

Paid Family Leave and Innovation: Women Inventors on U.S. Patents

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(Presenter)

Abstract

Women inventors are still underrepresented in the world of inventing. For instance, the proportion of women in patent applications is less than 20%.¹ One challenge of female inventors is work-life balance issues, particularly caregiving to child. Motherhood penalty has been consistently shown with data across countries, i.e. mother's earning drops significantly relative to fathers' earning after the birth of child (Klevin et al. 2019).

This paper examines how paid family leave (hereafter, PFL) policy, which provides eligible employees paid time off to care for their newborn child, affects the innovation activities of female inventors. We hypothesize the adoption of PFL induces female inventors to participate more because they are less likely to drop out from the inventor career after the birth of child. Further, this effect should be larger for small firms or firms in fields that provided female inventors relatively lower maternity benefits before the law. Second, providing family-friendly policies may increase total innovation output including the number and quality of innovations. Increasing diversity and promoting women's more active participation could produce even more effective innovation outcomes.

To shed a light on these issues, we use a difference-in-difference empirical approach, examining changes in innovation outcome in states that implemented PFL programs during our sample period (California and New Jersey, Rhode Island, and New York) relative to comparable outcomes in eight states including D.C. ² that passed the law after 2019. Using USPTO PatentsView database from 1980 to 2019, our empirical strategy has several components. First,

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¹ Why are so few women inventors named on patents? BBC 2019, <https://www.bbc.com/news/technology-49843990>

² Comparison group includes CO, CT, DE, MA, MD, OR, WA, and D.C.

to test our hypotheses stated above, we construct measures for the women inventor rate, which is the share of women among all inventors in a given period of time. Second, to examine whether the adoption of PFL affects individual productivity, we use the occurrence of multiple patents featuring the same inventors in a given window of time as an indicator of team persistence. The repetition of the same pairs of inventors indicates work stability. Further, we examine the state-level innovation outcomes including the number of patents and citations. In addition to using citations received as a measure of patent quality, we also use measures of patent generality and originality.

Our empirical analysis leads to several conclusions. First, tests at the state-level suggest that the adoption of PFL attracts more female inventors in small firms that provided relatively lower maternity benefits. It supports our hypothesis that the effect of the law could be larger for these firms since they faced a relatively higher risk of losing their talented employees before the law due to a lack of family-friendly policies. Second, inventor-level analyses show that the implementation of PFL improves both productivity of female inventors with superior ability and team persistence. Third, state-level analyses using all inventors provide empirical evidence that the implementation of PFL improves aggregate innovation outcome, and the impact is stronger for male-dominated fields.

This paper contributes to the growing literature that examines the economic effects of state-level PFL policies in the U.S. Predominantly, previous studies focus on parental and infant health or labor market outcomes (Ruhm, 2011; Bullinger, 2019; Rossin-Slater et al). Second, our work provides a more comprehensive picture on how PFL program affect innovation activities by considering firm types or technological fields. The previous two related papers (Jin and Zhu, 2021; Lim, 2021) mainly focus on innovation outcomes by public firms. It is important to understand the effects of PFL by firm types or technological fields, however, since access to employer-provided PFL benefits vary across fields.

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