



Appendix

D. Guarantee Options:
Declines in Income Replacement Ratios



NOTE: NONE OF THESE RETURNS ARE GUARANTEED FOR PARTICIPANTS. THESE ARE MERCER’S PROJECTIONS BASED ON VARIABLE ASSUMPTIONS.

A Third Party Insurance Company Provides the Guarantee

The exhibits below highlight the net reduction in account balance by looking at income replacement ratios, assuming 6% of salary contribution into the Program for various age groups and no other retirement savings before joining the Program. Appendix B provides data for income replacement ratios assuming 3% of salary contribution into the Program. The calculations below include fees to cover investment management and administrative costs in-line with the financial feasibility analysis. The fees include the cost of a guarantee (where appropriate).

EXHIBIT D.1: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH NO GUARANTEES

6% contribution	Age 25	Age 40	Age 55
Low Income	109%	67%	47%
Mid Income	105%	59%	40%
High Income	100%	49%	30%

Please see appendix B for details on the assumptions.

EXHIBIT D.2: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH PRINCIPAL AT AGE 62

6% contribution / Principal Guarantee	Age 25	Age 40	Age 55
Low Income	98%	64%	47%
Mid Income	94%	56%	40%
High Income	89%	46%	30%

Please see appendix B for details on the assumptions.

EXHIBIT D.3: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH 1% RETURN GUARANTEES AT AGE 62

6% contribution / 1% Return Guarantee	Age 25	Age 40	Age 55
Low Income	91%	62%	46%
Mid Income	87%	54%	39%
High Income	82%	44%	29%

Please see appendix B for details on the assumptions.

EXHIBIT D.4: EXPECTED INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN A TARGET DATE FUND WITH NO GUARANTEE VS. TARGET DATE FUND WITH A GUARANTEE OF PRINCIPAL)

6% contribution	Age 25	Age 40	Age 55
All income level	11%	3%	<1.0%

Please see appendix B for details on the assumptions.

EXHIBIT D.5: INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN A TARGET DATE FUND WITH NO GUARANTEE VS. TARGET DATE FUND WITH A 1% RETURN GUARANTEE)

6% contribution	Age 25	Age 40	Age 55
All income level	18%	5%	1%

Please see appendix B for details on the assumptions.



The income replacement ratio does not change significantly for participants that enter the Program at the age of 55; regardless of the assets in which they invest because their expected asset balances at retirement are fairly small compared to participants contributing at an earlier age. In all age groups, the participants have poorer outcomes from an income replacement ratio perspective compared to simply investing in an investment option without the guarantee. Moreover, the cost of insuring guarantees is not static. The State may procure insurance in a given year at one price; however, as market conditions change, the insurance might not be available or the cost may vary significantly. Communications around the guarantee costs and administration will vary over time assuming the cost of the guarantee will be passed to the participants.

Using a Stable Value Fund as an Option

The guarantee’s cost and return profile should be assessed with regard to how this option affects the expected income replacement ratio versus expectations associated with investing in an alternative approach, e.g. a target date fund. The tables below compare investment in a stable value fund to a target date fund. The income replacement of a stable value fund is significantly lower than a target date fund, except when the time horizon for investment is short.

EXHIBIT D.6: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH NO GUARANTEES)

6% contribution	Age 25	Age 40	Age 55
Low Income	109%	67%	47%
Mid Income	105%	59%	40%
High Income	100%	49%	30%

Please see appendix B for details on the assumptions.

EXHIBIT D.7: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A STABLE VALUE FUND

6% contribution	Age 25	Age 40	Age 55
Low Income	89%	62%	46%
Mid Income	85%	54%	39%
High Income	80%	44%	29%

Please see appendix B for details on the assumptions.

EXHIBIT D.8: INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN TARGET DATE FUNDS VS. STABLE VALUE FUNDS)

6% contribution	Age 25	Age 40	Age 55
All income level	20%	5%	1%

Please see appendix B for details on the assumptions.

Investing in a Conservative Portfolio

EXHIBIT D.9: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH NO GUARANTEES)

6% contribution	Age 25	Age 40	Age 55
Low Income	109%	67%	47%
Mid Income	105%	59%	40%
High Income	100%	49%	30%

Please see appendix B for details on the assumptions.



EXHIBIT D.10: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A CONSERVATIVE PORTFOLIO

6% contribution	Age 25	Age 40	Age 55
Low Income	83%	60%	46%
Mid Income	79%	52%	39%
High Income	74%	42%	29%

Please see appendix B for details on the assumptions.

EXHIBIT D.11: INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN TARGET DATE FUNDS VS. A CONSERVATIVE PORTFOLIO)

6% contribution	Age 25	Age 40	Age 55
All income level	26%	7%	1%

Please see appendix B for details on the assumptions.

Using a Money Market Fund as the Guarantee Option

EXHIBIT D.12: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A TARGET DATE FUND WITH NO GUARANTEES

6% contribution	Age 25	Age 40	Age 55
Low Income	109%	67%	47%
Mid Income	105%	59%	40%
High Income	100%	49%	30%

Please see appendix B for details on the assumptions.

EXHIBIT D.13: EXPECTED INCOME REPLACEMENT RATIO (INCLUDING SOCIAL SECURITY BENEFITS) AT 6% CONTRIBUTIONS, IF INVESTED IN A MONEY MARKET FUND PORTFOLIO

6% contribution	Age 25	Age 40	Age 55
Low Income	81%	60%	46%
Mid Income	77%	52%	39%
High Income	73%	42%	29%

Please see appendix B for details on the assumptions.

EXHIBIT D.14: INCOME REPLACEMENT RATIO COMPARISON (DIFFERENCE BETWEEN INVESTING IN TARGET DATE FUNDS VS. A CONSERVATIVE PORTFOLIO)

6% contribution	Age 25	Age 40	Age 55
All income level	28%	7%	1%

Please see appendix B for details on the assumptions.