
Target Date Fund Simulation Exercise

Bob Mitchell, Chief Investment Officer

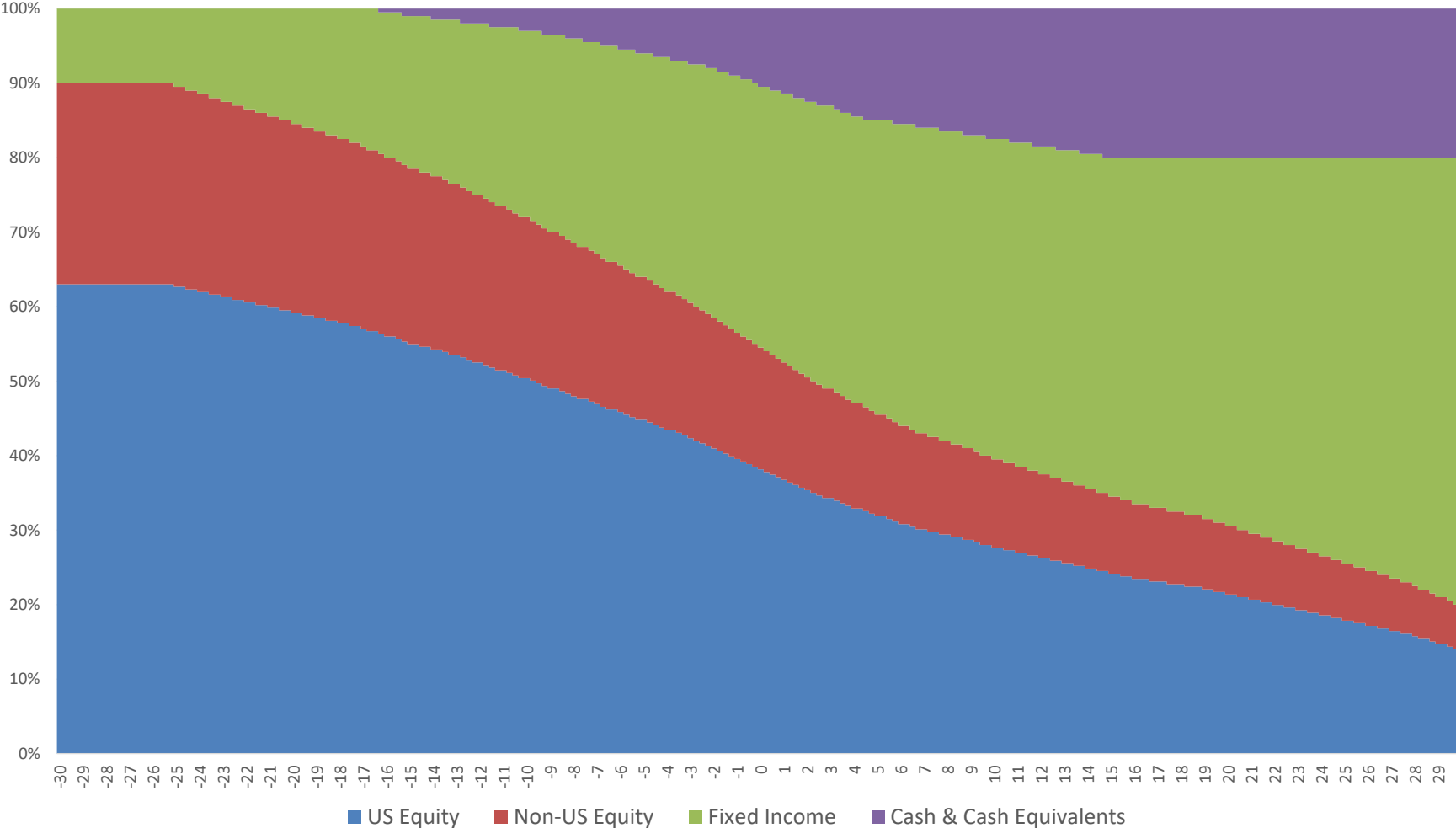
April 22, 2019

Background

- In 2017, the Department of Administration requested that the Department of Revenue build a stochastic model that simulates the experience of defined contribution employees enrolled in the Alaska Target Date Retirement Trusts.
- The purpose of the model was to test the likelihood that 30-year employees will have sufficient assets to last 30 years into retirement.
- Four cases were tested: PERS with SBS, Police/Fire with SBS, TRS, and TRS with 6.13% deferred compensation contributions.
- In 2019, the ARMB requested an update to this analysis at the upcoming June defined contribution committee meeting.
- Also in 2019, Representative Kopp requested an update to this analysis, incorporating additional occupational scenarios, including Police/Fire without SBS, 25-Year Career Police/Fire with SBS, 25-Year Career Police/Fire without SBS.

Target Date Fund Glide Path

Target Date Fund Glide Path Relative to Years to/from Retirement



Callan 2019 Return and Risk Assumptions

Risk and return: 2019–2028

Asset Class	Index	PROJECTED RETURN			PROJECTED RISK		2018 - 2027	
		1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	Projected Yield	10-Year Geometric*	Standard Deviation
Equities								
Broad U.S. Equity	Russell 3000	8.50%	7.15%	4.90%	17.95%	2.00%	6.85%	18.25%
Large Cap	S&P 500	8.25%	7.00%	4.75%	17.10%	2.10%	6.75%	17.40%
Small/Mid Cap	Russell 2500	9.55%	7.25%	5.00%	22.65%	1.55%	7.00%	22.60%
Global ex-U.S. Equity	MSCI ACWI ex USA	9.20%	7.25%	5.00%	21.10%	3.10%	7.00%	21.00%
Non-U.S. Equity	MSCI World ex USA	8.70%	7.00%	4.75%	19.75%	3.25%	6.75%	19.70%
Emerging Markets Equity	MSCI Emerging Markets	10.70%	7.25%	5.00%	27.45%	2.65%	7.00%	27.45%
Fixed Income								
Short Duration	Bloomberg Barclays 1-3 Yr G/C	3.40%	3.40%	1.15%	2.10%	3.25%	2.60%	2.10%
U.S. Fixed	Bloomberg Barclays Aggregate	3.75%	3.75%	1.50%	3.75%	3.85%	3.00%	3.75%
Long Duration	Bloomberg Barclays Long G/C	4.25%	3.75%	1.50%	10.65%	4.80%	3.00%	10.95%
TIPS	Bloomberg Barclays TIPS	3.80%	3.75%	1.50%	5.05%	3.90%	3.00%	5.25%
High Yield	Bloomberg Barclays High Yield	5.75%	5.35%	3.10%	10.35%	7.75%	4.75%	10.35%
Non-U.S. Fixed	Bloomberg Barclays Gbl Agg ex US	1.80%	1.40%	-0.85%	9.20%	2.35%	1.40%	9.20%
Emerging Market Debt	EMBI Global Diversified	5.40%	5.05%	2.80%	9.50%	6.00%	4.50%	9.60%
Other								
Real Estate	NFI-ODCE	7.30%	6.25%	4.00%	15.70%	4.75%	5.75%	16.35%
Private Equity	Cambridge Private Equity	12.40%	8.50%	6.25%	29.30%	0.00%	7.35%	32.90%
Hedge Funds	Callan Hedge FOF Database	5.75%	5.50%	3.25%	8.85%	2.50%	5.05%	9.15%
Commodities	Bloomberg Commodity	4.75%	3.20%	0.95%	18.00%	2.50%	2.65%	18.30%
Cash Equivalents	90-Day T-Bill	2.50%	2.50%	0.25%	0.90%	2.50%	2.25%	0.90%
Inflation	CPI-U		2.25%		1.50%		2.25%	1.50%

Note that return projections for public markets assume index returns with no premium for active management.

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

Source: Callan

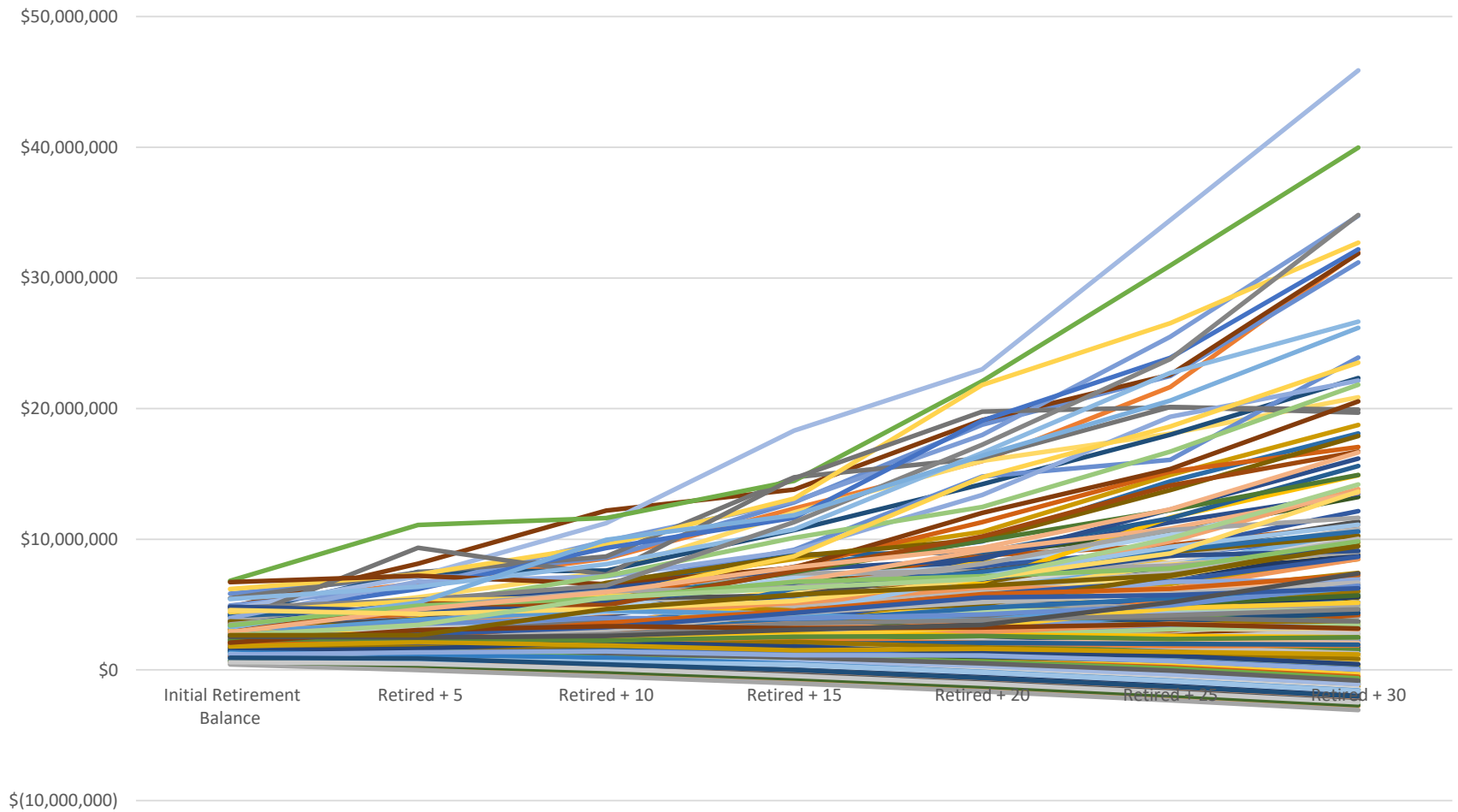
Assumptions

- A blend of Callan’s 2019 10-year & long-term capital market assumptions were used. 10-year assumptions were assumed during the first 10 years, were scaled linearly to the long-term assumptions during the next 10 years, and the long-term assumptions were assumed thereafter. Callan’s generic fixed income assumption was used in place of the specific fixed income mix employed by the target date funds.
- Inflation was set at 2.25%/year, with employee salaries assumed to grow at 2.75%/year. Initial consumption in retirement was set at 70% of earnings at retirement. Consumption was assumed to grow with inflation thereafter.
- 10,000 trials were used for each simulation. The trials were rank-ordered, and the simulations that represented the 25th-, 50th- and 75th-percentiles of the distribution of outcomes are displayed.
- A summary of the scenarios examined can be found in the table below.

	30-Yr PERS + SBS	30-Yr Police/Fire + SBS	30-Year Police/Fire w/o SBS	30-Yr TRS w/o SBS	30-Yr TRS + 6.13% Def. Comp.	25-Year Police/Fire + SBS	25-Year Police/Fire w/o SBS
Years' Service	30	30	30	30	30	25	25
Starting Salary	\$53,782	\$60,694	\$60,694	\$54,817	\$54,817	\$60,694	\$60,694
DCR Employee Contribution Rate	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%
DCR Employer Contribution Rate	5.00%	5.00%	5.00%	7.00%	7.00%	5.00%	5.00%
SBS Employee Contribution Rate	6.13%	6.13%				6.13%	
SBS Employer Contribution Rate	6.13%	6.13%				6.13%	
Deferred Compensation					6.13%		
Total Contribution Rate	25.26%	25.26%	13.00%	15.00%	21.13%	25.26%	13.00%

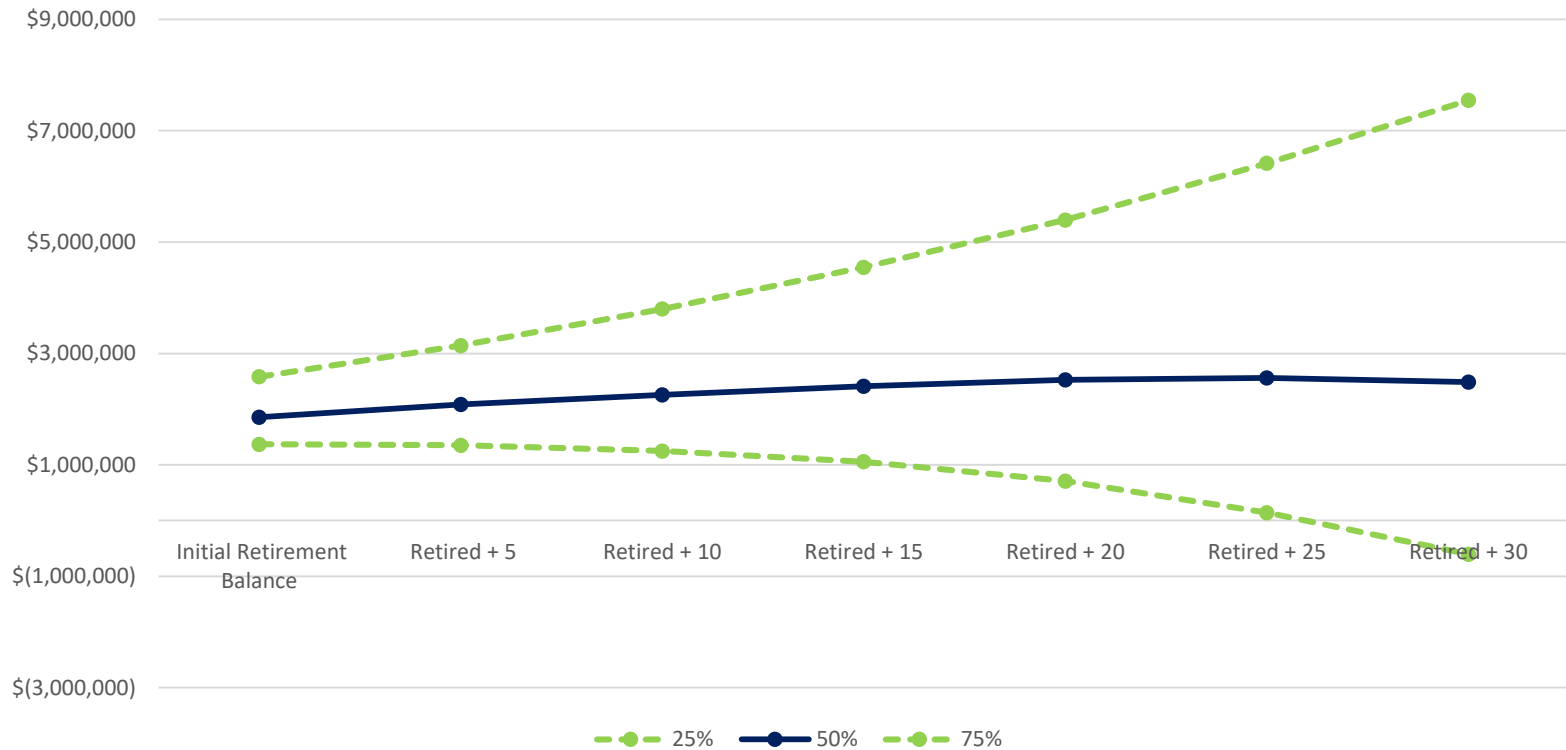
Illustration of Simulated Outcomes

Example: 250 Trial Runs



Results

30-Year PERS + SBS



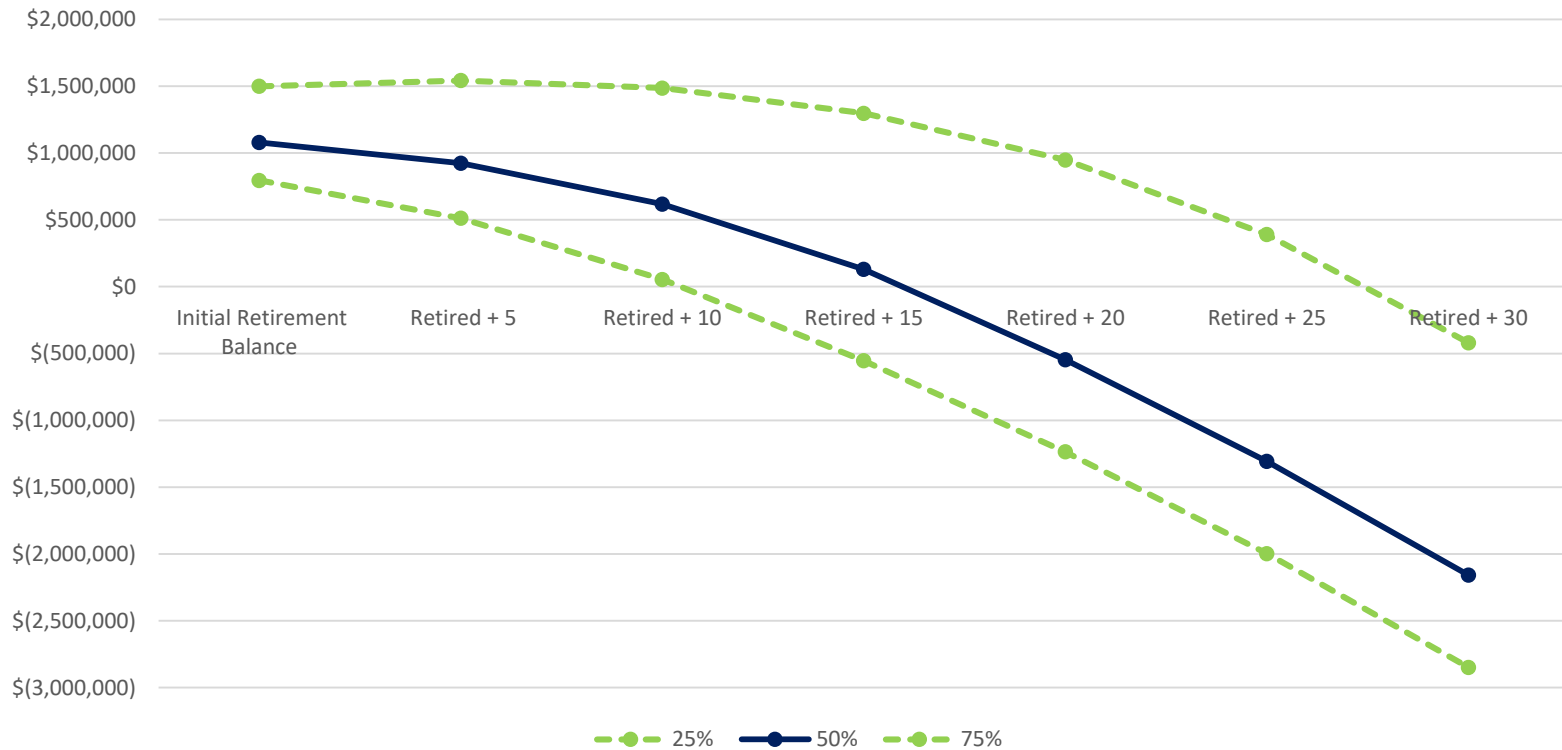
Results

30-Year Police/Fire + SBS



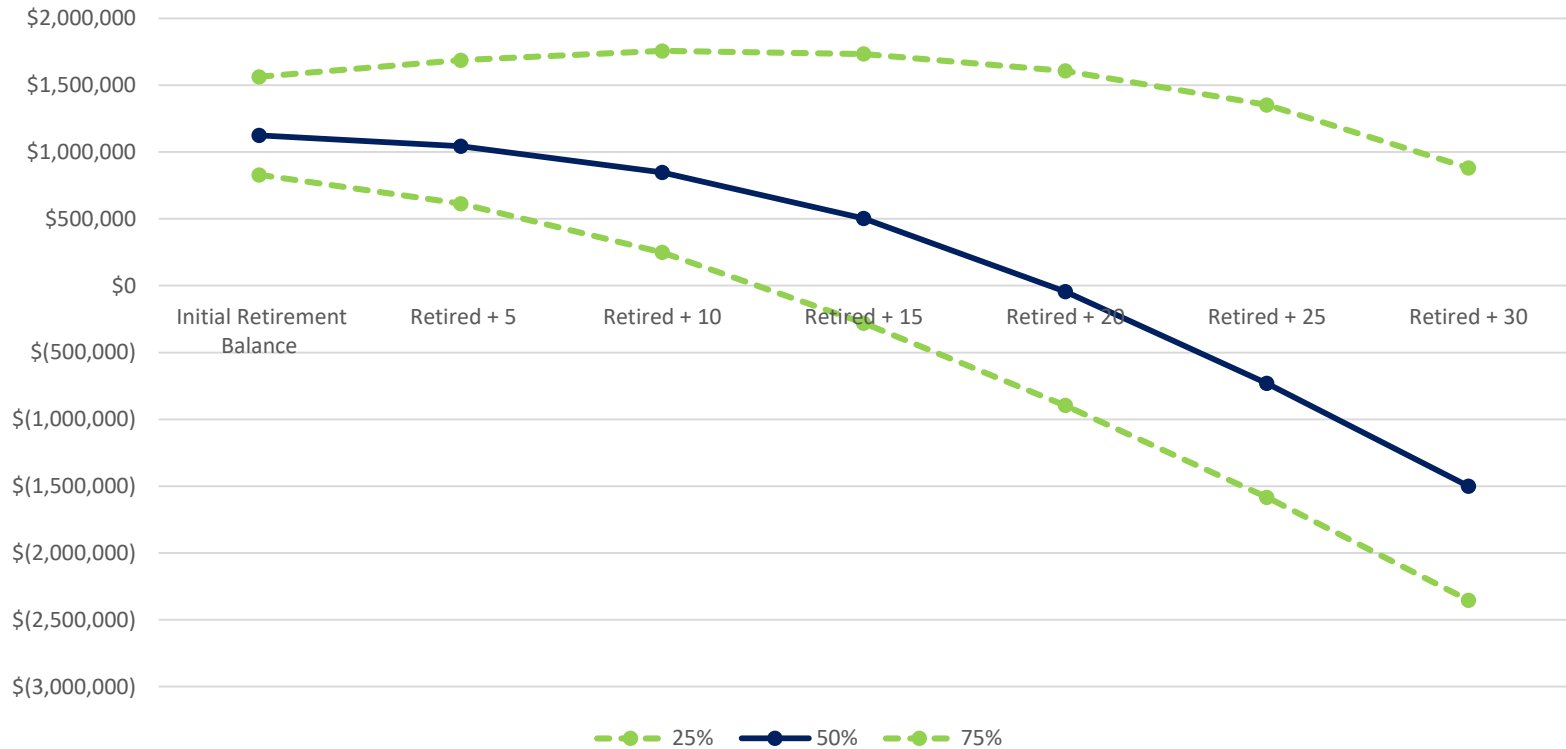
Results

30-Year Police/Fire w/o SBS



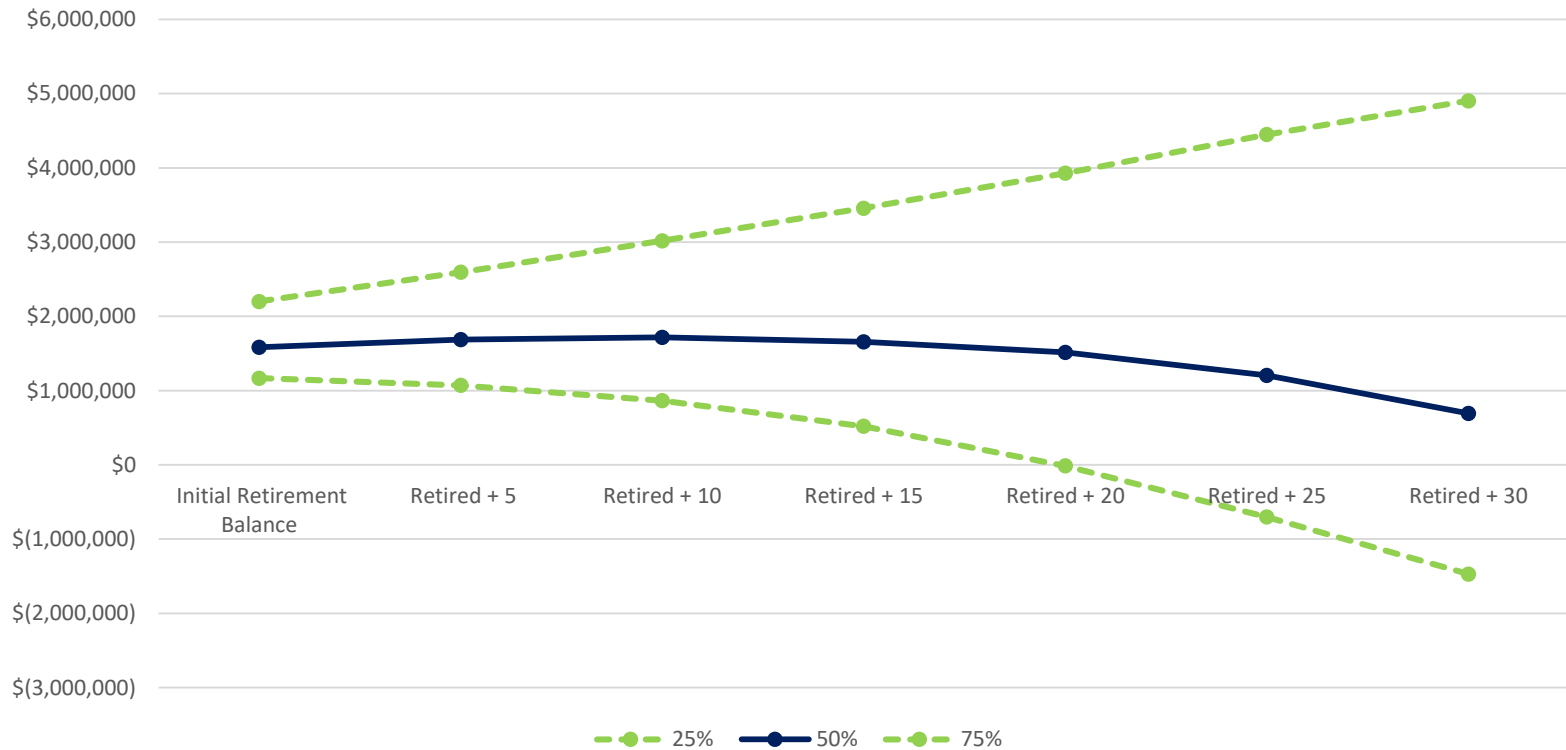
Results

30-Year TRS



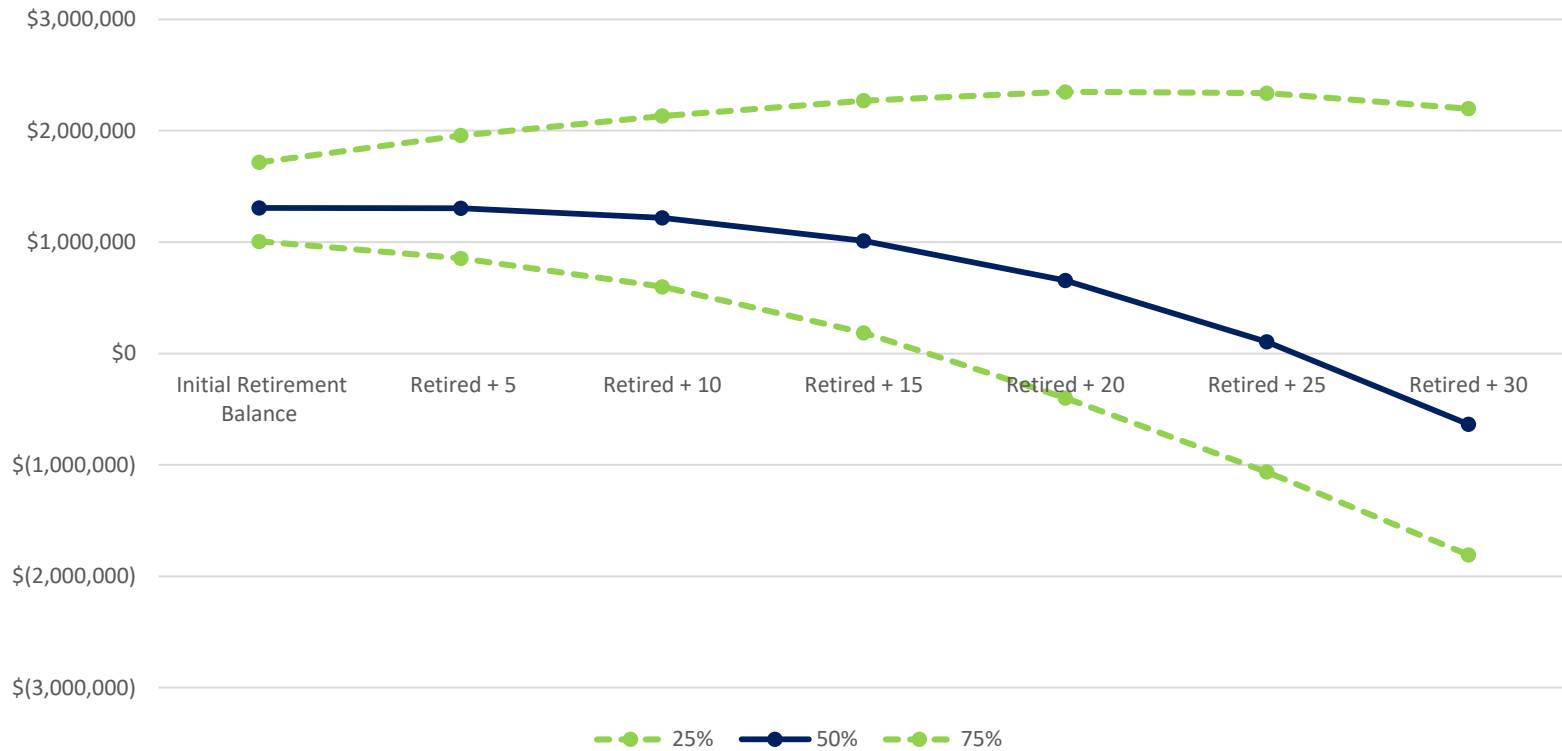
Results

30-Year TRS + 6.13% Deferred Compensation



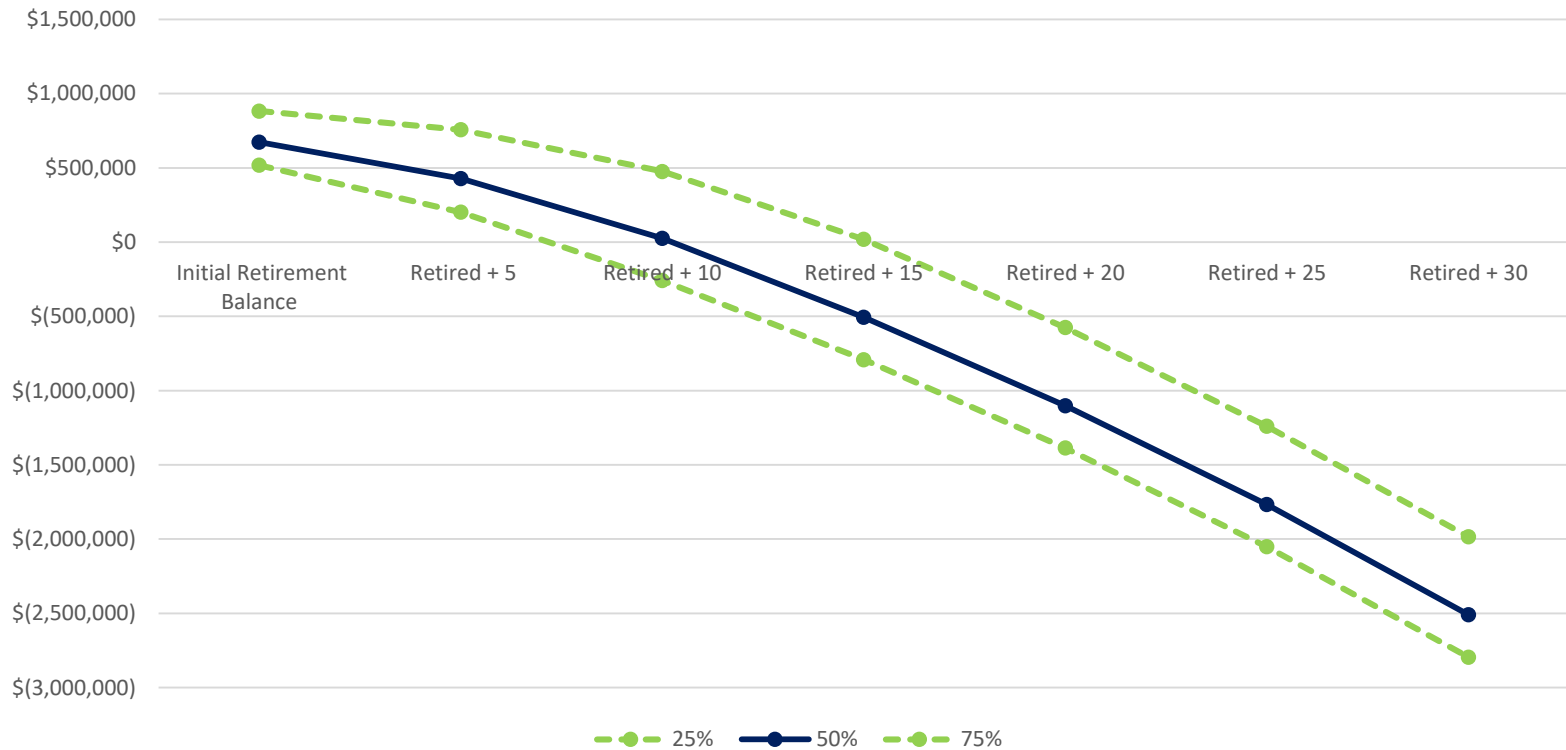
Results

25-Year Police/Fire + SBS



Results

25-Year Police/Fire w/o SBS



Probability of Success

- 30-Year PERS + SBS = 69%
- 30-Year Police/Fire + SBS = 69%
- 30-Year Police/Fire w/o SBS = 22%
- 30-Year TRS w/o SBS = 31%
- 30-Year TRS + 6.13% Deferred Comp. = 56%
- 25-Year Police/Fire + SBS = 43%
- 25-Year Police/Fire w/o SBS = 6%

Success = retirement assets surviving 30 years into retirement, assuming initial consumption level of 70% of final take-home pay, increasing with inflation.