The impacts of California’s paid Family and Medical Leave program on childhood health outcomes: immunization rates, breastfeeding, and infant mortality


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Abstract:
The impacts of paid and unpaid parental leave policies on employment-related outcomes have been studied extensively, but little attention has been paid to health outcomes. We study the impacts of California’s 2004 Family and Medical Leave program, which grants paid leave to parents, on childhood health outcomes. We collected detailed data on relevant state policies from 1995-2016. We combine these with aggregate state-year data on immunization, breastfeeding, and infant mortality rates, and state-level covariates including education, unemployment, and political ideology. We use the synthetic control method to create a better counterfactual for California and preliminary results suggest increases in immunization rates.
Background:
Parental and medical leave policies allow employees to take time off work for pregnancy and birth, for personal illness, or to care for sick children, parents and spouses. By 2013, all OECD countries other than the United States (US) offered some form of national paid leave policy. Over the past two decades, there have been hundreds of changes to legislation governing paid leave from work. Although recent trends are towards more generous benefits and government-mandated leave, there is still substantial variation in allowances and benefits, both cross-nationally and sub-nationally. The wide variation in the design and generosity of leave policies may result in heterogeneous effects, both across economic, social, and health outcomes and across population groups.

The impacts of parental leave policies on economic outcomes including employment, wages, have been studied fairly extensively. Among the many studies that evaluated the impact of the US Federal Family and Medical Leave Act (FMLA), which provided 12 weeks of unpaid leave, most did not find evidence that the provision of unpaid leave was accompanied by substantial changes in labor market outcomes. For example, Baum (2003) concluded that FMLA did not affect employment or wages, results that corroborated earlier work by (Waldfogel 1999). This may be because the leave is unpaid and short in duration, giving new mothers less control over their decisions about whether and when to return to work.(Baum 2003)

Paid parental leave policies, by contrast, induce mothers to take or extend their time away from work. Research consistently shows that expansions in the duration of paid leave were accompanied by attendant increases in leave-taking and longer durations of leave. Evidence concerning the impact of paid leave policies on wages and earnings is mixed. Whether reforms have negative, null, or positive effects might depend on the structure of the program and the point at which wages and earnings were measured.(Nandi et al. 2017)

From a population health perspective, parental leave policies have the potential to influence health over the life-course.(Burtle and Bezruchka 2016) Leave provides time for preventive care, from immunizations for infants to preventive care visits for adults and children. Leave makes time available for health-promoting behaviors from breastfeeding infants to caring for family members. Access to paid leave might increase use of health services for those with covered health conditions as well as adults caring for their children and family members. By reducing conflict between work and family responsibilities, job-protected paid leave might reduce stress related to pregnancy, personal illness, and the demands of caregiving for family members.

There is little evidence that unpaid leave impacts health-related outcomes like breastfeeding, maternal depression, or children’s cognitive or behavioral outcomes.(Washbrook et al. 2011) In a cross-national study using aggregate data from 16 OECD countries spanning the period from 1969 to 1994, Ruhm found that unpaid leave was not associated with reductions in rates of infant mortality,(Ruhm 2000) a conclusion corroborated by similar analyses of more recent data.(Shim 2016)
In contrast, evaluations of paid parental leave document impacts on infant and child mortality, with benefits largely concentrated in the post-neonatal period. For example, Ruhm (2000) and (Tanaka 2005) showed that a 10-week extension of paid leave was associated with a roughly 2.5 percent decrease in infant mortality and a 3 percent decrease in child mortality.

**Public Policy Context and California’s Paid Family Leave Reform:**
The US is the only OECD country lacking a national paid parental leave policy. The 1978 Pregnancy Discrimination Act required employers to treat pregnancy as a temporary disability. In lieu of a national paid leave benefit, some US businesses are required by the federal Family Medical Leave Act (FMLA) of 1993 to provide at least twelve weeks of unpaid leave to workers depending on eligibility criteria. Only about half of employees qualify for the twelve weeks of unpaid leave through FMLA because people working for smaller employers and those who have worked less than 1250 hours and/or 12 months are not covered. (Berger, Hill, and Waldfogel 2005) However, these criteria have also been modified by some US states, by either extending the duration of unpaid leave or easing the eligibility thresholds. (Huang and Yang 2015)

California (2004), New Jersey (2009), and Rhode Island (2014) passed legislation providing paid leave for durations of 4-6 weeks at wage replacement rates of 55-60%;(Baum and Ruhm 2016; Burtle and Bezruchka 2016; Raabe and Theall 2016).

California became the first US state to enact a paid family leave insurance program to help new parents and other family caregivers make ends meet when a new baby arrives or a family member becomes ill. From its implementation in July 2004, the Paid Family Leave program replaces wages at 55%, up to a capped amount, for up to six weeks. Beginning in 2018, for a four-year trial period, wage replacement rates will be increased to 60-70% of income. Workers do not have job protection while they are on family leave, although some may be eligible for job protection under other Federal or state laws. The program is funded through employee payroll contributions. (National Partnership for Women and Families 2016)

There are a limited number of studies assessing the effects of introducing paid family leave in California in 2004, with mixed findings with respect to employment and positive impacts on health outcomes. One documented an increase in employment among women 12 months after childbirth (Baum and Ruhm 2016), another showed no impact (Rossin-Slater, Ruhm, and Waldfogel 2013), and a third found an increase in the labor force participation rate and the unemployment rate among young women, potentially because of discrimination in hiring. (Das and Polacheck 2015) Two studies investigating the health impacts of the Paid Family Leave program found positive effects on exclusive and overall breastfeeding rates through the first three, six, and nine months following birth (Huang and Yang 2015) and reductions in the incidence of abusive head trauma admissions among children less than two years of age, potentially due to lower levels of stress and abusive behavior.(Klevens et al. 2016)

Given the relative dearth of studies estimating the impact of parental leave policies on health outcomes, we investigate the impacts of California’s Paid Family Leave program on childhood health outcomes including immunization rates, breastfeeding rates, and infant mortality.
**Data and Methods:**

We focused on three relevant outcomes: immunization, breast feeding and infant-mortality. We used data from the US National Immunization Survey 1995-2014 (NIS) to measure immunization and breastfeeding outcomes. The NIS is a telephone survey conducted by the CDC's National Center for Immunization and Respiratory Diseases. The survey queries parents and guardians about vaccine coverage among children aged 19-35 months. Parents and guardians are asked to provide their children's vaccination providers and permission to contact them. A questionnaire is then mailed to each child's vaccination provider to collect information on the type, dose, and dates of vaccine administration. We collected aggregated state-year data on 50 states plus Washington DC, and created indicator variables for receipt of three possible vaccines:

1. Dose 4 of diphtheria and tetanus toxoids and acellur pertusus (DTaP, DTP)
2. Measles-Mumps-Rubella (MMR)
3. Combination 4:3:1:3 - 4 or more doses of DTP, 3 or more doses of polio, 1 or more doses of MMR, Hib full series (3 or 4 doses)

In the NIS, breastfeeding questions began being fielded in 2001. We calculate state-year rates of breastfeeding using responses to the question “Was [child] ever breastfed or fed breast milk?”. Finally, we collected data on infant mortality from the National Center of Health Statistics and calculated state-year rates for deaths of children under 1 year of age, occurring within the United States to U.S. residents.

To measure the presence of paid parental leave policies across US states – our exposure of interest - we collected data on parental leave policies related to the Federal Family and Medical Leave Act. (National Partnership for Women and Families 2016; U.S. Department of Labor 1993) Detailed information including the reasons leave can be taken, eligibility criteria, length of leave, whether the leave is paid and, if so, the corresponding wage replacement rates – and any changes over time from 1995 to 2016 – is included in our FMLA expansion dataset. We categorize each state-year as covering the minimum FMLA requirements, as offering leave beyond the FMLA minimum but still unpaid, or as offering paid leave.

We collected aggregate state-year level data on covariates from various sources: the unemployment rate from the American Community Survey; the gross state product and the fraction of the state legislature that is Democratic from the University of Kentucky Center for Poverty Research; the Gini coefficient of income inequality and educational attainment from Mark W. Frank at Sam Houston State University; and a measure of citizen ideology from liberal to conservative (0 to 100) from Richard C. Fording at the University of Alabama.

We estimated the effects of extended paid parental leave in California on childhood immunization rates using a comparative case study approach using the synthetic control method (Abadie, Diamond, and Hainmueller 2010), specifically the “Synth” package in R. We used all other US states as potential controls except those that enacted similar policies during our study period (New Jersey) and those with limited data availability (Nebraska and
Washington DC). For each outcome separately, we created a weighted average of a subset of control states to stand in as the counterfactual California. Following (Abadie and Gardeazabal 2003), we choose weights to minimize the mean squared prediction error of the outcome for the pre-intervention periods. Our estimate of the effect of the CA policy change on immunization rates is the difference between immunization rates in CA and in its synthetic version after the passage of the law.

**Preliminary Results:**
The states chosen as the counterfactual California, and their corresponding weights, are shown in Table 1. Not surprisingly, New York and Texas contribute substantially to each synthetic control group, with Oregon usually contributing as well.

Table 1: States to contributing to synthetic controls (weights shown)

<table>
<thead>
<tr>
<th></th>
<th>DTP4</th>
<th>MMR</th>
<th>4:3:1:3</th>
<th>Infant Mortality</th>
<th>Breastfeeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alaska</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Louisiana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York</td>
<td>0.063</td>
<td>0.433</td>
<td>0.312</td>
<td>0.312</td>
<td>0.238</td>
</tr>
<tr>
<td>Oregon</td>
<td>0.365</td>
<td></td>
<td>0.241</td>
<td>0.241</td>
<td>0.353</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>0.145</td>
<td></td>
<td></td>
<td></td>
<td>0.051</td>
</tr>
<tr>
<td>Texas</td>
<td>0.427</td>
<td>0.398</td>
<td>0.401</td>
<td>0.401</td>
<td>0.356</td>
</tr>
</tbody>
</table>

Pre-policy change sample characteristics are shown in Table 2. California is fairly different from the rest of the US on a number of factors: a vastly larger Gross State Product, higher unemployment and income inequality, and more liberal/Democratic. The synthetic control groups are much more similar to California, with the continued exception of Gross State Product.
Table 2: Pre-2004 sample characteristics

<table>
<thead>
<tr>
<th></th>
<th>Average for total sample</th>
<th>California</th>
<th>DTP4 Synthetic Control</th>
<th>MMR Synthetic Control</th>
<th>4:3:1:3 Synthetic Control</th>
<th>Infant Mortality Synthetic Control</th>
<th>Breastfeeding Synthetic Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed high school</td>
<td>61.2%</td>
<td>57.7%</td>
<td>58.3%</td>
<td>58.0%</td>
<td>58.4%</td>
<td>57.0%</td>
<td>59.0%</td>
</tr>
<tr>
<td>Completed college/university</td>
<td>16.5%</td>
<td>18.0%</td>
<td>17.0%</td>
<td>17.2%</td>
<td>17.1%</td>
<td>17.3%</td>
<td>17.4%</td>
</tr>
<tr>
<td>Gini coefficient of income inequality</td>
<td>0.572</td>
<td>0.624</td>
<td>0.588</td>
<td>0.616</td>
<td>0.606</td>
<td>0.622</td>
<td>0.598</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>4.68</td>
<td>5.80</td>
<td>5.71</td>
<td>5.66</td>
<td>5.69</td>
<td>5.41</td>
<td>5.76</td>
</tr>
<tr>
<td>Gross State Product (millions USD)</td>
<td>$184,076</td>
<td>$1,405,928</td>
<td>$431,740</td>
<td>$679,221</td>
<td>$608,901</td>
<td>$807,327</td>
<td>$520,679</td>
</tr>
<tr>
<td>Citizen ideology (0 to 100, conservative to liberal)</td>
<td>48.5</td>
<td>55.4</td>
<td>55.1</td>
<td>49.8</td>
<td>52.6</td>
<td>52.6</td>
<td>55.3</td>
</tr>
<tr>
<td>Fraction of State House Democratic Party</td>
<td>52.0%</td>
<td>56.8%</td>
<td>56.0%</td>
<td>54.8%</td>
<td>55.9%</td>
<td>57.9%</td>
<td>55.4%</td>
</tr>
</tbody>
</table>
If the synthetic control approach is successful, we should see evidence of improved exchangeability, not only on the pre-period sample characteristics, but also in terms of the outcomes of interest in the pre-policy change period. Figures 1-3 show that the synthetic control groups show more similar levels and trends in the outcomes when compared to California, whereas the trends for all other states look quite different. Figures 4 & 5 show that rates of infant mortality and breastfeeding are more similar in CA and the synthetic controls than they are in CA and the other potential control states. The trends are similar however the levels are not the same. The implications for our synthetic control approach are discussed below.

Figures 1-5: Trends in outcomes for California, the synthetic control group, and all other states
Figure 2

Trends in MMR coverage, 1995-2014

% coverage of MMR vaccine

California
Synthetic California
All other states

Figure 3


% coverage of 4:3:1:3 vaccine

California
Synthetic California
All other states
As described above, the estimate of the effect of the CA policy change is the difference between the outcome in CA and in its synthetic control after the passage of the law. Figures 6-10 plot the differences in each outcome over time (we are currently working on variance estimates). While the data are somewhat noisy, our preliminary results suggest a relative increase in rates of DPT4 and MMR after California’s paid parental leave policy. The impact on MMR looks like it may be relatively short-lived. In contrast, we suggestive evidence of an
immediate impact on the 4:3:1:3 immunization coverage, but our follow-up period is currently too short to conclude much.

The persistent differences in levels of infant mortality and breastfeeding rates suggest that taking a simple difference in the post-policy period is not an adequate approach to estimate an unbiased effect of the policy. Our work between now and June will focus on a mixed approach, using the weighted average synthetic control groups and estimating a difference-in-differences model to account for fixed differences between the groups over time.

Figures 6-10: Raw differences in outcomes between California and the synthetic control group