Worker Paid Leave Usage Simulation (Worker PLUS) Model

Issue Brief: Estimating Impacts of Leave Policies on Low-Wage Workers

January 2021

OVERVIEW

The Family and Medical Leave Act (FMLA) has provided up to 12 weeks of job-protected unpaid leave to eligible U.S. workers since 1993.[i] While the FMLA has increased access to leave among eligible workers, the scale of the program is still limited. To qualify, workers must have worked at least 1,250 hours over the past 12 months for the same employer, and the employer must have at least 50 employees within 75 miles of the work site.[ii,iii] About 45% of workers do not meet these requirements. The unpaid nature of the FMLA leaves about 50 million U.S. workers without access to paid sick days, and many workers lack sufficient paid time off for family and medical needs. Only 39% have access to short-term disability insurance that provides cash benefits for non-work-related medical conditions, including childbirth,[iv] and 15% of workers have access to paid leave to care for family members. Even among these workers, the low wage replacement rates still render leave time unaffordable for many.

There have been some attempts at the federal level to respond to these types of concerns, such as the Healthy Families Act introduced to Congress in March 2019 that proposes to provide employees the opportunity to earn a minimum of seven paid sick days per year.[v] However, the main responses have been from individual states or localities, which have independently enacted their own family leave policies to provide more comprehensive leave benefits, such as paid sick days, and to expand coverage by loosening the federal eligibility requirements.

Among those relatively few states and localities that have implemented such plans, the terms differ. For example, the San Francisco Paid Sick Leave Ordinance covers nearly all workers in San Francisco and provides up to five paid sick leave days per year for workers in small businesses (with fewer than 10 employees) and up to nine days per year for workers in larger businesses.[vi] Vermont workers, on the other hand, must work at least 18 hours per week for at least 20 weeks to be eligible for up to five sick days per year.[vii] Among the jurisdictions with paid leave programs funded by payroll taxes (including California, the District of Columbia, New Jersey, New York, Rhode Island, and Washington), program eligibility and benefits also vary widely.[viii] These variations across jurisdictions reflect different considerations to balance a range of economic issues and trade-offs, including the impact on employment stability of leave takers, the differential effects of paid leave across age groups and industries, and the marginal cost of various policy parameters. This consequently makes impact evaluation of these policies a complicated task, in that many factors and the interdependence among them need to be considered, including eligibility rules, program benefits, program take-up rates, prevailing wages, worker characteristics, and workers' leave-taking behaviors.

To facilitate understanding of the potential impacts of different policy alternatives on workers' leave-taking behaviors and program costs, the U.S. Department of Labor's Chief Evaluation Office contracted with IMPAQ International, and its partner Institute for Women's Policy Research (IWPR), to develop the Worker Paid Leave Usage Simulation (Worker PLUS) model, an open-sourced microsimulation tool based on public microdata and predictive modeling. The model and other relevant materials are publicly available at [*hyperlink*].

In this issue brief, we use simulation results from the Worker PLUS model to analyze the impacts of moving from the unpaid leave system under the current Family and Medical Leave Act to a system that includes a paid leave program that adopts the program rules of the existing program in California. The population considered consists of individuals who work in the state of Maryland who meet the eligibility rules of the California program, and among them, the low-wage workers who earn no more than $30,000 annually.

The examples demonstrated in this brief should help users perform similar impact evaluation tasks or extend the analyses to other topics related to worker leaves, using the simulation results from the Worker PLUS model.

This brief explores and quantifies how the benefits of paid leave differ across the income distribution, with a particular focus on low-wage workers, a group that suffers from lack of paid leave.[ix] Our results are derived from the Worker PLUS model developed by IMPAQ International and the Institute for Women's Policy Research for the Chief Evaluation Office at the U.S. Department of Labor (DOL). The model uses 2018 DOL FMLA Employee Survey public microdata to train models for individual-level leave needs and behaviors. With user-supplied paid leave program parameters (such as eligibility rules), the model then simulates specific leave-taking behavior and outcomes (including number of leaves, leave lengths, benefit levels, and benefit eligibility) for individual workers in a state using data from the 2014–2018 five-year American Community Survey (ACS) Public Use Microdata Sample (PUMS). The model outputs a post-simulation ACS PUMS state sample, which allows users to analyze leave benefits of the given paid leave program for individuals, subgroups, and the population.

Throughout this issue brief, we use the state of Maryland as a case study. As of February 2020, Maryland adopted only the federal FMLA policy.[x] In a counterfactual simulation, we quantify the impacts of Maryland's adopting a paid leave program with the same parameters as the current paid leave program in California, State Disability Insurance (SDI). California SDI features minimum requirements on wage earnings (a minimum of $300 per year) and allows a paid leave period up to one year for a worker's own disability or maternity and up to six weeks for family care.[xi]

A SIMULATION ANALYSIS OF MARYLAND WORKERS, WITH A FOCUS ON LOW-WAGE WORKERS

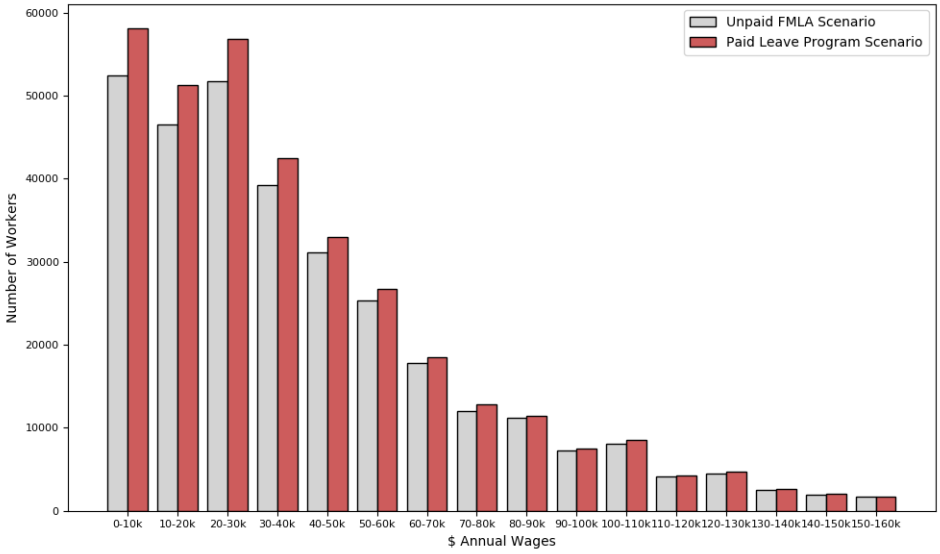
ANALYSIS OF THE IMPACT OF THE PROGRAM ON ELIGIBLE WORKERS

In this counterfactual study, the Worker PLUS model simulates two sets of leave behaviors for Maryland workers, including (i) leave-taking behavior without any paid leave program (thus only the unpaid FMLA coverage is in place), and (ii) leave-taking behavior under the hypothetical scenario where a program identical to California's is adopted. The comparison of leave taking between the two scenarios then reveals the simulated impact of the hypothetical program.

The Worker PLUS model assumes that a paid leave program can affect workers' leave-taking behavior through two different mechanisms. First, with the paid leave program as an additional source to fund leave, workers will be more willing to take leave or take longer periods of leave using existing funding resources, such as employer resources (e.g., paid time off or employer-sponsored sick leave) or their own resources (i.e., unpaid leave). This is the *indirect effect*. Second, workers can take leave by participating in the paid leave program. This is the *direct effect*.

We first consider the aggregate of the indirect and direct effects. The relevant workers are those who are eligible for the paid leave program, but may take paid leave sponsored by employers, take paid leave under the paid leave program, or take unpaid leave. **Exhibit 1** presents the simulated number of workers in Maryland who take leave over a 12-month period under the unpaid FMLA scenario and under a scenario where Maryland adopts a program with identical parameters to those of California. Worker counts are aggregated by $10,000 annual wage bins, and wage is censored at the top 5% (around $158,000 per year) for clearer visualization. The exhibit shows that the number of leave takers increases almost for all wage groups with program implementation. Based on the ACS population weights, we estimate that the number of leave takers would increase by approximately 7.7%, from 329,310 to 354,819 workers, out of an estimate of 1,955,310 eligible workers under the hypothetical program.

Exhibit 1: Simulated Number of Leave Takers by Wage Group

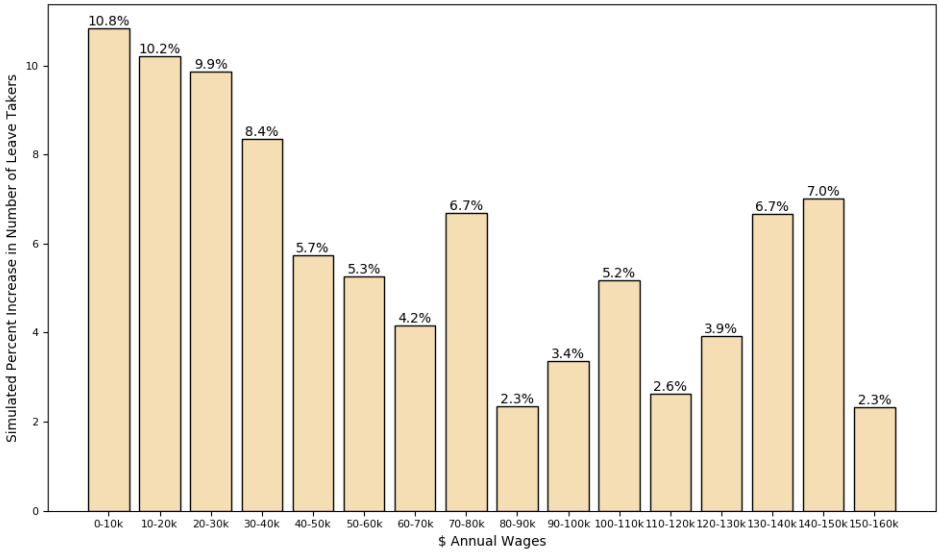


Note: Worker counts are estimated based on simulation output of the Worker PLUS model, which uses the 2014–2018 ACS PUMS data file containing data on individuals who work in Maryland. Histogram bin size is $10,000 in wages per year. Wage is censored at the top 5% of the sample for clearer visualization. Paid leave program rules follow those adopted by California State Disability Insurance and Paid Family Leave programs during 2014–2018. Sample size is 91,822 with the program rules applied to the ACS sample, representing an underlying eligible worker population of 1,955,310.

The above plot reveals the prevalence of leave taking across the wage distribution. **Exhibit 2** displays the percent increase in the number of leave takers by wage group. Overall, under the hypothetical program, the number of leave takers increases the most, by 10% or

higher, among low-wage workers who earn no more than $30,000 annually, or equivalently earn no more than $15 per hour in a full-time job (assuming 50 work weeks and 40 work hours per week).[xii] These are precisely the workers who suffer from lack of paid sick leave and family leave, as shown by the 2018 National Compensation Survey summary data.[ix]

Exhibit 2: Simulated Percent Increase in Number of Leave Takers by Wage Group



Note: Percent increases are estimated based on leave-taking worker counts simulated by the Worker PLUS model, which uses the 2014–2018 ACS PUMS data file containing data on individuals who work in Maryland. Histogram bin size is $10,000 in wages per year. Wage is censored at the top 5% of the sample for clearer visualization. Paid leave program rules follow those adopted by California State Disability Insurance and Paid Family Leave programs during 2014–2018. Sample size is 91,822 with the program rules applied to the ACS sample, representing an underlying eligible worker population of 1,955,310.

Exhibit 3 (a) and (b) show the leave taker counts and increases in leave length, both by leave reason, among the low-wage workers. The six leave reasons shown in the exhibits represent leaves taken due to, respectively, a worker's own health concerns, maternity disability, bonding with a new child, caring for an ill child, caring for an ill spouse, and caring for an ill parent. The Worker PLUS model focuses on these leave reasons in that they are the most common ones causing worker leaves, accounting for over 96% of all leaves taken based on the 2018 DOL FMLA Employee Survey public microdata.[xiii]

In **Exhibit 3** (a), the leave taker counts under the unpaid FMLA scenario are also presented for comparison. Across all leave reasons, the model predicts that there will be a substantial increase in number of leave takers after the paid leave program implementation. **Exhibit 3** (b) shows the exact magnitudes of increase, ranging from 42% for leaves taken due to *Own Health*, to 912% for leaves due to *Ill Child*. **Exhibit 3** (b) also shows the increases in aggregate leave length, computed as the percent increase in the sum of leave lengths across all eligible workers for a given leave reason.

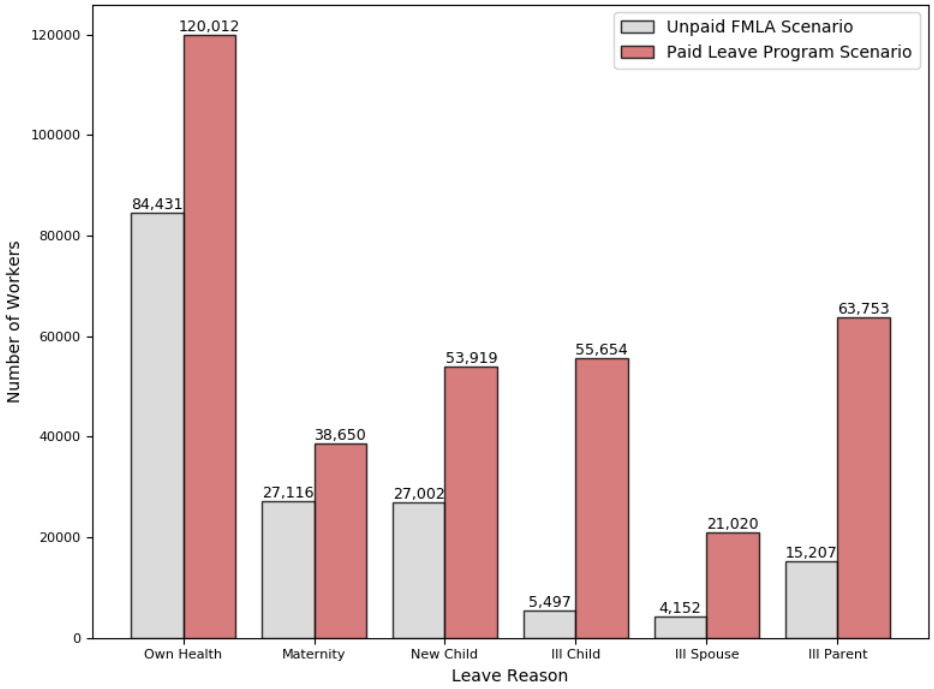
Exhibit 3 reveals two interesting results. First, the magnitude of increase is large for both the number of leave takers and the aggregate leave length. This may raise concerns about a paid leave program incentivizing too many leaves, which could disrupt business or damage workplace morale. However, the concern should be mitigated when the baseline levels (leave-taker counts and leave lengths under the without-program scenario) are considered. For example, for the leave reason *Ill Child*, for which the largest increases are seen, the number of low-wage leave takers has increased from 5,497 to 55,654, or from 0.76% to 7.7% of all eligible low-wage workers, and the aggregate leave length has increased from 65,671 days to 514,202 days (not shown in exhibit), or from 0.035 days to 0.27 days per eligible worker per year. Similar results hold for leave reasons *Ill Spouse* and *Ill Parent*. These results suggest that the paid leave program can incentivize more leave taking, but the leaves taken will remain a small proportion of work time among all low-wage workers. Therefore, the overall impact of the additional leaves on business operations or workplace morale will be limited.

Second, the aggregate leave length increases in similar magnitude as number of leave takers for *Own Health*, *Maternity*, and *New Child*. However, the increase in leave length is *smaller* than the increase in number of leave takers for *New Child* (100% increase in number of leave takers versus 72% increase in leave length), *Ill Child* (912% versus 683%), *Ill Spouse* (406% versus 310%), and *Ill Parent* (319% versus 215%). This suggests that the additional leave takers simulated with the paid leave program in effect taker *shorter* leaves on average due to these reasons, compared to the simulated existing leave takers when the program is absent. For example, the average

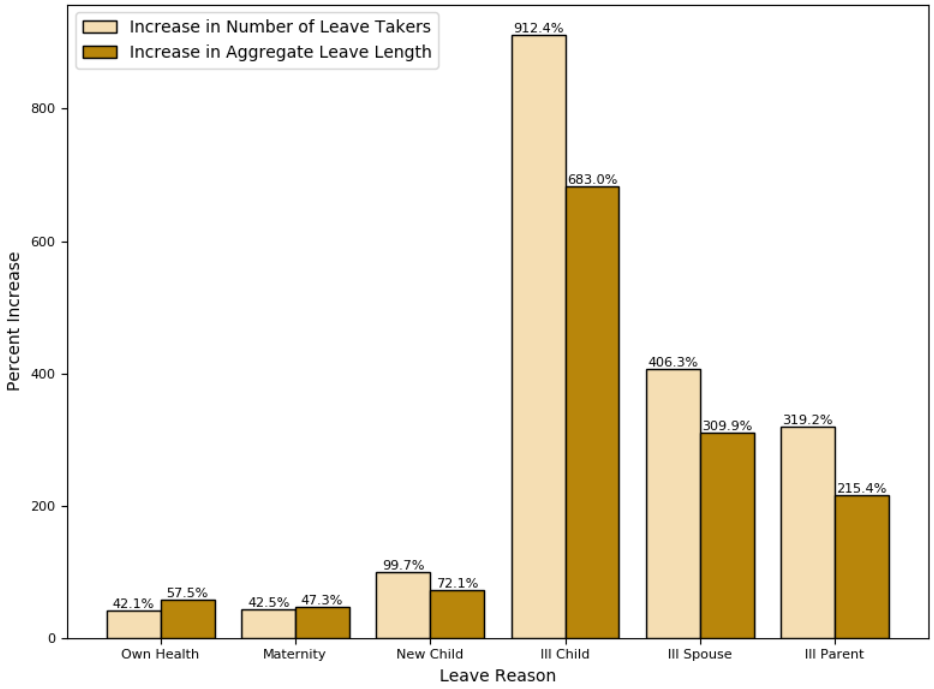
leave length due to *Ill Child* per leave taker has *decreased* from 13.3 days to 9.5 days per year (not shown in exhibit). Namely, the simulation model predicts that the impact of a paid leave program on low-wage workers' leave taking is primarily through increasing the number of leave takers, instead of through incentivizing existing leave takers to take longer leaves.

Exhibit 3: Simulated Number of Low-Wage Leave Takers and Increase in Leave Lengths with Paid Leave Program Implementation

(a) Number of Leave Takers



(b) Increase in Number of Leave Takers and Leave Lengths



Note: Number of workers and percent increases are estimated based on leave-taking worker counts and leave lengths simulated by the Worker PLUS model, which uses the 2014–2018 ACS PUMS data file containing data on individuals

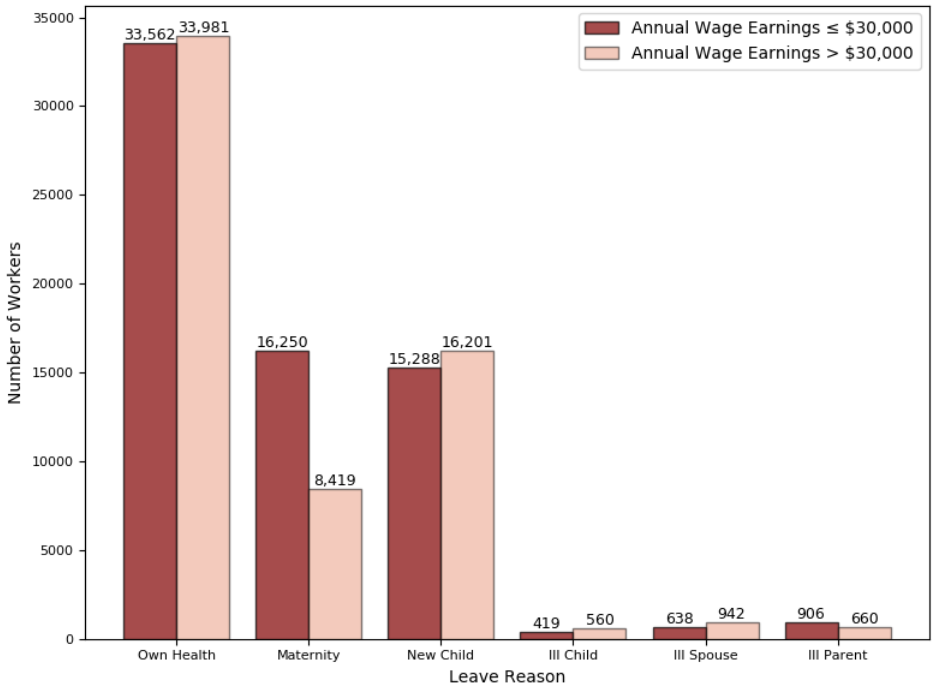
who work in Maryland. Paid leave program rules follow those adopted by California State Disability Insurance and Paid Family Leave programs during 2014–2018. Sample size is 32,331 with the program rules applied to the ACS sample, representing an underlying eligible low-wage worker population of 726,936. Low-wage workers are defined as those who earn no more than $30,000 a year. Increase in leave length for a given leave reason is computed as percent increase in total leave lengths due to that reason aggregated across all eligible workers.

ANALYSIS OF PAID LEAVE PROGRAM PARTICIPANTS

The analyses above have focused on the aggregate of indirect and direct effects of a hypothetical paid leave program. Namely, the workers being analyzed include all eligible workers regardless of program participation, and the leaves being analyzed include all leaves taken either covered or not covered by the program. We now turn to the direct effect alone, by focusing on the low-wage workers who are simulated to take leave as participants in the paid leave program. This allows us to evaluate how the program can directly benefit workers through wage replacement.

Exhibit 4 shows the simulated number of program participants across different reasons for leave taking for both low-wage and high-wage workers. Low-wage participant counts in **Exhibit 4** sum to 60,282 workers across leave reasons (after adjusting for multiple reasons incurred by the same worker), accounting for 52% of all recipients. This suggests that disproportionally more low-wage workers will receive benefits from the program than workers in the high-wage group, as the low-wage group accounts for only 37% of all eligible workers for the program, and our model assumes independence between program take-up and wage earnings. Similar results hold specifically for workers with leaves taken due to maternity disability or bonding with a new child, as 29,185 low-wage workers, equivalent to 56% of all eligible workers, are simulated to receive these benefits (after adjusting for multiple reasons incurred by the same worker). These results indicate that the program can precisely address the widely recognized and pressing need for more generous maternity and paternity paid leave policies.[xiv]

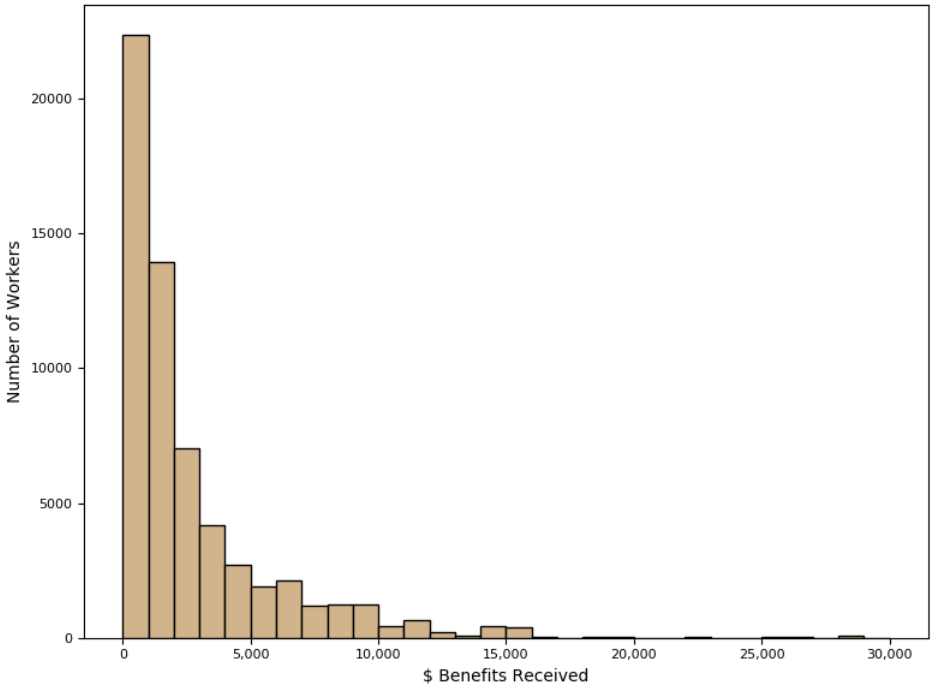
Exhibit 4: Simulated Number of Paid Leave Program Participants by Leave Reason and Low-Wage Status (≤ $30,000 per year)



Note: Number of workers receiving program benefits are simulated by the Worker PLUS model, which uses the 2014–2018 ACS PUMS data file containing data on individuals who work in Maryland. Paid leave program rules follow those adopted by California State Disability Insurance and Paid Family Leave programs during 2014–2018. Sample size is 5,133 simulated program participants with the program rules applied to the ACS sample, representing an underlying eligible worker population of 116,665. Sample size is 2,581 for low-wage worker participants, representing an underlying population of 60,282. Low-wage workers are defined as those who earn no more than $30,000 per year.

Lastly, **Exhibit 5** presents the distribution of the amount of program benefits received by the simulated 60,282 low-wage participants in Maryland. These benefits are concentrated toward the left of the distribution, below $4,000 per year, with a mean of $2,505, equivalent to 20% of mean wages of these worker recipients. The magnitude of these paid leave benefits suggests substantial financial support for low-wage workers and their families with unmet leave needs due to financial constraints.

Exhibit 5: Simulated Number of Low-Wage Paid Leave Program Participants by Benefit Level



Note: Number of workers receiving program benefits are simulated by the Worker PLUS model, which uses the 2014–2018 ACS PUMS data file containing data on individuals who work in Maryland. Histogram bin size is $1,000 in wage replacement benefits received from the paid leave program per year. Paid leave program rules follow those adopted by California State Disability Insurance and Paid Family Leave programs during 2014–2018. Sample size is 2,581 simulated low-wage program participants with the program rules applied to the ACS sample, representing an underlying eligible worker population of 60,282. Low-wage workers are defined as those who earn no more than $30,000 per year.

IMPLICATIONS

This brief shows the simulated impacts of adopting a hypothetical paid leave program on a state's workers and low-wage workers who earn no more than $30,000 per year, based on the simulation results produced by the Worker PLUS model. The input data for the simulation are the 2018 FMLA Employee Survey and 2014–2018 five-year ACS public use microdata. The eligibility rules and program take-up rates of the hypothetical program are assumed to follow the paid leave program implemented in California during 2014–2018, one of the existing state paid leave programs. The program is simulated using data from workers in Maryland, a state with active discussion on implementing its own paid leave program as of February 2020. Our analyses suggest the following:

- Adoption of a paid leave program is progressive in that it benefits low-wage workers and their families more than the higher-wage groups. Among low-wage workers, the simulation predicts about a 10% increase in the number of leave takers (versus 7.7% for all workers), and the low-wage workers account for 52% of all program participants (versus 37% of low-wage workers among all eligible workers).
- The increase in the number of leave takers is predicted to be larger across all leave reasons. Among low-wage workers, the increase is around 50% for leaves taken due to the worker's own illness and maternity disability, and it ranges from 100% (for workers taking leave to bond with a new child) to over 900% (for workers taking leave to care for an ill child). We note, however, that

these large increases are for leave reasons that are relatively uncommon among workers as predicted by the model. Therefore, even with the large increase in leave takers, the total number of leave days would remain a small proportion of work time, at 0.27 per eligible worker per year. This suggests that, overall, the program can benefit low-wage workers without introducing excessive costs in the areas of business operations and workplace morale.

- Among program participants, low-wage workers who earn no more than $30,000 annually are predicted to receive an average of $2,505 per year from the program. This is equivalent to 20% of mean wages for these workers, indicating substantial financial relief during their leave. Low-wage participants account for 56% of those predicted to take leave due to either maternity disability or bonding with a new child. This proportion exceeds that of low-wage workers among all eligible workers, at 37%, suggesting that the program is also progressive in directly benefiting workers in need of these leaves through wage replacements.

APPENDIX A: GUIDE TO REPLICATING RESULTS IN THIS ISSUE BRIEF

Model users should follow the steps below to replicate the results in this brief. The results can be replicated using the random seed value specified below on a Windows 10 Pro operating system with OS Build version 19041.630. The results may slightly vary for different Windows operating systems and OS Build versions.

1. Ensure that all model materials have been downloaded according to the Worker PLUS Model User Manual.[xv]
2. Ensure that the file *analysis_low_wage_workers.py* is placed in the same directory as other code files, such as *_5a_aux_functions.py* and *Utils.py*.
3. Follow the user manual to complete these steps:
    a. Launch the model graphical user interface (GUI).
    b. Turn on the Advanced Parameters button.
    c. Use the 2018 FMLA Employee Survey data and the 2014–2018 ACS PUMS data as input files.
    d. Set Output Directory as a desired local directory (e.g., the "*output*" folder in the same directory as the code file *analysis_low_wage_workers.py*).
    e. Set Random Seed to 12345 and Engine Type to Python.
    f. Set Simulation Method to *Logistic Regression GLM.*
4. Set state to simulate and apply the corresponding parameters.
    a. In the main panel of the GUI, set State to Simulate to MD (i.e., Maryland).
    b. Under the Simulation tab of the GUI, set Existing State Program to CA (i.e., California). This will auto-fill all the parameters under *Program* and *Population* tabs with the pre-configured parameters for the California program and population.
5. Click the Run button to execute the simulation.
6. After the simulation is completed, navigate to the output directory (as specified in Step 3d) and choose the latest output folder. The latest output folder can be identified by the folder name, which contains the date stamp and time stamp of when the model is executed. For example, the folder named "*output_20200924_115049_main simulation*" contains simulation output files from the simulation executed on September 24, 2020 at 11:50:49 local machine time.
7. In *analysis_low_wage_workers.py*, update the following:
    a. Line 15 as local directory to store output figures files.
    b. Line 18 as the label for time stamp and date stamp corresponding to the label in the output folder file name, e.g., "*20200924_115049.*"
    c. Line 19 as a user-defined label that identifies the simulation method. This label will only be added to output file names and can be any string preferred by the user. For example, in Step 3f the simulation method is set to *Logistic Regression GLM* in the model GUI, and the string can then be set to "*glm*" for easy reference.
    d. Line 24 as the same local directory specified in Step 3d.
8. Run *analysis_low_wage_workers.py* from terminal, and all output figure files will be saved in the folder specified in Step 7a.

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[i] Congress (1993). Family and Medical Leave Act of 1993. 130th Congress. January 5. Washington, D.C.
[ii] Jorgensen, H., & Appelbaum, E. (2014). Documenting the need for a national paid family and medical leave program: Evidence from the 2012 FMLA survey. Center for Economic Policy and Research, Washington, DC.
[iii] Klerman, J. A., Daley, K., and Pozniak, A. (2012). Family and medical leave in 2012: Technical report. Cambridge, MA: Abt Associates Inc.
[iv] Acosta and Wiatrowski (2017). National Compensation Survey: Employee Benefits in the United States, March 2017. September. Bulletin 2787. U.S. Bureau of Labor Statistics.
[v] Congress (2019). Healthy Families Act. 116th Congress. March 14. Washington, D.C.
[vi] Office of Labor Standards Enforcement, San Francisco (2020). Paid Sick Leave Ordinance. Retrieved from https://sfgov.org/olse/paid-sick-leave-ordinance-pslo
[vii] Department of Labor, Vermont (2020). Vermont Earned Sick Time Rules. Section 3. Definitions, and Section 5. Accrual of Earned Sick Time. Retrieved from https://labor.vermont.gov/sites/labor/files/doc_library/Earned-Sick-Time-Rules.pdf?wpmobileexternal=true
[viii] For details on state paid leave program features, see https://edd.ca.gov/Disability (California), https://does.dc.gov/page/dc-paid-family-leave (District of Columbia), https://myleavebenefits.nj.gov/worker/fli (New Jersey), https://paidfamilyleave.ny.gov (New York), http://ripaidleave.net (Rhode Island), and https://paidleave.wa.gov (Washington).

[ix] Acosta, R. A. and Wiatrowski, W. J. (2018). National Compensation Survey: Employee Benefits in the United States, March 2018. Bulletin 2789. Table 32. Leave Benefits: Access, Civilian Workers, March 2018.

[x] CBS Baltimore (2020). Lawmakers discuss Maryland family leave bill. February 24. Retrieved from https://baltimore.cbslocal.com/2020/02/24/hearing-set-for-maryland-bill-to-provide-family-leave

[xi] See https://edd.ca.gov/Disability/Am_I_Eligible_for_PFL_Benefits.htm for details on eligibility for the California State Disability Insurance program.

[xii] The threshold of $15 per hour for defining low-wage workers is consistent with the 2018 FMLA Employee Survey.

[xiii] The variable used for deriving proportion of leave reasons is a5_mr_cat in the 2018 DOL FMLA Employee Survey public microdata.

[xiv] For more details on need for paid maternity and paternity leave among low-wage workers, see Gupta, P., Goldman, T., Hernandez, E., & Rose, M. (2018). Paid Family and Medical Leave is Critical for Low-wage Workers and Their Families. Center for Law and Social Policy. Retrieved from https://www.clasp.org/publications/fact-sheet/paid-family-and-medical-leave-critical-low-wage-workers-and-their-families; and Mehta, D. (2020) How to Ask for Parental Leave When You're an Hourly Worker. Retrieved from https://www.nytimes.com/article/parental-leave-hourly-worker.html

[xv] The Worker PLUS Model User Manual is provided along with model code and data files during model downloading. See IMPAQ (2021). Worker Paid Leave Usage Simulation Model User Manual.