative estimate, we conclude that following a $1,000 increase in government spending on paid leave, the present discounted value of decreases in children's healthcare costs (ages 0-78) would be $303. When we use the mean estimate, the decrease would be $335.

Avoided expenditures on parents' healthcare costs

We follow the same calculation method of children's health expenditure reductions in calculating parental health expenditure reductions. Using our most conservative estimate of the increase in parental health, we estimate a reduction of $735 in lifelong healthcare expenditures (ages 29-78) of parents as the result of a $1,000 investment in paid leave. Using the mean estimate, the decrease would be $1,525.

Excess burden for taxpayers and deadweight loss for beneficiaries

We follow Garfinkel et al., (2022) in assuming that excess burden for taxpayers is 40% of the net changes in taxes. Reductions in health insurance premiums, around 1/3 of the reductions in healthcare expenditures, are not counted in the net changes in taxes. We assume that deadweight loss for beneficiaries is 40% of the decrease in in-program earnings of parents.

Estimated Benefits and Costs of Introducing Paid Leave in the U.S.: Using Minimum and Mean Estimates of Direct Evidence

Table 2 presents estimates of some of the benefits and costs of paid parental leave to infants, mothers, and taxpayers per $1,000 spent. This section explains how we use these estimates to assess the benefits and costs of introducing a national paid family leave program for parental leave. We simulate two potential national programs: 1) one that was proposed under the Build Back Better Act (BBB Act) and passed the House of Representatives, which would offer workers four weeks of paid leave, and 2) one that was proposed under the Family and Medical Insurance Act (FAMILY Act), which would offer workers 12 weeks of paid leave. We refer to these two programs as the BBB and FAMILY Act programs. All existing state PFL policies offer more than four weeks of leave. The proposed BBB plan would have replaced 85 percent of weekly pay under $290, plus 69 percent of weekly pay between $290 and $659, plus 50 percent of weekly pay between $659 and $1,192. The proposed FAMILY Act would have replaced 66 percent of monthly pay up to $4,000 with a minimum monthly benefit of $580.

Converting the benefits to mothers, their newborns, and taxpayers in Table 2 to estimates of the social benefits of the two potential national programs requires only that we know the initial fiscal costs of each program. The social benefits per $1000 of paid leave benefits will carry over to the ratio of social benefits to initial fiscal costs—about 7 to 1 or 29 to 1, depending on whether we use the minimum or mean estimates. Thus, any errors in the simulation will affect fiscal costs and social benefits proportionately.

Table 2. Present discounted value of monetary benefits and costs per $1,000 of paid leave: Direct evidence from literature and near-certain secondary impacts

	Minimum-benefit study			All selected studies		
	Direct participants +	Indirect taxpayers =	Total society	Direct participants +	Indirect taxpayers =	Total society
Direct evidence from literature						
Paid leave benefits	1,000	-1,000	0	1,000	-1,000	0
Increased mothers' health	10,491	0	10,491	21,777	0	21,777
Increased infants' health in childhood	8,260	0	8,260	8,909	0	8,909
Increased future earnings of infants	3,712	0	3,712	3,712	0	3,712
Decreased in-program earnings of mothers	-942	0	-942	-942	0	-942
Changes in mothers' post-program earnings	-13,433	0	-13,433	-4,966	0	-4,966
Increased expenditures and foregone earnings due to increased educational attainment of infants	-340	-81	-422	-340	-81	-422
Administrative cost	0	-52	-52	0	-52	-52
Near-certain secondary impact						
Increased future tax payments by infants	-1,039	1,039	0	-1,039	1,039	0
Decreased in-program tax payments by mothers	198	-198	0	198	-198	0
Changes in post-program tax payments by mothers	2,821	-2,821	0	1,034	-1,034	0
Avoided expenditures on mothers' health care costs [a]	81	654	735	168	1,357	1,525
Avoided expenditures on infants' health care costs [a]	33	269	303	37	298	335
Excess burden for taxpayers	0	-999	-999	0	-92	-92
Deadweight loss for beneficiaries	-377	0	-377	-377	0	-377
Total	**10,464**	**-3,189**	**7,275**	**29,178**	**229**	**29,406**

[a] Reductions in health care expenditures include reductions in out-of-pocket costs to beneficiaries and reductions in public and private insurance costs to taxpayers. Given that out-of-pocket medical expenditures are about 11 percent of national health expenditures in 2019 (Centers for Medicare & Medicaid Services, 2019), we allocate 11 percent of the reduction in expenditures to beneficiaries and 89 percent to taxpayers.

Two Micro-Simulation Models

That the ratio of fiscal costs to social benefits will not be affected by errors in the micro-simulation is fortunate because our estimates of initial fiscal costs are based on several assumptions subject to error. We estimate initial fiscal costs in two ways: (1) conducting a micro-simulation of the 4-week BBB plan and the 12-week FAMILY Act and (2) converting the Congressional Budget Office's (CBO) micro-simulation estimates (Congressional Budget Office, 2020, 2021) of fiscal costs of paid leave for all employees taking leave for any eligible reason to reflect the fiscal costs of only mothers taking leave to bond with newborns.

We use data from the American Community Survey (ACS) (Ruggles et al., 2024) to establish eligibility for paid leave for mothers and infants. The CBO uses the Current Population Survey (CPS) (Congressional Budget Office, 2020). [12] Infants are identified in both data sets as children younger than one-year-old, and mothers with newborn infants are deemed eligible if they have sufficient work experience in the prior year. Costs depend not just on the number of eligible workers but also upon what proportion of those who are eligible decide to claim benefits (the take-up rate) and, of those who claim benefits, the average length of leave taken. The CBO estimates assume that after ten years following policy implementation, the take-up rates and average leave lengths will approach the maximum allowed under the policy.[13] In order to estimate initial take-up rates and leave durations, the CBO supplements CPS data with data from

[12] CBO uses the CPS when estimating paid leave proposed under the FAMILY Act. CBO doesn't mention data source used for the estimation of paid leave proposed under the Build Back Better Act. We assume that CBO uses CPS for the latter as well.

[13] When estimating the FAMILY Act, CBO states that in compliance with the Balanced Budget and Emergency Deficit Control Act, it presents the full costs of providing paid leave to all workers eligible. We assume that CBO adopts the same practice when estimating the Build Back Better Act, that it produces cost assuming 100% take-up.

the Family and Medical Leave Act survey (FMLA) and data on the existing state programs. The published estimates from the CBO include projections for the growth in eligibility over time but do not provide data on how much of the growth in costs over time is due to increases in eligibility versus increases in take up, the number of weeks of leave taken, and the number of births. Finally, the CBO estimates include funds that the federal government would need to pay to states and employers if they choose to continue offering their own benefits despite the federal program. We consider these funds a rough estimate of costs that states and employers are paying for their own paid leave programs in the CBO estimate, and we subtract these funds from the paid leave benefits that the federal governments would need to pay to arrive at an estimate of new expenditures.

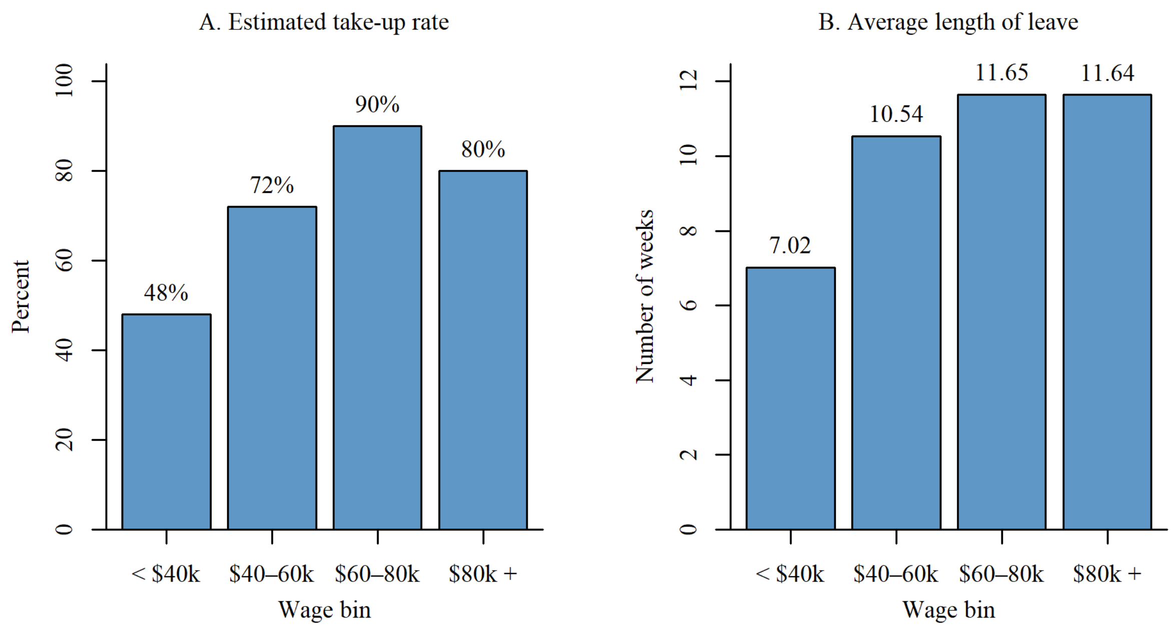
Our micro-simulation model includes maximum take-up rates (100 percent) and leave lengths and below-maximum values for take-up rates and leave lengths. To estimate below-maximum values, we use actual program data from the state of New York. We estimate take-up rates and length of leave taken by combining the ACS sample for New York with official data published by the New York State Department of Financial Services (2022) that provides summary statistics for the New York State program and its participants, including data on the number of paid leave beneficiaries by earnings level. The level of detail allows us to reconcile our microsimulation model with the official program data reported by New York State, increasing the accuracy of our microsimulation estimates.

The take-up rates presented in Figure 1 below come from our microsimulation of New York and are estimated by dividing the number of mothers reported taking leave to bond with a newborn in official New York data by the number of mothers eligible for paid leave in New

York, estimated using the ACS.[14] Panel A illustrates that no group of mothers has take-up rates of 100 percent and that mothers with low earnings are much less likely to take up paid leave benefits than are mothers with high earnings: the take-up rate for mothers with earnings below $40,000 is only 48 percent, compared to mothers with earnings $40,000-$60,000, $60,000-$80,000, and above $80,000, whose rates are 72 percent, 90 percent, and 80 percent, respectively. Though the official New York paid leave data contains only averages, we estimate the relationship between the mothers' earnings and length of leave taken by assuming that the length of leave varies with income in concordance with take-up. As displayed in Panel B of Figure 1, the length of leave approaches the maximum of 12 weeks for all mothers, except for the lowest earnings group.

[14] To calculate the take-up rate, we need to estimate the number of eligible mothers. We identify mothers of newborns in the ACS data and use ACS variables on work history and the eligibility criteria of the New York State program to identify eligible mothers. We use ACS variables on earnings to assign mothers into different earnings groups. We then divide number of mothers taking up the program (reported by NYS) by the number of eligible mothers (identified by us in the ACS). See appendix E for more details.

Figure 1. Microsimulation Estimates of Paid Leave Take-Up Rates
and Average Length of Leave in New York State



Differences by earnings level are also critical to generalizing the New York results to the national level. For example, states with a larger proportion of low-wage residents will have more mothers in the lower earnings bin than New York. To simplify the national microsimulation, we assume that the earnings-bin-specific take-up rates in the US are equal to those in New York and apply the bin-specific take-up rates in New York to the rest of the U.S. We also assume that the earnings-bin specific lengths of leave in the US equal those in New York.

Average benefits within earnings bins vary according to the replacement rates in states with existing PFL programs. The simulation is straightforward for states without existing PFL programs, as the baseline scenario is no program. However, for states with existing PFL programs, the baseline scenario simulation is of the existing program, and either the BBB or FAMILY Act program is also simulated. If the new national program's costs exceed the state program costs, suggesting that the new national program is more generous, then we assume that the state will adopt the new national program and the difference in costs is the added national cost. If the state program costs are higher than the new national program, suggesting that the existing state program is more generous, then we assume that the state will keep its own program and the national program has no impact on the state, causing no change in total national costs. Neither the ACS nor NYS data on paid leave provides information on employer-paid leave programs. Thus, one final adjustment that we make to our estimates of costs is to subtract the existing costs of employer-provided paid leave, estimated from the CBO's estimate of the new national programs.

Table 3 provides cost estimates for the BBB 4-week and FAMILY Act 12-week proposals. The first set of estimates assumes less than 100 percent take-up and less than 100 percent use of the maximum length of leave. The second set of estimates assumes 100 percent take-up and maximum length of leave. In the last row of the table, we also display our estimates based on adjustments to the CBO estimates. The details of the micro-simulation analysis are described in more detail in Appendix D.

Table 3. Fiscal Costs of Paid Parental Leave in the United States by Program, Take up, and Source ($millions)

	Build Back Better Plan, 4 weeks	FAMILY Act, 12 weeks
Assuming < 100% take-up and length of leave (microsimulation results)	1,707	5,446
Assuming 100% take-up and length of leave (microsimulation results)	2,898	9,340
Assuming 100% take-up and length of leave (CBO estimates)	1,886	6,945

We find that the 12-week proposal is around three times more costly than the 4-week proposal. In addition to offering different lengths of leave, the BBB and FAMILY Act programs have different income replacement rates. The last row of the table indicates that the CBO estimates for the 100 percent take-up and maximum length of leave case are only about 65% to 74% of our estimates.

The Benefits and Costs of Two Paid Leave proposals

Table 4 combines our minimum and mean estimates in table 2 with the cost estimate from the CBO for the BBB 4-week proposal into two full-fledged benefit-cost analyses based only on direct evidence on impacts from the paid leave literature plus the near-certain impacts on benefits and costs that flow from these. As in table 2, the social benefits exceed the initial fiscal costs to taxpayers in the minimum benefits case by 7 to 1 and in the mean benefits case by 29 to 1. In the minimum benefits case, mothers and their newborns derive about $19 billion in benefits, but taxpayers lose about $6 billion. In the mean benefits case, mothers and children gain over $54 billion and taxpayers experience a small gain of $.3 billion. As discussed above, the big difference between the minimum and mean estimates is that the mother's health benefits are much larger and the mothers' long run earnings losses are much smaller in the mean estimates.

As shown in Table 3, the initial fiscal costs of the more generous 12 weeks of paid leave proposed in the Family Act is just under $7 billion. Though not shown in Table 4, the net social benefits generated by the 12-week program would be about 7 or 29 times the initial fiscal cost, depending upon whether the minimum or mean benefits were used—either about $50 billion or about $200 billion.

Table 4. Benefits and Costs of 4-Week Paid Parental Leave in the United States:
Using Direct Evidence from the Literature, Near-certain Secondary Impacts and Fiscal Cost Estimates from the CBO ($millions)

	Minimum-benefit study			All selected studies		
	Direct beneficiaries +	Indirect taxpayers =	Total society	Direct beneficiaries +	Indirect taxpayers =	Total society
Paid leave benefits	1,886	-1,886	0	1,886	-1,886	0
Increased mothers' health	19,787	0	19,787	41,074	0	41,074
Increased infants' health in childhood	15,579	0	15,579	16,802	0	16,802
Increased future earnings of infants	7,000	0	7,000	7,000	0	7,000
Decreased in-program earnings of mothers	-2,137	0	-2,137	-2,137	0	-2,137
Changes in mothers' post-program earnings	-25,336	0	-25,336	-9,367	0	-9,367
Increased expenditures and foregone earnings due to increased educational attainment of infants	-642	-154	-796	-642	-154	-796
Increased future tax payments by infants	-1,960	1,960	0	-1,960	1,960	0
Decreased in-program tax payments by mothers	449	-449	0	449	-449	0
Changes in post-program tax payments by mothers	5,321	-5,321	0	1,967	-1,967	0
Avoided expenditures on mothers' health care costs [a]	152	1,233	1,386	316	2,560	2,876
Avoided expenditures on infants' health care costs [a]	63	508	571	70	563	633
Administrative costs [b]	0	-98	-98	0	-98	-98
Excess burden for taxpayers [c]	0	-1,914	-1,914	0	-204	-204
Deadweight loss for beneficiaries [d]	-855	0	-855	-855	0	-855
Total	19,308	-6,120	13,188	54,604	326	54,929

[a] Reductions in health care expenditures include reductions in out-of-pocket costs to beneficiaries and reductions in public and private insurance costs to taxpayers. Given that out-of-pocket medical expenditures are about 11 percent of national health expenditures in 2019 (Centers for Medicare & Medicaid Services, 2019), we allocate 11 percent of the reduction in expenditures to beneficiaries and 89 percent to taxpayers.

A Sensitivity Analysis

In Table 4 above, we present our baseline results, which relied on the minimum impact or the mean impact from the literature and our baseline assumptions of parameters values (ex: social discount rate of 3%, QALY of $143,527). Even using the minimum impact from the literature still results in considerable net social benefits. Here, we test the sensitivity of our main results in two ways. First, in Panel A of Table 5 we consider the change in net social benefits relative to higher and lower social discount rates, higher and lower values of QALY, health care elasticities, excess burden, and deadweight loss, and a higher value for the share of increased future earnings of infants counted as benefits. Each of the alternatives simulated, as described below, are grounded in the literature. Second, in Panel B of Table 5, we conduct Monte Carlo simulations that offer more insight into the interactions of alternative parameter values introduced in Panel A.

There are arguments for using lower as well as higher social discount rates. Real market interest rates were closer to zero than 3 percent for a long time and, including recent experiences of high inflation, continued to be well below 3 percent. The Office of Information and Regulatory Affairs (OIRA) has recently updated its guidance on regulatory analysis (The White House, 2024), recommending that evaluations of federal programs use a 2% social discount rate. On the other hand, when market interest rates were higher, benefit-cost analyses typically used rates between 5 and 10 percent, and at least one economist currently argues that the appropriate social discount rate for benefit-cost analyses of government programs is 10 percent (Gollier et al., 2023). We examine the impact of using a 1% and a 5% social discount rate on our estimates.

Our baseline analysis relies on a QALY of $125,000, (144k in 2022 dollars), the midpoint of the range recommended by ICER ($100k-150k, or $115k-$172k in 2022 dollars). For the sensitivity analysis reported in Table 5, we use the minimum and maximum values of the range recommended by ICER.

Our baseline analysis uses a health expenditure elasticity of 0.84, which is the midpoint of the range (0.19-1.48) calculated by Garfinkel et al. (2022). In Table 5, we use the minimum or the maximum value of this range. Our baseline analysis also assumes that excess burden is 40% of net changes in taxes, and that deadweight loss is 40% of changes in mothers' post-program earnings. As a sensitivity analysis, we experiment with alternative values of 30% and 50%.

Finally, in our baseline results, we count only 75% of the face value of increased children's future earnings. As a sensitivity analysis, we count 100% of such increase.

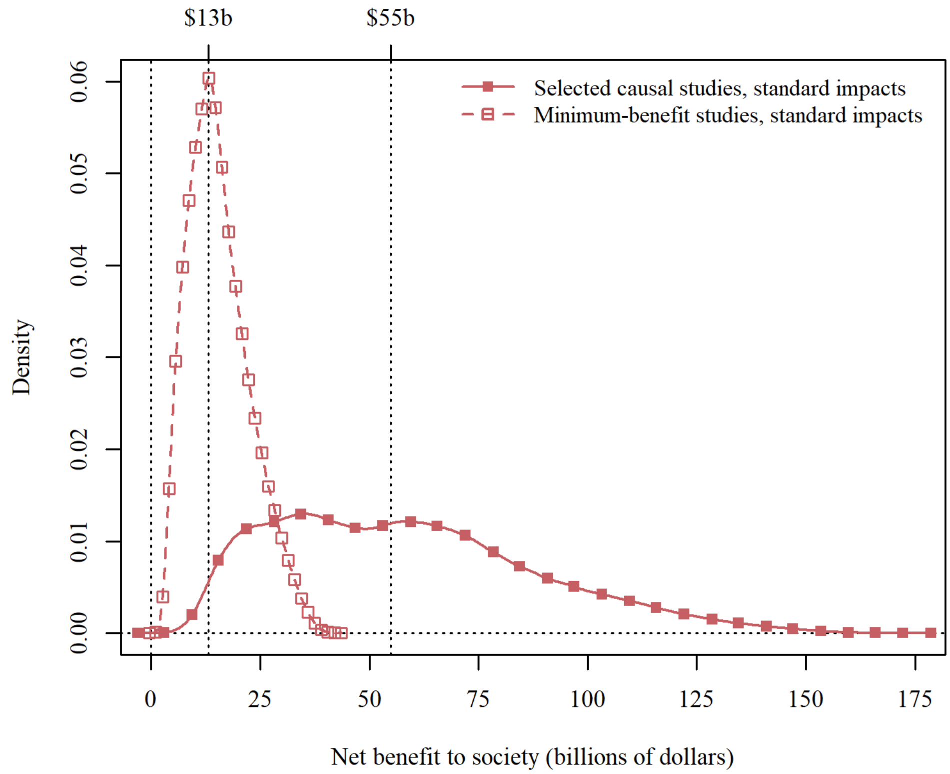
Similar to our baseline results, we conduct sensitivity analyses using both the minimum and mean literature estimates. Because net social benefits are so large under the mean estimates and still large under the minimum, our discussion of the table focuses on the minimum, and within that on decreases in estimates. As we can see from Panel A, variations in the social discount rate and the QALY values have the largest impacts on net social benefits. The lower QALY value cuts net social benefits by more than half—from $13 billion to $6 billion. A 5% social discount rate cuts net benefits by close to 40%, to $8 billion. Higher values of excess burden and welfare loss and a lower value of the health care elasticity all have much smaller effects. The bottom row of Panel A shows that, if all the most negative parameters are used, the net social benefit shrinks to only $346 million, but still remains positive.

In Panel B, we run Monte Carlo-style simulations that allow us to examine the impact on net social benefits of the variations introduced in Panel A of Table 5. We allow our assumptions to vary randomly across many iterations. In particular, we contrast approaches that use the minimum benefit estimates from the causal literature with those that choose randomly from all of our selected causal studies. Both of the distributions described in Figure 2 and in Panel B of Table 5 are from a Monte Carlo simulation of 1 million iterations. In Figure 2, net social benefits are described on the horizontal axis and the density of observation on the vertical axis; they are uniformly positive and very large. Panel B in Table 5 indicates that when using the minimum literature estimate, the mean value of net social benefits is $15.6 billion, and that net benefits range from $7.1 billion at the 10^{th} percentile of net benefits to 25.7 billion at the 90^{th} percentile of benefits. 0% of the estimates of net social benefits are negative. Net benefits calculated using minimum literature estimates are, not surprisingly, much smaller than the ones calculated using the mean of randomly drawn estimates. When using randomly drawn literature estimates, the mean net social benefit is $59 billion. Even at the 10th percentile, net social benefits stand at $22 billion. At the 90th percentile, net social benefits are close to $101 billion.

Table 5. Sensitivity Analysis of the Net Social Benefit of 4-Week Paid Parental Leave in the United States ($millions)

	Minimum-impact study		All selected studies	
Net social benefits, baseline	13,188		54,929	
A. Estimates based on varying specific assumptions, individually or in combination				
	Lower	Upper	Lower	Upper
Net social benefits, by sensitivity assumptions:				
Social discount rate {0.05, 0.01}	7,859	25,352	39,168	84,891
QALY {115k, 170k}	6,115	20,261	43,354	66,504
Health expenditure elasticity {0.19, 1.48}	11,352	15,024	51,627	58,232
Excess burden {0.5, 0.3}	12,709	13,667	54,878	54,980
Deadweight loss {0.5, 0.3}	12,974	13,402	54,716	55,143
Future earning share {0.75, 1}	13,188	15,521	54,929	57,263
Extreme combinations of parameters	346	43,498	27,699	111,447
B. Estimates based on stochastic simulations over 1 million iterations				
	Minimum-impact study		Random draw (mean) from all selected studies	
Net social benefits, by summary statistic:				
Mean	15,579		58,508	
10th percentile	7,062		22,066	
25th percentile	10,267		34,404	
50th percentile	14,575		55,283	
75th percentile	19,999		77,555	
90th percentile	25,694		100,958	
Percent of observations below zero	0.00%		0.00%	

Figure 2. Distribution of Monte-Carlo Estimates



Third, we run Monte-Carlo simulations that allow us to examine the impact on net social benefit of introducing increasing uncertainty into all of our estimated literature impacts and the parameters. Once again, we focus on the results using minimum literature impact. We introduce uncertainty by increasing the range of the minimum estimates from 10% to 90%. On the negative side we allow the QALY value to be discounted by up to 90% and the social discount rate to increase by up to 10% at the same time as we allow the discount of impact estimates to decrease by 90%. Each of the distributions described in the figure is from a Monte Carlo simulation of 1 million iterations. Figure 3 describes the results. Net social benefits are described on the horizontal axis and the density of observation on the vertical axis. The dark black curve, labeled standard impacts, reproduces our baseline results of net social benefits using minimum benefits from Figure 2. It indicates that net social benefits are positive for virtually all observations. The 10% deviation actually tightens the distribution, indicating that the standard error that results from a 10% deviation from the minimum estimates is actually smaller than the standard error implicit in the variations from the parameter values in Table 5, more specifically the variation of QALY and social discount values. But all of the other larger increases in deviations from the minimum estimates--beginning with 20% and increasing by 10 percentage point increments to 90%--have the opposite and expected effect of widening the distribution and most important, on the negative side, of increasing the percentage of observations that have negative net social benefits. At 20% and 30%, as the figure shows, the proportions with negative values is still quite small.[15] Table 6 gives the exact values of the percentage of net social benefits that are below zero. At 20% and 30%, only 0.3% and 5% of net social benefits fall below zero, respectively.

The intuition for these results is straightforward. As the impacts are increasingly discounted (on the negative side) they approach zero. As they approach zero, the percent of observations with net benefits below zero approaches 50% and the percent with infinite net benefits approaches 50%. But, as Table 6 shows, even a 90% discount of impacts and QALY values results and a 10% social discount rate results in only 35% of observations with net social benefits less than zero, which is to say that even in this most extreme combination of negative possibilities, 65% of observations indicate that net benefits are positive.

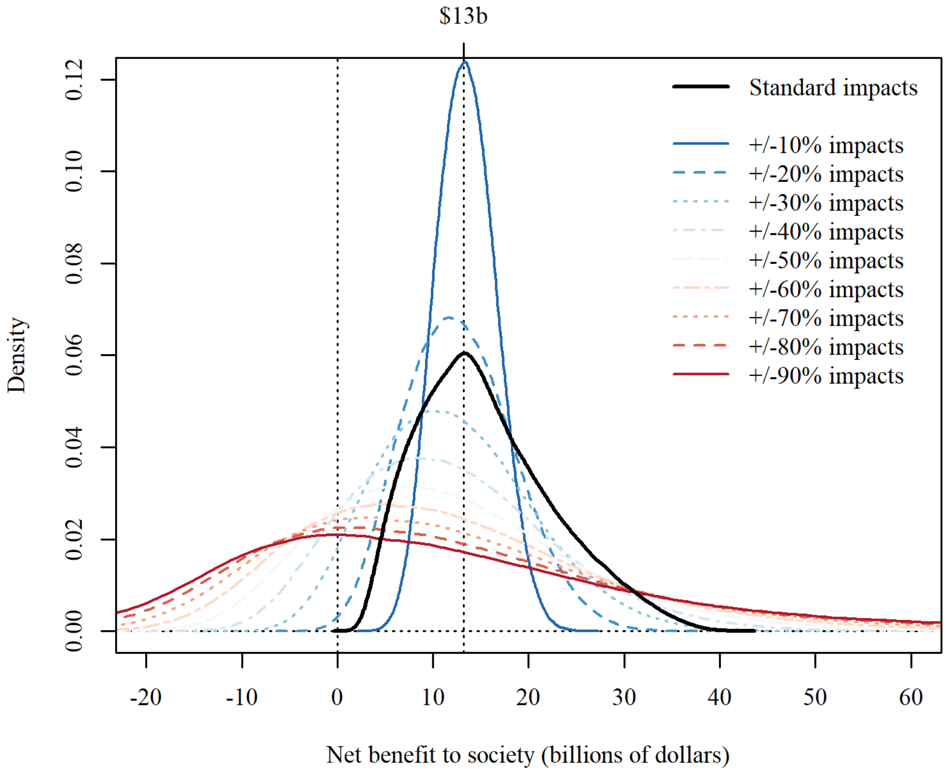
Table 6. Percentage of net social benefits that fall below zero within 1 million iterations, by level of uncertainty

Level of uncertainty	Percentage of net social benefits that fall below zero
+/- 10%	0%
+/- 20%	0.3%
+/- 30%	5%
+/- 40%	12.4%
+/- 50%	19.1%
+/- 60%	24.4%

[15] The reader will note that as uncertainty increases to 30% and beyond, the modal value shifts increasingly to the left. This asymmetry arises because the extreme values of the social discount rate—10% and .03%--are asymmetrical.

+/- 70%	28.6%
+/- 80%	32.0%
+/- 90%	34.7%

Figure 3. Distribution of Monte-Carlo Estimates by Level of Uncertainty



Discussion

Our assessment of the social benefits and costs of paid leave programs demonstrates that, given the current empirical evidence, net social benefits under the vast majority of assumptions are strongly positive. Our estimates are driven by improvements to health for parents and their children — outcomes that have been rigorously assessed in the paid leave literature (A. Bartel et al., 2023b). We standardize our estimates to represent benefits and costs for every $1,000 investment in paid parental leave and demonstrate through our microsimulation of two national policy scenarios how these standardized estimates can be used to analyze paid leave policies. Based on the direct evidence from a tightly focused literature, we observe benefits between

$7,275 (conservative estimate) and $29,406 (mean estimate) for every $1,000 invested in paid parental leave.

While there are a few benefit-cost analyses of similar programs — such as the unpaid but job-secure FMLA (Eisenach, 2007), temporary disability insurance (Jacoby, 2013b), and the potential costs of a range of national proposals (Hartmann & Hayes, 2021) — ours is the first to estimate a comprehensive list of benefits and costs of paid parental leave and to extend these to proposals at the national level.

Our study encounters several important limitations. First, few studies that met our inclusion criteria examine the impacts of paid parental leave on outcomes other than health. There is limited evidence on the effects of leave policies on earnings in the long term. The only study of the earnings effects of introducing a paid leave policy on infants (Carneiro et al., 2015) that met our inclusion criteria is based in Norway — which has a more robust social policy environment and less inequality than the United States. Similarly, only two studies analyze the long-term earning effects on mothers, one based in Norway (Bütikofer et al., 2021) and the other considering the California paid family leave policy implemented in 2004 (M. Bailey et al., 2024) . Additionally, little is known about the interaction between publicly provided paid leave benefits and private plans for paid family and medical leave offered through employers (Boyens et al., 2021). These limitations introduce greater uncertainty into our estimates.

In addition, there are numerous potential social benefits identified in Table 1 on which no empirical research exists. Even with respect to health, there are no studies on the effects of paid leave on parent mortality or infant health in adulthood and mortality later in life. In view of paid leave's documented improvements in parental health and infant health in childhood, improvements in parent mortality and infant health in adulthood are highly likely, suggesting that we have underestimated some social benefits. Similarly, there are no studies of the impact of paid leave on crime that met our study criteria, and effects on crime have factored heavily into long-run benefit-cost analyses of other childhood interventions including a child allowance (Garfinkel et al., 2022) and early childhood education (Heckman et al., 2010).

Relatedly, research on the impact of paid leave on fathers' eligibility and outcomes as well as the use of paid leave for reasons other than parental leave would improve these estimates. While one study indicates fathers also benefit from paid parental leave (A. P. Bartel et al., 2018), the study does not distinguish between the effects of paid parental leave on father outcomes and the effects of paternal leave on mothers, fathers, and children. Similarly, there is also limited literature on paid leave beyond parental leave, which inhibits assessment of the full benefits of a policy that can be used to care for seriously ill family members beyond the infant bonding period. That said, while Gimm & Yang (2016) found no effects of California PFL on the physical or mental health of caregivers of adults, Arora & Wolf (2018) found that the California PFL program reduced nursing home utilization by 0.5-0.7 percentage points, producing taxpayer savings large enough for the policy to pay for itself (Arora & Wolf, 2018).

Despite these limitations, the existing literature indicates that paid parental leave improves the health of mothers and increases the health, education, and future earnings of the newborn children while decreasing the earnings of mothers in the short and long term. Putting all these estimates together in a benefit cost analysis indicates that net social benefits are highly likely to be positive and large. Using only the most conservative direct evidence from the paid leave literature still results in net social benefits per $1,000 in paid leave of about $7,000. Using mean rather than minimum impacts from the literature results in net social benefits per $1000 of paid leave of about $29,000. Sensitivity analyses indicate that these results are highly robust to even the most conservative set of additional assumptions.

We find that implementing a program based on the 4-week BBB plan would cost somewhat less than $2 billion and generate between $13 billion and $55 billion dollars in net social benefits to American families. A more generous policy than BBB – such as the FAMILY Act –would cost nearly $7 billion and generate even larger net social benefits—either about $50 billion or about $200 billion. Our analyses demonstrate that that the absence of a paid parental leave policy in the US likely comes at significant cost to the economy.

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Appendix A. Non-monetary Benefits and Costs of Paid Leave

Non-monetizable benefits may also be important. Table A1 illustrates some conceptual non-monetary effects of a paid leave expansion. Reduction in poverty, presented in row An, is one of such benefits. By ensuring workers receive a portion of their wages while taking leave, paid leave reduces the risk of workers and their families falling into poverty. Poverty reduction also benefits taxpayers (ex, requiring lower rates of transfers). Co-occurring with poverty reduction is an increase in equality of opportunity (row Bn) and a reduction in inequality (row Cn), two values that cannot be monetized but are valued by beneficiaries and taxpayers (Page and Jacobs, 2009) and the society.

Table A1. Conceptual table of non-monetary benefits (+) and costs (-) of paid leave

	Direct beneficiaries	+	Indirect taxpayers	=	Total society
An. Reduction in poverty	+		+		+
Bn. Increase in equality of opportunity	+		+		+
Cn. Reduction in inequality	+		+		+
Dn. Increase in prosocial outcomes	+		+		+
En. Increase in freedom (avoided incarceration)	+		0		+
Fn. Fertility and childbearing	?		?		?
Gn. Work	?		?		?
Hn. Gender equality	?		?		?

Infants enjoy better development outcomes due to their parents taking paid leave. Such improvement in development leads to more prosocial outcomes (row Dn), making them better members of society. Improved developmental outcomes also mean a lower probability of committing crimes and being incarcerated, increasing freedom (row En).

Family-friendly policies like paid leave are sometimes implemented for their potential impacts on fertility and childbearing (row Fn). However, it is unclear how society values fertility. Additionally, there is mixed evidence on the impact of paid leave on fertility (Thomas et al., 2022). Thus, how beneficiaries, taxpayers, and society value the fertility effect remains a question.

Work (row Gn) is another value that beneficiaries and taxpayers use to support or oppose a policy. On one hand, taxpayers may oppose paid leave simply because it reduces work for beneficiaries. On the other hand, taxpayers may support paid leave if beneficiaries are more likely to return to work or become employed after taking paid leave. As discussed in the main text, the literature presents mixed evidence on the impact of paid leave on mothers' labor market outcomes. Thus, we have question marks in the row.

Finally, paid leave is often framed as a policy affecting gender equality (row Hn) by encouraging fathers to share caregiving responsibilities and allowing mothers to return to the labor market. Evidence shows that the availability of paid leave programs increases fathers' leave-taking and joint-leave-taking (Bartel et al., 2018). However, literature on mothers' labor market outcomes after taking paid leave presents mixed effects. It is thus ambiguous whether paid leave would increase or decrease gender equality.

Appendix B. Impacts of Paid Leave on Employers

Paid leave also incurs benefits and costs to employers. In terms of benefits, if paid leave encourages parents to return to work after birth, employers enjoy lower turnover and savings from recruiting new employees. Concerning the costs of paid leave, current paid family leave policies that are based on a social insurance framework relieve costs to employers who provide paid family leave to workers voluntarily, as workers begin to contribute via payroll taxes to create a fund. In New York, employees contribute 0.455 percent of their wages per period. Leave-offering employers would incur cost-savings equal to where the paid leave policy is equally or more generous than their current policy. Employers who did not previously provide leave do not incur additional direct costs.

Employers have expressed concern that paid family leave policies will increase their difficulty managing absences (US Chamber of Commerce, 2020). However, these concerns among small employers are not supported by the research. A number of studies have attempted to shed light on the impact of paid leave on employers. In their study of 250 California firms, Appelbaum and Milkman found that 90 percent of firms reported that the PFL policy had either positive or neutral effects on employee productivity, morale, and costs (Appelbaum & Milkman, 2011; Milkman & Appelbaum, 2013). A similar, though smaller study of 18 firms in New Jersey also found no adverse impacts on profitability or employee productivity (Lerner & Appelbaum, 2014). More recently, a survey comparing firms in San Francisco – who implemented an ordinance requiring employers to provide fully paid leave to workers – also found that firms reported minimal negative impacts and high levels of support for the policy. A study of small firms in NY and NJ found that employers' support for paid leave increased significantly during the COVID-19 pandemic, particularly among firms with employees who used leave (A. P. Bartel et al., 2021). The overall conclusion from these studies is that paid leave has a null or positive impact on business operations, productivity, or profitability and that paid leave policies are largely supported by employers where implemented. However, most of these studies (exception: A.P. Bartel et al., 2021) are limited by a lack of baseline data prior to policy implementation, lacked control groups, and did not use a representative sample of firms.

Few studies assess impacts on employers using causal designs. Bartel et al. (2023) studied the impact of implementing the NY PFLA on small firms with fewer than 100 employees. They found that employers reported greater ease in handling absences –particularly absences longer than four weeks – when the paid leave policy was in place. Additionally, no impacts were observed on employer ratings of worker performance (A. Bartel et al., 2023a). Bennet et al. (2020) use establishment-level data and find that state-level paid leave mandates benefit firms on average, resulting in reduced employee turnover, increased productivity, and higher proportions of women in executive roles (Bennett et al., 2020).

Studies from Europe relying on administrative data have resulted in mixed findings and may be less applicable to the US context. Using Danish administrative data, Brenøe et al. found little evidence that parental leave use hurt firm output, profitability, survival, or coworkers (Brenøe et al., 2020). Conversely, a study of expanding the policy by 22 weeks found adverse effects on firm survival and the retention of mothers (Gallen, 2019). A study of the 1989 parental leave expansion in Sweden found that firms incurred additional wage costs due to hiring additional workers and increasing hours worked by other employees (Ginja et al., 2023). Finally, Huebener et al. found that the 2007 German parental leave expansion led firms to hire fewer women of childbearing age into occupations where they were difficult to replace internally (Huebener et al., 2022). However, these expansions extend leave periods that are already longer than those under consideration in the United States, and thus, these findings should be applied with caution.

Appendix C. Microsimulation of Introducing Paid Leave in the U.S.

We conduct microsimulations of two national proposals for a paid parental leave program: a 4-week program proposed under the Build Back Better Act and a 12-week program proposed under the FAMILY Act. For each of these proposals, we provide two sets of estimates: 1) assuming 100 percent of all eligible leave takers participate in the program and use the maximum length of leave allowed, and 2) assuming only a certain proportion of the eligible population were to participate and use a less-than-maximum length of leave allowed. We perform these microsimulations using the 2019 American Community Survey (ACS) as it reflects pre-pandemic data.

Using ACS data, we estimate 3,501,917 newborns born in 2019. This is an underestimate of compared to natality data produced by the U.S. National Vitality Statistics System (Martin et al., 2021), which estimates 3,747,540 newborns in 2019. There are a few potential explanations for this discrepancy; notably, U.S. natality data reflects the number of live births, which may not be the case for ACS data. Below, we detail the steps taken to conduct the microsimulation of each paid parental leave policy of interest.

4-weeks Build Back Better Plan (BBB Plan)

Microsimulation of the Build Back Better Plan.—

This program provides up to 4 weeks of paid leave, which can be used by mothers bonding with a newborn child. Table C1 shares our estimates for this program. The first column presents estimates assuming 100 percent of eligible mothers participate and take the maximum allowable length of leave. The second column presents estimates assuming less-than-maximum participation rate and length of leave taken.

Table C1. Microsimulation Results, 4-week Build Back Better Plan

	4-weeks Build Back Better Plan	
	< 100% take-up and length	100% take-up and length
Total paid leave cost	$1,707,336,651	$2,897,643,822
Number of mothers taking leave	903,281	1,466,879
Average weekly earnings	$1,294	$1,108
Average weekly benefit amount	$572	$527
Total lost earnings	$2,403,737,903	$3,282,427,830

In order to estimate the costs of implementing this 4-week BBB program nationally, we first account for states with existing paid leave programs. Eight states had active paid leave programs at the time of writing: Connecticut, Massachusetts, Rhode Island, New Jersey, New York, California, D.C., and Washington. Notably, the current programs of these states are all more generous than the proposed 4-week BBB program, offering longer lengths of leave and wage replacement rates. We thus assume that these states will not participate in the administration of the BBB program, meaning that the total paid leave cost would not change in these states following the implementation of the BBB plan. Changes in total paid leave cost following the implementation of the BBB plan result from mothers of newborns in the remaining 42 states without currently active paid leave programs.

To be eligible for paid leave under the BBB plan, mothers must have earned income of any amount in the form of wages, self-employment income, or unemployment benefits and have at least $2,000 in earned income over an unspecified 2-year period prior to leave-taking (Boyens et al., 2022). We exclude self-employed workers from our analysis and cannot identify unemployment benefits in the ACS data. Thus, we use income from wages as earned income, designate the 2-year period to include the year of leave-taking (or 2019 in the data) and the year prior, and assume this $2,000 earnings requirement is evenly split across these years such that eligible mothers must have a minimum of $1,000 in earned income in 2019. We estimate that 1,466,879 mothers are eligible for leave-taking under this eligibility criteria.

The benefit amount that leave-takers receive is a function of their earned income. The BBB plan replaces 85 percent of average weekly earnings below $290, 69 percent between $290-$659, and 50 percent of average weekly earnings between $659-$1192. The maximum weekly benefit amount is $768. As our data is in 2019, we adjust these cutoffs to their 2019 value to calculate mothers' average weekly benefit amount and then readjust benefit amounts to 2022 dollars for present-day comparison. Under these parameters, we estimate that the average weekly paid leave benefit is $527, though this amount will vary dramatically across mothers with different earnings. We divide mothers into four earnings groups: those with earnings below $40,000, with earnings between $40,000-$60,000, between $60,000-$80,000, and earnings above $80,000. We estimate that the average weekly benefit amount within each earnings bin is $376, $666, $767, and $768, respectively.

In simulating a scenario with a 100-percent take-up rate, we assume all mothers who are eligible for the program will participate and take the maximum length of leave (4 weeks). We estimate the program's total cost by wage bin by multiplying the number of eligible mothers, weekly benefit amount, and leave length within each wage bin. Our total cost estimate is approximately $3.1 billion if all eligible mothers were to participate. Some employers are currently offering their own paid leave programs. Following the same logic of not counting existing costs paid by states with active paid leave programs, we do not want to count this employer cost and need to subtract it from our total cost estimate. However, we are not able to calculate this employer cost through the microsimulation. As discussed in the following section, the Congressional Budget Office's (2021) estimate on the BBB program suggests that when program take-up is 100 percent, employer costs are 6.35 percent of federal costs. We thus subtract 6.35 percent from the $3.1 billion, arriving at a final cost estimate of $3 billion.

An important consideration is that mothers will lose wages while participating in the program, as only a portion of earnings are replaced. Thus, we also estimate the amount of lost earnings for each earnings group. The calculation of in-program decreases in earnings needs to consider that even without a paid leave program, mothers may still take leave. Thus, we must first estimate the increase in the duration of leave taken following the introduction of a paid leave program to estimate the earnings lost as a result of this program. As mentioned in the main text, we use Rossin-Slater (2013), who studied the changes in leave-taking behavior in California following the introduction of the state-paid leave program. After standardizing Rossin-Slater's estimates, we find that following the introduction of a paid leave program, parents would take an additional 0.805 weeks of leave per $1,000 of paid leave benefits. We estimate the total lost earnings per earnings group by multiplying the average weekly earnings within the earnings group by the total program cost (divided by $1,000) and 0.805. Adding together all the lost earnings of all the earnings groups, we estimate total lost earnings of $3.3 billion.

When not assuming that all mothers will participate in the program, we utilize estimates from New York State on the take-up rate and average length of leave per earnings group. Out of all states with active paid leave programs, New York State publishes the most comprehensive data on program usage, allowing for incorporating variations in leave-taking behavior across the income distribution (New York State Department of Financial Services, 2023). We calculate the take-up rate by dividing the number of mothers utilizing paid leave to bond with a newborn child (approximated by the number of newborn bonding claims made by mothers as reported by New York), divided by the number of eligible mothers (estimated through the ACS). Notably, we find a much lower take-up rate for mothers in the lowest earnings groups than those with higher earnings. The take-up rates for mothers with earnings below $40,000 are estimated at 48percent, 72 percent for those with earnings between $40,000-$60,000, 90 percent when earnings are $60,000-$80,000, and 80 percent for earnings above $80,000. We estimate a weighted average total take-up rate of 62 percent.

We calculate the average length of leave using the latest data from New York State, which estimates that mothers take an average of 10.2 out of 12 weeks of leave, or 85 percent of the maximum. For the 4-week BBB Plan, this is the equivalent of 3.4 weeks of leave. We assume that the length of leave taken varies for mothers with different earnings and is proportional to their program take-up rate. For example, we estimate the take-up rate for mothers with earnings below $40,000 to be 3.4*(.48/.62). Using this method, we estimate that the average length of leave to be 2.7 weeks for those with earnings <$40,000, and around four weeks for mothers in the remaining earnings groups.

For each earnings bin, we randomly select a proportional number of eligible mothers to participate in the paid leave program based on their take-up rate and simulate their leave-taking behavior. We identify that approximately 900,000 mothers will participate in the program (note that this still does not include mothers in the eight listed states with active paid family leave programs, as their state programs are still more generous than the national proposal). We simulate their average weekly earnings ($1,294) and average weekly benefit amount ($572). We use these components to calculate the total cost of the program (by multiplying the number of weeks of leave by the average weekly benefit amount and the number of participating numbers and lost earnings. When only 62 percent of eligible mothers participate in the program, we estimate the total cost to be nearly $1.7 billion. Finally, we estimate $2.4 billion in lost earnings while mothers participate in the program, calculated using the abovementioned method.

CBO's microsimulation of the Build Back Better Plan

Above, we have discussed our microsimulation of the Build Back Better plan's leave program. The Congressional Budget Office (CBO) estimated the cost of the federal paid family and medical leave program under the Build Back Better Act (Congressional Budget Office, 2021). They assumed that the first year of program implementation would be 2024, with $4.3 billion of paid leave benefits paid by the federal government. The annual benefits paid would increase at a decreasing rate, reaching $23 billion in 2031. In a previous cost estimate of the federal paid leave program under the FAMILY Act (Congressional Budget Office, 2020), the CBO claimed that it aimed to produce the cost for all eligible leave-takers and indicated that the take-up rate of a program might increase over time. CBO did not explain in detail how they estimated the costs of paid leave under Build Back Better. We assume that CBO adopted the same practice in its work on the FAMILY Act and that the $23 billion estimate for the year 2031 is the cost when the take-up rate has reached 100 percent.

The estimated $23 billion benefits the federal government would pay included all types of leave covered by the program (leave taken for a person's sickness, bonding with a child, caring for a sick family member, etc.). To estimate benefits paid for parental leave, we use CBO's work on the FAMILY Act, where CBO estimated that around 30 percent of benefits paid would be for people to bond with a new child (Congressional Budget Office). We assume this ratio applies to the BBB plan. Multiplying $23 billion by 30 percent, we obtain $7 billion in benefits paid for parental leave. CBO assumed that both mothers and fathers would take parental leave. We use paid leave data from New York State to estimate benefits paid to mothers. In 2022, mothers made 69,445 claims, with the average claim amount being $7740. Fathers made 46,599 claims, with an average claim amount of $6,127. This suggests that mothers claimed 65 percent of parental leave benefits. We assume this ratio applies to the BBB plan. Multiplying $7 billion by 65 percent, we obtain $4.6 billion in benefits paid to mothers to bond with a new child.

CBO also estimates that the BBB plan would provide funding for states and employers if they continue providing their paid leave programs. Funding for states would reach $9.8 billion by 2031, and funding for employers would reach $1.5 billion by 2031. Using the same assumptions we have adopted for the benefits paid by the federal government, we assume that these findings are results of a 100-percent take-up rate, that 30 percent of these fundings would be paid to people to bond with a new child, and that 65 percent these fundings would be paid to mothers, leading to around $1.9 billion fundings for states and $0.3 billion funding for employers. We regard the $1.9 billion and $0.3 billion as rough estimates of the costs that states and employers currently pay for their own paid leave programs.[16] To estimate the increase in costs following the implementation of the BBB plan, we subtract these current costs of states and employers from

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[16] If employer costs are $1.5 billion and federal costs are $23.5 billion, this suggests that employer costs are around 6.35% of federal costs. We use this 6.35% to adjust our own microsimulation estimate on the federal costs of paid leave when take-up is 100%. We use CBO's estimate in 2025 to calculate the relationship between employer costs and federal costs when take-up is less than 100%. We choose 2025 because by 2025 the program has been in full implementation for one year. Employer costs are $0.766 billion and federal costs are 9.035 billion, suggesting that employer costs are 8.48% of federal costs. We use this 8.48% to adjust our own microsimulation estimate on the federal costs of paid leave when take-up is less than 100%.

the total costs incurred by the federal government under the BBB plan. We calculate that parental leave benefits for mothers under the BBB plan would be $2.4 billion (4.6-1.9-0.3).

The working paper of CBO suggests that when estimating future budget, CBO also projects inflation (CBO, 2024). CBO's estimates for the Build Back Better plan are for year 2031, so are likely denoted in 2031 dollars. In the working paper that documents CBO's methodology of projecting inflation, CBO estimates that the growth rate of CPI-U will be 2.5% in 2024 (CBO, 2024) and remain around 2.5% until the year 2034. In year 2022, r-CPI-U is 431.5 (Bureau of Labor Statistics, 2023). Applying an annual growth rate of 2.5%, we estimate that in year 2031, CPI-U will be around 547.4. We use this projected CPI-U to roughly adjust the CBO estimate from 2031 back to 2022 dollars. $2,393 million in 2031 is worth $1,886 million (2393 * 431.5/547.4) in 2022 dollars.

CBO does not include mothers' in-program earnings loss under their BBB plan estimates. Our estimates of the BBB plan suggest that lost earnings are around 1.13 times the cost. Thus, we multiply $1.89 billion by 1.13 to obtain the loss of mothers' in-program earnings.

12-week FAMILY Act

Microsimulation of the FAMILY Act.—

The FAMILY Act proposal would provide up to 12 weeks of paid leave, which mothers can use to bond with a newborn child. Table C2 provides results for our estimates of this program's costs under two scenarios, one which assumes a 100-percent participation rate and length of leave and one where a simulated proportion of mothers participate, based on the take-up rates derived from New York State data and explained above.

Table C2. Microsimulation Results, FAMILY Act

	FAMILY Act

	< 100% take-up and length	100% take-up and length
Total paid leave cost	$5,446,188,235	$9,340,386,263
Number of mothers taking leave	937,565	1,559,291
Average weekly earnings	$1,271	$1,089
Average weekly benefit amount	$607	$544
Total lost earnings	$8,675,976,544	$12,513,991,449

As noted with the Build Back Better program, in estimating the costs of a national paid leave program, we must account for the existence of paid leave programs in other states. We identify eight states with currently existing paid leave programs: Connecticut, Massachusetts, Rhode Island, New Jersey, New York, California, D.C., and Washington.[17] In some cases, the proposed FAMILY Act is more generous than states' current programs. Thus, we expect some mothers in these states to participate in the national program. We derive cost estimates for these states by simulating their current program and the national program. Where the national program is more generous (i.e., the cost is greater), we take the difference between the two program estimates. We provide more details for this calculation below, but first focus on the estimates for states without currently active paid leave programs.

To be eligible for the FAMILY Act, one must have met the criteria to be insured for Social Security Disability Insurance and must have earned income in the past 12 months. The ACS data does not allow us to identify the use of Social Security Disability Insurance. We thus

[17] Certain states have enacted PFL laws but they are not effective yet: Colorado, Delaware, Maryland, Minnesota, and Oregon. Since their programs are so recent that we do not have any data on them, we consider them states without active paid leave programs.

identify eligible mothers as those with positive earnings from wages and estimate approximately 1.5 million eligible mothers in states without active paid family leave programs.

The benefit amount that leave-takers receive is a function of their earned income. The FAMILY Act program replaces 66 percent of average weekly earnings, with a minimum benefit amount of $580 a month and a maximum monthly benefit amount of $4,000. As we calculate *weekly* benefits, we assume this minimum and maximum are $145 and $1,000, respectively. We adjust these thresholds to their 2019 value to calculate mothers' average weekly benefit amount and then readjust the calculated benefit amounts to 2022 dollars. Under these parameters, we estimate that the average weekly paid leave benefit among all eligible mothers in states without active paid leave programs is $540. However, it is important to consider that this benefit amount may vary dramatically across mothers with different earnings. We estimate the weekly benefit amount (among all eligible mothers) to be $332 for mothers with earnings below $40,000, $670 for those with earnings between $40,000-$60,000, $891 when earnings are $60,000-$80,000, and $1,000 for earnings above $80,000.

When assuming a 100-percent participation rate, we assume all eligible mothers will participate in the program at the maximum leave length (12 weeks). We estimate the total cost of the program by wage bin by multiplying the number of eligible mothers, weekly benefit amount, and leave length within each wage bin. Our total cost estimate is approximately $9.3 billion if all eligible mothers were to participate.

As explained under the Build Back Better program estimates, we also consider mothers' lost earnings while participating in the paid leave program, as their entire earnings are not being replaced. We assume that in the absence of a paid leave program, mothers would still take unpaid leave; thus, we must first estimate the increase in the duration of leave following the introduction of a paid leave program to estimate the earnings lost due to this program. We utilize standardized estimates derived from Rossin-Slater (2013) and estimate that parents would take an additional 0.805 weeks of leave per $1,000 of paid leave benefits. We estimate the total lost earnings per earnings group by multiplying the average weekly earnings for each earnings group by the total program cost for each earnings group (divided by $1,000) and .92. Adding together the lost earnings across earnings groups, we estimate total lost earnings of $12.5 billion.

When assuming a 100-percent take-up rate, our total cost estimates must also account for states that already have existing programs. We use the most recent program information available for states to calculate their current program costs, assuming all eligible mothers participate. The program information for states with active paid leave programs is listed in Table C3 below.

Table C3. Paid Family Leave Program Parameters for States with Existing Paid Leave Programs
(2022, or most recent available data)

State	Eligibility criteria	Max. leave length	Wage replacement rate	Max. weekly benefit	Average duration of leave
Rhode Island	Employed for past 12 months (52 weeks worked) and work at least 30 hrs/wk	5	60% of one's weekly wage, not to exceed max benefit	$1,007	3.79*
California	Employed/looking for work, at least $300 in base earnings	8	$50 minimum weekly benefit if highest quarterly earnings (HQE) <$929. 70% of HQE if HQE between $929-6, 7154. 60% of HQE if HQE >$7154.	$1,540	6.064*
Connecticut	Currently employed & minimum earnings of $2325 in reference year	12	95% of wage up to 40x CT minimum wage ($520) + 60% of wage >40x CT min wage	$840	9.096*
District of Columbia	Must be covered by your employer, and employed	8	90% of AWW up to 1.5x DC minimum wage ($15×1.5×40=$900) + 50% of AWW above $900	$1,000	6.064*
Massachusetts	Must have made at least 6000 in last 4 quarters, and 30x the weekly benefit amount they would be eligible for	12	80% of wage up to half SAWW (1487.78/2=743.89) + 50% of wages >743.89	$1,084	9.096*
New Jersey	Employed and minimum earnings of $12000	12	85% of wages	$993	9.4
New York	26 consecutive weeks of work for full-time employees;	12	67% of wages	$1,068	9.1

	175 days of work for part-time employees.				
Washington	16 hours a week of work in base period	12	90% of wages	$1,327	8.1

Notes: Some states do not provide as specific information on leave-taking behavior for mothers bonding with a newborn as is produced in New York State. Specifically, they may not provide the average length of leave taken. In these scenarios, we impute the average length of leave using a NYS estimate that mothers take an average of 85% percent of the maximum leave.
[*] Source: Bartel et al 2023.

When considering a scenario of 100 percent participation, we identify six states where the 12-week national program costs more than their current state program: Connecticut, Massachusetts, Rhode Island, New Jersey, D.C., and New York. The paid leave programs in California and Washington are more generous than the proposed national program, suggesting that mothers would still participate in the state's local program when given the option. We exclude these two states from our analysis. For the remaining six states, we take the cost difference between their current programs and the national program to produce the estimates in Table C4. The weighted sum of the cost estimates among all participating states leads us to the results shared in Table C2.

We estimate that approximately 49,000 mothers from states with paid leave programs will participate in the national program at a total cost of $.17 billion. The average weekly benefit amount among these mothers under the national program is $650. This is greater than the average weekly benefit amount among mothers in states without programs, explained by the greater average weekly earnings of mothers in states with existing programs compared to those without ($1529 vs $1075).

We use data on mothers' average weekly earnings to estimate lost earnings. Our estimates for lost earnings for mothers in states with active paid leave programs differ from those in states without programs. Since these states already have programs in place, we are not modeling mothers' behavior following the enactment of a paid leave program but the difference in lost earnings from one program to another. We estimate lost wages under states' current programs and the national program as the number of eligible mothers multiplied by the leave length and their average weekly earnings. When we assume a 100-percent participation rate, we estimate $1.4 billion in lost earnings due to participating in the national program.

Table C4. Microsimulation results, FAMILY Act, 100-percent participation rate

	FAMILY Act	
	States with existing programs	States without programs
Total paid leave cost	$170,567,300	$9,169,818,963
Number of mothers taking leave	48,517	1,510,774
Average weekly earnings	$1,529	$1,075
Average weekly benefit amount	$650	$540
Total lost earnings	$1,413,357,139	$11,100,634,310

We now turn to our estimates when not assuming a 100-percent participation rate. As with the Build Back Better estimates, we utilize estimates from New York State on the take-up rate and average length of leave per earnings group. We calculate the take-up rate by dividing the number of mothers utilizing paid leave to bond with a newborn child in New York State, divided by the number of eligible mothers. Notably, we find a much lower take-up rate for mothers in the lowest earnings groups than those with higher earnings. The take-up rates for mothers with earnings below $40,000 are estimated at 48 percent, 72 percent for those between $40,000-$60,000, 90 percent when earnings are $60,000-$80,000, and 80 percent for earnings above $80,000.

We calculate the average length of leave using the latest data from New York State, which estimates that mothers take an average of 10.2 out of 12 weeks of leave, or 85 percent of the maximum. For the FAMILY Act program, this is also equivalent to 10.2 weeks of leave. We assume that the length of leave taken varies for mothers with different earnings and is proportional to their program take-up rate. For example, we estimate the take-up rate for mothers with earnings below $40,000 to be 10.2*(.48/.62). Using this method, we estimate that the average length of leave to be approximately seven weeks for those with earnings <$40,000, 11 weeks for those with earnings between $40,000-$60,000, and 12 weeks for mothers with earnings above $60,000. In our estimates for states with current paid leave programs, we also use this method to estimate the average length of leave for each earnings group under the *current* state program. When available, we use official state data on the average length of leave and derive the average length of leave by earnings group using the take-up rates described above.

For each earnings bin, we randomly select a proportional number of eligible mothers to participate in the paid leave program based on their take-up rate, and simulate their leave-taking behavior. In states without current paid leave programs, we identify that approximately 923,000 mothers will participate in the program. We simulate their average weekly earnings ($1263), average weekly benefit amount ($605), and the share of mothers in families with incomes below $57,000, between $57,000-$110,000, and above $110,000. We use these components to calculate the program's total cost (by multiplying the number of weeks of leave by the average weekly benefit amount and the number of participating numbers), the amount of benefits received by the three family income groups, and lost earnings. When approximately 61 percent of eligible mothers in states without currently active paid leave programs participate in the program, we estimate the total cost to be nearly $5.4 billion. Finally, we estimate $8.2 billion in lost earnings while mothers are participating in the program, calculated using standardized estimates from the literature on the changes in leave-taking behavior following the implementation of a paid leave program. These results are shared in Table C5.

We also consider program participation from the eight states with existing paid leave programs. For both the current programs and the national proposals, we select a proportion of eligible mothers to participate based on the take-up rates established above. We then estimate the total costs and compare to see which program is more generous in each state. We find that five states will participate in the national program based on our cost estimates: Connecticut, Massachusetts, Rhode Island, D.C., and New Jersey. When simulating current state programs and the FAMILY Act at a lower participation rate, we find that the current paid leave programs in New York, California, and Washington are more generous and cost more than the national program, suggesting that when given the choice, mothers will participate in their corresponding state program. We exclude mothers in these three states from our estimates.

We estimate that approximately 15,000 mothers from states with paid leave programs will participate in the national program at an average weekly benefit amount of $730. This translates to approximately $.08 billion in total costs. We use data on mothers' average weekly earnings to calculate lost earnings by earnings group, estimated as the number of eligible mothers multiplied by the average length of leave and their average weekly earnings. We estimate $.48 billion in lost earnings due to participating in the national program.

Table C5 shares our cost estimates for states with (and without) existing paid leave programs when we do not assume a 100-percent participation rate. The weighted sum of the cost estimates among all participating states leads us to the results shared in Table C2.

Table C5. Microsimulation results, FAMILY Act, simulated parameters

	FAMILY Act (cost difference for states with existing programs)	
	States with existing programs	States without programs
Total paid leave cost	$76,333,180	$5,369,855,054
Number of mothers taking leave	14,601	922,964
Average weekly earnings	$1,765	$1,263
Average weekly benefit amount	$730	$605
Total lost earnings	$475,595,050	$8,200,381,494

CBO's microsimulation of the FAMILY Act

CBO has estimates on the cost of the paid leave program under the FAMILY Act. It estimates that program benefits will reach $84.3 billion by 2030. We assume that 2030 is the year when take-up would reach 100 percent. Using the same assumptions we have adopted for CBO's estimate of the BBB plan, we multiply $84.3 by 30 percent and then by 65 percent to roughly estimate costs paid to mothers to bond with their newborns. We then further subtract costs that states and employers currently pay to run their paid leave programs. Our calculation using CBO's estimate on the BBB plan suggests that states' costs are 42 percent of the federal costs, and employer costs are 6 percent of the federal costs when take-up is 100 percent. Having subtracted these costs, we arrive at $8.6 billion. CBO's estimate for the Family Act is for year 2030 and given CBO's method, the estimate is likely denoted in 2030 dollars. In the working paper that documents CBO's methodology of projecting inflation, CBO estimates that the growth rate of CPI-U will be 2.5% in 2024 (CBO, 2024) and remain around 2.5% until the year 2034. In year 2022, r-CPI-U is 431.5 (Bureau of Labor Statistics, 2023). Applying an annual growth rate of 2.5%, we estimate that in year 2030, CPI-U will be around 534.1. We use this projected CPI-U to roughly adjust the CBO estimate from 2031 back to 2022 dollars. $8,596 million in 2030 is worth $6,945 million (8596 * 431.5/534.1) in 2022 dollars. CBO does not estimate the lost in-program earnings of mothers. In our microsimulation, the loss of in-program earnings is 1.34 times the costs. We thus multiply $6.9 billion by 1.34 to estimate the loss of in-program earnings.