The Benefits and Costs of Expanding Paid Parental Leave in New York State

Appendix 1A. Literature and Standardization Procedures Used to Calculate Direct Estimates

In this appendix to our policy brief, we describe the study and standardization procedure used to generate direct estimates on the benefits and costs of paid leave.

Increased future earnings of infants

We identify one Norwegian study that estimates the impact of paid leave on infants' future earnings-Carneiro et al. (2015).

Authors found that exposure to 4 months of paid maternity leave in Norway at birth increased earnings at age 30 by 0.050 (s.e. 0.016) or 5 percent. In terms of educational outcomes, it increased college attendance rate by 0.020 (s.e. 0.011) or 2 percentage points, increased years of schooling by 0.116 (s.e. 0.053) or 0.116 years, increased IQ of male by 0.084 (s.e. 0.054) points, and decreased high school dropout rate by 0.019 (s.e. 0.007) or 1.9 percentage points. In terms of health outcomes, it reduced teenage pregnancy by 0.001 (s.e. 0.007) or 0.1 percentage points and increased birth weight (of the child exposed to the reform) by 0.429 (s.e. 12.8) grams. Authors used administrative data from Norway. To study the impact of time that mothers spend with children early in life, authors exploited an exogenous change in maternity leave entitlement generated by the 1977 Norwegian reform. The reform introduced 4 months of paid leave and extended unpaid leave from 12 weeks to 12 months. The main analysis sample was restricted to mothers that were likely eligible for paid leave based on their pre-birth income, and their children. Authors combined regression discontinuity design with difference-in-differences design, comparing outcomes of children born 90 days before and after the reform was introduced (July 1st) within the year of the reform (1977), and years without the reform (1975, 1978, and 1979). To test the validity and strength of the RD-DD design, authors 1) examined the number of birth and mother characteristics around the cutoff date, including mother's education, mother's age at childbirth, mother's income pre-reform, parent's urban location, and distance to grandparents, 2) conducted analyses using alternative bandwidth, 3) conducted analyses without children born close to the cutoff date, 4) conducted a simple RD regression, 5) conducted analyses using alternative control groups, including children born to ineligible mothers, 6) conducted a DDD regression with additional difference between eligible and ineligible children, 7) conducted placebo tests assuming the reform occurred in years other than 1977. Results on earnings at age 30 and high school dropout rates were most robust. Authors also found that the beneficial effect on education was stronger for children from disadvantaged backgrounds. Authors found that the amount of unpaid leave taken stay the same before and after the reform, suggesting that the results discovered above could be fully attributed to increase in paid leave.

Authors did not provide statistics on the monetary benefits that mothers receive during paid leave, so we come up with our own estimates. According to the authors, benefits equaled 18 weeks of pre-birth wage incomes and that mothers eligible for paid leave had an average income of 94,088 NOK pre-1977-reform. 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. Having adjusted for inflation and exchange rate, we arrive at a benefit of $6,587 in 2022 dollars. If we attribute the 5 percent increase in age-30 earnings to the $6,587 of increase in paid leave benefits, then a $1,000 increase in government spending on paid leave would increase age-30 earnings by 0.76percent (5*1000/6,587). The authors assumed a 100% of take-up rate of the reform. Thus, the 0.76 percent increase is already a treatment-on-the-treated effect. Authors reported that average log earnings at age 30 was 12.6 for children whose mothers were eligible for the paid-leave, which was around 296,559 NOK. We assume that 296,559 was denoted in 2007 NOK (children born in 1977 would reach age 30 around the year 2007). Having adjusted for inflation and exchange rate, we arrive at an average earning of $50,568 in 2022, . Multiplying 0.76percent increase in earnings by $50,568, we conclude that a $1,000 increase in government spending on paid leave would lead to $384 increase in children's future earnings per year. To calculate the present discounted value of increased future earnings, we assume that infants are 0 years old and that increased earnings occur at every age from 22-64 and that the social discount rate is 3%. We conclude that as a result of a $1,000 increase in government spending on paid leave, the present discounted value of increased future earnings over the lifetime is $4,949. Valuing increased earnings at only 75% of its face value, we conclude that infants' future earnings would increase by $3,712 over the lifetime.

Infants' health in childhood:

We use two studies to estimate the impact of paid leave on infants' health in childhood (before age 22)- Bullinger (2019), and Lichtman-Sadot & Bell (2017). Both studies examine the impact of paid-leave following the introduction of the California paid leave program in 2004, which offered six weeks of paid family leave. The average of our estimates from these two studies suggest that a $1,000 increase in government spending on paid-leave results in an increase in children's childhood health worth $550 per year (individual values are $510, and $590). Assume that health benefits from paid-leave last through the entirety of childhood (ages 0-21), the mean of the present discounted values of health improvements over childhood is $9,025 (individual values are $8,368 and $9,682).

Bullinger (2019):

Authors discovered that after the introduction of paid family leave in California, infants in California experienced a 0.019 (p-value: 0.208) to 0.052 (p-value: 0.018), or 1.9 to 5.2 percentage-point increase in chances of having their health rated as very good or excellent by parents. Exposure to the program also decreased chance of having asthma by 0.047 (p-value: 0.025) to 0.057 (p-value: 0.023), or 4.7 to 5.7 percentage points, and decreased chance of having respiratory allergy by 0.011 (p-value: 0.278) to 0.045 (p-value: 0.025) or 1.1 to 4.5 percentage points. Exposure also increased chance of having food allergy by 0.032 (p-value: 0.201) to 0.042 (p-value: 0.193) or 3.2 to 4.2 percentage points. With respect to the effects on parents, exposure to the program increased the chance of mothers reporting very good mental health by 0.019 (p value: 0.238) to 0.043 (p value: 0.071) or 1.9 to 4.3 percentage points and changed the chance of fathers reporting very good mental health by -0.017 (p value: 0.352) or

0.001 (p value: 0.505) or -1.7 to 0.1 percentage points. Authors used data from the 2003 and 2007 survey of the National Survey of Children's Health. Sample included infants (aged 0-1) and their parents (N=157,161). Given the lack of employment data, authors couldn't approximate or identify which parents and their children are eligible for paid leave. To estimate the causal impact of paid leave, authors used a difference-in-differences model (DD), comparing children born in California versus other states in 2003 (pre-treatment period, before the introduction of six weeks of paid family leave in California in 2004) and 2007 (post-treatment period). Since the data didn't allow authors to test for parallel trend in the pre-treatment period, authors experimented with three different control groups: 1) Neighboring states (Arizona, Oregon, Nevada, and Washington), 2) Other large states (Florida, New York, Pennsylvania, and Texas), and 3) All states other than California plus Washington D.C.). Authors also 1) conducted a difference-in-difference-in-differences analysis (DDD), adding the difference between infants and children ages 2-17, 2) and used alternative data to analyze pre-reform trends in health in California and the control group. Other controls in the model included individual covariates, time-varying state-level controls, state fixed effects and an indicator variable for the 2007 survey.

The results summarized above come from the DDD model. We do not use the results from the DD model because authors couldn't test for parallel trends and results from the DDD model are of smaller magnitude and would give us more conservative estimates. We do not have a preference over the three different control groups that authors used. Thus, we calculate an unweighted average of the three sets of results and use the average for our calculations. We only use the result on parents' rated health for the calculation because it is a comprehensive measure of children's overall health (the other three results focus on specific health problems instead of overall health). The average of the three results on parents' rated health is 0.0403 (individual result is 0.052, 0.019 and 0.050) or a 4.03 percentage-point increase in the probability of health being rated as very good or excellent by parents. According to the Employment Development Department of California (2022), average weekly benefit was $415 in 2004, the equivalent of $643.4 in 2022 dollars, and a total of $3,860 for the six-weeks of paid leave benefits. We assume that the 4.03 percentage-point increase is the result of $3,860 paid leave benefits. Following a $1,000 increase in government spending on paid leave, the probability of health being rated as very good or excellent would be 1.045 (4.03*1000/3,860) percentage points. To obtain a treatment-on-the-treated effect, we divide the result by the take-up rate. Rossin-Slater et al. (2013) estimated that around 59.6% of mothers in California had worked non-zero hours before the introduction of the PFL and were thus likely eligible for the PFL and would take up the program. Assuming that the take-up rate is 59.6%, we obtain a treatment-on-the-treated effect of 1.75percentage points (1.045/0.596) [1]. We value this increase in health using quality of life (QALY). We adopt Garfinkel et al. (2022)'s method in giving QALY a full value of around $126,628 in 2019 dollars, or $145,397 in 2022 dollars. We adopt Garfinkel et

[1] There are alternative estimates on the take-up rate of the California program. For instance, Bullinger (2019) claimed that 35% of eligible mothers took the paid leave. California's Employment Development Department estimates that 19% of women have filed a claim to bond with their new-born. Both of these alternative estimates however would make our standardized impact bigger and less conservative. Thus, in the baseline we use 59.6% as the take-up rate.

al. (2022)'s method in giving QALY a scale of 0-5, with 0 being "death" and 5 being "excellent health" (a score of 1, 2, 3, and 4 correspond to "poor health", "fair health", "good health", and "excellent health" respectively). Death corresponds to a QALY value of $0, excellent health corresponds to a QALY value of $145,397, and an increase in one unit of health quality corresponds to one-fifth of the value of QALY. We assume that Bullinger (2019) is measuring one unit increase of health quality. A 1.75percentage point increase in chances of having very good/excellent health is thus worth $510 (0.0175*145397/5). We conclude that a $1,000 increase in government spending on paid leave would lead to a $510 increase in childhood health per year.

To calculate the present discounted value of health increase through the entirety of childhood, we assume that infants are 0 years old and health benefit lasts through the entirety of childhood (ages 0-21). We use a social discount rate of 3%. Under these assumptions, we arrive at a present discounted value of $8,368 of increased infants' health in childhood.

Lichtman-Sadot & Bell (2017):

Authors discovered that after the introduction of paid family leave in California, kindergarteners (ages 5-6) in California experienced a 0.056 (0.017) or 0.056 standard-deviation increase in parent-rated health, a 0.041 (s.e. 0.008) or 4.1 percentage-point reduction in the probability of being overweight, a 0.007 (s.e. 0.002) or 0.7 percentage-point reduction in chance of being diagnosed with ADHD, a 0.024 (s.e. 0.004) or 2.4 percentage-point reduction in chance of being diagnosed with hearing problems, a 0.011 (s.e. 0.004) or 1.1 percentage-point reduction in being diagnosed with communication problems, and a 0.027 (s.e. 0.008) or 2.7 percentage-point reduction in having frequent ear infections. The authors used data from the Early Childhood Longitudinal Study. Given the lack of employment data on parents, authors couldn't approximate or identify which children/parents are eligible for paid leave. Sample included children born in 42 states in late 1992-1993, 2001, and late 2004-2005 (N=26,437). To examine the impact of paid leave, authors used a difference-in-differences model, comparing kindergarten-outcomes of children born in California versus other states, before and after the introduction of paid family leave in California. Authors couldn't test for parallel trends between California and other states. To check the validity of the research design: authors 1) tested whether there were substantial changes in child characteristics, mother characteristics, and household characteristics in California versus other states after the introduction of paid leave, and 2) constructed control groups that were more similar to California using synthetic control methods. Other controls in the model included survey cohort, state fixed effects, and child characteristics (including race, gender, birth month, age at start of kindergarten, number of siblings, whether English is second language, age of mothers at interview, education of mothers, household socioeconomic status, mother's marital status at birth, and household income). Authors also found that the health improvements summarized above could be largely attributed to children from less advantaged backgrounds and male children.

We only use the 0.056 standard-deviation increase in overall health for the calculation because it is a comprehensive indicator of children's overall health (the other results focus on health issues that are partial measures of health). As mentioned above, we estimate that beneficiaries receive $3,860 of paid leave benefits under California's PFL program. Assuming that the 0.056

standard-deviation increase in health is the result of $3,860 of benefits, following a $1,000 increase in government spending on paid leave, overall health would increase by 0.0145 (0.056*1000/3860) standard deviations. To obtain a treatment-on-the-treated effect, we follow the authors' calculations. According to the authors, the best estimate on PFL take-up is produced by Rossin-Slater, Ruhm, and Waldfogel (2013), who estimated that around 59.6% of mothers in California had worked non-zero hours before the introduction of the PFL and were thus likely eligible for the PFL and would take up the program. Thus, we divide 0.0145 by 0.596 and obtain an increase in overall health of 0.0243 standard deviations (0.0145/0.596). We conclude that a $1,000 increase in government spending on paid leave per year would increase children's health by 0.0243 standard deviations per year. We value improvement in health using QALY. Following Garfinkel et al. (2022), we assume that six standard deviations of the measure on parent-rated health capture the full value of QALY. This means that a standard deviation of -3 corresponds to a QALY value of $0, a standard deviation of 3 corresponds to the full value of QALY ($145,397), and one standard deviation of increase in overall health equals 1/6th of the full value of QALY. A 0.0243 standard-deviation increase in overall health per year thus corresponds to $590 (0.0243*145397/6) increase in children's health per year. We conclude that a $1,000 increase in government spending on paid leave would lead to $590 increase in infants' childhood health per year. To calculate the present discounted value, we assume that infants are 0 years old and health benefit lasts through the entirety of childhood (0-21 years old) and that the social discount rate is 3%. Under these assumptions, we arrive at a present discounted value of $9,682 of increased infants' health in childhood.

Parents' health:

We use two studies to estimate the impact of paid leave on parents' health- Bütikofer et al. (2021) and Lee et al. (2019). The mean of our estimates suggests that a $1,000 increase in government spending on paid leave would result in a $833 increase in parents' health per year, and a $22,061 increase in parents' health over the lifetime. The mean of the present discounted values of lifelong increase in parents' health is $22,061 (individual values are $10,628 and $33,494). To be conservative, we use the $10,628 increase as the baseline estimate.

Bütikofer et al. (2021):

Authors found that at age 40, mothers exposed to the introduction of 4 months of paid leave in Norway at childbirth (ages 16-33 at childbirth) experienced a 0.164 (s.e. 0.028) or 0.164 standard-deviation decrease in metabolic syndrome, a 0.048 (s.e. 0.012) or 4.8 percentage-point decrease in the probability of reporting any pain, a 0.054 (s.e. 0.014) or 0.054 standard-deviation improvement in self-reported general health, and a 0.114 (s.e. 0.023) or 0.114 standard-deviation improvement in self-reported mental health. Mothers were also 0.049 (s.e. 0.013) or 4.9 percentage points less likely to smoke and 0.120 (s.e. 0.042) or 12 percentage points more likely to engage in any active exercise. Authors used administrative and health survey data from Norway. Eligibility for paid leave was approximated by whether mothers earned at least 10,000 NOK in the year before giving birth. The main analysis sample included eligible mothers giving birth in the reform year of 1977 and those giving birth in non-reform years of 1975, 1978 and 1979, who would have been eligible for the paid leave introduced in 1977 given their earning status. To estimate the causal impact of paid leave, authors used a difference-in-regression discontinuity design, comparing mothers giving birth immediately before and after the date the reform was introduced in the year of 1977 (July 1st 1977), and years other than 1977 (1975, 1978, and 1979). To ensure that no mothers in the sample had manipulated childbirth in response to the reform, authors compared the pre-reform characteristics of mothers giving birth after July 1st in 1977 with those of mothers giving birth before July 1st in 1977. Characteristics examined included education, age at birth, income, marital status at birth, child's birth weight, whether there were complications at birth, whether the birth involved a c-section, and the parity of birth. No discontinuity was found at the July 1st 1977 cutoff. Authors also experimented with four additional estimation strategies: 1) Simply compare mothers giving birth in June 1977 and July 1977; 2) A diff-in-diff model whether mothers giving birth in June and July of 1975, 1978 and 1979 were used to control for birth-month effects; 3) A RD model using mothers giving birth in 1977; 4) A RD-DD model only using mothers giving birth in 1975 as the control group. To further prove the strength of the method, authors performed several robustness checks: 1) a placebo test assuming the reform occurs on July 1st of a year other than 1977. 2) a placebo test where reform occurs on the 1st of a month other than July, 3) alternative bandwidth for the RD part of the model. All robustness checks confirm the strength of the main RD-DD specifications. Authors also found that the beneficial health impacts were more prominent among first-time mothers and disadvantaged mothers. Authors found that the reform did not crowd out unpaid leave, but simply increased paid leave taken by mothers by 4 months, thus the results summarized above could be fully attributed to increased paid leave.

We use the results on metabolic syndrome and self-rated general health for the calculation because they are comprehensive measures of parents' overall health. We do not use the results on mental health and other health measures because they are only partial reflections of health status. We start the calculation with the result on metabolic syndrome-a 0.164 standard deviation decrease. As mentioned above, we estimate that mothers in Norway receive an average of $6,587 of paid-leave benefits following the introduction of paid leave in Norway. A $1,000 increase in government spending on paid leave would thus decrease metabolic syndrome by 0.0249standard deviations (0.164*1000/6587). Authors pointed out there was good evidence that the take-up rate of the reform was close to 100 percent. Thus, the 0.0249standard deviation decrease in metabolic syndrome is a good approximation of the treatment-on-the-treated-treated effect. We adopt Garfinkel et al. (2022)'s assumption that one standard deviation of the metabolic syndrome equals one-sixth of the value of QALY. A 0.0249standard deviation decrease is thus worth $603 (0.0249*145397/6). We conclude that a $1,000 increase in government spending on paid leave per year would improve parental health (more specifically, maternal health) by $603 per year.

Through the same standardization process, we conclude that a $1,000 increase in government spending on paid leave per year would lead to a 0.0082 standard-deviation improvement in self-rated general health (0.054*1000/6587). Like our assumption on metabolic syndrome, we assume that one standard deviation of the general health index equals one-sixth of the value of QALY. Thus, a 0.0082 standard-deviation increase is worth $199 (0.0082*145397/6).

Taking an average of the two results, we obtain an increase of $401 in parental health per year. To calculate the present discounted value, we assume that parents are age 29 at childbirth (29 is the mean age of mothers at birth in 2019 according to CDC Vital Statistics) and that benefit in parental health occurs at every age from 29-78. The resulting increase in parental health over the lifetime has a present discounted value of $10,628.

Lee et al. (2020):

Authors found that after the introduction of paid family leave in California, mothers and fathers in California had 0.11 (95% CI: 0.052, 017) or 11 percentage-point higher probability of rating their health as excellent or very good. Including time trends would decrease the estimate to 0.1 or 10 percentage-point higher probability of rating their health as excellent or very good. Parents saw a -0.79 (95% CI: -1.26 -0.32) or 0.79 decrease in psychological distress as measured by K-6 score, a -0.082 (95% CI: -0.15, -0.016) or 8.2 percentage-point decrease in the risk of being overweight, a -0.026 (95% CI: -0.082, 0.030) or 2.6 percentage-point decrease in the risk of being obese, a -0.12 (95% CI: -0.16, -0.071) or 12 percentage-point decrease in the probability of consuming any alcohol, and -0.057 (95% CI: -0.095, -0.019) or 5.7 percentage-point decrease in the probability of having at least three drinks per day. Authors used data from the 1993-2017 waves of the Panel Study of Income Dynamics. Eligible for paid leave was approximated with being employed one year before child birth. Sample was restricted to parents that were likely eligible for paid leave and with children under age 2 (N=6,690). To estimate the casual impact of paid leave on parents' health, authors used a difference-in-differences model to compare parents whose children were born in California versus other states, before and after an extension of 6 weeks of paid leave in California. Other controls included parent characteristics (gender, age, education, household size, household income one-year before childbirth, and race of head of household), state of birth, year of birth, and state characteristics (GDP, unemployment rate, proportion of adults with less than a high school education, AFDC/TANF benefit, SNAP benefit, poverty rate, whether the governor was Democrat, EITC, and minimum wage). To ensure the validity of the DD model, authors tested the differences in parent characteristics between California and other non-PFL states before the policy was implemented and found no significant differences except for age and other races. Authors also conducted placebo tests by assuming that the California extension happened in years other than 2004. If the California extension took place in 2001/2007, then no impacts were detected except for psychological distress. Finally, authors added controls for group and state specific linear time trends. The effects on self-rated health stayed the same when these controls were added. Effect sizes for being overweight decreased in half and lost their statistical significance. Effects on being obese turned positive when state-specific trends were added.

We use the 10 percentage-point increase in self-rated health for the calculation as we regard self-rated health as a comprehensive measure of a person's overall health. We do not use the results on mental health and other health measures because they are only partial reflections of a person's health status. As mentioned in the previous section, we estimate that California's introduction of a paid family leave program brought an increase of $3,860 benefits. If the 10 percentage-point increase in self-rated health is attributed to the $3,860 increase in benefits, then a $1,000 increase in government spending on paid leave would result in a 2.59 percentage-points (10*1000/3860) increase in self-rated health. Having adjusted for a take-up rate of 59.6%, we obtain a treatment-on-the-treated effect of 4.35 percentage points (2.59/0.596). 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. As discussed in the previous section, an increase of one unit of health quality captures one-fifth of the value of QALY. A 4.35 percentage point increase in probability of having very good/excellent health is thus worth $1,264 (0.0435*145397/5) per year. Assuming that such a health benefit lasts from ages 29-78, the present discounted value of increased health over the lifetime of parents is $33,494.

Decreased in-program earnings of parents:

To estimate decreased in-program earnings of parents, we need to estimate the duration of paid leave and average weekly earnings of parents. For instance, to estimate decreased in-program earnings of parents under the New York State 2022 program, we need to know how many weeks of leave parents are taking and their average weekly earnings. However, since parents may take paid leave even without a paid leave program, we need to know the additional weeks of leave parents are taking once a paid leave program is established, relative to the status quo of no program.

We identify one study that estimates the increase in leave-taking following the introduction of a paid leave program: Rossin-Slater et al. (2013). Authors found that following the introduction of the California program, mothers were 0.0598 or 5.98 percentage points more likely to go on maternity leave. Authors translated the percentage-point increase into increase in weeks by multiplying it by 52 weeks, leading to a 3.11-weeks increase of leave. According to our estimate in the previous section, mothers received an average of $3,860 of benefits under the California program. If the 3.11-weeks increase was motivated by the $3,860, then for a $1,000 benefit, mothers would take 0.805 (3.11*1000/3860) weeks of additional leave. As discussed later, we found through microsimulation that mothers participating in the NYS paid family program have average weekly earnings of $1,647.45. Multiplying 0.805 weeks by $1,647.45, we obtain a $1,327 decrease in parents' earnings while taking paid leave. This decrease does not need to be discounted because it occurs at the receipt of paid leave.

Changes in post-program earnings of parents:

We identify five studies that provide evidence on post-program earnings of parents. Rossin-Slater et al. (2013), Baum & Ruhm (2016), Butikofer et al. (2021), and Carneiro et al. (2015) provide evidence on earnings 1-2 years after childbirth. Other than Rossin-Slater et al. (2013), the three other studies find very small increases or decreases in earnings. To be conservative, we assume zero changes in parent earnings from ages 30-31 (if parents give birth at age 29, then ages 30-31 are 1-2 years post childbirth).

Carneiro et al. (2015), Butikofer et al. (2021), and Bailey et al. (2019) provide evidence on earnings 3 years after childbirth and beyond. We use the most negative estimate from Bailey et al (2019), of a decrease in earnings of $21 per year and assume that such decrease takes places for parents from ages 32-64 (if parents give birth at age 29, then ages 32-64 is the equivalent of 3 years after childbirth and beyond).

We calculate the present discounted value using a social discount rate of 3%. The present discounted value of decrease in parents' earnings post-program is $415.

Rossin-Slater et al. (2013):

Authors found that following the introduction of paid family leave in California, Californian mothers with infants were 0.0271 (not statistically significant) or 2.71 percentage-points less likely to be at work, and 0.0281 (not statistically significant) or 2.81 percentage-points less likely to be unemployed or not in the labor force. Californian mothers with children aged 1 experienced a 0.1266 ($p<0.1$) or 12.66 percent increase in earnings from last year (excluding zero earnings). Mothers with children aged 2 experienced a 0.0543 (not statistically significant) or 5.43 percent increase in earnings from last year. Mothers with children aged 3 experienced a 0.2036 (not statistically significant) or 20.36 percent increase in earnings from last year. The estimated intent-to-treatment effects show that California mothers were 0.0357 (s.e. 0.0074) or 3.57 percentage points more likely to take maternity leave following the introduction, were 0.0362 (s.e. 0.0070) or 3.62 percentage points more likely to take family leave, were 0.0048 (s.e. 0.0055) or 0.48 percentage points less likely to take other leave, and 0.0308 (s.e. 0.0092) or 3.08 percentage points more likely to take any leave. Authors used 1999-2010 CPS data. Sample included mothers that were employed during pregnancy (N=14,947). Authors used a difference-in-differences method, comparing Californian mothers with infants to Californian mothers whose youngest children were ages 5-17, before and after California introduced 6 weeks of paid family leave. Other controls in the model included age, race, marital status, birth in the US, education, age of youngest child, and survey year. Authors could not test for parallel trend between treatment and control during the pre-treatment period. To ensure that results were robust, authors experimented with multiple control groups when analyzing leave-taking outcomes, including: 1) California women with no children, 2) mothers with infants in other large states (Florida, New York, Texas), 3) mothers with infants in all states other than California. Meanwhile, to ensure that the effects discovered were not spuriously attributed to PFL (it's possible that the effects could be attributed to some unobserved factors that affected treatment and control differently), authors conducted a falsification test using states that had TDI programs but not PFL programs (Hawaii, New York, and Rhode Island). Authors detected small but insignificant effects on leave taking among these states, confirming that unobserved factors could not explain the effects discovered for California PFL. Finally, authors also tested whether the program had changed the composition of the treatment group by inducing mothers to move to California or have children. Authors didn't find any significant effects. Authors didn't conduct robustness checks for outcomes such as wages and hours worked.

We begin the calculation with the results on mothers' earnings. The results are already treatment-on-the-treated effects, so we simply adjust them for the amount of paid leave benefits. As mentioned in previous sections, we estimate that paid leave benefits increased by a total of $3,860 following the introduction of California paid family leave. For mothers with children aged 1, 2 and 3, a $1,000 increase in government spending on paid leave would thus increase last year's earnings by 3.28 (12.66*1000/3860) percent 1.41 (5.43*1000/3860) percent and 5.27(20.36*1000/3860) percent respectively. To convert these percentage changes into changes in dollars, we leverage the fact that before the introduction of the program, mothers in the control group had an average log earnings of 10.056, close to $23,295 in 2010 dollars, or $31,432 in 2022 dollars. Multiplying the percentage changes by $31,432, we conclude that for mothers with children aged 1, 2, and 3, a $1,000 increase in government spending on paid leave would increase last year's earnings by $1,031, $442, and $1,658 respectively (all conditional on mothers having non-zero earnings). Given that earnings are from the last year, we conclude that mothers' earnings increased by $1,031 during the year of child birth (when children are aged 0), by $442 one year after childbirth (when children are aged 1), and by $1,658 two years after childbirth (when children are aged 2).

Baum & Ruhm (2016):

Authors found that as a result of the introduction of paid family leave in California, the total numbers of weeks that Californian mothers were working increased by 0.22 weeks (s.e. 0.36) during the quarter before birth, decreased by 1.81 weeks (s.e. 0.36) during the 1st quarter after birth, decreased by 0.15 weeks (s.e. 0.33) during the 2nd quarter after birth, increased by 0.72 weeks (s.e. 0.30) during the 3rd quarter after birth, and increased by 1.77 weeks (s.e. 0.28) during the 4th quarter after birth. The total number of weeks that California mothers were employed increased by a total of 5.79 (s.e. 1.77) weeks from a quarter before birth to the 4th quarter after birth. With respect to labor market outcomes in the medium-term, within one year of childbirth, Californian mothers were 0.183 (s.e. 0.019) or 18.3 percentage-point more likely to return to work, and earned 0.050 (s.e. 0.039) or 5 percent higher hourly wages (exclude zero hourly wages). Two years after childbirth, mothers worked 7.053 (s.e. 1.046) more weeks annually and worked 2.771 (s.e. 0.999) more hours weekly (include zero weeks worked and hours worked). In terms of leave-taking behaviors, Californian mothers spent 4.98 (s.e. 0.77) more weeks on leave from the quarter before birth till the 4th quarter after birth. Californian fathers spent 0.42 (s.e. 0.12) more weeks on leave from the 3 weeks before birth to the 12 weeks after birth. Authors used NLSY97 data. Analysis sample was restricted to parents that were employed during the nine months before childbirth, since they were more likely to be eligible for paid leave. To estimate the causal impact of paid leave, authors used a difference-in-differences model, comparing parents in California versus other states, before and after the introduction of six weeks of paid family leave in California. Other controls in the model included state dummies, year dummies, race, age, education, marital status, work experience, family size, child parity, and birth year. Authors also studied the leave-taking behavior of fathers. Authors directly tested whether leave taking was similar in California and other states during the pre-treatment period by conducting a regression with an interaction term between linear time trend (from 2000-2004) and a dummy for California. Coefficient for the interaction term was insignificant. To test the robustness of the results on leave taking and earnings, authors experimented with different treatment groups: 1) parents with at least 20 weeks of employment during pregnancy, 2) parents with at least 32 weeks of employment during pregnancy, and 3) parents with any employment during pregnancy. Alternative robustness checks included: 1) dropping those giving birth in 2004 from the sample to estimate the extent of birth date manipulation, and 2) using a subset of non-California states that were more likely to have similar trends in leave taking with California as the control group.

We start with the results on hourly wages- a 5 percent increase in mothers' hourly wages one year after childbirth. We estimate that there was a $3,860 increase in paid leave benefits following California's introduction of paid family leave. If the 5 percent increase was a result of a $3,860 increase of paid leave benefits, then a $1,000 increase in benefit would result in a 1.3 (5*1000/3860) percent increase in mothers' hourly wages one year after child birth. We further adjust this 1.3-percent increase for the take-up rate (0.596), producing a 2.17 percent increase.

The pre-reform mean of hourly wages is $15.37 in 2012 dollars, close to $19.69 in 2019 dollars. Multiplying $19.69 by 2.17percent, we conclude that a $1,000 increase in government spending on paid leave would increase mothers' hourly wages, conditional on employment, by $0.43 one-year post childbirth.

Through the same standardization process, we conclude that a $1,000 increase in government spending on paid leave would increase mothers' weekly hours by 1.2hours and would increase mothers' annual weeks worked by 3.07weeks. Multiplying the increase in hourly wages by increase in weekly hours and weeks worked, we obtain a $1.58 increase in annual earnings.

Carneiro et al. (2015):

Authors found that after Norway introduced 4 months of paid leave, mothers' income (excluding zero income) decreased by 0.032 (s.e. 0.070) or 3.2 percent during the year of childbirth, decreased by 0.009 (s.e. 0.021) or 0.9 percent one year before and after childbirth, decreased by 0.007 (s.e. 0.021) or 0.7 percent two years before and after childbirth, and decreased by 0.1 (s.e. 0.103) or 10 percent 5 years after child birth. The probability of being employed decreased by 0.016 (s.e. 0.010) two years after child birth and decreased by 0.009 (s.e. 0.009) five years after childbirth. Since mothers' labor market outcomes were not the main focus of the paper, no robustness checks were conducted for the results on these outcomes.

In the previous section, we estimate that mothers received an average of $6,587 in paid leave benefits under the Norwegian program. If the results summarized above were attributed to the $6,587 of benefits, then a $1,000 increase in government spending on paid leave would lead to a 0.49 (3.2*1000/6587) percent decrease in mothers' income during the year of childbirth, a 0.14 (0.9*1000/6587) percent decrease in mothers' income one year before and after childbirth, a 0.11 (0.7*1000/6587) percent decrease in mothers' income two years before and after childbirth, and a 1.52(10*1000/6587) percent decrease in mothers' income five years after childbirth, conditional on employment. Authors argued that the take-up rate of the Norwegian program was 100 percent, so we do not need to adjust the estimates further for take-up rate. The pre-reform average of mother's log income (in 1975 dollars) was 9 during the year of childbirth, 10.2 one-year pre and post childbirth, 10.3 two-year pre and post childbirth, and 8.3 five years after childbirth. We convert log income into income and multiply income by the percentage changes in income. Carneiro et al.'s analysis sample was restricted to mothers with positive income, which means the earning losses of mothers that have become unemployed after the paid leave program came into effect were not captured by the coefficients. Indeed, as summarized above, the probability of being employed decreased by 0.016 (s.e. 0.010) two years after child birth and decreased by 0.009 (s.e. 0.009) five years after childbirth. Having standardized these decreases in employment (into decreases in employment under a $1,000 increase in paid leave spending) and monetized them by the average income of mothers, we conclude that these decreases in the probability of employment translate to a $4 decrease in income two years after childbirth and a $2 decrease in income five years after childbirth. Thus, two years after child birth, mothers' income decreased by a total of $10. Five years after childbirth, mothers' income decreased by a total of $15.

Bütikofer et al. (2021):

Authors found that after the introduction of paid leave in Norway, mothers (including those with zero income) experienced a 13.7 (s.e. 45.8) NOK decrease in income 2 years after childbirth, a 11.1 (s.e. 10.5) NOK increase in income 5 years after childbirth, and a 10.9 (s.e. 17.1) NOK increase in income 10 years after childbirth.

As mentioned in the previous section, we estimate that mothers in Norway receive an average of $6,587 of paid-leave benefits following the introduction of paid leave in Norway. A $1,000 increase in government spending on paid leave would thus decrease income by 2.08 NOK (13.7*1000/6587) 2 years after birth, increase income by 1.69NOK 5 years after birth, and by 1.65 NOK 10 years after birth. Having adjusted for inflation and exchange rate, we obtain a $0.8 decrease (2019 dollars) in mothers' income 2 years after birth, a $0.6 increase in mothers' income 5 years after birth, and a $0.6 increase in mothers' income 10 years after birth.

Bailey et al. (2019):

Authors found that after the introduction of paid family leave in California, Californian mothers (including those with zero income) had a $0.725 (s.e. 157) increase or $74.6 (s.e. 167) decrease in earnings four years after childbirth and a $15.8 (s.e. 193) increase or $95.5 (s.e. 205) decrease in earnings five to eleven years after childbirth. Californian mothers also had a 0.00370 (s.e. 0.00267) to 0.00150 (s.e. 0.00284) decrease in employment in the short run, and a 0.00234 (s.e. 0.00285) to 0.00334 (s.e. 0.00303) decrease in employment in the long run. Authors used 2001-2015 IRS tax data. The advantage of the tax data was that authors could not only identify those eligible for PFL, but those that took up PFL. Sample included mothers giving birth in the reform year of 2004 and non-reform years of 2003, 2005 and 2006. Authors used an event-study design, comparing California mothers giving birth in the third quarter of 2004 (these mothers were considered as the treatment group as they gave birth after the program became effective on July 1st 2004) with Californian mothers giving birth in the first quarter of 2004 (these mothers were considered as the control group as they gave birth at a time when the program was not yet effective. Other controls in the model included quarter-of-birth fixed effects, birth-year fixed effects, calendar year of observations, and birth year/calendar year fixed effects. To test the robustness of the result, authors 1) introduced the comparison between California and non-California mothers in one specification, and 2) introduced individual fixed effects (while getting rid of quarter-birth-year fixed effects in another) in one specification. To ensure the validity of the research design, authors 1) used national natality data to examine whether mothers manipulated date of childbirth in response to the paid leave reform and 2) used data to detect any differences between treatment and control group before childbirth (whether there were differences in the probability of filing taxes, age, age at first birth, marital status, birth parity, probability of working, earnings, spouse earnings, probability of being with the same employer, and firm size).

We first calculate the average of the results summarized above. On average, mothers experienced a $36.9 ((0.725-74.6)/2) decrease in earnings four years after childbirth and a $39.85 ((15.8-95.5)/2) decrease in earnings five to eleven years after childbirth. Adjusting the estimates for the increase of paid leave benefits ($3,860), we estimate that following a $1,000 increase in paid leave benefits, earnings would decrease by $9.56(36.9*1000/3860) four years after childbirth and by $10.32 (39.85*1000/3860) five to eleven years after childbirth. The $9.56 and $10.32 decrease are denoted in 2016 dollars. Having converted them into 2022 dollars and adjusted them for the take-up rate (0.596), we conclude that a $1,000 increase in paid leave benefits would lead to a $20 decrease of mothers' earnings four years after childbirth, and a $21 decrease five to eleven years after childbirth.

Appendix 1B. Literature and Standardization Procedures Used to Calculate Indirect Estimates

In this appendix, we explain how we derive inferential estimates. A table that presents both direct and inferential estimates can be found at the end of Appendix 1B.

Decreased neonatal mortality:

We did not identify any literature that directly studied the impact of paid family leave on neonatal mortality. However, Stearns' paper on the impact of temporary disability insurance programs on infant mortality (Stearns, 2015) provides some guidance.

Stearns (2015) found that compared to U.S. states without paid maternity leave, states that introduced paid maternity leave through their Temporary Disability Insurance programs (TDI), including California, Hawaii, New Jersey, New York, and Rhode Island, experienced a 0.000115 (s.e. 0.000199) or 0.0115 percentage-point decrease in infant mortality rates. Given a mean of 0.0133, this represents a 0.86 (0.000115/0.0133) percent decrease. Assuming that mothers in the five treated states experienced an increase of $3,200 in paid leave benefits, and that the average take-up rate was 0.27, we obtain a 1 ((0.86*1000/3200)/0.27) percent decrease as a result of a $1,000 increase in government spending on paid leave. Infant mortality rate in the US was 0.558 percent in 2019 (Ely & Driscoll, 2021). Multiplying the 1 percent decrease by 0.558 percent, we obtain a decrease of 0.00558 percentage points (0.01*0.00558). We value the 0.00558 percentage-point decrease using Value of Statistical Life (VSL). We give VSL a value of $11,340,939. The 0.00558 percentage-point decrease in infant mortality rate is thus worth $633 (0.0000558*11340939). Infant mortality occurs at a higher rate than neonatal mortality. Thus, the $633 we have calculated is likely an overestimation of the benefit from decreased neonatal mortality. Neonatal mortality rate in the US was 0.37 percent in 2019 (UNICEF 2020). We assume that the dollar value of decreased neonatal mortality and infant mortality is proportional to neonatal mortality rate and infant mortality rate. We multiply $633 by (0.37/0.558) and obtain a benefit of $420. Since decreased neonatal mortality occurs at the receipt of paid leave, this benefit does not need to be discounted. We conclude that a $1,000 increase in government spending on paid leave would bring $420 benefit from decreased neonatal mortality per year.

We can also estimate decreased neonatal mortality from paid leave by using the ratio of neonatal mortality and childhood health in Garfinkel et al. (2022) and the estimates on childhood health from the two paid leave studies described above (Bullinger, 2019; Lichtman-Sadot & Bell, 2017). Garfinkel et al. (2022) found that a $1,000 increase in cash transfer would decrease neonatal mortality by $10.26 per year and increase childhood health by $31 per year. However, in Garfinkel et al. (2022), only non-first-born children would experience decreased neonatal mortality from cash transfers (about 45% of children are non-first born). In the case of paid leave, all children would experience decreased neonatal mortality from paid leave, regardless of birth order. We thus divide $10.26 further by 0.45 and arrive at $22.8. The ratio of decreased neonatal mortality and increased childhood health implied in Garfinkel et al. (2022) is 1.34 ($31/$22.8). We assume that such a ratio also applies to paid leave. In the previous section, we conclude that a $1,000 increase in government spending on paid-leave results in an increase in childhood health worth $550 per year. Dividing $550 by 1.34, we obtain a $410 increase in neonatal mortality following a $1,000 increase in government spending on paid leave.

We can also make an inference on neonatal mortality by using the ratio of neonatal mortality and future earnings in Garfinkel et al. (2022) and the estimate on future earnings from the one paid leave study described above (Carneiro et al. 2015). According to Garfinkel et al. (2022), a $1,000 increase in cash transfer would increase children's future earnings by $86 per year, and decrease neonatal mortality by $22.8 per year (if decrease applies to all children, not just non-first-born children), suggesting a ratio of 3.77 between future earnings and neonatal mortality. We assume that such a ratio also applies to paid leave. In the previous section, we conclude that a $1,000 increase in government spending on paid leave would increase future earnings of infants by $384 per year. Using the ratio of 3.77, we obtain a $102 (384/3.77) decrease in neonatal mortality following a $1,000 increase in government spending on paid leave.

We can also make an inference on neonatal mortality by using the ratio of neonatal mortality and future education in Garfinkel et al. (2022) and an estimate on future education from the paid leave literature. We identify one study that estimates the impact of paid leave on infants' future education- Carneiro et al (2015). Carneiro et al (2015) found that exposure to paid maternity leave in Norway at birth increased years of schooling by 0.116 (s.e. 0.053) or 0.116 years and decreased high school dropout rate by 0.019 (s.e. 0.007) or 1.9 percentage points. Adjusting these two educational results by the increase in paid leave benefits and take up rate of paid leave (100% 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 and decrease high school dropout rate by 0.003 percentage points or 1.7 percent (given an average dropout rate of 19%) per year. We do not count the increase in infants' future education as a benefit because we are already counting the increase in their future earnings, which we believe capture the increase in their education. However, as detailed in this and the following sections, we use increase in education to make inferences on outcomes that the paid leave literature has not examined, such as increase in infants' health in adulthood and longevity. Garfinkel et al. (2022) calculated a 0.0137 per-year increase in children's education and a $22.8 per-year decrease in neonatal mortality from a $1,000 increase in cash transfer. Given the 0.02 per-year increase in education estimated from the paid leave literature, we obtain a $34 (22.8*0.02/0.0137) decrease in neonatal mortality from a $1,000 increase in government spending on paid leave.

The mean of all estimates above is $239. To be conservative, we use the $34 decrease in neonatal mortality as the baseline estimate.

Increased infants' health in adulthood:

We have not found any literature that provides evidence on the health impacts of paid leave beyond childhood (beyond age 21). Similar to what we have done to obtain an estimate on decreased neonatal mortality in the previous section, we use our estimates on childhood health/future earnings/education to derive an estimate on adulthood health.

We first make an inference on adulthood health by using the ratio of adulthood health and childhood in Garfinkel et al. (2022) and the estimates on childhood health from two paid leave studies described above (Bullinger, 2019; Lichtman-Sadot & Bell, 2017). Garfinkel et al. (2022) found that a $1,000 cash transfer would increase childhood health by $31 per year, and would increase adulthood health by $47 per year. Their estimates suggest that under cash transfer, the increase in adulthood health would be 1.53 times the increase in childhood health. We assume that such a ratio also applies to paid leave. In the previous section, we conclude that as a result of a $1,000 increase in government spending on paid leave, childhood health would increase by an average of $550 per year. We thus infer that as a result of $1,000 government spending on paid leave, adulthood health would increase by $842 ($550*1.53) per year, around 18 times greater than the per year increase from cash transfer. Assuming that increase in adulthood health occurs at every age from 22-78, we conclude that a $1,000 increase in government spending on paid leave would lead to a $12,281 increase in health over adulthood.

We can also make an inference by using the ratio of adulthood health and future earnings in Garfinkel et al. (2022) and the estimate on future earnings from the one paid leave study described above (Carneiro et al. 2015). According to Garfinkel et al. (2022), a $1,000 cash transfer would increase adulthood health by $47 per year and increase future earnings by $86 per year. This suggests that under cash transfer, the increase in children's earnings and children's adulthood health has a ratio of 1.8. We assume that the same ratio applies to paid leave. In the previous section, we conclude that as a result of a $1,000 increase in government spending on paid leave, infants' future earnings would increase by $384 per year. We divide the $384 per-year increase in future earnings by the ratio of 1.8 and obtain a $209 per-year increase in adulthood health. Assuming that increase in adulthood health occurs at every age from 22-78, we conclude that a $1,000 increase in government spending on paid-leave would lead to a $3,052 increase in adulthood health.

We can also make an inference about adulthood health by using the ratio of adulthood health and future education in Garfinkel et al. (2022) and the estimate on future education derived from Carneiro et al. (2015) (see *Decreased neonatal mortality* section above). According to Garfinkel et al., (2022), a $1,000 cash transfer would increase adulthood health by $47 per year and increase years of schooling by 0.0137 years per year. Applying this ratio to the 0.02 years of increased schooling estimated from paid leave literature, we obtain a $69 (47* 0.02/0.0137) increase in adulthood health per year, and a $1,005 increase over the lifetime.

The mean of all estimates above is $7,155. To be conservative, we will use the $1,005 increase in adulthood health inferred from education as the baseline estimate.

Infants' Longevity:

Similar to what we have done to obtain an estimate on decreased neonatal mortality and adulthood health in the previous section, we use our estimates on childhood health/future earnings/education to derive an estimate on longevity.

We first estimate increase in longevity using the ratio of increase in longevity and increase in childhood health in Garfinkel et al. (2022) and increase in childhood health estimated from the two paid-leave studies (Bullinger, 2019; Lichtman-Sadot & Bell, 2017). Garfinkel et al. (2022) found that as a result of a $1,000 increase in cash transfer, childhood health would increase by $30.6 and children's longevity would increase by $7,874.6, suggesting a childhood health-longevity ratio of 257.7. We assume this ratio applies to paid leave. Based on two paid-leave studies, we concluded that a $1,000 increase in paid leave benefit would increase childhood health by $549.8 per year. Multiply $549.8 by 257.7, we obtain a $141,685 increase in longevity under a $1,000 increase in government spending on paid leave. Assuming that longevity benefit occurs at age 78, we obtain a present discounted value of $14,126.

We can also construct an estimate using the ratio of longevity and future earnings from Garfinkel et al. (2022) and increase in infants' future earnings from one paid leave literature (Carneiro et al. 2015). Garfinkel et al. (2022) found that as a result of a $1,000 increase in cash transfer, children's future earnings would increase by $86 per year and children's longevity would increase by $7,874.6 per year, suggesting a ratio of 92. Assuming that such a ratio applies to paid leave, we multiply the $384 per-year increase we have estimated from paid leave literature by 92 and obtain a $35,215 per-year increase in longevity. Assuming that longevity benefit occurs at age 78, we obtain a present discounted value of $3,511.

We can also estimate longevity using the ratio of longevity and future education from Garfinkel et al. (2022) and increase in infants' future education from one paid leave literature (Carneiro et al. 2015) described in the Decreased neonatal mortality estimate section above. Garfinkel et al. (2022) found that as a result of a $1,000 increase in cash transfer, children's years of schooling would increase by 0.01374 years per year and children's longevity would increase by $7,874.57 per year. Given the 0.02022 years of increased years of schooling estimated from paid leave literature, we calculate a $11,593 (7874.57* 0.02022/0.01374) increase in infants' longevity. Assuming that longevity benefit occurs at age 78, we obtain a present discounted value of $1,156.

The mean of all estimates above is $8,230. To be conservative, we will use the $1,156 increase in longevity inferred from children's education as the baseline estimate.

Parents' longevity:

We did not identify any literature that directly measures the impact of paid leave on parents' longevity. We impute an increase in parents' longevity using the ratio of improvement in parents' health and longevity in Garfinkel et al. (2022) and the parent health estimates from two paid leave studies (Bütikofer et al. 2021; Lee et al. 2020). According to Garfinkel et al. (2022), resulting from a $1,000 increase in cash transfer, parents' health would increase by $1.34 per year, and parents' longevity would increase by $1,128.7 per year, suggesting a ratio of 842.44. Multiplying the per-year increase in parents' health ($895.63) by 842.44, we obtain an $754,514 increase in parents' longevity, which is discounted to $177,273 at age 78.

Given that this estimate would dominate all other benefits and costs we have calculated, we do not use it and use a conservative estimate of zero as the baseline estimate.

Avoided expenditures on infants' health care:

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

We first calculate healthcare expenditures related to birth weight. In order to estimate reductions in birth-weight-related expenditures, we must first estimate the effect of paid leave on birth weight. We use one study to estimate the impact of paid leave on birthweight-- Stearns (2015).

Stearns (2015) found that compared to U.S. states without paid maternity leave, states that introduced paid maternity leave through their Temporary Disability Insurance programs (TDI), including California, Hawaii, New Jersey, New York, and Rhode Island, saw a 0.00218 (s.e. 0.000414) or 0.218 percentage-point decrease in share of low birthweight births, a a 0.0110 (s.e. 0.00207) or 1.1 percentage-point decrease in share of early term birth, a 0.0122 (s.e. 0.00242) or 1.22 percentage-point decrease in share of less than full term births, and a 0.000412 (s.e. 0.000955) or 0.0412 percentage-point decrease in share of premature births. The five treated states also saw a 5.611 (s.e. 1.861) or 5.611-gram increase in average birthweight and a 0.000115 (s.e. 0.000199) or 0.0115 percentage-point decrease in infant mortality rates. Author used U.S. national data on birth from 1972-1985 (N=47,902,095). Given the lack of employment data, authors could not identify which mothers may be eligible to take leave. To study the impact of paid maternity leave, authors used a difference-in-differences model, comparing birth outcomes in the five U.S. states that granted paid maternity leave through their TDI programs (California, Hawaii, New Jersey, New York, and Rhode Island) to outcomes in the rest of the U.S., before and after paid maternity leave was introduced in the five treated states in 1978. Because authors couldn't test for parallel trend, a requirement of difference-in-differences, authors chose to use control groups generated by the synthetic control method. As a robustness check, authors used states bordering the treated states as the control group and found results were similar to those using synthetic control group. Other controls in the model included state fixed effects, month-year fixed effects, yearly female employment rate, labor market participation rate, per capita income, share of private sector workers, and state-month-year specific variables (percentage of mothers of a race and age category, percentage of married mothers, whether the state gives women job-protected unpaid leave for childbirth and minimum wage). Authors also found that the beneficial impacts on birth were strongest among black and unmarried mothers. We use the results on low birth weight for the calculation. Authors did not specify the average amount of paid leave benefits that 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 paid 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 $3,200in 2022 dollars before childbirth (we ignore post-birth leave because we believe it does not influence birth weight). Assuming that the 0.218 percentage-point decrease in share of low birthweight is the result of $3,200 increase in government spending on paid leave, a $1,000 increase in government spending on paid leave would lead to a 0.07 (0.218* 1000/3200) percentage points decrease in share of low birth weight. According to the authors, the take-up rate of TDI benefits among women is 0.27. To obtain a treatment-on-the-treated effect, we thus divide 0.07 percentage point by 0.27 and obtain a 0.25 percentage-point decrease (or a 3.7 percent decrease over a mean of 6.76 percent) in share of low birthweight. We conclude that a $1,000 increase in government spending on paid-leave benefit would lead to a 0.25 percentage-point or a 3.7 percent decrease in the share of low birthweight per year. We do not count decreases in low birthweight as a benefit because we are counting childhood health, which should capture the impacts on birthweight. As seen in this section, we do count reductions in health expenditures due to decreases in low birthweight as part of the benefit-cost of paid leave.

Above, we have obtained a standardized estimate on the percentage decrease in low birthweight following a $1,000 paid leave investment. To convert such improvement in health into 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) so we have a change in percentage points. Then we multiply the percentage-points change by the increases in health expenditures due to low birthweight, estimated by Garfinkel et al (2022).based on Beam et al (2020) . We conclude that following a $1,000 increase in government spending on paid leave, healthcare expenditures related to birthweight would decrease by $19-$41. This reduction does not need to be discounted because it occurs at the receipt of paid leave. We use the more conservative estimate of $19 as the baseline estimate.

In previous sections, we have calculated standardized estimates on increases in infants' childhood and adulthood health following a $1,000 paid leave investment. We use the more conservative health estimate of Bullinger (2019) for the calculation. To convert increases in health into reductions in healthcare expenditures, we use 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 estimated by Garfinkel et al. (2022)based on the statistics of Centers for Medicare & Medicaid Services (CMS, 2019). We discount reductions in health expenditures from ages 1-78 using a social discount rate of 3%.

We conclude that following a $1,000 increase in government spending on paid leave, the present discounted value of decreases in children's lifelong healthcare costs (ages 0-78) would be $365.

Avoided expenditures on parents' health care:

We follow the same assumptions and method of Garfinkel et al. (2022) in calculating reductions in health expenditures for parents. Using our most conservative estimate on the increase of parents' 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.

Avoided expenditures and victimization costs of crime:

We do not have any direct evidence on the impact of paid leave on crime. Since crime and education are correlated with each other, we come up with a rough estimate on crime by using our education estimate and the relationship between crime and education in the cash transfer literature. Our education estimate suggests that a $1,000 increase in government spending on paid leave would increase years of schooling by 0.0202 years. Using experimental and quasi-experimental cash transfer literature (Bailey et al. (2020); Barr & Smith (2023)), and literature on the age distribution of crime over the life course (Schulman et al (2013)), we calculate that a $1,000 increase in cash transfer would lead to a $1,025 decrease in expenditures and victim costs of crime over the lifetime (age 0-65). Using experimental and quasi-experimental literature, Garfinkel et al. (2022) calculated that a $1,000 increase in cash transfer would lead to a 0.0137 increase in years of schooling. Based on these results, we infer that a $1,000 increase in government spending on paid leave would result in a $1,509 ($1025*0.0202/0.0137) lifetime decrease in crime and victim cost of crime.

Since increased earnings is another mechanism through which crimes could be reduced, we construct another rough estimate on the impact of paid leave on crime by using our estimate on earnings and the ratio of increased earnings and reduced crime suggested by cash transfer literature. Based on experimental and quasi-experimental cash transfer literature, Garfinkel et al. (2022) concluded that a $1,000 cash transfer would increase children's future earnings by $85.8 per year. As mentioned above, we calculate that a $1,000 cash transfer would reduce crime and victimization costs of crime by $1,025 over the lifetime (age 0-65). Given that a $1,000 increase in government spending on paid leave would increase infants' future earnings by $384 per year, it would lead to $4,584 (1025*384/85.8) lifetime reduction in crime expenditures and victim costs.

The mean of the estimates above is $3,047. To be conservative, we use the $1,509 lifetime decrease in costs of crime inferred based on children's education as the baseline estimate.

Avoided expenditures on foster care:

There are no studies directly assessing the relationship between paid leave policies and foster care use.

As one alternative, we rely on a paper evaluating the impact of California's paid leave program on hospital admissions rates for abusive head trauma among children under two years of age using a difference-in-differences design (Klevens et al., 2016). Authors discovered that after the California paid family leave program came into effect, the admission rate for pediatric abusive head trauma of those younger than one year old decreased by 5.113 (s.e. 1.964), or 0.005113 percent, and the admission rate for those younger than two years old decreased by 2.799 (s.e. 1.085) or 0.002799 percent. Authors used 1995-2011 inpatient admission data from California and seven comparison states (Arizona, Colorado, Florida, Iowa, Maryland, Massachusetts, and Wisconsin). To estimate the causal impact of California paid leave program, authors deployed a difference-in-differences model, comparing admission rate for abusive head trauma in California and comparison states, before and after the California program came into effect. The pre-reform trends in California and other states, depicted in Figure 1, were parallel during most of the pre-reform periods. Other controls in the model included state dummies, year dummies, the state unemployment rate, and the percentage of people in the state with less than a high school degree. Authors didn't conduct robustness checks. We use the result on those younger than two years old given that it was more conservative. We adjust the 0.002799 percent decrease by the amount of increase in government spending on paid leave in the California program ($3,860) and the take-up rate of the California program (0.596). The result is a 0.001 percent decrease in admission rate of pediatric abusive head trauma per year following a $1,000 increase in government spending on paid leave per year. To roughly convert decreases in pediatric abusive head trauma into decreases in child protection cost, we assume that 100% of head trauma cases are admitted into the hospital, that 100% of head trauma cases are investigated by the CPS, and that head trauma is the only form of child abuse investigated by the CPS. Fang et al. (2012) estimated that the average per-year cost per child investigated by the CPS is $10,428 (2022 dollars). Multiplying the 0.001 percent decrease in the rate of head trauma by $10,428, we conclude that a $1,000 increase in government spending on paid leave would at least reduce child protection cost by $0.13. This benefit does not need to be discounted because it occurs at the receipt of paid leave.

We can obtain an alternative estimate on child protection costs using the increase in children's education. Garfinkel et al. (2022) found that as a result of a $1,000 increase in cash transfer, children's years of schooling would increase by 0.0137 years, and savings in child protection cost would increase by $21 per year. From the paid leave literature (Carneiro et al., 2015), we estimate that children's years of schooling would increase by 0.02 years as a result of a $1,000 increase in government spending on paid leave. We thus estimate that under paid leave, there would be a $31 (21*0.02/0.0137) increase in savings in child protection costs. Given that we are uncertain about the assumption that we have made to obtain the $0.13 estimate, we do not use the $0.13 estimate as the conservative estimate, even though it is the most conservative estimate. We use the $31 inferred from future education as the conservative and baseline estimate.

Increased payment due to increased infants' longevity:

In the previous section, we calculated that following a $1,000 increase in paid leave investment, the present discounted value of increased infants' longevity would be $1,156, around 1.13 times of the increased children's longevity calculated by Garfinkel et al. (2022) for cash transfer ($1,024). The present discounted value of increased payment associated with infants' longevity would also be 1.13 times higher under paid leave. Garfinkel et al. (2022) found a $229 increase in longevity payment due to cash transfer. We thus calculate that due to a $1,000 increase in paid leave, the present discounted value of increased longevity payment would be $259 ($229 * 1.13).

Increased payment due to increased parents' longevity:

In the previous section, we estimate that following a $1,000 increase in paid leave investment, the present discounted value of increased parents' longevity would be $0. Thus, there would be no increased payment due to increased parents' longevity.

Increased costs due to increased education of infants:

Even though we do not count increased education as a benefit (to avoid double counting as we are counting increased earnings, which should capture increased education), increased costs brought by increased education shall be counted. We follow the assumption and method of Garfinkel et al (2022), who, based on Abel and Deitz (2014), estimated increases in costs due to increased education for children (ex: tuition and lost earnings) and taxpayers (ex: grants and scholarship). Through the paid leave literature (Carneiro et al., 2015), we found that following a

$1,000 increase in paid leave, years of schooling would increase by 0.02 years. Multiplying 0.02 years by the increased education cost and assuming that 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.

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% of earnings (Wamhoff & Gardner, 2019). In the previous section, we estimate that as a result of a $1,000 increase in government spending on paid leave, infants' future earnings would increase by $4,949 over their lifetime. 21% 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% 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 $1,327 and the present discounted value of decreased post-program earnings of parents is $415. Using the 21% figure, we calculate that parents' in-program tax payments would decrease by $279 (1327*0.21) and parents' post-program tax payments would decrease by $87 (415*0.21).

Avoided expenditures on other cash or near-cash transfers:

We follow the analysis of Garfinkel et al. (2022) on the relationship between earnings and other transfers. They found that a $1,000 increase in earnings would lead to a $13.61 reduction in welfare transfers. We then apply the relationship to the $4,949 increase in earnings we have found from a $1,000 increase in government spending on paid leave, resulting in an estimated $67 (13.61*4949/1000) decrease in welfare transfers, which is three times the estimate of Garfinkel et al., (2022).

Administrative costs:

We estimate the ongoing administrative costs of implementing a paid leave program using data available from California, Rhode Island, and New Jersey's existing paid family leave programs. The IMPAQ International report (2021), "A Review of the Administrative Costs of Establishing a State Paid Family and Medical Leave Program" reported that, in 2015, ongoing administrative costs in California, Rhode Island, and New Jersey were 4.4%, 4.33%, and 6.43% of the total benefits disbursed in that year, respectively. We identify the total number of beneficiaries in each of these states in order to generate weights for each state in our sample. We then estimate the weighted average ongoing cost as a percent of benefits distributed to be 4.57%. We thus multiply benefits paid by 4.57% to calculate administrative costs. For a $1,000 increase in paid leave benefits, the administrative cost is $46.

Benefits and costs per $1,000 of PFL expenditure: Using only the most conservative direct evidence and direct evidence supplemented by ancillary evidence

Table 1B.1 below replicates Table 1 in the main text. It presents only the direct evidence from paid leave literature. Table 1B.2 presents both the direct and indirect evidence. As we can see, including indirect evidence would increase net social benefits from $20,768 to $24,679.

Table 1B.1. Present discounted value of monetary benefits and costs per $1,000 increase in government spending on paid parental leave: Direct evidence from quasi-experimental/experimental literature, lower-bound estimates

	Beneficiary: Mothers	Taxpayers	Society
Paid leave benefits	$ 1,000	$ -1,000	$ 0
Increased future earnings of infants	$ 3,712	$ 0	$ 3,712
Increased infants' health in childhood	$ 8,368	$ 0	$ 8,368
Increased mothers' health	$ 10,628	$ 0	$ 10,628
Decreased in-program earnings of mothers	$ -1,327	$ 0	$ -1,327
Changes in mothers' post-program earnings	$ -415	$ 0	$ -415
Total	$ 21,966	$ -1,000	$ 20,966

Table 1B.2. Present discounted value of monetary benefits and costs per $1,000 increase in government spending on paid leave: Direct evidence from literature and ancillary estimate

	Beneficiaries	Taxpayers	Society
Paid leave benefits	$ 1,000	$ -1,000	$ 0
Increased future earnings of infants [a]	$ 3,712	$ 0	$ 3,712
Increased future tax payments by infants	$ -1,039	$ 1,039	$ 0
Decreased neonatal mortality	$ 34	$ 0	$ 34
Increased infants' health in childhood	$ 8,368	$ 0	$ 8,368
Increased infants' health in adulthood	$ 1,005	$ 0	$ 1,005
Increased infants' longevity	$ 1,156	$ 0	$ 1,156
Increased parents' health	$ 10,628	$ 0	$ 10,628
Increased parents' longevity	$ 0	$ 0	$ 0
Avoided expenditures on infants' health care costs [b]	$ 40	$ 325	$ 365
Avoided expenditures on parents' health care costs [b]	$ 81	$ 654	$ 735
Avoided expenditures and victimization costs of crime	$ 0	$ 1,509	$ 1,509
Avoided expenditures on child protection services	$ 0	$ 31	$ 31
Avoided expenditures on other cash or near-cash transfers	$ -67	$ 67	$ 0
Increased payment due to increased infants' longevity	$ 259	$ -259	$ 0
Increased payment due to increased parents' longevity	$ 0	$ 0	$ 0
Increased costs of infants' future education	$ -340	$ -81	$ -421
Decreased in-program earnings of parents	$ - 1,327	$ 0	$ -1,525
Decreased in-program tax payments by parents	$ 279	$ -279	$ 0
Deadweight loss for beneficiaries	$ -531	$ 0	$ -610
Changes in parents' earnings post-treatment	$ -415	$ 0	$ -415
Changes in tax payments by parents post-treatment	$ 87	$ -87	$ 0
Administrative costs [c]	$ 0	$ -46	$ -46
Excess burden for taxpayers [d]	$ 0	$ 172	$ 156
Total	$ 22,927	$ 2,046	$ 24,973

Notes: [a] Future earnings are valued at 75% of the face value ($4,949). This is because some increases in earnings come from increased hours, and our upper bound estimate (to be conservative) is 25%. To be conservative, we assume the recipient gets no surplus from increased earnings that come through additional hours.

[b] Reductions in health care expenditures reduce both out-of-pocket costs to beneficiaries and public and private insurance costs to taxpayers. Out-of-pocket medical expenditures are about 11% of national health expenditures in 2019 (Centers for Medicare & Medicaid Services, 2019). We allocate 11% of the reduced health care costs to beneficiaries and 89% of the costs to taxpayers at large in the form of reduced taxes and insurance premiums.

[c] Based on administrative costs of CA, NJ, and RI paid leave program, we have estimated ongoing administrative costs to be approximately 4.57% of benefits disbursed.

[d] Excess burden is assumed to be equal to 40% of the net increase or decrease in the present discounted value of taxes. Neither decreases in victim costs nor reductions in health insurance premiums, 74% and 33% respectively of total taxpayer benefits are counted in the calculation of excess burden.

Appendix 1C. Microsimulation of the New York State 2022 Program and Proposed Expansion

Because New York has an existing paid parental leave program, we conduct two microsimulations: one on the existing program, the other on the proposed expansion.

Table 1C.1 below presents the full set of results of the micro-simulation. In the following sections, we describe the steps taken to produce these results.

Table 1C.1. Simulating the New York State 2022 paid parental leave program and the proposed expansion

	NYS 2022 program	NYS proposed expansion [lower, larger]
Total costs for mothers who claimed benefits [a]	$0.58 billion	[$0.68 billion, $0.73 billion]
Number of mothers that claimed benefits [b]	69445	[78191, 82298]
Average duration of leave	10.2 weeks	[10 weeks, 10.3 weeks]
Average paid leave benefits	$7740	[$8106, $8348]
Number of mothers with earnings below 40k that claimed benefits [b]	18271	[26418, 29313]
Number of mothers with earnings between 40k-60k that claimed benefits	14292	[14695, 15546]
Number of mothers with earnings between 60k-80k that claimed benefits	11002	[11002, 11097]
Number of mothers with earnings above 80k that claimed benefits	25880	[26076, 26342]
Take-up rate of mothers with earnings below 40k	48%	[48%, 53%]
Take-up rate of mothers with earnings between 40k-60k	72%	[72%, 77%]
Take-up rate of mothers with earnings between 60k-80k	90%	[90%, 91%]
Take-up rate of mothers with earnings above 80k	80%	[80%, 80%]
Duration of leave taken by mothers with earnings below 40k	7.02 weeks	[7.02 weeks, 7.99 weeks]
Duration of leave taken by mothers with earnings between 40k-60k	10.54 weeks	[10.54 weeks, 11.51 weeks]
Duration of leave taken by mothers with earnings between 60k-80k	11.65 weeks	11.65 weeks
Duration of leave taken by mothers with earnings above 80k	11.64 weeks	11.64 weeks
Average weekly paid leave benefits received by mothers with earnings below 40k	$309	$443
Average weekly paid leave benefits received by mothers between 40k-60k	$675	$902
Average weekly paid leave benefits received by mothers between 60k-80k	$913	$1,058
Average weekly paid leave benefits received by mothers with earnings above 80k	$1,056	$1,058

Additional decrease in mothers' earnings when taking paid leave (relative to no program)	$0.8 billion	[$0.86 billion, $0.92billion]

1C.1. Identify newborns and mothers in a given year using ACS data:

The first step is to identify newborns in a given year. We use the 2019 American Community Survey as it reflects pre-pandemic data. We identify newborns in the 2019 American Community Survey using the variable on age and regard people less than one year old as newborns. We use the variable "perwt" to produce population-level estimates. The 2019 ACS suggests that there are 207,905 newborns in New York State during the survey period (a mix of years 2018 and 2019). This is lower than the NYS natality data, which estimates a total of 225,162 live births in New York state in 2018 and 220,536 live births in New York State in 2019.

Table 1C.1.1. Number of newborns and mothers with newborns in New York State, 2019 ACS (weighted)

Number of newborns	207,905
Number of mothers with newborns	168,308

We identify the mothers of newborns using the *momloc* "pointer" variable available in the ACS data retrieved from IPUMS, which links children to their mothers within the sampled household. Our results suggest that for 207,905 newborns, there are 168,308 mothers in NYS in 2019. There are three reasons why the number of newborns and mothers with newborns do not exactly match: 1) a mother can have multiple newborns, 2) some newborns do not live in the same household as their mothers, and 3) the ACS weights for newborns and mothers are different, so even though the two numbers are more similar when weights are not applied, they could diverge once weights are applied. We then restrict our analysis sample to newborns and their mothers and drop the other household members. We ignore fathers and ignore newborns that are not living with their mothers.

We also assume that the number of newborns and mothers of newborns are the same for the NYS 2022 program and the NYS proposed expansion.

1C.2. Determine the number of PFL-eligible mothers in a given year using ACS data:

Having identified mothers with newborns using ACS data, the second step is to determine which of these mothers are eligible to take parental leave under the 2022 program and the proposed expansion.

The 2022 NYS PFL requires that full-time workers (those working at least 20 hours/ week) must have 26 weeks of consecutive employment and part-time workers must have 175 days of employment before qualifying. We use variables on usual hours worked, weeks worked in the past 12 months, and income from wages to determine eligibility based on New York State's eligibility parameters. We exclude mothers with no income from wages in the past 12 months. According to Table 3 below, we identify 102,229 mothers eligible for the NYS 2022 program.

The newly proposed NYS PFL rules that workers become qualified after 4 consecutive weeks of employment with a single employer. Table 3 shows that more mothers would be eligible under the proposed program.

Table 1C.2.1. Number of mothers that are eligible for the 2022 program and the proposed expansion, 2019 ACS (weighted)

	(2) Mothers eligible for NYS 2022 program (part-time workers qualify after 35 weeks of work)	(3) Mothers eligible for NYS proposed expansion: qualify after 4 weeks of employment
N	102,229	120,869

1C.3. Determine take-up rate, the length of PFL taken, and the average amount of paid leave benefits that mothers receive using ACS data and NYS official statistics

Not all of the eligible mothers we have identified would take up PFL. To determine how many eligible mothers would actually take up the program, we need to estimate the take-up rate. Take-up rate, the length of paid leave taken, and average paid leave benefits depend on each other, so instead of estimating these three components one by one, we estimate them together.

We first estimate these three parameters for the 2022 program. There are no official statistics on the take-up rate, but NYS does report the total number of parental leave claims by mothers for bonding with a newborn every year between 2018-2022. To calculate take-up rate in a year, we use the total number of eligible mothers in the year as the denominator (estimated by us through the ACS data), and use the total number of leave claims for newborn bonding in the year as the numerator (reported by the NYS). Since our analysis focuses on mothers, we further restrict the numerator to the total number of claims made by mothers and the denominator to the total number of eligible mothers. We calculate take-up rates by earnings bins. This is because NYS reports the earnings distribution of beneficiaries and we want to make sure that our ACS mother sample has the same earnings distribution as the actual take-up population of NYS. NYS groups participants into five earnings groups:<40k, 40k-60k, 60k-80k, 80k-110k, above 110k, and reports the number and percentage of claims made by participants in these income groups. We calculate take-up rate for each earnings group using the method discussed above. Our calculation produces a 48% take-up rate for mothers with earnings below 40k, 72% take-up rate for those with earnings between 40k and 60k, 90% take-up rate for those with earnings between 60k and 80k, and 80% take-up rate for those with earnings above 80k. Assuming that every mother we have identified as eligible in the ACS sample has an equal probability of taking up paid parental leave, we ask Stata to randomly and repeatedly draw eligible mothers from the sample for 100 times. We break the sample according to earnings groups and use the earnings specific take-up rate we have calculated to determine how many mothers to draw from each sample. For instance, we have a sample of 369 mothers with earnings below 40k. We have estimated that 48% of mothers with earnings below 40k would take up the program. We thus draw 177 mothers (0.4814*369) randomly and repeatedly from 369 mothers for 100 times. Once we apply ACS person weight, our simulation predicts that 69,386 mothers would be taking paid parental leave under the 2022 program. Assuming that every mother makes one claim, the model predicts 69,686 number of claims, which is slightly higher than the total number of claims reported by NYS-69,445. We reconcile our estimate with the NYS estimate by multiplying 69,686 by a ratio of (69445/69686). We conclude that there are 69,445 mothers taking up the 2022 program.

For the 2022 program, NYS provides the official number on length of leave taken and average benefits received. According to the NYS PFL report, in 2022, mothers took an average of 10.2 weeks of newborn parental leave. We believe that mothers with lower incomes would take shorter weeks of leave. NYS doesn't report leave length by earnings group. We make inferences about leave length using take-up rates. We calculate that the take-up rate of all eligible mothers is 68%. We assume that leave-length is proportional to take-up rate. For instance, mothers with earnings below 40k has a take-up rate of 48%, which is 70% (48/68) of the take-up rate of all mothers. We thus assume that their length of leave is 70% of the average length of leave of all mothers: around 7 weeks (10.2 weeks * 0.7).[2] Under this method, we calculate that among mothers that would take up the program, average length of leave would be 10.5 weeks. Given that this is higher than the 10.2 weeks reported by NYS, we multiply length of leave by a ratio of 0.97 (10.2/10.5) to reconcile our estimate with the NYS statistics. We conclude that mothers with earnings below 40k, 40k-60k, 60k-80k, and above 80k would take 7.02 weeks, 10.55 weeks, 11.66 weeks, and 11.65 weeks of paid leave respectively. NYS reports that in 2022, mothers taking paid parental leave receive an average of $7,740 worth of benefits. We simulate benefits using the incomes of ACS workers and the income replacement rate of the 2022 program. Like length of leave, we believe that mothers with lower earnings would receive lower benefits. Our model produced an average of $7,789 benefits among mothers taking up the program, which is higher than the $7,740 reported by NYS. We reconcile our estimate with the statistics of NYS by multiplying our simulated benefits by a ratio of 0.99 (7740/7789). We conclude that mothers with earnings below 40k, 40k-60k, 60k-80k, and above 80k would receive $309, $675, $913, $1,056 weekly paid leave benefits under the 2022 program.

We now estimate take-up rate, length of leave, and average benefits for the proposed expansion. First, we simulate the new eligibility criteria. Under the policy reform, mothers of newborns would be eligible to take paid leave after 4 consecutive weeks of employment, as opposed to the currently required 26 weeks of employment. This would increase the number of mothers that are eligible to take paid leave. We define the paid leave take-up rate to be the proportion of eligible mothers that actually participate in paid leave. For our lower estimate, we assume that the take-up rate remains unchanged following the expansion. However, given that there are now a greater number of eligible mothers, assuming that the same proportion of eligible mothers participates in paid leave implies that there will be an increase in the number of mothers taking paid leave. Table 1C.3.1 demonstrates how expanding eligibility increases the number of eligible mothers in each earnings group. Mothers with incomes at the lower end of the earnings distribution see the largest increase in the number of eligible mothers following the expansion.

[2] Under this calculation method, the length of leave of mothers with earnings between 60k-80k would exceed 12 weeks. We assume that these mothers take 12 weeks of leave.

Table 1C.3.1. Simulated number of eligible mothers in various income group under the New York State 2022 program and the proposed expansion ($2022), 2019 ACS (weighted)

	Number of eligible mothers [a]		
	NYS 2022 program	NYS proposed expansion	Take-up rate [b]
Mothers with earnings below 40k [b]	37,803	55,261	48%
Mothers with earnings between 40k-60k [b]	19,838	20,413	72%
Mothers with earnings between 60k-80k [b]	12,160	12,160	90%
Mothers with earnings above 80k [b]	32,428	33,035	80%

[a] Estimated using the 2019 ACS

[b] Estimated using the 2019 ACS and the number of paid parental leave cases in the NYS PFL report.

Similarly, we use the wage replacement parameters of the proposed expansion to estimate changes in average weekly benefit amounts. The current policy has a flat, 67% wage replacement rate of workers' average weekly wages, up to a maximum benefit of 67% of the state average weekly wage. The policy proposal would shift to a multi-tier wage replacement restructure, where participants would receive 90% of their wages should their wages fall below 50% of the state average weekly wage, and 67% of their wages should their wages be above this threshold. As under current law, the maximum weekly benefit amount is capped at 67% of the state average weekly wage. This multi-tier wage replacement structure specifically benefits those with low incomes, who are most likely to have a greater proportion of their wages replaced (90%) than under current law (67%). We thus expect average benefits to increase especially for mothers whose earnings are below 40k, or between 40-60k. The experience of simulating the 2022 program informs us that our model produces overestimates of paid leave benefits. We adjust for this overestimation using an adjustment ratio when estimating benefits under the proposed expansion. Table 1C.3.2 presents our simulation results. As shown in the table, mothers with lower earnings experience bigger increases in paid leave benefits following the expansion.

Table 1C.3.2. Simulated average weekly benefits of mothers in various earnings under the New York State 2022 program and the proposed expansion ($2022), 2019 ACS (weighted)

	Average weekly benefit		
	NYS 2022 program	NYS proposed expansion	Δ in benefit
Mothers with earnings below 40k	$309	$443	43%
Mothers with earnings between 40k-60k	$675	$902	33%
Mothers with earnings between 60k-80k	$913	$1,058	16%
Mothers with earnings above 80k	$1,056	$1,058	0.1%

For this analysis, we assume the minimum amount of costs and benefits by holding the take-up rate constant following the expansion. That is, despite the fact we estimate an increase in the number of new participants (due to expanded eligibility), the proportion of mothers in each earnings group that takes paid leave remains the same. When simulating our larger cost estimate, we relax this assumption; given the bigger increase in benefits for mothers whose earnings are below 40k, or between 40-60k, we may expect a bigger increase in take-up rates for these mothers as well. To benchmark the increase in take-up, we calculate take-up rates of the NYS program over time, using the total number of births in the year as the denominator (reported by NYS natality data), and the total number of newborn parental leave claims in the year as the numerator (reported by the NYS). Table 1C.3.3 shows that the biggest increase in estimated take-up happened during the 2018-2019 transition, when both the maximum weeks of leave and wage replacement rate increased. This resulted in a 5 percentage-point increase in take-up. Since the proposed expansion would not increase the maximum weeks of leave, but only increase the wage replacement rate, it's reasonable to assume that the increase in take-up following the proposal would not exceed 5 percentage points. Still, we assume that take-up rate increases may vary across earnings groups. As mentioned above, we speculate that mothers making below 40k, and mothers making 40k-60k would experience larger increases in take-up because they experience a bigger increase in paid leave benefits following the expansion. We simulate a maximum case, where mothers making below 40k, and 40k-60k experience a 5 percentage-point increase in take-up, mothers making 60k-80k experience a 1 percentage-point increase in take-up, and mothers making above 80k experience zero increase in take-up.

Again, though we simulate a minimum estimate of the benefits and costs of this expansion, where we assume no increase in the average length of leave, it may be possible that this expansion may increase the average length of leave. We estimate this increase using data on the length of leave under the NYS program over time. We also expect that mothers making below 40k and mothers making 40k-60k would experience greater increases in the length of leave taken. Table 1C.3.2 shows that the biggest increase in leave length happened during the 2018-2019 and the 2020-2021 transition, when maximum weeks of leave were extended and average weeks of leave increased by approximately one week. Thus, we believe that under this proposal (which would not extend the maximum weeks of leave) the increase in the length of leave would not exceed one week. We simulate a case of a larger estimate, where mothers making below 40k, and 40k-60k experience a one-week increase in duration of leave, and mothers making 60k-80k or above 80k experience zero increase. The experience of simulating the current 2022 program informs us that our model produces overestimates of paid leave duration. We adjust for this overestimation when estimating duration of leave under the proposed expansion using the same adjustment ratio.

Table 1C.3.3. Program statistics and estimated take-up rate of the New York State program from 2018-2022

Year	Max weeks of leave [b]	% of wage replaced [b]	Estimated take-up rate [a] (mothers)	Δ in take-up rate	Average weeks of newborn leave taken (mothers) [b]	Δ in weeks of leave taken (mothers)
2018	8	50%	25%		6.9	
2019	10	55%	30%	5 pp	8.3	1.1
2020	10	60%	29%	-1 pp	8.4	0.2
2021	12	67%	32%	3 pp	9.9	1.2
2022	12	67%	33% [c]	1 pp	10.2	0.3

[a] Total number of newborn bonding claims in NYS is 56,621 in 2018, 66,146 in 2019, 60,086 in 2020, 67,618 in 2021, and 69,445 in 2022. According to natality data, the total number of births in NYS is 225,162 in 2018, 220,536 in 2019, 207,590 in 2020, 210,742 in 2021, and 207,484 in 2022. We calculate the take-up rate by dividing the total number of newborn bonding claims by the total number of births.

[b] Taken directly from the NYS PFL report.

[c] This is the take-up rate for 2022 if we calculate take-up rates using the total number of births in the year as the denominator and the total number of parental leave claims in the year as the numerator. As mentioned above, we have calculated take-up rate for 2022 using a second method, with the total number of eligible mothers in the year as the denominator (estimated using ACS data) and use the total number of newborn parental leave claims in the year as the numerator, giving us a take-up rate of 68% for all mothers. We have only used this second method for the 2022 program.

1C.4. Estimate total program costs

We estimate the total costs of administering paid parental leave for mothers by putting together the simulated information. The total program costs are equivalent to the total benefits distributed to mothers throughout their leave. Thus, it is derived by multiplying the number of mothers taking leave by the average lengths of their leave, along with their average weekly benefit amounts. We estimate that these parameters vary across mothers in each earnings bin, and account for this in our total cost estimation. Table 1C.4.1 shows how the total cost calculations are derived for each policy, across each wage bin.

Table 1C.4.1. Total cost estimations of the current (2022) and proposed NYS paid parental leave program

Earnings Bin	NYS Program	Number of Participants	Average leave length (weeks)	Average weekly benefit	Estimated cost (millions)
<40k	Current	18,271	7.02	$309	$39.6
	Expanded	26,418	7.02	$443	$82.5
40k-60k	Current	14,292	10.54	$675	$101.7
	Expanded	14,695	10.54	$902	$139.7
60k-80k	Current	11,002	11.65	$913	$117
	Expanded	11,002	11.65	$1058	$135.6
80k+	Current	25,880	11.64	$1056	$318.1
	Expanded	26,076	11.64	$1058	$321.1
Total Cost (millions)	Current	$576.4			
	Expanded	$678.6			

We follow a similar process for estimating the total cost of the program expansion when we assume increases in take-up and average leave length.

1C.5. Estimate in-program decreases in parents' earnings

Parents would lose wages while taking paid leave.

For the NYS 2022 program, the calculation of in-program decreases in earnings needs to take into consideration the fact that even without a paid leave program, parents may still take unpaid leave. Thus, it's important to estimate the increase in duration of leave following the introduction of a paid leave program. We use Rossin-Slater (2013), who studied the increase in leave taking following the introduction of the California paid family leave program. Our estimate based on Rossin-Slater (2013) suggests that following the introduction of a paid leave program, parents would take 0.805 weeks of additional leave for every $1,000 paid leave benefit. As discussed in Table 1C.1, our micro-simulation suggests that total benefits paid would be $0.58 billion under the NYS 2022 program. Mothers that took up the program have an average weekly wage of $1,647. Thus, total lost earnings under the NYS 2022 program can be approximated by ($1647 * (580000000/1000) * 0.805). This gives us $0.8 billion of lost earnings under the 2022 program (relative to no program).

For the NYS proposed expansion, we calculate lost earnings while taking into consideration that more parents are taking paid leave under the proposal and that parents are taking longer leave.