**Issue Brief Outline: Comparing the Results of ACM/IMPAQ models**

This brief compares a new paid leave microsimulation model funded by the US Department of Labor (DOL) to an older version of the model. Both models are also compared to actual historical paid leave program statistics. The purpose of this exercise is to benchmark the newer model’s performance at modeling state paid leave programs.

# Project Overview

Access to and use of paid and unpaid leave are critical to an individual’s financial security and quality of life (Winston, 2017). The United States remains an outlier when it comes to paid leave. Nearly every other developed country provides paid maternity leave, and most advanced industrial countries offer extended paid medical and parental leaves. In the US, there is no federal requirement for paid leave or sick days, which leaves many individuals, especially low-income workers, facing difficult tradeoffs. In 2016, only 14 percent of all US workers have access to paid family leave through their employers, and 68 percent have paid sick leave (BLS, 2016).

However, in recent years, paid family and medical leave programs have received considerable support from both sides of the political aisle. Some states and municipalities have moved forward on paid family leave. California enacted paid family leave legislation in 2002, New Jersey in 2008, Rhode Island in 2013, New York in 2016 (effective January 2018), District of Columbia in 2017 (effective July 2020), and Washington in 2017 (effective January 2020). Several states and municipalities using government funds have examined the feasibility of instituting paid leave polices in their constituency. However, the sophistication and reliability of these methods are inconsistent. In order to support different state’s quantitative evaluation of proposed paid leave policy, DOL funded the creation of a microsimulation model built by the Institute for Women’s Policy Research (IWPR), Randy Albelda, and Alan Clayton-Matthews (the ACM model). This model offered a rigorous way for any state or municipality to test different scenarios of paid-leave programs and to estimate the implications on costs in benefits paid out.

However, the ACM model was built in proprietary programming languages and requires advanced programming knowledge to use. To make the model more accessible to a wider audience, DOL contracted with IMPAQ International and IWPR to create a new version of the model (the IMPAQ model). The underlying purpose of this model was similar; to still be a rigorous model of leave taking behavior that policymakers could use to quantitatively evaluate proposed leave policy. However, the IMPAQ model is built in open-source programming languages, makes several changes to the model output structure, and has an accessible graphic user interface. These changes make the IMPAQ model more accessible, customizable, and usable to a broader audience.

This brief provides a benchmark comparison between the two models against real-world leave program statistics to demonstrate the reliability of both the original and new versions at modeling real-world leave taking. The IMPAQ model is not a pure replication of the ACM model. While similar in many ways, the IMPAQ development team has made several changes for ease of use and generalizability of the model. While the intent is to keep model output estimates close to both ACM model estimates and empirically observed leave taking data, these adjustments have slight impacts on program estimates. By conducting these comparisons, we show the extent to which the ACM and IMPAQ model estimates differ. We also compare how both models compare to real-world program statistics. We then discuss the differences in results and how differences in the model structure could explain them.

We benchmark both models against actual statistics reported by three states with leave programs with appreciable historical data to observe: California, New Jersey, and Rhode Island. Corresponding with the timeframe of the 2012-2016 ACS 5-year survey data set used in the simulation models, we generally compare the 5-year averages of these states from 2012-2016. Rhode Island has only been active from 2014-2016, and so averages from only those years are used for Rhode Island.

# Methodology

To compare the two models and actual statistics, we perform two different types of comparisons:

***Comparing simulated and published program costs.*** The ability to closely predict total program cost has been one of the primary uses of the original ACM model; it is natural that we test the IMPAQ model’s ability to replicate these results. There are three states with sufficient historical data on benefit outlays to perform this test on: California, New Jersey, and Rhode Island. For each state, we specified the model parameters so that they can approximate the eligibility rules and benefit payout schedules as closely as possible to the actual rules of the programs. Upon completion of simulation under a given simulation method for a given state, we compute the weighted sum of benefits received by each ACS worker in that state, with weight being the population represented by the worker (i.e. the ACS variable *PWGTP*). This weighted sum is our simulated total program cost and is then compared against the published program outlays of the same state.

***Comparing simulated and observed population-level statistics.*** We recognize that the robustness of a microsimulation model cannot be fully verified if we can only confirm that the model can produce good estimates for the final program cost. In addition, we need to validate the model’s capability to approximate the real-world mechanisms by examining a series of key intermediate outputs. In our case, we consider the following intermediate outputs at the population level:

* Total number of workers eligible for the program
* Total number of leave takers receiving benefits
* Average lengths of leaves where takers receive benefits
* Total number of leave needers receiving benefits

All of these population level statistics can be computed directly based on the respective variables observed for each worker in the FMLA data, allowing the comparison with the simulated counterparts for model testing purpose. All statistics are reported with the sampling standard error derived from the ACS replicate weights using the procedure described by the Census Bureau (Census Bureau, 2014).

# Results

1. Results
   1. Compare R, Python, ACM models:
      1. Population leave needing/taking estimates
      2. Length of leave estimates
      3. Number of eligible workers for program
      4. Program cost estimates
   2. Discuss results
2. Conclusion
   1. Summary of findings
   2. Explanations for differences
   3. Next steps

**Mock Graphs for Results Section**

Bibliography

Winston, P. (2017). Exploring the Relationship between Paid Family Leave and the Well-being of Low-Income

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Census Bureau (2014). American Community Survey Design and Methodology. Chapter 12: Variance Estimation. Retrieved from <https://www2.census.gov/programs-surveys/acs/methodology/design_and_methodology/acs_design_methodology_report_2014.pdf>

Appendix

**ACM Parameters**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **CA** | **NJ** | **RI** |
| DEPENDENTALLOWANCE | 10 | 10 | 10 |
| ELIGIBILITYRULES | a\_earnings=300 | a\_earnings=8400 | a\_earnings=3840 |
| EXTENDLEAVES | yes | Yes | yes |
| GOVERNMENT | No | No | no |
| MAXWEEKS | OH=52, MD=52, NC=6, IC=6, IS=6, IP=6 | OH=26, MD=26, NC=6, IC=6, IS=6, IP=6 | OH=30, MD=30, NC=4, IC=4, IS=4, IP=4 |
| REPLACEMENTRATIO | 0.55 | 0.66 | 0.6 |
| STATEOFWORK | CA | NJ | RI |
| TAKEUPRATES | default=1 | default=1 | default=1 |
| WAITINGPERIOD | 1 | 1 | 1 |

**IMPAQ Parameters**

| **Parameter** | **California** | **New Jersey** | **Rhode Island** |
| --- | --- | --- | --- |
| ann\_hours | NULL | NULL | NULL |
| bene\_effect | FALSE | FALSE | FALSE |
| bene\_level | 0.55 | 0.66 | 0.6 |
| bond\_uptake | 1 | 1 | 1 |
| dependent\_allow | 10 | 10 | 10 |
| dual\_receiver | 0 | 0 | 0 |
| Earnings | 300 | 8400 | 3840 |
| ext\_base\_effect | TRUE | TRUE | TRUE |
| extend\_days | 0 | 0 | 0 |
| extend\_prob | 0 | 0 | 0 |
| extend\_prop | 0 | 0 | 0 |
| fmla\_protect | FALSE | FALSE | FALSE |
| full\_particip\_needer | FALSE | FALSE | FALSE |
| GOVERNMENT | FALSE | FALSE | FALSE |
| illchild\_uptake | 1 | 1 | 1 |
| illparent\_uptake | 1 | 1 | 1 |
| illspouse\_uptake | 1 | 1 | 1 |
| impute\_method | Logit | logit | logit |
| matdis\_uptake | 1 | 1 | 1 |
| maxlen\_bond | 30 | 30 | 20 |
| maxlen\_DI | 260 | 130 | 150 |
| maxlen\_illchild | 30 | 30 | 20 |
| maxlen\_illparent | 30 | 30 | 20 |
| maxlen\_illspouse | 30 | 30 | 20 |
| maxlen\_matdis | 260 | 130 | 150 |
| maxlen\_own | 260 | 130 | 150 |
| maxlen\_PFL | 30 | 30 | 20 |
| maxlen\_total | 260 | 130 | 150 |
| minsize | NULL | NULL | NULL |
| own\_uptake | 1 | 1 | 1 |
| sens\_var | unaffordable | unaffordable | unaffordable |
| SELFEMP | FALSE | FALSE | FALSE |
| topoff\_min\_length | 0 | 0 | 0 |
| topoff\_rate | 0 | 0 | 0 |
| waiting\_period | 5 | 5 | 5 |
| week\_bene\_cap | 1216 | 594 | 795 |
| week\_bene\_cap\_prop | NULL | NULL | NULL |
| week\_bene\_min | 50 |  | 89 |
| weeks | NULL | NULL | NULL |