Maryland Family and Medical Leave Insurance (FAMLI): Five Independent and Inter-related Analytical Studies

Submitted to
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Submitted by
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Executive Summary

While the federal Family and Medical Leave Act of 1993 (FMLA) provides covered employees with up to 12 weeks' family and medical leave, it does not provide replacement wage for leave-takers. One consequence of this unpaid leave is that many Americans, particularly minority or lower-income workers, may have the need for the leave but cannot afford to take it. As of May 2022, eight states have active Paid Family and Medical Leave (PFML) programs (also called Family and Medical Leave Insurance (FAMLI) programs) and four other states, including Maryland, have passed similar legislations but have yet to implement them. In Maryland, Senate Bill 275 (Ch. 48) establishes the FAMLI Program and FAMLI Fund to be administered by the Maryland Department of Labor. At the request of the Maryland Department of Labor, we conducted a cost analysis to address several issues on implementing the program. Our study includes: (1) a cost analysis of the FAMLI program using multiple methodologies; (2) an analysis of the optimal cost-sharing rule between the contribution rates of employers and employees and taxable wage cap in light of the tradeoff between two goals of the state: efficiency and equity, as well as the determination of an appropriate contribution rate given a cost-sharing ratio and taxable wage cap; (3) an actuarial study on the cost to the State for paying the required contribution for Community Providers.

We first reviewed the literature and other states' PFML or FAMLI programs (in Part 2) on their claim incidence rates, incidence rate growth over time, average claim durations, administrative costs, and labor and social impacts of those programs. Our analysis proceeds with five different studies (in Parts 3 through 7) on the appropriate cost-sharing ratio and taxable wage cap, and cost analyses using different methodologies. In this executive summary, we first answer five specific policy questions, followed by a summary of our key assumptions and findings.

ANSWERS TO SPECIFIC POLICY QUESTIONS

Question 1: Is it recommended to index Maximum Weekly Benefit Payment to inflation?

In summary, we find that **tying the maximum weekly benefit payment (MaxBP) to CPI does not have a large impact on the solvency of the fund in subsequent years**. We considered three inflation and wage growth scenarios and compared three measures of fund solvency: contemporaneous contribution minus expenses for each year, fund balance in a given year, and fund balance as a fraction of subsequent expenses for each year. Assuming that the state pursues a balanced goal between efficiency and equity and using the intermediate rate of inflation as an example, we find that indexing MaxBP to CPI reduces fund balance by $20 million and $70 million for 2026 and 2027 respectively, as compared to the case of no-indexing; these reductions represent 1.1% and 3.5% of the corresponding fund balances, based on Part 6. This result assumes that the state will set the same contribution rate in the indexing scenario as the break-even contribution rate under the no-indexing scenario.

We also compared the break-even contribution rate under the indexing-scenario with that under the no-indexing scenario. We found that the break-even contribution rate under the indexing-scenario is 0.84%, which is slightly higher than that under the no-indexing scenario (which is 0.83% as stated above). However, this slight rise in contribution rate is more than sufficient to offset the decline in fund balance under the indexing scenario. The detailed analysis is presented in Section 6.2.2 in Part 6 of this report.

Question 2: Is it recommended to set a cap on contribution rates?

If a cap on employees' contribution is set above the contribution rate that is needed to meet the program solvency (as shown in the column of total contribution rates in Table 1), the cap does not impact the program solvency. If there is such a cap, however, it might lead to a possible increase in program participation, particularly for employees/employers who may have options to opt-in or opt-out; this is because such a cap provides a guarantee that the contribution rate would not exceed a certain rate in future years and therefore be sustainable in the long term from the employers' and employees' perspective.

If a cap on employees' contribution rate is *below* what is needed to meet the program solvency, this would lead to fund deficiency and consequently jeopardize program sustainability. Therefore, the state has two choices. It can **either not to have a cap** or **consider a cap that would provide enough cushion above the upper bound of the estimated contribution rates needed for program solvency**. Our three empirical models provide consistent though slightly different estimates of the needed contribution rates for program solvency. Based on our analysis in Parts 4, 5, and 7, Table 1 summarizes the upper and the lower bounds of the contribution rates needed for reaching program solvency depending on the State's program goals (efficiency, equity, or balanced approaches) and whether there is a cap on taxable wages at social security wage base (SSWB). The table also presents hypothetical caps that are set 20% above the corresponding upper bounds: in this case, the caps can range from 1.18% for low employer cost share and no taxable wage cap to 1.44% when employer share is the highest and there is a cap on taxable wage at SSWB. Given such a high cap (1.44%), Similarly, our scenario analysis in Part 6 also results in contribution rates ranging from 0.43% under the low-cost scenario to 1.36% (under the high-cost scenario). Despite the potential benefit of increasing program participation and stable planning with a cap on contribution rates, **we recommend against setting a cap given the potential significant rise of contribution rate under unpredictable adverse scenarios**. The study conducted in Strunk et al. (2020) in the state of Colorado also finds that under some cost scenarios, contribution rates can go beyond the stipulated cap in their state (1.2%), which provides another caveat to set a cap on contribution rates as a state policy.

Table 1. The Lower and Upper Bounds of Contribution Rates

	Employer/Employee Cost Sharing	Lower	Upper	20% Above the Upper Bound
No Cap	25%/75%	0.90%	0.98%	1.18%
	50%/50%	0.95%	1.02%	1.22%
	75%/25%	1.00%	1.06%	1.27%

Cap at SSWB	25%/75%	0.88%	1.10%	1.32%
	50%/50%	0.91%	1.15%	1.38%
	75%/25%	0.94%	1.20%	1.44%

Question 3: What is the appropriate cost-sharing formula between employers and employees for making contributions to fund the Program, including various formulas that range between 75% Paid by Employers, and 25% Paid by Employees;75% Paid by Employees, and 25% Paid by Employers?

The appropriate cost-sharing formula depends on the State's goal in this program – equity, efficiency, or a balance between the two. Table 2 summarizes the recommended cost-sharing formula conditional on the state's goals using the theoretical model in Part 3.

Table 2. Recommended Cost-Sharing Formula and Taxable Wage Cap Conditional on State's Goal Based on Our Theoretical Model

State's Goals	Suggested Taxable Wage Cap	Suggested Cost-Sharing by Employers	Contribution Rate
Maximize efficiency (social welfare as measured by employers' and employees' surpluses)	Average expected benefit payment plus administrative costs per participant (around **$670/participant including employers' share**)	75%	100%
Maximize equity	Ranges between around $60,000 to $200,000 (with SSWB in the middle)	25%	0.78-1.31% (depending on specific value of the cap)
Balance between efficiency and equity	Suggest Social Security Wage Base (SSWB) (or some value in the range above)	50%	0.84%
Lowest contribution rate (Note: solvency may be very) sensitive to opt-outs)	No cap	25%	0.71%

Question 4: Should there be a threshold for limiting the amount of an employee's wages that the tax is applied to (e.g. Social Security Wage Base).

If there is no cap applied to the taxable income, the contribution rates required to maintain the program solvency are lower given a specific cost-sharing formula. If there is a cap (e.g. Social Security Wage Base, or SSWB) applied to the taxable income, the contribution rates need to be

increased to maintain the program solvency given each cost-sharing formula. This is based on our analysis in Parts 4, 5, and 7 and is summarized in Table 3.

In addition, our analysis in Part 3 suggests that the answer to this question depends on the State's goals. While increasing or even removing the cap on taxable income may reduce overall economic efficiency (since more income is subject to the proportional tax and thus a decline in total social welfare as measured by the sum of employers' and employees' surpluses), it can nonetheless enhance equity, especially when the cap is within the range of $60,000--$200,000 as per Table 2. These analyses lead to two conclusions: (1) It is not optimal to have no cap on taxable wages from both the efficiency and equity (if outside a certain range) points of view. SB275 (Ch. 48)[1] states that "the total rate of contribution shall be applied to all wages up to and including the social security wage base", which means there will be a cap on taxable wage income. This accords to our analysis on the optimality of wage cap. (2) If the State pursues a balanced goal between efficiency and equity, our analysis suggests that it is not a bad idea to set SSWB as the cap on taxable wage (see Table 2).

Table 3. Recommended Contribution Rates with Different Cost-Sharing Formula using Different Models.

	Cost Sharing Formula	Econometric Model	Worker PLUS Model	Milliman Model
No Cap	Employer 25%; Employee 75%	0.98%	0.90%	NA
	Employer 50%; Employee 50%	1.02%	0.95%	NA
	Employer 75%; Employee 25%	1.06%	1.00%	NA
Cap at SSWB	Employer 25%; Employee 75%	1.10%	1.05%	0.88%
	Employer 50%; Employee 50%	1.15%	1.10%	0.91%
	Employer 75%; Employee 25%	1.20%	1.15%	0.94%

Question 5: What are the weekly employee and employer costs with an average salary in Maryland?

Below is a summary of weekly dollar cost for employees and employers assuming the average (mean and median) salary in 2023.

[1] See provision (3), subsection (D) of 8.3-601 of SB275 (Ch. 48).

Table 4. Weekly Cost for Employers and Employers in 2023

		Employer/ Employee Cost Sharing Formula	Total Tax Rate	Based on Weekly Mean Earnings ($)		Based on Weekly Median Earnings ($)	
				Employer	Employee	Employer	Employee
Econometric Model	No Cap	25%/75%	0.98%	3.66	10.97	3.05	9.16
		50%/50%	1.02%	7.61	7.61	6.36	6.36
		75%/25%	1.06%	11.87	3.96	9.91	3.30
	Cap at SSWB	25%/75%	1.10%	4.11	12.32	3.43	10.28
		50%/50%	1.15%	8.58	8.58	7.17	7.17
		75%/25%	1.20%	13.44	4.48	11.22	3.74
Worker PLUS Model	No Cap	25%/75%	0.90%	3.36	10.08	2.80	8.41
		50%/50%	0.95%	7.09	7.09	5.92	5.92
		75%/25%	1.00%	11.20	3.73	9.35	3.12
	Cap at SSWB	25%/75%	1.05%	3.92	11.76	3.27	9.81
		50%/50%	1.10%	8.21	8.21	6.85	6.85
		75%/25%	1.15%	12.88	4.29	10.75	3.58
Milliman Model	No Cap	25%/75%	NA	NA	NA	NA	NA
		50%/50%	NA	NA	NA	NA	NA
		75%/25%	NA	NA	NA	NA	NA
	Cap at SSWB	25%/75%	0.88%	3.28	9.85	2.74	8.22
		50%/50%	0.91%	6.79	6.79	5.67	5.67
		75%/25%	0.94%	10.53	3.51	8.79	2.93

Note: The 2023 weekly mean earnings are calculated based on the 2021 weekly average wage in Maryland from the government website[2]. The weekly median wages are obtained using American Community Survey (5-year data, 2016 - 2020). The weekly costs in the table are all inflation-adjusted to 2023 dollars.

[2] See https://msa.maryland.gov/msa/mdmanual/01glance/economy/html/wages.html#wages.

IMPORTANT ASSUMPTIONS AND SUMMARY OF THE STUDIES

Each of our five studies projects wages, Social Security Wage Base (SSWB), average weekly wage, and the maximum weekly benefit payment based on the annual wage growth, inflation, and employment growth rates as shown in Table 6-1 and reproduced in Table 5 here for convenience. Our wage growth and inflation projections are based on the 2022 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds (2022 OASDI Trustee Report). Our employment growth follows MDL's Maryland Occupational & Industry Projections.

Table 5. Assumptions for Wage Growth, Inflation, and Employment Growth

Year	Wage Growth Rate (%)	Inflation (%)	Employment Growth Rate (%)
2022	6.52	4.54	2.47
2023	4.77	2.33	2.47
2024	4.31	2.40	0.95
2025	4.07	2.40	0.95
2026	3.96	2.40	0.95
2027	3.86	2.40	0.95

The first analytic study (in Part 3) is a theoretical model on the optimality of contribution rate cost-sharing rule and taxable wage cap with simulations of the model using the 2021 American Community Survey (ACS) data on wage income and hours worked of individual workers in Maryland. The study concludes with a recommendation for the optimal cost-sharing ratio and taxable wage cap conditional on the state's goals (efficiency vs. equity, or simply the lowest contribution rate), as summarized in Table 5-7 and reproduced in Table 2 above.

Our second analytic study is a cost analysis relying on econometric modeling using the 2018 Employee and Worksite Perspectives of the Family and Medical Leave Act National Survey (2018 FMLA Survey) and the latest five-year ACS data covering the period 2016 to 2020 (5-year ACS data). We modeled Maryland workers' leave taking behaviors, followed by a brief actuarial report with scenario analysis. This model shows that the contribution rates required for program solvency are lower if the cost shared by employees is higher and, expectedly, if there is no cap on taxable wage. Table 6 summarizes the six scenarios considering capping taxable wage at Social Security Wage Base (SSWB) and different cost-sharing ratios, and Table 7 summarizes the projected fund balance until 2027.

Table 6. Recommended Contribution Rates Conditional on Different Cost-Sharing Rules and Whether or Not to Cap Taxable Wage at SSWB

	Contribution Rate	Employer Rate	Employee Rate
No Cap			
Employer 75%; Employees 25%	1.06	0.795	0.265
Employer 50%; Employees 50%	1.02	0.510	0.510
Employer 25%; Employees 75%	0.98	0.245	0.735
Cap at SSWB			
Employer 75%; Employees 25%	1.20	0.900	0.300
Employer 50%; Employees 50%	1.15	0.575	0.575
Employer 25%; Employees 75%	1.10	0.275	0.825

Table 7. Fund Balance Across Years ($ millions)

Employer/Employee Sharing	2023	2024	2025	2026	2027
No Cap					
75%/25%	$401.6	$2,344.4	$2,347.2	$2,528.5	$2,617.0
50%/50%	$404.5	$2,353.9	$2,362.1	$2,563.7	$2,681.1
25%/75%	$401.8	$2,330.9	$2,320.9	$2,512.2	$2,626.1
Cap at SSWB					
75%/25%	$388.0	$2,317.5	$2,324.5	$2,536.7	$2,679.9
50%/50%	$388.9	$2,316.7	$2,325.5	$2,551.0	$2,717.1
25%/75%	$388.3	$2,307.3	$2,310.4	$2,540.0	$2,718.5

The data used in our third study is similar to that in the second study. However, instead of using econometric analysis, it simulates workers' leave taking behaviors using the U.S. Department of Labor's Worker PLUS Model, extended to include Maryland's FAMLI program policy parameters. It uses the 2018 FMLA Survey and machine learning techniques to train models for individual-level leave behaviors and then extends the simulated leave-taking behaviors to the most recent data on individual workers in Maryland using the five-year ACS data (2016-2020). The simulation results with different cost-sharing formulas, payroll contribution rates, and thresholds on taxable income show that: (1) the fund balance without the taxable wage cap is higher than the fund balances with cap at SSWB, (2) the fund balance with higher payroll contribution rate is considerably greater, (3) the more the contribution is shared by employers, the lower the contribution rate is needed to maintain the solvency of the FAMLI Program. The recommendations on the payroll contribution rates under different scenarios are summarized in Table 8 below.

Table 8. Break-Even Contribution Rates under Different Cost-Sharing Rules and Whether or Not to Cap Taxable Wage at SSWB

Taxable Wage Cap	Cost Shared by Employers	Break-Even Contribution Rate
No Cap	25%	0.90%
	50%	0.95%
	75%	1.00%
Cap at SSWB	25%	1.05%
	50%	1.10%
	75%	1.15%

The fourth study extends the first one to simulate the dynamic response of the labor market with implementing the FAMLI program and conducts a cost analysis of the program. It combines the micro-level ACS data on employee wage income and labor supply and macro-level assumptions of claim incidence rate, average leave length, and administrative costs based on other states' experiences, and estimates the break-even contribution rate and program solvency. In addition to providing backup for the recommended policies conditional on state's goals as in Table 2, it also analyzes several other important issues related to the program, including the impact on solvency of indexing the maximum weekly benefit payment to inflation, the sensitivity of contribution rate and solvency to alternative assumptions of the program incidence rate, leave length, and administrative costs, the impact of potential opt-outs from the program and self-employed individuals on contribution rates, and whether it is advisable to set a cap on contribution rate as a part of the policy. The finding on the impact of indexing the maximum weekly benefit payment to CPI on solvency is summarized in Table 9, where we consider three inflation scenarios following the 2022 OASDI Trustee Report.

Table 9. Indexing Maximum Weekly Benefit Payment to Inflation on Solvency

Scenario	Contribution Rate	Solvency	10/2023 – 12/2024	2025	2026	2027
Not indexing $MaxBP$ to inflation	0.83%	Contributions - Expenses ($ million)	1646.6	27.7	**176.4**	**147.1**
		Fund Balance ($ million)	1646.6	1674.3	**1850.8**	**1997.8**
		Fund Balance/Subsequent Expenses	112%	123%	126%	
Indexing $MaxBP$	0.83%	Contributions - Expenses ($ million)	1564.8	***-29.3***	88.0	25.2
		Fund Balance ($ million)	1564.8	1535.5	1623.5	1648.6

at low inflation		Fund Balance/Subsequent Expenses	109%	112%	112%	
Indexing $MaxBP$ at intermediate inflation	0.83%	Contributions - Expenses ($ million)	1646.6	27.7	**154.8**	**99.1**
		Fund Balance ($ million)	1646.6	1674.3	**1829.1**	**1928.2**
		Fund Balance/Subsequent Expenses	112%	121%	121%	
Indexing $MaxBP$ at high inflation	0.83%	Contributions - Expenses ($ million)	1696.5	67.2	207.5	160.6
		Fund Balance ($ million)	1696.5	1763.7	1971.2	2131.8
		Fund Balance/Subsequent Expenses	115%	124%	127%	

Our fifth, or the last, analytic study is an actuarial study conducted by Milliman, Inc. This actuarial study includes an analysis of the potential costs and contribution rates for FAMLI benefits in Maryland, the potential costs for the State to pay the employer contribution for Community Providers, as well as the potential cost to the State to pay the employee contribution for employees who earn less than $15 an hour. Milliman's study does not specifically analyze sensitivity of SSWB cap or nuanced individual workers' leaving taking behavior and focuses instead on historical experience in other states that have passed leave laws, employee demographics, and actuarial methods for estimating costs. This analysis, therefore, relies on different data and slightly different assumptions than the other models. For the data, instead of individual-worker-level data, Milliman's analysis uses aggregate employment data by age and gender from the U.S. Census, as well as aggregate employment and taxable wages from administrative records (for employment of Community Providers). For the assumption differences, for example, instead of assuming 8% ongoing administrative expenses out of paid claim expenses, this report assumed 5% of total contributions for family claims and 8% of total contributions for medical claims. This is overall slightly lower than, but close to, prior four analytic studies, and this assumption is still consistent with typical expense ratios observed in other states that provide benefits through a state fund. The estimated contribution rate from Milliman's analysis range from 0.88% to 0.94%, with employer-employee cost-sharing ratio to be from 25/75 to 75/25; the estimated cost to the State for paying the employer contribution for the Community Providers ranges from $20 million to $64 million between October 1, 2023 and December 31, 2024 depending on different cost-sharing scenarios and corresponding contribution rates.

Our independent and inter-related studies include simulations based on theoretical modeling, empirical modeling and the USDOL Worker PLUS Model, and an actuarial study. Despite different models, data, and even assumptions, the overall findings share some consensus across

the five studies using both nationally representative survey data (including the individual-worker-level newest 1-year 2021 ACS data versus 5-year 2016-2020 ACS data, FMLA 2018 data, or aggregate employment data) and administrative records: the higher employer share of the contribution, the lower the contribution rate is needed to maintain the FAMLI fund; the fund balance without the taxable wage cap is higher than the fund balances with cap at SSWB. We provide policy recommendations based on the simulation results, including the total rate of contribution required for program solvency, the impact of establishing a cap on taxable wage amount, and the cost-sharing formula between employers and employees. Our analysis considers the impact of inflation in subsequent years and provides estimates of contributions from employers and employees, as well as expenses in four categories, including benefit payments, administrative expenses, and expenses to cover contributions by low-wage workers and community providers.

In summary, our findings show that the state faces a tradeoff in balancing efficiency and equity to choose the optimal policies with respect to the taxable wage cap and cost-sharing rule. The total rate of contribution required for reaching program solvency is lower with no limit on the amount of wages subject to tax and a larger share of the tax paid by employees. Our recommendations for optimal policies are conditional on specific goals of the state.

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Part 1 Introduction

Although the federal Family and Medical Leave Act (FMLA) provides covered employees up to 12 weeks' family and medical leaves, it does not provide wage replacement for the leave-takers. Paid Family and Medical Leaves (PFML) in most states remain to be discretionary benefits that are only available at some employers. Recent reports based on the National Compensation Survey show that only 23 percent of workers have access to paid family leave to care for a sick child or adult relative; in contrast, 79 percent of the workers have access to paid sick leave for non-work-related medical conditions (U.S. Department of Labor, 2021a). However, the distribution of these paid leaves is uneven across wage earners. While the paid sick leave is available for 93 percent of workers in management, professional, and related occupations, it is only available for 59 percent of service workers. Similarly, while the paid family leave is available for 37 percent of workers in the highest 25th percent wage category, it is only available for 12 percent of the workers in the lowest 25th percent wage category.

While most developed countries have PFML, the federal FMLA leave in the United States is unpaid. A direct consequence of this is that many Americans, particularly minority or lower-income workers cannot afford the leave even though they may need it (Pew, 2017). Currently, eight states (e.g. California, New Jersey, Rhode Island, Washington, the District of Columbia, etc.) have established PFML programs to most of the employees in their states.

In the State of Maryland, Senate Bill 275 (Ch. 48) establishes the Family and Medical Leave Insurance (FAMLI) Program and FAMLI Fund administered by the Maryland Department of Labor (MDL). The program provides up to 12 weeks of paid medical or family leave, with up to 24 weeks of paid leave to a covered individual meeting certain criteria on child birth/adoption, serious medical conditions of family members and self, and duties related to caring or deployment of a service member in the employee's family. The purpose of this project includes the following: (1) a cost analysis of the FAMLI Program with the consideration of benefit adjustment based on projected inflation rates in subsequent years; (2) a study of the total rate of contribution required to establish and maintain a solvent program including an evaluation of the impact of a cap for limiting the amount of an employee's wages that may be taxed and an analysis of an appropriate cost-sharing formula between employers and employees; and (3) an analysis of the cost to the State for paying the required contribution for community providers.

To accomplish these goals, we reviewed prior scholarly studies and various states' PFML or FAMLI reports, and conducted simulations based on theoretical and empirical models. Part 2 of this report provides a literature review. Part 3 develops a theoretical model and analyzes the optimality of cost-sharing rule and taxable wage cap. Part 4, 5 and 6 provide results of cost analysis using econometric modeling, the USDOL Worker PLUS Model and simulation of the theoretical model developed in Part 3, respectively. Part 7 includes the Actuarial Study from Milliman, Inc. Conclusion and additional remarks are in Part 8.

Part 2 Literature Review

Our literature review is based on prior scholarly studies, various states' PFML (or FAMLI) program reports, and states' actuarial studies. To provide relevant background information for our model building and estimates, this section reviews literature on the development of the PFML programs, PFML program key policy parameters, claim incidence rates, incidence rate growth overtime, average claim durations, administrative costs (ACs), and the impacts of PFML programs on labor market and social outcomes.

2.1 Development of the PFML Programs

The United States remains one of the few countries that do not have paid leave programs for employees at the federal level (Greenfield et al., 2019). Despite the fact that the availability of firm-provided paid parental leave has greatly increased in the last two decades, the levels of provision differ greatly by the industry, firm size, and the degree of firm-specific training; however, even the top-of-the-line firm in the U.S. provides fewer fully paid parental weeks than the median OECD nation (Goldin et al 2020). According to a national survey of employers conducted by the Bureau of Labor Statistics (BLS), *2021 Employee Benefits Survey*, 23% of private-industry employees had access to paid family leave (separate from other leave categories) through their employers in March 2021, somewhat mirroring the 27% of workers who took leave (paid and unpaid) for family caregiving reasons or their own serious health condition between November 2014 and November 2016 (Pew, 2017). The BLS (2021a) estimates that 77% of private sector workers had access to employer-provided paid sick leave in March 2021, and the median number of days that could be earned in a given year was 6 (among those limited to a fixed number of sick days per year). There was a 5% increase in private sector workers' access to paid family leave between March 2019 and March 2021 (from 18% to 23%), partially due to the Covid-19 pandemic. Pew (2017) further reveals that 16% of workers (26% of African American, 23% of Hispanic, 13% of White workers) had the need but were unable to take a leave. Among those who take a leave without pay, 62% have a household income less than $30,000 and but only 26% have income of at least $75,000.

Some states have enacted legislation to create state PFML insurance programs that are funded by contributions through payroll tax deductions. Typically, these programs provide cash payment via partial wage replacement to eligible workers who take a leave for medical or family caregiving reasons. California was the first state to enact legislation in 2004, followed by New Jersey (in 2009), Rhode Island (in 2014) and New York (in 2018). These states also manage two separate paid leave benefit programs based on the two different types of claims: (1) temporary disability and personal sickness or injury and (2) caregiving claims either for childbirth or for supportive care of family members. California's PFML was built on the state's existing Temporary Disability Insurance (TDI) program (California Senate Office of Research, 2014).

New Jersey's PFML was an extension of the state's temporary disability program to include benefits for individuals to take leaves for the care of a new child or an ill relative (New Jersey Department of Labor and Workforce Development, 2019). The District of Columbia (DC) established a paid leave program in 2017 and it caters to employees leaving to bond with a new child, caring for a sick relative, or caring for their own health condition (District of Columbia Department of Employment Services, 2021). Delaware and Colorado are among the newer states to establish a PFML program. Washington state established a PFML program in 2017 and was the first to build such a program from the ground up (Watkins, 2020). Colorado is expected to pay out claims to eligible employees beginning in 2024 (Colorado Department of Labor and Employment, 2022) and Delaware in 2025 (Delaware Office of the Governor, 2022). Currently, Delaware offers paid parental leave to employees. As of May 2022, eight states—California (2004), Connecticut (2021), District of Columbia (2020), Massachusetts (2021), New Jersey (2009), New York (2018), Rhode Island (2014), and Washington (2020)—have active programs. Four additional programs in Colorado, Delaware, Maryland, and Oregon have yet to be implemented (Congressional Research Service (CRS), 2022).

As CRS (2022) states, following the Family and Medical Insurance Leave Act (FAMILY Act; H.R. 804/S. 248), the overarching goal of PFML legislative activity in the 117th Congress has been to increase access to family and medical leave by reducing the costs incurred by family caregivers and workers who are unable to work due to their serious health condition. PFML addresses family caregiving and medical needs associated with the arrival and caring of a newborn child or a newly adopted or fostered child, the serious medical needs of certain close family members, and an employee's own serious medical needs that interfere with the performance of his or her job duties. In Maryland, this new program is the Family and Medical Leave Insurance Program (FAMLI) (Senate Bill (SB) 275, Ch. 48).

2.2 PFML Program Key Policy Parameters

Program eligibility typically involves in-state employment of a minimum duration, minimum earnings in covered employment, and contributions to the insurance funds. Delaware's program further conditions benefit eligibility on a worker's tenure with the current employer, according to CRS (2022).

Tax contribution rate is the first key policy parameter that directly drives state's PFML fund revenue. The contribution rate ranges from 0.26% in Washington DC to 0.5% in Connecticut, 0.68% in Massachusetts, 0.8% in Delaware, 0.9% in Colorado, 1% in Oregon, and to 1.1% in California and Rhode Island.

The cost-sharing ratio between employers and employees also varies across states. According to our interviews of many states' PFML program staff members, the ratio is typically determined based on policy discussions. The employee portion of the contribution ranges from 0% for Washington DC, up to 50% in Delaware, 50% in Colorado, up to 60% in Oregon, to up to 49% for PML in Massachusetts, to 100% for PFL in New Jersey, New York, Massachusetts and for PFML in California, Rhode Island, and Connecticut.

Some states have exemptions for small employers. For example, in Massachusetts and Oregon, employers with fewer than 25 employees are exempt from paying contributions. In Maryland and Colorado, employers with fewer than 15 and 10 employees are exempt from paying contributions, respectively.

Regarding the maximum leave length, many states allow a longer PML than PFL. For example, California allows up to 52 weeks for PML but only 8 weeks for PFL. New Jersey allows up to 38 weeks with 26 weeks' maximum length for PML and 12 weeks' maximum length for PFL. Rhode Island allows up to 30 weeks for PML but only 5 weeks for PFL; New York allows for 26 weeks for PML and 12 weeks for PFL. Massachusetts allows for 20 weeks for PML and 12 weeks for PFL. Many other states allow 12 weeks for both PML and PFL, such as Washington Connecticut, Colorado, DC, Maryland, and Oregon. Most of them also allow a few weeks' additional leave for certain health and pregnancy related conditions.

Weekly benefits amounts range from 50% to 100% of an employee's average weekly earnings and all states cap weekly benefits at a maximum amount, which ranges from $650 to $1300 by states. Most states with leave insurance programs have or plan to have a progressive benefit formula (CRS, 2022).

According to CRS (2022), some state programs (e.g. Oregon) provide job protection directly to workers who receive insurance benefits, meaning that employers must allow these workers to return to their original jobs after the leaves. In other states (e.g. California), workers may receive job protection if they are eligible for both the federal job-protected FMLA leave and state leave, and coordinate the job-protected leave with the state insurance benefits.

The Maryland SB 275 (Ch. 48, the Act) also provides job protection. It requires employers to restore an employee to an "equivalent position of employment" upon the expiration of the leave. This job protection extends to an employee who "receives benefits" or "takes leave from work for which benefits may be paid" under the law. The Act provides that employers may terminate an employee on such a leave only "for cause." Employers may only deny an employee's restoration rights if (1) the denial is necessary to prevent "substantial and grievous" economic injury to the employer's operations, (2) the employer provides the employee notice of the intent to deny restoration rights at the time the employer determines the economic injury would occur, and (3) the employee "elects not to" return to work after receiving notice of the employer's intent to deny restoration rights (SB 275, Ch 48). Employers must also maintain an employee's health benefits during any leave in the same manner required under the FMLA. In addition to job protection, SB 275 contains an anti-retaliation provision prohibiting an employer from taking any adverse action against any employee because the employee applied for or received FAMLI benefits, took a family or medical leave for which FAMLI benefits may be paid, inquired about the rights and responsibilities under the Act, communicated an intent to file a claim or appeal under the Act, or has testified or assisted in a proceeding under the Act.

Some states' PFML programs have a 7-day waiting period, such as DC, Massachusetts, Washington, while some only have the waiting period for PML, such as California, New Jersey, New York. Other states have no waiting period, such as Connecticut, Colorado, Delaware Maryland, Oregon, and Rhode Island.

Most states allow self-employed people to participate in the state PFML programs, except for Rhode Island and New Jersey. Most states' public employers can opt in, except for Washington, Maryland, and Delaware. In DC, public employers do not participate in the state PFML. Most states allow the PFML programs to be provided either through a state fund or a private option, except for Rhode Island and DC that allow no private options, according to Correia and Skwire (2022).

Most states have opt-out options. Of the 10 publicly funded PFML programs, seven (California; Colorado; Connecticut; Massachusetts; New Jersey; Oregon; and Washington) allow employers to opt out through an approved "private plan" alternative (Boyens et al. 2021). For many states, employees opting out of the state plans account for a relatively small percentage. For instance, in Washington/California, only approximately 3%/4% of the reported covered employees opted out of the state plan (Milliman, 2022). However, there are exceptions. For example, in Massachusetts, 33 percent of eligible workers are covered by a private plan (Boyens et al., 2021).

2.3 Claim Incidence Rate

The claim incidence rates represent the number of claims approved for benefits divided by the exposure of eligible employees (Correia 2022), or covered employees (American Council of Life Insurers (ACLI) 2022) in a given time period. The incidence rates are generally on the rise for new PFML programs during the phase-in period.

Across all leave types, Washington state has roughly 24.44 approved claims per 1000 covered employees quarterly from 2020 Q1 to 2022 Q2, averaged based on the quarterly incidence rates of PFL and PML (Correia (2022)). From 2014 to 2018, the approved PFL claims per 1000 covered employees are about 13.5 for California, 8.5 for New Jersey, and 12.9 for Rhode Island, according to ACLI (2022).

Calculated based on data published by the Connecticut Paid Leave Authority (2022) on town-by-town claim application information, the total number of claims per 1,000 people is about 12.95. The incidence rate (per 1,000 eligible employees) in Connecticut would probably be much more. As Sebastian (2022)'s actuarial report estimates, the average approved claim incidence rate is likely to be 2.99% for February -March 2022 in Connecticut.

According to the Office of the Budget Director, Council of the District of Columbia (2016), in 2015, the PFML uptake rate was 5.1% in California and 9.4% in Rhode Island. Uptake rate is the rate at which an insurance plan's members file eligible benefit claims. The uptake rates here are different from the aforementioned incidence rates because (1) for the uptake rate, the universe is the PFML insurance plan's members, different from the number of eligible employees which is the universe of the incidence rates, (2) the incidence rates mentioned above from ACLI (2022) are for PFL claims.

Colorado's PFML will start in 2023. Strunk et al (2020) estimates the state's claim rate to be around 7% (with 5% as the lower bound and 9% as the upper bound). The claim rate reflects the

total number of claims that receive payment divided by the total number of people eligible to make claims. Greenfield and Cole (2019) reported the utilization rate (i.e., the number of claims out of the number of eligible workers) in 2017 to be 4.7% in California (California Employment Development Department 2018), 2.5% for New Jersey (New Jersey Department of Labor and Workforce Development, 2017), and 7.1% for Rhode Island (Rhode Island Department of Labor and Training, 2017*)*, adjusted for New Jersey and Rhode Island to remove double counting of those using both forms of leaves, according to Vorgetts (2019). California increased their benefit structure[3] slightly since 2017 (Falconer and Chilco 2019) and experienced a claim rate of 5.4% in 2019 (State of California Employment Development Department, 2021). The utilization rate in New Jersey also increased to 4.08% in 2018 (Greenfield & Cole, 2019).

PFML utilization is sensitive to demographics. The number of women of childbearing ages naturally affects maternity leaves. PML usage also varies with age, while PFL caretakers are disproportionately older and females aged 44 years and older (Spring, 2019). According to Connecticut Paid Leave Authority (2022), in Connecticut, females account for 28,814 (65.3%) of the claims; the 26-41 age group accounts for 23,062 (52.2%) of claims filed, followed by 42-57 year-olds for 10,509 (24%) claims and 58-76 year-olds accounting for 7,423 (16.8%) of claims. The report also shows that an individual's own illness or injury was the leading reason for leave for all age groups except for the 26-41 age group for whom bonding with a newborn was the most common reason.

Claim incidence rate varies by different leave types, with short-term disability benefits higher than parental leave which are in turn higher than other types of family leave (Greenfield and Cole, 2019). Correia and Skwire (2022) noted that PML claims typically represent 75-85% of total PFML claims; maternity claims typically represent 25-30% of PML claims; bonding claims typically represent 70-80% of PFL claims. Most bonding claims are from female employees, though male bonding claims are trended up in recent years. PFL claims among workers aged up to 44 are predominantly from bonding claims.

In the case of Washington state, according to the Washington State Employment Security Department (2022) October report, PFL accounts for about 50.48% of the claims while PML accounts for about 49.52%. Bonding PFL and non-maternity PML are much higher. For Massachusetts, according to Massachusetts Department of Family and Medical Leaves (2022), PML accounted for 59.31% of approved applications (66,738 approved applications); PFL to bond with a child following birth and adoption or foster care placement accounted for 30.61% of approved applications (34,441 approved applications); family leave to care for a family member with a serious health condition accounted for 10.05% of approved applications (11,313 approved applications); military exigency leave accounted for 0.04% of approved applications (32 approved applications); leave to care for a service member accounted for 0.01% of approved applications (7 approved applications).

[3] California expanded its PFL program by increasing the maximum length of family leave, adding military deployment of a family member as a qualified reason for taking leave, and expanding the definition of family.

California and New Jersey had nearly three times as many eligible medical as family leave claims. In 2015, Rhode Island's medical leave insurance received seven times as many claims as its family leave insurance. These three states' short-term disability programs have existed for decades while the family leave benefit is relatively new, perhaps explaining some of the difference in their uptake rates. Among workers reporting taking a leave for an FMLA-qualifying reason (even if they were not eligible for FMLA-protected leave) in 2018, Brown et al (2020) find that most of the leaves (50.5%) were taken for the workers' own illness; about 18.6% to care for a child, spouse, or parent with a serious medical need (and another 5.3% report taking a leave to care for a non-FMLA covered individual).

2.4 Incidence Rate Growth Overtime

Several empirical studies show that utilization and length of parental bonding leave increases following the introduction of PFL (Baum and Ruhm, 2016; Bartel et al., 2018). The incidence rates were relatively high in the first year due to the claims incurred in the previous year that were eligible for benefits for the first year of the program.

Program awareness typically increases over time, which results in an increase in utilization rates (Jacobs, 2019). California PFL trends are being propelled by increases in use of family leave by males, which may reflect evolving attitudes towards male caretaking roles (Spring 2019; Milkman and Appelbaum, 2013). Bana, Bedard, and Rossin-Slater (2019) find that increases in benefits received during an earlier period increases the likelihood of filing a PFML claim within the next three years. The California PFL program has been found to (1) increase the likelihood of maternal leave-taking by 6 percent and more than doubled the average length of leave from 2.8 to 6 weeks, particularly evident for disadvantaged groups (Rossin-Slater, Ruhm, & Waldfogel, 2013), (2) increase maternal leave use by 23% and parental use by 10% two weeks after child birth, or an increase of 5 weeks and 2-3 days respectively (Baum & Ruhm, 2016). Lower wage earners, minorities, and workers with lower degree of educational attainments generally exhibit less awareness of state PFML programs (Milkman and Appelbaum, 2013).

Many states collect the PFML contributions about one year before the program starts, such as Washington (Washington State Employment Security Department, 2022). After the initial year's surge, the incidence rate will level off at first, then goes through some growth throughout the first few years of the PFML program, due both to increased awareness and the changes to the waiting period in the case of Washington (Correia 2022).

Calculated based on quarterly incidence rate in Correia (2022), from 2020 Q1 to 2022 Q2, average/annual quarterly incidence rate increases 2.58%/15.59%. However, this incidence rate growth is projected to slow down after the first three years, according to Correia (2022)'s forecast. If using the estimated first five-year incidence growth rates, average growth is about 11.33% annually and 2.14% quarterly. Note that Washington state's high incidence rate growth is partly due to new PFML legislation in 2022 that removed the waiting period requirement for maternity claims and that the maximum PFML benefit amount increased on January 1, 2021 and January 1, 2022, in addition to the increased awareness of the program.

According to the data from Milliman's 2020 actuarial study in the ACLI report (2022), from 2014 to 2018, the incidence rate on average grew 2.07% for California, 0.89% for New Jersey, and 13.9% for Rhode Island. The incidence rate growth was significantly lower for New Jersey Family Leave Insurance, possibly due to differences in benefit design, employee demographics, employee behavior, and benefit awareness. The actuarial report in the State of Colorado Department of Labor and Employment (2019), produced by AMI Risk Consultants, assumed an average annual growth rate in utilization of 3.53%; when averaging between those five states for the 5-year periods' annual growth, it is expected to growth roughly 5.902% annually.

In Maryland, Since the FAMLI program will start to collect contributions on Oct 1, 2023 before the claim payout starts on January 1, 2025, the carryover of eligible claims from the prior 15 months could result in a surge of claims in the first year. Subsequently, Maryland probably will follow most other states' incidence rate growth patterns over time, particularly for the first few years due to the increased awareness of the program.

2.5 Average Claim Durations

In general, the average durations were relatively stable. The claim duration varies by leave types. For Washington state from 2020 Q1 to 2022 Q1, the average weekly claim duration ranges from 3.32 weeks for military leaves, to 5.98 weeks for care leaves, 6.81 weeks for non-maternity medical leaves, 7.77 weeks for maternity leaves, and 8.21 weeks for bonding leaves, calculated based on the PFML claim duration data from Correia (2022). These average PFML claim durations are expected to increase due to the change in PFML legislation that specifies the waiting period is no longer subtracted from an employee's available leave bank in Washington state. Across all types and all time periods, when weighed by incidence rates, the mean PFML duration is about 6.49 weeks. According to the Washington State Employment Security Department (2022) October report, it calculated an average duration of 7.4 weeks per claim for claims ending in recent months and 9.5 weeks per claim year for claim years ending in recent months.

The PFL claim duration also varies by time and by employment size classes. For the state of New York, PFL claim duration has increased every year since 2018 when the program started with the longest duration for smallest employment sizes. According to the New York State Department of Financial Services (2022), from 2018 to 2019, duration increased by 15.03% from 5.52 weeks to 6.35 weeks; in the following year duration further increased by 6.31% to 6.75 weeks, and in 2021 it increased another 14.33% to 7.72 weeks. Across employment size classes, the average claim duration for businesses with 0-49/50-499/more than 500 employees is about 7.34/6.66/6.47 weeks, respectively. Over the four years and across all employment size classes, the average annual increase is about 11.89%, with mean PFL claim duration at 6.65 weeks (New York State Department of Financial Services, 2022).

In Massachusetts, for both PML and PFL, the median duration of a leave completed in FY22 was 12 weeks (Massachusetts Department of Family and Medical Leaves, 2022). In 2017, California's average length of PFML duration was about 13.2 weeks (California Employment Development Department, 2018), New Jersey was about 9.10 weeks (New Jersey Department of

Labor and Workforce Development, 2017), and Rhode Island was about 11.9 weeks (Rhode Island Department of Labor and Training, 2017*)*. New Jersey's average PFML duration slightly decreased to 8.8 weeks in 2018 and California's decreased to 13.12 weeks in 2019 (Greenfield & Cole, 2019).

2.6 Administrative Costs

Besides setup costs, ACs are typically expressed as a fraction and calculated using two different methods that could result in very different rates in some states. One is as a percentage of total contribution, and the other is as a percentage of total benefit payment or disbursement.

For Washington state from 2020 Q1 to 2022 Q3, the ACs averaged 6.38% of total contributions (Washington State Employment Security Department, 2022). This rate is 5.05% for California in 2020 (State of California Employment Development Department, 2021), 6.44% for New Jersey in 2019 (New Jersey Department of Labor and Workforce Development 2019) and 5.27% for Rhode Island in 2021 (Rhode Island Department of Labor and Training 2021). On average in those states, the ACs for 2019-2022 are approximately 5.79% of total contributions. Calculated based on numbers published by Washington State Employment Security Department (2022) and Correia (2022), the first-year ACs in Washington are higher at 8.04% of contributions (ranging from 9.81% in 2020 Q1 to 6.52% in 2020 Q3) or 8.93% of benefit payments. Later years, this rate dropped slightly. By September 2022, the average ACs for the first 2.75 years are about 6.38% of total contributions or 5.81% of total benefit payments[4]. Earlier estimates of ACs were lower (see Stiffler, 2013, Colorado Legislative Council Staff, 2018, and Greenfield and Cole, 2019). The Office of the Budget Director, Council of the District of Columbia (2016) reported the 2015 administrative expense as a percentage of disbursements to be 4.4% for California, 6.4% for New Jersey, and 4.3% for Rhode Island.

With the aforementioned incidence rate increase, the administrative cost will naturally grow, with a likely increase in PFML claim volumes, an increased number of staff members (including FTE), as well as their salary increase based on the wage growth assumptions and inflation forecasts (Correia, 2022).

However, several actuarial studies assumed the needed ACs to be much higher, ranging between 8-11% of the benefit payment costs. The actuarial report in the Weldon Cooper Center for Public Service (2021) for Virginia PFML assumed ongoing administrative expenses to be equal to 12.5% of total PML costs and 10.0% of total PFL costs between 2024 and 2033, developed from a variety of different sources including financial exhibits from states with mandated benefits,

[4] In Washington, from January 2020 to September 2022, the total collected premium is $2,181,906,858 and the total benefit payment is $2,398,927,995, calculated based on numbers published by Washington State Employment Security Department (2022) and Correia (2022). Therefore, though in general contribution exceeds benefit payment hence the ACs as a fraction of total contribution should be smaller than the ACs as a fraction of total benefit payment, the peculiar fiscal situation in the state of Washington explains why the former fraction is actually higher than the latter.

target loss ratios used by New York Department of Financial Services for determining PFL premium rates and risk adjustments, and average expenses reported by insurance companies for administering group short-term disability and paid family leave benefits. Based on AMI actuarial report's estimated expense ratio at 7% and Pinnacol's report estimated at 10% for Colorado, Strunchk et al (2020) assumed an ACs of 8% of benefits and 10.6% on the high end and 6% on the low end. Their upper bound of ACs were estimated at 10.6%, given this is the ratio of administrative expenses for Colorado's Unemployment Insurance benefit program. This is close to California Dube and Kaplan's (2002) estimate of 6-10% of total costs and not far from the calculation based on Institute for Women's Policy Research WildFig Partners' (n.d.) estimate for Connecticut for fiscal years 2023 through 2025—10% to 11% of benefit payout, which include implementation and IT development costs, and were moderately higher than the expenditure projections provided by the Connecticut Paid Family and Medical Leave Insurance Authority in May of 2020.

Prior studies have estimated the staffing ratio patterns. For example, the estimates by Institute for Women's Policy Research (n.d.) for Rhode Island and California show that 140 employees were needed to run a program with approximately 100,000 leaves. But based on Connecticut's Unemployment Insurance program staffing, the report expects that 120 employees are likely to be needed when the program is fully operational. Maryland Department of Legislative Services (DLS) and the Office of Policy Analysis (2019) reported that Washington expects to employ 94 full-time employees once its program is fully implemented. The estimated staffing needs for DC, New Jersey and Maryland are 106, 125, and 100 employees, respectively. Based on information technology (IT) costs related to FAMLI implementation in other states, the Maryland DLS estimates that the State would incur $60 million in contractual services over three years to develop a framework necessary to implement a paid FAMLI program. If existing UI IT infrastructure is utilized, the IT costs could be significantly lower. In addition, if a FAMLI program requires employer contributions, there will be significant costs to the State as an employer (DLS, 2019).

2.7 Labor and Social Impacts of PFML Programs

Due to the novelty of PFML insurance programs and limited data, a small strand of literature examines labor and social impacts of U.S. workers' access to and use of PFML. With available data, much of this research emphasizes experiences and outcomes related to *parental leave* (including leaves related to the birth and care of new children), such as stronger labor force attachment for family caregivers and workers experiencing serious medical issues, greater income stability for their families, and improvements to worker morale, job tenure, and other productivity-related factors (CRS, 2022). After reviewing the broader literature on the impacts of maternity and paid parental leave in the United States, Europe, and other high-income countries and noting some general observations, Rossin-Slater (2018) find that access to PFML increases new parents' leave-taking, improves new mothers' labor force attachment (which echoes the positive short-run labor force participation and earnings' boost identified by Bailey et al (2019)), and improves children's well-being, despite the wide variations of the results. But leave entitlements longer than one year can have the opposite effect (i.e., long separations can weaken labor force attachment among mothers) or does not appear to further improve child-related outcomes.

The PFML or FAMLI programs have also been reported to improve family health and well-being. For example, As the first PFML state, California data has been analyzed in greater detail. California's FAMLI program found an estimated 10.2% decrease in the risk of poverty among mothers of one year-old and an estimated 4.1% increase in household income (Stanczyk 2019). The program also appeared to have improved the mental health of mothers and the overall welfare of their infant children (Bullinger 2019). Furthermore, there has been a reduction in nursing home use by about 0.65 percentage points, representing an 11% relative decline in elderly nursing home utilization over a five-year timeframe (Arora and Wolf, 2018). The program has reduced infant admissions due to upper respiratory complications by about 33%. These admissions are classified as avoidable when babies receive more preventive care (Pihl and Basso 2019). Among Organization for Economic Co-operation and Development (OECD) countries, a study found that a one-week increase in job-protected paid parental leave would result in a 0.2% decrease in the infant mortality rate. Thus, a 12-week increase in job-protected paid leave would result in a 2.4% decline in the infant mortality rate (Patton et al 2017). Some caution is warranted in directly applying the results of paid sick leave studies to medical leave (CRS 2022). Research on paid sick leave will likely capture the impacts of relatively short periods of leave (e.g., less than one week), as well as the effects of preventive care and absences for minor illness and injury because paid *medical leave* does not include preventive care and tends to allow for several weeks of leave.

In addition to health benefits, PFML programs have also been found to result in positive labor market outcomes. Hill (2013) found that access to paid sick leave is associated with lower involuntary job separation rates. Baum and Ruhm (2013) noted evidence that California's FAMLI program increased the likelihood of mothers' returning to work within a year after the birth of a child, and the number of hours and weeks worked by mothers increased during the second year of the child's life by 15% to 20%. Bartel et al. (2021) found an increase in the ease of dealing with employee absences in the first year of implementation for employers with 50 to 99 employees. Bennett et al. (2020) found evidence of lower employee turnover rates and improved firm-level performance after the establishment of state programs for firms headquartered in states with leave insurance laws and attribute the improvements to greater employee retention and the nomination of women to executive positions. Thus, observing the San Francisco Paid Parental Leave Ordinance, Goodman et al. (2020) found that 82% of firms supported the leave. Bartel et al. (2021) find that paid family leave leads to an improvement in employers' rating of their ease of handling long employee absences, concentrated in the first policy year and among firms with 50-99 employees, as well as an increase in employee leave-taking in the second policy year driven by smaller firms. However, no significant impacts are identified to be associated with PFML programs for small and medium-sized employers in terms of productivity and other related metrics based on a survey of small and medium-sized businesses in the food services and manufacturing sectors in Connecticut, Massachusetts, and Rhode Island (Bartel et al., 2016). Morefield et al (2016) noted that lack of program awareness was identified in California and New Jersey as a potential reason that the programs had not been associated with an increase in leave taking among potential elder care providers.

However, the effects of family and medical leaves are not all positive. Potential high costs of such policies are a major concern. In addition to benefit payout (typically a fraction of wage replacement) and program ACs, firms or organizations also face costs to find replacement labor

during an employee's leave, which could negatively affect the labor force participation of women by motivating employers to substitute them with hires less likely to take paid leaves (Stock and Inglis 2021). Longer maternity leaves may lead to erosion of human capital and job skills and inhibit mothers' return to employment (Olivetti and Petrongolo 2017). Huebener et al (2021) document that mothers who are difficult to replace internally take shorter leave and that their firms hire replacements more often. As a result, firms respond by hiring fewer women of childbearing age into occupations where they are difficult to replace internally. Therefore, motherhood and generous parental leave policies could burden firms that have few internal substitutes available.

In addition, Johnson et al (2014) noted the intended and unintended effects of increasing Family and Medical Leave Act (FMLA) absence. Relying on geographic and temporal variation in mandate enactment, as well as within-county variation in the propensity to gain paid sick leaves following a mandate, Callison and Pesko (2022) found that (1) paid sick leave mandates increase coverage rates and work absences for those most likely to gain coverage, and these effects are larger for women and households with children; (2) paid sick leave mandates reduce the rate of presenteeism.

In Maryland, the FAMLI program may be particularly important in increasing labor market participation and other outcomes. Novello (2021) stated that if prime-age women in Maryland participated in the labor force at levels comparable to countries with paid leave, there would be more than 47,000 additional workers in the state in 2020 and $2.5 billion more in wages earned statewide. However, small employers often cannot provide the benefit (National Partnership for Women & Families. 2019). In Maryland, a typical worker who takes four weeks of unpaid leave loses more than $3,700 in income (BLS, 2021). According to Integrated Benefits Institute (2021), COVID-19 has resulted in an estimated $536.8 million in lost wages for Maryland workers due to lack of or inadequate paid leave since 2020. Hamilton et al (2021) noted that about 68,500 children are born in Maryland each year, and both parents work in 77 percent of all Maryland households with children (more than 970,000 households). Also, in Maryland, more than one in four workers are 55 and older. In the next 20 years, the share of the state's population aged 65 and older will grow by more than 10% (BLS 2021c) and older workers are more likely to experience serious medical conditions that require care (Atkinson 2021). Thus, Novello (2021) estimated that a paid leave program could add about 139,300 family caregivers to Maryland's workforce by 2030.

Part 3. Optimality of Cost-Sharing Rule and Taxable Wage Cap

3.1 Theoretical Model and Intuition

In choosing an appropriate cost-sharing rule and taxable wage cap for the MD FAMLI program, the state may have two goals in mind: efficiency and equity. While the former is mainly concerned about maximizing the aggregate welfare of the participants in the program (employers and employees), the latter primarily deals with the imbalance between the benefits accruing to them and the costs they need to incur.

We develop a theoretical model on the optimality of cost-sharing rule and taxable wage cap focusing on the efficiency of the program. The details for the model are in Appendix I. A building premise of the model is that the payroll/proportional tax regime as is common for the contribution part of state FAMLI programs is distortionary in nature when wage income is below the taxable wage cap. In contrast, the benefit payment that the employee is expected to receive during her leave is not subject to this distortionary tax. Therefore, different cost-sharing rules matter because of their differential effects on the equilibrium wage rate (e.g., wage per hour) and labor supply which have different implications on the magnitude of the distortion and expected benefit payment. Combined with the state's solvency constraint, these tradeoffs result in different optimal cost-sharing rules depending on whether the wage income of the employee is below the taxable wage cap, whether her benefit receipt during the leave is below the maximum weekly payment as set in the law (SB 275, Ch 48), and whether she always finds it economical to take the leave.

For the same reason, the taxable wage cap matters because it determines whether the tax is distortionary or not. The proportional tax is distortionary/non-distortionary if the wage income is below/above the cap. Therefore, to maximize efficiency a lower cap is preferred to a higher cap because a lower cap means more employees can enjoy the non-distortion of the tax. Because the state needs to maintain solvency of the FAMLI program, our model thus argues that the optimal taxable wage cap should equal the average per capita expected benefit payment plus the administrative costs (ACs). The contribution rate in this case is 100% and the tax effectively becomes lump-sum.

Though the efficiency goal favors a lump-sum tax, the equity goal may not. In the context of FAMLI programs, equity is measured by actuarial fairness which indicates the degree to which contribution deviates from the expected benefit (plus ACs). A particular concern to the state may be the scenario of "overpayment", where an employee contributes more than her expected benefit receipt plus allocated ACs. Though overpayment is generally unavoidable for an insurance program, the equity concern of the state suggests that it may strive to minimize the extent of overpayment, in particular for relatively lowly paid employees. Lump-sum tax regime may not be optimal from this perspective because it suggests that lowly paid employees are essentially

subsidizing highly paid ones which is exactly opposite to the goal of equity. Similar arguments can also be made to cost-sharing rules. Though a given rule may be optimal from the efficiency's point of view, it may nevertheless fall short in maximizing equity if it results in a higher contribution rate which tends to exacerbate the overpayment situation, especially for relatively lowly paid workers. Therefore, a benevolent state may face a tradeoff in choosing the taxable wage cap and cost-sharing rule to balance the goals of efficiency and equity.

3.2 Simulation of the Model

We simulate our model using the one-year American Community Survey (ACS) data for 2021, the latest ACS data available on the Census Bureau's website. The ACS is the most comprehensive data covering both labor supply and wage rate, the two key variables in our model.[5]

Since the FAMLI program in Maryland will start in January 2025,[6] we project the ACS 2021 data to 2025 by applying the following forecasted wage growth rates from the 2022 Social Security Administrative Trustee Report[7] and employment growth rates estimated from the Maryland Occupational & Industry Projections[8]:

Table 3-1. Assumptions for Wage Growth and Employment Growth

Year	Wage Growth Rate (%)	Employment Growth Rate (%)
2022	6.52	2.47
2023	4.77	2.47
2024	4.31	0.95
2025	4.07	0.95

To simulate the model we also make the assumptions for the key variables/parameters in the model as summarized in Table 3-2.

The simulation proceeds as follows:

- 1. We apply an initial contribution rate of **2%** at a given cost-sharing ratio and taxable wage cap. Given these assumptions we can calculate various cutoff points to determine the

[5] There are around 14.8% of data in ACS with wage per hour below the state minimum requirement ($12.2/hour in 2021). We believe most of these may be due to either input error or respondents' carelessness in answering relevant questions. As such in this simulation analysis we adjust the wage data which are below the state minimum wage requirement to be the minimum. In other parts of our analyses we still keep the raw data. This provides a means to check the robustness of the results in light of potential data issues.

[6] The premium collection will start in October, 2023. But the benefit payments will start in January, 2025. We consider 2025 as the first year for the FAMLI program to formally start since it is the first year with both benefit contributions and claims processing and benefit payment.

[7] Available at https://www.ssa.gov/OACT/TR/2022/.

[8] Available at https://www.dllr.state.md.us/lmi/iandoproj/.

employee type given our model in Section I.1 and I.2 of Appendix I. We then apply the corresponding formulas to calculate the new labor supply and wage rate.

- 2. We then calculate the tax base and revenue, as well as the expected benefit payment given the new labor supply and wage rate for each individual in the first step. In this process we also consider the exceptions with regard to community providers, employers with fewer than 15 employees, and workers earning less than $15/hour. We also incorporate the assumed ACs into the cost estimation. Aggregating all the individual tax bases and expected benefit payments (with ACs included) we can determine the new break-even contribution rate:

$$t_{new} = \frac{Total\ tax\ base}{Total\ benefit\ payment\ (with\ ACs\ included)}$$

We then apply this new contribution rate, the assumed cost-sharing ratio and taxable wage cap and start the process again until it converges to the final contribution rate that equates the expected tax revenue with the benefit payment (with ACs included). We set the convergence criteria as:

$$abs(Tax\ revenue - Expected\ benefit\ payment\ (with\ ACs\ included)) < \$500,$$

where abs stands for absolute value operation. That is, we allow the tax revenue to deviate slightly from the expected benefit payment to expedite convergence. This final contribution rate meets the state's solvency requirement under the assumption of the specific cost-sharing ratio and taxable wage cap. We then calculate the consumer and producer surpluses of each individual following the formulas in Appendix I and aggregate them into total surpluses which serves as a measure of social welfare. To avoid confusion, we subsequently call consumer surplus ***employee surplus*** and producer surplus ***employer surplus***.

- 3. We repeat Steps 1 & 2 under different assumptions of the cost-sharing rule and taxable wage cap. This allows us to compare the social welfare under different values of these variables and draw inferences on optimality.

3.3 Simulation Results and Discussions

3.3.1 Optimal Taxable Wage Cap

We first examine the efficiency of the taxable wage cap. Figure 3-1 plots the relationship between taxable wage cap and social welfare as the sum of employee and employer surpluses, where we assume the cost shared by employers is 50%. Consistent with our model prediction, the figure shows a clear inverse relationship between the cap and social welfare. In Appendix I we also examine the separate relationships between the cap and employee and employer surpluses, as well as similar relationships under different cost-sharing ratios. We document similar patterns. Therefore, in maximizing the efficiency of the FAMLI program, our simulation results favor a lump-sum tax, where each participant contributes around $741 to the program.

Table 3-2. Assumptions for Parameters in the Simulation

Variable	Relevance	Assumption	Rationale
Leave length (d)	Estimate expected benefit payment	10.5 weeks	Average proportion of leave length to the maximum leave length multiplied by 18, the average maximum leave length in MD considering that some employees may be able to take own sickness and maternity leaves in the same year.[9] The calculation of the average proportion of leave length to the maximum leave length was based on the statistics from the CA, CO, MA, NJ, NY, RI, and WA reports
Probability of the occurrence of FAMLI-covered life events (b)	Estimate expected benefit payment	6.25%	Average claim incidence rate from the statistics provided in CA, CO, CT, NJ, NY, RI, and WA reports plus 1% (safety reserve), then scaled by 1.25 to consider first-year surge in the filing of claims because of backlogs.
Administrative costs (AC)	Determines the total cost of the benefit program	8% of total expected benefit payment. Add $60 million in 2025 to consider the setup costs.	Literature review. See Part 2.
Contribution by employees earning less than $15/hour	Estimate total revenue	Total contributions associated with these employees are calculated as: $s * t * min\ (wage, taxable\ wage\ ca$. That is, only the employer	SB 275 (Ch.48) states that the state intends to cover the contributions paid by these employees.

[9] Though in general the maximum leave length is 12 weeks according to SB 275, it allows an employee to take an additional 12 weeks' leave if she encounters two particular types of life events in a single year: a new born baby and own sickness. We crudely adjust the maximum leave length considering this aspect of the law by taking the average of 12 and 24, the maximum leave length if the employee can take advantage of this provision, which is why we have 18 as the "average maximum leave length" in the leave length estimation.

		portion of the taxes are included in the revenue estimation.	
Taxable income from employers with fewer than 15 employees	Need to deduct this amount to estimate total taxable income.	14.36%*s of total taxable income, where s is the cost shared by employers	SB 275 (Ch. 48) stipulates that employers with fewer than 15 employees do not have to participate in the program. 14.36% is estimated by the taxable income by all community providers as a fraction of total taxable income in Maryland based on the administrative records.
Taxable income from community providers (net of those with fewer than 15 employees)	Need to deduct this amount to estimate total taxable income.	4.16%*s of total taxable income, where s is the cost shared by employers	SB 275 (Ch. 48) stipulates that the state intends to cover the cost of the community providers. 4.16% is estimated by the taxable income by all community providers (net of those with fewer than 15 employees) as a fraction of total taxable income in Maryland based on the administrative records.
Minimum utility loss if a FAMLI program covered life event occurs but the worker does not take the leave (E_1)	Determine the probability of taking the leave as well as equilibrium labor supply and wage rate under some scenarios.	$100	Small enough to increase the chance to have the type of workers who do not always find it economical to take the leave, to increase the probability of finding the optimal cost-sharing ratio not to be 100%. Varying the value of this parameter will not change the conclusions.
Maximum utility loss if a FAMLI program covered life event occurs but the worker does not take the leave (E_2)	Determine the probability of taking the leave as well as equilibrium labor supply and wage rate under some scenarios.	$60 million	Large enough to be more consistent with the nature of the insurance program and help avoid the uninteresting case under which some workers never find it economical to take the leave. Varying the value of this variable will not change the conclusions.

Return-to-scale factor (c)	Determine equilibrium labor supply and wage rate.	0.1754	Based on our simulation for the parameter ranges that would increase the chance of having the type of workers who do not always take a leave when a life event occurs. This can increase the chance of finding the optimal cost-sharing ratio not to be 100%. Randomizing this variable will not change the conclusions.
Productivity factor (α)	Determine equilibrium labor supply and wage rate.	Equation (80) in Appendix I	From the assumptions of the labor market being in equilibrium prior to the implementation of the FAMLI program. Also incorporate the consideration of federal FMLA leaves for an employee.
Disutility to work measure (a)	Determine equilibrium labor supply and wage rate.	Equation (80) in Appendix I	From the assumptions of the labor market being in equilibrium prior to the implementation of the FAMLI program. Also incorporate the consideration of federal FMLA leaves for an employee.

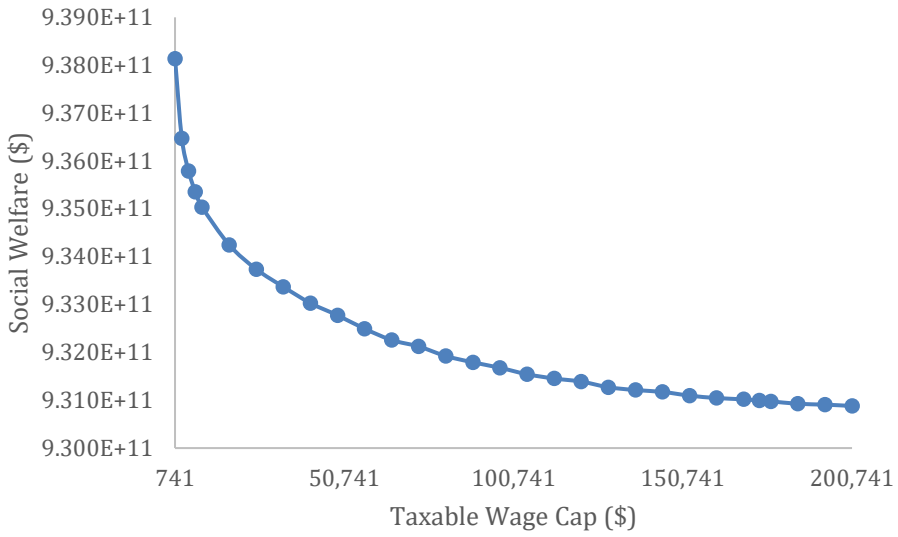

Figure 3-1. Taxable Wage Cap and Social Welfare

(Cost shared by employers = 50%)

We then proceed to examine the equity concern of the state. Specifically, we calculate a weighted squared overpayment (WSO) as follows:

$$Weighted\ Squared\ Overpayment = \sum_{i=1}^{N} \frac{1}{Annual\ wage_i}(Contribution_i - Expected\ benefit\ receipt_i)^2 \quad if\ Contribution_i > Expected\ benefit\ receipt_i,$$

where i indicates employee number and N is the total number of employees in the workforce. The square in the overpayment term, $contribution_i - expected\ benefit\ receipt_i$, assumes that the state penalizes overpayment significantly in setting policies. Expected benefit receipt includes ACs. Note that in the above expression we assume that the weight on each individual is inversely related to her wage income, which is consistent with the idea that the state is more concerned about low-earning workers overpaying than high-earning workers overpaying.

In Figure 3-2, we plot the relationship between the taxable wage cap and the state's equity concern as measured by WSO.[10] Unlike Figure 1 where the maximum cap is only around $200,000, we

[10] To be able to accurately estimate the WSO we need the information on contribution and expected benefit payment for each individual in the ACS database. However, due to the fact that community providers and small businesses with fewer than 15 employees do not need to contribute to the insurance program, accurately estimating each individual's contribution is not possible because the ACS database does not allow an identification of community providers and firm sizes. Therefore, our analysis with respect to WSO is meant to be suggestive. Nonetheless, since we focus on the relative magnitudes of the measure under different taxable income caps, there is no reason to suspect systematic bias in this measure, either.

extend the cap to be around $1 million in Figure 3-2. This is because in the ACS database the maximum wage income is around this level. Essentially, setting the cap above this level is equivalent to assuming no cap for taxable income.

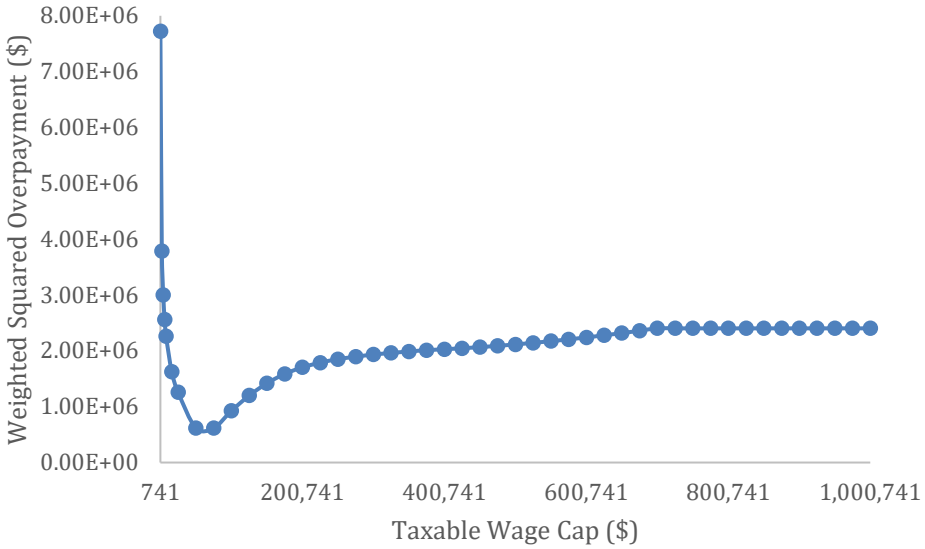

Figure 3-2. Taxable Wage Cap and State's Equity Concern

(Cost shared by employers = 50%)

Interestingly, Figure 3-2 shows that as the cap increases, the WSO first decreases significantly then gradually increases. Since lower value of this overpayment measure indicates higher equity, the evidence in Figure 3-2 suggests that, despite the efficiency advantage of a lump-sum tax, it nonetheless falls short in equity. This suggests that relative to the proportional tax regime, lump-sum tax has the worst equity implication. From this perspective, choosing some intermediate value of the taxable wage cap such as Social Security Wage Base (SSWB) may be advisable. The comparison between different tax regimes ranging from the lump-sum tax regime, the proportional tax regime with a cap on taxable income at SSWB, and the proportional tax regime with no cap is summarized in Table 3-3. We assume a cost-sharing ratio of 50% in this table.

Table 3-3. Comparison of the Efficiency and Equity of Different Tax Regimes (Cost Shared by Employers=50%)

Tax Regime	Social Welfare ($)	Decrease in SW Relative to ***Best*** Case	Weighted Squared Overpayment ($)	Decrease in WSO Relative to ***Worst*** Case
Lump-sum (each participant pays $741)	9.381E+11	0%	7.723E+06	0%
Proportional tax with cap at SSWB ($173,400)	9.310E+11	$7.145E+09 (0.762%)	1.572E+06	6.151E+06 (79.648%)
Proportional tax with no cap	9.306E+11	$7.502E+09 (0.800%)	2.403E+06	5.320E+06 (68.888%)

3.3.2 Optimal Cost-Sharing Rule

Similar to the analysis with respect to taxable wage cap, we first examine the efficiency implication of the cost-sharing rule. Figures 3-3 to 3-5 plot the relationships between percentage cost shared by employers ranging from 25% to 75% and social welfare, employees' welfare, and employers' welfare, respectively, where we have assumed a taxable wage cap of $173,400, the expected SSWB at 2025. As can be seen, a clear positive relationship is present in all these figures. The positive effect of the cost-sharing by employers and their welfare is counter-intuitive at first glance. However, when we realize that our model is built on the premise that the labor market responds to factors that may affect supply and demand and the fact that employers will benefit from a larger labor supply, this positive relation is expected. The reason is that employers would always attempt to shift the burden of the taxes to employees so the nominal cost-sharing does not necessarily correspond to the eventual tax burden on the two parties. Rather, tax incidence is determined by elasticities of demand and supply, a classical result in economics. Here, a higher cost-sharing by employers is optimal for themselves not because of this tax incidence argument, but because employers' response to the tax results in lower distortion in the labor market, which benefits both parties. Indeed, both employees' and employers' welfare are increasing with the cost shared by employers as Figure 3-4 & 3-5 demonstrate.

Since our theoretical model prescribes different optimal cost-sharing ratios depending on the type of employees but our simulation results point to the optimal ratio at 75%, the highest in the range of ratios in SB 275 (Ch. 48), it is necessary to examine the distribution of the employee types in the ACS data to better understand the finding. We do this in Table I-5 of Appendix I. The statistics show that the employees are either of the types who prefer a higher cost-sharing ratio or are indifferent, which provides an explanation to the relationships observed in Figures 3-5.

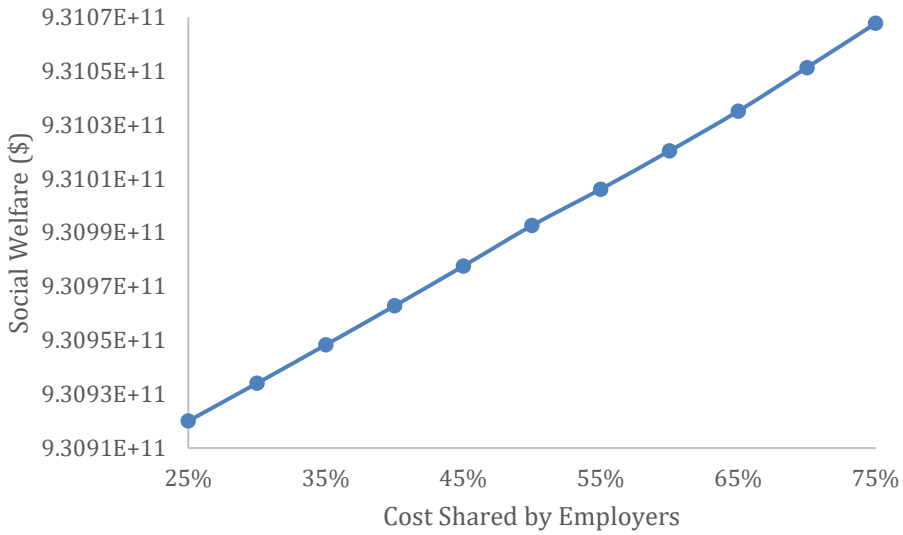

Figure 3-3. Cost Shared by Employers and Social Welfare (Taxable Wage Cap=Expected SSWB at 2025 ($173,400))

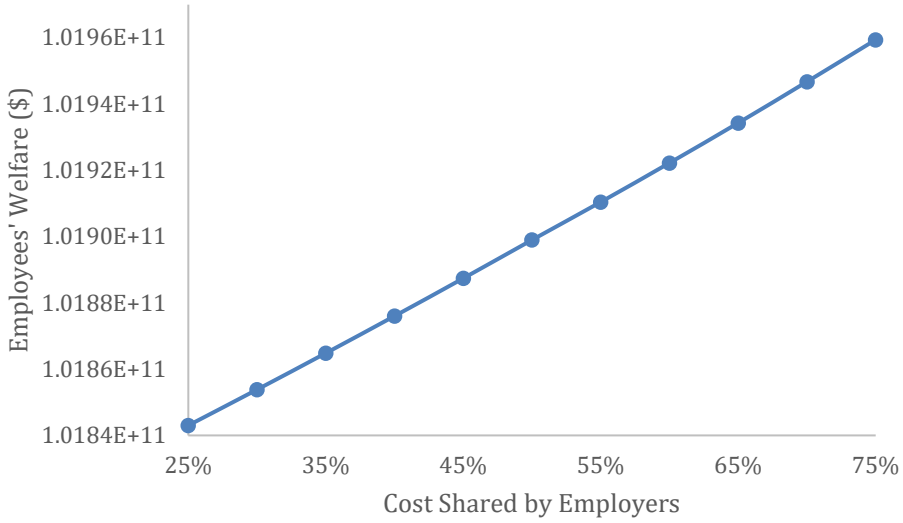

Figure 3-4. Cost Shared by Employers and Employees' Welfare (Taxable Wage Cap=Expected SSWB at 2025 ($173,400))

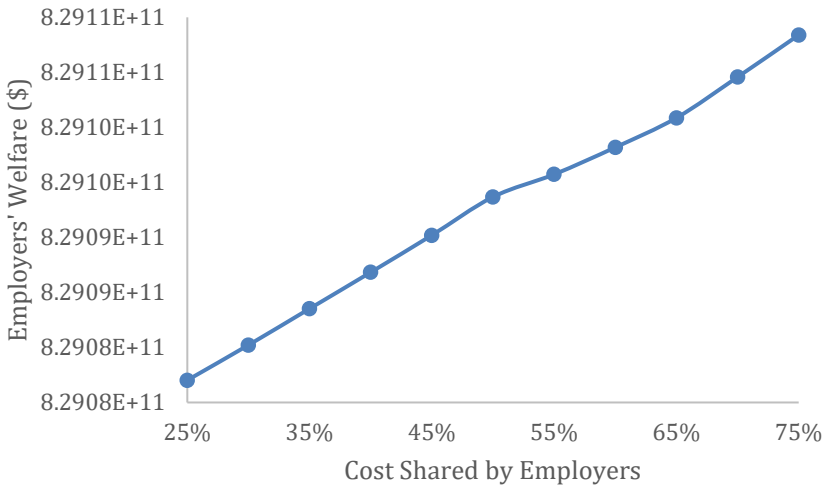

Figure 3-5. Cost Shared by Employers and Employers' Welfare

(Taxable Wage Cap=Expected SSWB at 2025 ($173,400))

Therefore, to maximize efficiency our results suggest that the state should set a higher cost-sharing ratio for employers. We then proceed to examine the equity implication of the cost-sharing rule. Figure 6 plots the relationship between cost-sharing and break-even contribution rate. The graph shows that a larger cost shared by employers results in a higher contribution rate. The result is mainly due to two provisions in SB 275 (Ch.48). First, it requires the state to pay the contribution by community providers. Second, employers with fewer than 15 employees are not required to contribute. Both provisions shift the burden of the contribution by these employers to other participants in the program. A higher share of the cost by employers thus suggests a larger cost from these entities to be shared among other program participants, which results in a higher contribution rate.

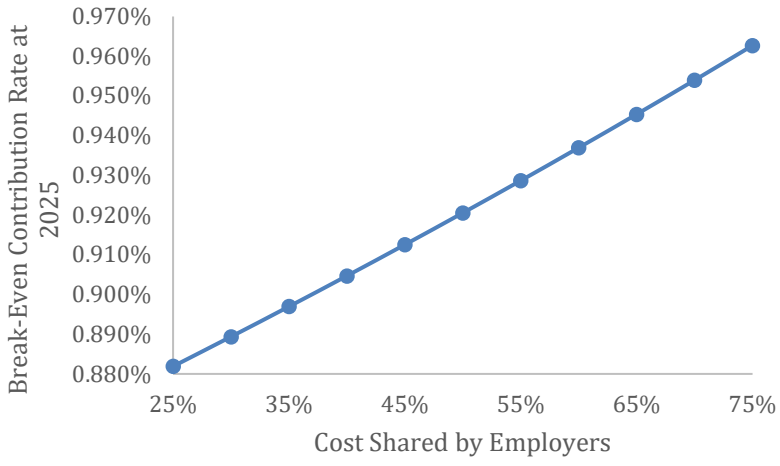

Figure 3-6. Cost Shared by Employers and Contribution Rate

(Taxable Wage Cap=Expected SSWB at 2025 ($173,400))

Since a higher contribution rate can disproportionally affect the overpayment by relatively lowly paid employees, it can exacerbate inequity. Indeed, Figure 3-7 illustrates a clear positive relationship between the cost shared by employers and our inequity measure: WSO.

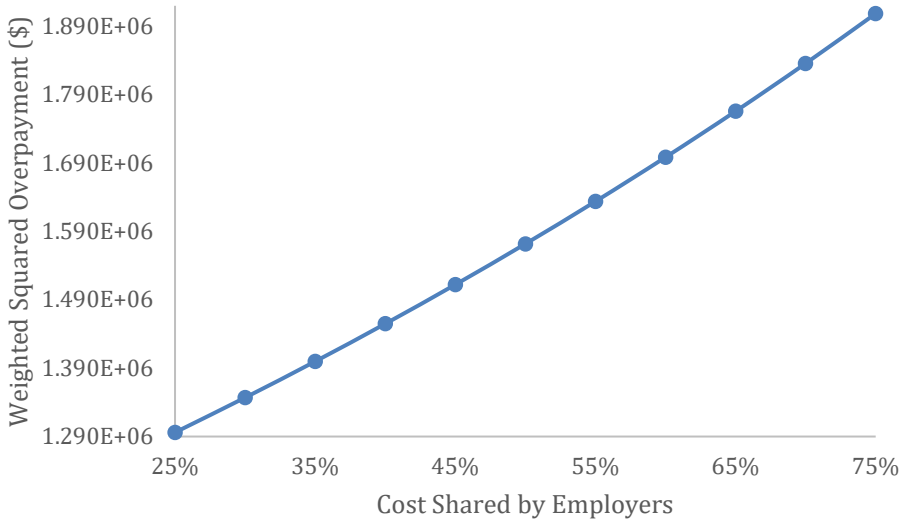

Figure 3-7. Cost Shared by Employers and State's Equity Concern

(Taxable Wage Cap=Expected SSWB at 2025 ($173,400))

Therefore, the state faces a tradeoff in balancing the efficiency gain of a higher cost-sharing by employers and its accompanying equity loss. Table 3-4 compares the magnitudes of the welfare loss and equity gain when we decrease the cost shared by employers. Though the 75% cost-sharing ratio is the best to maximize efficiency, it is nonetheless the worst to maintain equity. The state thus may wish to choose some middle point in balancing these conflicting goals.

Table 3-4. Comparison of the Efficiency and Equity of Different Cost-Sharing Rules (Taxable Wage Cap = SSWB at 2025 = $173,400)

Cost by Employers	Social Welfare ($)	Decrease in SW Relative to ***Best*** Case	Weighted Squared Overpayment ($)	Decrease in WSO Relative to ***Worst*** Case
25%	9.309E+11	1.477E+08 (0.016%)	1.296E+06	6.126E+05 (32.097%)
50%	9.310E+11	0.751E+08 (0.008%)	1.572E+06	3.368E+05 (17.647%)
75%	9.311E+11	0	1.909E+06	0

3.3.3 Policy Recommendations

We summarize our policy recommendations in the following table based on our discussions above. Our recommendations are predicated upon the goal of the state, which may result in different optimal policies and break-even contribution rates. In the last row we also consider the possibility that the state prefers the lowest contribution rate. In this case the optimal policy is to have no taxable wage cap and cost-sharing by employers at 25%, the lowest level set in SB 275 (Ch.48). However, we also added a caution to this policy based on our simulation results with respect to worst-scenario opting-out in Part 6, where we document that the break-even contribution rates and the solvency of the program under no-cap scenarios are very sensitive to the prospect of opting-out. The specific value of the lump-sum tax amount as well as the break-even contribution rates in Table 3-5 are based on the simulation of the sample between 2025 and 2027 (rather than just 2025), the entire period when the first contribution rate is expected to apply (after Oct 2026 the state will reevaluate the solvency situation and possibly redetermine the rate and other policy parameters based on SB 275). The details are discussed in Part 6.

Table 3-5. Policy Recommendation Conditional on State's Goal

State's Goal	Suggested Taxable Wage Cap	Suggested Cost Shared by Employers	Contribution Rate
Maximize efficiency (social welfare)	Average expected benefit payment plus ACs per participant (around **$670/participant including employers' share**)	75%	100%
Maximize equity	Ranges between around $60,000 to $200,000 (with SSWB in the middle)	25%	0.78-1.31% (depending on specific value of the cap)
Balance between efficiency and equity	Suggest SSWB (or some value in the range above)	50%	0.84%
Lowest contribution rate (Note: solvency may be very sensitive to opt-outs)	No cap	25%	0.71%

Part 4 Cost Analysis - Econometric Modeling Using FMLA and ACS Survey Data

In Part 4, we conduct a cost analysis based on econometric modeling, using the 2018 FMLA and 2016-2020 ACS data to model Maryland workers' leave taking behavior. We provide estimates of program revenue and expenses based on the results of the simulation models with the consideration of policy parameters and inflation adjustments.

4.1 Policy Parameters and Projection Assumptions

4.1.1 Policy Parameters

The total revenue of the program includes tax revenue from employers' and employees' contribution to the program. One exception is employers with fewer than 15 employees since their contribution is not mandatory.

$$I = TAX\ (All)\ -\ TAX\ (Small\ Employers) \tag{4-1}$$

where TAX(All) is the tax revenue that would be collected from all employees and employers, and TAX (Small Employers) is the uncollected tax revenue from employers with fewer than 15 employees.

The expenses of the program include the expected benefit payment to eligible participants, the administrative expenses to run the program, the state expenses for employee contribution for workers whose pay is less than $15 per hour (between Oct. 1, 2023 - June 30, 2026), and state's expenses on employers' contribution for community providers.

$$C = BP + AC + TAX\ (<\$15) + TAX(CP) \tag{4-2}$$

where C is the total program cost, BP is the expected benefit payment, AC is the expected administrative expenses, TAX (<$15) is the tax to be paid by the state to cover contributions of employees making an hourly wage less than $15.00 per hour. According to the legislation, TAX (<$15) starts on Oct. 1, 2023 and ends on June 30, 2025. TAX(CP) is the state's expenses to pay for community providers' employer contributions to the program. We consider community providers with more than 15 employees only given that all employers with fewer than 15 employees are not required to make contributions.

The following policy parameters are incorporated into the analysis.

- Working hours. To be eligible for the benefits, individuals must work at least 680 hours per year. Since the ACS survey did not have the variable on the number of weeks worked per year before 2019, our estimation related to this variable is based on the ACS data in 2019-2020. Our analysis shows that the number of employees who work more than 680

hours account for 91.5% of the total employment in Maryland. We then apply this estimate when predicting the number of employees who are likely to be eligible for FAMLI benefits.

- The proportion of taxable earnings by employers that employ 15 and more employees. According to SB 275 (Ch. 48), Section 8.3, each employer with 15 or more employees shall contribute to the fund. We adjust this portion by considering the proportion of taxable earnings in 2021 by employers with 15 and more employees. This percentage of taxable earnings without and with social security wage base (2021) is 86.59% and 86.64%, respectively.
- The tax sharing ratio between employers and employees. The state plans to cover employer contributions for community providers and employee contributions for low-wage (<$15 per hour) workers. The cost-sharing formula, therefore, would have an impact on contribution rates needed to reach program solvency.

4.2.1 Actuarial Study and Projection Assumptions

The following assumptions are used in the actuarial study and projections.

A. The individual weekly average wages, state average weekly wage[11], and maximum weekly benefit are adjusted by inflation.
B. Take up rates and administrative expenses each year are adjusted based on other states' experience (section 1).
C. Employment size[12] is adjusted based on the short-term (2021-2023) and long-term (2021-2031) occupational projections in Maryland (Maryland Department of Labor, 2022).

These assumptions are summarized in Appendix II – Table 1.

4.2 Method

4.2.1 Data

Two datasets are employed for the analysis: FMLA (2018) survey and American Community Survey (2016-2020). FMLA survey collected information on workers' leaving taking behaviors in the 12 months prior to the survey. ACS 5-year survey data is employed because the 5-year estimates for an area tend to have larger samples and smaller margins of error than the 1-year estimates (census.gov., 2022).

We first employ the FMLA Survey data to develop leave-taking behavioral models, which are then used to simulate individuals' leave-taking behavior using the MD sample in the ACS data (2016-2020). The simulation further considers the specific provisions of the MD FAMLI program when predicting benefit payments, administrative expenses, and other potential costs under the MD program. ACS personal weights and FMLA personal weights are applied in the analysis.

[11] See https://msa.maryland.gov/msa/mdmanual/01glance/economy/html/wages.html#wages.
[12] The employment data by business employment size classes are from the calculated administrative records.

4.2.2 Methodology

To estimate expected benefit payments, we first develop a model of leave-taking behavior conditional on known and/or estimated attributes of an individual and the employer for which he/she works. These attributes include workers' demographics (sex, age, race, marital status), education attainments, the employment sectors (government, private and non-for profit), as well as occupations and industries. The leave-taking behaviors in the FMLA survey are classified into six categories:

- Own sickness except for pregnancy-related health reason
- Related to new child
- Child's health conditions
- Care of spouses' health condition
- Care of parent(s)'s health condition
- To address issues arising from the deployment of a military family member

We employ the following logit model to estimate the probability of taking a leave in this category using the FMLA survey data.

$$Probability(Y_i = 1) = \frac{exp\,(\alpha_0 + \beta_1 Demog_i + \beta_2 Edu_i + \beta_3 Employment_{it} + \beta_4 Occupation_i + \beta_4 Industry_i)}{1 + exp\,(\alpha_0 + \beta_1 Demog_i + \beta_2 Edu_i + \beta_3 Employment_{it} + \beta_4 Occupation_i + \beta_4 Industry_i)} \quad (4\text{-}3)$$

In equation (3), the dependent variable is binary, which equals one if individual *i* takes a leave at time t, and zero otherwise. We will estimate different versions of the logit model corresponding to different needs of an individual in pursuance to the provisions in SB 275 (Ch. 48) (such as own health, care for newborn child, care for foster child, care for spouse, care for parent, care for service men). As discussed above, the outcome variable is theorized to be influenced by a combination of factors, including demographics ($Demog_i$, e.g. marital status, age, gender), education attainments (Edu_i), employment characteristics ($Employment_i$), occupation ($Occupation_i$) and industry ($Industry_i$)[13].

After we have estimated the probability of a covered individual taking a leave, we then estimate the duration of the leave. This is determined by similar attributes as in equation (3) for the probability of taking a leave. The FMLA Survey data includes a variable with leave length ranges in working days, we use the midpoint in each range to approximate the length of the leaves. Based on the behavioral models, we then simulate individuals' leave-taking behavior in the presence of the MD FAMLI program using the ACS data. The outcome of the simulation includes estimates of the days that covered individuals would take and total benefits by different types of leave. It needs to be acknowledged that eligibility for family and medical leaves differs for the unpaid FMLA and paid FAMLI in Maryland. To be eligible for unpaid FMLA, an employee has at least 1000 hours of work and paid leave for the employer in the preceding 52 weeks and the employee worked for the employer for at least 52 consecutive weeks. In contrast, the eligibility for FAMLI in Maryland requires 680 hours of work in one year. To account for the

[13] Only variables that exist in both datasets (FMLA and ACS) can be retained in the model for estimating the leave-taking behaviors since behavioral models developed using FMLA survey data are used to predict leave-taking behaviors in Maryland using the ACS data.

difference in eligibility, we conduct separate analysis using two samples – a sample with all workers in the FMLA survey and a sample with those who are eligible for FMLA. The rationale of examining the two models in the estimation is that MD FAMLI program's eligibility requirements are not as high as the FMLA provisions; therefore, one who is not eligible for FMLA can be eligible for MD FAMLI. We term the two models as FMLA eligibility leave model vs. general leave model.

4.3 Findings

4.3.1 Leave Taking Behavior

The estimated probability of taking leaves based on the General Leave model and the FMLA Eligibility model is shown in Table 4-1. Our findings show that the general leave model and the FMLA edibility model have similar predictions of taking-up rates on leaves related to own-sickness, child's health conditions, spouse and parent leaves. The major difference is shown on leaves related to a new child (e.g. maternity leave, bonding with new child, etc.). Given that the FMLA eligibility is largely different from the requirements for FAMLI eligibility, we adopt the general leave model when predicting the benefit payment expenses in the following sections.

Table 4-1. Probability of Taking Leaves

Leave Types	General Leave Model	FMLA Eligibility Model
1. Own sickness	0.105	0.108
2. Related to new child	0.026	0.126
3. Child's health conditions	0.004	0.004
4. Spouse	0.01	0.01
5. Parent	0.019	0.019
6. Military	0.002	0.002

After we have estimated the probability of a covered individual taking a leave, we then estimate the duration of the leave. The FMLA Survey data includes a variable with leave length ranges in working days, we use the midpoint in each range to approximate the length of the leaves. Based on the behavioral models of an individual taking a specific type of leave and the expected length of the leave, we then simulate individuals' leave-taking behavior in the presence of the MD FAMLI program using the ACS data. The outcome of the simulation includes estimates of leave length that covered individuals would take and total benefits by different types of leave. We further consider individuals' wages in comparison to the benefit levels which correlates with one's relative weekly wages in the state to estimate the benefit payment. Aggregating all these benefits generates an estimate for BP.

4.3.2 Tax Revenue Estimates Using Different Tax Wage Base Conditions

The total tax revenue of the FAMLI program is the tax collected from both employers and employees except for those employers with fewer than 15 employees. We estimate the tax revenue based on two taxable wage bases conditions - with and without social security wage base limits. The estimated taxable earnings are shown in Table 4-2.

Table 4-2. Estimated Taxable Earnings (in millions) in 2023 - 2027

	2023	2024	2025	2026	2027
Without Social Security Wage Base					
Employer 75%; Employees 25%	$46,949.8	$195,901.2	$203,873.4	$211,906.8	$220,199.5
Employer 50%; Employees 50%	$48,846.7	$203,816.0	$212,110.4	$220,468.4	$229,096.1
Employer 25%; Employees 75%	$50,743.6	$211,730.9	$220,347.3	$229,029.9	$237,992.7
With Social Security Wage Base					
Employer 75%; Employees 25%	$41,125.6	$172,777.0	$181,721.9	$190,648.2	$199,955.4
Employer 50%; Employees 50%	$42,780.2	$179,728.3	$189,033.2	$198,318.6	$208,000.3
Employer 25%; Employees 75%	$44,434.8	$186,679.7	$196,344.4	$205,989.0	$216,045.1

4.3.3 Estimation of Expenses

The expenses include four parts: the estimated benefits payments, the administrative costs, the state contribution payment to cover contributions for employees making an hourly wage less than $15 an hour, and the state's payment to cover contributions for employers that are community providers.

A major part of the program expenses is the benefit payments. We estimate the benefit payments based on the estimated take-up rates, the length of the leaves, and the benefit levels. The following factors are considered in the analysis. The benefit limit of $1,000 per week (2025) is adjusted by inflation (see section 4.1). The base year is 2025 given that benefit expenses are planned to start in January 2025. The limits are predicted to be $1,024 and $1,049 in 2026 and 2027, respectively. We adjust the state average weekly wage and individual wages by inflation (see section 4.1). Covered individuals' inflation-adjusted weekly wages are then compared to the inflation-adjusted state average weekly rates to determine their benefit.

The expenses in 2023 and 2024 mainly consist of administrative expenses since the benefit payments would not start until the beginning of 2025. Based on the other states' experience, we estimate the expenses at $60 million in the program set-up stage in 2023-2024, that is, 12 millions in Oct. - December 2023 and 48 million in 2024. In the following years (2025 - 2027), based on other states' experience, we assume the administrative expenses to be 8% of the benefit payment given that more claims are related to more administrative expenses. With these considerations, the expenses are predicted. Table 4-3 shows the estimates of the benefit payments and administrative expenses in 2023 - 2027.

Table 4-3. Estimated Benefit Payments and Administrative Expenses ($ millions)

	2023	2024	2025	2026	2027
Benefit Payments	0	0	$1,923.0	$1,839.2	$2,011.4
Administrative Expenses	$12.0	$48.0	$153.8	$147.1	$160.9

The amount of the last two types of expenses (<$15 employees; community providers) are related to the cost-sharing formula between employers and employees as well as the contribution rate that will be adopted. We consider such variations in the break-even analysis and actuarial study. The estimates are shown in Appendix II. Tables 2-7. In all of the estimations, we consider the cost-sharing formula between employers and employees because (1) a higher sharing ratio by employees is associated with a higher amount of expenses to cover employees' contributions to the fund; (2) a higher cost-sharing ratio by employers would lead to higher expenses for the state to cover employer contributions for community providers. In addition, we consider the proportion of taxable earnings by community providers based on administrative record (2021). This percentage of taxable earnings for community providers (with 15 and more employees) is estimated to be 3.73% (without social security wage base limit) and 4.16% (with social security wage base limit).

4.3.4 Estimates of Contribution Rates for Program Solvency

We conduct a break-even analysis to determine an appropriate contribution rate that would maintain program solvency. To account for the considerations of taxable wage bases (with and without social security wage bases) and the varying tax sharing ratios between employers and employees, we conduct the analysis in the following six scenarios.

- Without SSWB; Employer/Employee sharing at 75%/25%
- Without SSWB; Employer/Employee sharing at 50%/50%
- Without SSWB; Employer/Employee sharing at 25%/75%
- With SSWB; Employer/Employee sharing at 75%/25%
- With SSWB; Employer/Employee sharing at 50%/50%
- With SSWB; Employer/Employee sharing at 25%/75%

In order to maintain a solvent program, the expense and tax revenue should be at least at the same level so that all the expenses can be covered by the tax revenue. The lower tax wage base is applied, a higher contribution rate would be needed. Table 5 shows the contribution rate that is needed in order to reach the break-even point from 2025-2027. Our analysis shows that the contribution rates required for program solvency are lower with no social security wage base limit and when the employees take a larger share of the tax contribution to the program.

Table 4-5. Contribution Rates and Program Solvency from Break-Even Analysis

Employer/Employee Sharing	2025 Contribution Rate			2026 Contribution Rate			2027 Contribution Rate		
Without SSWB	**Total**	**ER**	**EE**	**Total**	**ER**	**EE**	**Total**	**ER**	**EE**
75%/25%	1.06%	0.80%	0.27%	0.97%	0.73%	0.24%	1.02%	0.76%	0.25%
50%/50%	1.02%	0.51%	0.51%	0.93%	0.46%	0.46%	0.97%	0.48%	0.48%
25%/75%	0.97%	0.24%	0.73%	0.88%	0.22%	0.66%	0.92%	0.23%	0.69%
With SSWB									
75%/25%	1.20%	0.90%	0.30%	1.08%	0.81%	0.27%	1.13%	0.84%	0.28%
50%/50%	1.15%	0.57%	0.57%	1.03%	0.52%	0.52%	1.07%	0.53%	0.53%
25%/75%	1.10%	0.27%	0.82%	0.99%	0.25%	0.74%	1.02%	0.25%	0.76%

4.3.5 Estimates of Contribution Rates for Program Solvency

We further conduct the actuarial analysis with the consideration of tax revenue and expenses in the six scenarios in 2023-2027. We identify contribution rates to be at the lowest possible points (0.01 incremental adjustment in the total contribution rate) to meet the following three criteria:

A. There is a positive balance at the end of year.
B. The revenue in each year is higher than predicted expenses in the same year, i.e. not encountering deficit in the same year cost-benefit balance.
C. A same contribution rate from 2023 - 2027

Table 4-6 and 4-7 provide a summary of the recommended contribution rates that would fulfill these criteria in the six scenarios and the fund balance in 2023-2027 with the suggested contribution rates. The balance sheets provided in Appendix II-Tables 2-7.

Table 4-6. Recommended Contribution Rates with Positive Funding Balance

Without SSWB	Total Contribution Rate	Employer Rate	Employee Rate
Employer 75%; Employees 25%	1.06	0.795	0.265
Employer 50%; Employees 50%	1.02	0.510	0.510
Employer 25%; Employees 75%	0.98	0.245	0.735
With SSWB			
Employer 75%; Employees 25%	1.20	0.900	0.300
Employer 50%; Employees 50%	1.15	0.575	0.575
Employer 25%; Employees 75%	1.10	0.275	0.825

Table 4-7. Funding Balance Across Years ($ millions)

Employer/Employee Sharing	2023	2024	2025	2026	2027
Without SSWB					
75%/25%	$401.6	$2,344.4	$2,347.2	$2,528.5	$2,617.0
50%/50%	$404.5	$2,353.9	$2,362.1	$2,563.7	$2,681.1
25%/75%	$401.8	$2,330.9	$2,320.9	$2,512.2	$2,626.1
With SSWB					
75%/25%	$388.0	$2,317.5	$2,324.5	$2,536.7	$2,679.9
50%/50%	$388.9	$2,316.7	$2,325.5	$2,551.0	$2,717.1
25%/75%	$388.3	$2,307.3	$2,310.4	$2,540.0	$2,718.5

4.3.6 The impact of administrative costs on contribution rates

In the simulations above, we assume the administrative expenses at 8% of the benefit payments based on other states' experience. This percentage, however, may vary within a range. Table 7 shows the contribution rates required for maintaining program solvency at low (5%), medium (8%) and high (10%) levels of administrative expenses.

Table 4-8. Contribution Rates and Program Solvency at Various Levels of Administrative Expenses

Employer/Employee Sharing	Administrative Expenses								
	Low			**Medium**			**High**		
Without SSWB	**Total**	**ER**	**EE**	**Total**	**ER**	**EE**	**Total**	**ER**	**EE**
75%/25%	1.03%	0.77%	0.26%	1.06%	0.80%	0.27%	1.08%	0.81%	0.27%
50%/50%	0.99%	0.50%	0.50%	1.02%	0.51%	0.51%	1.04%	0.52%	0.52%
25%/75%	0.95%	0.24%	0.71%	0.97%	0.24%	0.73%	1.00%	0.25%	0.75%
With SSWB									
75%/25%	1.17%	0.88%	0.29%	1.20%	0.90%	0.30%	1.22%	0.92%	0.31%
50%/50%	1.12%	0.56%	0.56%	1.15%	0.57%	0.57%	1.17%	0.59%	0.59%
25%/75%	1.07%	0.27%	0.80%	1.10%	0.27%	0.82%	1.12%	0.28%	0.84%

Part 5 Cost Analysis - Simulation using USDOL Worker PLUS Model

5.1 Simulation model

To facilitate the understanding of the impacts of different policy alternatives on leave-taking behaviors and costs, the Chief Evaluation Office at the U.S. Department of Labor (DOL) developed the Worker Paid Leave Usage Simulation (Worker PLUS) model and open-source microsimulation tool based on public microdata and predictive modeling (U.S. Department of Labor, 2021). The basic strategy behind this model was to base estimates of program costs on actual known leave-taking behavior as much as possible, and where this was not possible, to estimate a range of program costs reflecting a range of reasonable assumptions about unknown aspects of behavior in the presence of a paid leave program. (Matthews, A. C. and Alberlda, R., 2017) We use this model as the base model and modified the model to comply with the Family and Medical Leave Insurance Program (FAMLI) of Maryland. We use the DOL Family and Medical Leave Act (FMLA) Employee Survey public microdata to train models for individual-level leave needs and behaviors, and then simulate leave-taking behavior with individual workers in Maryland using data from 2016-2020 five-year American Community Survey (ACS) Public Use Microdata Sample (PUMS). The simulation model "runs" each sample person from the ACS through the estimated behavior models and sets of assumptions about leave-taking behavior. At several points during the simulation, such as when a person decides to take a leave of a particular type or not, a decision is made based on a logistic regression equation. The probability of deciding "yes" is estimated using a logistic regression as a function of the person's demographic characteristics and is compared to a random draw from a standard uniform distribution to make the decision. After each person has been passed through the model, a history of leave-taking behavior is simulated. The methodologies to simulate the leave taking decision and the leave length are discussed as below.

5.1.1 Leave taking simulation

The leave taking behaviors are predicted from logistic regression models which are trained with FMLA Employee Survey public microdata. The feature variables used are available from both the FMLA and ACS microdata, including age, marital status, educational attainment, race, family income, wage, work hours per week, occupation and industry codes as specified by the Census Current Population Survey, eligibility for the FMLA coverage (the existing unpaid leave coverage), and statuses of childbearing, living with elderly dependents, hourly paid, labor union membership, nonprofit organization employment, and government employment. A predictive model is trained for each leave type, i.e. own health, maternity disability, new child, ill health of child, ill health of spouse, and ill health of parent.

For each sample person in ACS data, the eligibility rule is checked to verify whether each individual is eligible to take leaves. A covered employee is an employee who has worked at least 680 hours over the 12-month application year immediately preceding the date on which leave is to begin. The statistical models are implemented in the simulation by applying the estimated coefficients to variables in the ACS data for each sample individual worker. These models estimate the probability of taking or needing a leave for a particular reason using the coefficients of the logistic regression models. For each sample person, the probability of taking a leave predicted from the logistic regression model is compared to a random "draw" from a standard uniform distribution (any point on the number line between zero and one is equally likely to be drawn). If the random draw is less than or equal to the probability given by the logistic regression equation, the decision "yes" is simulated; otherwise, the decision "no" is simulated. The logistic regression uses the following formula to calculate the probability:

$$\text{Probability} = \frac{e^{\beta x}}{(1+e^{\beta x})}$$

where x is a vector of independent variables used, β is the vector of coefficients estimated in the logit regressions, and e is the natural log. Program participation is determined by the user input parameters for take up rates for each leave type.

5.1.2 Leave length simulation

According to the FAMLI program, maximum leave length is 12 weeks in an application year except the employee may receive an additional 12 weeks for care of a newborn child, adoption, foster care, etc. or if a serious health condition arises. In this simulation model, leave length taken in absence of any state paid leave program is simulated from FMLA-based distribution. Maximum needed lengths are randomly drawn from simulation without program length distribution conditional on maximum needed length is no less than leave length taken in absence of any state paid leave program. Leave length covered by the program is determined based on the relative levels of wage replacement rates between the employer and the state program.

5.2 Model parameters

The input parameters of the simulation model are obtained from Family and Medical Leave Insurance Program (FAMLI):

- **Eligibility rules**:
    - **Minimum work hours:** at least 680 work hours over the 12-month application year.
    - **Employer type:** private employees and government employees with size of 15 or more.
    - **Qualifying leave:** own illness, maternity, new child, ill child, ill spouse, ill parent.
- **Maximum number of weeks**: 12 weeks in an application year, except the employee may receive an additional 12 weeks for care of a newborn child, adoption, foster care, etc., or if a serious health condition arises.
- **Weekly benefit cap**: Muston the wage be at least $50 and cannot exceed $1000.
- **Wage replacement structure**:
    - If weekly wage is 65% or less of state average, then 90% of weekly wage.

- If weekly wage is greater than 65% of state average, then 90% of weekly wage up to 65% of state average and 50% of the weekly wage that is greater than 65% of state average.

Some of the input parameters, i.e. social security wage base, wage inflation rate, state weekly average wage, weekly benefit cap, take up rates inflate over years. For example, the Social Security Administration (SSA) announced that the Social Security taxable wage base for 2022 has increased from 2021 ($142,800) to 2022 ($147,000), and that the maximum earnings subject to Social Security tax (Social Security wage base) will increase from $147,000 to $160,200 in 2023. As the input to our simulation model, the social security wage base is adjusted based on the OASDI Trustees Report (2022) and the wage base projections for 2023 through 2031 published by the Social Security Administration (2022). For those input parameters that vary over time, the annual inflated values or the inflation rates are summarized in the Appendix II – Table 1. The wage related data in 2016-2020 five-year ACS data are adjusted based on the wage inflation rate from 2020 to 2029 in the Appendix II –Table 1.

5.3 Simulation

The aim of the study is to conduct a cost analysis of the FAMLI Program to find an appropriate payroll contribution rate and cost sharing formula between employers and employees to establish and maintain a solvent program. Here, we use the simulation model to estimate the tax revenue income from the employment data and predict the program expenses based on the leave taking behavior. To study the impact of payroll contribution rates, cost sharing formula and SSWB on the tax revenue, we simulated the tax revenue and total balance with different payroll contribution rates ranging from 0.75% to 1.50% and different cost sharing ratio with or without SSWB applied to taxable income.

5.3.1 Tax revenue

To test whether all of an employee's wages should have the tax applied to it or there should be a threshold for limiting the amount of wages the tax is applied to, i.e., SSWB, the total tax revenue is simulated with SSWB and with no SSWB in taxable income with a range of payroll contribution rates from 0.75% to 1.50%, as displayed in Table 5-1.

Table 5-1(a). Tax revenue without SSWB in taxable income ($ millions)

Payroll Contribution Rate	0.75%	1.00%	1.05%	1.10%	1.15%	1.25%	1.50%
2023	1143	1524	1601	1677	1753	1906	2287
2024	1195	1594	1674	1753	1833	1992	2391
2025	1246	1662	1745	1828	1911	2077	2492
2026	1298	1731	1818	1904	1991	2164	2597
2027	1351	1802	1892	1982	2072	2252	2703
2028	1405	1874	1967	2061	2155	2342	2811
2029	1461	1947	2045	2142	2240	2434	2921

Table 5-1(b). Tax revenue with SSWB in taxable income ($ millions)

Payroll Contribution Rate	0.75%	1.00%	1.05%	1.10%	1.15%	1.25%	1.50%
2023	1016	1355	1423	1491	1559	1694	2033
2024	1060	1413	1484	1555	1625	1767	2120
2025	1107	1476	1549	1623	1697	1844	2213
2026	1153	1538	1615	1691	1768	1922	2306
2027	1201	1601	1681	1761	1841	2001	2401
2028	1249	1665	1748	1832	1915	2081	2498
2029	1298	1731	1817	1904	1991	2164	2596

According to SB 275 (Ch. 48), Section 8.3, each employer with 15 or more employees shall contribute to the fund. For employers with fewer than 15 employees, their employer contributions are not required and therefore should be excluded from the total tax revenue contribution. Table 5-2 displays the total contributions from employers with fewer than 15 employees. The waived contributions from employers depend on the cost-sharing formula between employers and employees and can be calculated by multiplying total contributions in Table 5-2 by the ratio shared by employers.

Table 5-2. Total contributions ($ millions) from employers of size fewer than 15

Payroll Contribution Rate	0.75%	1.00%	1.05%	1.10%	1.15%	1.25%	1.50%
2023	176	235	246	258	270	293	352
2024	184	245	257	269	281	306	367
2025	191	255	267	280	293	318	382
2026	199	265	278	291	305	331	397
2027	206	275	289	303	316	344	413
2028	214	285	300	314	328	357	428
2029	222	296	311	326	340	370	444

5.3.2 Program expenses

5.3.2.1 Benefit expenses

The majority of the program expenses are the benefit payments. The weekly claim amount must be at least $40 and cannot exceed $1,000 according to the FAMLI program. The wage replacement rate is 90% of weekly wage if weekly wage is 65% or less of state average. If weekly wage is greater than 65% of state average, then the covered employee receives 90% of weekly wage up to 65% of state average and 50% of the weekly wage that is greater than 65% of state average. For the 12-month period beginning January 1, 2026 and each 12 month period after, the Secretary will use CPI to calculate new benefit amounts. The Board of Public works can temporarily suspend a benefit increase if the seasonally adjusted total employment is

negative. The number of leave takers and the benefit expenses in 2025-2029 are displayed in Table 5-3.

Table 5-3. Number of leave takers and benefit expenses ($ millions)

Year	Number of Leave Takers	Benefit Expenses
2025	313,375	$1,334
2026	307,259	$1,311
2027	310,526	$1,410
2028	313,344	$1,452
2029	318,234	$1,504

5.3.2.2 Administrative expenses

The administrative expenses in 2023 and 2024 include the startup costs. According to the MD DLS report mentioned in the literature review, $60 million is the assumed startup cost. Since only three months are in 2023 for the October 2023-December 2024 period, we set up the startup costs to be 12 million in 2023 and to be 48 million in 2024. The administrative costs are assumed to be 8% of the benefit expenses, based on other states' data we reviewed. Table 5-4 presents the administrative cost estimates by year.

Table 5-4. Administrative expenses ($ millions)

Year	Admin Costs
2023	$12.00
2024	$48.00
2025	$106.70
2026	$104.90
2027	$112.82
2028	$116.19
2029	$120.32

5.3.2.3 Expenses of covering employees with hourly pay less than $15

Per the SB 257 Ch 48, it is the intent of the Maryland General Assembly (MGA) for the state to cover contributions for employees making an hourly wage less than $15.00 an hour from October 1, 2023, to June 30, 2026. Thus, those contributions covered by the state are considered as part of the expenses. As of January 1, 2022, Maryland's minimum wage increased from $12.20 to $12.50 an hour, while the federally mandated minimum wage remained at $7.25 an hour. The minimum wage in Maryland is scheduled to reach $13.25 on January 1, 2023 and then $14.00 on January 1, 2024. For tipped employees, the Maryland minimum cash-wage is $3.63 an hour, though this amount plus tips must at least equal Maryland's Minimum Wage Rate (Comptroller of Maryland, 2022). Given the current inflation rate, it is likely that the minimum wage in Maryland will be approximately or greater than $15.00 an hour; if the State is still to

cover employees with hourly wage less than $15, the cost to cover those employees' contributions would be relatively less. To estimate the number of employees making an hourly wage under $15.00, the hourly wages are estimated by the annual earnings, the number of weeks worked over a year, and the number of hours worked over a week from ACS data. The total contributions from employers and employees with the hourly wage under $15 are simulated with different payroll contribution rates as in Table 5-5. The expenses of covering the contributions for employees with hourly wage under $15 depend on the cost-sharing formula between employers and employees and can be calculated by multiplying total contributions in Table 5-5 by the ratio shared by employees.

Table 5-5. Contributions ($ millions) from employers and employees with hourly pay less than $15

Payroll Contribution Rate	0.75%	1.00%	1.05%	1.10%	1.15%	1.25%	1.50%
2023	11	15	16	16	17	19	22
2024	41	55	57	60	63	68	82
2025	39	52	54	57	59	64	77
2026	18	25	26	27	28	31	37
2027	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0

5.3.2.4 Expenses of covering employers of community providers

In addition, it is the intent of the MGA for the state to cover contributions for employers that are community providers that are funded by the Behavioral Health Administration, the Developmental Disabilities Administration, or the Medical Care Programs Administration to serve individuals with mental disorders, substance-related disorders, or a combination of those disorders or developmental disorders. Those contributions covered by the state are considered as part of the expenses as well. The total contributions from community providers are shown in Table 5-6. The expenses of covering employers of community providers depend on the cost-sharing formula between employers and employees and can be calculated by multiplying total contributions in Table 5-6 by the ratio shared by employers.

Table 5-6. Contributions from community providers ($ millions)

Payroll Contribution Rate	0.75%	1.00%	1.05%	1.10%	1.15%	1.25%	1.50%
2023	51	68	72	75	78	85	102
2024	53	71	75	78	82	89	107
2025	55	74	78	81	85	92	111
2026	58	77	81	85	88	96	115
2027	60	80	84	88	92	100	120
2028	62	83	87	91	95	104	124

2029	64	86	90	94	99	107	129

5.3.3 Balance of revenue and expenses

Given the simulated tax revenue and expense, the balance is calculated as the difference between tax revenue and expenses for each year. To study the influence of the cost sharing formula between employees and employers on the balance, three scenarios are performed with a cost sharing formula of 25%, 50%, and 75% with total balance in 2023-2029 displayed in Table 5-7, 5-8 and 5-9.

Table 5-7. Total balance with tax revenue 25% from employers ($ millions)

(a) Without SSWB in taxable income

Payroll Contribution Rate	0.75%	0.80%	0.85%	0.90%	0.95%	1.00%	1.05%
2023	1066	1138	1210	1282	1354	1426	1497
2024	1058	1131	1205	1279	1352	1426	1500
2025	-285	-208	-131	-54	23	100	177
2026	-196	-114	-33	49	130	211	293
2027	-238	-153	-67	19	104	190	276
2028	-232	-143	-54	35	124	213	302
2029	-235	-143	-50	42	135	228	320

(b) With SSWB in taxable income

Payroll Contribution Rate	0.75%	1.00%	1.05%	1.10%	1.15%	1.25%	1.50%
2023	939	1256	1320	1383	1447	1573	1891
2024	922	1245	1310	1375	1439	1708	2059
2025	-424	-86	-18	50	117	253	592
2026	-341	18	89	161	233	376	735
2027	-389	-11	65	140	216	367	745
2028	-389	5	83	162	240	398	791
2029	-398	11	93	175	256	420	829

Table 5-8 Total balance with tax revenue 50% from employers ($ millions)

(c) Without SSWB in taxable income

Payroll Contribution Rate	0.75%	0.80%	0.85%	0.90%	0.95%	1.00%	1.05%
2023	1012	1081	1149	1217	1285	1354	1422
2024	1009	1079	1149	1220	1290	1361	1431
2025	-337	-263	-190	-116	-42	31	105
2026	-255	-178	-100	-23	55	132	209

2027	-305	-224	-142	-61	20	101	182
2028	-301	-217	-132	-48	36	121	205
2029	-307	-219	-131	-43	44	132	220

(d) With SSWB in taxable income

Payroll Contribution Rate	0.75%	1.00%	1.05%	1.10%	1.15%	1.25%	1.50%
2023	885	1184	1244	1304	1364	1483	1783
2024	873	1180	1242	1303	1364	1626	1961
2025	-476	-155	-91	-26	38	166	488
2026	-400	-62	6	74	142	277	616
2027	-456	-100	-29	43	114	256	612
2028	-458	-88	-13	61	135	283	653
2029	-469	-84	-7	70	147	301	686

Table 5-9 Total balance with tax revenue 75% from employers ($ millions)

(e) Without SSWB in taxable income

Payroll Contribution Rate	0.75%	0.80%	0.85%	0.90%	0.95%	1.00%	1.05%
2023	958	1023	1088	1152	1217	1282	1346
2024	960	1027	1094	1161	1228	1295	1363
2025	-389	-319	-249	-178	-108	-38	32
2026	-315	-241	-168	-94	-21	53	126
2027	-371	-295	-218	-141	-64	12	89
2028	-370	-291	-211	-131	-51	29	109
2029	-379	-295	-212	-129	-46	37	120

(f) With SSWB in taxable income

Payroll Contribution Rate	0.75%	1.00%	1.05%	1.10%	1.15%	1.25%	1.50%
2023	831	1112	1169	1225	1281	1394	1675
2024	824	1115	1173	1231	1289	1544	1863
2025	-528	-224	-163	-103	-42	80	384
2026	-460	-141	-77	-13	50	178	497
2027	-522	-188	-122	-55	12	145	479
2028	-527	-180	-110	-41	29	168	515
2029	-541	-180	-108	-35	37	181	543

5.3.4 Income statements

For each scenario of the cost sharing formula, the minimum payroll contribution rate that yields a consistently positive balance is selected to generate an income statement in 2023-2029.

- When the cost sharing formula is 75% from employers and 25% from employees, the selected payroll contribution rate is 1.15% with SSWB applied in taxable income, with income statement in 2023-2029 displayed in Appendix III – Table 1.
- When the cost sharing formula is 50% from employers and 50% from employees, the selected payroll contribution rate is 1.10% with SSWB applied in taxable income, with income statement in 2023-2029 displayed in Appendix III – Table 2.
- When the cost sharing formula is 25% from employers and 75% from employees, the selected payroll contribution rate is 1.05% with SSWB applied in taxable income, with income statement in 2023-2029 displayed in Appendix III – Table 3.

5.4 Findings and discussions

As can be seen from the simulated total balance, all three factors, i.e. cost sharing formula, payroll contribution rates, and SSWB, have significant impact on the total balances. The total balance with no SSWB is significantly higher than the total balance with SSWB. The total balance with higher payroll contribution rate is considerably higher. The higher the tax is shared by employers, the higher the payroll contribution rate needs to be set in order to maintain the solvency of the FAMLI Program. For example, when employers contribute 25% of the tax with 75% shared by the employees, a payroll contribution rate of 1.05% is high enough to maintain a solvent program, while the payroll contribution rate needs to be lifted to 1.15% when employers contribute 75% of the tax.

Part 6 Cost Analysis Using Simulated Theoretical Model

6.1 Mechanism and Assumptions

In this part we use the theoretical model we developed in Part 3 and Appendix I to simulate the dynamic response of the labor market with the implementation of the FAMLI program in Maryland and conduct a cost analysis of the program. Our model and the simulation conducted in that section center on two fundamental goals of the state: efficiency and equity. The simulation results suggest that the state often faces a tradeoff in balancing these two goals. While lowering the taxable wage cap increases social welfare (efficiency), it nonetheless reduces equity by increasing the proportion of low wage earners to overpay (in the sense of contributing to the program more than their expected benefit payment plus ACs). On the other hand, increasing the cap to a certain level (but not eliminating it completely) can increase equity, yet at the same time sacrifices efficiency by reducing social welfare. Similarly, increasing cost-shared by employers often results in improved social welfare, but this comes at the price of an increased contribution rate which results in more low-wage earners overpaying. Our policy recommendations in face of these tradeoffs are listed in Table 3-5 and the Executive Summary.

In this section we simulate the response of the labor market under different policy parameters. We estimate the break-even contribution rates and fund balances in consideration of the four policies we recommended in Table 3-5 conditional on the state's goal(s). We also analyze the sensitivity of solvency to tying maximum weekly benefit payment to CPI (as required by SB 275 Ch. 48) and to altering the three key variables in the FAMLI program: claim incidence rate, average leave length, and administrative costs (ACs). Finally, we consider the impact of potential opting-out of some employers/employees from the program and optional participation of self-employed individuals.

The data used in our simulation follows that in Part 3, but our projection of the wage and labor supply (hours worked in a year) does not stop at 2025, the starting year of the program as in Part 3, but continues until 2027, the last year when the contribution rate and other key policy parameters may apply before the two-year cycle of the re-assessment of the solvency situation of the FAMLI program and the possible re-determination of the contribution rate begins, according to SB 275. The wage growth rate, inflation rate, and employment growth rates used in our projection are summarized in Table 6-1. The source document for the first two rates is 2022 Social Security

Administrative Trustee Report[14] and the reference for the last one is Maryland Occupational & Industry Projections[15].

Table 6-1. Assumptions for Wage Growth, Inflation, and Employment Growth

Year	Wage Growth Rate (%)	Inflation (%)	Employment Growth Rate (%)
2022	6.52	4.54	2.47
2023	4.77	2.33	2.47
2024	4.31	2.4	0.95
2025	4.07	2.4	0.95
2026	3.96	2.4	0.95
2027	3.86	2.4	0.95

The key parameters assumed in our simulations are summarized in Table 6-2.

Table 6-2. Assumptions for Key Variables in Simulations

Variable	10/2023–12/2024	2025	2026	2027	Rationale
Leave length (weeks)		10.5	10.5	10.5	See Table 3-2
Base claim incidence rate (probability of the occurrence of FAMLI-covered life events) (%)		5	5	5	Average claim incidence rate from reports of similar programs in CA, CO, CT, NJ, NY, RI, and WA plus 1% (safety reserve)
Growth rate of claim incidence rate (%)		25	-8	5	Literature review in Part 2
Claim incidence rate (%)		6.25	5.75	6.04	Calculated based on assumptions of the base incidence rate and its annual growth rate.
Administrative costs (ACs) as a fraction of total benefit payment (%)		8	8	8	Literature review in Part 2
One-time ACs ($ million)	60				Literature review in Part 2

[14] Available at https://www.ssa.gov/OACT/TR/2022/.
[15] Available at https://www.dllr.state.md.us/lmi/iandoproj/.

The simulation process is the same as what is described in Section 3.2 of Part 3 except that we use the entire sample from 2025 to 2027 to estimate the break-even contribution rate. We then apply this contribution rate to each year between 2023 and 2027 and consider specific contingencies in a given year (such as one-time ACs in 2023-2024) to calculate expected total contributions and total expenses consisting of benefit payments and ACs for each year and project the solvency of the FAMLI program. We use several measures of solvency: contemporaneous total contribution minus total expenses, fund balance at the end of year, and fund balance as a fraction of subsequent total expenses. Fund balance in a given year is calculated as:

$$Fund\ Balance_t = Fund\ Balance_{t-1} + Contribution_t - Expected\ Benefit\ Payment_t - AC_t$$

where t indicates the year. The rest of the section reports the findings for each scenario we considered. In our report we focus on how a given scenario affects the break-even contribution rate and solvency situation. The detailed income statements are available in Appendix IV.

6.2 Cost Analysis Results

6.2.1 Four Policy Recommendations Conditional on State's Goal(s)

In Table 3-5, we suggested four policy parameters depending on the state's preferences. We first analyze the break-even contribution rates and solvency of the program under each of these four scenarios. The results are summarized in Table 6-3. The simulation results show that out of the four policies, a balanced goal between efficiency and equity has the lowest fund balances and ratios of the balances to subsequent expenses. The policy with the best solvency situation is the one that maximizes efficiency. But all four policies are solvent under different contribution rates.

6.2.2 Indexing Maximum Weekly Benefit Payment to CPI

SB 275 requires the maximum weekly benefit payment ($MaxBP$) be tied to inflation as measured by CPI. One of our charges is to analyze the impact of this indexing to subsequent solvency of the program. To do this, we consider three possible scenarios of inflation and wage growths from the 2022 Social Security Administrative Trustee Report as summarized in Table 6-4. The table also reports the corresponding $MaxBPs$, SSWB, and average weekly wage (AWW) conditional on the three scenarios.

Table 6-3. Cost Analysis of Four Recommended Policies Conditional on State's Goal(s)

State's Goal(s)	Taxable Wage Cap	Cost Shared by Employers	Contribution Rate	Solvency Measure	10/2023 – 12/2024	2025	2026	2027
Maximize efficiency (social welfare)	Average expected benefit payment + ACs per participant (around $670 including employers' share)	75%	100%	Contributions - Expenses ($ million)	1800.7	125.5	149.5	95.8
				Fund Balance ($ million)	1800.7	1926.2	2075.7	2171.5
				Fund Balance/Subsequent Expenses	118%	137%	135%	
Maximize equity	$100,000 (could also be some value between around $60,000 to $200,000, with SSWB within the range).	25%	0.97%	Contributions - Expenses ($ million)	1714.1	72.5	224.7	168.2
				Fund Balance ($ million)	1714.1	1786.5	2011.3	2179.5
				Fund Balance/Subsequent Expenses	117%	130%	134%	
Balance between efficiency and equity	Suggest SSWB (or some value in the range above)	50%	0.84%	Contributions - Expenses ($ million)	1674.4	51.3	**179.4**	**124.8**
				Fund Balance ($ million)	1674.4	1725.7	**1905.1**	**2029.9**
				Fund Balance/Subsequent Expenses	114%	124%	126%	
Lowest contribution rate	No cap	25%	0.71%	Contributions - Expenses ($ million)	1704.4	75.3	220.3	163.6
				Fund Balance ($ million)	1704.4	1779.7	2000.0	2163.6
				Fund Balance/Subsequent Expenses	117%	130%	134%	

Table 6-4. Three Scenarios of Inflation and Wage Growth

Variable	Year	Low	Intermediate	High
Inflation (%)	2026	1.8	2.4	3
	2027	1.8	2.4	3
Wage Growth (%)	2026	3.04	3.96	5.04
	2027	2.74	3.86	5.07
MaxBP ($)	2026	1,018	1,024	1,030
	2027	1,036	1,049	1,061
SSWB ($)	2026	170,100	180,600	187,500
	2027	175,200	188,100	197,100
Average Weekly Wage ($)	2026	1,489	1,582	1,669
	2027	1,530	1,643	1,754

We first consider the base case of not tying the $MaxBP$ to inflation, assuming that all other parameters follow the intermediate scenario. We also assume that the state's goal is to maintain a balance between efficiency and equity. This means the taxable wage cap is at the SSWB level and cost-sharing between employers/employees is 50%/50%. The simulation estimates a break-even contribution rate. We then apply the same rate but consider indexing $MaxBP$ to inflation given different levels of inflation and the corresponding other parameters as in Table 6-4. We then compare the solvency situations between these four scenarios (no inflation and three scenarios under different levels of inflation). The results are summarized in Table 6-5.

Table 6-5. Indexing Maximum Weekly Benefit Payment to Inflation on Solvency

Scenario	Contribution Rate	Solvency	10/2023 – 12/2024	2025	2026	2027
No indexing $MaxBP$ to inflation	0.83%	Contributions - Expenses ($ million)	1646.6	27.7	**176.4**	**147.1**
		Fund Balance ($ million)	1646.6	1674.3	**1850.8**	**1997.8**

		Fund Balance/Subsequent Expenses	112%	123%	126%	
Indexing $MaxBP$ at low inflation	0.83%	Contributions - Expenses ($ million)	1564.8	-29.3	88.0	25.2
		Fund Balance ($ million)	1564.8	1535.5	1623.5	1648.6
		Fund Balance/Subsequent Expenses	109%	112%	112%	
Indexing $MaxBP$ at inter-mediate inflation	0.83%	Contributions - Expenses ($ million)	1646.6	27.7	**154.8**	**99.1**
		Fund Balance ($ million)	1646.6	1674.3	**1829.1**	**1928.2**
		Fund Balance/Subsequent Expenses	112%	121%	121%	
Indexing $MaxBP$ at high inflation	0.83%	Contributions - Expenses ($ million)	1696.5	67.2	207.5	160.6
		Fund Balance ($ million)	1696.5	1763.7	1971.2	2131.8
		Fund Balance/Subsequent Expenses	115%	124%	127%	

Interestingly, the results in Table 6-5 show that tying $MaxBP$ to inflation jeopardizes solvency only under a low inflation environment (as shown by the negative value of the contemporaneous contributions minus expenses), which is counter-intuitive at first glance. As long as we recognize that other parameters such as wage, AWW, and SSWB also increase with inflation and the differential between the wage growth and inflation growth tends to be higher under high inflation environment as Table 6-4 suggests, this result is expected especially given that our baseline scenario assumes an intermediate inflation environment for all other variables except for $MaxBP$. Comparing the results under the same assumptions of the other parameters (which means comparing the two scenarios with indexing at intermediate inflation and wage growth rates and without

indexing but at the same levels of inflation and wage growth for other parameters), we find a drop of fund balance of $20 million and $70 million at 2026 and 2027, respectively under indexing relative to no indexing. The drop is not that significant as compared to the size of the fund.

From a different perspective, we compare the break-even contribution rate under indexing with that under no indexing. As shown in Table 6-3 (third scenario), the break-even contribution rate under indexing is 0.84%, which is only slightly higher than the corresponding contribution rate of 0.83% under no-indexing. However, this minor change in contribution rate is sufficient to mend the slight worsening of the solvency situation under indexing as shown by comparing the statistics in Table 6-3 to those in Table 6-5. The fund balance increases by $76 million and $102 million for 2026 and 2027, respectively. The solvency situation now is slightly better than that under no-indexing scenario.

6.2.3 Sensitivity to Key Variables of the Program

Our baseline assumptions of claim incidence rate, average leave length, and ACs follow Table 6-2. These assumptions are built on our reviewing of the available reports on similar programs in other states. However, given the potentially different demographics and employment patterns in Maryland as compared to these states, it is possible that the actual values of these variables can deviate from our assumed ones. The deviations can even be significant, as some states may have learned in a hard way for the implementation of their programs. It is therefore important to conduct an analysis of the sensitivity of the solvency to these key parameters of the program. We do this in this section. We first summarize the three cost scenarios we consider in Table 6-6. Note that in calculating the incidence rates from the base incidence rates we have applied the same annual growth rates of incidence rates as in Table 6-2. The three scenarios are similar to those considered in the COPFML model in Strunk et al. (2020), except that our assumptions of incidence rates are correspondingly lower than theirs. The reasons are twofold. First, our definition of claim incidence rate is different from their claim rate. In their report, claim rate is defined as the total number of claims that receive payment to the total number of eligible workers. In contrast, the denominator in our rate calculation is the total number of covered workers, not just eligible ones.[16] This tends to make the rate smaller. Second, our assumptions of the baseline (intermediate) as well as the low- and high-cost scenarios are based on a survey of the relevant reports from other states, which rarely show a value above these ranges. Table 6-7 presents the results under these cost scenarios.

[16] Strictly speaking based on our theoretical model in Appendix I what we need to estimate is the probability of the occurrence of a FAMLI-program-covered life event. But given our evidence in Table I-5 of Appendix I which shows that it is very rare that an eligible worker facing the program-covered life events does not take the leave, we approximate this probability using the claim incidence rate.

Table 6-6. Three Cost Scenarios

Cost Scenario	Base Incidence Rate	Incidence Rate	Leave Length (weeks)	ACs to Benefit Payment
Low	3%	3.75%	9	6%
Intermediate	5%	6.25%	10.5	8%
High	7%	8.75%	12	10%

As can be seen, the contribution rates and fund balances vary widely depending on different scenarios. The contribution rates range between a low of merely 0.43% to a whopping 1.36% under the high-cost scenario. The size of the program under the high-cost scenario is also significantly larger as shown by fund balances. The high sensitivity to these key determinants of the solvency of the program points to the importance of making appropriate assumptions for these parameters. Though our assumptions are built on experiences of other states, we recognize the jeopardy of blindly trusting these statistics and the possibility of significant deviation between the actual values and our assumed ones. Nonetheless, given that SB 275 requires the state to re-assess the solvency situation and possibly re-determine the contribution rate every two years starting from June, 2025, the insolvency risk is alleviated to some extent. Besides, the fund also accumulates balance for 15 months (from Oct, 2023 to Dec, 2024) before benefit payment can be claimed starting in Jan., 2025, which also helps decrease the risk of insolvency.

Table 6-7. Sensitivity of Contribution Rate and Solvency to Different Cost Scenarios

Cost Scenario	Contribution Rate	Solvency	10/2023 – 12/2024	2025	2026	2027
Low	0.43%	Contributions - Expenses ($ million)	828.0	36.1	101.3	74.2
		Fund Balance ($ million)	828.0	864.1	965.4	1039.5
		Fund Balance/Subsequent Expenses	111%	123%	126%	
Inter-mediate	0.84%	Contributions - Expenses ($ million)	1674.4	51.3	179.4	124.8
		Fund Balance ($ million)	1674.4	1725.7	1905.1	2029.9

		Fund Balance/Subsequent Expenses	114%	124%	126%	
High	1.36%	Contributions - Expenses ($ million)	2749.2	70.8	278.8	189.2
		Fund Balance ($ million)	2749.2	2820.0	3098.8	3288.1
		Fund Balance/Subsequent Expenses	115%	125%	126%	

6.2.4 Potential Opting-Out from the Program

SB 275 allows private companies to opt out of the FAMLI program if they have a comparable or better insurance program for their employees. As reviewed in Part 2, however, most of the states have very low opt-out ratios among their employees (around 3-4%) except for the state of Massachusetts which has around a third of its workforce covered by private insurance plans. If opting-out is randomly distributed across all firm sizes and wage categories, it is not expected to affect the contribution rate and solvency. If opt-out is not random, however, and especially if opt-outs are concentrated in those who may disproportionately contribute more to the program than their benefit payments, it may jeopardize the solvency of the program. We analyze this possibility in this section.

An accurate assessment of the impact of opt-out on FAMLI programs is limited by the availability of detailed data on the types of firms who are likely to opt out. However, extant evidence suggests that privately offered paid family and sick leaves are more prevalent to high wage earners than low wage earners (US Department of Labor, 2021b). This means if anything, firms with high wage earners are more likely to opt out of the state program because they already have private plans. If this happens, the contribution rate is likely to increase because these wage earners would have contributed more than their fair share of the benefit payments if they had stayed in the program, provided that the tax regime is sufficiently distant from lump-sum as we showed in Part 3.

We consider the different incentives of employees to opt out by calculating each employee's "overpayment" variable, which is defined as:

$$Overpay_i = Contribution_i - Expected\ Benefit\ Payment_i - AC_i,$$

where i indicates the employee number. "$Overpay$" measures the degree of "*actuarial unfairness*". It is expected that the more an employee overpays, the more likely she will opt out. On the other hand, because these employees would have contributed more than their fair share of benefit payments, their opting-out from the program will increase the break-even contribution rate. From

this perspective, this type of opt-out is the "worst" in terms of program solvency. In that regard, our analysis is conservative in nature.

We consider different ratios of opting out ranging from 3% to 30%. Specifically, we identify the n^{th} (n ranges between 70 to 97) percentile of the overpayment distribution and drop all the employees overpaying more than this value from the sample. We also compare the policies with a taxable wage cap to those without a cap because the latter is likely to exacerbate the potential impact of the opt-out of high wage earners. It is also more likely that under this scenario the high wage earners have stronger incentive to opt out given the more significant deviation of their contribution from their expected benefit receipt. The simulation results are reported in Table 6-8, where we have omitted the reporting of solvency measures to save space. The policy parameters of the scenarios with the cap follow those of balanced goals. The comparable policy parameters of the scenarios without the cap are similar except for the cap. We also report the baseline results without opting out to ease comparisons.

Table 6-8. Opting-Out and Contribution Rates

Opting-Out Ratio	Contribution Rate (With Cap)	Pct Increase Relative to Baseline Case	Contribution Rate (Without Cap)	Pct Increase Relative to Baseline Case
0%	0.84%	0%	0.74%	0%
3%	0.88%	4.31%	0.85%	14.88%
5%	0.92%	9.09%	0.89%	19.84%
10%	0.98%	16.20%	0.97%	30.63%
15%	1.04%	24.12%	1.04%	40.75%
30%	1.27%	50.67%	1.27%	72.04%

The results in Table 6-8 show that if opting-out ratio follows the most common pattern in other states (around 3%), and if opt-out is concentrated in those who have the strongest incentive to do so, the contribution rate is likely to increase by 4.31% relative to the baseline case of no opting-out. In contrast, the no cap scenarios are much more sensitive to opting-out. In this case, with the same opting-out ratio of 3%, the contribution rate has to increase by a whopping 14.88% to break even. Actually, the table shows that as opt-out increases, the advantage of a lower contribution rate under the no cap scenarios fades rapidly, and disappears completely at around 10% opting-out ratio. This is expected since the data shows that in Maryland around 10% of the workforce earns above the SSWB. But even under a very low opt-out ratio such as 3%, the difference between the break-even contribution rates under the two scenarios is quite small (0.88% vs. 0.85%). Note that, as argued above, the no-cap policy should provide the higher wage earners the strongest incentive to opt out.

This should provide another argument against this policy given its hypersensitivity to the worst-case scenario of opting-out.

6.2.5 Exclusion of Self-Employed Individuals

SB 275 also allows self-employed individuals to opt in the FAMLI program. Our analysis so far assumes that all of them will elect to participate in the program. In this section we analyze the sensitivity of the contribution rate and solvency situation if we exclude the self-employed individuals from the program. The results show that the contribution rate increases slightly from 0.8420% if we assume all self-employed individuals will participate in the program to 0.8439% if we assume that none of them will participate in the program. Therefore, the difference is minimal and we conclude that the potential opting-in of self-employed individuals is unlikely to alter the solvency of the program.

6.3 Discussions

Our sensitivity analysis so far can help us address a question that we were asked to answer in the RFP, that is, whether there should be a cap on contribution rate. Our scenario analysis results in contribution rates ranging from 0.43% under the low-cost scenario to 100% in the case of lump-sum taxes. Even ruling out the possibility of a lump-sum tax the rate can still go as high as 1.36% (under the high-cost scenario), though under most scenarios the rates are below 1%. Despite the potential benefit of more stable planning if having a cap on contribution rates, we would recommend against setting a cap as a policy given the potential significant rise of contribution rate under some adverse scenarios. The study conducted in Strunk et al. (2020) in the state of Colorado also finds that under some cost scenarios contribution rates can go beyond the stipulated cap (at 1.2%), which provides another caveat to set a cap on contribution rates in the state policy.

Part 7 Actuarial Study from Milliman, Inc

This part is an actuarial study conducted by Milliman, Inc (see Appendix V). This actuarial study includes an analysis of the potential costs and contribution rates for FAMLI benefits in Maryland, the potential costs for the State to pay the employer contribution for Community Providers, as well as the potential cost to the State to pay the employee contribution for employees who earn less than $15 an hour. Milliman's study does not specifically analyze sensitivity of SSWB cap or nuanced individual workers' leaving taking behavior, and focuses instead on historical experience in other states that have passed leave laws, employee demographics, and actuarial methods for estimating costs. This analysis therefore relies on different data and slightly different assumptions than the other models. For the data, instead of individual-worker-level data, Milliman's analysis uses aggregate employment data by age and gender from the U.S. Census, as well as aggregate employment and taxable wages from and administrative records (for employment of Community Providers). For the assumption differences, for example, instead of assuming 8% ongoing administrative expenses out of paid claim expenses, this report assumed 5% of total contributions for family claims and 8% of total contributions for medical claims. This is overall slightly lower than, but close to, prior three analytic studies, and this assumption is still consistent with typical expense ratios observed in other states that provide benefits through a state fund. The estimated contribution rate from Milliman's analysis range from 0.88% to 0.94% (see Table 1 of Milliman's report in Appendix V), with employer-employee cost-sharing ratio to be from 25/75 to 75/25; the estimated cost to the State for paying the employer contribution for the Community Providers ranges from $20 million to $64 million between October 1, 2023 and December 31, 2024 depending on different cost-sharing scenarios and corresponding contribution rates (see Table 2 of Milliman's report in Appendix V).

Part 8 Conclusion and Additional Remarks

8.1 Conclusion

In this project, we conduct five independent and inter-related studies to provide policy recommendations on the Maryland FAMLI program, including simulations based on theoretical modeling, econometric modeling, and the USDOL Worker PLUS Model, and an actuarial study by Milliman. Both nationally representative survey data (FMLA-2018, ACS-2016-2020, ACS-2021) and administrative data are used in the analysis. We provide policy recommendations based on the simulation results including benefit take-up rates, the total rates of contribution required for program solvency, the impact of establishing a cap on taxable wage amount, and the cost-sharing formula between employers and employees. Our analysis considers the impact of inflation in subsequent years and provides estimates of employers' and employees' contributions to the program, as well as expenses in four categories including benefit payments, administrative expenses, and expenses to cover contributions by low-wage workers and community providers.

Since the fourth study follows closely that of the second one and uses the same methodology, we have altogether four different methodologies on cost analysis of the FAMLI program. These different studies generate somewhat different contribution rates. For example, the recommended contribution rates based on the econometric modeling and the US Department of Labor Worker PLUS Model range between 0.90% to 1.20% depending on cost-sharing rules and whether to set a taxable wage cap at SSWB. In contrast, the simulation of the theoretical model as in Parts 3 and 6 results in a contribution rate in the range of 0.71% to 100% in the case of lump-sum tax (where each participant pays a fixed amount at around $670 including employer's share). Ruling out the possibility of a lump-sum tax, the contribution rate can go as high as 1.36% under a high-cost scenario. The contribution rates of the Milliman study are still somewhat different from the other studies, though under most scenarios closer to the rates based on the simulated theoretical model. It needs to be noted that the Milliman study relies on different data and slightly different assumptions than the other models. For the data, instead of individual-worker-level data, Milliman's analysis uses aggregate employment data by age and gender from the U.S. Census, as well as aggregate employment and taxable wages from administrative records (for employment of Community Providers). For the assumption differences, for example, instead of assuming 8% ongoing administrative expenses out of paid claim expenses, this report assumed 5% of total contributions for family claims and 8% of total contributions for medical claims. This is overall slightly lower than, but close to, prior four analytic studies, and this assumption is still consistent with typical expense ratios observed in other states that provide benefits through a state fund. The estimated contribution rate from Milliman's analysis ranges from 0.88% to 0.94%,. These apparent inconsistencies may pose somewhat of a challenge for policy makers to make a choice. First, we view employing multiple methodologies as a strength of our study, which naturally may result in somewhat different results. Second, to provide some guidance for the policy makers in making the final choice regarding an appropriate contribution rate for the program, we summarize the micro-level modeling strengths and weaknesses of each methodology in Table 8-1.

Table 8-1. Strengths and Weaknesses of Different Cost Analysis Methodologies

Cost Analysis Methodology	Contribution Rate Range (%)	Strength	Weakness
Econometric modeling (see the second study)	0.98 - 1.20	Micro-level detailed modeling of individual worker's leave-taking behaviors conditional on leave types (medical, maternity, etc.). Internally generated take-up rates (defined as the number of benefit receivers divided by the number of eligible workers) from the FMLA survey data.	Though FMLA survey is the best source of information on family and medical leaves, it is not specifically designed for the state paid leave program. As such, the probability of taking a certain leave as generated from this survey may be different from the probability for a paid leave program.
Worker PLUS Model (see the third study)	0.90 - 1.15	Micro-level modeling of individual worker's leave-taking behaviors. Could also simulate many details of leave-taking such as needers based on unpaid FMLA leaves becoming takers of the paid program, leave-taking in consideration of combined employer-provided and state paid leaves, etc.	Same as above. In addition, take-up rates need to be externally provided. If using actual statistics from other states, it would suffer from the same weakness as the model below.
Simulation based on theoretical model (see the first and fourth studies)	0.71 - 100 (lump-sum tax). If no lump-sum tax, then 0.71-1.36	Micro-level modeling of dynamic response of each individual's behavior in the labor market when the state program takes place. This could also evaluate welfare & equity implications of state policy.	Key parameters of the leave including incidence rate, duration, and ACs are externally provided based on other states' experiences. But given that Mayland may have different demographics and employment patterns, these statistics may not apply to Maryland. Besides, individual-level differences between leave durations are not considered. Average duration from other states' experiences are assumed for each individual.

In short, our findings show that the State faces a tradeoff in balancing efficiency and equity to choose the optimal policies with respect to the taxable wage cap and cost-sharing rules. The total contribution rate required for reaching program solvency is lower with no limit on the amount of wages subject to tax and a larger share of the contribution rate by the employees. Our recommendations for the optimal policies are conditional on the specific goal of the state.

8.2 Additional Remarks

8.2.1 Exhausting employer program before using the state leave

SB 275 (Ch. 48) requires a covered individual to exhaust the employer program before using the state leave. Although it is possible that an employee may have employer-sponsored paid leave programs before the state program is put into place, the employers and employees may opt to replace the program by participating in the FMLI program. For employers that have had leave benefits that are at the same or higher levels than covered by the FAMLI program, they may choose to opt out of the program. However, according to SB 275 (Ch. 48), in order to be eligible for opting-out, an employer's benefit plan on paid family and medical leaves would need to meet all of the PFML program criteria for all employees. In many cases, the current employer plans may not satisfy all the criteria; consequently, for employers planning to opt out of the FAMLI program, it would take some time before the employers are ready for opting-out (e.g. collective bargaining in unionized employers). Incidents in which a covered individual claims employer benefits before claiming the FAMLI program may occur in some cases, and if it does, it would reduce the cost of the benefits.

8.2.2 Leave taking behavior in FAMLI states and non-FAMLI states

It is likely that when FAMLI program is implemented, the more individuals that are covered by the paid leave compared to FMLA, the more that would take leaves than before given that the leaves are paid, and those who would not be covered would seek to find jobs that are covered under FAMLI or work at least 680 hours to be eligible. To estimate the difference, we consider a comparison of the take-up rates among the FMLA eligible workers between FAMLI states and non-FAMLI states based on the FMLA survey. Our analysis shows that the take-up rates for own sickness and spouse's health conditions are higher at the paid leave states but the difference is not statistically significant.

We further examined the leave length of those who are FMLA eligible in paid-leave states and unpaid-leave states. The results show that workers in paid leave states generally take longer leaves than those in unpaid-leave states except for leaves related to having a new child. This is likely because the take-up rate of leaves related to a new child is more affected by the birth rates in various states. However, none of the differences on the leaves across the paid and unpaid leave states are statistically significant. This is likely due to the small sample size for the paid-leave states.

8.2.3 Needers and Takers

Our analysis of the FMLA survey shows that some employees who are eligible for FMLA unpaid leaves, reported that they need FMLA leaves but did not take the leaves. These individuals, when family and medical leaves are paid, may be "drawn" to take the leaves. About 4% of individuals

reported that they needed leaves but did not take the leaves, and they encountered such situations on average 2.34 times in the previous 12 months. In the meanwhile, some individuals who took at least a leave once also reported that they have experienced situations in which they needed leaves but did not take leaves. As FAMLI benefits start in effect in 2025, leave-needers may choose to take the leaves, and therefore, it may increase the take-up rate.

8.2.4 Most Recent Leaves vs. All Leaves

One limitation in using the FMLA survey is that the participants were asked to report information related to the most recent leaves and longest leaves rather than all the leaves that were taken (i.e. reasons, FMLA eligibility, length). To address this issue, analysis using the most recent leaves was adjusted with the number of leaves in the previous 12 months.

8.2.5 Job Protection

The FAMLI program not only provides employees with benefits to receive some income during their eligible leaves but also helps to enhance job stability. Instead of leaving the labor market due to their own sickness, new child, or other FAMLI covered leave reasons, employees now would be more likely to stay employed while taking these leaves. This is likely to help stabilize the labor force and encourage more individuals to participate in the labor market.

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Appendix I

I.1 Optimality of Cost-Sharing Ratio

I.1.1 Model Description

We employ an economic model to analyze the optimal cost-sharing ratio of the Family and Medical Leave Insurance (FAMLI) program. Our model focuses on the efficiency implications of cost-sharing, which is mainly concerned about the aggregate social welfare without regard to its specific distributions among participants of the program. In the subsequent simulations we also discuss another presumably major concern of the state, equity, which is about the distribution of social welfare especially among participants of different socioeconomic status.

The model proceeds as follows:

- 1. The state chooses a benefit premium/tax rate $t(0 < t < 1)$ and cost-sharing rule s $(0 \leq s \leq 1)$ to maximize social welfare as measured by the sum of producer and consumer surpluses subject to the solvency constraint of the FAMLI program, where $s/1-s$ is the share of the premium tax firms/workers need to pay. The benefit program also postulates the eligibility criterion for the leave based on the amount of time required to work during the preceding time period, $\underline{h}$,[17] a wage replacement rate, $\xi(0 < \xi < 1)$, the maximum payment $\underline{P}$ in a given time window,[18] as well as the maximum duration of the leave, d.[19] These parameters were determined by the law and hence exogenous to the model.

  Note that in the absence of the state FAMLI programs, federal Family and Medical Leave Act (FMLA) which was passed in 1993 allows employees to have job-protected unpaid leaves. Therefore, the major difference between the state FAMLI and federal FMLA leaves is whether the employees receive payment during their leaves. As a result, we assume that the maximum duration of the leave still applies in the absence of the state FAMLI program. In other words, we assume that an employee can still choose to take an unpaid FMLA-allowed leave to take care of their life events if the state paid program is not available.
- 2. Once the state chooses the tax rate and cost-sharing rule, the labor market responds to the new benefit program. Specifically, we consider a representative worker and firm. As will be shown in the analyses of this and the next sections, under some scenarios it is not likely that the representative worker may proxy for the average worker in the labor market. To simplify the calculations, however, we still consider the representative worker in those situations as if she were the average worker. Our goal is to gauge the intuition of the optimality of the cost-sharing ratio and the taxable earnings cap under those scenarios, which may still inform policy making with regards to these variables.

  Given the wage rate, w, the worker maximizes her expected utility by choosing the labor supply in a given time period, h. For trackability the utility function is assumed to be linear in total (labor) income with quadratic disutility of labor:

$$U(Y,h) = Y - \frac{1}{2}ah^2 ,$$

[17] In the case of Maryland, this equals 680 hours over the 12-month period immediately preceding the leave.

[18] In the case of Maryland, P=$1,000/week.

[19] In the case of Maryland, d=12 weeks/480 hours (assuming 40 hours/week) for most incidences and can be 24 weeks under some situations.

where Y is the after-tax labor income in a given time period to be specified in the next section and a measures the degree of disutility to work. The worker also faces a time endowment constraint in that $h \leq H_0$, where H_0 indicates the maximum amount of labor supply that is possible in a given time period. For simplicity, however, we do not enforce this constraint when we solve the optimization problem. Note that this is without loss of generality as imposing the constraint will not change the intuition and basic conclusion of the model.

We consider a two-period model for the optimization problem of the worker. The flow chart of the model and the decision points are illustrated in Figure I-1. At the start of the first period the worker determines h, which is the same for both periods. A shock event that the benefit program covers may strike in the second

period with an exogenously provided probability, b. However, when the event strikes the worker may still

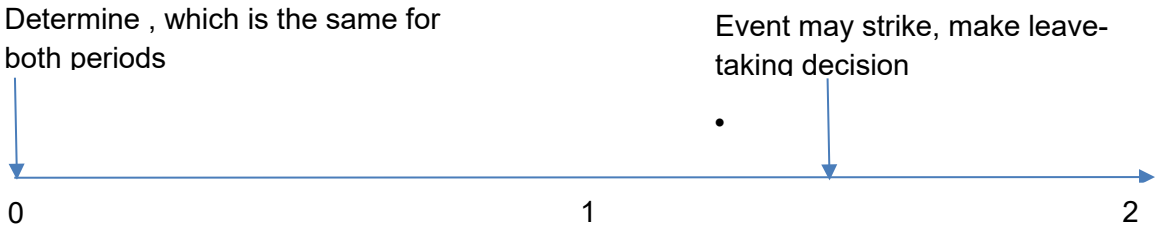

Figure I-1

determine whether she takes the leave or not ıot take the leave, she suffers a utility loss as measured by E, which is a random var y distributed over $[E_1, E_2]$ $(E_2 > E_1 > 0)$.[20] She does not suffer the utility loss if she takes the leave. Besides, she earns the replacement wage which is a fraction of the full wage from the FAMLI program. If she does not take the leave, however, she earns full wage though suffering the utility loss.

Similarly, a representative firm maximizes its expected profit from the two periods by taking into consideration the leave-taking behavior of the worker. If the incumbent worker takes the leave in the second period, the firm needs to incur a friction in the labor market to find a replacement worker for her, as indicated by $f(>1)$. Mathematically, the friction is equivalent to scaling the total wage payment during the leave period by a factor of f. The production function of the firm is assumed to be:

$$Q = \alpha h - \frac{1}{2} c h^2,$$

where α is the productivity factor and c is a return-to-scale factor. For convenience and without loss of generality we normalize the price of the product to be 1. The profit of the firm is thus:

$$\pi = \alpha h - \frac{1}{2} c h^2 - wh - tswh = \alpha h - \frac{1}{2} c h^2 - (1 + ts) wh \quad (1)$$

I.1.2 Solving the Model

We use backward induction to solve the optimization problem of the worker and the firm. Depending on whether the eligibility criterion of the FAMLI program is met ($h \geq \underline{h}$) or not ($h <$

[20] One may argue that the events that the benefit program covers may not all cause utility losses, such as having a new child. In that case, we could add a positive constant to the utility function to measure the utility gain of having a new child. E in this case measures the utility loss relative to the heightened utility function if not taking the maternity/paternity leave to take care of and bond with the new baby. The conclusions from the model remain the same in this case.

$\underline{h}$) we can have two types of solutions. We discuss the simpler case of not meeting the eligibility criterion first, then turn to the more complicated case of eligibility-meeting case.

I.1.2.1 Worker Is Not Eligible for the Leave ($h < \underline{h}$)

Given that the representative worker is not eligible to take the leave, the state's optimization problem is an uninteresting one since it does not need to collect any taxes in order to pay the leave-takers. To gauge the intuition for a worker in this situation, however, we still solve the worker and firm's optimization problem in this case. As will be seen, the key insight from this simple case can still carry through to the more complicated and realistic situation of the worker being eligible to take the leave.

As discussed above, even if the worker may not qualify for the FAMLI program because of the shortage in labor supply, in theory she may still qualify for the unpaid FMLA leave to reduce the utility loss if the event strikes. However, at least in the state of MD, the minimum labor supply requirement is lower than that of FMLA. As a result, not qualifying for the state leaves also means not qualifying for the FMLA leaves. This means that in this case the worker will have to suffer the utility loss in the second period.

Since the worker's amount of working time in the first period will not qualify her for the FAMLI, depending on whether the event strikes, her after-tax labor incomes in the second period are respectively:

$$\{Y_E = wh - t(1-s)wh - E = (1 + ts - t)wh - E \; Y_{nE} = wh - t(1-s)wh = (1 + ts - t)wh \quad ,$$

where Y_E and Y_{nE} are the after-tax labor income if the event strikes and does not strike, respectively. Given that all the parameters that determine these two variables are either given (t, s, w, E) or determined in the first period (h), the values of both variables are known to the worker. Since E is uniformly distributed over $[E_1, E_2]$, the probability distribution function (pdf) of E could be written as:

$$pdf(E) = \frac{1}{E_2 - E_1} = \frac{1}{\Delta E}$$

Therefore, the expected utility in the second period when the event strikes is:

$$\begin{aligned} EU_2(event\ strikes) &= \int_{E_1}^{E_2} \left(Y_E - \frac{1}{2}ah^2\right)\frac{1}{\Delta E}dE \\ &= \int_{E_1}^{E_2} \left((1 + ts - t)wh - \frac{1}{2}ah^2 - E\right)\frac{1}{\Delta E}dE \\ &= (1 + ts - t)wh - \frac{1}{2}ah^2 - \frac{{E_2}^2}{2\Delta E} + \frac{{E_1}^2}{2\Delta E} \end{aligned}$$

Then the expected utility in the second period could be written as:

$$EU_2 = bEU_2(event\ strikes) + (1-b)EU_2(event\ does\ not\ strike)$$
$$= b\left((1+ts-t)wh - \frac{1}{2}ah^2 - \frac{{E_2}^2}{2\Delta E} + \frac{{E_1}^2}{2\Delta E}\right) + (1$$
$$- b)\left((1+ts-t)wh - \frac{1}{2}ah^2\right)$$

Since no event strikes at the first period, the worker's labor income is the same as Y_{nE} hence her expected utilities under both periods/situations are also the same. Therefore, ignoring discounting, her expected utility at the start of the first period could be expressed as:

$$EU = EU_1 + bEU_2(event\ strikes) + (1-b)EU_2(event\ does\ not\ strike)$$
$$= \left((1+ts-t)wh - \frac{1}{2}ah^2\right) + b\left((1+ts-t)wh - \frac{1}{2}ah^2 - \frac{{E_2}^2}{2\Delta E} + \frac{{E_1}^2}{2\Delta E}\right)$$
$$+\ (1-b)\left((1+ts-t)wh - \frac{1}{2}ah^2\right)$$
$$= 2\left((1+ts-t)wh - \tfrac{1}{2}ah^2\right) + b\left(-\tfrac{{E_2}^2}{2\Delta E} + \tfrac{{E_1}^2}{2\Delta E}\right)$$

Therefore, the worker's optimization problem is:

$$EU\ = 2\left((1+ts-t)wh - \frac{1}{2}ah^2\right) + b\left(-\frac{{E_2}^2}{2\Delta E} + \frac{{E_1}^2}{2\Delta E}\right)$$

Take the first-order condition (FOC) of this goal function with respect to h, we have:

$$2\big((1+ts-t)w - ah\big) = 0$$

From this we can solve out the inverse labor supply function:

$$w_S(h)_{h<\underline{h}} = \tfrac{ah}{1+ts-t} \qquad (2)$$

Given that the worker does not qualify for FAMLI, the expected profits of the firm for both periods are the same as equation (1). Therefore, the firm's optimization problem is:

$$E\pi\ = 2\left(\alpha h - \frac{1}{2}ch^2 - (1+ts)wh\right)$$

From the FOC it is easy to solve out the inverse labor demand function:

$$w_D(h)_{h<\underline{h}} = \tfrac{\alpha - ch}{1+ts} \qquad (3)$$

Equating $w_S(h)_{h<\underline{h}}$ with $w_D(h)_{h<\underline{h}}$ based on the equilibrium condition in the labor market, we can solve out the equilibrium level of labor supply, h^*, and wage rate, w^*:

$$\{{h^*}_{h<\underline{h}} = \frac{\alpha}{\frac{1+ts}{1+ts-t}a + c}\ {w^*}_{h<\underline{h}} = \frac{ah^*}{1+ts-t} = \frac{1}{1+ts-t}\frac{a\alpha}{\frac{1+ts}{1+ts-t}a + c}$$

To simplify the notation, we denote:

$$x = \tfrac{1+ts}{1+ts-t} \qquad (4)$$

Hence we can conveniently write h^* and w^* as:

$$\{h^*_{h<\underline{h}} = \frac{\alpha}{xa+c} \quad w^*_{h<\underline{h}} = \frac{a\alpha}{(xa+c)(1+ts-t)}$$

(5)

Given that we require that $h^*_{h<\underline{h}} < \underline{h}$, it must be true that:

$$\alpha < (xa + c)\,\underline{h} \tag{6}$$

Condition (6) is thus the constraint that must be met for the worker to not to be eligible for the leave. It suggests that workers with lower productivity may be more likely to not to meet the eligibility requirement to take the leave.

From (5) it is easy to show that $\frac{\partial h^*}{\partial x} < 0$ and $\frac{\partial x}{\partial s} < 0$. We have therefore proved the following proposition:

***Proposition 1*:**

$$\frac{\partial h^*}{\partial s} > 0$$

It is worthwhile to comment on the intuition of this proposition. Since the benefit tax is levied on and hence is proportional to wage income, it is an *ad valorem* tax and is therefore distortionary in nature, unlike a lump-sum tax.[21] Taxing the firm more (increasing s) will add extra burden to its wage cost. In response, the firm will attempt to lower the wage rate and by doing so decreases the per unit benefit taxes. Given that the tax is distortionary in nature, a decrease in wage rate will result in smaller distortion and hence will encourage more labor supply. In contrast, if the tax is levied more on the worker side (smaller s), her after-tax wage income will decrease and in response the equilibrium level of wage rate will increase and hence the per unit benefit tax will also increase. The distortionary nature of the tax suggests that the labor supply will decrease relative to the case when more taxes are levied on the firm side.

The intuition of Proposition 1 is graphically illustrated in Figure I-2. To highlight the effect of different levels of s on labor supply, we consider two extreme cases: if all the taxes are levied on the firm and if all the taxes are levied on the worker. The former is indicated by the movement from the "original" inverse demand curve D^0 to D, and the latter is shown as the movement from the original inverse supply curve S^0 to S. "Original" here indicates the corresponding curves before the implementation of the benefit program (without taxes). The functional forms for the original inverse demand and supply curves are easily obtained by setting t to be 0 in equations (2) and (3). The original equilibrium labor supply, h^0, can also be easily calculated by equating the inverse demand with inverse supply. To help illustrate the point, we write the inverse demand and supply curves with taxes respectively as:

$$w_D + tw_D = \alpha - chw_S - tw_S = ah$$

[21] Note that the "distortionary" statement here is only specific to the tax part of the benefit program. It may not necessarily apply to the benefit program itself. Actually as we will show in the model when the worker can utilize the benefit program (unlike in this case when she is not eligible for the leave), her equilibrium labor may well increase relative to the pre-tax level. Thus, the FAMLI program itself may not be distortionary. But the tax part of the program is always distortionary given that it is an *ad valorem* (proportional) rather than a *lump-sum* tax.

Note that based on these functional forms, neither shifts in the figure should be parallel, due to the fact that we have a *proportional/ad valorem* tax rather than a *unit* tax. Instead, the vertical movement of the curves are larger when the wage rates are higher. Nonetheless, the above functional forms suggest that the fraction of the vertical movement of either curve (tw_D or tw_S) to their corresponding wage rate (w_D or w_S) is always equal to the tax rate, t. The non-parallel shifts in both curves are the reason for their differential impacts on the equilibrium labor supplies.

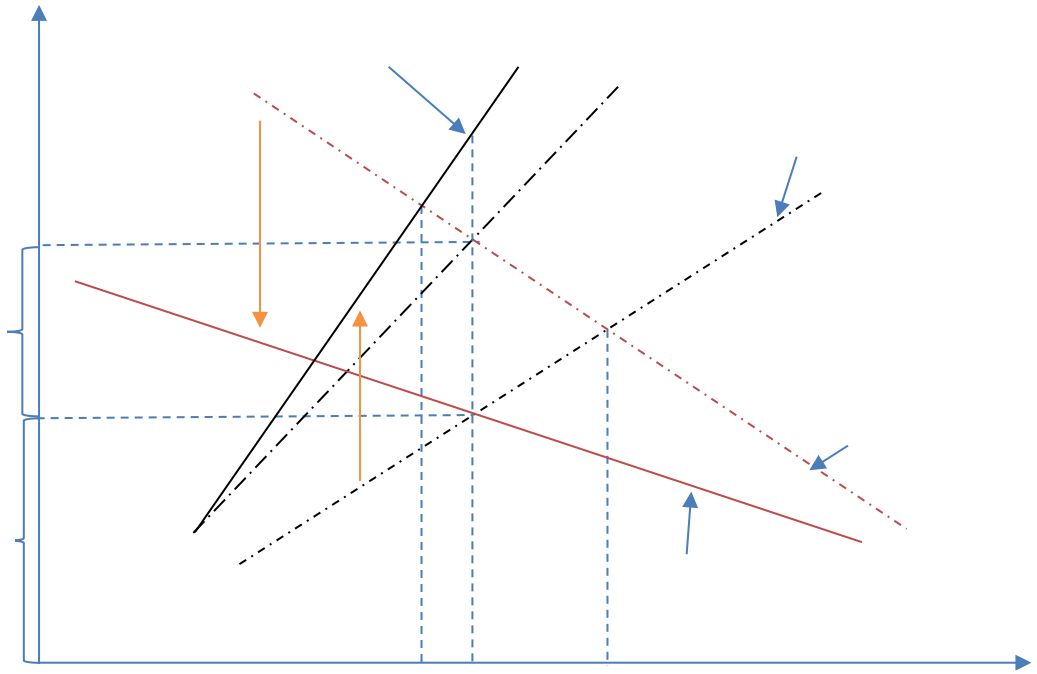

Figure I-2

Adding the taxes will shift both the inverse demand and supply curves from their original positions inward. The inward shifts suggest that the new equilibrium labor supply will always be smaller than the original level, representing the distortionary nature of the *ad valorem* tax. However, the fact that an inward shift of the inverse demand curve means a downward shift but an inward shift of the inverse supply curve means an upward shift suggests the subtle difference between these two types of movements. If the taxes are levied on the demand (firm) side, equilibrium wage rate will decrease relative to the original level, which is indicated by the movement from point e^0 to A in the figure. The equilibrium labor supply also decreases from h^0 to h_D^*. The downward movement of the inverse demand curve at point A is illustrated by the distance AB, or tw_D^*. If taxing the supply (worker) side instead results in the same equilibrium labor supply, the upward movement of the inverse supply curve at point A also needs to be tw_D^*. However, this is not possible given that if it were, the new equilibrium would be at point B with a higher wage rate, thus the upward shift of the curve at this point relative to the new equilibrium wage will be smaller than the tax rate ($\frac{tw_D^*}{tw_D^*+w_D^*} < t$). To maintain the same percentage shifts in the inverse supply curve as the inverse demand curve, the vertical shift of the inverse supply curve at point A needs to be

larger (as illustrated by AC instead of AB). This means the new equilibrium point B' if taxing the supply side of the labor market should be to the left of point A, suggesting that taxing the supply side will result in a lower labor supply than taxing the demand side. This is what Proposition 1 states.

Note that the result in Proposition 1 should not be confused with the classical result in economics that the *bona fide* tax incidence of employers and employees should not depend on their statutory "cost-sharing", but on the relative magnitude of the elasticities of labor demand and supply. Our result is concerned about how the relative statutory tax rates may affect the degree of distortion of the tax on the labor market, rather than the proportion of eventual taxes borne by different parties. In fact, the result in Proposition 1 is "*geometric*" rather than "*economical*" in nature, as illustrated in Figure I-2.

I.1.2.2 Worker Is Eligible for the Leave ($h \geq \underline{h}$)

In this case the worker is eligible to take the leave given her choice of the level of the labor supply in both time periods. Since the firm's optimization problem depends on the leave-taking behavior of the worker, we solve the optimization problem of the worker first. If the event strikes in the second period, the worker compares her utility under leave-taking with that under no-leave-taking to make the leave-taking decision. Her after-tax labor income under the two scenarios are respectively:[22]

$$\{Y_l = w(h-d) + \left(\xi w, \underline{P}\right) d - t(1-s) * [w(h-d)] = (1+ts-t)\big[w(h-d) + min(\xi w, \underline{P})d\big]\, Y_n = wh - t(1-s)wh = (1+ts-t)wh \quad (7),$$

where Y_l and Y_n are the after-tax labor income under leave-taking and non-leave-taking, respectively. In the expression for Y_l we take the minimum value of ξw and $\underline{P}$ because the law stipulates a maximum level of payment in a given time window to the leave-takers. Depending on which value is taken we can further have two sets of solutions. It turns out that the two solutions have significantly different implications for the optimal cost-sharing rule. We discuss each in turn.

1. Worker Does Not Receive Maximum Benefit Payment ($\left(\xi w, \underline{P}\right) = \xi w$)

This corresponds to the case when the wage rate of the worker is not high enough to reach the maximum payment. Assuming that tax also applies to the benefit payment as many states currently do, this suggests that the distortionary effect of benefit taxes also applies to the benefit payment. This turns out to have important implications for the model, as we discuss later.

From equation (7), the worker's utility under leave-taking and no-leave-taking are respectively:

$$\{U_l = Y_l - \tfrac{1}{2}a(h-d)^2 = (1+ts-t)w(h-d) + \xi wd - \tfrac{1}{2}a(h-d)^2\; U_n = Y_n - \tfrac{1}{2}ah^2 - E = (1+ts-t)wh - \tfrac{1}{2}ah^2 - E \quad (8)$$

[22] Note that the expression for Yl assumes that the worker takes the maximum length of leave allowable by law. This is without loss of generality as altering the length will only change the level of the utility under leave-taking without impacting the fundamental intuition from the model.

Note that at this stage, all the variables that determine U_l and U_n are known. Therefore, the worker takes the leave if she finds that $U_l > U_n$; otherwise she does not take the leave. Solving out the range of E, we have that if:

$$E > E' = (1 + ts - t)wd - \xi wd - \tfrac{1}{2}ad(2h - d) \quad (9),$$

the worker takes the leave. Therefore, depending on the magnitude of E' relative to E_1 and E_2, we can have three possibilities: $E' \geq E_2$, $E_1 < E' < E_2$ and $E' \leq E_1$. Given that the main purpose of the FAMLI program is to help workers maintain a healthier work-life balance, we rule out the uninteresting case of $E' \geq E_2$, which suggests that the worker never finds it economical to take the leave. This means that E_2 is sufficiently large for a worker to always find it worthwhile to take the leave under some situations. This leaves two possibilities $E_1 < E' < E_2$ and $E' \leq E_1$.

The former inequality indicates that the probability of taking the leave is less than 100% and the latter means that the worker finds it always economical to take the leave. We consider the latter possibility first and then the former.

A. Worker Always Takes the Leave ($E' \leq E_1$)

In this case the worker finds it always economical to take the leave. Her expected utility in the second period is thus:

$$EU_2 = bEU_2(event\ strikes) + (1 - b)EU_2(event\ does\ not\ strike)$$
$$= b\left((1 + ts - t)w(h - d) + \xi wd - \frac{1}{2}a(h - d)^2\right)$$
$$+ (1 - b)\left((1 + ts - t)wh - \frac{1}{2}ah^2\right) = (1 + ts - t)wh - \frac{1}{2}ah^2 - bE'$$

The expected utility at the start of the first period is therefore:

$$EU = EU_1 + EU_2 = (1 + ts - t)wh - \frac{1}{2}ah^2 + (1 + ts - t)wh - \frac{1}{2}ah^2 - bE'$$
$$= 2(1 + ts - t)wh - ah^2 - bE'$$

The worker's optimization problem is thus:

$$EU = 2(1 + ts - t)wh - ah^2 - bE'$$

Take the FOC of this equation and since $\frac{\partial E'}{\partial h} = -ad$, we have:

$$2(1 + ts - t)w - 2ah + bad = 0$$

We can solve out the inverse supply function as:

$$w_S(h)_{h \geq \underline{h};(\xi w, \underline{P}) = \xi w; E' \leq E_1} = \frac{ah}{1+ts-t} - \frac{abd}{2(1+ts-t)} \quad (10)$$

Since wage cannot be negative, it must be true that:

$$h \geq \frac{bd}{2} \quad (11)$$

We can proceed to solve the firm's optimization problem. Given that the worker always takes the leave if the event strikes in the second period, the expected after-tax wage cost of the firm in this period is:

$$\{Wage\ Cost\ (if\ event\ strikes) = fwd + w(h - d) +$$
$$tswh\ Wage\ Cost\ (if\ event\ does\ not\ strike) = (1 + ts)wh \quad (12),$$

where the additional taxes due to the FAMLI program if the event strikes the worker is still $tswh$ because we assume that the firm pays the same wage to the replacement worker as the leave-taking incumbent worker. The firm's optimization problem is:

$$E\pi = E\pi_1 + E\pi_2$$
$$= \alpha h - \frac{1}{2}ch^2 - (1+ts)wh + \alpha h - \frac{1}{2}ch^2 - b(fwd + w(h-d) + tswh)$$
$$- (1-b)(1+ts)wh = 2\alpha h - ch^2 - 2(1+ts)wh - b(f-1)dw$$

Take the FOC of this equation with respect to h we have:

$$2\alpha - 2ch - 2(1+ts)w = 0$$

The inverse demand function is thus:

$$w_D(h)_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1} = \frac{\alpha - ch}{1+ts} \quad (13)$$

Note that this is the same as the inverse demand function if the worker is not eligible for the leave as in equation (3). This is because if the worker always takes the leave, the leave-taking behavior will not affect the labor demand just like the case when the worker is not eligible to take the leave. Equating $w_S(h)_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}$ with $w_D(h)_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}$ we can solve out:

$$\{h^*_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1} = \frac{x\frac{abd}{2}+\alpha}{xa+c}\, w^*_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1} =$$

$$\frac{a\left(\alpha-\frac{bcd}{2}\right)}{(xa+c)(1+ts-t)} \quad (14)$$

Given that wage cannot be negative, it must be true that:

$$\alpha \geq \frac{bcd}{2} \quad (15)$$

This implies that $\frac{\partial h^*_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}}{\partial x} < 0$ and $\frac{\partial h^*_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}}{\partial s} > 0$, the same result as Proposition 1 and carries the same intuition. As will be shown this has important implications for the optimal cost-sharing rule.

From (9) and (14) and the condition that $E' \leq E_1$, the following constraint must also be met:

$$\alpha \geq \frac{bcd}{2} + \frac{(y_1 - 2y_2)(ax+c)(1+ts-t)}{2ad\xi} \quad (16),$$

where y_1 and y_2 are created to simplify the notations:

$$y_1 = 2\Delta E - abd^2;\ y_2 = E_2 - \frac{1}{2}ad^2 \quad (17)$$

We further make the assumptions that both variables are positive. We deem these assumptions reasonable because they essentially mean that the uncertainty and the maximum utility loss associated with the FAMLI program covered life events are sufficiently large. This should be expected given the nature of the insurance program. These assumptions ensure a meaningful range of the productivity factor, and also that the inverse supply functions are well behaved (upward-sloping).

Having solved the second stage game of the private labor market response to the tax rate and cost-sharing rule of the FAMLI program (as shown in equation (10), (13), and (14)), we now proceed to solve the first stage game of the state's optimization problem to obtain the optimal cost-sharing ratio. We assume that the state attempts to maximize the social welfare subject to the solvency

constraint of the benefit program. The social welfare is measured by the sum of consumer surplus (CS) and producer surplus (PS). Generally speaking CS is the excess welfare associated with the consumption of goods, while PS is the excess welfare due to the production of goods. In the case of the labor market, the worker is the producer of labor while the firm is the consumer. Therefore, technically we should measure CS for the firm and PS for the worker. But just to be consistent with the common perception that CS measures individual welfare but PS measures firm welfare, we still use CS to measure the worker's surpluses and PS the firm's surpluses. To calculate both surpluses we need to be mindful of the eligibility constraint: $h \geq \underline{h}$. If $h < \underline{h}$ we cannot use the inverse supply and demand functions of equations (10) and (13) as they only apply when the eligibility condition is met. Instead, we need to apply the inverse supply and demand functions of equations (2) and (3) in this case. Equation (11) also states another lower bound, $\frac{bd}{2}$, for h to apply the inverse supply function assuming the eligibility criterion is met. Given that $b < 1$, $d \leq 24\ (weeks) = 960\ (hours\ assuming\ an\ employee\ works\ 40\ hours/week)$ and $\underline{h} = 680\ hours$, it is generally true that $\frac{bd}{2} < \underline{h}$. Therefore, when we lower h the constraint $h \geq \underline{h}$ is violated first before the constraint in equation (11). We thus can calculate CS and PS as follows:

$$
\begin{aligned}
CS = \int_{\underline{h}}^{h^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}} & \Big(w^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}(1+ts-t) \\
& - w_S(h)_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}(1+ts-t)\Big)\,dh \\
& + \int_0^{\underline{h}} \Big(w^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}(1+ts-t) - w_S(h)_{h<\underline{h}}(1+ts-t)\Big)\,dh \\
& = \int_{\underline{h}}^{h^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}} \Big(ah^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1} - \frac{abd}{2} - ah + \frac{abd}{2}\Big)\,dh \\
& + \int_0^{\underline{h}} \Big(ah^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1} - \frac{abd}{2} - ah\Big)\,dh \\
& = \frac{1}{2}ah^{*2}{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1} - \frac{abd}{2}\underline{h}
\end{aligned}
\tag{18}
$$

$$
\begin{aligned}
PS = \int_{\underline{h}}^{h^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}} & \Big(w_D(h)_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}(1+ts) \\
& - w^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}(1+ts)\Big)\,dh \\
& + \int_0^{\underline{h}} \Big(w_D(h)_{h<\underline{h}}(1+ts) - w^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}(1+ts)\Big)\,dh \\
& = \int_0^{h^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}} \Big(\alpha - ch - \alpha + ch^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1}\Big)\,dh
\end{aligned}
$$

$$= \frac{1}{2} c h^{*2}{}_{h \geq \underline{h};(\xi w, \underline{P}) = \xi w; E' \leq E_1} \quad (19)$$

Both CS and PS increase with s since $h^*{}_{h \geq \underline{h};(\xi w, \underline{P}) = \xi w; E' \leq E_1}$ increases with s. The state's optimization problem could be written as:

$$Social\ Welfare(SW) = CS + PS \quad s.t. \quad Tax\ revenue\ (TR)$$
$$= tw^*{}_{h \geq \underline{h};(\xi w, \underline{P}) = \xi w; E' \leq E_1} h^*{}_{h \geq \underline{h};(\xi w, \underline{P}) = \xi w; E' \leq E_1} \geq \underline{R}$$
$$=$$
$$bd\xi w^*_{h \geq \underline{h};(\xi w, \underline{P}) = \xi w; E' \leq E_1}$$

Given that both the left-hand side (LHS) and right-hand side (RHS) of the TR constraint include $w^*{}_{h \geq \underline{h};(\xi w, \underline{P}) = \xi w; E' \leq E_1}$, it cancels out and hence the constraint could also be written as:

$$th^*{}_{h \geq \underline{h};(\xi w, \underline{P}) = \xi w; E' \leq E_1} \geq b\xi d \quad (20)$$

Since $h^*{}_{h \geq \underline{h};(\xi w, \underline{P}) = \xi w; E' \leq E_1}$ increases with s, this constraint is easier to satisfy with a larger s. Given that SW also increases with s, the optimal s should be 100%. This is stated in the following Proposition:

***Proposition 2*:**

If the expected benefit payment does not reach the maximum level as stipulated in the law and the worker is expected to always take a leave if the FAMLI program covered events occur to her, then the optimal cost-sharing rule of the benefit program is that ***taxes should only be levied on employers****.*

Note that Proposition 2 obtains not only because social welfare is an increasing function of the cost-sharing on firms. The budget constraint also needs to cooperate. In general, it can be shown that under reasonable assumptions of the parameters, tax revenue (hence wage rate) is a decreasing function of s. Therefore, the tradeoff is that though a higher s increases social welfare, it nonetheless decreases the tax revenue. Since the state must balance budget, a higher s may not be optimal in general. But if both the tax revenue and the expected benefit payment are proportional to the wage rate as we assume, this variable has no effect on the budget constraint, which is why the tradeoff no longer exists and a larger s is always better.

B. Worker Does Not Always Take the Leave ($E_1 < E' < E_2$)

In this case the probability of the worker taking the leave if the event strikes in the second period is not 100%, which means that even if the worker is eligible for the leave and may suffer from some events as covered by the FAMLI program, she may still choose not to utilize the program because she finds it economical to not to do so. Similar to the case considered in the previous section, we first solve the worker's optimization problem, then proceed to solve the firm's and the state's optimization problems. Define

$$p_l = \frac{E_2 - E'}{\Delta E} = \frac{E_2 - (1 + ts - t)wd + \xi wd + \frac{1}{2}ad(2h - d)}{\Delta E} \quad (21),$$

which indicates the worker's probability of taking the leave given that an event strikes. The worker's utilities if the event strikes are provided in (8) depending on whether she takes the leave or not. Since the condition for her to take or skip the leave is provided in equation (9), we can calculate her expected utility in the second period given that an event strikes as:

$$EU_2(event\ strikes) = \int_{E_1}^{E'} U_n \frac{1}{\Delta E} dE + \int_{E'}^{E_2} U_l \frac{1}{\Delta E} dE$$
$$= \int_{E_1}^{E'} \left((1+ts-t)wh - \frac{1}{2}ah^2 - E\right)\frac{1}{\Delta E} dE$$
$$+ \int_{E'}^{E_2} \left((1+ts-t)w(h-d) + \xi wd - \frac{1}{2}a(h-d)^2\right)\frac{1}{\Delta E} dE$$
$$= (1-p_l)\left((1+ts-t)wh - \frac{1}{2}ah^2\right) - \frac{E'^2}{2\Delta E} + \frac{{E_1}^2}{2\Delta E}$$
$$+\ p_l\left((1+ts-t)w(h-d) + \xi wd - \frac{1}{2}a(h-d)^2\right)$$

Both the expected utility at the first period, EU_1, and the expected utility at the second period if the event does not strike, $EU_2(event\ does\ not\ strike)$, could be expressed as:

$$EU_1 = EU_2(event\ does\ not\ strike) = wh - t(1-s)wh - \frac{1}{2}ah^2 = (1+ts-t)wh - \frac{1}{2}ah^2$$

The expected utility at the beginning of the first period could be written as:

$$EU = EU_1 + bEU_2(event\ strikes) + (1-b)EU_2(event\ does\ not\ strike)$$
$$= (2-b)\left((1+ts-t)wh - \frac{1}{2}ah^2\right) + b((1-p_l)\left((1+ts-t)wh - \frac{1}{2}ah^2\right)$$
$$- \frac{E'^2}{2\Delta E} + \frac{{E_1}^2}{2\Delta E} +\ p_l\left((1+ts-t)w(h-d) + \xi wd - \frac{1}{2}a(h-d)^2\right))$$
$$= 2\left((1+ts-t)wh - \frac{1}{2}ah^2\right) + b(-\frac{E'^2}{2\Delta E} + \frac{{E_1}^2}{2\Delta E}$$
$$+ p_l\left(-(1+ts-t)wd + \xi wd + \tfrac{1}{2}ad(2h-d)\right))$$

(22)Therefore, the worker's optimization problem is:

$$EU$$

Take the FOC and note that $\frac{\partial p_l}{\partial h} = \frac{ad}{\Delta E}$, we have:

$$2\big((1+ts-t)w - ah\big) - abd(\frac{(1+ts-t)wd - \xi wd - \frac{1}{2}ad(2h-d)}{\Delta E}$$
$$- \frac{E_2 - (1+ts-t)wd + \xi wd + \frac{1}{2}ad(2h-d)}{\Delta E}$$
$$+ \frac{-(1+ts-t)wd + \xi wd + \frac{1}{2}ad(2h-d)}{\Delta E}) = 0$$

From this equation we can solve out the inverse supply function:

$$w_S(h)_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2} = \frac{a}{1+ts-t+\frac{abd^2\xi}{y_1}}h - \frac{abd\frac{y_2}{y_1}}{1+ts-t+\frac{abd^2\xi}{y_1}} \qquad (23)$$

It is worthwhile to dig deeper into this function. Without the benefit program ($t = 0;\ \xi = 0$), the function becomes:

$$w_{S0}(h)_{h\geq\underline{h};E_1<E'<E_2} = ah - abd\frac{y_2}{y_1}$$

Relative to this "original" inverse supply function, equation (23) is obtained by multiplying the RHS of this function by a factor of $\frac{1}{1+ts-t+\frac{abd^2\xi}{y_1}}$ rather than $\frac{1}{1+ts-t}$ as in the case when the worker is not eligible to take the leave (equation (2) and the associated "original" inverse supply function without the benefit taxes). Note that $\frac{abd^2\xi}{y_1} > 0$. Therefore, it is possible for $1 + ts - t + \frac{abd^2\xi}{y_1}$ to be greater than 1. This suggests that relative to the case without the benefit program, the inverse supply curve could shift downward due to the benefit program. The additional term, $\frac{abd^2\xi}{y_1}$ captures the benefit of the program to encourage a worker to work more, because the downward shift of the inverse supply curve suggests that the equilibrium labor supply may go up relative to the original level.

Since wage cannot be negative, equation (23) also suggests the following constraint on labor supply:

$$h \geq bd\frac{y_2}{y_1} \tag{24}$$

The firm's optimization problem could be written as:

$$\begin{aligned} E\pi &= E\pi_1 + E\pi_2 \\ &= \alpha h - \frac{1}{2}ch^2 - (1+ts)wh + \alpha h - \frac{1}{2}ch^2 - bp_l(fwd + w(h-d) + tswh) \\ &\quad - (1-bp_l)(1+ts)wh \\ &= \alpha h - \frac{1}{2}ch^2 - (1+ts)wh + \alpha h - \frac{1}{2}ch^2 - tswh - bp_l\big(fwd + w(h-d)\big) \\ &\quad - (1-bp_l)wh \\ &= \alpha h - \frac{1}{2}ch^2 - (1+ts)wh + \alpha h - \frac{1}{2}ch^2 - tswh - wh - bp_l(f-1)wd \\ &= 2\alpha h - ch^2 - 2(1+ts)wh - bp_l(f-1)wd \end{aligned} \tag{25}$$

Given that p_l only relates to the worker's labor supply and wage rate but not labor demand, the last term in equation (24) drops out when we take the FOC. As such the inverse demand function will be the same as before:

$$w_D(h)_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2} = \frac{\alpha - ch}{1+ts} \tag{26}$$

Equating $w_S(h)_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_1<E'\leq E_2}$ with $w_D(h)_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_1<E'\leq E_2}$ we can solve out:

$$\{h^*_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2} = \frac{abdy_2x_1+\alpha y_1}{(ax_1+c)y_1}\ w^*_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2} = \frac{a(\alpha y_1 - bcdy_2)}{\big((1+ts-t)y_1+abd^2\xi\big)(ax_1+c)} \tag{27},$$

where $x_1 = \frac{1+ts}{1+ts-t+\frac{abd^2\xi}{y_1}}$.

It can be shown that $\frac{\partial h^*_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2}}{\partial x_1}<0$. But whether $\frac{\partial x_1}{\partial s}>0$ or $\frac{\partial x_1}{\partial s}<0$ is uncertain, depending on whether $\frac{abd^2\xi}{y_1}>t$ or $\frac{abd^2\xi}{y_1}<t$. Therefore, unlike Proposition 1, we cannot prove that $\frac{\partial h^*_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2}}{\partial s}>0$ in general. Intuitively, given that the benefit payment is not taxable and positively correlated with wage rate, a worker needs to balance the lower wage rate hence benefit payment associated with a higher s, and the accompanying lower distortion. If the worker always takes the leave when an event strikes as in the previous section, the benefit program cannot encourage her to exert more labor supply since doing so will not increase her chance of taking the leave (given that $\frac{\partial p_l}{\partial h}=\frac{ad}{\Delta E}>0$, a higher h should be associated with a higher probability of taking the leave, *ceteris paribus*.), but nonetheless have the undesirable consequence of lowering the wage rate hence benefit payment during her leave. Therefore, a higher s serves as the mechanism to encourage or less significantly discourage her labor supply in that case. In this case, however, the benefit program itself (as measured by the term, $\frac{abd^2\xi}{y_1}$) can encourage the worker to work more since it increases her probability of taking the leave, though it also has the undesirable consequence of a lower wage rate. Since cost-sharing is not the only mechanism to encourage labor supply in this case, the worker can balance the two mechanisms and hence a higher s does not necessarily encourage labor supply.

Given that wage cannot be negative, it must be true that:

$$\alpha \geq bcd\frac{y_2}{y_1} \tag{28}$$

Given the equilibrium values of labor supply and wage rate, the probability of taking the leave as provided in (21) can be expressed as:

$$p_l^* = \frac{2y_2(1+ts-t)}{(1+ts-t)y_1+abd^2\xi}+\frac{2ad\xi}{(1+ts-t)y_1+abd^2\xi}h^*_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2}$$

$$=\frac{2y_2}{y_1}+\frac{2ad\xi\left(\alpha-bcd\frac{y_2}{y_1}\right)}{\left((1+ts)a+\left(1+ts-t+\frac{abd^2\xi}{y_1}\right)c\right)y_1} \tag{29}$$

Given that we require $0<p_l^*<1$, we can solve out the constraint on the productivity factor, α:

$$\frac{bcdy_2}{y_1}-\frac{y_2\left((1+ts)a+\left(1+ts-t+\frac{abd^2\xi}{y_1}\right)c\right)}{ad\xi}<\alpha<\frac{bcdy_2}{y_1}+\frac{(y_1-2y_2)\left((1+ts)a+\left(1+ts-t+\frac{abd^2\xi}{y_1}\right)c\right)}{2ad\xi} \tag{30}$$

Note that the first inequality in (30) is subsumed by (28) given our assumptions that both y_1 and y_2 are positive. Hence, we can write the constraints on α as:

$$\frac{bcdy_2}{y_1}\leq\alpha<\frac{bcdy_2}{y_1}+\frac{(y_1-2y_2)\left((1+ts)a+\left(1+ts-t+\frac{abd^2\xi}{y_1}\right)c\right)}{2ad\xi} \tag{31}$$

To solve the state's optimization problem we make a similar assumption as in the previous section that the lower bound for h as set in (24), $bd\frac{y_2}{y_1}$, is smaller than $\underline{h}$, the cutoff labor supply to be eligible for the leave. Then, following a similar procedure as in the previous section to calculate CS and PS, we obtain the following expressions:

$$CS = \frac{ax_1}{2x} h^{*2}_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2} - \frac{a}{2}\left(1-\frac{x_1}{x}\right)\underline{h}^2 - \frac{abdy_2x_1}{y_1x}\underline{h} \quad (32)$$

$$PS = \frac{1}{2} c h^{*2}_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2} \quad (33)$$

Since $h^*_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2}$ no longer necessarily increases with s, unlike the results in the last section, we cannot prove that CS and PS are increasing in s. The state's optimization problem now becomes:

$$SW = CS + PS s.t.\ \ Tax\ revenue\ (TR) = tw^*_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2} h^*_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2} \geq \underline{R}$$

$$= bp_l^* d\xi w^*_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2}$$

Plugging in the expression for p_l^* in (29) and cancel out $w^*_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2}$ on both sides, the budget constraint becomes:

$$\left(t - \frac{2abd^2\xi^2}{(1+ts-t)y_1+abd^2\xi}\right) h^*_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_1<E'<E_2} \geq \frac{2bd\xi y_2(1+ts-t)}{(1+ts-t)y_1+abd^2\xi} \quad (34)$$

Both the SW and this form of the budget constraint may not increase with s. An interior solution may obtain and Proposition 2 may not hold in this case.

2. Worker Receives Maximum Benefit Payment ($(\xi w, \underline{P}) = \underline{P}$)

In this case, the benefit payment in a given time window (typically a week) is capped at the maximum amount. Given this, the worker's utilities under leave-taking and no-leave-taking are respectively:

$$\{U_l = Y_l - \frac{1}{2}(h-d)^2 = (1+ts-t)[w(h-d)] + \underline{P}d - \frac{1}{2}a(h-d)^2\ U_n = Y_n - \frac{1}{2}ah^2 - E = (1+ts-t)wh - \frac{1}{2}ah^2 - E \quad (35)$$

From this we can solve out the range of E under which the worker will find it economical to take the leave:

$$E > E'_{\underline{P}} = (1+ts-t)wd - \underline{P}d - \frac{1}{2}ad(2h-d) \quad (36)$$

We once again separate the discussions into two scenarios: when the worker always takes the leave ($E'_{\underline{P}} \leq E_1$), and when the worker does not always find it economical to take the leave ($E_1 < E'_{\underline{P}} < E_2$).

A. Worker Always Takes the Leave ($E'_{\underline{P}} \leq E_1$)

In this case, relative to similar case under the scenario that the benefit payment does not reach the maximum amount the only change is to replace E' with $E'_{\underline{P}}$. Since E' and $E'_{\underline{P}}$ relate to h only through the second term $\left(\frac{1}{2}ad(2h-d)\right)$ which is the same under both situations, the FOC will not be affected. This means the same inverse supply function as in (10) will obtain.

Similarly, the firm's optimization problem is also the same as before and hence the inverse demand function is still as in (13). This means the same equilibrium labor supply and wage rate as in (14) will obtain. This will result in the same expressions for CS and PS. The state's optimization problem is now:

$$SW = CS + PS$$

$$s.t.\ \ Tax\ revenue\ (TR) = tw^{*}{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1} h^{*}{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1} \geq \underline{R} = b\underline{P}d \quad (37)$$

The RHS of the budget constraint is now a constant. Given equation (13), the LHS of the budget constraint can be written as:

$$TR = \frac{t}{1+ts}(\alpha - ch^{*}{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1})h^{*}{}_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E'\leq E_1} \quad (38)$$

It can be shown easily that $\frac{t}{1+ts} = 1 - \frac{1}{x}$, where x is as in (4). The expressions in (18) and (19) suggest that both CS and PS relate to t and s only through x. The expression in (38) also show that TR relates to t and s only through x. But different pairs of t and s can result in the same value of x. This suggests that the optimization problem in (37) can have multiple/infinite number of optimal solutions for s, with 100% being one of them. This is stated in Proposition 3:

Proposition 3:

If a worker always takes the leave when a life-related event covered by the FAMLI program strikes and she receives the maximum benefit payment, there exists ***multiple optimal cost-sharing rules ranging from 0% to 100% share of taxes levied on employers****.*

B. Worker Does Not Always Take the Leave ($E_1 < E'_{\underline{P}} < E_2$)

Following a similar procedure as outlined in the previous sections, we can derive the inverse supply function in this case as:

$$w_S(h)_{h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{\underline{P}}<E_2} = \frac{a}{1+ts-t}h - \frac{abd(y_2+d\underline{P})}{y_1}\frac{1}{1+ts-t} \quad (39)$$

The inverse demand function will be the same as before. This results in the equilibrium labor supply and wage rate:

$$\{h^{*}{}_{h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{\underline{P}}<E_2} =$$

$$\frac{abdx(y_2+d\underline{P})+\alpha y_1}{ay_1x+cy_1}\ w^{*}{}_{h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{\underline{P}}<E_2} = \frac{ax(\alpha y_1 - bcd(y_2+d\underline{P}))}{y_1(1+ts)(ax+c)} \quad (40)$$

Given that wage cannot be negative, it must be true that:

$$\alpha \geq \frac{bcd(y_2+d\underline{P})}{y_1} \quad (41)$$

This once again leads to the result that $h^{*}{}_{h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{\underline{P}}<E_2}$ is an increasing function of s. From (40) we can also derive the equilibrium probability of taking the leave by the worker:

$$p^{*}_{l\underline{P}} = \frac{2y_2}{y_1} + \frac{2d\underline{P}}{y_1} \quad (42)$$

From (40) it can also be shown that:

$$CS = \frac{1}{2}ah^{*2}{}_{h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{\underline{P}}<E_2} - \frac{abd(y_2+d\underline{P})}{y_1}\underline{h} \quad (43)$$

$$PS = \frac{1}{2}ch^{*2}{}_{h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{\underline{P}}<E_2} \quad (44)$$

Similar to before, both CS and PS are increasing in s. The state's optimization problem now becomes:

$$SW = CS + PSs.t.\ \ Tax\ revenue\ (TR) = tw^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E_{\underline{P}}'<E_2} h^*{}_{h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E_{\underline{P}}'<E_2}$$
$$\geq \underline{R} = bp_{l\underline{P}}^* d\underline{P}$$
$$= bd\underline{P}\left(\frac{2y_3}{y_2} + \frac{2d\underline{P}}{y_2}\right)$$

Using the same trick as in the case when the worker does not always take the leave, we can prove that Proposition 3 still holds in this scenario.

I.2 Optimality of Taxable Wage Cap and Cost-Sharing Ratio Under Taxable Wage Cap

I.2.1 Model Description

The model in the previous section assumes that all the wage incomes are taxable. But in practice many states impose a cap on the taxable earnings for the FAMLI programs. The cap is typically set to be equal to the Social Security Wage Base (SSWB). In this section we analyze how setting a cap on taxable earnings may affect the optimal cost-sharing ratio, as well as the desirability and optimal level of this cap. Compared to the model in the previous section, we add another variable, I, as a choice variable for the state's optimization problem, which indicates the cap on the taxable earnings. The sequence of the model is the same as before. To highlight the focus on the role I may play in the model, we assume that the representative worker's earnings are above the cap.

I.2.2 Solving the Model

Similar to before, we use backward induction to solve the model, and separate the discussions on whether the eligibility criterion is met or not, whether the maximum benefit payment is reached or not, and whether the worker always takes the leave or not.

I.2.2.1 Worker Is Not Eligible for the Leave ($h < \underline{h}$)

Compared to the case before when the worker is not eligible for the leave, the difference is the tax part of the worker's utility function. Because of the cap, the taxes are now expressed as $t(1-s)I$ instead of $t(1-s)wh$ as before. Therefore, the worker's expected utility at the start of period 1 could be written as:

$$EU = EU_1 + bEU_2(event\ strikes) + (1-b)EU_2(event\ does\ not\ strike)$$
$$= \left(wh - t(1-s)I - \frac{1}{2}ah^2\right) + b\left(wh - t(1-s)I - \frac{1}{2}ah^2 - \frac{{E_2}^2}{2\Delta E} + \frac{{E_1}^2}{2\Delta E}\right)$$
$$+\ (1-b)\left(wh - t(1-s)I - \frac{1}{2}ah^2\right)$$
$$= 2\left(wh - t(1-s)I - \tfrac{1}{2}ah^2\right) + b\left(-\tfrac{{E_2}^2}{2\Delta E} + \tfrac{{E_1}^2}{2\Delta E}\right)$$

The optimization problem of the worker is thus:

$$EU\ = 2\left(wh - t(1-s)I - \frac{1}{2}ah^2\right) + b\left(-\frac{{E_2}^2}{2\Delta E} + \frac{{E_1}^2}{2\Delta E}\right)$$

The FOC gives:

$$w_{SI}(h)_{h<\underline{h}} = ah \tag{45}$$

Similarly, the firm's optimization problem becomes:

$$E\pi = 2\left(\alpha h - \frac{1}{2}ch^2 - wh - tsI\right)$$

The FOC leads to:

$$w_{DI}(h)_{h<\underline{h}} = \alpha - ch \tag{46}$$

The significant change in equations (45) and (46) as compared to equations (2) and (3) is that labor supply and demand are no longer affected by the tax rate and cost-sharing ratio, unlike the case when there is no cap on taxable earnings. This result is expected because with a cap any marginal change in labor supply or demand will not affect the taxes a worker or firm has to pay, thereby eliminating the distortionary effect of the proportional taxes. This result also suggests that Proposition 1 is no longer true under the scenario with a cap on taxable income.

I.2.2.2 Worker Is Eligible for the Leave ($h \geq \underline{h}$)

The after-tax labor incomes of the worker under leave-taking and no-leave-taking in the second period are respectively:

$$\{Y_l = w(h-d) + \left(\xi w, \underline{P}\right) d - t(1-s)I \; Y_n = wh - t(1-s)I$$

Because we assume that the worker's taxable earnings are over the cap, we must assume that:

$$w(h-d) \geq I \tag{47}$$

1. Worker Does Not Receive Maximum Benefit Payment ($\left(\xi w, \underline{P}\right) = \xi w$)

If the event strikes in the second period, the worker's utility under leave-taking and no-leave-taking are respectively:

$$\{U_l = Y_l - \tfrac{1}{2}a(h-d)^2 = wh - (1-\xi)wd - t(1-s)I - \tfrac{1}{2}a(h-d)^2 \; U_n = Y_n - \tfrac{1}{2}ah^2 - E = wh - t(1-s)I - \tfrac{1}{2}ah^2 - E$$

Comparing U_l with U_n we can solve out the range of E that the worker finds economical to take the leave:

$$E > E_I' = (1-\xi)dw - \frac{1}{2}ad(2h-d)$$

This suggests that the ex-ante probability of taking a leave by the worker when an event strikes could be expressed as:

$$p_{Il} = \frac{E_2 - E_I'}{\Delta E} = \frac{E_2 - (1-\xi)wd + \frac{1}{2}ad(2h-d)}{\Delta E} \tag{48}$$

Depending on whether p_{Il} equals 1 or is less than 1 we have two situations.

A. Worker Always Takes the Leave ($E_I' \leq E_1$)

The worker's expected utility in the second period is:

$$EU_2 = bEU_2(event\ strikes) + (1-b)EU_2(event\ does\ not\ strike)$$
$$= b\left(w(h-d) + \xi wd - t(1-s)I - \frac{1}{2}a(h-d)^2\right)$$
$$+ (1-b)\left(wh - t(1-s)I - \frac{1}{2}ah^2\right) = wh - t(1-s)I - \frac{1}{2}ah^2 - bE_I'$$

Her expected utility at the start of the first period is:

$$EU = EU_1 + EU_2 = wh - t(1-s)I - \frac{1}{2}ah^2 + wh - t(1-s)I - \frac{1}{2}ah^2 - bE_I'$$
$$= 2(wh - t(1-s)I) - ah^2 - bE_I'$$

The optimization problem of the worker thus becomes:

$$EU = 2(wh - t(1-s)I) - ah^2 - bE_I'$$

Given that $\frac{\partial E_I'}{\partial h} = -ad$ the FOC results in:

$$w_{SI}(h)_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} = ah - \frac{abd}{2} \quad (49)$$

Similarly, the firm's optimization problem becomes:

$$E\pi = E\pi_1 + E\pi_2$$
$$= \alpha h - \frac{1}{2}ch^2 - wh - tsI + \alpha h - \frac{1}{2}ch^2 - b(fwd + w(h-d) + tsI)$$
$$-(1-b)(wh + tsI) = 2\alpha h - ch^2 - 2wh - 2tsI - b(f-1)dw$$

The FOC of the equation above leads to:

$$w_{DI}(h)_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} = \alpha - ch \quad (50)$$

Similar to the case when the worker is not eligible for the leave and for the same reason, the labor demand and supply and hence equilibrium wage rate are not affected by the tax rate and cost-sharing ratio. Equating $w_{SI}(h)_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}$ with $w_{DI}(h)_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}$ we can solve out:

$$\{h^*_{I,h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} = \frac{\frac{abd}{2}+\alpha}{a+c}\ w^*_{I,h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} =$$
$$\frac{a\left(\alpha - \frac{bcd}{2}\right)}{a+c} \quad (51)$$

The calculations of CS and PS are more involved than before. In addition to the consideration of the eligibility requirement, we also need to consider the range of income (which is obtained by multiplying wage rate with labor supply) and whether it is above or below I.

Calculating CS

From equation (49) the wage income can be expressed as:

$$I_S = w_{SI}(h)_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}\ h = \left(ah - \frac{abd}{2}\right)h \quad (52)$$

Setting I_S equal to I we can solve out two roots,

$$\dot{h}_S = \frac{abd+\sqrt{a^2b^2d^2+16aI}}{4a};\ \dot{h}_{S1} = \frac{abd-\sqrt{a^2b^2d^2+16aI}}{4a} \quad (53)$$

We focus on the larger root $\dot{h}_S$ because the smaller one is negative. The shape of the income function I_S as well as the positions of the two roots are shown in Figure I-3. Because the income function is increasing with h in the vicinity of $\dot{h}_S$, we need the equilibrium labor supply, $h^*_{I,h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}$ to be larger than $\dot{h}_S$ to meet the requirement that the worker's wage income is above the cap. However, the relative magnitude of $\dot{h}_S$ and $\underline{h}$ is uncertain. Depending on whether $\underline{h} \leq \dot{h}_S$ or $\underline{h} > \dot{h}_S$, we can have two scenarios, which are indicated as (1) and (2) in Figure I-3. We discuss each scenario in turn.

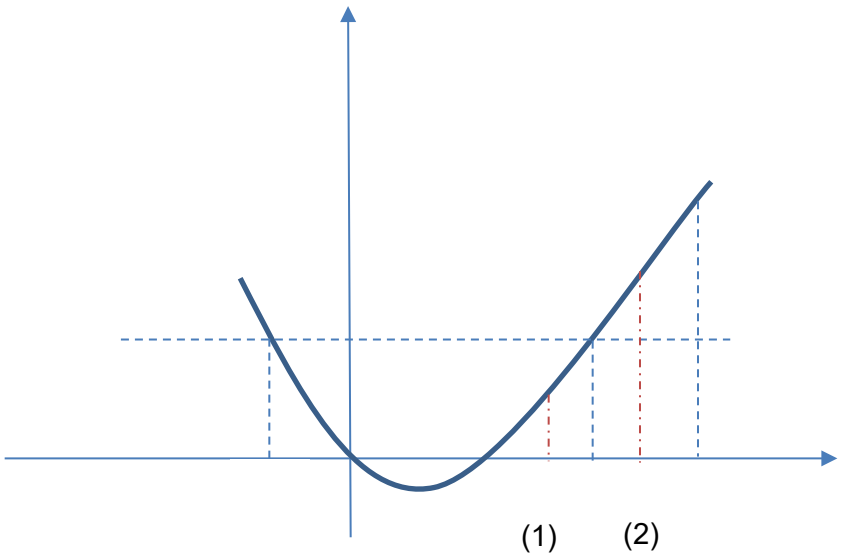

Figure I-3

(1) $\underline{h} \leq \dot{h}_S$

In this case, the calculation of CS is broken down into three parts, depending on the range of h. The "effective" wage rates, which is the wage rate after paying the taxes, are respectively:

$$w_{SI}^{e}\left(\dot{h}_S < h \leq h^{*}_{I,h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}\right) = ah - \frac{abd}{2} - t(1-s)\frac{I}{h}$$

$$w_{SI}^{e}(\underline{h} \leq h \leq \dot{h}_S) = \left(\frac{ah}{1+ts-t} - \frac{abd}{2(1+ts-t)}\right)(1+ts-t) = ah - \frac{abd}{2}$$

$$w_{SI}^{e}(h < \underline{h}) = \left(\frac{ah}{1+ts-t}\right)(1+ts-t) = ah,$$

where the first equation is obtained because the total taxes are $t(1-s)I$ hence the per unit (of labor supply) taxes are $t(1-s)\frac{I}{h}$. The second and third equations are based on their corresponding inverse supply functions as in (10) and (2) multiplied by $1+ts-t$ to get the after-tax wage rates conditional on the range of the labor supply h, respectively. The subscript "e" denotes "effective". Thus the CS can be calculated as:

$$CS = \int_{\dot{h}_S}^{h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}} \left(w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - t(1-s)\frac{I}{h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}} - ah + \frac{abd}{2} + t(1-s)\frac{I}{h} \right) dh$$
$$+ \int_{\underline{h}}^{\dot{h}_S} \left(w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - t(1-s)\frac{I}{h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}} - ah + \frac{abd}{2} \right) dh$$
$$+ \int_{0}^{\underline{h}} \left(w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - t(1-s)\frac{I}{h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}} - ah \right) dh$$

$$= \frac{1}{2} ah^{*2}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - \frac{abd}{2}\underline{h} + t(1-s)I\left(lnh^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - ln\dot{h}_S - 1 \right) \quad (54)$$

(2) $\underline{h} > \dot{h}_S$

Similar to the calculations above, we can write the effective/after-tax wage rates corresponding to the three ranges of h as:

$$w^e_{SI}\left(\underline{h} \leq h \leq h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}\right) = ah - \frac{abd}{2} - t(1-s)\frac{I}{h}$$
$$w^e_{SI}\left(\dot{h}_S \leq h < \underline{h}\right) = ah - t(1-s)\frac{I}{h}$$
$$w^e_{SI}\left(h < \dot{h}_S\right) = ah,$$

where the second equation is obtained by subtracting per unit taxes from the inverse supply function as in (45). The CS can now be calculated as:

$$CS = \int_{\underline{h}}^{h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}} \left(w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - t(1-s)\frac{I}{h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}} - ah + \frac{abd}{2} + t(1-s)\frac{I}{h} \right) dh$$
$$+ \int_{\underline{h}}^{\dot{h}_S} \left(w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - t(1-s)\frac{I}{h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}} - ah + t(1-s)\frac{I}{h} \right) dh$$
$$+ \int_{0}^{\underline{h}} \left(w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - t(1-s)\frac{I}{h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}} - ah \right) dh$$

$$= \frac{1}{2} a h^{*2}_{I,h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - \frac{abd}{2}\underline{h} + t(1-s)I\left(ln h^{*}_{I,h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - ln\dot{h}_S - 1\right)$$

(55)

Note that equation (55) is exactly the same as equation (54). Therefore, regardless of the position of $\dot{h}_S$ relative to $\underline{h}$ the expressions for CS are identical.

Calculating PS

We can follow a similar procedure to calculate the PS. First, from equation (50) the wage income can be calculated as:

$$I_D = w_{DI}(h)_{h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} h = (\alpha - ch)h \qquad (56)$$

Similar to the case of I_S, Equating I_D with I we can also solve out two roots:

$$\dot{h}_D = \frac{\alpha - \sqrt{\alpha^2 - 4cI}}{2c};\ \dot{h}_{D1} = \frac{\alpha + \sqrt{\alpha^2 - 4cI}}{2c} \qquad (57)$$

Unlike the case of I_S, however, we now focus on the smaller root, $\dot{h}_D$. The reason is illustrated in Figure I-4. As shown, the I_D function is decreasing in the vicinity of $\dot{h}_{D1}$. But we require the I_D to be greater than I. This means $h^{*}_{I,h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}$ cannot be greater than $\dot{h}_{D1}$. In contrast, the I_D function is increasing in the vicinity of $\dot{h}_D$. For the same reason this suggests that $h^{*}_{I,h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}$ cannot be smaller than $\dot{h}_D$. To calculate the PS we need to consider the ranges of h to the left of $h^{*}_{I,h\geq \underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}$. That is why we need to focus on the smaller root $\dot{h}_D$.

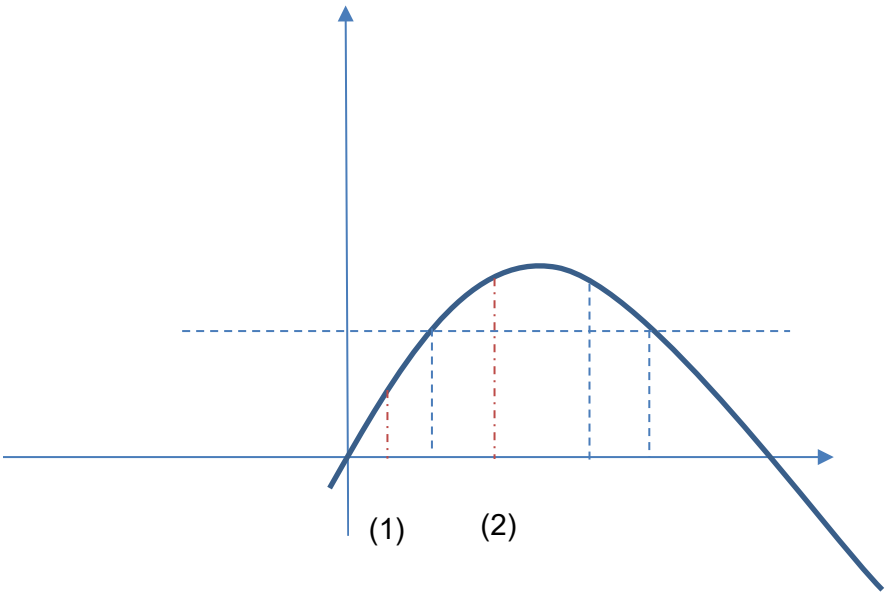

Figure I-4

Similar to the case of calculating CS, the relative position of $\dot{h}_D$ to $\underline{h}$ also sets two scenarios:

(1) $\underline{h} \leq \dot{h}_D$

The three effective wage rates for a firm depending on the ranges of h are respectively:

$$w_{DI}^{e}\left(\dot{h}_D < h \le h^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1}\right) = \alpha - ch + ts\frac{I}{h}$$
$$w_{DI}^{e}\left(\underline{h} \le h \le \dot{h}_D\right) = \left(\frac{\alpha-ch}{1+ts}\right)(1+ts) = \alpha - ch$$
$$w_{DI}^{e}\left(h < \underline{h}\right) = \left(\frac{\alpha-ch}{1+ts}\right)(1+ts) = \alpha - ch$$

The PS can now be calculated as:

$$PS = \int_{\dot{h}_D}^{h^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1}} \left(\alpha - ch + ts\frac{I}{h} - w^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1} - ts\frac{I}{h^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1}}\right)dh$$
$$+ \int_{\underline{h}}^{\dot{h}_D} \left(\alpha - ch - w^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1} - ts\frac{I}{h^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1}}\right)dh$$
$$+ \int_{0}^{\underline{h}} \left(\alpha - ch - w^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1} - ts\frac{I}{h^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1}}\right)dh$$
$$= \frac{1}{2}ch^{*2}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1} + tsI\left(lnh^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1} - ln\dot{h}_D - 1\right) \quad (58)$$

(2) $\underline{h} > \dot{h}_D$

Following a similar procedure we can write the effective wage rates depending on the ranges of h as:

$$w_{DI}^{e}\left(\underline{h} \le h \le h^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1}\right) = \alpha - ch + ts\frac{I}{h}$$
$$w_{SI}^{e}\left(\dot{h}_D \le h < \underline{h}\right) = \alpha - ch + ts\frac{I}{h}$$
$$w_{DI}^{e}\left(h < \dot{h}_D\right) = \alpha - ch$$

Similarly, we can show that the expression for PS is:

$$PS = \frac{1}{2}ch^{*2}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1} + tsI\left(lnh^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1} - ln\dot{h}_D - 1\right) \quad (59),$$

which, similar to the case of CS is also identical to the expression under the other scenario (equation (58)).

State's Optimization Problem

The state's optimization problem could be written as:

$$SW = CS + PS$$
$$s.t.\ \ Tax\ revenue\ (TR) = tI \ge \underline{R} =$$
$$bd\xi w^{*}_{I,h\ge\underline{h};(\xi w,\underline{P})=\xi w;E_I'\le E_1} \quad (60)$$

There could be four possible combinations of CS and PS depending on the relative magnitudes of $\underline{h}$, $\dot{h}_D$ and $\dot{h}_S$, $\underline{h} \le \dot{h}_D, \dot{h}_S$; $\underline{h} > \dot{h}_D, \dot{h}_S$; $\dot{h}_S \ge \underline{h} > \dot{h}_D$; and $\dot{h}_D \ge \underline{h} > \dot{h}_S$. However, since the expressions for CS and PS are identical regardless of the relative

magnitude of $\underline{h}$ and $\dot{h}_D/\dot{h}_S$, the expressions for the sum of CS and PS are also the same regardless of the four combinations. Specifically, plugging in the expressions in (54) and (58), we have:

$$SW = CS + PS = \frac{1}{2}ah^{*2}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} + \frac{1}{2}ch^{*2}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - \frac{abd}{2}\underline{h} + t(1-s)I\left(lnh^{*}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - ln\dot{h}_S - 1\right) + tsI\left(lnh^{*}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - ln\dot{h}_D - 1\right) = \frac{1}{2}ah^{*2}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} + \frac{1}{2}ch^{*2}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - \frac{abd}{2}\underline{h} + tI\left(lnh^{*}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - ln\dot{h}_S - 1\right) + tIs\left(ln\dot{h}_S - ln\dot{h}_D\right) \quad (61)$$

Because $w^{*}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}$ does not depend on t, s or I, The RHS of the solvency constraint in (60) also does not depend on t, s or I. In other words, the required revenue is a constant. Replacing the inequality sign in (60) with an equal sign because the state's goal is only to balance the budget rather than making a profit, and plugging in the expression for tI into (61), we have:

$$SW = \frac{1}{2}ah^{*2}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} + \frac{1}{2}ch^{*2}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - \frac{abd}{2}\underline{h} + bd\xi w^{*}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}\left(lnh^{*}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - ln\dot{h}_S - 1\right) + bd\xi w^{*}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}s\left(ln\dot{h}_S - ln\dot{h}_D\right) \quad (62)$$

In the above equation, the only term that concerns s is the last one. Since the solvency constraint does not depend on s, whether SW increases or decreases with s hence the optimal level of s depends on the relative magnitude of $\dot{h}_S$ and $\dot{h}_D$. This is summarized in Proposition 4.

Proposition 4:

If there is a cap on the taxable earnings in the benefit program and a worker's wage income is above the cap, the optimal cost-sharing ratio depends on the relative magnitude of the larger root of the equation where the wage income based on the inverse supply function equals the cap ($\dot{h}_S$) and the smaller root of the equation where the wage income based on the inverse demand function equals the cap ($\dot{h}_D$). Specifically,

If $\dot{h}_S > \dot{h}_D$, then the optimal cost sharing rule is that benefit taxes should only be levied on firms hence the demand side of the labor market ($s = 100\%$).

If $\dot{h}_S < \dot{h}_D$, then the optimal cost sharing rule is that benefit taxes should only be levied on workers hence the supply side of the labor market ($s = 0\%$).

The intuition behind this proposition is as follows: the non-distortionary nature of the taxes under the cap scenario for income above the cap results effectively in a saving of the taxes relative to the case when the tax regime is proportional hence distortionary. This is captured by the terms $t(1-s)I\left(lnh^{*}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - ln\dot{h}_S\right)$ and $tsI\left(lnh^{*}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - ln\dot{h}_D\right)$ in the expressions for CS and PS, respectively. Because these terms measure tax savings, they both increase with the "effective" tax rate, which is ts for the demand side and $t(1-s)$ for the supply side of the labor market. The net benefit to the society, therefore, depends on which side can take

advantage of this saving in taxes in a wider range of the labor supply, which is determined by the relative magnitude of $\dot{h}_S$ and $\dot{h}_D$. Labor side with a smaller cutoff value should be taxed more because this can generate a higher net saving of the taxes hence benefiting the society.

Equation (62) can also be written as:

$$SW = \frac{1}{2}ah^{*2}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} + \frac{1}{2}ch^{*2}_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - \frac{abd}{2}\underline{h} + bd\xi w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}\left(lnh^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1} - 1\right) - bd\xi w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}(1-s)ln\dot{h}_S - bd\xi w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}sln\dot{h}_D \quad (63)$$

This expression for SW suggests that the only terms that concern I are the last two through $\dot{h}_S$ and $\dot{h}_D$. It is easy to see from (53) and (57) that both $\dot{h}_S$ and $\dot{h}_D$ increase with I. As a result, SW is a decreasing function of I. However, the solvency constraint and the fact that $t \leq 100\%$ suggest that the smallest I has to be the value that equals the RHS of the budget constraint, which is the expected benefit payment. This results in our Proposition 5.

Proposition 5:

If there is a cap on the taxable earnings in the benefit program and a worker's wage income is above the cap, the optimal value of the cap should be equal to the expected benefit payment. The optimal tax rate in this case should be 100%.

The fact that the optimal tax rate in this case is 100% suggests that this is a lump-sum tax. Therefore, the intuition for Proposition 5 is easy to understand: because putting a cap on taxable income for the income that is subject to the cap effectively eliminates the distortionary effect of the taxes, a smaller cap should be better for the society. But given the solvency requirement, the smallest cap the state can impose must be equal to the expected benefit payment, under which the tax effectively becomes lump sum. Note that in this case the insurance program essentially becomes a "savings" plan – the state simply forces each worker to put aside the same amount of money that is equal to the average expected amount to cover the needs of the FAMLI program-covered life events if we interpret the representative worker to be the average worker in the economy.

B. Worker Does Not Always Take the Leave ($E_1 < E_I' < E_2$)

The worker's optimization problem is similar to the comparable case when there is no cap on taxable earnings, except that we need to replace the taxes ($t(1-s)wh$ with ($t(1-s)I$, p_l with p_{Il}, and E' with E_I'. Taking the FOC of the worker's expected utility with respect to h we can generate the inverse supply function in the following form:

$$w_{SI}(h)_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_1<E_I'<E_2} = \frac{ay_1}{y_3}h - \frac{abdy_2}{y_3} \quad (64),$$

where $y_3 = 2\Delta E - abd^2(1-\xi)$.

Similarly, the firm's optimization problem leads to the following inverse demand function:

$$w_{DI}(h)_{h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_1<E_I'<E_2} = \alpha - ch \quad (65)$$

Note that (65) is the same as (50). Similar to the case when the worker always takes the leave and for the same reason both the inverse supply and demand functions are not related to the three

variables that the state can choose, t s, and I. This results in the equilibrium labor supply and wage rate that are also independent of these three variables:

$$\{h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_1<E_I^{'}<E_2} = \frac{abdy_2+ay_3}{ay_1+cy_3}\ w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_1<E_I^{'}<E_2} = \frac{a(ay_1-bcdy_2)}{ay_1+cy_3} \quad (66)$$

Comparing (66) with the comparable expressions for h^* and w^* under the no-cap scenario in (27), we can see that (66) is obtained by dropping any terms in (27) that relate to the tax rate and cost-sharing ratio. To ensure that the wage rate is positive, we need to impose the same constraint on the parameters as in (28).

We can now proceed to calculate the CS and PS. Similar to the case when the worker always takes the leave, we need to first figure out the ranges of h under which the worker's income is above or below the cap, as well as when the worker is not eligible for the leave. The calculations are also classified on the relative magnitude of $\underline{h}$ to $\dot{h}_S/\dot{h}_D$. The difference here is that since the inverse supply function has changed, so does the larger root of the function where labor income equals *I* (similar to (52)), which is expressed in the following equation rather than (53):

$$\dot{h}_{S,(\xi w,\underline{P})=\xi w;E_1<E_I'<E_2} = \frac{abdy_2+\sqrt{a^2b^2d^2{y_2}^2+4ay_1y_3I}}{2ay_1} \quad (67)$$

$\dot{h}_D$ remains the same as the inverse demand function is the same as before. But we can still show that regardless of the relative magnitude of $\underline{h}$ to $\dot{h}_{S,(\xi w,\underline{P})=\xi w;E_1<E_I'<E_2}/\dot{h}_D$, the expressions for CS/PS are identical and the same as (54)/(58), except that we need to replace $h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}$ with $h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_1<E_I'<E_2}$, and $\dot{h}_S$ with $\dot{h}_{S,(\xi w,\underline{P})=\xi w;E_1<E_I'<E_2}$. But the fundamental intuition for Proposition 4 & 5 remains and as such they still hold under this scenario.

2. Worker Receives Maximum Benefit Payment ($(\xi w,\underline{P}) = \underline{P}$)

In this case, the worker's utilities under leave-taking and no-leave-taking in the second period if the event strikes are respectively:

$$\{U_l = w(h-d)+\underline{P}d-t(1-s)I-\frac{1}{2}a(h-d)^2\ U_n = Y_n-\frac{1}{2}ah^2-E$$
$$= wh-t(1-s)I-\frac{1}{2}ah^2-E$$

Comparing U_l with U_n can solve out the cutoff E_I' above which the worker will find it economical to take the leave:

$$E'_{I\underline{P}} = (w-\underline{P})d-\frac{1}{2}ad(2h-d)$$

This gives rise to the probability of taking the leave as:

$$p_{I\underline{P}l} = \frac{E_2-E'_{I\underline{P}}}{\Delta E} = \frac{E_2-(w-\underline{P})d+\frac{1}{2}ad(2h-d)}{\Delta E} \quad (68)$$

A. Worker Always Takes the Leave ($E'_{I\underline{P}} \leq E_1$)

Following a similar procedure as before, we can show that the inverse supply and demand functions are the same as in the case when the maximum benefit payment is not reached. That is, they are expressed by (49) and (50), respectively. This means the equilibrium labor supply and wage rate are also the same as in (51). These will result in the same expressions for CS and PS and a similar optimization problem for the state, as follows:

$$SW = CS + PS$$
$$s.t.\ \ Tax\ revenue\ (TR) = tI \geq \underline{R} = bd\underline{P} \quad (69)$$

Compared to the state's optimization problem when the worker does not receive the maximum benefit payment, (60), the only change here is that the RHS of the solvency constraint becomes $bd\underline{P}$ rather than $bd\xi w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\xi w;E_I'\leq E_1}$. But since the equilibrium wage rate is not related to the three choice variables, the RHS of the solvency constraint remains a constant. As such the same intuition will lead to the conclusion that Proposition 4 & 5 still hold.

B. Worker Does Not Always Take the Leave ($E_1 < E'_{I\underline{P}} < E_2$)

Following a similar procedure as before we can derive the inverse supply function as follows:

$$w_{SI}(h)_{h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{I\underline{P}}<E_2} = ah - \frac{abd(d\underline{P}+y_2)}{y_1} \quad (70)$$

The inverse demand function is still the same as before (equation (65)). This means the equilibrium labor supply and wage rate are:

$$\{h^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{I\underline{P}}<E_2} =$$
$$\frac{abd(d\underline{P}+y_2)+\alpha y_1}{(a+c)y_1}\ w^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{I\underline{P}}<E_2} = \frac{a\left(\alpha y_1 - bcd(d\underline{P}+y_2)\right)}{(a+c)y_1} \quad (71)$$

To ensure that wage rate is non-negative we need to impose the constraint on the parameters as follows:

$$\alpha \geq \frac{bcd(d\underline{P}+y_2)}{y_1} \quad (72)$$

Given (71), the equilibrium probability of taking the leave assuming that an event strikes is:

$$p^*_{I\underline{P}l} = \frac{2(d\underline{P}+y_2)}{y_1} \quad (73)$$

Because we assume that $0 < p^*_{I\underline{P}l} < 1$, this means the following constraint must be true:

$$\frac{2(d\underline{P}+y_2)}{y_1} < 1 \quad (74)$$

Based on the inverse supply function in (70) we have yet another expression for the larger root of the equation where labor income I_S equals I:

$$\dot{h}_{S,(\xi w,\underline{P})=\underline{P};E_1<E'_{I\underline{P}}<E_2} = \frac{abd(d\underline{P}+y_2)+\sqrt{a^2b^2d^2(d\underline{P}+y_2)^2+4ay_1{}^2I}}{2ay_1} \quad (75)$$

Regardless of the expressions, however, the key features that drive Proposition 4 & 5 is that none of these roots are related to the two choice variables by the state, t and s, and they are all increasing in I.

Given that $\dot{h}_D$ does not change, one can show that the expression for PS is the same as before and independent of the relative magnitude of $\underline{h}$ to $\dot{h}_D$ except that we should plug in the corresponding

h^* in equation (58). Following the same procedure as before, we can show that regardless of the relative magnitude of $\underline{h}$ to $\dot{h}_{S,(\xi w,\underline{P})=\underline{P};E_1<E'_{I\underline{P}}<E_2}$, the expression for CS is the following:

$$CS = \frac{1}{2}ah^{*2}_{I,,h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{I\underline{P}}<E_2} - \frac{abd(d\underline{P}+y_2)}{y_1}\underline{h} + t(1-s)I\left(lnh^*_{I,h\geq\underline{h};(\xi w,\underline{P})=\underline{P};E_1<E'_{I\underline{P}}<E_2} - ln\dot{h}_{S,(\xi w,\underline{P})=\underline{P};E_1<E'_{I\underline{P}}<E_2} - 1\right) \quad (76)$$

The state's optimization problem can be written as:

$$SW = CS + PS$$
$$s.t.\ \ TR = tI \geq \underline{R} = bp^*_{I\underline{P}l}d\underline{P} \quad (77),$$

where the expression for $p^*_{I\underline{P}l}$ is in (73) and independent of the three choice variables by the state. As such the RHS of the above solvency constraint is once again a constant. Therefore, Proposition 4 & 5 still hold in this scenario.

I.3 Simulation of the Model, Discussions and Policy Recommendations

We model the efficiency of the FAMLI program in previous sections. In our model, a representative firm maximizes profit while a representative worker maximizes utility in the face of uncertainty with regards to the severity of the program-covered life events. A benevolent state, on the other hand, attempts to maximize social welfare as measured by consumer and producer surpluses subject to the solvency constraint. The parameters at the discretion of the state are the tax/contribution rate, an appropriate cost-sharing rule and some level of the cap on taxable wage.

The fundamental insight of the model is that the optimal cost-sharing ratio and taxable wage cap need to balance the adverse effects of the proportional tax regime and the state's need to stay solvent. The model prescribes a lump-sum tax regime where every participant in the FAMLI program pays a uniform amount that equals the expected benefit payment. The primary rationale for this result is that, compared to the proportional tax regime, lump-sum taxes are non-distortionary. The optimal cost-sharing rule in this case is determined by which side of the labor market is expected to enjoy the non-distortionary benefit of the tax longer. If the demand hence the employer side is expected to enjoy longer this benefit, taxes should only be levied on employers. The reverse is true if the other side of the labor market, the employees, are expected to enjoy this benefit longer.

It must be stressed that our prescription that lump-sum tax is optimal is purely from the efficiency's point of view. If adding equity, another major concern of a benevolent state, into the goal function, the conclusion may change. One particular adverse characteristic of a lump-sum tax is that in this tax regime essentially relatively lowly paid workers are subsidizing relatively highly paid workers, which is exactly opposite to equity. Subsequently we confirm this is true using simulations.

If we move away from the lump-sum tax regime, our analysis in the previous sections suggests that the optimal cost-sharing rule is scenario dependent. In most of the cases, it is either 100% or 0% (paid by employers) depending on parameters in the model. Given that Senate Bill 275 (SB275)

which establishes the FAMLI program in Maryland prescribes a range between 75% and 25%, our model would predict either a 75% or 25% as the optimal cost paid by employers depending on scenarios. Once again, these results are from the perspective of efficiency. Equity concern may change the prescriptions as we also show subsequently.

Because of the uncertainty with respect to the taxable wage cap and optimal cost-sharing rule in theory, it is important examine which level of the taxable wage cap and cost-sharing ratio are likely to be optimal using real world data. This also serves as a means to substantiate the primary implications of our model. As such we simulate our model using the Maryland employment and wage data.

I.3.1 Simulation of the Model

I.3.1.1 Data and Sample Construction

The two key variables of interest based on our model are labor supply and wage rate. Out of the many potential data sources, the Census Bureau's American Community Survey (ACS) seems to be the most comprehensive and the only one that covers both variables.[23] As such we employ this database in our simulations. Specifically, we use the one-year ACS data at 2021 (abbreviated for ACS1 2021 henceforth), which is the latest one-year data released by the Census Bureau. In other parts of our report we also employ the five-year ACS data covering the period 2016 to 2020. Since both data sets have advantages as well as drawbacks, we entertain both to provide us with more confidence in our analysis.

Because the FAMLI program in Maryland will start in January 2025,[24] we project the ACS1 2021 data to 2025 for our simulation analysis. Specifically, between 2021 and 2025 we apply the following wage growth rates based on the 2022 Social Security Administrative Trustee Report[25] and employment growth rates estimated from the Maryland Occupational & Industry Projections of the Maryland Department of Labor[26] to obtain the 2025 projected sample.

Table I-1. Assumptions for Wage Growth and Employment Growth

Year	Wage Growth Rate (%)	Employment Growth Rate (%)
2022	6.52	2.47
2023	4.77	2.47
2024	4.31	0.95

[23] For example, another major source of data for wage and employment, the Occupational Employment and Wage Statistics (OEWS) from the Bureau of Labor Statistics (BLS), only include annual and hourly wage but not total hours worked in a year. We need the latter to determine the eligibility of the worker for the leave.

[24] The premium collection will start in October, 2023. But the benefit payments will start in January, 2025. We consider 2025 as the first year for the FAMLI program to formally start since it is the first year with both benefit contributions and claims processing and benefit payment.

[25] Available at https://www.ssa.gov/OACT/TR/2022/.

[26] Available at https://www.dllr.state.md.us/lmi/iandoproj/.

2025	4.07	0.95

I.3.1.2 Assumptions for Simulation Parameters

In pursuant to SB275 and after referencing similar analyses done for other states (see our Literature Review section), we also make the following assumptions for the leave-taking-related parameters in our simulations, as summarized in Table I-2.

Besides these leave-related variables, our model also depends on assumptions for several other parameters, including the measure of disutility to work (a), productivity and return-to-scale factors (α, c), and the minimum and maximum potential utility loss if the employee does not take the leave when an event strikes (E_1 and E_2). To make the insurance program meaningful, upper bound of the utility loss, E_2, needs to be large enough. We set E_2 to be \$60 million but varying this value does not change our conclusions. Most of our analyses in prior sections for workers earning less than the taxable wage cap suggest that the optimal cost-sharing ratio is either 100% or any value between 0% and 100% which also encompasses 100%. Exceptions to this rule happen when the employee is not expected to take the leave with certainty when a covered life event happens. To allow for these exceptions in our simulation model, we set the lower bound of the potential utility loss, E_1, to be a relatively small value \$100, because small value of utility loss results in a higher chance of an employee not to take the leave. But similar to the results with respect to the upper bound, varying this value does not change our results, either.

The determination of the other three parameters, a, $\alpha, c,$ is more involved. Prior to the enactment of the FAMLI program, we expect the labor market to be at equilibrium. However, without the paid FAMLI program, the worker may also qualify for the unpaid federal FMLA leave. Therefore, the labor market equilibrium prior to the arrival of the state program is predicated on the availability of the FMLA leaves. Since FMLA requires a minimum of 1,250 hours in the preceding 12 months to qualify for the leave, the equilibrium labor supply and wage rate if the hours worked by an employee are below this requirement can be easily derived as follows:

$$\{h^* = \frac{\alpha}{a+c}\ w^* = \frac{a\alpha}{a+c} \quad if\ h^* < 1{,}250\ hrs \tag{78}$$

If an employee's working hours exceed 1,250 hence she qualifies for the FMLA leave, the specific functional form for the equilibrium labor supply and wage rate depends on whether the employee is expected to always take the leave when an event occurs, as we showed in equation (14) and (27) in Section I.1.2.2. Note that in both equations we need to assume $t = 0$ and $\xi = 0$ to be consistent with the scenario of no paid leave. Given our assumptions for E_1 and E_2, we can further show that:

$$\frac{y_2}{y_1} \approx \frac{1}{2}$$

Table I-2. Assumptions for Parameters in the Simulation

Variable	Relevance	Assumption	Rationale
Leave length (d)	Estimate expected benefit payment	10.5 weeks	Average proportion of leave length to the maximum leave length multiplied by 18, the average maximum leave length in MD considering that some employees may be able to take own sickness and maternity leaves in the same year.[27] The calculation of the average proportion of leave length to the maximum leave length was based on the statistics from the CA, CO, MA, NJ, NY, RI, and WA reports.
Probability of FAMLI-covered life events occurring (b)	Estimate expected benefit payment	6.25%	Average claim incidence rate from the statistics provided in CA, CO, CT, NJ, NY, RI, and WA reports plus 1% (safety reserve), then scaled by 1.25 to consider first-year surge in the filing of claims because of backlogs.
Maximum weekly benefit payment ($\underline{P}$)	Estimate expected benefit payment	$1,000	SB275 stipulates that the starting value for this variable is $1,000 in 2025. Then it grows with inflation.
AWW (average weekly wage)	Determine an employee's wage replacement rate during her leave. The rate is based on the employee's weekly wage relative to the state AWW. Specifically, if an	$1,522	Projected AWW based on the current level of AWW ($1,338) and forecasted wage growth rates in Table I-1.

[27] Though in general the maximum leave length is 12 weeks according to SB275, it allows an employee to take an additional 12 weeks' leave if she encounters two particular types of life events in a single year: a new born baby and own sickness. We crudely adjust the maximum leave length considering this aspect of the law by taking the average of 12 and 24, the maximum leave length if the employee can take advantage of this provision, which is why we have 18 as the "average maximum leave length" in the leave length estimation.

	employee's average weekly wage is at or below 65% of state AWW, her wage replacement rate is 90%. Otherwise it is calculated as the sum of 90% of the portion of her wage that is below 65% of state AWW and 50% of the portion above it.		
Minimum number of hours worked in a year to qualify for the leave ($\underline{h}$)	Determines the employee's eligibility for the leave. SB275 stipulates that an employee needs to work at least 680 hour in the preceding 12 months to qualify for the leave.	680 (hrs)	SB275
Administrative costs (AC)	Determines the total cost of the benefit program	8% of total expected benefit payment. Add $60 million in 2025 to consider the setup costs.	Literature review. See Part 2.
Contribution by employees earning less than $15/hour	Estimate total revenue.	Total contributions associated with these employees are calculated as: $s * t * (wage, taxable\ wage\ c$	SB275 states that the state intends to cover the contributions paid by these employees.

		. That is, only the employer portion of the taxes are included in the revenue estimation.	
Taxable income from employers with fewer than 15 employees	Need to deduct this amount to estimate total taxable income.	14.36%*s of total taxable income, where s is the cost shared by employers	SB275 stipulates that employers with fewer than 15 employees do not have to participate in the program. 14.36% is estimated by the taxable income by all community providers as a fraction of total taxable income in Maryland based on the administrative records.
Taxable income from community providers (net of those with fewer than 15 employees)	Need to deduct this amount to estimate total taxable income.	4.16%*s of total taxable income, where s is the cost shared by employers	SB275 stipulates that the state intends to cover the cost of the community providers. 4.16% is estimated by the taxable income by all community providers (net of those with fewer than 15 employees) as a fraction of total taxable income in Maryland based on the administrative records.

Therefore, one can also show that under these conditions equations (14) and (27) are equivalent. Therefore, the equilibrium labor supply and wage rate if a worker qualifies for the FMLA leave can be written as equation (14) and are copied below for convenience:

$$\{h^* = \frac{\frac{abd}{2}+\alpha}{a+c}\ w^* = \frac{a\left(\alpha-\frac{bcd}{2}\right)}{a+c}\ \ if\ h^* \geq 1{,}250\ hrs \tag{79}$$

From the ACS data we can estimate the annual total number of hours worked (h^*) and the total wage for an employee, from which we can also estimate the hourly wage w^*. However, both (78) and (79) have three unknowns but only two equations, which cannot solve out a deterministic value for all parameters. Our approach to deal with this issue is to fix the value of one parameter, and then use the two equations to solve out the other two. Specifically, we assume that the return-to-scale measure, c, is 0.1754 for all employees. This value is obtained from our simulations of different ranges of the parameters to generate the cases when a worker does not always take the leave when an event occurs. As discussed above, these cases may result in a higher chance of finding the optimal cost shared by employers not to be 100%. If under this scenario we still find the optimal cost-sharing to be 100% (based on the efficiency argument), then we should have a stronger case to support our recommendations. In unreported analyses we also randomize c around this value and obtain similar results.

From (78) & (79) we can solve out α and a as a function of c:

$$\begin{cases} \alpha = w^* + ch^* \; a = \frac{w^*}{h^*} & if\ h^* < 1{,}250\ hrs \\ \alpha = \frac{1}{2}\left(\frac{bcd}{2} + w^* + ch^* + \sqrt{\left(\frac{bcd}{2} + w^* + ch^*\right)^2 - 2bcd\left(w^* + ch^*\right)}\right) \; a = \frac{cw^*}{\alpha - \frac{bcd}{2} - w^*} & if\ h^* \geq 1{,}250\ hrs \end{cases} \quad (80)$$

We summarize the assumptions for the parameters in our model and our rationales to make these assumptions in Table I-3 below.

Table I-3. Assumptions for Parameters in the Model

Variable	Relevance	Assumption	Rationale
Minimum utility loss if a FAMLI program covered life event occurs but the worker does not take the leave (E_1)	Determine the probability of taking the leave as well as equilibrium labor supply and wage rate under some scenarios.	$100	Small enough to increase the chance to have the type of workers who do not always find it economical to take the leave, to increase the probability of finding the optimal cost-sharing ratio not to be 100%. Varying the value of this parameter will not change the conclusions.
Maximum utility loss if a FAMLI program covered life event occurs but the worker does not take the leave (E_2)	Determine the probability of taking the leave as well as equilibrium labor supply and wage rate under some scenarios.	$60 million	Large enough to be more consistent with the nature of the insurance program and help avoid the uninteresting case under which some workers never find it economical to take the leave. Varying the value of this variable will not change the conclusions.
Return-to-scale factor (c)	Determine equilibrium labor supply and wage rate.	0.1754	Based on our simulation for the parameter ranges that would increase the chance of having the type of workers who do not

			always take a leave when a life event occurs. This can increase the chance of finding the optimal cost-sharing ratio not to be 100%. Randomizing this variable will not change the conclusions.
Productivity factor (α)	Determine equilibrium labor supply and wage rate.	Equation (80)	From the assumptions of the labor market being in equilibrium prior to the implementation of the FAMLI program. Also incorporate the consideration of federal FMLA leaves for an employee.
Disutility to work measure (a)	Determine equilibrium labor supply and wage rate.	Equation (80)	From the assumptions of the labor market being in equilibrium prior to the implementation of the FAMLI program. Also incorporate the consideration of federal FMLA leaves for an employee.

I.3.1.3 Steps for Simulation

The simulation proceeds as follows:

- 1. Based on the assumptions for the relevant parameters in the model we apply an initial tax/contribution rate of **2%** at a given cost-sharing ratio and taxable wage cap. Given these assumptions we can calculate various cutoff points to determine the type of the worker given our model in Section I.1 and I.2. Based on the worker type we then apply the corresponding formulas from the two sections to estimate the expected labor supply and wage rate under the assumed tax rate, cost-sharing rule, and taxable wage cap. Note that in doing this we have implicitly assumed that the representative worker/firm model we developed in the

previous sections is applicable to each individual. We believe this is a reasonable assumption given that the labor markets for different occupations and workers of different skills are often segregated.

- 2. We then calculate the expected tax base and revenue, as well as expected benefit payment given the new expected levels of labor supply and wage rate for each individual. In this process we also consider the exceptions for tax base and revenue calculations with regard to community providers, small employers with fewer than 15 employees, and low-wage workers earning less than $15/hour, as discussed in the previous section. We also incorporate the assumed administrative costs (ACs) into the cost estimation. Aggregating all the individual tax bases and expected benefit payments (with the ACs added) we can determine the new break-even contribution rate:

$$t_{new} = \frac{Total\ tax\ base}{Total\ benefit\ payment\ (with\ ACs\ included)}$$

  We then apply this new contribution rate, the assumed cost-sharing ratio and taxable wage cap and start the process again until it converges to the final contribution rate that equates the expected tax revenue with the benefit payment (with ACs included). We set the convergence criteria as:

$$abs(Tax\ revenue - Expected\ benefit\ payment\ (with\ ACs\ included)) < \$250,$$

  where abs stands for absolute value operation. That is, we allow the tax revenue to deviate slightly from the expected benefit payment. This can shorten the time for convergence. Under some scenarios, we also find that it is critical to set the cutoff point for convergence to be significant enough to ensure convergence. This final contribution rate meets the state's solvency requirement under the assumption of the specific cost-sharing ratio and taxable wage cap. We then calculate the consumer and producer surpluses of each individual based on her type following the formulas in the previous sections, and aggregate them into total surpluses, which serves as a measure of social welfare. To avoid confusion, we subsequently call consumer surplus ***employee surplus*** and producer surplus ***employer surplus***.
- 3. We repeat steps 1 & 2 under different assumptions of the cost-sharing rule and taxable wage cap. This allows us to compare the social welfare under different values of these choice variables by the state, and draw conclusions on the optimal values of taxable wage cap and cost-sharing ratio.

I.3.1.4 Simulation Results and Discussions

A. Optimal Taxable Wage Cap

Figure I-5 plots the relationship between social welfare as measured by the sum of employees' and employers' surpluses and taxable wage cap, assuming a cost shared by employers at 50% which is the middle point in the range of the cost-sharing ratios in SB275. The smallest taxable wage cap we considered is $741, under which the contribution rate is 100%, effectively making it a lump-sum tax. The

highest cap included in the figure is around $200,000. The Figure I-shows a clear negative relationship between social welfare and the taxable wage cap, which is consistent with the prediction of our model. Actually, social welfare under the case when the cap is $200,741 decreases by about 0.77% compared to the case when the cap is at $741. Though this may appear small, the absolute dollar value of the decrease is around $7.3 billion, a very significant amount. If we set the cap to be the same as the expected social security wage base (SSWB) at 2025, $173,400, we find that social welfare decreases by about 0.76% relative to the best case, or about $7.1 billion.
The plot in Figure I-5 assumes a cost-sharing of 50% by employers. To examine the robustness of the results under a different cost-sharing rule, we plot a similar relationship in Figure I-6 & I-7 under a cost-sharing of 25% and 75% by employers, respectively. These ratios represent the lower and upper bound of the range of the ratios in SB275. As can be seen, the inverse relationship between taxable wage cap and social welfare is still apparent under these alternative cost-sharing rules.

Since social welfare is the sum of employees' and employers' surpluses and it is possible that the state may place different weights on each in their goal function, it is informative to examine the relationship between each type of surpluses and the taxable wage cap. Therefore, in Figure I-8 & I-9 we plot the relationship between employees' and employers' welfare on taxable wage cap, respectively. As can be seen, by and large a similar inverse relationship is present in both charts. Therefore, decreasing the cap increases both employees' and employers' welfare. The simulation results so far thus support our Proposition 5 that the optimal tax regime should be a lump-sum tax.

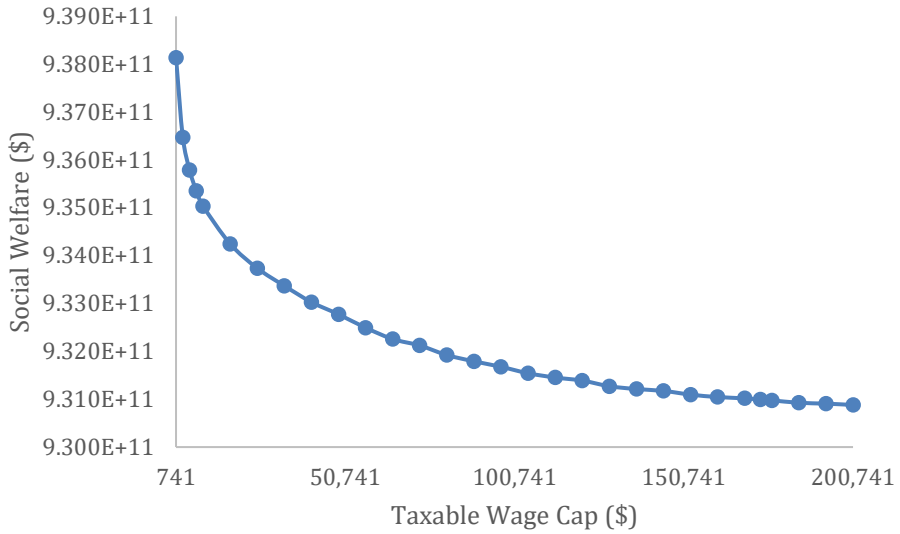

Figure I-5. Taxable Wage Cap and Social Welfare (cost shared by employers = 50%)

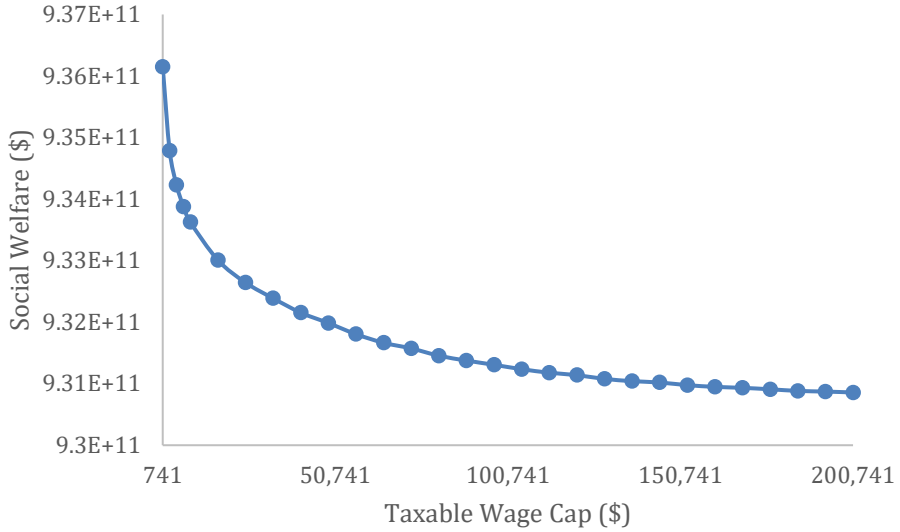

Figure I-6. Taxable Wage Cap and Social Welfare
(cost shared by employers = 25%)

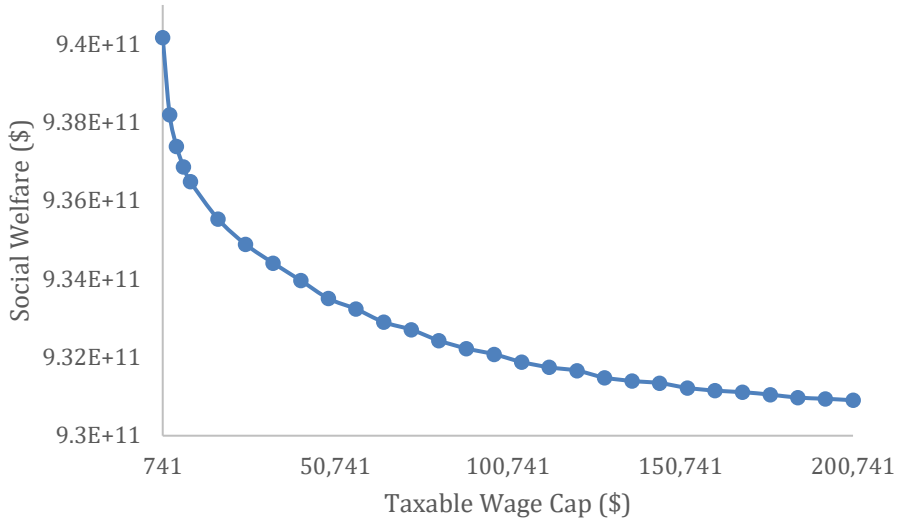

Figure I-7. Taxable Wage Cap and Social Welfare
(cost shared by employers = 75%)

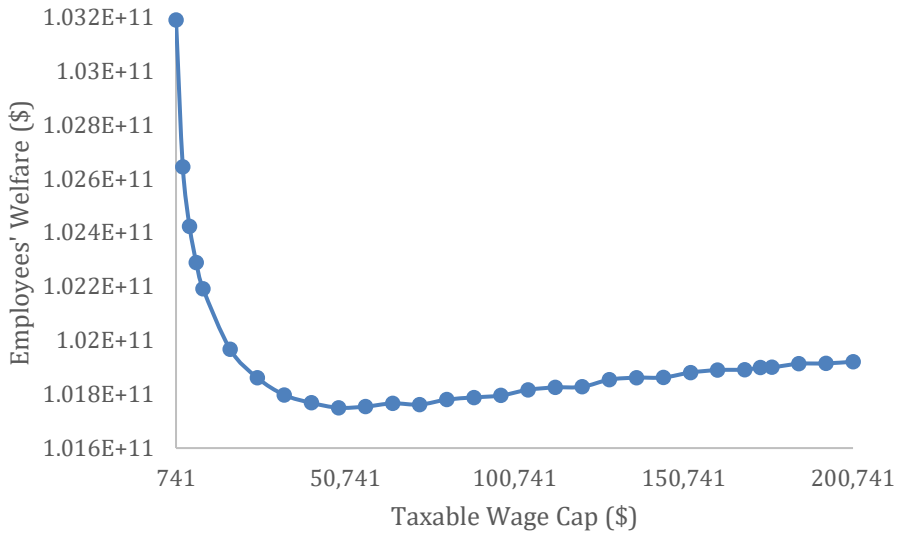

Figure I-8. Taxable Wage Cap and Employees' Welfare (cost shared by employers = 50%)

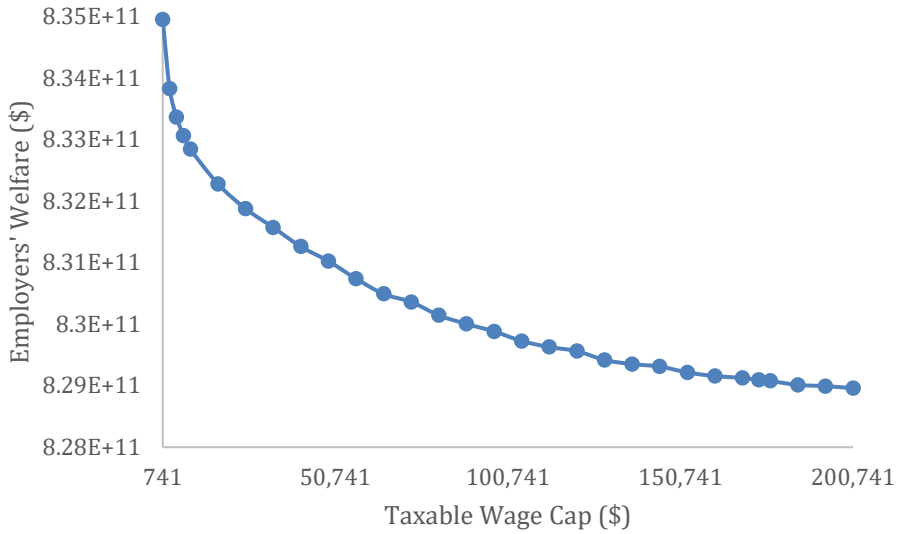

Figure I-9. Taxable Wage Cap and Employers' Welfare
(cost shared by employers = 50%)

The optimality conclusion we just described is purely from the efficiency's point of view, which is the focus of our model in the previous sections. Besides efficiency, a state may also consider equity in its goal function. In the context of FAMLI programs, this means actuarial fairness. But absolute fairness, the scenario under which the contribution of each participant in the program exactly equals her expected benefit payment (plus rationed ACs, similar note subsequently so omitted), is often not achievable. Therefore, we only consider relative fairness, which is measured by the deviation of a person's contribution from her expected benefit receipt. We further assume that a person may be only concerned about overpaying than underpaying. From the equity's point of view, a state is expected to be more concerned about a relatively lowly paid worker overpaying than highly paid workers overpaying. Therefore, we assume that the state attempts to minimize the following weighted squared overpayment (WSO) function in meeting the equity goal of the program:

$$Weighted\ Squared\ Overpayment = \sum_{i=1}^{N} \frac{1}{Annual\ wage_i}(Contribution_i - Expected\ benefit\ receipt_i)^2$$
$$if\ Contribution_i > Expected\ benefit\ receipt_i,$$

where i indicates employee number and N is the total number of employees in the workforce. The square in the overpayment term, $contribution_i - expected\ benefit\ receipt_i$, assumes that the state penalizes overpayment significantly in setting policies. Note that in the above expression we assume that the weight on each individual is inversely related to her wage income, which is consistent with the idea that the state is more concerned about low-earning workers overpaying than high-earning workers doing the same.

To be able to accurately estimate the WSO we need the information on contribution and expected benefit payment for each individual in the ACS database. However, due to the fact that community providers and small businesses with fewer than 15 employees do not need to contribute to the insurance program, accurately estimating each individual's contribution is not possible because the ACS database does not allow an identification of community providers and firm sizes.[28]

[28] This is why in Table 2 we are only able to estimate the aggregate amount of taxable income by community providers and small businesses.

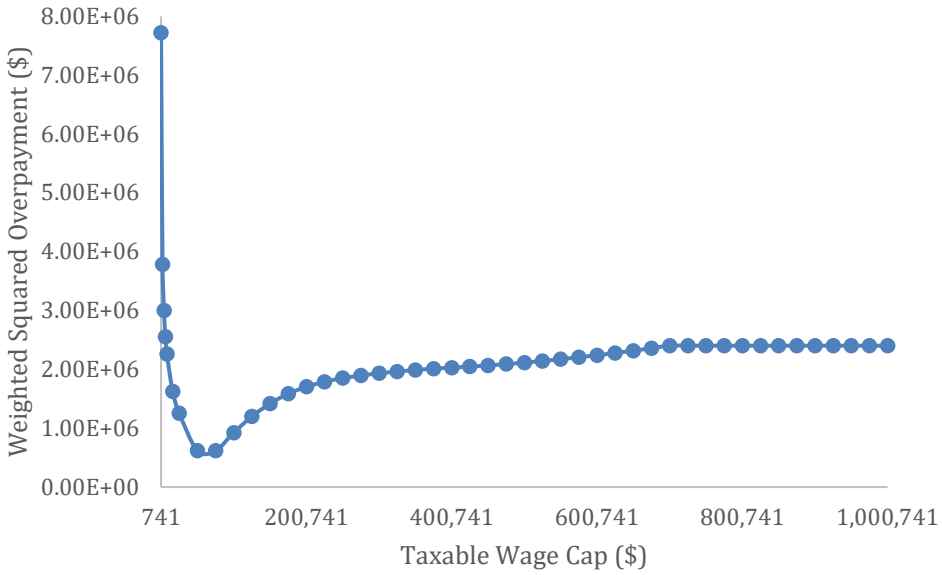

Figure I-10. Taxable Wage Cap and State's Equity Concern (cost shared by employers = 50%)

Therefore, the WSO we calculate is only meant to be suggestive. Nonetheless, since we focus on the relative magnitudes of the measure under different taxable income caps, there is no reason to suspect systematic bias in this measure, either. In Figure I-10, we plot the simulated relationship between the taxable wage cap and the state's equity concern as measured by WSO. Unlike Figures 5-9 where the maximum cap is only around $200,000, we extend the cap to be around $1 million in Figure I-10. This is because in the ACS database the maximum wage income is around this level. Essentially, setting the cap above this level is equivalent to assuming no cap for taxable income.

Interestingly, Figure I-10 shows that as the cap increases, the WSO first decreases significantly then gradually increases. Since lower value of this overpayment measure indicates higher equity, the evidence in Figure I-10 suggests that, despite the efficiency advantage of a lump-sum tax, it nonetheless falls short in equity: it has the highest level of WSO among all the caps. This suggests that relative to the proportional tax regime, lump-sum tax has the worst equity implication. In fact, lump-sum tax in the context of FAMLI program suggests that lowly paid employees are subsidizing highly paid employees, which is contrary to equity. Therefore, a balance of efficiency

and equity requires the state to consider both social welfare and potential overpayment, especially by relatively lowly paid workers. From this perspective, choosing some intermediate value of the taxable wage cap such as SSWB may not be a bad idea. The comparison between different tax regimes ranging from the lump-sum tax regime, the proportional tax regime with a cap on taxable income at SSWB, and the proportional tax regime with no cap is summarized in Table I-4. We assume a cost shared by employers at 50% in this table.

Table I-4. Comparison of the Efficiency and Equity of Different Tax Regimes (Cost Shared by Employers=50%)

Tax Regime	Social Welfare ($)	Decrease in SW Relative to ***Best*** Case	Weighted Squared Overpayment ($)	Decrease in WSO Relative to ***Worst*** Case
Lump-sum (each participant pays $741)	9.381E+11	0%	7.723E+06	0%
Proportional tax with cap at SSWB ($173,400)	9.310E+11	$7.145E+09 (0.762%)	1.572E+06	6.151E+06 (79.648%)
Proportional tax with no cap	9.306E+11	$7.502E+09 (0.800%)	2.403E+06	5.320E+06 (68.888%)

B. Optimal Cost-Sharing Rule

We plot the relationship between different cost-sharing rules ranging from 25% to 75% paid by employers and social welfare in Figure I-11, assuming a taxable wage cap at SSWB of $173,400. A clear upward trend is present in the figure. In Figure I-12 & I-13 we also plot a similar relationship between cost-sharing ratio and employees' and employers' welfare, respectively, and observe a similar trend. The latter result is counter-intuitive at first glance. However, as soon as we realize that our model is built on the pre-assumption that the labor market is dynamic and will respond to coordinates that may affect supply and demand, and the fact that employers will benefit from a larger labor supply, the positive effect of the cost shared by employers and their own welfare is expected. The reason is that

employers would always attempt to shift the burden of the benefit taxes to employees so the nominal cost-sharing does not correspond directly to the eventual tax burden shared between the two parties. Rather, tax incidence is determined by elasticities of demand and supply – a classical result in economics. Here, a higher cost-sharing by employers is optimal for themselves not because of this tax incidence argument, but because employers' response to their share of the cost results in lower distortion in the labor market, which benefits both parties. Indeed, both employees' and employers' welfare are increasing with the cost shared by employers as Figure I-12 & I-13 demonstrate.

Given that our theoretical model predicts different optimal cost-sharing rules depending on the type of workers, it is informative to examine the proportion of each type in the data to have a better understanding on the observed relationships in Figures 11-13. We summarize the statistics in Table I-5, where we have assumed a cost-sharing ratio of 50% and taxable wage cap at SSWB. The statistics are similar under different cost-sharing rules and taxable wage caps.

The statistics in Table I-5 provide an explanation for why we observe the relationships as in Figures 11-13. Among workers whose wage income is below the cap, the largest two groups are those who would always take the leave. Between the two, though the group whose benefit payment reaches the maximum can

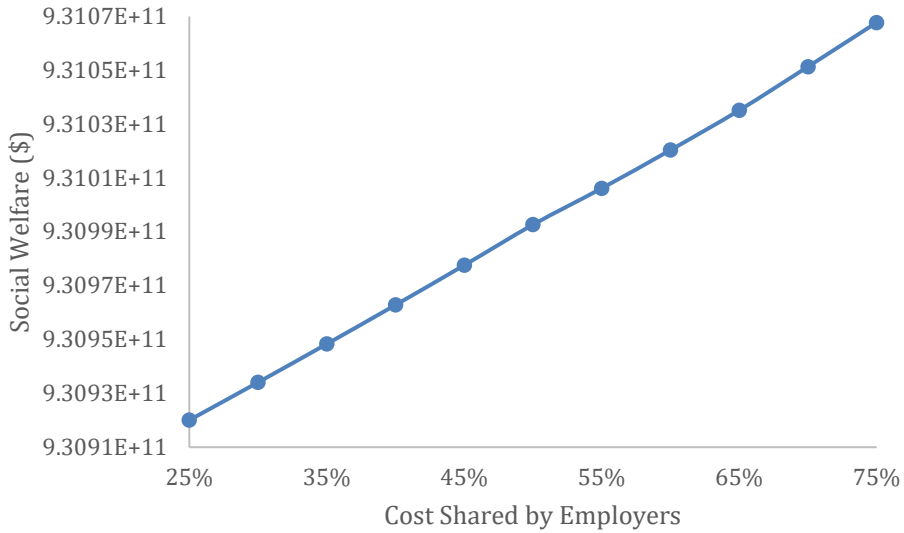

Figure I-11. Cost Shared by Employers and Social Welfare (Taxable Wage Cap=Expected SSWB at 2025 ($173,400))

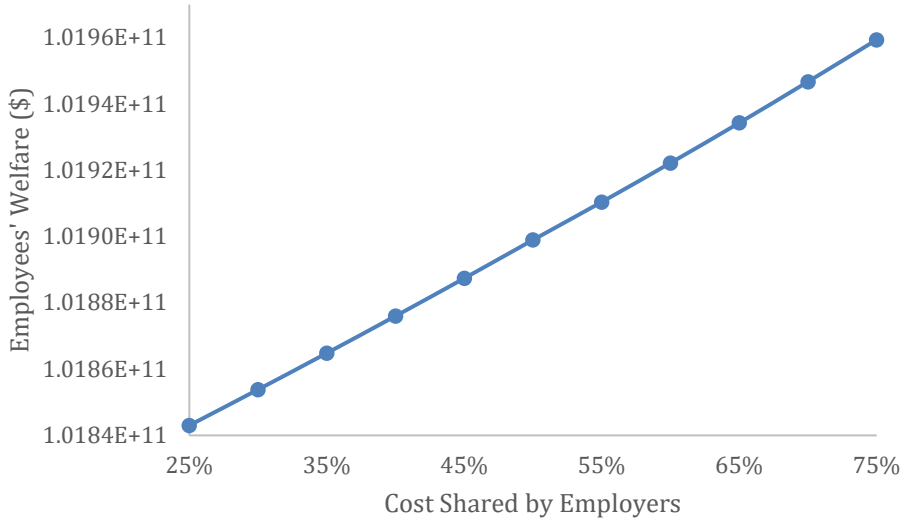

Figure I-12. Cost Shared by Employers and Employees' Welfare (Taxable Wage Cap=Expected SSWB at 2025 ($173,400))

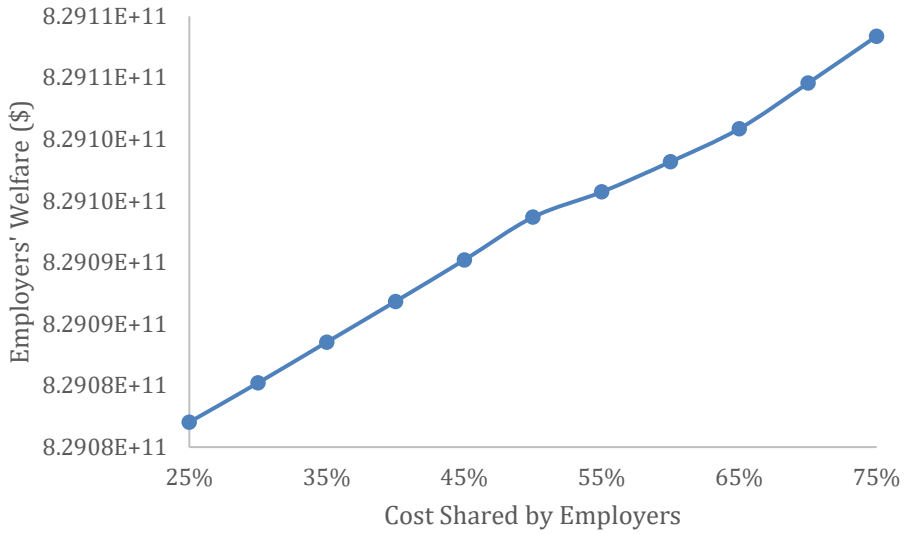

Figure I-13. Cost Shared by Employers and Employers' Welfare (Taxable Wage Cap=Expected SSWB at 2025 ($173,400))

accept any cost-sharing ratio according to our model, this result is subsumed by the optimality of the cost-sharing ratio of the other group whose benefit payment is below the maximum. According to our model, the optimal cost sharing is 75% for this group. Similarly, for all the workers whose wage incomes are above the cap, the larger root of the equation where income based on the inverse supply function equals the cap is always above the smaller root of the equation where income based on the inverse demand function equals the cap. This condition results in the optimal cost-sharing ratio being 75% according to our model. Therefore, the statistics in Table I-5 suggest that most of the workers in the ACS database would either prefer a cost-sharing ratio of 75%, or be indifferent to the ratio, in which case 75% would still be optimal for them.

The evidence in Figures 11-13 suggests that the optimal cost-sharing ratio is 75% for employers. But once again, we have to stress that this result is only from efficiency's point of view. We proceed to examine another major concern by the state, equity, and how cost-sharing may affect this concern.

We first examine the relationship between cost-sharing and break-even contribution rate, which is illustrated in Figure I-14. As can be seen, a clear positive relationship between the two variables is present: a larger cost shared by employers results in a higher contribution

rate. Two facts lead to this result. First, our model predicts a generally lower wage rate under a higher cost shared by employers. Though labor supply is higher under a higher cost-sharing ratio, the effect seems to be subsumed by the lower wage rate, requiring a slightly higher tax rate to balance the budget. Second and more importantly, SB275 requires the state to pay the contribution by community providers. Besides, small employers with fewer than 15 employees are not required to contribute. Both provisions shift the burden of the contribution by these employers to other participants in the program. A higher cost shared by employers thus suggests a larger cost by these entities to be shared among other program participants, resulting in higher contribution rate.

Table I-5. Employee Statistics in ACS
(Cost Shared by Employers=50%; Taxable Wage Cap=$173,400)

Employee Type	Optimal Cost Shared by Employers Based on Model	$\dot{h}_S > \dot{h}_D$?	Proportion Based on Number	Proportion Based on Taxable Income
Below cap; not eligible			12.1%	2.2%
Below cap; below max payment; always take leave	75%		36.7%	17.5%
Below cap; below max payment; not always take leave	25%-75% (may have interior solution)		0%	0%
Below cap; above max payment; always take leave	25%-75% (any value is optimal)		41.8%	58.4%
Below cap; above max payment; not always take leave	25%-75% (any value is optimal)		0.1%	0.1%

Above cap; not eligible			0.1%	0.2%
Above cap; below max payment; always take leave	25% or 75% depending on whether $\dot{h}_S < \dot{h}_D$ or $\dot{h}_S > \dot{h}_D$, where $\dot{h}_S$ and $\dot{h}_D$ are the larger/ smaller root of the equation where wage income based on the inverse supply/demand function equals the cap, respectively.	Yes	0%	0%
Above cap; below max payment; not always take leave	25% or 75% depending on whether $\dot{h}_S < \dot{h}_D$ or $\dot{h}_S > \dot{h}_D$	Yes	0%	0%
Above cap; above max payment; always take leave	25% or 75% depending on whether $\dot{h}_S < \dot{h}_D$ or $\dot{h}_S > \dot{h}_D$	Yes	8.2%	19.2%
Above cap; above max payment; not always take leave	25% or 75% depending on whether $\dot{h}_S < \dot{h}_D$ or $\dot{h}_S > \dot{h}_D$	Yes	1.1%	2.5%

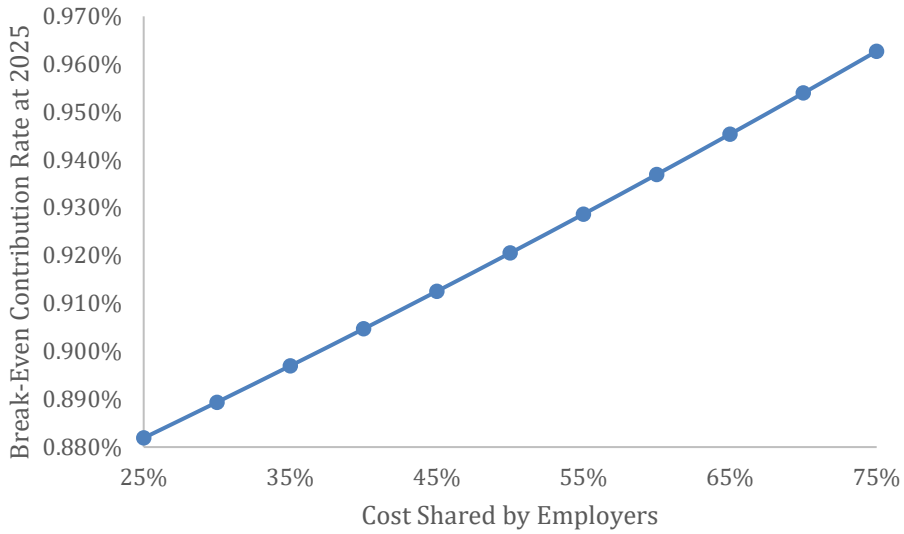

Figure I-14. Cost Shared by Employers and Contribution Rate (Taxable Wage Cap=Expected SSWB at 2025 ($173,400))

Though a higher contribution rate does not affect the efficiency of the program, it can disproportionally affect the overpayment by employees with relatively lower wage incomes. This is because increasing the contribution rate will not alter the overpaying status of the relatively highly-paid workers who are already overpaying. Instead, workers nearing the overpaying status will tend to cross this line when contribution rate rises. These effects will decrease the equity of the program. Indeed, Figure I-15 illustrates a clear positive relationship between the cost shared by employers and our inequality measure as discussed in the previous section: WSO. A straightfoward explanation for this relationship is the positive effect of cost-sharing on the contribution rate as we observed in Figure I-14.

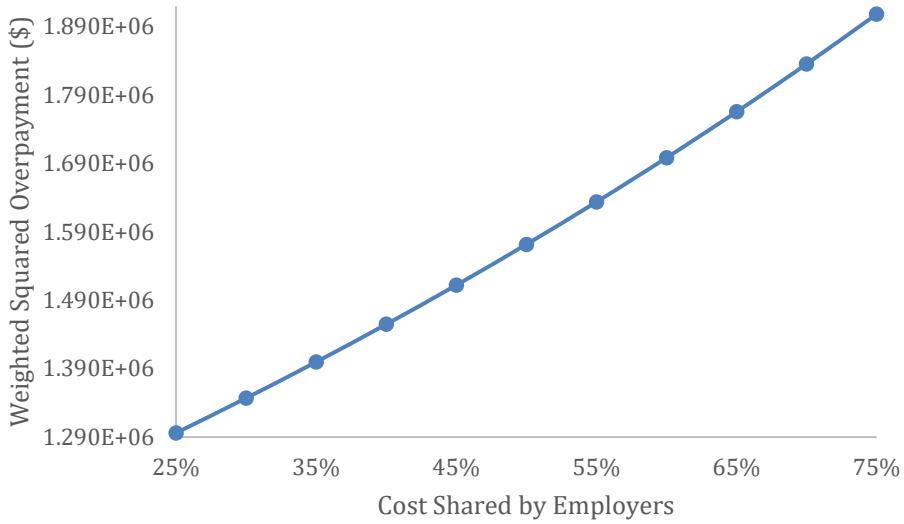

Figure I-15. Cost Shared by Employers and State's Equity Concern (Taxable Wage Cap=Expected SSWB at 2025 ($173,400))

Therefore, the state faces a tradeoff in balancing the efficiency gain of a higher cost-sharing by employers and its accompanying equity loss. Table I-6 compares the magnitudes of the welfare loss and equity gain when we decrease the cost shared by employers. Though the 75% cost-sharing ratio is the best to maximize effiency, it is nonetheless the worst to maintain equity. The state may therefore wish to choose some middle point in balancing these two conflicting goals.

Table I-6. Comparison of the Efficiency and Equity of Different Cost-Sharing Rules (Taxable Wage Cap = SSWB at 2025 = $173,400)

Cost by Employers	Social Welfare ($)	Decrease in SW Relative to ***Best*** Case	Weighted Squared Overpayment ($)	Decrease in WSO Relative to ***Worst*** Case
25%	9.309E+11	1.477E+08 (0.016%)	1.296E+06	6.126E+05 (32.097%)

50%	9.310E+11	0.751E+08 (0.008%)	1.572E+06	3.368E+05 (17.647%)
75%	9.311E+11	0	1.909E+06	0

I.3.2 Policy Recommendations

We summarize our policy recommendations in the following table based on our discussions above. Our recommendations are predicated upon the goal of the state, which may result in different optimal policies and break-even contribution rates. In the last row we also consider the possibility that the state prefers the lowest contribution rate. In this case the optimal policy is to have no taxable wage cap and cost-sharing by employers at 25%, the lowest level set in SB 275 (Ch.48). However, we also added a caution to this policy based on our simulation results with respect to worst-scenario opting-out in Part 6 of the main text, where we document that the break-even contribution rates and the solvency of the program under no-cap scenarios are very sensitive to the prospect of opting-out. The specific value of the lump-sum tax amount as well as the break-even contribution rates in Table 3-5 are based on the simulation of the sample between 2025 and 2027 (rather than just 2025), the entire period when the first contribution rate is expected to apply (after Oct, 2026 the state will reevaluate the solvency situation and possibly redetermine the rate and other policy parameters based on SB 275). The details are discussed in Part 6 of the main text.

Table I-7. Policy Recommendations Conditional on State's Goal

State's Goal	Suggested Taxable Wage Cap	Suggested Cost Shared by Employers	Contribution Rate
Maximize efficiency (social welfare)	Average expected benefit payment plus ACs per participant (around **$670/participant including employers' share**)	75%	100%

Maximize equity	Ranges between around $60,000 to $200,000 (with SSWB in the middle)	25%	0.78-1.31% (depending on specific value of the cap)
Balance between efficiency and equity	Suggest Social Security Wage Base (SSWB) (or some value in the range above)	50%	0.84%
Lowest contribution rate (Note: solvency may be very sensitive to opt-outs)	No cap	25%	0.71%

Appendix II

Appendix II – Table 1. Projection Assumptions

Year	Wage Adj.	CPI - Benefit Adj	Weekly Benefit Cap	SSWB	Employment Size (each year increase)	Emp. Size Projection	Take-up rate adj.	Take-up rate Adj. (cumulative)
2020	2.82	1.21	-	137700	-	-	-	-
2021	5.54	5.26	-	142800	base year	2,566,868	-	-
2022	6.52	4.54	913	147000	2.470	6,339,147	-	-
2023	4.77	2.33	954	160200	2.470	6,339,147	-	-
2024	4.31	2.4	977	165300	0.954	2,448,765	-	-
2025	4.07	2.4	1000	173400	0.954	2,448,765	25.0%	1.25
2026	3.96	2.4	1024	180600	0.954	2,448,765	-8.0%	1.15
2027	3.86	2.4	1049	188100	0.954	2,448,765	5.0%	1.21
2028	3.77	2.4	1074	195600	0.954	2,448,765	5.0%	1.27
2029	3.69	2.4	1100	203100	0.954	2,448,765	5.0%	1.33

Notes:

1. The social security wage bases (SSWB) for 2020-2023 are released numbers. The SSWBs for 2024-2029 are based on projections. Projected Social Security wage base information as provided by the SSA in June 2022.
2. Wage inflation adjustment uses the current year inflation rate; Benefit inflation adjustment uses the previous year inflation rate (CPI).
3. Employment size is adjusted for employment growth. In addition, we consider the proportion of taxable earnings by community providers based on administrative records (2021). This percentage of taxable earnings for community providers (with 15 and more employees) is 3.73% (without social security wage base limit) and 4.16% (with social security wage base limit).

Appendix II – Table 2. Balance Sheet (Without Social Security Wage Base; Employer 75%; Employees 25%)

Without Social Security Wage Base	Total Contribution Rate (%)	Employer Contribution Rate (%)	Employee Contribution Rate (%)		
Employer 75%; Employees 25%	**1.06**	0.795	0.265		
	2023	**2024**	**2025**	**2026**	**2027**
Fund Balance - Beginning of Year ($ millions)	$0.0	$401.6	$2,344.4	$2,347.2	$2,528.5
Taxable Wages ($ millions)	$46,949.8	$195,901.2	$203,873.4	$211,906.8	$220,199.5
Tax Revenue	**$497.7**	**$2,076.6**	**$2,161.1**	**$2,246.2**	**$2,334.1**
Benefit Payment ($ millions)	$0.0	$0.0	$1,923.0	$1,839.2	$2,011.4
Administrative Expenses	$12.0	$48.0	$153.8	$147.1	$160.9
Contributions for Employees <$15	$21.6	$20.7	$13.6	$8.2	$0.0
Contributions for Community Providers	$62.4	$65.1	$67.8	$70.4	$73.2
Total Expenditure	**$96.1**	**$133.8**	**$2,158.3**	**$2,065.0**	**$2,245.5**
Fund Balance - End of Year	**$401.6**	**$2,344.4**	**$2,347.2**	**$2,528.5**	**$2,617.0**

Appendix II – Table 3. Balance Sheet (Without Social Security Wage Base; Employer 50%; Employees 50%)

Without Social Security Wage Base	Total Contribution Rate (%)	Employer Contribution Rate (%)	Employee Contribution Rate (%)		
Employer 50%; Employee 50%	**1.02**	0.51	0.51		
	2023	**2024**	**2025**	**2026**	**2027**
Fund Balance - Beginning of Year ($ millions)	$0.0	$404.5	$2,353.9	$2,362.1	$2,563.7
Taxable Wages ($ millions)	$48,846.7	$203,816.0	$212,110.4	$220,468.4	$229,096.1
Tax Revenue	**$498.2**	**$2,078.9**	**$2,163.5**	**$2,248.8**	**$2,336.8**
Benefit Payment ($ millions)	$0.0	$0.0	$1,923.0	$1,839.2	$2,011.4
Administrative Expenses	$12.0	$48.0	$153.8	$147.1	$160.9
Contributions for Employees <$15	$41.7	$39.8	$35.0	$15.7	$0.0
Contributions for Community Providers	$40.0	$41.8	$43.5	$45.2	$46.9
Total Expenditure	**$93.7**	**$129.5**	**$2,155.3**	**$2,047.3**	**$2,219.3**
Fund Balance - End of Year	**$404.5**	**$2,353.9**	**$2,362.1**	**$2,563.7**	**$2,681.1**

Appendix II – Table 4. Balance Sheet (Without Social Security Wage Base; Employer 25%; Employees 75%)

Without Social Security Wage Base	Total Contribution Rate (%)	Employer Contribution Rate (%)	Employee Contribution Rate (%)		
Employer 25%; Employee 75%	**0.98**	0.245	0.735		
	2023	**2024**	**2025**	**2026**	**2027**
Fund Balance - Beginning of Year ($ millions)	$0.0	$406.0	$2,355.6	$2,366.8	$2,580.6
Taxable Wages ($ millions)	$50,743.6	$211,730.9	$220,347.3	$229,029.9	$237,992.7
Tax Revenue	**$497.3**	**$2,075.0**	**$2,159.4**	**$2,244.5**	**$2,332.3**
Benefit Payment ($ millions)	$0.0	$0.0	$1,923.0	$1,839.2	$2,011.4
Administrative Expenses	$12.0	$48.0	$153.8	$147.1	$160.9
Contributions for Employees <$15	$60.0	$57.3	$50.4	$22.7	$0.0
Contributions for Community Providers	$19.2	$20.1	$20.9	$21.7	$22.6
Total Expenditure	**$91.3**	**$125.4**	**$2,148.2**	**$2,030.7**	**$2,194.9**
Fund Balance - End of Year	**$406.0**	**$2,355.6**	**$2,366.8**	**$2,580.6**	**$2,718.0**

Appendix II – Table 5. Balance Sheet (With Social Security Wage Base; Employer 75%; Employees 25%)

With Social Security Wage Base	Total Contribution Rate (%)	Employer Contribution Rate (%)	Employee Contribution Rate (%)		
Employer 75%; Employee 25%	**1.20**	0.900	0.300		
	2023	**2024**	**2025**	**2026**	**2027**
Fund Balance - Beginning of Year ($ millions)	$0.0	$388.0	$2,317.5	$2,324.5	$2,536.7
Taxable Wages ($ millions)	$41,125.6	$172,777.0	$181,721.9	$190,648.2	$199,955.4
Tax Revenue	**$493.5**	**$2,073.3**	**$2,180.7**	**$2,287.8**	**$2,399.5**
Benefit Payment ($ millions)	$0.0	$0.0	$1,923.0	$1,839.2	$2,011.4
Administrative Expenses	$12.0	$48.0	$153.8	$147.1	$160.9
Contributions for Employees <$15	$24.5	$23.4	$20.6	$9.3	$0.0
Contributions for Community Providers	$69.0	$72.5	$76.2	$80.0	$83.9
Total Expenditure	**$105.5**	**$143.9**	**$2,173.7**	**$2,075.6**	**$2,256.2**
Fund Balance - End of Year	**$388.0**	**$2,317.5**	**$2,324.5**	**$2,536.7**	**$2,679.9**

Appendix II – Table 6. Balance Sheet (With Social Security Wage Base; Employer 50%; Employees 50%)

With Social Security Wage Base	Total Contribution Rate (%)	Employer Contribution Rate (%)	Employee Contribution Rate (%)		
Employer 50%; Employee 50%	**1.15**	0.575	0.575		
	2023	**2024**	**2025**	**2026**	**2027**
Fund Balance - Beginning of Year ($ millions)	$0.0	$388.9	$2,316.7	$2,325.5	$2,551.0
Taxable Wages ($ millions)	$42,780.2	$179,728.3	$189,033.2	$198,318.6	$208,000.3
Tax Revenue	**$492.0**	**$2,066.9**	**$2,173.9**	**$2,280.7**	**$2,392.0**
Benefit Payment ($ millions)	$0.0	$0.0	$1,923.0	$1,839.2	$2,011.4
Administrative Expenses	$12.0	$48.0	$153.8	$147.1	$160.9
Contributions for Employees <$15	$47.0	$44.9	$39.4	$17.7	$0.0
Contributions for Community Providers	$44.1	$46.3	$48.7	$51.1	$53.6
Total Expenditure	**$103.0**	**$139.1**	**$2,165.0**	**$2,055.2**	**$2,225.9**
Fund Balance - End of Year	**$388.9**	**$2,316.7**	**$2,325.5**	**$2,551.0**	**$2,717.1**

Appendix II – Table 7. Balance Sheet (With Social Security Wage Base; Employer 25%; Employees 75%)

With Social Security Wage Base	Total Contribution Rate (%)	Employer Contribution Rate (%)	Employee Contribution Rate (%)		
Employer 25%; Employee 75%	**1.10**	0.275	0.825		
	2023	**2024**	**2025**	**2026**	**2027**
Fund Balance - Beginning of Year ($ millions)	$0.0	$388.3	$2,307.3	$2,310.4	$2,540.0
Taxable Wages ($ millions)	$44,434.8	$186,679.7	$196,344.4	$205,989.0	$216,045.1
Tax Revenue	**$488.8**	**$2,053.5**	**$2,159.8**	**$2,265.9**	**$2,376.5**
Benefit Payment ($ millions)	$0.0	$0.0	$1,923.0	$1,839.2	$2,011.4
Administrative Expenses	$12.0	$48.0	$153.8	$147.1	$160.9
Contributions for Employees <$15	$67.4	$64.4	$56.6	$25.4	$0.0
Contributions for Community Providers	$21.1	$22.1	$23.3	$24.4	$25.6
Total Expenditure	**$100.5**	**$134.5**	**$2,156.7**	**$2,036.2**	**$2,198.0**
Fund Balance - End of Year	**$388.3**	**$2,307.3**	**$2,310.4**	**$2,540.0**	**$2,718.5**

Appendix III

Table 1. Income statement with tax revenue 25% from employees and payroll contribution

Employee 25%, Contribution rate 1.15%	2023	2024	2025	2026	2027	2028	2029
Fund balance - beginning of year	$0	$112	$1,401	$1,252	$1,198	$1,097	$1,009
Tax revenue	$390	$1,625	$1,696	$1,768	$1,841	$1,915	$1,991
Benefit expenses	$0	$0	$1,440	$1,416	$1,523	$1,569	$1,624
Administrative expenses	$12	$48	$107	$105	$113	$116	$120
Contributions for employees < $15	$17	$63	$59	$28	$0	$0	$0
Contributions for employers size <15	$270	$281	$293	$305	$316	$328	$340
Contributions for community providers	$78	$82	$85	$88	$92	$95	$99
Total revenue	$187	$1,414	$1,476	$1,540	$1,604	$1,669	$1,735
Total expenses	$75	$125	$1,626	$1,594	$1,705	$1,756	$1,819
Fund balance - end of year	$112	$1,401	$1,252	$1,198	$1,097	$1,009	$926

Table 2. Income statement with tax revenue 50% from employees and payroll contribution rate of 1.10% in millions in 2023-2029.

Employee 50%, Contribution rate 1.10%	2023	2024	2025	2026	2027	2028	2029
Fund balance - beginning of year	$0	$186	$1,489	$1,356	$1,325	$1,254	$1,199
Tax revenue	$373	$1,555	$1,623	$1,691	$1,761	$1,832	$1,904
Benefit expenses	$0	$0	$1,440	$1,416	$1,523	$1,569	$1,624
Administrative expenses	$12	$48	$107	$105	$113	$116	$120
Contributions for employees < $15	$16	$60	$57	$27	$0	$0	$0
Contributions for employers size <15	$258	$269	$280	$291	$303	$314	$326
Contributions for community providers	$75	$78	$81	$85	$88	$91	$94

Total revenue	$244	$1,420	$1,483	$1,546	$1,610	$1,675	$1,741
Total expenses	$58	$117	$1,616	$1,577	$1,680	$1,730	$1,792
Fund balance - end of year	$186	$1,489	$1,356	$1,325	$1,254	$1,199	$1,148

Table 3. Income statement with tax revenue 75% from employees and payroll contribution rate of 1.05% in millions in 2023-2029.

Employee 75%, Contribution rate 1.05%	2023	2024	2025	2026	2027	2028	2029
Fund balance - beginning of year	$0	$252	$1,563	$1,438	$1,422	$1,374	$1,341
Tax revenue	$356	$1,484	$1,549	$1,615	$1,681	$1,748	$1,817
Benefit expenses	$0	$0	$1,440	$1,416	$1,523	$1,569	$1,624
Administrative expenses	$12	$48	$107	$105	$113	$116	$120
Contributions for employees < $15	$16	$57	$54	$26	$0	$0	$0
Contributions for employers size <15	$246	$257	$267	$278	$289	$300	$311
Contributions for community providers	$72	$75	$78	$81	$84	$87	$90
Total revenue	$294	$1,420	$1,482	$1,545	$1,609	$1,674	$1,740
Total expenses	$42	$110	$1,607	$1,561	$1,657	$1,707	$1,767
Fund balance - end of year	$252	$1,563	$1,438	$1,422	$1,374	$1,341	$1,314

Appendix IV

Table IV-1 Income Statement for Efficiency-Maximizing Policy

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		6.25%	5.75%	6.04%
Leave length (weeks)		10.5	10.5	10.5
Taxable wage cap	670	670	670	670
Contribution rate	100%	100%	100%	100%
Cost shared by employers	75%	75%	75%	75%
Contribution rate				
Employer	75%	75%	75%	75%
Employee	25%	25%	25%	25%
Taxable wages ($ million)	1,576.0	1,322.8	1,451.7	1,522.2
Contributions ($ million)				
Community providers (employer portion paid by state)	80.2	67.0	70.3	73.7
All other employers	1,178.2	984.7	1,033.5	1,083.6
Employees earning < $15/hour (employee portion paid by state)	273.3	211.1	0.2	0.0
Employee portion of employers with less than 15 employees (employer portion not required)	69.2	57.9	60.7	63.7
All other employees	388.2	324.4	392.1	407.2
Total	1,989.1	1,645.1	1,556.8	1,628.2
Expenditures ($ million)				

Claim payment	0.0	1,311.6	1,254.1	1,367.7
Administrative costs	60.0	104.9	100.3	109.4
Employer portion of community providers	60.1	50.3	52.7	55.3
Employee portion of employees earning < $15/hour	68.3	52.8	0.0	0.0
Total	188.5	1,519.6	1,407.2	1,532.4
Contribution - Expenditure	1,800.7	125.5	149.5	95.8
Fund balance ($ million)	1,800.7	1,926.2	2,075.7	2,171.5
Fund balance as % of next year's total expenditures	118.5%	136.9%	135.5%	

Table IV-2 Income Statement for Equity-Maximizing Policy

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		6.25%	5.75%	6.04%
Leave length (weeks)		10.5	10.5	10.5
Taxable wage cap	100,000	100,000	100,000	100,000
Contribution rate	0.97%	0.97%	0.97%	0.97%
Cost shared by employers	25%	25%	25%	25%
Contribution rate				
Employer	0.24%	0.24%	0.24%	0.24%
Employee	0.73%	0.73%	0.73%	0.73%
Taxable wages ($ million)	162,712.5	138,111.5	149,713.7	156,969.9
Contributions ($ million)				
Community providers (employer portion paid by state)	71.4	60.3	63.3	66.4
All other employers	349.7	295.6	310.3	325.3
Employees earning < $15/hour (employee portion paid by state)	67.4	50.7	0.0	0.0
Employee portion of employers with less than 15 employees (employer portion not required)	185.0	156.3	164.1	172.0
All other employees	1,168.9	980.8	1,059.5	1,100.3
Total	1,842.4	1,543.7	1,597.2	1,664.1

Expenditures ($ million)				
Claim payment	0.0	1,313.1	1,256.1	1,369.7
Administrative costs	60.0	105.0	100.5	109.6
Employer portion of community providers	17.8	15.1	15.8	16.6
Employee portion of employees earning < $15/hour	50.5	38.0	0.0	0.0
Total	128.4	1,471.3	1,372.4	1,495.9
Contribution - Expenditure	1,714.1	72.5	224.7	168.2
Fund balance ($ million)	1,714.1	1,786.5	2,011.3	2,179.5
Fund balance as % of next year's total expenditures	1.2	1.3	1.3	

Table IV-3 Income Statement for Balanced Goal Between Efficiency & Equity

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		6.25%	5.75%	6.04%
Leave length (weeks)		10.5	10.5	10.5
Taxable wage cap	SSWB	SSWB	SSWB	SSWB
Contribution rate	0.84%	0.84%	0.84%	0.84%
Cost shared by employers	50%	50%	50%	50%
Contribution rate				
Employer	0.42%	0.42%	0.42%	0.42%
Employee	0.42%	0.42%	0.42%	0.42%
Taxable wages ($ million)	187,968.4	160,452.8	171,632.8	180,058.1
Contributions ($ million)				
Community providers (employer portion paid by state)	74.1	63.1	66.2	69.5
All other employers	725.8	617.9	648.8	680.7
Employees earning < $15/hour (employee portion paid by state)	58.5	44.0	0.0	-
Employee portion of employers with less than 15 employees (employer portion not required)	128.0	108.9	114.4	120.0
All other employees	814.3	688.1	738.5	767.5
Total	1,800.7	1,522.0	1,568.0	1,637.6
Expenditures ($ million)				

Claim payment	-	1,312.2	1,255.0	1,368.6
Administrative costs	60.0	105.0	100.4	109.5
Employer portion of community providers	37.0	31.5	33.1	34.7
Employee portion of employees earning < $15/hour	29.2	22.0	0.0	-
Total	126.3	1,470.7	1,388.6	1,512.8
Contribution - Expenditure	1,674.4	51.3	179.4	124.8
Fund balance ($ million)	1,674.4	1,725.7	1,905.1	2,029.9
Fund balance as % of next year's total expenditures	113.8%	124.3%	125.9%	

Table IV-4 Income Statement for Goal to Minimize Contribution Rate

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		6.25%	5.75%	6.04%
Leave length (weeks)		10.5	10.5	10.5
Taxable wage cap	No cap	No cap	No cap	No cap
Contribution rate	0.71%	0.71%	0.71%	0.71%
Cost shared by employers	0.25	0.25	0.25	0.25
Contribution rate				
Employer	0.18%	0.18%	0.18%	0.18%
Employee	0.53%	0.53%	0.53%	0.53%
Taxable wages ($ million)	223,069.3	190,551.7	204,732.5	214,648.5

Contributions ($ million)				
Community providers (employer portion paid by state)	70.7	60.2	63.1	66.2
All other employers	346.1	294.7	309.3	324.3
Employees earning < $15/hour (employee portion paid by state)	49.1	37.0	-	-
Employee portion of employers with less than 15 employees (employer portion not required)	183.1	155.8	163.6	171.5
All other employees	1,170.0	988.1	1,056.1	1,096.8
Total	1,818.9	1,535.7	1,592.1	1,658.8
Expenditures ($ million)				
Claim payment	-	1,312.7	1,255.6	1,369.1
Administrative costs	60.0	105.0	100.4	109.5
Employer portion of community providers	17.7	15.0	15.8	16.5
Employee portion of employees earning < $15/hour	36.8	27.7	-	-
Total	114.5	1,460.5	1,371.8	1,495.2
Contribution - Expenditure	1,704.4	75.3	220.3	163.6
Fund balance ($ million)	1,704.4	1,779.7	2,000.0	2,163.6
Fund balance as % of next year's total expenditures	1.167050537	1.29733779	1.33760359	

Table IV-5 Income Statement for No-Indexing Scenario

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		6.25%	5.75%	6.04%
Leave length (weeks)		10.5	10.5	10.5
Maximum weekly benefit payment		1,000	1,000	1,000
Taxable wage cap	SSWB (intermediate)	SSWB (intermediate)	SSWB (intermediate)	SSWB (intermediate)
Contribution rate	0.83%	0.83%	0.83%	0.83%
Cost shared by employers	50%	50%	50%	50%
Contribution rate				
Employer	0.414%	0.414%	0.414%	0.414%
Employee	0.414%	0.414%	0.414%	0.414%
Taxable wages ($ million)	187,968.4	160,448.7	171,628.3	180,053.6
Contributions ($ million)				
Community providers (employer portion paid by state)	72.9	62.1	65.2	68.4
All other employers	714.2	608.0	638.4	669.8
Employees earning < $15/hour (employee portion paid by state)	57.5	43.3	0.0	0.0
Employee portion of employers with less than 15 employees (employer portion not required)	125.9	107.2	112.5	118.1
All other employees	801.3	677.0	726.7	755.1

Total	1,771.8	1,497.6	1,542.8	1,611.3
Expenditures ($ million)				
Claim payment	0.0	1,312.2	1,235.0	1,324.2
Administrative costs	60.0	105.0	98.8	105.9
Employer portion of community providers	36.4	31.0	32.6	34.2
Employee portion of employees earning < $15/hour	28.8	21.6	0.0	0.0
Total	125.2	1,469.9	1,366.4	1,464.3
Contribution - Expenditure	1,646.6	27.7	176.4	147.1
Fund balance ($ million)	1,646.6	1,674.3	1,850.8	1,997.8
Fund balance as % of next year's total expenditures	112%	123%	126%	

Table IV-6 Income Statement for Indexing at Low Inflation Scenario

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		6.25%	5.75%	6.04%
Leave length (weeks)		10.5	10.5	10.5
Maximum weekly benefit payment		1,000	1,018	1,036
Taxable wage cap	SSWB (low inflation)	SSWB (low inflation)	SSWB (low inflation)	SSWB (low inflation)
Contribution rate	0.83%	0.83%	0.83%	0.83%
Cost shared by employers	50%	50%	50%	50%
Contribution rate				

Employer	0.414%	0.414%	0.414%	0.414%
Employee	0.414%	0.414%	0.414%	0.414%
Taxable wages ($ million)	178,384.4	149,636.5	155,867.2	165,153.9
Contributions ($ million)				
Community providers (employer portion paid by state)	69.4	58.1	60.4	62.7
All other employers	679.9	569.0	591.9	614.3
Employees earning < $15/hour (employee portion paid by state)	62.9	48.0	47.5	0.0
Employee portion of employers with less than 15 employees (employer portion not required)	119.9	100.3	104.4	108.3
All other employees	758.8	629.8	650.0	692.7
Total	1,690.9	1,405.2	1,454.2	1,478.0
Expenditures ($ million)				
Claim payment	0.0	1,279.1	1,215.1	1,316.2
Administrative costs	60.0	102.3	97.2	105.3
Employer portion of community providers	34.7	29.0	30.2	31.4
Employee portion of employees earning < $15/hour	31.4	24.0	23.8	0.0
Total	126.1	1,434.5	1,366.3	1,452.8
Contribution - Expenditure	1,564.8	-29.3	88.0	25.2
Fund balance ($ million)	1,564.8	1,535.5	1,623.5	1,648.6

Fund balance as % of next year's total expenditures	109%	112%	112%	

Table IV-7 Income Statement for Indexing at Intermediate Inflation Scenario

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		6.25%	5.75%	6.04%
Leave length (weeks)		10.5	10.5	10.5
Maximum weekly benefit payment		1,000	1,024	1,049
Taxable wage cap	SSWB (intermediate inflation)	SSWB (intermediate inflation)	SSWB (intermediate inflation)	SSWB (intermediate inflation)
Contribution rate	0.83%	0.83%	0.83%	0.83%
Cost shared by employers	50%	50%	50%	50%
Contribution rate				
Employer	0.414%	0.414%	0.414%	0.414%
Employee	0.414%	0.414%	0.414%	0.414%
Taxable wages ($ million)	187,968.4	160,448.1	171,627.7	180,052.9
Contributions ($ million)				
Community providers (employer portion paid by state)	72.9	62.1	65.2	68.4
All other employers	714.2	608.0	638.4	669.8
Employees earning < $15/hour (employee portion paid by state)	57.5	43.3	0.0	0.0

Employee portion of employers with less than 15 employees (employer portion not required)	125.9	107.2	112.5	118.1
All other employees	801.3	677.0	726.7	755.1
Total	1,771.8	1,497.5	1,542.8	1,611.3
Expenditures ($ million)				
Claim payment	0.0	1,312.2	1,255.0	1,368.6
Administrative costs	60.0	105.0	100.4	109.5
Employer portion of community providers	36.4	31.0	32.6	34.2
Employee portion of employees earning < $15/hour	28.8	21.6	0.0	0.0
Total	125.2	1,469.9	1,388.0	1,512.2
Contribution - Expenditure	1,646.6	27.7	154.8	99.1
Fund balance ($ million)	1,646.6	1,674.3	1,829.1	1,928.2
Fund balance as % of next year's total expenditures	112%	121%	121%	

Table IV-8 Income Statement for Indexing at High Inflation Scenario

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		6.25%	5.75%	6.04%
Leave length (weeks)		10.5	10.5	10.5
Maximum weekly benefit payment		1,000	1,030	1,061
Taxable wage cap	SSWB (high inflation)	SSWB (high inflation)	SSWB (high inflation)	SSWB (high inflation)
Contribution rate	0.83%	0.83%	0.83%	0.83%

Cost shared by employers	50%	50%	50%	50%
Contribution rate				
Employer	0.414%	0.414%	0.414%	0.414%
Employee	0.414%	0.414%	0.414%	0.414%
Taxable wages ($ million)	193,825.2	170,478.4	181,048.1	192,048.3
Contributions ($ million)				
Community providers (employer portion paid by state)	75.0	64.7	68.7	72.9
All other employers	735.1	634.1	673.5	714.4
Employees earning < $15/hour (employee portion paid by state)	54.0	0.0	0.0	0.0
Employee portion of employers with less than 15 employees (employer portion not required)	129.6	111.8	118.7	125.9
All other employees	827.3	728.7	766.6	805.5
Total	1,821.0	1,539.4	1,627.5	1,718.7
Expenditures ($ million)				
Claim payment	0.0	1,333.1	1,283.0	1,408.9
Administrative costs	60.0	106.7	102.6	112.7
Employer portion of community providers	37.5	32.4	34.4	36.5
Employee portion of employees earning < $15/hour	27.0	0.0	0.0	0.0
Total	124.5	1,472.2	1,420.0	1,558.1

Contribution - Expenditure	1,696.5	67.2	207.5	160.6
Fund balance ($ million)	1,696.5	1,763.7	1,971.2	2,131.8
Fund balance as % of next year's total expenditures	115%	124%	127%	

Table IV-9 Income Statement under Low-Cost Scenario

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		3.75%	3.45%	3.62%
Leave length (weeks)		9	9	9
Taxable wage cap	SSWB	SSWB	SSWB	SSWB
Contribution rate	0.43%	0.43%	0.43%	0.43%
Cost shared by employers	50%	50%	50%	50%
Contribution rate				
Employer	0.216%	0.216%	0.216%	0.216%
Employee	0.216%	0.216%	0.216%	0.216%
Taxable wages ($ million)	187,968.4	160,339.6	171,510.0	179,933.7
Contributions ($ million)				
Community providers (employer portion paid by state)	37.9	32.3	33.9	35.5
All other employers	371.6	316.2	332.0	348.3
Employees earning < $15/hour (employee portion paid by state)	29.9	22.6	0.0	0.0
Employee portion of employers with less than 15 employees (employer portion not required)	65.5	55.7	58.5	61.4
All other employees	416.9	352.0	377.9	392.7
Total	922.0	778.8	802.2	837.9
Expenditures ($ million)				

Claim payment	0.0	674.8	645.3	703.7
Administrative costs	60.0	40.5	38.7	42.2
Employer portion of community providers	19.0	16.1	16.9	17.8
Employee portion of employees earning < $15/hour	15.0	11.3	0.0	0.0
Total	93.9	742.7	701.0	763.7
Contribution - Expenditure	828.0	36.1	101.3	74.2
Fund balance ($ million)	828.0	864.1	965.4	1,039.5
Fund balance as % of next year's total expenditures	111%	123%	126%	

Table IV-10 Income Statement under Intermediate-Cost Scenario

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		6.25%	5.75%	6.04%
Leave length (weeks)		10.5	10.5	10.5
Taxable wage cap	SSWB	SSWB	SSWB	SSWB
Contribution rate	0.84%	0.84%	0.84%	0.84%
Cost shared by employers	50%	50%	50%	50%
Contribution rate				
Employer	0.42%	0.42%	0.42%	0.42%
Employee	0.42%	0.42%	0.42%	0.42%
Taxable wages ($ million)	187,968.4	160,452.8	171,632.8	180,058.1
Contributions ($ million)				
Community providers (employer portion paid by state)	74.1	63.1	66.2	69.5
All other employers	725.8	617.9	648.8	680.7
Employees earning < $15/hour (employee portion paid by state)	58.5	44.0	0.0	-
Employee portion of employers with less than 15 employees (employer portion not required)	128.0	108.9	114.4	120.0
All other employees	814.3	688.1	738.5	767.5
Total	1,800.7	1,522.0	1,568.0	1,637.6
Expenditures ($ million)				

Claim payment		-	1,312.2	1,255.0	1,368.6
Administrative costs	60.0		105.0	100.4	109.5
Employer portion of community providers	37.0		31.5	33.1	34.7
Employee portion of employees earning < $15/hour	29.2		22.0	0.0	-
Total	126.3		1,470.7	1,388.6	1,512.8
Contribution - Expenditure	1,674.4		51.3	179.4	124.8
Fund balance ($ million)	1,674.4		1,725.7	1,905.1	2,029.9
Fund balance as % of next year's total expenditures	113.8%		124.3%	125.9%	

Table IV-11 Income Statement under High-Cost Scenario

	10/2023-12/2024	2025	2026	2027
Claim incidence rate		8.75%	8.05%	8.45%
Leave length (weeks)		12	12	12
Taxable wage cap	SSWB	SSWB	SSWB	SSWB
Contribution rate	1.36%	1.36%	1.36%	1.36%
Cost shared by employers	50%	50%	50%	50%
Contribution rate				
Employer	0.682%	0.682%	0.682%	0.682%
Employee	0.682%	0.682%	0.682%	0.682%

Taxable wages ($ million)	187,968.4	160,595.5	171,771.4	180,216.9
Contributions ($ million)				
Community providers (employer portion paid by state)	120.0	102.2	107.4	112.6
All other employers	1,175.6	1,001.7	1,051.9	1,103.5
Employees earning < $15/hour (employee portion paid by state)	94.7	71.2	0.4	0.0
Employee portion of employers with less than 15 employees (employer portion not required)	207.3	176.6	185.4	194.5
All other employees	1,319.0	1,115.4	1,197.1	1,244.1
Total	2,916.6	2,467.2	2,542.2	2,654.8
Expenditures ($ million)				
Claim payment	0.0	2,099.7	2,008.6	2,190.2
Administrative costs	60.0	210.0	200.9	219.0
Employer portion of community providers	60.0	51.1	53.7	56.3
Employee portion of employees earning < $15/hour	47.4	35.6	0.2	0.0
Total	167.4	2,396.4	2,263.3	2,465.5
Contribution - Expenditure	2,749.2	70.8	278.8	189.2
Fund balance ($ million)	2,749.2	2,820.0	3,098.8	3,288.1
Fund balance as % of next year's total expenditures	115%	125%	126%	

Appendix V

MILLIMAN REPORT

Maryland Family and Medical Leave Insurance

Actuarial Study

Commissioned by The University of Baltimore

November 10, 2022

Paul Correia, FSA, MAAA

Milliman

Table of Contents

Introduction

Milliman, Inc. ("Milliman") was engaged by the University of Baltimore to perform an actuarial analysis of the Family and Medical Leave Insurance (FAMLI) program in the state of Maryland. This analysis included the following components:

- Researching FAMLI benefits and provisions from the State of Maryland Senate Bill 275 (Chapter 48) which establishes the FMLI program and the FAMLI Fund.
- Estimating FAMLI claim costs and the initial required contribution rate for benefits provided through the FAMLI Fund.
- Estimating the cost to the State of Maryland for paying the employer contributions for Community Providers[1] and the employee contributions for employees who earn less than $15 an hour.
- Projecting FAMLI cash flows using Maryland demographic data provided to Milliman by the University of Baltimore.
- Researching the expenses related to administering paid family and medical leave benefits through a designated fund in other states, including start-up and ongoing expenses, as well as commenting on differences between self-administering benefits and outsourcing administration to a third-party administrator (TPA).

Data Reliance

In performing the analysis, Milliman relied on information provided by the University of Baltimore, as well as public information from various sources. Milliman did not audit or independently verify any of the information furnished, except that we did review the data for reasonableness and consistency. To the extent that any of the data or other information supplied to us was incorrect or inaccurate, the results of our analysis could be materially affected.

Distribution

Milliman's work is prepared solely for the use and benefit of the University of Baltimore, under the terms and conditions of the agreement signed between Milliman and the University of Baltimore on September 3, 2022. Milliman recognizes that this report may be public records subject to disclosure to third parties. Milliman does not intend to benefit and assumes no duty or liability to any third-party recipients of the report. To the extent that this report is not subject to disclosure under applicable public records laws, the University of Baltimore shall not disclose Milliman's work to any third parties without our prior written consent.

[1] Community–based agencies or programs funded by the Behavioral Health Administration, the Developmental Disabilities Administration, or the Medical Care Programs Administration to serve individuals with mental disorders, substance–related disorders, or a combination of those disorders or developmental disabilities.

Variability of Results

The projections contained herein are estimates based on carefully constructed assumptions and methodologies that have been described in this report. Actual experience, however, will differ from those assumptions. As such, actual results will vary from the estimates provided and the cost of benefits provided under the FAMLI program may be either higher or lower than the amounts illustrated in this report. In preparing this information, we have utilized actuarial models as defined by Actuarial Standards of Practice. The intended purpose of these models is to project future claim costs for paid family and medical leave benefits.

Qualifications

I, Paul Correia, am a consulting actuary for Milliman, Inc. and a member of the American Academy of Actuaries. I meet the qualification standards of these organizations for rendering the actuarial opinions contained herein.

Maryland FAMLI Program Design

The Maryland FAMLI program will provide benefits to employees in Maryland who take leaves of absence from work for family or medical reasons. The program was established in 2022 through Maryland Senate Bill 275 (Chapter 48) and includes the following benefits and provisions:

- **Contribution Begin Date**: October 1, 2023
- **Benefit Begin Date**: January 1, 2025
- **Eligibility**: All public and private employees who worked 680 hours or more during the 12-month period preceding the leave of absence date will be eligible for FAMLI benefits. Self-employed workers can opt into the program.
- **Permissible Leaves of Absence**: FAMLI covers leaves of absence taken for the following reasons:
    1. To care for a child during the first year after the child's birth or after the placement of the child through foster care, kinship care, or adoption;
    2. To care for a family member with a serious health condition;
    3. Because the covered individual has a serious health condition that results in the covered individual being unable to perform the functions of the covered individual's position;
    4. To care for a service member who is the covered individual's next of kin; or
    5. Because the covered individual has a qualifying exigency arising out of the deployment of a service member who is a family member of the covered individual.
- **Income Replacement**: FAMLI benefits replace 90% of the covered employee's average weekly wage up to an amount equal to 65% of the state average weekly wage, plus 50% of the covered employee's average weekly wage above an amount equal to 65% of the state average weekly wage.
- **Minimum Weekly Benefit Amount**: $50
- **Maximum Weekly Benefit Amount**: $1,000 for 2025, adjusted annually by The Secretary based on changes in the Consumer Price Index.
- **Maximum Benefit Period**: Generally speaking, employees can take 12 weeks of leave in a 12-month period. Employees who take leave for bonding with a new child or for their own serious health condition within a 12-month period will be eligible for an additional 12 weeks of FAMLI benefits, up to a combined total of 24 weeks in these cases.
- **Waiting Period**: None
- **Definition of Family Member**: The definition of "Family Member" includes a worker's spouse, siblings (including biological, adopted, fostered, and step siblings), children (including biological, adopted, fostered, or step children), parents (including a spouse's parents), legal guardians, grandparents (including biological, adopted, fostered, and step grandparents), and grandchildren (including biological, adopted, fostered, and step grandchildren).

Illustrative Contribution Rates

We developed illustrative contribution rates for the FAMLI program based on estimated claim costs and taxable wages of covered employees during the program's initial phase-in period. We assumed that FAMLI contributions will begin on October 1, 2023 and that benefits will begin on January 1, 2025. We estimated claim costs based on the benefits and provisions from Senate Bill 275 (Chapter 48), and on morbidity assumptions developed by Milliman from historical paid family and medical leave claim experience in other states. We calculated FAMLI contribution rates for employers and employees based on the assumed taxable wages of eligible employees, and the cost sharing formulas included in Senate Bill 275 (Chapter 48) that range between (1) 75% employer-paid and 25% employee-paid and (2) 25% employer-paid and 75% employee-paid. The following table contains our estimated initial FAMLI contribution rates for the different cost sharing options:

Table 1
Illustrative Initial FAMLI Contribution Rates as a Percentage of Taxable Wages
Taxable Wages: Up to the Social Security Maximum Wage Limit

Cost Sharing Percentage		Contribution Rate		
Employer	**Employee**	**Employer**	**Employee**	**Total***
25%	75%	0.22%	0.66%	0.88%
33%	67%	0.29%	0.60%	0.89%
50%	50%	0.46%	0.46%	0.91%
67%	33%	0.63%	0.31%	0.93%
75%	25%	0.71%	0.24%	0.94%

* The rates in the Total column may not equal the sum of the rates in the Employer and Employee columns due to rounding.

The total contribution rates in the final column of Table 1 increase as the employer share of costs increases because of the FAMLI small business exemptions, which exempt employers with fewer than 15 employees from paying the employer portion of FAMLI contributions. In other words, the value of the small business exemption is greater when the employer cost sharing percentage is higher; therefore, a higher contribution rate is necessary to subsidize these exemptions.

Senate Bill 275 (Chapter 48) does not specify a premium formula or target fund balance for the FAMLI program. The legislation includes a provision for setting contribution rates every two years based on "a cost analysis of the program that is focused on the cost of maintaining solvency and paying benefits to covered individuals". We developed the illustrative contribution rates in Table 1 for the program's initial phase-in by targeting a FAMLI Fund balance in the range of 120% to 130% of expected expenditure for benefits and administration in the first two claim years (i.e., 2025 and 2026). This approach seems reasonable for a new program, and is similar to the manner in which other states with new programs set contribution rates[2]. For example, in Massachusetts (where paid family and medical leave benefits began in 2021), the contribution rates are determined annually based on a target fund level no less than 140% of the previous year's total expenditure. Other states with more tenured programs have lower target fund balances. For example, in

[2] The section called "Funding Policies in Other States with PFML Programs" in this report includes additional detail on the funding policies in other states that have paid family and medical leave programs.

California, the target fund balance is in the range of 25% to 50% of the previous year's total expenditure. A higher initial target seems reasonable for new programs because there is uncertainty around utilization and claim costs when benefits first begin. In addition, we have observed claim incidence rates grade up gradually in the initial years for new programs in other states, and it may make sense to set a higher target in the initial years to mitigate the risk of underestimating the ultimate claim experience of the program. Over time, as experience emerges, it may make sense to reduce the target fund balance because there is less uncertainty as claim experience stabilizes.

The illustrative contribution rates in Table 1 assume $60 million in start-up expenses. This assumption is based on a high-level analysis of start-up expenses in other states that have implemented paid family and medical leave programs. We understand that actual start-up expenses for the Maryland FAMLI program will depend on several factors, including existing resources, staffing objectives, and administrative practices. We also assumed ongoing administrative expenses equal to 5% of total contributions for family claims and 8% of total contributions for medical claims, based on typical expense ratios observed in other states that provide benefits through a state fund. If the expected start-up or ongoing expenses are significantly higher or lower than these assumptions, the contribution rates in Table 1 may need to be adjusted. Additional details on expenses are provided in the section "Administration and Expenses" of this report.

State Subsidies

According to Senate Bill 275 (Chapter 48), the State may pay the employer contribution for employers that are Community Providers[3], and the employee contribution for employees who earn less than $15 per hour[4].

Community Providers

Community Providers include community–based agencies or programs funded by the Behavioral Health Administration, the Developmental Disabilities Administration, or the Medical Care Programs Administration to serve individuals with mental disorders, substance–related disorders, or a combination of those disorders or developmental disabilities. We have estimated the cost to the State for paying the required contribution for employers that are Community Providers based on the illustrative contribution rates from Table 1, and on the assumed taxable wages of Community Providers. We estimated these costs between October 1, 2023 through December 31, 2027, as shown below:

Table 2
Estimated Costs to the State for Paying the Required Contribution
For Employers that are Community Providers

Employer Share of Costs	Employer Contribution Rate*	Estimated Contributions Paid by The State ($ million)			
		10/2023 – 12/2024	2025	2026	2027
25%	0.22%	$19.9	$16.8	$17.6	$18.3
33%	0.29%	$26.5	$22.4	$23.4	$24.5
50%	0.46%	$41.1	$34.7	$36.4	$37.9
67%	0.63%	$56.4	$47.7	$49.9	$52.1
75%	0.71%	$63.9	$54.0	$56.5	$59.0

* The employer contribution rates are the same as in Table 1. The corresponding employee and total contribution rates would also be the same as Table 1, although they are not shown above.

The estimated costs in Table 2 are highest during the period 10/2023 – 12/2024 (when FAMLI contributions will be collected before benefits begin in 2025) because they include 15 months of contributions, whereas the estimates from 2025 through 2027 include 12 months of contributions in every year. The estimated costs are increasing from 2025 through 2027 due to assumed growth in taxable wages. We assumed the following taxable wages for Community Providers based on the 2022 taxable wage data provided to

[3] 8.3-1001.SECTION 7. AND BE IT FURTHER ENACTED, That it is the intent of the General Assembly that the State pay the required contribution under § 8.3–601 of the Labor and Employment Article, as enacted by Section 1 of this Act, to the Family and Medical Leave Insurance Fund established under § 8.3–501 of the Labor and Employment Article, as enacted by Section 1 of this Act, for employers that are community providers that are community–based agencies or programs funded by the Behavioral Health Administration, the Developmental Disabilities Administration, or the Medical Care Programs Administration to serve individuals with mental disorders, substance–related disorders, or a combination of those disorders or developmental disabilities.

[4] 8.3-1001.SECTION 8. AND BE IT FURTHER ENACTED, That, if a covered employee makes an hourly wage that is less than $15.00 an hour, it is the intent of the General Assembly that the State pay the covered employee's required contribution under § 8.3–601 of the Labor and Employment Article, as enacted by Section 1 of this Act, to the Family and Medical Leave Insurance Fund established under § 8.3–501 of the Labor and Employment Article, as enacted by Section 1 of this Act.

8.3-1001.SECTION 9. AND BE IT FURTHER ENACTED, That Section 8 of this Act shall remain effective for a period of 3 years and 6 months and, at the end of June 30, 2026, Section 5 6 8 of this Act, with no further action required by the General Assembly, shall be abrogated and of no further force and effect.

Milliman by the University of Baltimore, and employment and wage growth forecasts from the Social Security Administration and the US Department of Labor, respectively[5].

Table 3 Assumed Taxable Wages for Community Providers	
Calendar Period	**Taxable Wages ($ million)**
10/2023 – 12/2024	$9,050.5
2025	$7,645.3
2026	$7,983.1
2027	$8,327.9

Employees Who Earn Less Than $15 an Hour

We estimated the costs to the State to pay the employee contribution for employees who earn less than $15 an hour between October 1, 2023 and June 30, 2026, using hourly wage data provided to Milliman by the University of Baltimore. These estimated costs are shown below for the different cost sharing options:

Table 4 Estimated Costs to the State for Paying the Employee Contribution For Employees Who Earn Less Than $15 an Hour				
Employee Share of Costs	**Employee Contribution Rate***	**Estimated Contributions Paid by The State** ($ million)		
		10/2023 – 12/2024	**1/2025 – 12/2025**	**1/2026 – 6/2026**
25%	0.24%	$8.6	$5.7	$1.8
33%	0.31%	$11.2	$7.4	$2.3
50%	0.46%	$16.5	$10.9	$3.4
67%	0.60%	$21.6	$14.3	$4.5
75%	0.66%	$24.0	$15.8	$4.9

* The employee contribution rates are the same as in Table 1. The corresponding employer and total contribution rates would also be the same as Table 1, although they are not shown above.

The estimated costs in Table 4 are highest in the initial period (i.e., 10/2023 – 12/2024), in part, because the period includes 15 months of contributions whereas the other periods include 12 months (i.e., 1/2025 – 12/2025) and six months (i.e., 1/2026 – 6/2026). In addition, we assumed that the number of employees who earn less than $15 an hour will decrease over time due to wage growth assumed during the projection period. Similarly, the estimated costs are lowest in the final period because they include only six months of contributions, and because we assumed that the number of employees who earn less than $15 an hour is decreasing over time. The following table shows the number of employees assumed to earn less than $15 an hour between October 1, 2023 and June 30, 2026 along with the assumed taxable wages of these

[5] The estimated costs in Table 2 do not exactly equal the product of the contribution rates from Table 2 and the taxable wages from Table 3 due to rounding.

employees. The projections were developed from Maryland wage data from 2022 provided to Milliman by the University of Baltimore:

Table 5
Assumed Number of Employees and Taxable Wages for Employees who Earn Less Than $15 an Hour

Calendar Period	Number of Employees	Taxable Wages ($ million)
10/2023 – 12/2023	141,472	$852.8
1/2024 – 12/2024	114,878	$2,776.5
1/2025 – 12/2025	98,129	$2,396.5
1/2026 – 6/2026	64,449	$748.1

Financial Projections

This section contains financial projections for the Maryland FAMLI program from October 1, 2023 through December 31, 2027, for the different cost sharing options. In the projections, we have assumed that all employers will provide benefits through the FAMLI Fund. We understand that employers will have the option to provide FAMLI benefits through private insurance options, although we do not have sufficient detail on how these options will be structured to estimate the proportion of employers that may elect these options. Participation in private insurance options depends, in large part, on the way these options are structured and coordinated with the state program. In some states, such as Washington and California, employer participation in private insurance options is low (approximately 3% for Washington[6] and 4% for California[7]), whereas other states have much higher participation rates such as New York where most employees are covered through private options. For us to develop additional scenarios that assume employer participation in private insurance options, we would need additional information on the structure of private options.

The following items are included in the projections on pages 13 through 17:

- **Eligible Employees** – Projection of eligible employees based on Maryland employment data from 2022 provided to Milliman by the University of Baltimore, adjusted for expected job growth based on employment forecasts from the Social Security Administration. We did not assume any aging of the population over the projection period.

- **Taxable Wages** – Projection of taxable wages based on the Social Security maximum taxable wage limit. The projection was developed using Maryland wage data from 2022 provided to Milliman by the University of Baltimore, projected based on employment and wage growth forecasts from the Social Security Administration and the US Department of Labor, respectively.

- **Claims** – Projection of the number of claims approved for benefits between 2025 and 2027, for family leave, medical leave, and in total. The projection assumes that employees with newborn or newly adopted or fostered children in 2024 will be eligible for FAMLI benefits in 2025 to care for these children, consistent with FAMLI benefits defined in Senate Bill 275 (Chapter 48). The projection also assumes that claim incidence rates will increase gradually during the initial years as the program phases in and employee awareness increases. This dynamic has been observed in other states that have recently adopted paid family and medical programs[8].

- **Benefit Payments ($ millions)** – Projection of benefit payments between 2025 and 2027 for family leave, medical leave, and in total. The benefit payments are higher in 2025 than 2026 because we assumed additional claims in the first year related to caring for children who are born, fostered, or

[6] Washington Paid Family and Medical Leave Annual Report, Washington Employment Security Department, December 2021

[7] October 2021 Disability Insurance (DI) Fund Forecast, State of California Employment Development Department

[8] e.g., Washington Paid Family and Medical Leave Employment Security Department Advisory Committee Meeting, January 26, 2022

adopted in 2024, and would be eligible for bonding leave according to Senate Bill 275 (Chapter 48)[9].

- **Expenses ($ millions)** – Projection of start-up and ongoing administrative expenses for the FAMLI program. The $60 million start-up expense is a high-level assumption based on the start-up expenses in other states and may need to be revised depending on the expected start-up costs for the Maryland FAMLI program. The ongoing expenses in 2025 and beyond represent 5% of paid family leave costs and 8% of paid medical leave costs in every year, which are based on average ongoing expenses reported in other states with similar programs.

- **Total Expenditure ($ millions)** – Projection of total costs for family leave, medical leave, and in total. The total expenditure is the sum of benefit payments and administrative expenses in every year.

- **Contribution Rate** – Illustrative contribution rates that cover benefit payments and administration, and maintain a FAMLI Fund balance in the range of 120% to 130% of total expenditure in 2025 and 2026. The contribution rates in the projections are the same as the contribution rates included in Table 1. We understand that the FAMLI contribution rate will be revised every two years based on emerging experience. For illustrative purposes, the projections assume the same contribution rate from October 31, 2023 through December 31, 2027.

- **Contributions** (**$ millions**) – Projection of FAMLI contributions based on the illustrative contribution rates and the assumed taxable wages, beginning on October 1, 2023. The contributions assume that employers with fewer than 15 employees will be exempt from paying the employer contribution. The contributions are shown for employers, employees, the State (for paying the employer portion for Community Providers and the employee portion for employees who earn less than $15 an hour), and in total.

- **Fund Balance ($ millions**) – Projection of FAMLI Fund balances equal to the contributions in a given year, minus total expenditure in that year, plus the assumed investment income on fund balances in that year. We have assumed 1.0% annual investment income based on typical yields for short duration assets. This assumption may need to be revised if different returns are expected from the assets held in the FAMLI Fund.

The financial projections shown below depend on a variety of actuarial assumptions about future experience, including but not limited to employment and wage growth, FAMLI claim experience, expenses, and investment income. It is nearly certain that actual experience will vary from these assumptions, meaning that the program's actual fund balance will be higher or lower than the illustrated values.

[9] 8.3-302.(1) To care for a child during the first year after the child's birth or after the placement of the child through foster care, kinship care, or adoption

Projection 1

Cost Sharing Method: 25% Employer and 75% Employee

	10/2023 - 12/2024	2025	2026	2027
Eligible Employees		2,611,643	2,624,701	2,637,825
Taxable Wages ($ millions)				
Small Business Excluding Community Providers	$28,499.4	$24,074.4	$25,138.4	$26,224.1
Community Providers	$9,050.5	$7,645.3	$7,983.1	$8,327.9
All Others	$179,514.2	$151,641.9	$158,528.0	$165,567.5
Total	**$217,064.1**	**$183,361.6**	**$191,649.6**	**$200,119.5**
Claims				
Family		66,025	50,671	53,471
Medical		121,430	128,139	135,219
Total		**187,455**	**178,810**	**188,689**
Benefit Payments ($ millions)				
Family		$506.0	$404.3	$443.7
Medical		$917.8	$1,008.2	$1,106.5
Total		**$1,423.8**	**$1,412.5**	**$1,550.1**
Expenses ($ millions)				
Family		$26.6	$21.3	$23.4
Medical		$79.8	$87.7	$96.2
Total	**$60.0**	**$106.4**	**$108.9**	**$119.6**
Total Expenditure ($ millions)				
Family		$532.6	$425.5	$467.0
Medical		$997.6	$1,095.9	$1,202.7
Total	**$60.0**	**$1,530.2**	**$1,521.4**	**$1,669.7**
Contribution Rate				
Employer	0.22%	0.22%	0.22%	0.22%
Employee	0.66%	0.66%	0.66%	0.66%
Contributions ($ millions)				
Community Providers - Employer Portion Paid by State	$19.9	$16.8	$17.5	$18.3
All Other Employers	$395.0	$333.7	$348.8	$364.3
Employees with Wages < $15/hour Paid by State	$24.0	$15.8	$4.9	$0.0
All Other Employees	$1,408.9	$1,194.6	$1,260.2	$1,321.0
Total	**$1,847.8**	**$1,560.9**	**$1,631.5**	**$1,703.6**
Investment Income ($ millions)	$17.9	$18.4	$19.6	$20.2
Fund Balance	$1,787.8	$1,836.3	$1,964.7	$2,018.3
Fund Balance % of Total Expenditure		120%	129%	121%
Fund Balance % Prior Year Expenditure			128%	133%

Projection 2

Cost Sharing Method: 33% Employer and 67% Employee

	10/2023 - 12/2024	2025	2026	2027
Eligible Employees		2,611,643	2,624,701	2,637,825
Taxable Wages ($ millions)				
Small Business Excluding Community Providers	$28,499.4	$24,074.4	$25,138.4	$26,224.1
Community Providers	$9,050.5	$7,645.3	$7,983.1	$8,327.9
All Others	$179,514.2	$151,641.9	$158,528.0	$165,567.5
Total	**$217,064.1**	**$183,361.6**	**$191,649.6**	**$200,119.5**
Claims				
Family		66,025	50,671	53,471
Medical		121,430	128,139	135,219
Total		**187,455**	**178,810**	**188,689**
Benefit Payments ($ millions)				
Family		$506.0	$404.3	$443.7
Medical		$917.8	$1,008.2	$1,106.5
Total		**$1,423.8**	**$1,412.5**	**$1,550.1**
Expenses ($ millions)				
Family		$26.6	$21.3	$23.4
Medical		$79.8	$87.7	$96.2
Total	**$60.0**	**$106.4**	**$108.9**	**$119.6**
Total Expenditure ($ millions)				
Family		$532.6	$425.5	$467.0
Medical		$997.6	$1,095.9	$1,202.7
Total	**$60.0**	**$1,530.2**	**$1,521.4**	**$1,669.7**
Contribution Rate				
Employer	0.29%	0.29%	0.29%	0.29%
Employee	0.60%	0.60%	0.60%	0.60%
Contributions ($ millions)				
Community Providers - Employer Portion Paid by State	$26.5	$22.4	$23.4	$24.4
All Other Employers	$527.1	$445.3	$465.5	$486.2
Employees with Wages < $15/hour Paid by State	$21.6	$14.3	$4.5	$0.0
All Other Employees	$1,272.5	$1,078.9	$1,138.1	$1,193.1
Total	**$1,847.8**	**$1,560.9**	**$1,631.5**	**$1,703.7**
Investment Income ($ millions)	$17.9	$18.4	$19.6	$20.2
Fund Balance	$1,787.8	$1,836.3	$1,964.7	$2,018.4
Fund Balance % of Total Expenditure		120%	129%	121%
Fund Balance % Prior Year Expenditure			128%	133%

Projection 3

Cost Sharing Method: 50% Employer and 50% Employee

	10/2023 - 12/2024	2025	2026	2027
Eligible Employees		2,611,643	2,624,701	2,637,825
Taxable Wages ($ millions)				
Small Business Excluding Community Providers	$28,499.4	$24,074.4	$25,138.4	$26,224.1
Community Providers	$9,050.5	$7,645.3	$7,983.1	$8,327.9
All Others	$179,514.2	$151,641.9	$158,528.0	$165,567.5
Total	**$217,064.1**	**$183,361.6**	**$191,649.6**	**$200,119.5**
Claims				
Family		66,025	50,671	53,471
Medical		121,430	128,139	135,219
Total		**187,455**	**178,810**	**188,689**
Benefit Payments ($ millions)				
Family		$506.0	$404.3	$443.7
Medical		$917.8	$1,008.2	$1,106.5
Total		**$1,423.8**	**$1,412.5**	**$1,550.1**
Expenses ($ millions)				
Family		$26.6	$21.3	$23.4
Medical		$79.8	$87.7	$96.2
Total	**$60.0**	**$106.4**	**$108.9**	**$119.6**
Total Expenditure ($ millions)				
Family		$532.6	$425.5	$467.0
Medical		$997.6	$1,095.9	$1,202.7
Total	**$60.0**	**$1,530.2**	**$1,521.4**	**$1,669.7**
Contribution Rate				
Employer	0.46%	0.46%	0.46%	0.46%
Employee	0.46%	0.46%	0.46%	0.46%
Contributions ($ millions)				
Community Providers - Employer Portion Paid by State	$41.1	$34.7	$36.3	$37.8
All Other Employers	$817.8	$690.8	$722.2	$754.3
Employees with Wages < $15/hour Paid by State	$16.5	$10.9	$3.4	$0.0
All Other Employees	$972.3	$824.4	$869.7	$911.7
Total	**$1,847.8**	**$1,560.9**	**$1,631.5**	**$1,703.8**
Investment Income ($ millions)	$17.9	$18.4	$19.6	$20.2
Fund Balance	$1,787.8	$1,836.3	$1,964.8	$2,018.5
Fund Balance % of Total Expenditure		120%	129%	121%
Fund Balance % Prior Year Expenditure			128%	133%

Projection 4

Cost Sharing Method: 67% Employer and 33% Employee

	10/2023 - 12/2024	2025	2026	2027
Eligible Employees		2,611,643	2,624,701	2,637,825
Taxable Wages ($ millions)				
Small Business Excluding Community Providers	$28,499.4	$24,074.4	$25,138.4	$26,224.1
Community Providers	$9,050.5	$7,645.3	$7,983.1	$8,327.9
All Others	$179,514.2	$151,641.9	$158,528.0	$165,567.5
Total	**$217,064.1**	**$183,361.6**	**$191,649.6**	**$200,119.5**
Claims				
Family		66,025	50,671	53,471
Medical		121,430	128,139	135,219
Total		**187,455**	**178,810**	**188,689**
Benefit Payments ($ millions)				
Family		$506.0	$404.3	$443.7
Medical		$917.8	$1,008.2	$1,106.5
Total		**$1,423.8**	**$1,412.5**	**$1,550.1**
Expenses ($ millions)				
Family		$26.6	$21.3	$23.4
Medical		$79.8	$87.7	$96.2
Total	**$60.0**	**$106.4**	**$108.9**	**$119.6**
Total Expenditure ($ millions)				
Family		$532.6	$425.5	$467.0
Medical		$997.6	$1,095.9	$1,202.7
Total	**$60.0**	**$1,530.2**	**$1,521.4**	**$1,669.7**
Contribution Rate				
Employer	0.63%	0.63%	0.63%	0.63%
Employee	0.31%	0.31%	0.31%	0.31%
Contributions ($ millions)				
Community Providers - Employer Portion Paid by State	$56.4	$47.7	$49.8	$51.9
All Other Employers	$1,122.7	$948.4	$991.4	$1,035.5
Employees with Wages < $15/hour Paid by State	$11.2	$7.4	$2.3	$0.0
All Other Employees	$657.4	$557.4	$588.0	$616.4
Total	**$1,847.8**	**$1,560.9**	**$1,631.6**	**$1,703.8**
Investment Income ($ millions)	$17.9	$18.4	$19.6	$20.2
Fund Balance	$1,787.8	$1,836.3	$1,964.8	$2,018.6
Fund Balance % of Total Expenditure		120%	129%	121%
Fund Balance % Prior Year Expenditure			128%	133%

Projection 5

Cost Sharing Method: 75% Employer and 25% Employee

	10/2023 - 12/2024	2025	2026	2027
Eligible Employees		2,611,643	2,624,701	2,637,825
Taxable Wages ($ millions)				
Small Business Excluding Community Providers	$28,499.4	$24,074.4	$25,138.4	$26,224.1
Community Providers	$9,050.5	$7,645.3	$7,983.1	$8,327.9
All Others	$179,514.2	$151,641.9	$158,528.0	$165,567.5
Total	**$217,064.1**	**$183,361.6**	**$191,649.6**	**$200,119.5**
Claims				
Family		66,025	50,671	53,471
Medical		121,430	128,139	135,219
Total		**187,455**	**178,810**	**188,689**
Benefit Payments ($ millions)				
Family		$506.0	$404.3	$443.7
Medical		$917.8	$1,008.2	$1,106.5
Total		**$1,423.8**	**$1,412.5**	**$1,550.1**
Expenses ($ millions)				
Family		$26.6	$21.3	$23.4
Medical		$79.8	$87.7	$96.2
Total	**$60.0**	**$106.4**	**$108.9**	**$119.6**
Total Expenditure ($ millions)				
Family		$532.6	$425.5	$467.0
Medical		$997.6	$1,095.9	$1,202.7
Total	**$60.0**	**$1,530.2**	**$1,521.4**	**$1,669.7**
Contribution Rate				
Employer	0.71%	0.71%	0.71%	0.71%
Employee	0.24%	0.24%	0.24%	0.24%
Contributions ($ millions)				
Community Providers - Employer Portion Paid by Sta	$63.9	$54.0	$56.4	$58.8
All Other Employers	$1,271.4	$1,074.0	$1,122.8	$1,172.6
Employees with Wages < $15/hour Paid by State	$8.6	$5.7	$1.8	$0.0
All Other Employees	$503.9	$427.2	$450.7	$472.4
Total	**$1,847.8**	**$1,560.9**	**$1,631.6**	**$1,703.9**
Investment Income ($ millions)	$17.9	$18.4	$19.6	$20.2
Fund Balance	$1,787.8	$1,836.3	$1,964.8	$2,018.7
Fund Balance % of Total Expenditure		120%	129%	121%
Fund Balance % Prior Year Expenditure			128%	133%

Administration and Expenses

Employers in Maryland will be able to provide FAMLI benefits through the FAMLI Fund or through private insurance options. It is our understanding that benefits provided through the FAMLI Fund will be administered either by the State or by a third-party administrator (TPA), based on the provision in Senate Bill 275 (Chapter 48) that specifies that every two years, beginning in 2025, the Secretary shall conduct an analysis of the "cost efficiency and benefits of the Department issuing a request for proposals seeking the services of an outside contractor for premium collection, claims administration, data management, fraud control, marketing and advertising, or implementing any other elements of the program[10]." Although most states self-administer paid family and medical leave benefits provided through the state fund, Connecticut entered into an agreement with Aflac for administering Connecticut Family and Medical Leave Insurance claims. This agreement was the result of a competitive request for proposals process, in which Aflac was selected based on the evaluation criteria established by the state, which is not publicly available. The state of Connecticut agreed to pay Aflac $72 million[11] in TPA fees over three years for administering claims. According to this agreement, Aflac only assumes claim management duties and does not assume any other administrative tasks, such as premium collection and communications. It is important to note that in these types of outsourcing arrangements, the TPA does not bear the insurance risk (i.e., the chance that benefits will exceed contributions) because this risk is assumed by the State.

If the FAMLI program is self-administered, then the administrative expenses may vary depending on several factors including staffing, infrastructure, claim volumes, and administrative practices. We have researched administrative expenses in other states that have mandated paid family and medical leave benefits, as shown in Table 6 below. The expense ratio in the final row of Table 6 represents the cost of administration as a percentage of total contributions. The state programs included in Table 6 have been effective for many years; therefore, we view the expense ratios as ongoing expenses that do not include start-up costs.

Table 6
Paid Family and Medical Leave Expense Ratios
California, New Jersey, and Rhode Island

Financial Component	California[12] (2020)	New Jersey[13] (2019)	Rhode Island[14] (2021)
A. Contributions ($ millions)	$7,596.3	$510.5	$239.0
B. Administrative Expenses ($ millions)	$383.8	$32.9	$12.6
C. Expense Ratio	**5.1%**	**6.4%**	**5.3%**

We also researched administrative expenses from the Washington Paid Family and Medical Leave program, a more recent program where contributions began on October 1, 2019 and benefits began on January 1, 2020, as shown below in Table 7:

[10] Section 8.3-601-C(III)

[11] Press Release from The Office of The Governor Ned Lamont, July 29, 2021

[12] October 2021 Disability Insurance (DI) Fund Forecast, State of California Employment Development Department, Table 1, page 5

[13] Annual Report for 2019 Family Leave Insurance and Temporary Disability Insurance Programs, New Jersey Department of Labor and Workforce Development, Tables 5 and 9, pages 15 and 19

[14] Statistical & Fiscal Digest 2021, Rhode Island Department of Labor and Training, page 13

Table 7[15]
Washington PFML Expense Ratios

Quarter	Contributions ($ millions)	Operating Expenses ($ millions)	Expense Ratio
2Q 2019	$72.0	$10.2	14.2%
3Q 2019	$193.4	$7.3	3.8%
4Q 2019	$162.2	$10.3	6.4%
1Q 2020	$173.3	$13.2	7.6%
2Q 2020	$181.4	$19.9	11.0%
3Q 2020	$166.2	$10.8	6.5%
4Q 2020	$157.2	$10.6	6.7%
1Q 2021	$149.2	$10.3	6.9%
2Q 2021	$188.3	$11.8	6.3%
3Q 2021	$191.2	$8.3	4.3%
4Q 2021	$172.1	$11.2	6.5%
1Q 2022	$170.4	$13.9	8.2%

In Table 7, the expenses in 2019 include start-up costs, because benefits only began in 2020. The average expense ratio for calendar year 2021 was 5.9%, which we consider to be ongoing expenses that do not include start-up costs. The expense ratio increased to 8.2% in 1Q 2022 due, in part, to recent enhancements to administration which included additional staff to support claim management. The Washington PFML contribution rate is expected to increase in 2023, which might lead to average ongoing expense ratios closer to the 5-6% observed in other states.

In our analysis of Maryland FAMLI costs, we assumed ongoing expenses equal to 5% of total contributions for family leaves and 8% of total contributions for medical leaves. Generally speaking, the unit expenses related to medical claim administration tend to be higher than those related to family claim administration because medical claim administration includes initial and ongoing medical reviews that do not apply in the administration of family leave claims.

We also researched start-up costs in other states that have implemented paid family and medical leave programs. The start-up costs reported for the Washington Paid Family and Medical Leave program were equal to $63.2 million[16], and the expected start-up costs reported for the Colorado Family and Medical Insurance program are equal to $51.8 million[17]. In our analysis of Maryland FAMLI costs and funding requirements, we assumed $60 million in start-up costs. We understand that actual start-up costs for the Maryland FAMLI program will depend on several factors, including existing resources, staffing objectives, and administrative practices. If the actual start-up expenses are expected to be significantly higher or lower than $60 million, then the illustrative contribution rates may need to be adjusted.

[15] Advisory Committee Meeting, May 19, 2022, Washington Employment Security Department, slide 8

[16] Preliminary Lessons from Implementing Paid Family & Medical Leave in Washington, Economic Opportunity Institute, 2020

[17] Proposition 118: Paid Family and Medical Leave Insurance Program, page 8

Funding Policies in Other States with PFML Programs

The funding policies in other states with paid family and medical leave programs are summarized below:

California (Medical 1946 / Family 2004)[18]

- Target fund balance in the range of 25% to 50% of previous year's disbursements.
- Contribution rate formula: (145% of Previous Year Disbursements minus Fund Balance) divided by Taxable Wages.
- Contribution rate is capped at 1.5% of taxable wages.
- Rate reductions capped at 0.2%.
- Rates can be adjusted by +/- 0.1% if deemed necessary to maintain funding objectives.

New York (Medical 1949 / Family 2018)[19]

- Minimum fund balance of $12 million.
- Employee contribution rate for disability insurance is 0.5% of wages up to $0.60 per week.
- State sets PFL contribution rate annually based on historical experience and "sound actuarial principles".

New Jersey (Medical 1948 / Family 2009)[20]

- If the account designated to paying disability benefits is in deficit of $200,000 or more as of December 31st, the Division can assess a charge to employers for covering the deficit.

Washington (2020)[21]

- Contribution rates are determined annually based on the fund balance ratio as of September 30th of the previous year.
- The rates range from 0.1% to 0.6% depending on the fund balance ratio. The 2022 rate is 0.6%.
- A solvency surcharge is assessed in years when fund ratio is too low
- A solvency surcharge of 0.2% was assessed in 2022, bringing the contribution rate up to 0.8% for 2023.

Massachusetts (2021)[22]

- State sets PFML contribution rate annually based on historical experience and a target fund level of no less than 140% of the previous fiscal year's expenditure for benefits and administration.

[18] Overview of California's Paid Family Leave Program, State of California Employment Development Department, 2022

[19] New York Workers' Compensation Law, Article 9 Disability Benefits, Sections 209 and 214

[20] New Jersey Temporary Disability Benefits Law, Section 43 :21-46. State disability benefits fund

[21] Washington Legislation RCW 50A.10.030 Premiums-Solvency surcharge-Limitation on local regulation

[22] Massachusetts Laws c.175M Section 7, Family and Employment Security Trust Fund

Appendix A: Data and Assumptions

Maryland employment data was provided to Milliman by the University of Baltimore and was used to develop the assumptions for participating employees and taxable wages. The data included a distribution of employees and annual wages by age and gender. It did not include detail on the number of employees that worked fewer than 680 hours in the last four quarters; therefore, we did not make an adjustment for the FAMLI eligibility threshold in Senate Bill 275 (Chapter 48). The data is from 2022 and we assumed that the number of employees will increase by 1.5% between 2022 and 2025, and that total wages will increase by 13.8% between 2022 and 2025 based on employment and wage growth forecasts from the US Department of Labor[23] and the Social Security Administration[24], respectively. The following table shows the number of employees and the average wages assumed in 2025. Since we did not have individual employee data, we computed the average wages based on the number of employees and total employee wages for every age / gender segment.

Table A.1
Assumed Number of Eligible Employees and Average Monthly Wages in 2025

Age Band	Employees		Average Monthly Wages	
	Female	Male	Female	Male
< 25	133,262	122,224	$2,392	$3,037
25 - 34	266,334	265,324	$4,881	$6,235
35 - 44	282,781	280,328	$6,262	$8,635
45 - 54	280,564	269,952	$6,733	$10,119
55 - 64	254,683	249,581	$6,265	$9,917
65 +	98,675	107,935	$4,829	$7,687

Table A.2 shows the average weekly benefit amounts assumed in 2025. We used the average wages in Table A.1 above along with the FAMLI benefit formula from Senate Bill 275 (Chapter 48) to compute the average weekly benefit amounts shown below. The average weekly benefit amount for employees with average weekly wages above $1,180 is equal to the maximum weekly benefit amount of $1,000.

Table A.2
Assumed Average Weekly Benefit Amounts in 2025

Age Band	Female	Male
< 25	$496	$630
25 - 34	$973	$1,000
35 - 44	$1,000	$1,000
45 - 54	$1,000	$1,000
55 - 64	$1,000	$1,000
65 +	$967	$1,000

[23] https://www.bls.gov/news.release/pdf/ecopro.pdf - News Release Bureau of Labor Statistics, September 8, 2022

[24] https://www.ssa.gov/oact/TR/TRassum.html - Estimates Under the 2022 Trustees Report

We developed morbidity assumptions (i.e., claim incidence rates and average claim durations) based on historical claim experience in states with existing paid family and medical leave programs, adjusted for the Maryland FAMLI benefit design. We used these assumptions to calculate expected FAMLI benefit payments in 2025 through 2027 based on the following formula:

- Expected Benefits = Number of Claims x Average Claim Duration x Average Benefit Amount

The expected claims and expected benefit payments from 2025 through 2027 are provided in Table A.3 below. The benefit payments are highest in 2025 because we assumed additional claims in the first year related to caring for children who are born, fostered, or adopted in 2024.

Table A.3
Expected FAMLI Claims and Benefit Payments

Year	Expected Claims		Expected Benefit Payments ($ million)	
	Family	Medical	Family	Medical
2025	66,025	121,430	$506.0	$917.8
2026	50,671	128,139	$404.3	$1,008.2
2027	53,471	135,219	$443.7	$1,106.5

The expected claims and benefit payments shown above assume wage growth and employment growth in Maryland between 2025 and 2027 based on national forecasts from the Social Security Administration[25] and US Department of Labor[26], respectively. Wage growth results in higher expected benefit payments, with all else equal, because FAMLI benefits replace a percentage of income up to 90%, subject to a maximum benefit amount that is adjusted annually based on changes in the Consumer Price Index. Employment growth results in a greater number of expected claims, with all else equal, and therefore higher benefit payments. The wage and employment growth assumptions used in our analysis are provided in Table A.4:

Table A.4
Wage and Employment Growth Assumptions

Year	Wage Growth	Employment Growth
2025	4.1%	0.5%
2026	4.0%	0.5%
2027	3.9%	0.5%

[25] https://www.ssa.gov/oact/TR/TRassum.html - Estimates Under the 2022 Trustees Report

[26] https://www.bls.gov/news.release/pdf/ecopro.pdf - News Release Bureau of Labor Statistics, September 8, 2022

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