



STATE OF WISCONSIN
INVESTMENT BOARD

June 28, 2019

Senator Robert Cowles, Co-Chair
Joint Legislative Audit Committee
PO Box 7882
Madison, WI 53707-7882

Representative Samantha Kerkman, Co-Chair
Joint Legislative Audit Committee
PO Box 8952
Madison, WI 53708-8952

Dear Senator Cowles and Representative Kerkman,

As recommended by the Legislative Audit Bureau (LAB) in its evaluation (report 18-19) of the State of Wisconsin Investment Board (SWIB), we have prepared this report for the Committee's review. As detailed below, SWIB has addressed all of LAB's recommendations.

Recommendation: *Work with the Board of Trustees (Board) to conduct additional stress tests of the Wisconsin Retirement System and report the test results*

The stress testing that SWIB conducts with ETF (and its actuaries) on a biennial basis reviews the effects of sustained low returns on the funded ratio, contribution rates, annuity adjustments, and retiree pool funding status. The joint SWIB-ETF model covers more than 90% of potential expected investment outcomes, including extreme outcomes for multiple asset allocations over multiple time periods. This compares favorably with the Pew model, which only covers 50% of potential outcomes. In fact, the Pew Study found Wisconsin to be the most robust plan it tested, remarking that "Wisconsin — by designing its pension plan with significant risk-sharing elements in addition to a strong funding policy — serves as an exemplar for managing cost volatility under virtually any scenario." In addition to the biennial stress testing with ETF, SWIB conducts monthly stress testing of market shocks and presents the results during the closed session of SWIB's Investment Committee meeting.

SWIB's most recent stress test with ETF (from October 2017) is attached as [Exhibit A](#), and SWIB will next conduct that stress testing in October 2019. The October stress test results will be publicly available on SWIB's website. An example of SWIB's monthly stress test is attached as [Exhibit B](#). We have provided a dated example (from the audit period) as our current monthly stress test results are considered part of SWIB's proprietary and confidential investment strategy.

Recommendation: *Work with the Board to centrally track future technology project expenses and report such expenses quarterly*

SWIB was in the process of enhancing its technology and systems during the audit period. In 2016, SWIB implemented a new enterprise resource planning (ERP) system that allows all project costs (including technology projects) to be tracked and reported at a granular level and allocated directly to specific projects, business divisions, or investment portfolios. Starting in 2017, once scope is initially defined and work begins on any project, an expected budget is allocated to be tracked through the ERP system (with a unique project code), and all project expenses are charged against the budget. Both the Project Management Office and the Finance team monitor spending versus the budget over the life of the project. If the Project Management Office forecasts that a project may exceed its assigned budget, they are required to complete a change request to explain the anticipated overage and obtain approval from Finance and project leadership to go over the initial budget estimate. If the overage is approved, the additional funds from the aggregated approved project budget will be allocated to the project code.

Finance also monitors overall project spending across all of SWIB's approved projects, providing budget to actuals reporting and forecasts of future spending to the Chief Financial Officer on a monthly basis and to the Board on a quarterly basis. If SWIB forecasts that it will spend more than the approved aggregate project budget, Finance will coordinate a recommendation to the Board for approval of additional funds for project investment. Under SWIB's Total Cost of Management Plan & Policy, SWIB is not authorized to spend more than the Board-approved aggregate project budget. In the event SWIB reaches its budget, Finance will coordinate with the Project Management Office to stop spending until additional funds are authorized by the Board. While SWIB budgets for individual projects, we manage our project spending to the aggregate project budget, including reallocating available dollars among projects as they move forward and change priority.

SWIB's Fiscal Year 2020 Total Cost of Management Plan, including the budget for projects for the fiscal year, was presented to the Board (and approved) on June 11, 2019. The project budget from the Plan is attached as Exhibit C. A report of our project spending for FY 2019, budget to actuals, as well as our project budgets for FY 2020 is attached as Exhibit D. In addition, SWIB's most recent Quarterly Cost of Management Update was also presented on June 11, 2019 and is attached as Exhibit E.

Recommendation: *Work with the Board to develop policies that require Board approval of projected expenses that exceed the total approved budget, or portions thereof*

Annually, the Board approves the Total Cost of Management Plan for the fiscal year, which includes both external and internal investment management costs along with the internal operating budget. Through its Quarterly Cost of Management reporting, SWIB reports to the Board its year-to-date actual costs, as well as full fiscal year forecasted costs compared to the Plan, including forecasts of the internal operating budget.

In response to LAB's recommendations, SWIB recently made changes to its Total Cost of Management Plan & Policy, which were approved by the Board on June 11, 2019, to identify the Plan's budget categories and clarify which categories require Board approval for costs in excess of the budget and which

categories require a report to the Board of the amount by which actual costs have exceeded estimated costs. The updated Total Cost of Management Plan & Policy is attached as Exhibit F.

Recommendation: *Work with the Board to (a) report investment returns that include management fees and other investment expenses, and (b) more clearly identify whether reported investment returns include management fees and other investment expenses*

SWIB already reports Core Trust Fund (CTF) investment return information net of external management fees and all expenses to the Board on an annual basis. Beginning in March 2019, SWIB also provided individual asset class return information net of all fees and expenses to the Board as part of this annual reporting. Beginning in June 2019, SWIB started providing quarterly reporting of CTF investment returns net of external manager fees, which is in line with industry standards. SWIB has also worked to clarify the reporting of all investment returns to clearly indicate whether they are gross or net performance. The most recent quarterly performance report, presented to the Board on June 11, 2019, reflects those efforts and is attached as Exhibit G.

Recommendation: *Work with the Board to improve its application and selection process by revising its hiring policy to ensure equal consideration of all qualified applicants and improve its documentation*

SWIB utilizes an applicant tracking software system, called Newton, to manage its application and selection process. Newton allows SWIB to centralize all documentation related to the hiring process in one location that can be accessed by recruiting staff, management, and hiring managers. All applicants are maintained in Newton, regardless of how they are sourced. Newton lets recruiting staff and hiring managers move an applicant forward for a phone screen or interview, decline an applicant by selecting the appropriate rationale, provide additional documentation to explain situations where only one applicant is interviewed, and initiate the offer approval process. Use of Newton has also enabled SWIB to move fully to an online application process and create a full record of documentation for each applicant. Sample documentation from the Newton system is attached as Exhibit H.

SWIB has also enhanced its offer process, facilitated by Newton. Before an offer can be made to the most qualified applicant, all other applicants must be declined in Newton, with a rationale provided. Offers are initiated by recruiting staff and must be approved by the hiring manager, division head, group head, and the deputy executive director/chief administrative officer. We have also engaged a third party vendor to provide automated background checks and reference checks to add an additional level of independent review.

Recruiting staff is responsible for training hiring managers on the application and selection process, including use of the Newton system. SWIB has also revised its hiring policy (called the SWIB Recruitment Philosophy), which was approved by the Board on March 13, 2019, to address LAB's recommendations. The updated Recruitment Philosophy is attached as Exhibit I.

I hope this information has been helpful. We would be happy to schedule a time to discuss our response or answer any other questions you may have. We appreciate the work of the LAB audit team in covering so many important topics in this report. Thank you for your time and the opportunity to provide you with further information about SWIB.

Sincerely,



David Villa
Executive Director/Chief Investment Officer

cc: Joe Chrisman
State Auditor

David Stein
Chair, SWIB Board of Trustees

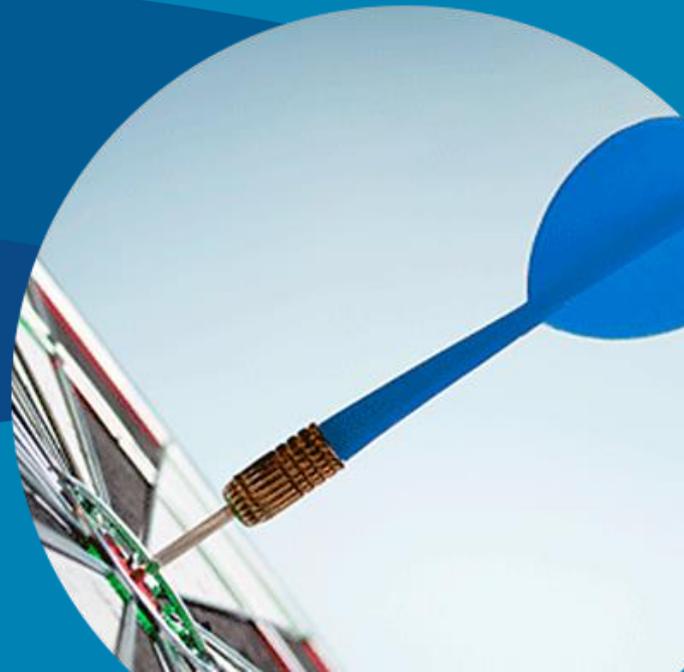
- Exhibit A: Biennial SWIB/ETF stress testing
- Exhibit B: Monthly Investment Committee stress testing
- Exhibit C: FY 2020 Total Cost of Management Plan project budget
- Exhibit D: Project budgets and spending
- Exhibit E: Q1 2019 Quarterly Cost of Management Update
- Exhibit F: Total Cost of Management Plan & Policy
- Exhibit G: Q1 2019 Investment Performance Report
- Exhibit H: Newton Applicant Tracking System
- Exhibit I: SWIB Recruitment Philosophy

Exhibit A

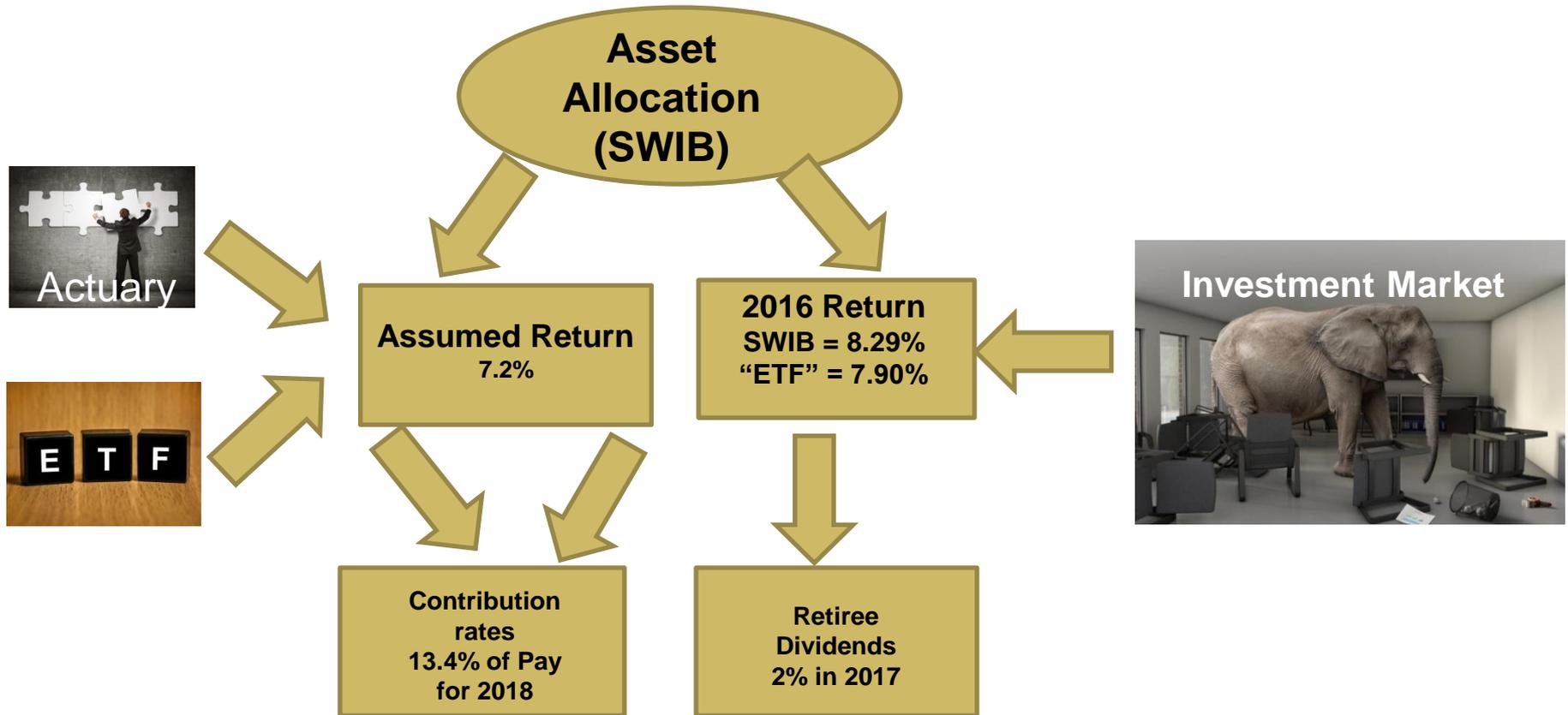
State of Wisconsin Investment Board

Wisconsin Retirement System Actuarial Overview and Projections

October 2017



Asset Allocation and WRS



Measures of Successful Asset Allocation (WRS Perspective)

- Stable Contribution Rates
- Affordable Contribution Rates
- Generate Dividends (earnings > 5%)
- Avoid Dividend Takebacks
- Maintain fully funded retiree reserve

Asset Allocation Spectrum

	<u>Asset Allocation Characteristics</u>	
	High Risk	Low Risk
Probability of	High Reward	Low Reward
Stable Contribution Rates	Low	High
Affordable Contribution Rates	Medium	Low
Generate Dividends	High	Low
Dividend Takebacks	Medium	Medium
Maintain Fully Funded Retire Reserve	Medium	High *

- An ideal Asset Allocation would provide stable, affordable contribution rates, generate dividends sufficient to offset inflation with no takebacks, and would maintain the retiree reserve in a fully funded position.
- There probably is no such thing, but is there a “Sweet Spot” that provides an optimal combined outcome of all the measures taken together.

* But not in the very long term

Objectives of this Presentation

- Provide an Overview of the WRS
 - Relationship of Investment Return to Success Measures
 - Effects of bad outcomes
- Evaluate several points along the Asset Allocation spectrum against the measures of success.
- Find the “Sweet Spot” if it exists.

WRS Operation

- Benefits
- Plan Governance
 - ETF Board Role
 - SWIB Role
- WRS Accounts and Reserves
- Actuarial Valuation of WRS
 - Sharing Asset Experience
 - Dividend Reserve Depletion

Key Changes from 2015 Study

- Combined SWIB returns for 2015 and 2016 slightly lower than assumed rate of 7.2% (-0.4% return for 2015 and 8.29% return for 2016)
- Mortality table update (slightly longer expected lifetimes)
- Slightly lower Standard Deviation than 2015 Study
- Updated census data as of December 31, 2016

Covered Population at 12/31/2016

	Number	Financial Information		
		Total \$ Millions	Average	Type
Retirees	197,647	\$ 4,887	\$ 24,725	Annual Benefit
Active Members	256,208	13,486	52,637	Annual Pay
Inactive Members	160,897	2,392	14,865	Money Purchase Balance
Total	614,752			

WRS Investment Funds

- Core Fund
 - Diversified Portfolio
 - 5 Year Smoothing through Market Recognition Account
- Variable Fund
 - Equity Portfolio
 - Marked to Market each year

Market Recognition Account

	For the Year Ended December 31						
	2014	2015	2016	2017	2018	2019	2020
Beginning of year							
a. Funding value	\$81,635,165,224	\$86,109,303,264	\$88,695,483,883	\$92,268,055,484	\$91,754,238,593	\$90,287,000,525	\$89,062,499,057
b. Market value	86,355,982,436	88,649,071,976	85,291,480,633	89,181,973,662	89,181,973,662	89,181,973,662	89,181,973,662
End of year							
c. Market value	88,649,071,976	85,291,480,633	89,181,973,662				
d. Non-investment cash flow (contributions minus benefits)	(2,288,570,809)	(2,738,977,618)	(2,985,477,640)				
e. Investment income							
e1. Total investment income	4,581,660,350	(618,613,725)	6,875,970,669				
e2. Assumed rate	7.2%	7.2%	7.2%				
e3. Amount for immediate recognition	5,795,343,347	6,101,266,641	6,278,597,645	-	-	-	-
e4. Amount for phased-in recognition: e1-e3	(1,213,682,997)	(6,719,880,366)	597,373,024	-	-	-	-
f. Phased-in recognition of investment income							
f1. Current year: 0.2 x e4	(242,736,599)	(1,343,976,073)	119,474,605	-	-	-	-
f2. First prior year	953,421,177	(242,736,599)	(1,343,976,073)	119,474,605	-	-	-
f3. Second prior year	793,268,488	953,421,177	(242,736,599)	(1,343,976,073)	119,474,605	-	-
f4. Third prior year	(936,085,396)	793,268,488	953,421,177	(242,736,599)	(1,343,976,073)	119,474,605	-
f5. Fourth prior year	<u>399,497,833</u>	<u>(936,085,396)</u>	<u>793,268,488</u>	<u>953,421,177</u>	<u>(242,736,599)</u>	<u>(1,343,976,073)</u>	<u>119,474,605</u>
f6. Total MRA recognition	967,365,503	(776,108,404)	279,451,597	(513,816,891)	(1,467,238,068)	(1,224,501,468)	119,474,605
f7. Amount for MRA recognition	-	-	-	-	-	-	-
f8. Total recognized gain (loss)	<u>967,365,503</u>	<u>(776,108,404)</u>	<u>279,451,597</u>	<u>(513,816,891)</u>	<u>(1,467,238,068)</u>	<u>(1,224,501,468)</u>	<u>119,474,605</u>
g. Total recognized investment income: e3 + f8	6,762,708,850	5,325,158,237	6,558,049,241	(513,816,891)	(1,467,238,068)	(1,224,501,468)	119,474,605
h. Funding value end of year: a + d + e3 + f8	86,109,303,264	88,695,483,883	92,268,055,484	91,754,238,593	90,287,000,525	89,062,499,057	89,181,973,661
i. Difference between market and funding values	2,539,768,712	(3,404,003,250)	(3,086,081,822)	(2,572,264,931)	(1,105,026,863)	119,474,605	-
j. Recognized rate of return	8.4%	6.3%	7.5%				
k. Market rate of return (net of fee)	5.4%	(0.7)%	8.2%				

WRS Benefits

- Hybrid Plan
 - Defined Benefit: $1.6\% \times \text{FAC} \times \text{Service}$ (Most participants)
 - Not less than twice value of member account (A form of employer match)
- Adjustments are made to the above for members participating in Variable.

WRS Contributions

- Three rate Groups: General/Executive, Protective with and without Social Security.
- Actuarial Valuation determines contributions by rate group.
- General and Executive are now combined - participants split cost equally with employers.
- Protective participants pay the same rate as General participants and employers pay the difference.

WRS Accounts and Reserves

- **Retired Reserve:** Intended to hold exactly the right amount of money so that **IF**
 - each person **lives** exactly the right number of years,
 - **and** gets exactly the same benefit each year
 - **and** the reserve earns exactly 5% each year,
- **Then** the reserve will be exhausted the day the last person dies.

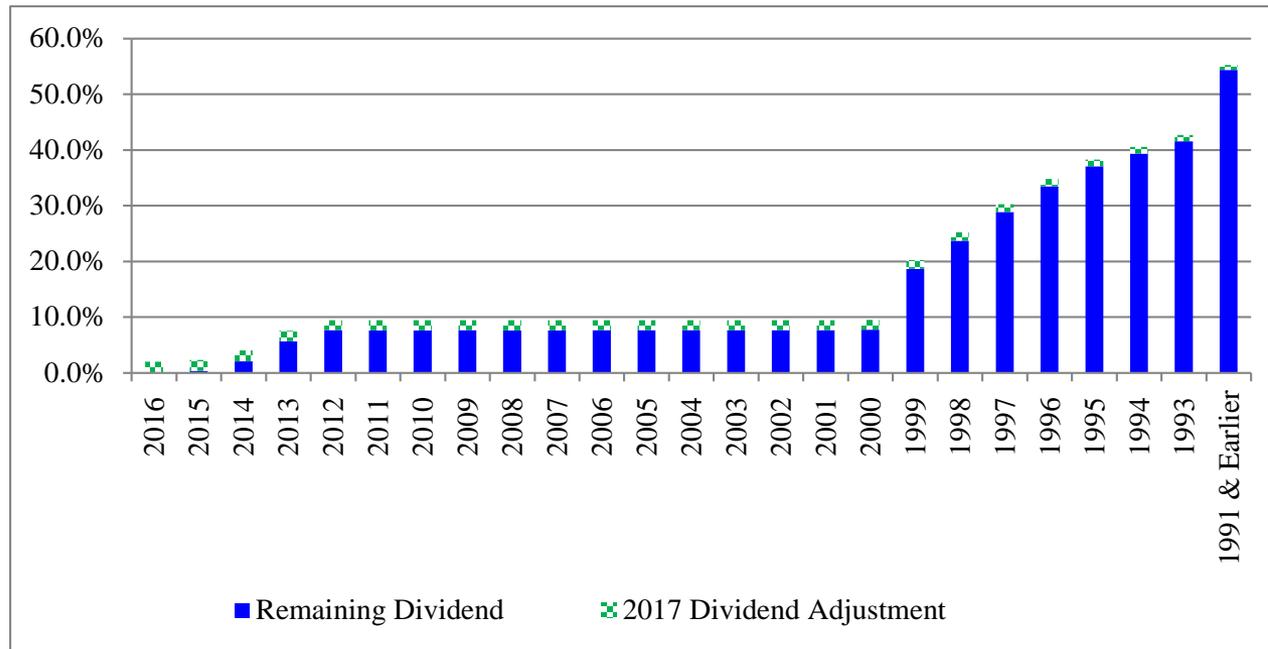
Dividend Reserve

- Retirees share in investment gains, but also share in investment losses. Prior dividends can be reduced if less than 5% is credited to the Core Annuity Division.
- Only dividends can be reduced. The original core benefit is protected.
- The present value of the excess of total core benefits over original benefits is called the “Dividend Reserve”, although there is no formal definition of such a reserve.

Dividend Reserve

- A positive dividend reserve means that retirees are getting some inflation protection, but also provides a means by which the effect of investment losses on employer rates can be dampened.
- A \$0 dividend reserve means that retirees have lost all inflation protection and one of the shock absorbers on employer rates is gone.

Dividend Remaining (as a Percentage of Total Benefit) by Year of Retirement



Dividend Reserve Depletion

- The probability of such an event is low. Even 2008 did not produce depletion.
- In a low and volatile return market environment, realizing a return low enough to deplete the dividend reserve is more likely.
- The following slides explore in general terms what a deficit in the retiree reserve means for the System.

Dividend Reserve Depletion: Liability Attributable to Dividends

<u>Valuation</u>	<u>Liability for Dividend Remaining (billions)</u>	<u>Liability for Dividend Adjustment (billions)</u>
12/31/2010	\$7.2	\$(0.3)
12/31/2011	6.4	(1.7)
12/31/2012	4.5	(1.3)
12/31/2013	3.0	2.0
12/31/2014	4.6	1.3
12/31/2015	5.5	0.2
12/31/2016	5.4	1.0
12/31/2017 (est)	6.0	

- Liability for Dividend Remaining represents the value of all previously granted dividends
- If another market event similar to 2008 were to occur again, the complete depletion of the dividend would become a real possibility

WRS PROJECTIONS

Monte Carlo Simulations

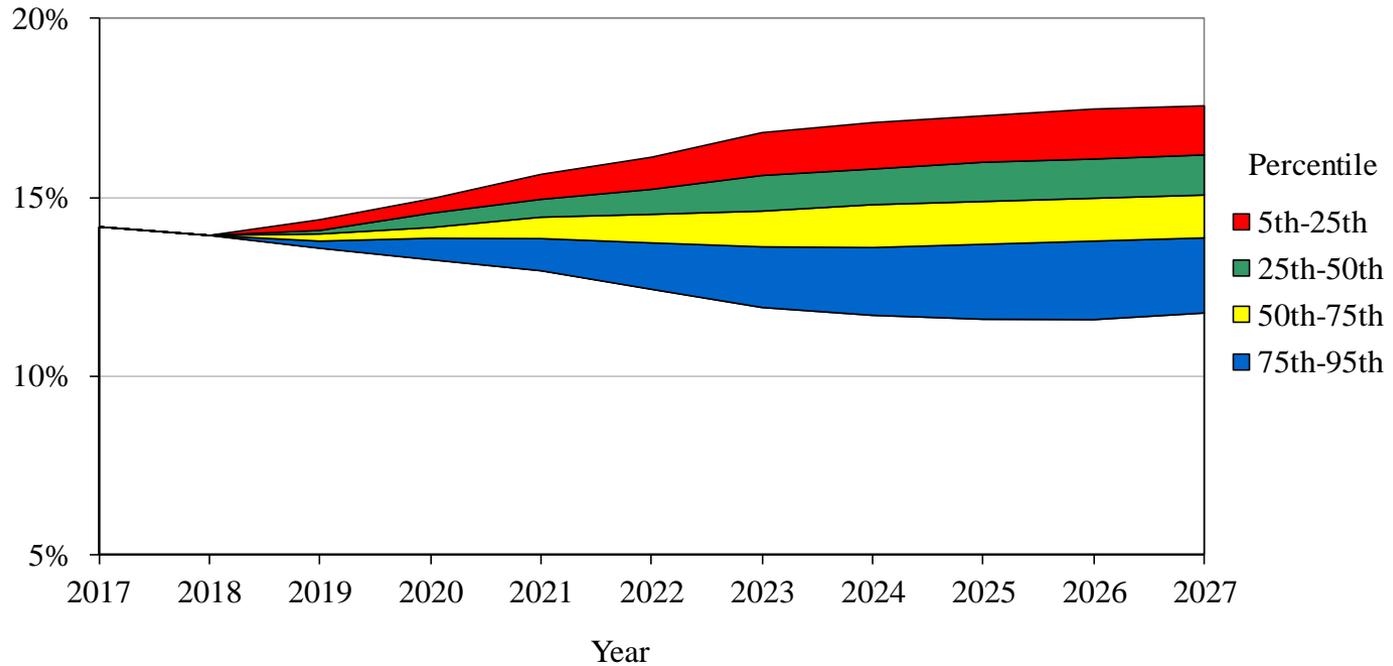
- Based on 10,000 random trials
- Valuation Assumptions held constant
- Assumes seven sets of expected return/standard deviations (provided by NEPC)

	Expected Return		Standard Deviation
	Geometric	Arithmetic	
Scenario 1	5.0%	5.3%	8.2%
Scenario 2	6.0%	6.5%	11.4%
Scenario 3	7.0%	7.9%	15.2%
Scenario 4	7.2%	8.2%	16.0%
Scenario 5	8.0%	9.4%	19.4%
Scenario 6	9.0%	11.1%	24.1%
Scenario 7	10.0%	13.1%	29.5%

Current →

Contribution as a % of Payroll

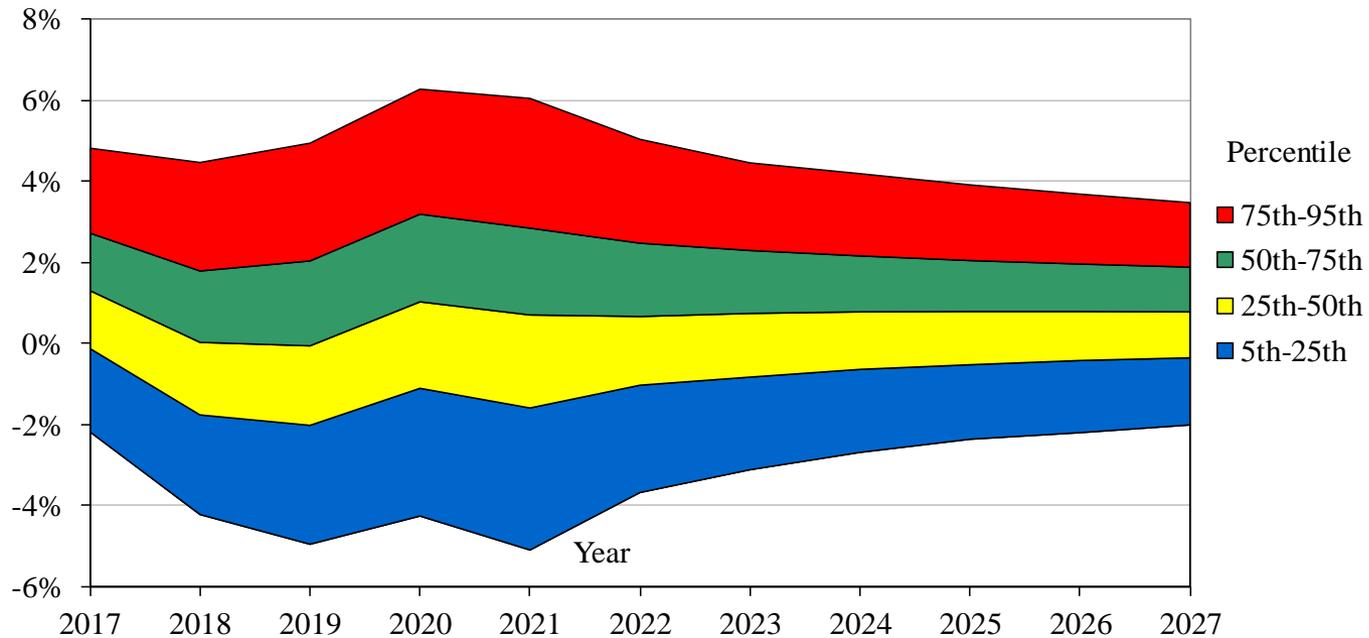
Scenario 2 – 6.0%ER, 11.4%SD



5th Percentile	14.2%	13.9%	14.4%	15.0%	15.6%	16.1%	16.8%	17.1%	17.3%	17.5%	17.6%
25th Percentile	14.2%	13.9%	14.1%	14.6%	14.9%	15.2%	15.6%	15.8%	16.0%	16.1%	16.2%
Median	14.2%	13.9%	14.0%	14.2%	14.4%	14.5%	14.6%	14.8%	14.9%	15.0%	15.1%
75th Percentile	14.2%	13.9%	13.8%	13.9%	13.8%	13.7%	13.6%	13.6%	13.7%	13.8%	13.9%
95th Percentile	14.2%	13.9%	13.6%	13.3%	12.9%	12.4%	11.9%	11.7%	11.6%	11.6%	11.8%

Dividend Rates

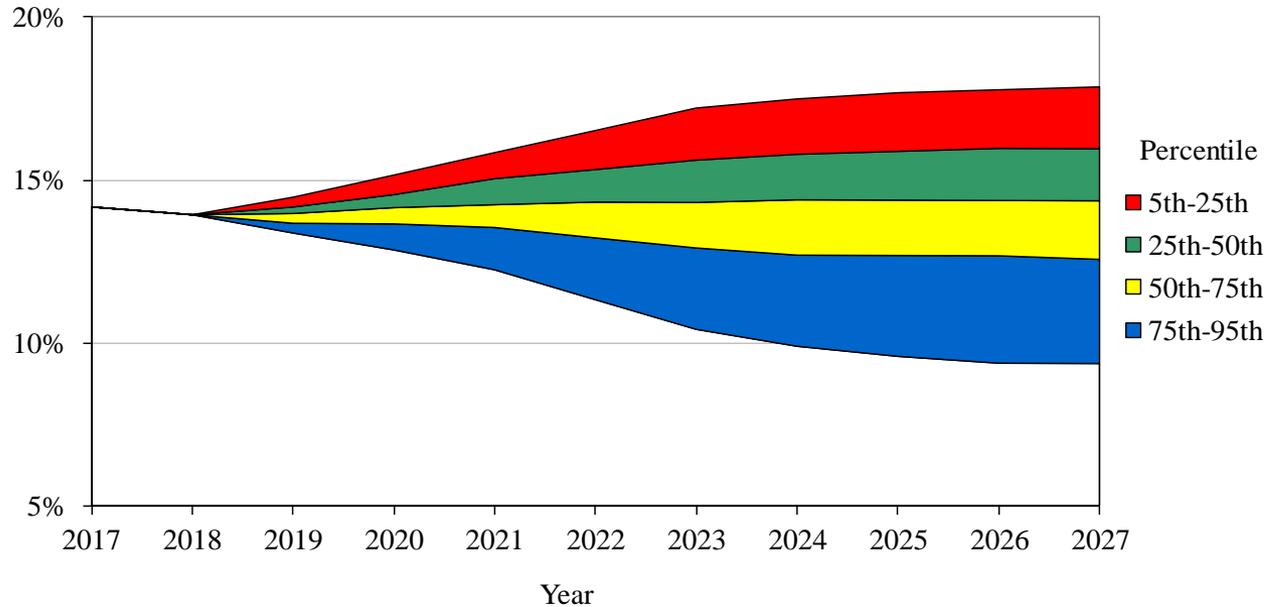
Scenario 2 – 6.0%ER, 11.4%SD



5th Percentile	-2.2%	-4.2%	-5.0%	-4.3%	-5.1%	-3.7%	-3.1%	-2.7%	-2.4%	-2.2%	-2.0%
25th Percentile	-0.1%	-1.8%	-2.0%	-1.1%	-1.6%	-1.0%	-0.8%	-0.6%	-0.5%	-0.4%	-0.4%
Median	1.3%	0.0%	-0.1%	1.0%	0.7%	0.7%	0.7%	0.8%	0.8%	0.8%	0.8%
75th Percentile	2.7%	1.8%	2.0%	3.2%	2.8%	2.5%	2.3%	2.2%	2.0%	2.0%	1.9%
95th Percentile	4.8%	4.5%	4.9%	6.3%	6.0%	5.0%	4.5%	4.2%	3.9%	3.7%	3.5%

Contribution as a % of Payroll

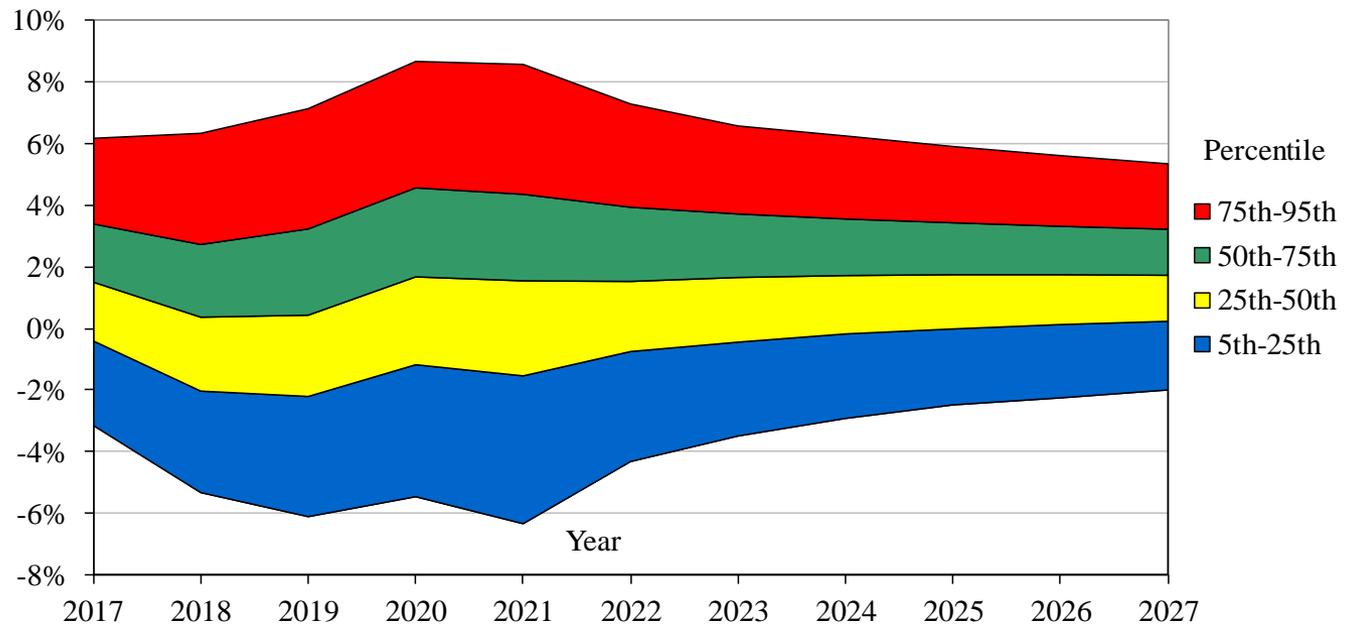
Scenario 3 – 7.0%ER, 15.2%SD



5th Percentile	14.2%	13.9%	14.5%	15.2%	15.8%	16.5%	17.2%	17.5%	17.7%	17.8%	17.9%
25th Percentile	14.2%	13.9%	14.2%	14.6%	15.0%	15.3%	15.6%	15.8%	15.9%	16.0%	16.0%
Median	14.2%	13.9%	14.0%	14.2%	14.2%	14.3%	14.3%	14.4%	14.4%	14.4%	14.4%
75th Percentile	14.2%	13.9%	13.7%	13.7%	13.5%	13.2%	12.9%	12.7%	12.7%	12.7%	12.6%
95th Percentile	14.2%	13.9%	13.4%	12.9%	12.2%	11.3%	10.4%	9.9%	9.6%	9.4%	9.4%

Dividend Rates

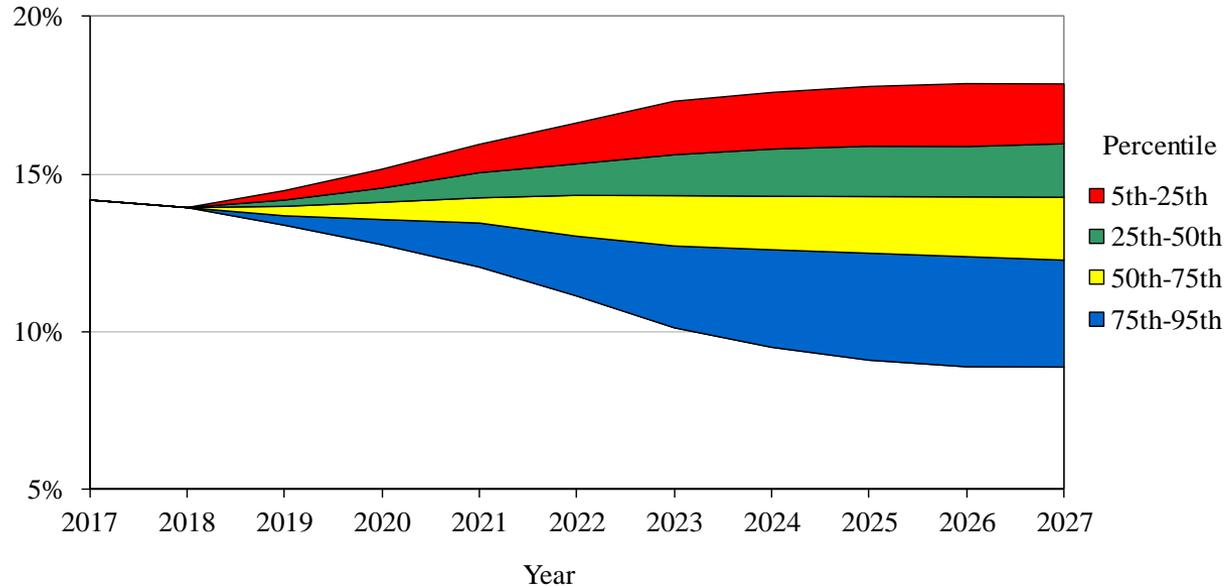
Scenario 3 – 7.0%ER, 15.2%SD



5th Percentile	-3.2%	-5.3%	-6.1%	-5.5%	-6.3%	-4.3%	-3.5%	-2.9%	-2.5%	-2.3%	-2.0%
25th Percentile	-0.4%	-2.0%	-2.2%	-1.2%	-1.5%	-0.8%	-0.4%	-0.2%	0.0%	0.1%	0.2%
Median	1.5%	0.4%	0.4%	1.7%	1.5%	1.5%	1.7%	1.7%	1.7%	1.7%	1.7%
75th Percentile	3.4%	2.7%	3.2%	4.6%	4.4%	3.9%	3.7%	3.6%	3.4%	3.3%	3.2%
95th Percentile	6.2%	6.3%	7.1%	8.7%	8.6%	7.3%	6.6%	6.2%	5.9%	5.6%	5.3%

Contribution as a % of Payroll

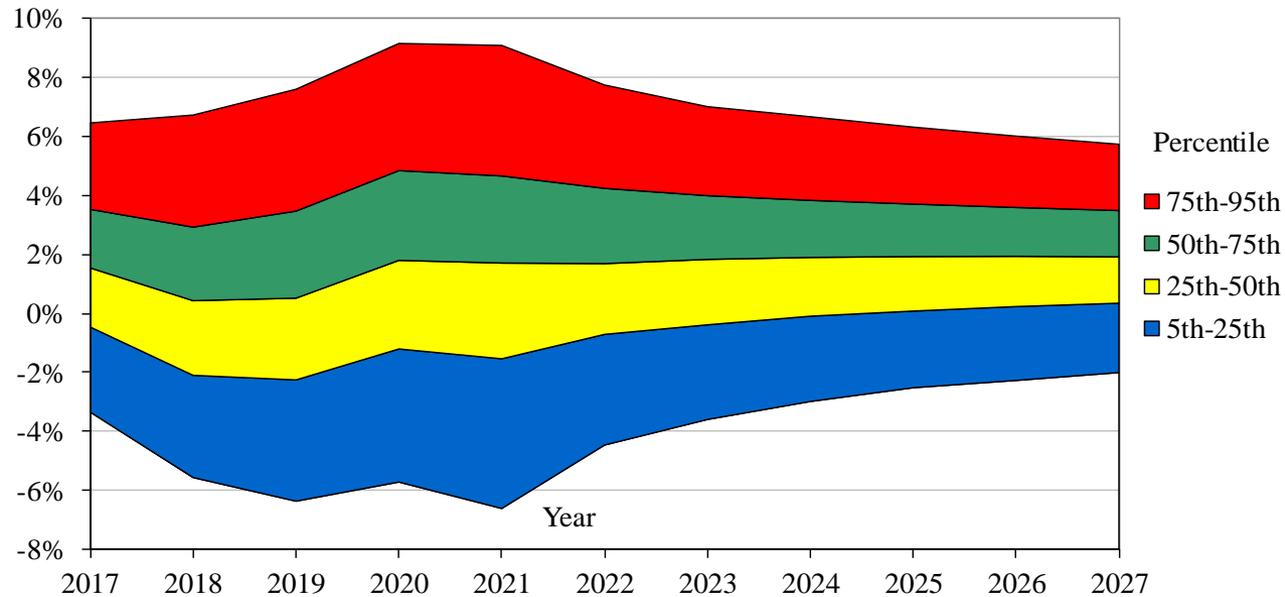
Scenario 4 – 7.2%ER, 16.0%SD



5th Percentile	14.2%	13.9%	14.5%	15.2%	15.9%	16.6%	17.3%	17.6%	17.8%	17.9%	17.9%
25th Percentile	14.2%	13.9%	14.2%	14.6%	15.0%	15.3%	15.6%	15.8%	15.9%	15.9%	16.0%
Median	14.2%	13.9%	14.0%	14.1%	14.2%	14.3%	14.3%	14.3%	14.3%	14.3%	14.3%
75th Percentile	14.2%	13.9%	13.7%	13.6%	13.4%	13.0%	12.7%	12.6%	12.5%	12.4%	12.3%
95th Percentile	14.2%	13.9%	13.4%	12.8%	12.0%	11.1%	10.1%	9.5%	9.1%	8.9%	8.9%

Dividend Rates

Scenario 4 – 7.2%ER, 16.0%SD



5th Percentile	-3.4%	-5.6%	-6.4%	-5.7%	-6.6%	-4.5%	-3.6%	-3.0%	-2.5%	-2.3%	-2.0%
25th Percentile	-0.5%	-2.1%	-2.3%	-1.2%	-1.5%	-0.7%	-0.4%	-0.1%	0.1%	0.2%	0.3%
Median	1.5%	0.4%	0.5%	1.8%	1.7%	1.7%	1.8%	1.9%	1.9%	1.9%	1.9%
75th Percentile	3.5%	2.9%	3.5%	4.8%	4.7%	4.2%	4.0%	3.8%	3.7%	3.6%	3.5%
95th Percentile	6.5%	6.7%	7.6%	9.2%	9.1%	7.7%	7.0%	6.7%	6.3%	6.0%	5.7%

Discussion of Dividend

Probability That Dividend Reserve Will Be Depleted in Year

	Expected ROR	Standard Deviation	Year				
			1	5	10	20	50
1	5.0%	8.2%	0.0%	12.5%	22.7%	30.0%	39.6%
2	6.0%	11.4%	0.0%	15.4%	17.6%	12.4%	3.9%
3	7.0%	15.2%	0.0%	18.2%	16.4%	7.7%	0.9%
4	7.2%	16.0%	0.0%	18.7%	16.4%	7.3%	0.6%
5	8.0%	19.4%	0.0%	20.9%	16.7%	6.5%	0.4%
6	9.0%	24.1%	0.3%	23.2%	18.0%	6.6%	0.3%
7	10.0%	29.5%	0.9%	26.2%	20.0%	7.5%	0.4%

Current →

Discussion of Dividend

Probability of Negative Dividend in Year

Current →

	Expected ROR	Standard Deviation	Year				
			1	5	10	20	50
1	5.0%	8.2%	23.2%	52.7%	55.8%	54.4%	52.5%
2	6.0%	11.4%	26.6%	42.0%	33.1%	28.8%	28.1%
3	7.0%	15.2%	29.5%	37.1%	23.2%	18.5%	18.8%
4	7.2%	16.0%	29.9%	36.5%	22.0%	17.3%	17.8%
5	8.0%	19.4%	31.7%	34.8%	19.2%	14.5%	14.9%
6	9.0%	24.1%	33.5%	34.3%	17.4%	12.7%	13.3%
7	10.0%	29.5%	34.9%	35.0%	17.2%	12.5%	13.1%

Discussion of Dividend

Worst Case Scenario of Cumulative Dividend Percent (% of Floor Benefit That Is Funded)

	Expected ROR	Standard Deviation	Year				
			1	5	10	20	50
1	5.0%	8.2%	109%	88%	81%	76%	66%
2	6.0%	11.4%	108%	81%	76%	77%	84%
3	7.0%	15.2%	106%	74%	69%	76%	103%
4	7.2%	16.0%	106%	72%	68%	75%	108%
5	8.0%	19.4%	105%	65%	61%	72%	122%
6	9.0%	24.1%	103%	55%	51%	65%	136%
7	10.0%	29.5%	100%	44%	39%	55%	141%

Worst Case Scenario based on 1st Percentile (i.e., 1% probability)

Dividend Observations

- The low risk scenarios are actually risky in the sense that, for example, 5% expected return has much higher chance of dividend depletion in later years than higher risk scenarios
- Must balance short and long term volatility
- Consider probability of dividend depletion
- Consider level of worst case scenario that is acceptable

Projected Net External Cash Flow*

Valuation Assumptions

Year	\$ (Millions)	% of Assets	% of Payroll
2017	\$ (2,853)	(3.2)%	(21.2)%
2027	(4,822)	(4.0)%	(25.5)%
2037	(6,857)	(4.3)%	(26.0)%
2047	(8,034)	(3.8)%	(21.8)%
2057	(10,633)	(3.6)%	(21.1)%
2067	(15,144)	(3.6)%	(21.9)%

*Contribution income minus benefit payout.

Combination of All Scenarios

2027 Results by %-tile of Investment Return Outcomes

		Contribution Rates			Dividend Rates			Retiree FS		
	ROR	StdDev	95th	50th	5th	95th	50th	5th	5th Percentile	
	1	5.0%	8.2%	13.6%	15.8%	17.5%	1.7%	-0.2%	-2.2%	76% in year 50
Current →	2	6.0%	11.4%	11.8%	15.1%	17.6%	3.5%	0.8%	-2.0%	88% in year 10
	2A	6.15%	12.0%	11.4%	15.0%	17.7%	3.8%	0.9%	-2.0%	87% in year 10
	3	7.0%	15.2%	9.4%	14.4%	17.9%	5.3%	1.7%	-2.0%	85% in year 10
	4	7.2%	16.0%	8.9%	14.3%	17.9%	5.7%	1.9%	-2.0%	84% in year 10
	5	8.0%	19.4%	6.4%	13.7%	18.2%	7.3%	2.7%	-2.1%	80% in year 10
	6	9.0%	24.1%	2.7%	13.0%	18.6%	9.4%	3.6%	-2.4%	74% in year 10
	7	10.0%	29.5%	0.0%	12.3%	19.2%	11.6%	4.4%	-2.9%	65% in year 10

Lower assumed rates of return result in higher expected contributions and lower expected dividends

Higher assumed rates of return are associated higher standard deviation (i.e. risk) and worst case scenario for retiree dividend pool falling below 50%

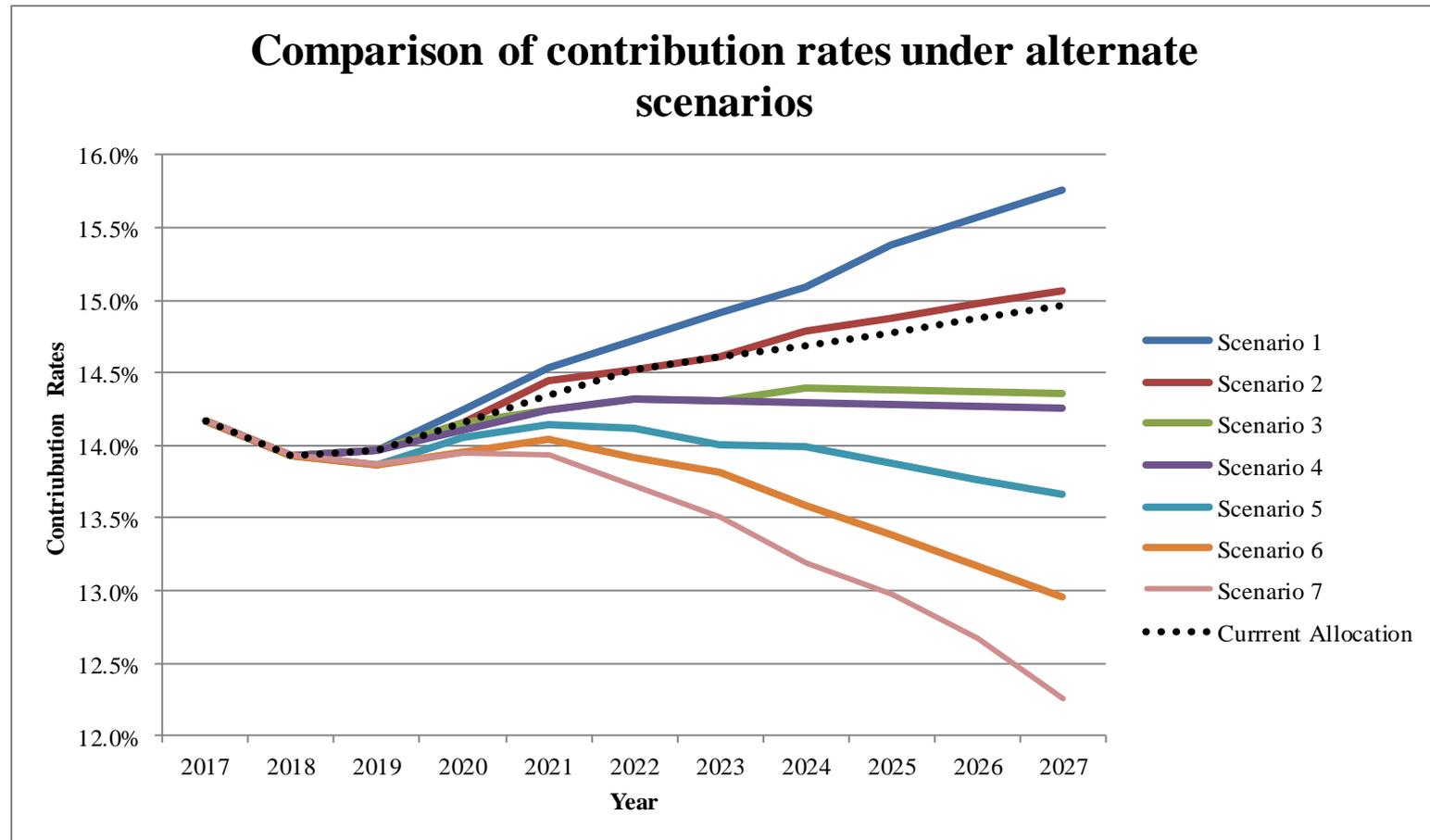
Scenarios 2, 2A, 3 and 4 represent potential 'Goldilocks Zone'

2017 Observations

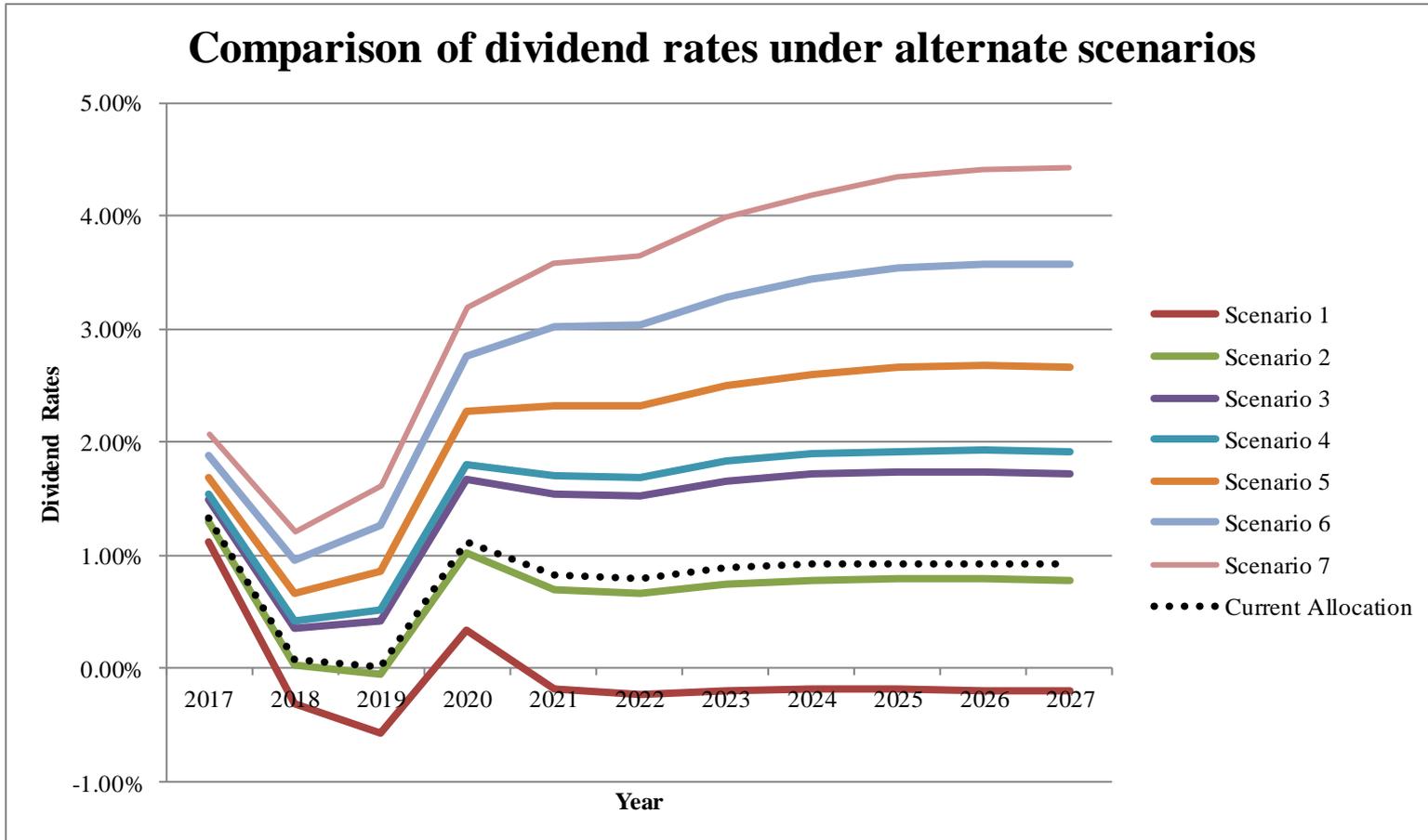
- Changes from 2015 Study
 - Combined returns for 2015 and 2016 slightly lower than assumed rate of 7.2% (-0.4% return for 2015 and 8.29% return for 2016)
 - Mortality table update (slightly longer expected lifetimes)
 - Slightly lower Standard Deviation than 2015 Study
- Overall results are similar to 2015 study
 - Slightly higher probability of depleting dividend reserve due to lower than expected returns
 - This may be offset by asset returns from 1/1/2017 through 12/31/2017
- Continue to target 'Goldilocks zone' that provides for positive return with appropriate downside protection

Appendix

Contribution rate summary under alternate scenarios - median



Dividend rate summary under alternate scenarios - median

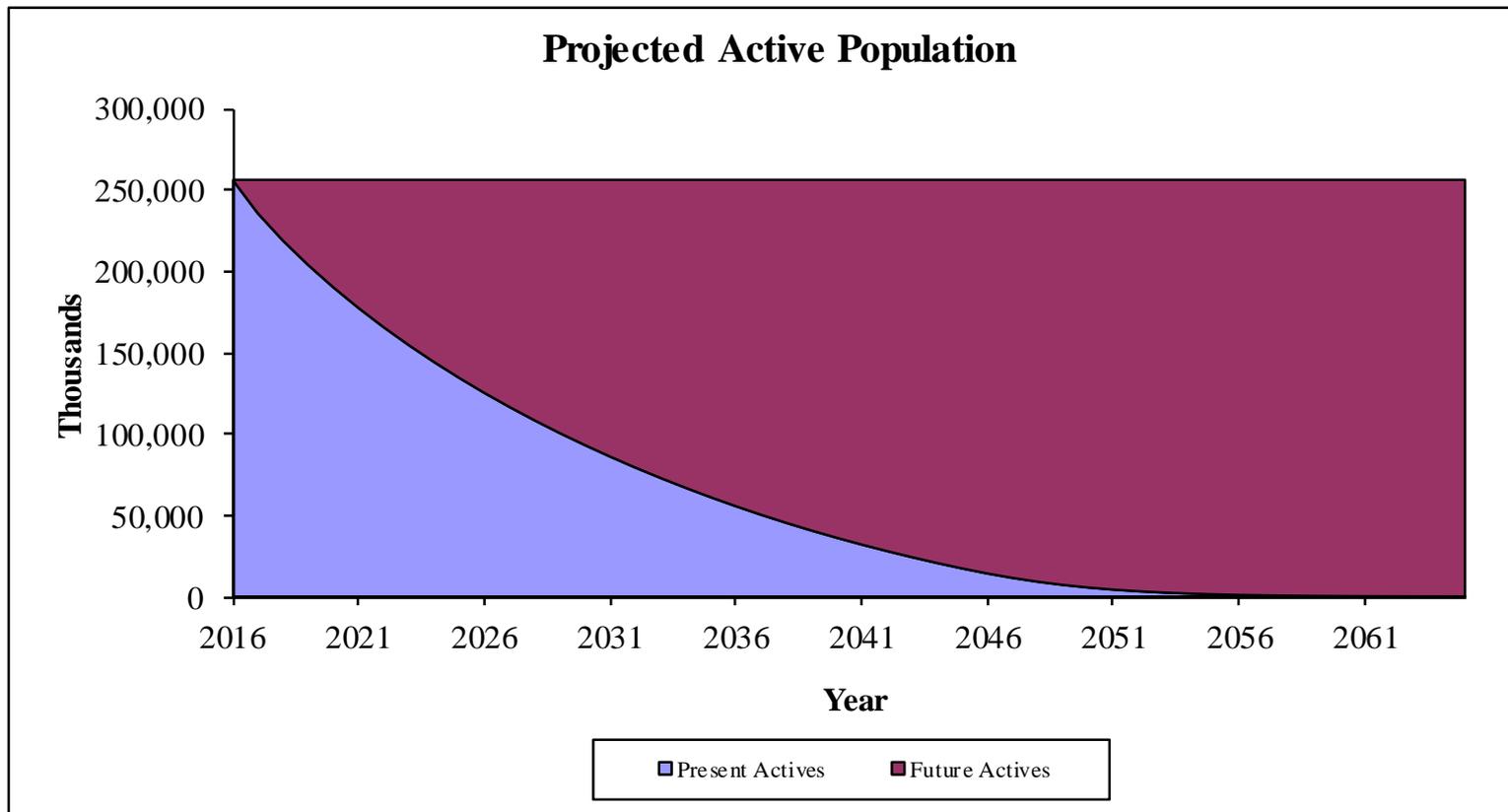


Present & Future Actives

Year by Year results

Year	Present Actives	Future Actives	Year	Present Actives	Future Actives
2014	256,208	-	2039	32,029	224,179
2015	235,652	20,556	2040	28,041	228,167
2016	218,822	37,386	2041	24,254	231,954
2017	203,865	52,343	2042	20,670	235,538
2018	190,155	66,053	2043	17,316	238,892
2019	177,464	78,744	2044	14,212	241,996
2020	165,652	90,556	2045	11,489	244,719
2021	154,619	101,589	2046	9,148	247,060
2022	144,270	111,938	2047	7,183	249,025
2023	134,497	121,711	2048	5,576	250,632
2024	125,312	130,896	2049	4,292	251,916
2025	116,631	139,577	2050	3,277	252,931
2026	108,392	147,816	2051	2,480	253,728
2027	100,568	155,640	2052	1,857	254,351
2028	93,150	163,058	2053	1,378	254,830
2029	86,098	170,110	2054	1,012	255,196
2030	79,371	176,837	2055	738	255,470
2031	72,996	183,212	2056	535	255,673
2032	66,924	189,284	2057	384	255,824
2033	61,122	195,086	2058	273	255,935
2034	55,606	200,602	2059	193	256,015
2035	50,363	205,845	2060	135	256,073
2036	45,391	210,817	2061	92	256,116
2037	40,678	215,530	2062	61	256,147
2038	36,235	219,973	2063	39	256,169

Present & Future Actives

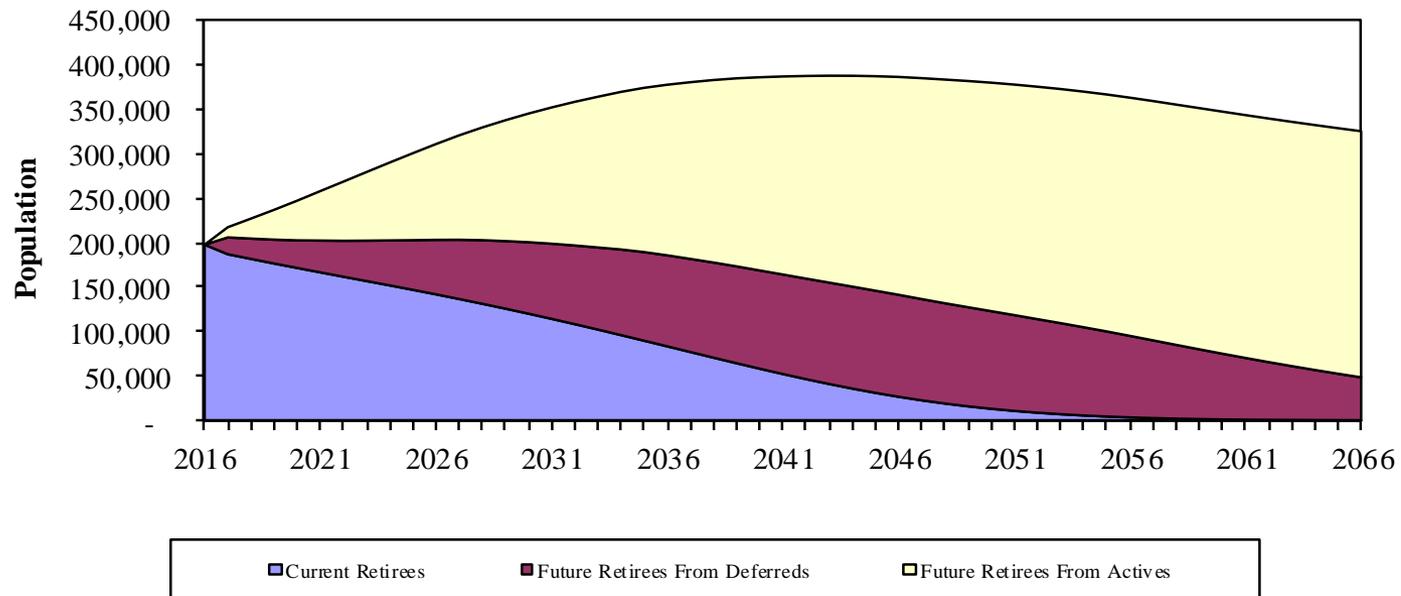


Retiree Population – Present and Future Year by Year Results

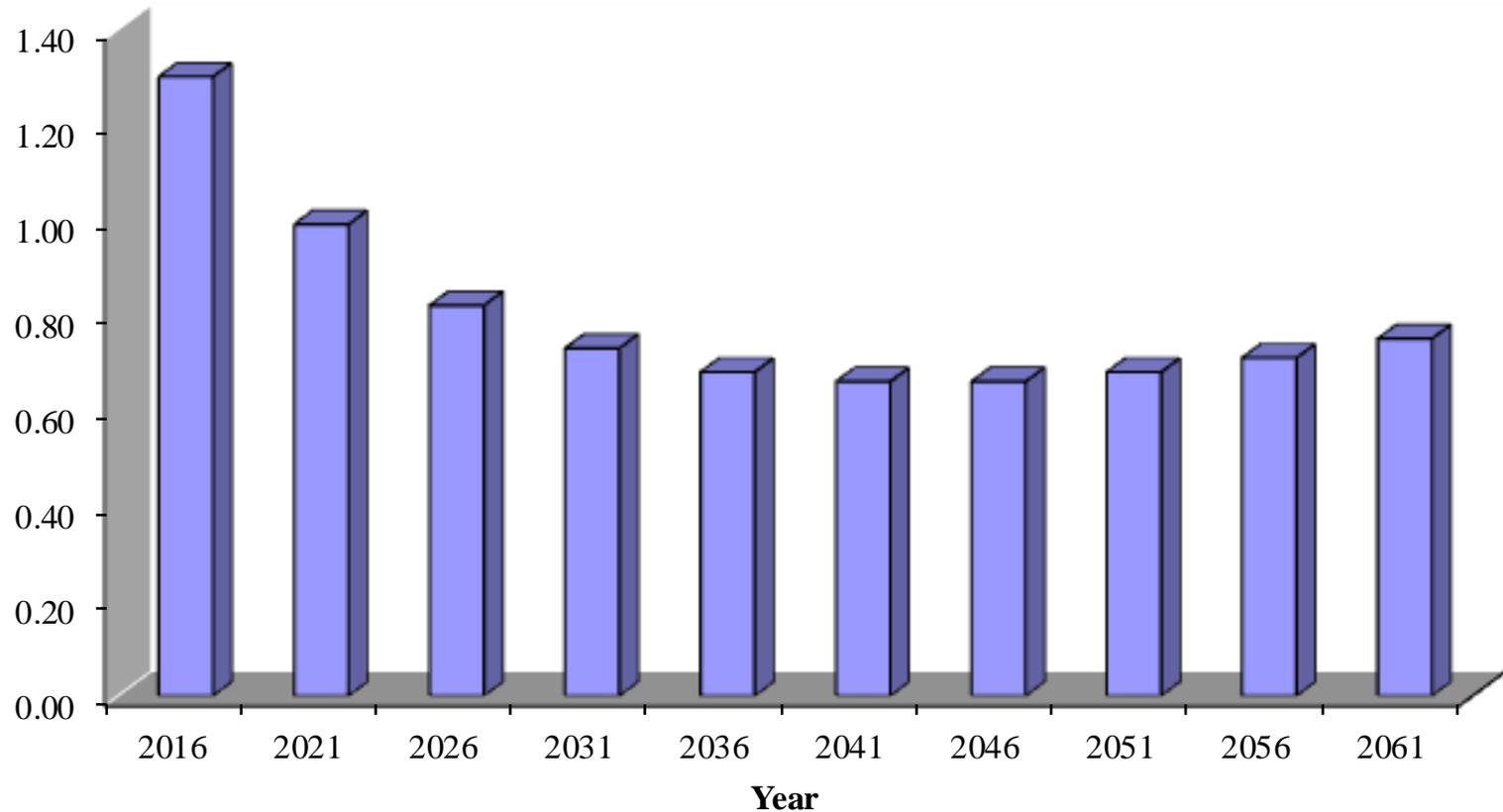
Year	Present Retirees	Future from Deferred	Future from Actives	Year	Present Retirees	Future from Deferred	Future from Actives
2016	197,647	-	-	2041	52,470	222,385	111,709
2017	186,931	11,442	18,907	2042	46,730	227,497	112,870
2018	181,738	22,415	22,805	2043	41,261	232,278	113,860
2019	176,555	33,453	26,785	2044	36,110	236,731	114,476
2020	171,553	44,533	30,971	2045	31,317	240,836	114,707
2021	166,623	55,563	35,681	2046	26,912	244,586	114,524
2022	161,681	66,435	40,367	2047	22,919	248,015	113,695
2023	156,818	77,068	45,362	2048	19,345	251,129	112,599
2024	151,978	87,459	50,478	2049	16,189	253,960	111,309
2025	147,006	97,646	55,703	2050	13,437	256,528	109,617
2026	141,921	107,559	61,153	2051	11,063	258,859	107,542
2027	136,717	117,197	66,472	2052	9,038	260,959	105,043
2028	131,360	126,552	71,356	2053	7,328	262,844	102,299
2029	125,873	135,634	75,845	2054	5,900	264,537	99,108
2030	120,224	144,433	80,232	2055	4,720	266,058	95,549
2031	114,420	152,967	84,359	2056	3,755	267,429	91,561
2032	108,468	161,255	88,342	2057	2,974	268,666	87,304
2033	102,378	169,246	92,156	2058	2,348	269,791	82,850
2034	96,173	176,967	96,111	2059	1,851	270,824	78,346
2035	89,880	184,425	99,478	2060	1,457	271,778	73,837
2036	83,532	191,578	102,180	2061	1,148	272,664	69,364
2037	77,167	198,426	104,525	2062	907	273,493	64,946
2038	70,830	204,945	106,792	2063	718	274,272	60,626
2039	64,569	211,123	108,752	2064	572	275,006	56,417
2040	58,432	216,930	110,286	2065	458	275,699	52,327

Retiree Population Present and Future

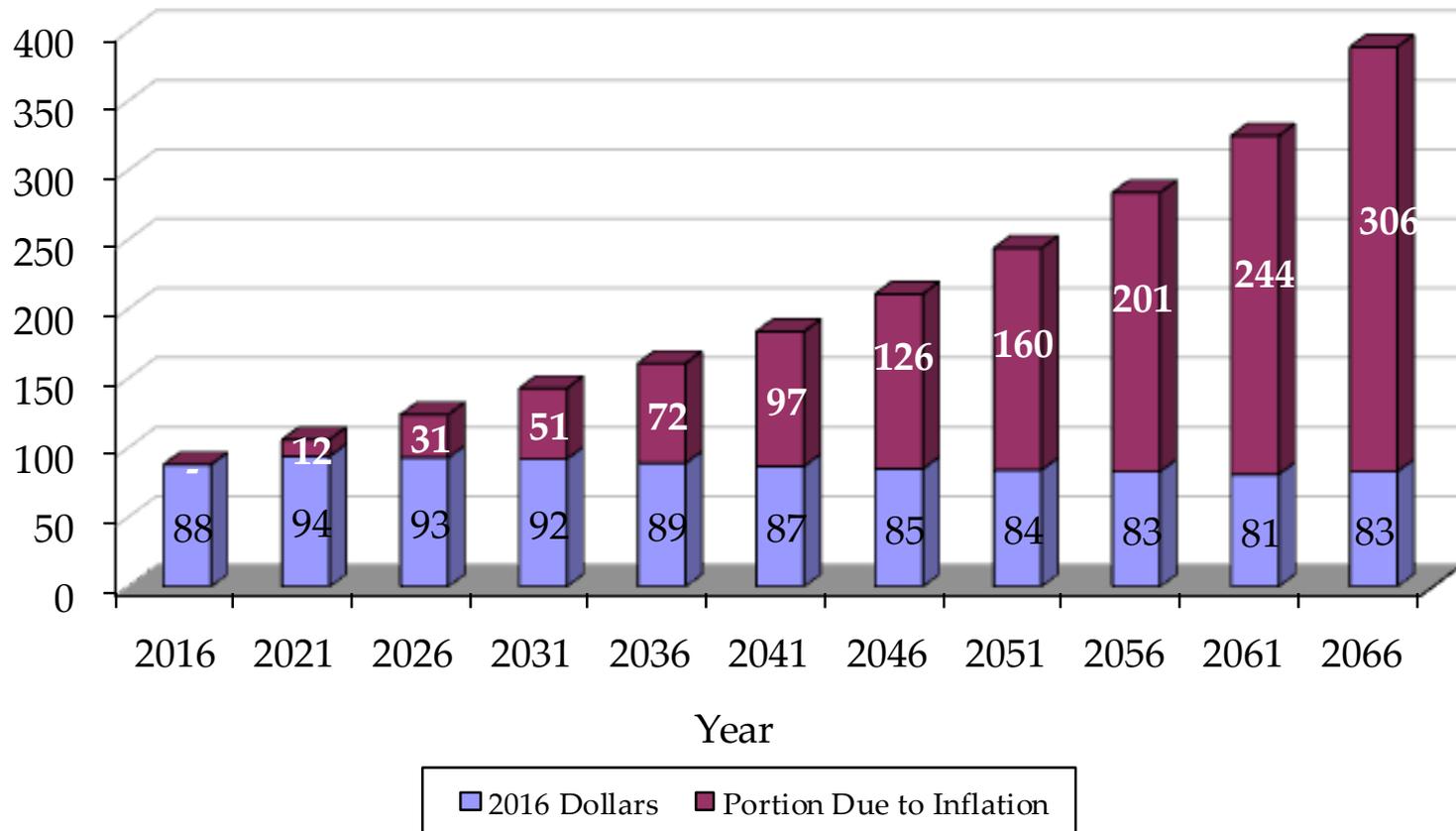
Projected Retiree Population



Ratio of Active Members to Retirees



Projected Core Trust Fund Assets (\$Billions)



Disclaimers

- This presentation shall not be construed to provide tax advice, legal advice or investment advice.
- Readers are cautioned to examine original source materials and to consult with subject matter experts before making decisions related to the subject matter of this presentation.
- This presentation expresses the views of the authors and does not necessarily express the views of Gabriel, Roeder, Smith & Company.

Exhibit B

Total and Active Risk Update As of December 2016

Selected Pages

Summary Performance (page #2 and #9)

- Preliminary performance, performance score cards, and peer group comparison shown.

Asset Allocation (page #10)

- The fund is currently positioned very close to major asset class policy weights. The fund was rebalanced at year end toward new policy weights.

Currency Exposure (page #11)

- On a relative basis, the Core Fund is very close to currency policy weights. The currency overlay is deployed to bring the CTF's currency exposure from allocation within the +/- 10 bps tolerance. The Variable Fund is slightly overweight the US dollar relative to its benchmark and slightly underweight a number of currencies.

Credit Exposure (pages #12 and #13)

- The Core Fund exposure to credit (AA and below) was about \$13.0 mid-January relative to a benchmark exposure of \$12.5B for a +\$0.5B relative overweight before adjusting for duration. On a duration adjusted basis, the fund is neutral investment grade credit.

Cash Exposure (pages #14 and #15)

- Cash exposures have been managed low for both funds to minimize the cash drag effect from allocation – the policy assumes full investment. The three year median daily cash exposure has been ~\$125M for the Core fund and ~\$9M for the Variable fund.

Market Risk / Top Equity Holdings (pages #16 thru #19)

- The CTF market risk was roughly in line with the policy at the end of December with Real Estate, the Alpha Pool, and Private Equity portfolios' contributions slightly higher than their respective benchmark contributions. A back test of the accuracy of the ex-ante total risk measure is showing a favorable modeling result for the since 2007 period. Top market risk contributors are listed by risk and market cap.

Active Risk / Tracking Error (pages #20 thru #25)

- The Core Fund's current ex-ante tracking error estimate is 0.64% this month, less than both the 2016 active risk budget of 0.77% and the long term target of 1.20%. Active risk detail for Public Equities and Public Fixed Income within the Core Fund as well as detail for the Variable Fund follows the aggregate Core Fund analysis.

Stress and sensitivity tests (pages #26 thru #29)

- Showing stress tests and sensitivity analysis for Core Fund's public assets and the hedge fund portfolio. Also showing a liquidity stress test for the Core Fund.

Market risk premiums and credit upgrade/downgrade indicators (page #30 thru #38)

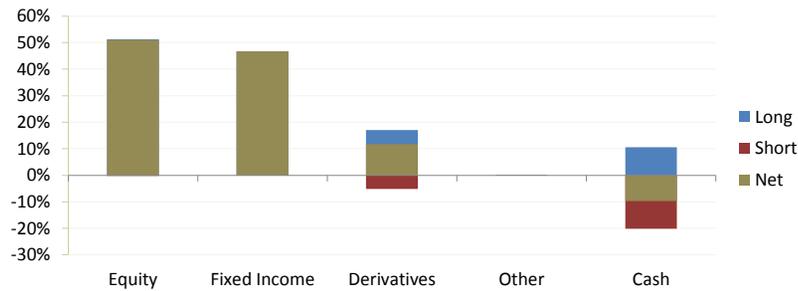
- Showing how current and equilibrium returns look for investment grade bonds, equity, high yield bonds, and CCC bonds. Also showing credit upgrade/down grade indicators for US credits and high yield in aggregate and energy sectors.

CTF Public Assets (ex Hedge Funds and Risk Parity) - Absolute Risk Summary

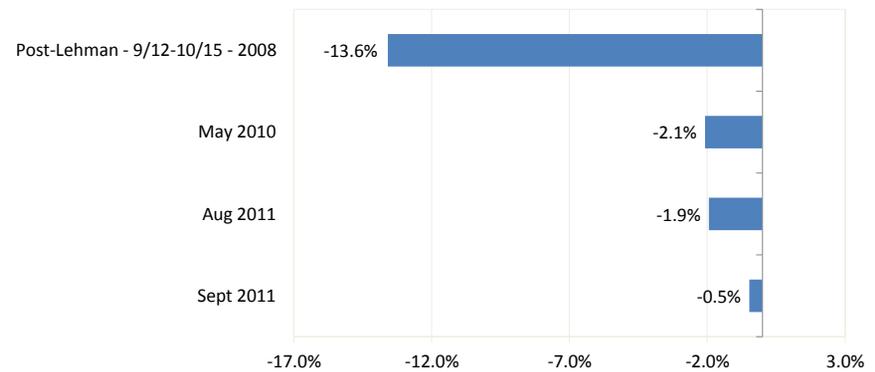
Holdings As Of: 12/31/2016

Exposure Summary (% Portfolio Value)

	Gross	Long	Short	Net
Equity	52%	51%	0%	51%
Fixed Income	47%	47%	0%	47%
Derivatives	22%	17%	-5%	12%
Other	0%	0%	0%	0%
Cash	31%	11%	-20%	-10%
Total	152%	126%	-26%	100%

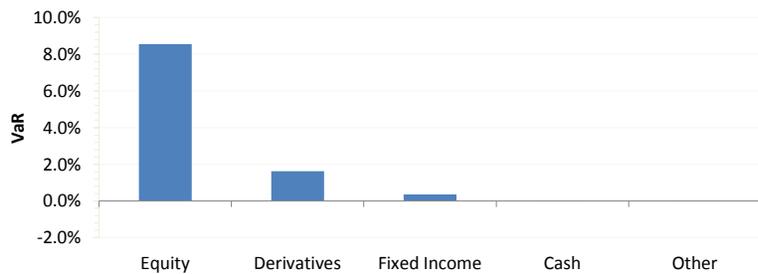


Stress Scenarios - Predicted Absolute Returns

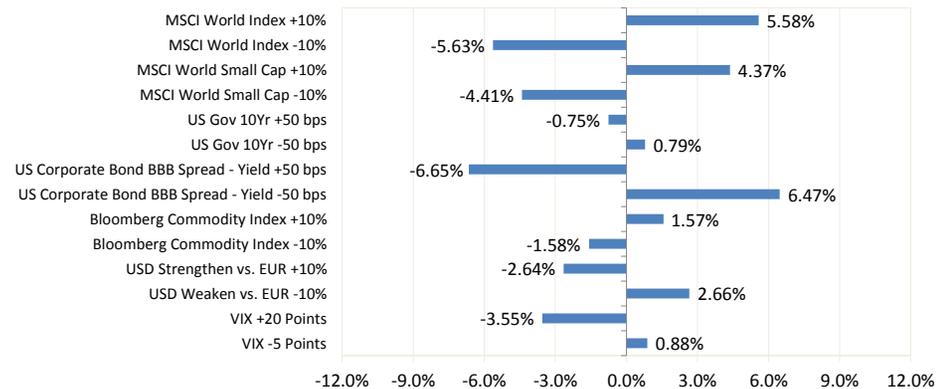


Absolute Risk Summary

	Standalone Risk	Total Risk	Systematic Risk	Idiosyncratic Risk
Equity	17.34%	8.56%	8.55%	0.00%
Derivatives	15.31%	1.62%	1.61%	0.00%
Fixed Income	5.53%	0.36%	0.79%	-0.43%
Cash	0.06%	0.00%	0.01%	-0.01%
Other	-5.42%	0.00%	0.00%	0.00%
Total	10.52%	10.52%	10.96%	-0.44%



Sensitivity Overview - Predicted Absolute Returns

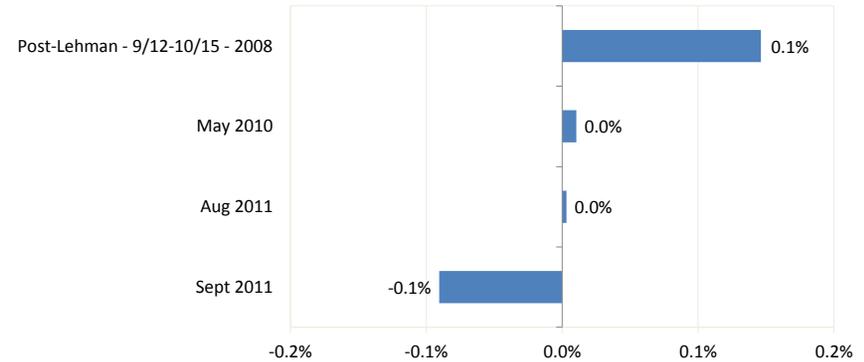


* VaR using 95% confidence interval, 21-day horizon, annualized percentage

CTF Public Assets (ex Hedge Funds and Risk Parity) - Relative Risk Summary

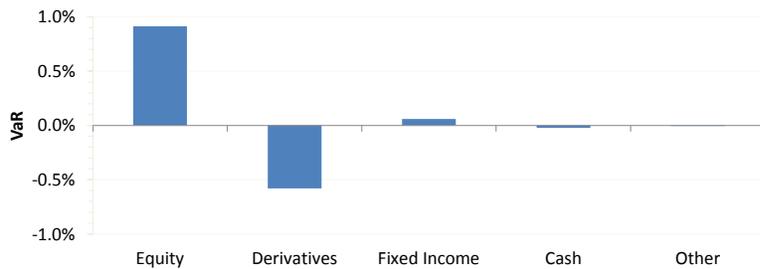
Holdings As Of: 12/31/2016

Stress Scenarios - Predicted Relative Returns



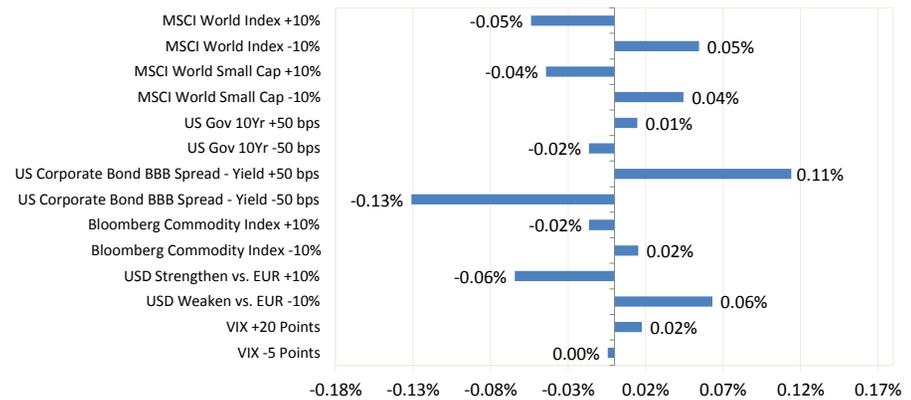
Relative Risk Summary

	Total Relative Risk	Systematic Relative Risk	Idiosyncratic Relative Risk
Equity	0.91%	0.75%	0.16%
Derivatives	-0.58%	-0.58%	0.00%
Fixed Income	0.06%	0.06%	0.00%
Cash	-0.02%	0.00%	-0.02%
Other	0.00%	0.00%	0.00%
Total	0.37%	0.23%	0.14%



* VaR using 95% confidence interval, 21-day horizon, annualized percentage

Sensitivity Overview - Predicted Relative Returns

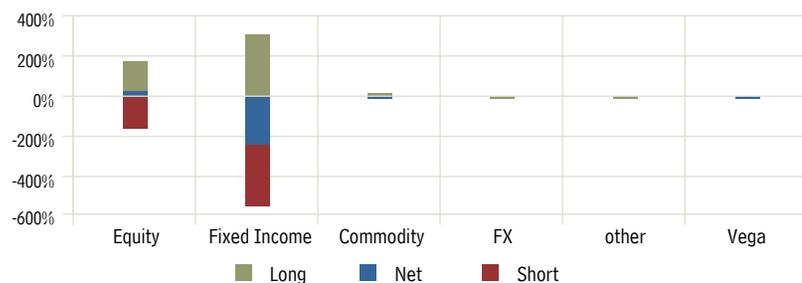


HedgePlatform Summary

Portfolio Name: **SWIB_GRP_Alpha** Analysis Date: **November 30, 2016**
 Portfolio Value: **3,595,057,751** # of Funds: **25**
 Currency: **USD** # of Positions: **159,403**

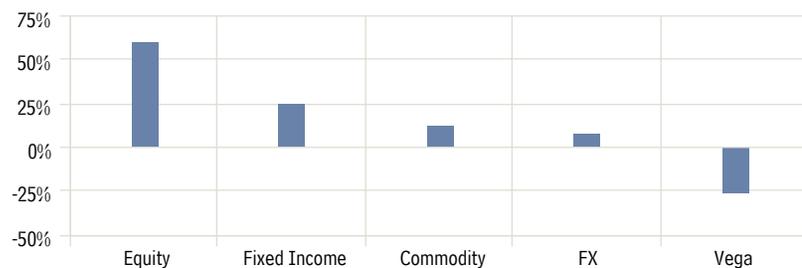
Exposure Summary (% Portfolio Value)

	Net	Long	Short	Gross
Equity	20.98	179.80	-160.69	340.49
Fixed Income	-238.65	314.77	-553.21	867.99
Commodity	0.51	9.07	-8.14	17.21
FX	-5.79	6.07	-11.65	17.72
other	0.49	0.49	-0.00	0.49
Vega	3.38			

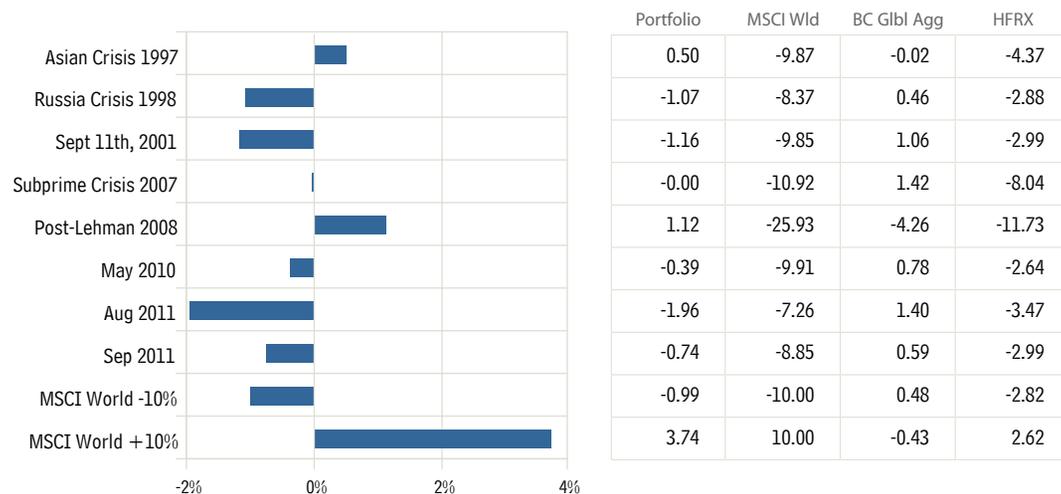


Risk Summary

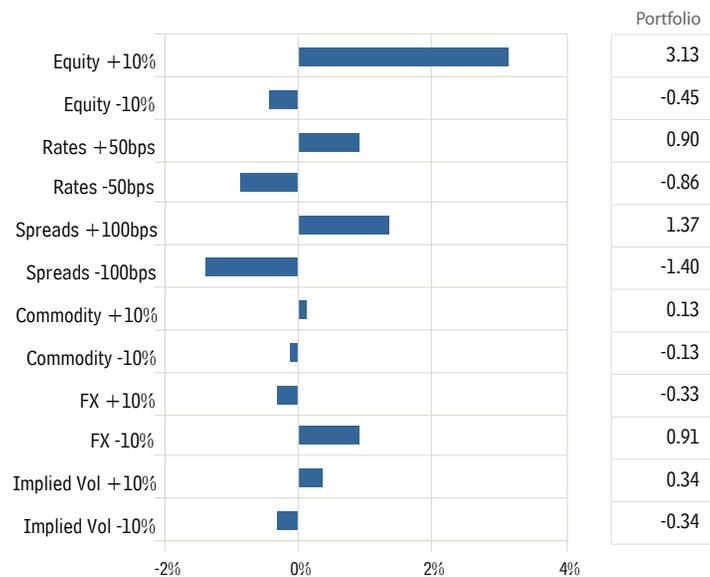
	1 Month MC IVaR	
	% Port Value	% Total
Total	1.07	100.00
Equity	-	60.00
Fixed Income	-	23.70
Commodity	-	12.53
FX	-	8.00
Vega	-	-26.42



Stress Test Overview



Sensitivity Overview



STATE OF WISCONSIN INVESTMENT BOARD
CTF Liquidity Stress Test (Policy Overlay at 109% / Alpha Overlay at ~5%)
Friday, January 13, 2017

Market stressed returns	Rate Change	Duration	Return
Equities & Commodities			-15.0%
Nominal Bonds	1.4%	6.64	-9.3%
TIPS and Linkers	1.0%	7.86	-7.9%

	Current Market	Current Exposure	Stressed Market	Stressed Exposure	Target Lev Ratio	Target Market
Stress test for Policy Overlay						
Domestic Equities (F907)	881.3	2,794.2	462.2	2,375.1	3.3	719.7
Treasury Futures (F908)	342.6	3,244.7	40.9	2,943.1	10.0	294.3
TIPS (F909)	727.6	2,491.8	531.8	2,296.0	3.3	695.8
Commodity Futures (F916)	<u>627.7</u>	<u>1,935.8</u>	<u>337.3</u>	<u>1,645.4</u>	3.3	<u>498.6</u>
Total Policy Overlay (G910)	2,579.2	10,466.5	1,372.3	9,259.5		2,208.4
1) Stress test for Policy Overlay (mils):		-836.1				

	Current Market	Current Exposure	Stressed Market	Stressed Exposure	Target Lev Ratio	Target Market
Stress test for Synthetic Beta						
Synthetic Large Cap (F7021)	1,172.5	3,647.2	625.5	3,100.1	3.3	939.4
Synthetic Small Cap (F7022)	39.6	110.5	23.1	93.9	3.3	28.5
Synthetic Int'l Equity (F7023)	233.5	741.2	122.3	630.0	3.3	190.9
Synthetic Treasuries (F7024)	<u>184.8</u>	<u>1,773.1</u>	<u>19.9</u>	<u>1,608.3</u>	10.0	<u>160.8</u>
Total Synthetic Beta for Alpha Overlay	1,630.5	6,272.0	790.8	5,432.3		1,319.6
2) Stress test for Alpha Overlay (mils):		-528.8				

3) Stress test for Private Markets (mils): (PMG's max capital call month in the past three years)	-432.5
--	--------

4) Stress test for monthly benefits: (reflects withdrawals only, contributions not reflected)	-430.0
--	--------

Total stress tests (1, 2, 3, and 4) for CTF (mils):	-2,227.4
---	----------

CTF liquidity stress test's impact on available liquidity (assumes active strategies with public equities and public fixed not accessed)				
Asset Class	Liquidity Stress	Liquidity Accounts	Passive Accounts*	Stress % of Available
Domestic Equities	-723.9	589.0	8,391.5	8.1%
Int'l Equities - Developed	-615.3	124.7	9,732.7	6.2%
Int'l Equities- Emerging	-108.6	0.0	3,255.7	3.3%
Public Fixed Income	<u>-779.6</u>	<u>1,462.1</u>	<u>274.0</u>	<u>44.9%</u>
	-2,227.4	2,175.8	21,653.8	9.3%

* Excludes passive mid cap portfolio (F7015) and excludes passive credit in BTC modules (F883).

Exhibit C

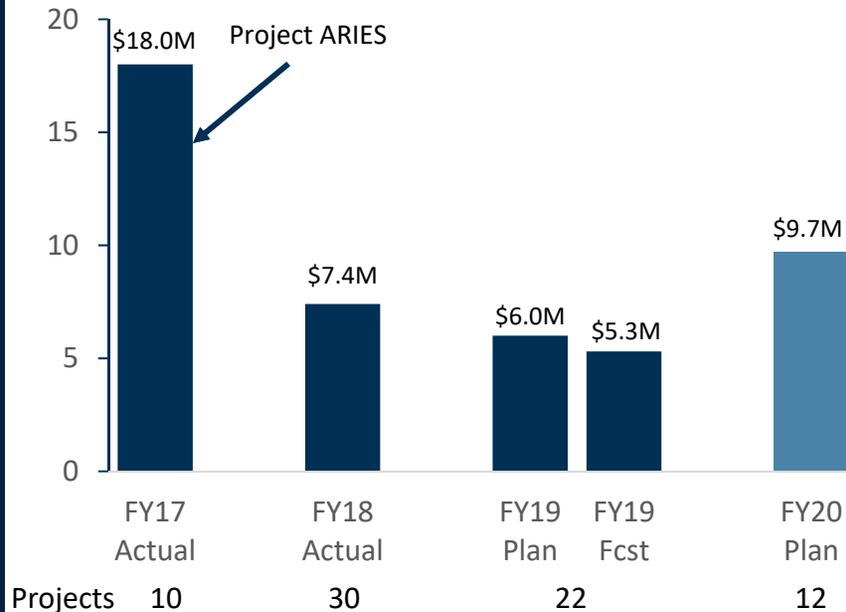


FY 2020 SWIB Total Cost of Management Plan

*Selected Slides from
June 2019 Audit and Finance Committee*



Our FY 2020 Project Investments reflect our strategic priorities for the fiscal year



ANTICIPATED PROJECTS

- SWIB Foundations
 - Account Master
 - Data Warehouse & DataMart
 - Middle Office Optimization
 - Performance, Attribution, & Ex-Post Risk
 - Reporting & Information Delivery
 - Security Master
 - Trading & Portfolio Management
- eFront Implementation Completion
- Portfolio Management System
- eFront Private Market Full Onboarding
- eFront IBOR Build Out
- Non-IBOR Data Warehouse

- FY 2019 project investments, totaling \$6.0M, the largest of which included:

- | | | |
|--------------------------------------|---|-------------------------|
| – Comprehensive Solution/Foundations | – PMFA eFront Implementation | – Charles River Upgrade |
| – Legacy Pace Retirement | – Barclays Point Replacement | – Markit Upgrade |
| – Client Reporting – Sep Mangd Funds | – Enterprise Data Store | – Unit4/Agresso Upgrade |
| – Incentive Compensation Database | – Global Sector Portfolio Restructuring | – RE eFront Upgrade |

Note: Project investments include both contractor resources and implementation expenses required to execute a project. A comprehensive list of FY 2019 projects is included in the appendix.



FY 2019 Projects – 22 in total (counting Comprehensive Solution workstreams as 1 project)

Comprehensive Solutions/Foundations Project:

- Comprehensive Solution Pre-work
- CS – Eagle Optimization Effort
- CS – Security Master
- CS – Reporting & Information Delivery
- CS – Functional Support Model
- CS – Reporting Tools Assessment
- CS – Account Master
- CS – Performance Tool RFP
- CS – Performance, Attribution & Ex-Post Risk
- FDN – IBOR Data Warehouse

Other PMO Projects:

- Barclays Point Replacement
- Client Reporting
- CRD Upgrade-2018
- DataMart
- Data Stewardship
- eFront Upgrade for Real Estate - 2019
- Enterprise Data Store Implementation
- Equity Sector Portfolios Redesign Project
- Facility Enhancement
- Incentive Comp Performance Calculation System
- InvestOne Retirement Reporting
- Legacy PACE Retirement
- Markit upgrade 18.1
- Multi-Asset Enablement Phase 2
- PE, VC & Co-Invest Project
- Performance Operations
- Portfolio P&L
- Technology Assessment
- Trade Tagging
- Unit4 Business World Upgrade (v7.2)
- WI Investments

Exhibit D

FY 2019 (Actuals Through April)

	Initial Budget Allocations	Subsequent Budget Allocations	Actual Project Spend	Budget Surplus
<i>SWIB Foundations (Comprehensive Solution)</i>				
Eagle Optimization Effort	\$ 137,500	\$ 579,372	\$ 716,872	\$ -
Security Master	\$ -	\$ 8,492	\$ 8,492	\$ -
Reporting & Information Delivery	\$ -	\$ 72,441	\$ 72,441	\$ -
Functional Support Model	\$ 27,000	\$ 116,240	\$ 143,240	\$ -
Reporting Tools Assessment	\$ -	\$ 63,899	\$ 63,899	\$ -
Account Master	\$ 137,500	\$ 122,156	\$ 135,947	\$ 123,709
Performance Tool RFP	\$ -	\$ 405	\$ 405	\$ -
Performance, Attribution & Ex-Post Risk	\$ -	\$ 68,506	\$ 68,506	\$ -
Data Warehouse & DataMart	\$ -	\$ 29,929	\$ 29,929	\$ -
<i>Other Project Management Office Projects</i>				
Private Mkts Platform Implementation	\$ 1,150,000	\$ 111,987	\$ 1,261,987	\$ -
Charles River Assessment	\$ 86,625	\$ -	\$ 31,773	\$ 54,852
Charles River Upgrade	\$ 318,787	\$ 191,161	\$ 509,948	\$ -
System Retirement – Legacy PACE	\$ 64,900	\$ 225,780	\$ 290,680	\$ -
Barclays Point Replacement Implementation	\$ 55,215	\$ 144,805	\$ 200,020	\$ -
Enterprise Data Store Performance and Risk	\$ 504,900	\$ -	\$ 159,646	\$ 345,254
Markit Upgrade 2018	\$ 147,675	\$ 16,319	\$ 163,994	\$ -
Data Mart Implementation	\$ 88,920	\$ 26,057	\$ 114,977	\$ -
Client Reporting Separately Managed Funds	\$ 19,900	\$ 80,889	\$ 100,789	\$ -
Unit 4 Agresso Upgrade	\$ 149,013	\$ -	\$ 92,336	\$ 56,677
Multi-Asset Enablement	\$ 43,000	\$ 38,780	\$ 81,780	\$ -
Portfolio P&L	\$ 41,800	\$ -	\$ 33,985	\$ 7,815
Global Sector Portfolio Restructuring	\$ 128,700	\$ -	\$ 30,918	\$ 97,782
Data Stewardship Contingency	\$ -	\$ 29,216	\$ 29,216	\$ -
Technology Assessment	\$ -	\$ 22,616	\$ 22,616	\$ -
Incentive Compensation Database	\$ 12,900	\$ 2,429	\$ 15,329	\$ -
eFront Upgrade for Real Estate 2019	\$ -	\$ 16,148	\$ 16,148	\$ -
Wisconsin Investment	\$ 16,050	\$ -	\$ 11,151	\$ 4,900
Facility Enhancement	\$ 52,000	\$ -	\$ 6,751	\$ 45,249
System Retirement - Invest One LIRM	\$ 2,524	\$ 8,248	\$ 10,772	\$ -
Performance Ops	\$ -	\$ 4,884	\$ 4,884	\$ -
Enterprise Trade Tagging	\$ -	\$ 829	\$ 829	\$ -
Total	\$ 3,184,908	\$ 1,981,589	\$ 4,430,261	\$ 736,237
Board-Approved Total Budget	\$ 6,000,000		\$ 4,430,261	

FY 2020 (Preliminary Estimates)

	Initial Budget Estimate
SWIB Foundations	\$ 5,007,804
Account Master	
Data Warehouse & DataMart	
Middle Office Optimization	
Performance, Attribution & Ex-Post Risk	
Reporting & Information Delivery	
Security Master	
Trading & Porfolio Management	
eFront Implementation Completion	\$ 2,750,000
Private Mkts Platform Implementation	
eFront Private Mkts Full Onboarding	
Portfolio Management System	\$ 1,000,000
eFront IBOR Build out	\$ 500,000
Non-IBOR Data Warehouse	\$ 459,000
Board-Approved Total Budget	\$ 9,716,804

Exhibit E



Quarterly Cost Of Management Update

June 2019 Audit & Finance Committee

Selected Slides

FYTD (Jul 18-Apr 19) Total Cost of Management is 8% Under Plan

\$ in millions	FYTD 2017 Actual	FYTD 2018 Actual	FYTD 2019 Actual	FYTD 2019 Plan	Variance to Plan
Total Cost of Management	\$324.4	\$363.9	\$377.3	408.8	31.5
FY 2019 Change over FY 2018 Plan					
External Management					
Real Estate (RE)	\$39.2	\$42.1	\$42.6	40.6	(1.9)
Private Equity (PE)	\$107.4	\$112.2	\$122.6	128.7	6.1
Public Markets (PM)	\$34.6	\$56.2	\$43.4	57.3	14.0
Hedge Funds (HF)	\$84.4	\$96.9	\$98.5	96.3	(2.2)
Total External Management Costs	\$265.6	\$307.4	\$307.0	322.9	15.9
Internal Management					
Research & Consulting Services	\$10.5	\$11.5	\$15.0	15.4	0.3
Contingent Staffing (BAU+Variable)	\$2.1	\$4.9	\$5.1	5.0	(0.0)
Research & Consulting Services	\$12.6	\$16.4	\$20.1	20.4	0.3
Projects	\$15.4	\$7.5	\$4.4	5.0	0.6
Projects	\$15.4	\$7.5	\$4.4	5.0	0.6
Middle Office	\$0.0	\$4.0	\$3.3	3.7	0.4
Asset Custody	\$3.1	\$1.2	\$1.6	2.2	0.6
Asset Custody/Middle Office	\$3.1	\$5.2	\$4.9	5.8	0.9
Legal Fees	\$1.8	\$1.2	\$1.6	2.1	0.5
Internal Operating Budget	\$25.9	\$26.1	\$39.3	52.6	13.3
Total Internal Management Costs	\$58.8	\$56.5	\$70.3	85.9	15.6

() indicates unfavorable variance

External management cost drivers:

- RE fees slightly above plan due to higher than plan AUM growth
- PE fees currently below plan because the timing of new capital deployment and first time management fee calls were slower than expected. Expect to make up some ground in May and June.
- PM fees below plan due to lower than plan AUM and performance. Assets planned to transition externally are taking longer than expected to deploy.
- HF fees slightly higher than plan due to excess performance calendar year to date.

Internal management cost drivers:

- Project costs lower than budget due to an intentional slow down & increased focus on foundational activities.
- Asset Custody/Middle Office below plan due to lower than forecast AUM.
- Legal spending below budget due to asset allocations to existing mgrs. rather than new investment firms.
- Incentive Comp payments under budget by \$7.2M due to lower than expected performance & fewer staff than budgeted.

Forecasted FY19 Total Cost of Management Approximately 6% Under Plan

Forecast through June 2019

\$ in millions	FY 2017 Actual	FY 2018 Actual	FY 2019 Current Forecast	FY 2019 Plan	Variance to Plan
Total Cost of Management	\$401.9	\$451.3	\$459.7	\$489.9	\$30.2
FY 2019 Change over FY 2018 Plan					
External Management					
Real Estate (RE)	\$47.1	\$50.4	\$53.0	\$48.8	(\$4.3)
Private Equity (PE)	\$129.4	\$135.9	\$151.5	\$154.4	\$3.0
Public Markets (PM)	\$40.2	\$64.9	\$53.4	\$68.8	\$15.4
Hedge Funds (HF)	\$97.2	\$112.0	\$118.2	\$115.5	(\$2.7)
Total External Management Costs	\$313.9	\$363.3	\$376.1	\$387.5	\$11.4
Internal Management					
Research & Consulting Services	\$34.1	\$17.8	\$18.1	\$18.4	\$0.4
Contingent Staffing (BAU+Variable)	\$0.0	\$4.0	\$6.1	\$6.0	(\$0.0)
Research & Consulting Services	\$34.1	\$31.6	\$24.1	\$24.5	\$0.3
Projects	\$0.0	\$7.4	\$5.3	\$6.0	\$0.7
Projects	\$0.0	\$2.5	\$5.3	\$6.0	\$0.7
Middle Office	\$2.1	\$4.2	\$3.9	\$4.4	\$0.5
Asset Custody	\$2.0	\$2.1	\$1.9	\$2.6	\$0.7
Asset Custody/Middle Office	\$4.1	\$6.3	\$5.9	\$7.0	\$1.1
Legal Fees	\$1.9	\$1.5	\$2.0	\$2.5	\$0.5
Internal Operating Budget	\$47.9	\$46.2	\$46.4	\$62.4	\$16.1
Total Internal Management Costs	\$88.0	\$88.0	\$83.6	\$102.4	\$18.8
Avg. AUM (in billions)	\$106.6	\$115.9	\$119.4	\$125.6	
Cost in Basis Points	37.7	38.9	38.5	39.0	

External management cost:

- Real Estate fees expected to come in higher than plan due to higher AUM
- PE forecasts are trending below budgeted levels but are expected to end within \$3M of plan
- Public Markets fees below plan due to slower than expected deployment of assets to external managers in FY19
- Higher performance fees for Beta One and Hedge Funds expected due to positive performance in recent months

Internal management cost:

- Projects anticipated to come in under budget due to an intentional slow down of new projects and an increased focus on foundational activities.
- Custody and Middle Office expected to end lower than plan due to lower than forecasted AUM
- We expect continued savings to our internal operating budget due to fewer approved positions than anticipated in our FY19 Plan & lower than expected Incentive Comp payout.

() indicates unfavorable variance

Note: Fees for Hedge Funds & Public Markets include both base and performance fees. Other asset classes such as private equity and real estate do not expense performance fees as standard industry practice.

Exhibit F

State of Wisconsin Investment Board Total Cost of Management Plan & Policy

**Approved by the Board: August 10, 2005
As Amended November 12, 2008, February 8, 2012 and June 11, 2019**

Under Wisconsin Statutes §25.187, the Board has the authority to establish the operating budget and monitor the fiscal management of this operating budget. In addition, under Wisconsin Statutes §16.505(2g), the Board can create or abolish staff positions.

1. The Executive Director/Chief Investment Officer (ED/CIO) shall annually prepare a plan for the total cost of management (Plan) for the upcoming fiscal year, for implementation under Wisconsin Statutes §§ 16.505(2g), 20.536(1)(k), 25.187, 25.18(1) and 25.18(2)(e). The Plan shall include: (a) an operating budget (Chapter 20 expenses); (b) the projected use and anticipated costs of external management and investment counsel (Chapter 25 expenses); and (c) any projected changes in the number of authorized positions. (*Target: June Board Meeting*)
2. The Plan for the upcoming fiscal year shall be submitted to the Board for review and discussion. The position authority and Plan shall require the Board's approval.
 - a. The operating budget approved by the Board shall authorize the ED/CIO (a) to adjust and repurpose the types of positions within the number of authorized positions and (b) to adjust the expense expectations between expenditure and/or budget categories, as necessary, during the fiscal year.
 - b. Pursuant to Wisconsin Statutes §25.15(2)(c) and §25.187, SWIB will assess the trust funds (other than the WRS trust funds) for which it provides investment services for their pro rata share of the Board's operating expenditures in September of each year. SWIB will assess reasonable fees for all such expenses incurred by SWIB. .
 - c. Wisconsin Statute §25.17(13r) requires the ED/CIO to appear before the joint committee on finance at the committee's first quarterly meeting in each fiscal year as requested by the committee to provide an update on the operating budget and position authority changes, assessments and performance of the funds under management.
3. SWIB receives no general-purpose revenues from the State for the trust funds it manages. Expenses and costs for assets under SWIB's management are paid directly from those trust funds.
4. The ED/CIO shall keep the Board apprised of any material adjustments to the Plan as they occur. Based on the expenditure or budget category, incurring costs in excess of the Plan may require prior Board approval or may require Board notification at the next regularly scheduled Audit & Finance Committee meeting. The Plan consists of the following

expenditure and/or budget categories, and the requirements for incurring costs in excess of the category projections are identified:

- a. External Management – includes fees paid to third party asset managers who manage specific assets pursuant to a contractual commitment. These costs are estimated annually based on assets under external management, expected performance and negotiated fees. The ED/CIO will notify the Board at the next regularly scheduled Audit & Finance Committee meeting if actual costs exceed (or are forecasted to exceed) estimated costs, including the reasons for such discrepancy. These expenses are paid pursuant to Chapter 25 of the Wisconsin Statutes.
- b. Research and Consulting Services – includes fees paid to research providers and consulting firms for specialized investment expertise supporting SWIB’s investment strategies and/or operations. These costs are estimated annually based on expected research and consulting needs. The ED/CIO will notify the Board at the next regularly scheduled Audit & Finance Committee meeting if actual costs exceed (or are forecasted to exceed) estimated costs, including the reasons for such discrepancy, and the ED/CIO will request and receive the approval of the Board prior to exceeding the budget by more than 10%. These expenses are paid pursuant to Chapter 25 of the Wisconsin Statutes.
- c. Projects – includes costs for specific initiatives that enhance SWIB’s internal capabilities to manage investments successfully. SWIB sets an annual budget in the Plan for these costs based on anticipated project needs, and the ED/CIO will request and receive the approval of the Board prior to exceeding the budget established in the Plan. These expenses are paid pursuant to Chapter 25 of the Wisconsin Statutes.
- d. Asset Custody/Middle Office – includes fees paid to SWIB’s custodian under a contractual commitment based on assets under management. These costs are estimated annually based on assets under management, expected growth and negotiated fees. The ED/CIO will notify the Board at the next regularly scheduled Audit & Finance Committee meeting if actual costs exceed (or are forecasted to exceed) estimated costs, including the reasons for such discrepancy. These expenses are paid pursuant to Chapter 25 of the Wisconsin Statutes.
- e. Legal Fees – includes fees paid to external legal counsel for legal services related to investments, regulatory/statutory compliance, litigation, etc. These costs are estimated annually based on expected transactions and other projects. The ED/CIO will notify the Board at the next regularly scheduled Audit & Finance Committee meeting if actual costs exceed (or are forecasted to exceed) estimated costs, including the reasons for such discrepancy. These expenses are paid pursuant to Chapter 25 of the Wisconsin Statutes.
- f. Internal Operating Budget – SWIB’s Chapter 20 budget covering all agency-related employee costs as prescribed by statute. SWIB sets an annual budget for internal

operations based on approved FTEs and expected investment performance (for incentive compensation purposes), and the ED/CIO will request and receive the approval of the Board prior to exceeding the budget. These expenses are paid pursuant to Chapter 20 of the Wisconsin Statutes.

5. SWIB will annually report to the Board on the general cost effectiveness of the Plan. *(Target: December Board Meeting)*

Exhibit G

Investment Performance Report

As of

March 31, 2019

Selected Slides

Executive Summary

March 31, 2019

- Core Trust Fund returned +8.05% gross of fees in Q1 resulting in an excess return of +15 bps YTD.
- Equity markets had a strong quarter with the US Equity markets (Russell 3000) returning +14.04% and Non US Equity markets (MSCI World ex US) returning +10.45%.
- Core Trust Fund five year gross of fee return of +6.36% outperforms the Policy Benchmark by +29 bps on an annualized basis.
- Core Trust Fund Return outperforms the 60/40 Reference Portfolio Return by \$46.7 billion or 37% (cumulative) over a 20 year time period.

Economic and Market Indicators

March 31, 2019

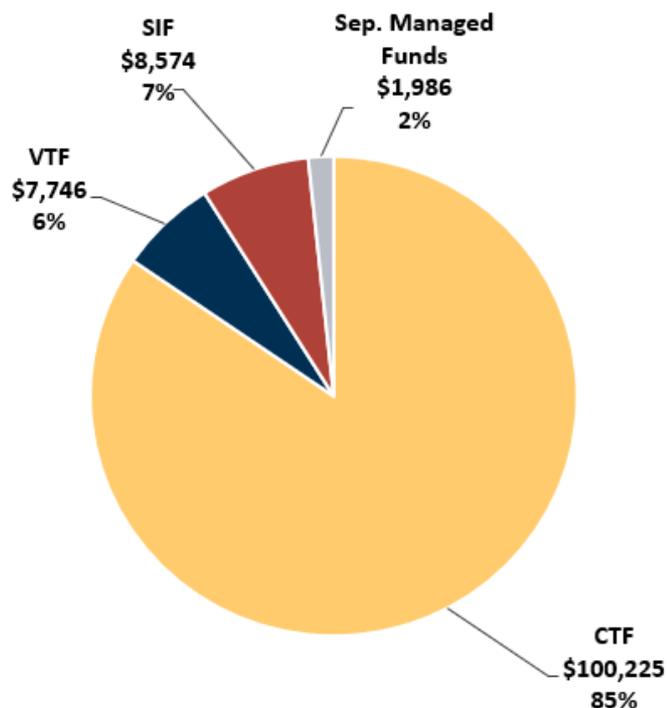
	YTD	1 Year	5 Year	10 Year
<u>Economic Indicators</u>				
GDP	0.95	5.10	4.25	3.88
GDP Deflator	0.16	1.83	1.60	1.61
CPI	0.74	1.42	1.38	1.75
National Wage Rate Growth	0.65	2.47	2.38	2.51
<u>Market Indicators</u>				
US Equity	14.04	8.77	10.36	16.00
Global Equity	12.33	3.16	7.03	12.58
International Developed Equity	10.45	-3.14	2.20	8.82
US Government Credit	3.26	4.48	2.78	3.92
Global Sovereign Debt	1.74	-1.57	0.59	2.20
Real Estate	1.76	8.35	10.41	8.50

Sources: US Equity, Russell 3000; Global Equity, MSCI ACWI Gross; International Developed Equity, MSCI World ex US Equities; US Government Credit, Barclays Capital Govt/Credit; Global Sovereign Debt, Citigroup World Govt Bonds; Real Estate, ODCE

All returns are represented in percent

Total Assets Under Management (AUM)

March 31, 2019 (in millions)



Fund	3/31/18 AUM ¹	3/31/19 AUM ¹	1 Year AUM Change
Total WRS	\$107,189	\$107,971	\$783
CTF	\$99,279	\$100,225	\$946
VTF	\$7,910	\$7,746	(\$164)
SIF ²	\$7,544	\$8,574	\$1,030
Sep. Managed Funds	\$1,494	\$1,986	\$492
Total AUM	\$116,226	\$118,531	\$2,305

- CTF investment earnings of +\$4.8b and \$3.9b of outflows for a one year change of +\$0.9b.
- VTF investment earnings of +\$0.3b and \$0.5b of outflows for a one year change of (-\$0.2b).

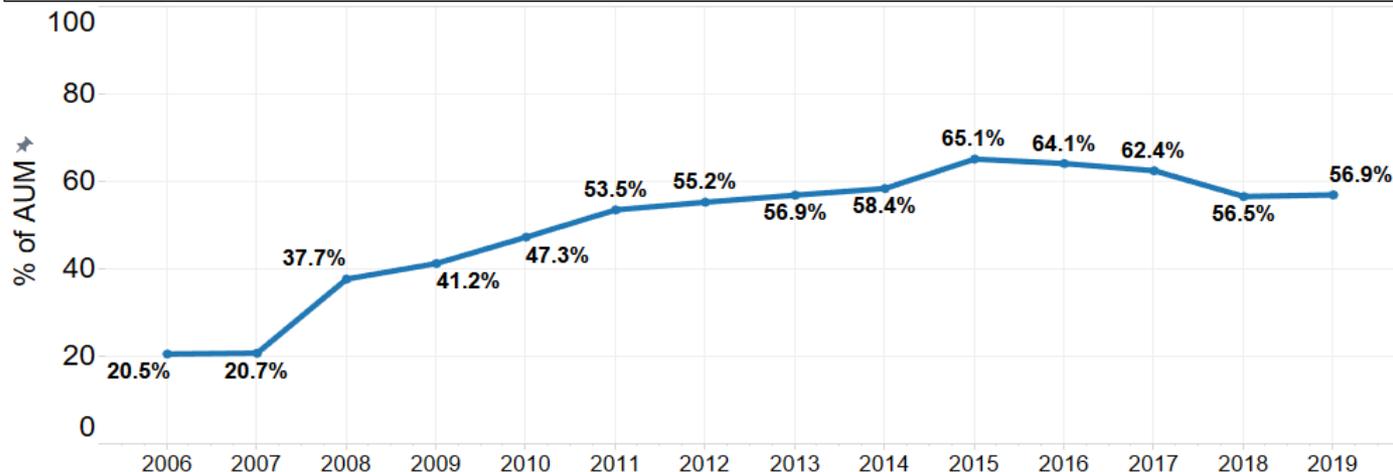
¹AUM is the total market value of assets that an investment company or financial institution manages on behalf of investors.

²Excluding cash held in CTF, VTF, and Separately Managed Funds.

WRS Assets as of March 31, 2019

Breakdown of Internal vs. External and Active vs. Passive

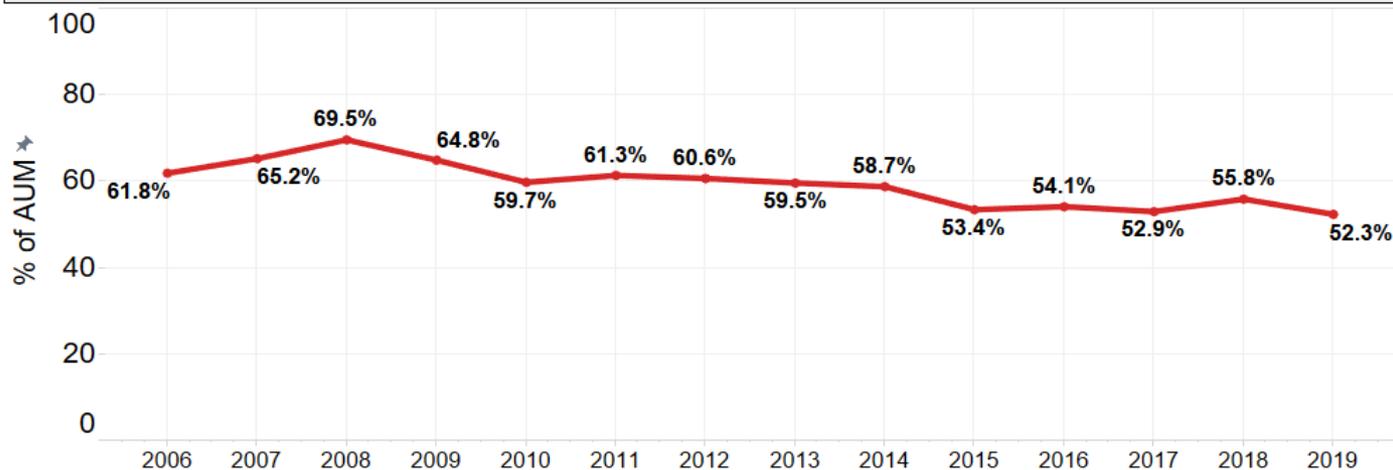
Internally Managed Assets



Change from 2018 to 2019

No significant changes for internal/external management relative to Q1.

Actively Managed Assets

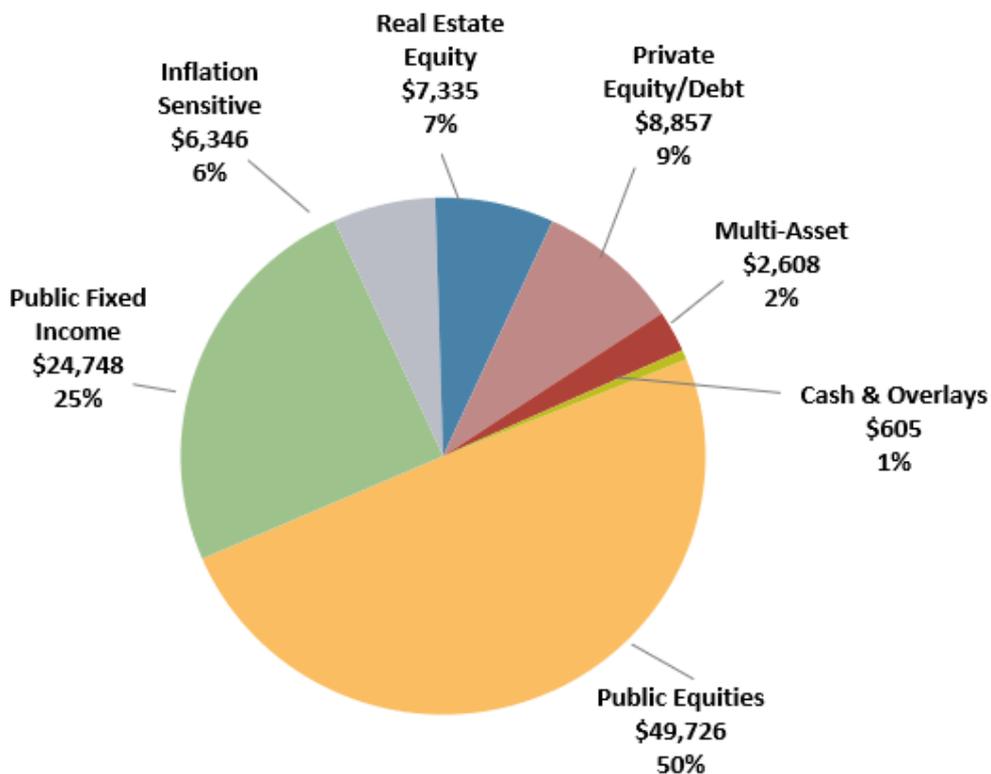


Change from 2018 to 2019

Decrease in active management due to policy change (Global Fixed Income) and transition out of Emerging Market equity manager.

Core Trust Fund Assets Under Management (AUM)

Breakdown by Asset Class as of March 31, 2019 (in millions)



Asset Class	3/31/18 AUM ¹	3/31/19 AUM ¹	1 Yr. AUM Change
Public Equities	\$50,074	\$49,726	(\$348)
Public Fixed Income	\$23,928	\$24,748	\$820
Inflation Sensitive	\$7,204	\$6,346	(\$857)
Real Estate Equity	\$6,513	\$7,335	\$822
Private Equity/Debt	\$8,399	\$8,857	\$457
Multi-Asset	\$2,551	\$2,608	\$58
Cash & Overlays	\$609	\$605	(\$4)
Total AUM	\$99,279	\$100,225	\$946

- Total AUM change of +\$0.9b due to +\$4.8b of investment returns and \$3.9b of withdrawals.

¹AUM is the total market value of assets that an investment company or financial institution manages on behalf of investors.

Core Trust Fund Allocation

All Values as of March 31, 2019

	Total Exposure (S Mil.)	Total Exposure (%)	Adjusted Policy Target ⁴	Target Range
Public Equities ¹	\$49,956	49.8%	50.2%	44.2 - 56.2%
<i>Global Developed</i>	43,859	43.8%	44.1%	
<i>Emerging Market</i>	3,050	3.0%	3.1%	
<i>US Small Cap</i>	3,047	3.0%	3.1%	
Public Fixed Income ¹	\$25,400	25.3%	25.5%	19.5 - 31.5%
<i>Investment Grade</i> ²	21,596	21.5%	21.6%	
<i>High Yield</i>	1,947	1.9%	1.9%	
<i>Emerging Debt</i>	949	0.9%	1.0%	
<i>Emerging Debt (local)</i>	907	0.9%	0.9%	
Inflation Sensitive ¹	\$15,417	15.4%	15.5%	10.5 - 20.5%
Real Estate Equity ¹	\$7,335	7.3%	7.3%	5.0 - 11.0%
Private Equity/Debt ¹	\$8,857	8.8%	8.8%	6.0 - 12.0%
Multi-Asset ¹	\$2,608	2.6%	2.6%	1.0 - 7.0%
Cash & Overlays ³	\$605	0.6%	0.0%	
Total Fund	\$110,178	109.9%		

- Asset class exposures are within the Target Range
- Public Fixed Income – Global sub asset class removed according to approved Policy change
- Core Trust Fund financial leverage remains at ~10%

¹ Public and private market asset values include cash.

² Contains government/credit investment grade bonds, excess treasuries, and long treasuries.

³ Cash is liquidity, global equity income, overlay related cash and amount of cash needed to fund synthetic beta related to Alpha Pool as physical investment inclusive of adjustment for interest.

⁴ Adjusted Policy Target is the fund policy target weights dynamically adjusted for actual weights and other asset allocation and rebalancing.

Core Trust Fund Relative Gross Return Attribution

Gross of Fees as of March 31, 2019

SWIB Total Fund Returns	YTD	One Year	Five Years	Ten Years
Core Trust Fund	8.05%	4.81%	6.36%	10.56%
Core Trust Fund Benchmark	7.90%	4.41%	6.07%	9.90%
Portfolio Implementation	-0.01%	-0.03%	-0.05%	0.01%
Public Equity Management	0.05%	-0.09%	-0.01%	0.15%
Public Fixed Management	0.04%	0.03%	0.06%	0.17%
Inflation Protection Management	0.01%	0.04%	0.02%	0.02%
Real Estate Management	-0.04%	-0.01%	0.05%	0.08%
Private Equity/Debt Mgmt	0.00%	0.43%	0.18%	0.17%
Multi-Asset Management	0.01%	0.01%	0.00%	0.04%
Cash/Leverage & Overlays (Alpha Pool)	0.08%	0.02%	0.04%	0.02%
Total Excess Return	0.15%	0.40%	0.29%	0.66%

- 29 bps of annualized excess return over five years due to selection effect.

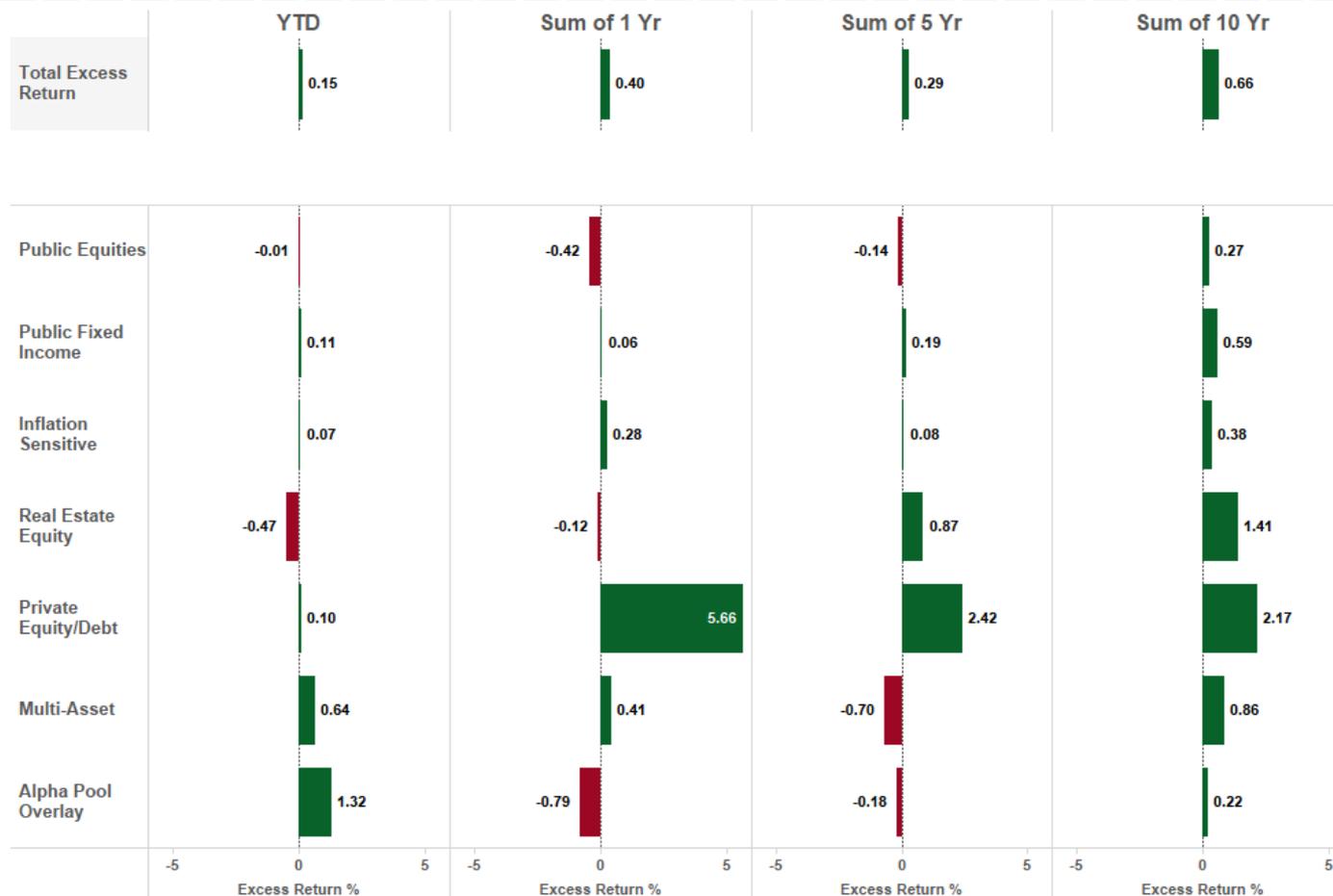
Portfolio Implementation: a combination of intentional style drift, allocation drift, and timing effects.

NOTES

- Performance attribution may result in residuals - small differences between attributes are not meaningful.

Core Trust Fund Asset Class Excess Return

Performance Above Benchmark as of March 31, 2019



- Five year asset class relative gross returns remain strong with Private Markets (Real Estate and Private Equity) as the main drivers of excess return.
- Private Equity/Debt and Alpha Pool Overlay excess returns are net of external manager fee. All other excess returns are gross of fee.

Core Trust Fund & Asset Class Performance

As of March 31, 2019

	Inception Date	Market Value (Millions)	Calendar YTD	1 Year	5 Years	10 Years / ITD ³
Core Trust Fund (Gross)	6/30/77	\$100,225	8.05	4.81	6.36	10.56
Core Trust Fund Benchmark (Gross)			<u>7.90</u> 0.15	<u>4.41</u> 0.40	<u>6.07</u> 0.29	<u>9.90</u> 0.66
Core Trust Fund (Net)¹	6/30/77	\$100,164	7.96	4.44	6.01	10.21
Core Trust Fund Benchmark (Net)			<u>7.84</u> 0.12	<u>4.20</u> 0.25	<u>5.85</u> 0.16	<u>9.67</u> 0.54

ASSET CLASSES - GROSS OF FEES

	Inception Date	Market Value (Millions)	Calendar YTD	1 Year	5 Years	10 Years / ITD ³
Public Equities ²	12/31/92	\$49,956	12.56	2.97	6.73	13.01
Public Equity Benchmark			<u>12.57</u> -0.01	<u>3.39</u> -0.42	<u>6.87</u> -0.14	<u>12.74</u> 0.27
Global Developed Equity	2/28/17	\$43,859	12.69	4.39	N/A	2.19
MSCI World Custom Net			<u>12.64</u> 0.05	<u>4.58</u> -0.19	<u>N/A</u> N/A	<u>2.28</u> -0.08
Emerging Market Equity	2/28/17	\$3,050	8.39	-9.48	N/A	-2.36
MSCI Emerging Market Custom Net			<u>9.94</u> -1.55	<u>-7.35</u> -2.13	<u>N/A</u> N/A	<u>-1.28</u> -1.08
US Small Cap	2/28/17	\$3,047	15.54	1.32	N/A	1.22
Russell 2000			<u>14.58</u> 0.96	<u>2.05</u> -0.73	<u>N/A</u> N/A	<u>0.74</u> 0.47

¹ Net of External Manager Fees

² Market value includes the Notional Exposure for Synthetic and/or Policy Overlay Accounts

³ 10 years annualized or since inception annualized

Asset Class Performance Cont'd

As of March 31, 2019

ASSET CLASSES - GROSS OF FEES

	Inception Date	Market Value (Millions)	Calendar YTD	1 Year	5 Years	10 Years / ITD ³
Public Fixed Income²	12/31/92	\$25,400	3.63	3.87	2.73	4.69
Fixed Income Benchmark			<u>3.52</u>	<u>3.80</u>	<u>2.55</u>	<u>4.11</u>
			0.11	0.06	0.19	0.59
Investment Grade Fixed Income ⁴	5/31/05	\$21,596	3.28	4.71	2.99	4.38
Barclays Capital Govt/Credit			<u>3.17</u>	<u>4.39</u>	<u>2.77</u>	<u>3.91</u>
			0.11	0.32	0.23	0.46
High Yield Fixed Income	1/31/01	\$1,947	6.94	5.54	5.21	10.91
BofA Merrill Lynch Corporate High Yield Ba/B Index since 1/1/18			<u>7.33</u>	<u>6.35</u>	<u>4.69</u>	<u>9.93</u>
			-0.40	-0.80	0.52	0.99
Emerging Market Debt	5/31/05	\$949	7.16	3.53	5.70	10.35
JPM EMBI Global Diversified			<u>6.95</u>	<u>4.21</u>	<u>5.44</u>	<u>8.52</u>
			0.21	-0.68	0.26	1.83
Emerging Market Debt - Local	7/31/17	\$907	2.33	-10.20	N/A	-1.82
JPM GBI-EM Global Diversified			<u>2.92</u>	<u>-7.58</u>	<u>N/A</u>	<u>-0.77</u>
			-0.59	-2.62	N/A	-1.05
Inflation Sensitive²	12/31/03	\$15,417	3.26	2.98	1.06	3.31
Inflation Sensitive Benchmark			<u>3.19</u>	<u>2.70</u>	<u>0.98</u>	<u>2.92</u>
			0.07	0.28	0.08	0.38

¹ Net of External Manager Fees

² Market value includes the Notional Exposure for Synthetic and/or Policy Overlay Accounts

³ 10 years annualized or since inception annualized

⁴ Contains government/credit investment grade bonds, excess treasuries, and long treasuries

Asset Class Performance Cont'd

As of March 31, 2019

ASSET CLASSES - NET OF FEES

	Inception Date	Market Value (Millions)	Calendar YTD	1 Year	5 Years	10 Years / ITD ³
Real Estate Equity¹	3/31/04	\$7,329	1.10	7.46	10.42	8.83
Real Estate Benchmark			<u>1.52</u>	<u>7.36</u>	<u>9.30</u>	<u>7.28</u>
			-0.42	0.09	1.13	1.55
Private Equity/Debt¹	12/31/02	\$8,810	0.24	11.95	11.91	13.47
Private Equity Benchmark			<u>0.13</u>	<u>6.30</u>	<u>9.49</u>	<u>11.30</u>
			0.10	5.66	2.42	2.17
Multi-Asset¹	3/31/03	\$2,608	9.50	5.21	4.63	9.58
Multi-Asset Benchmark			<u>8.86</u>	<u>4.80</u>	<u>5.80</u>	<u>9.32</u>
			0.64	0.41	-1.18	0.26
Alpha Pool Overlay¹	1/31/11	\$6,403	1.32	1.25	1.30	1.99
Alpha Pool Overlay Benchmark			<u>0.00</u>	<u>2.04</u>	<u>1.49</u>	<u>1.77</u>
			1.32	-0.79	-0.18	0.22

¹ Net of External Manager Fees

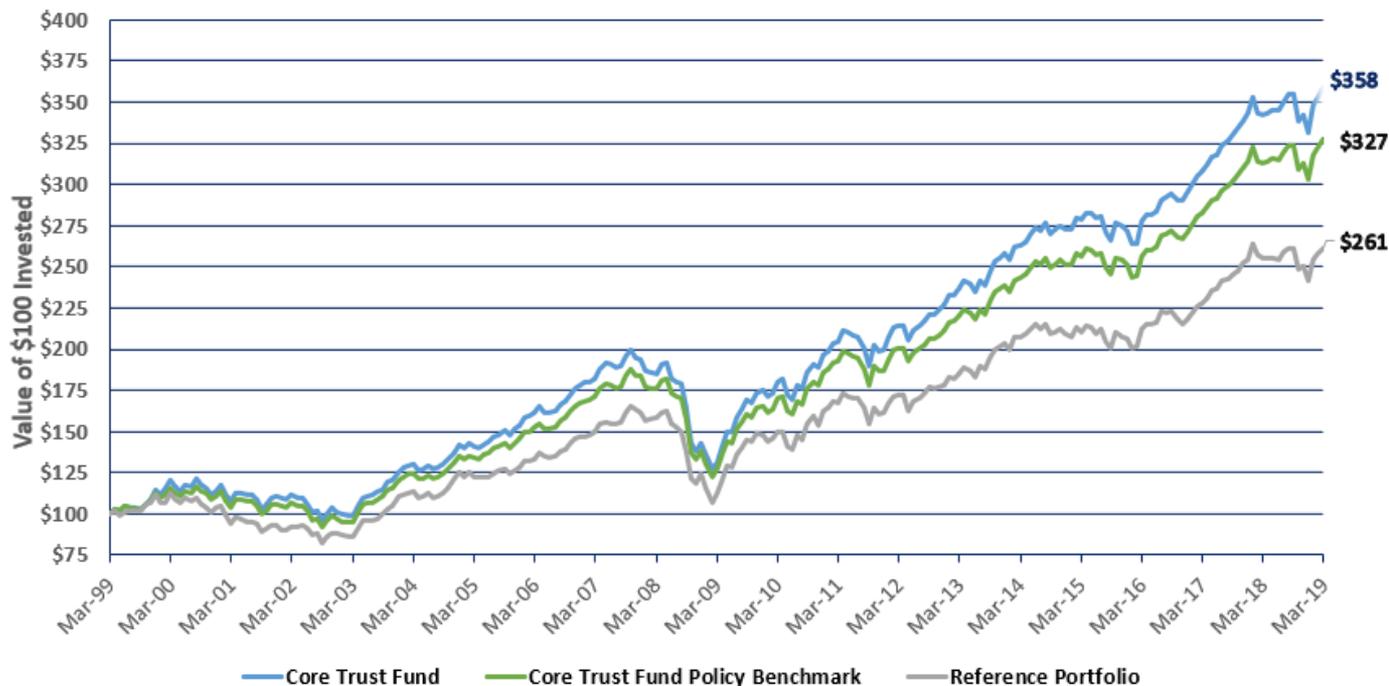
² Market value includes the Notional Exposure for Synthetic and/or Policy Overlay Accounts

³ 10 years annualized or since inception annualized

CTF Performance vs. 60/40 Reference Portfolio

March 1999 to March 2019

Benefit of SWIB's Asset Allocation & Active Management Over Time



- Core Trust Fund Return outperforms the 60/40 Reference Portfolio Return by \$46.7 billion or 37% (cumulative) over a 20 year time period.

Reference Portfolio 20 Year Dollar Return*	Additional Policy Portfolio Return Above Reference*	Additional Active Portfolio Return*	Total Core Trust Fund Dollar Return*
\$126 Billion	+\$31.6 Billion	+\$15.1 Billion	= \$172.7 Billion

*Based on CTF market value as of March 1999 assuming no contributions or withdrawals.

Variable Trust Fund Allocation vs. Policy Target

All Values as of March 31, 2019

	Market Value (\$ Mil.)	Total Exposure (%)	Target	Target Range
Public Equities	\$7,725	99.7%	100.0%	
<i>Domestic</i>	<i>5,420</i>	<i>70.0%</i>	<i>70.0%</i>	<i>65.0 - 75.0%</i>
<i>International</i>	<i>2,305</i>	<i>29.8%</i>	<i>30.0%</i>	<i>25.0 - 35.0%</i>
Cash	\$21	0.3%	0.0%	
TOTAL FUND	\$7,746	100%	100%	

- Ended the quarter slightly underweight international equities but within Target Range.

Variable Trust Fund Relative Gross Return Attribution

Gross of Fees as of March 31, 2019

SWIB Total Fund Returns	YTD	One Year	Five Years	Ten Years
Variable Trust Fund	12.97%	4.72%	8.18%	14.27%
Variable Trust Fund Benchmark	12.95%	4.92%	8.13%	13.94%
Portfolio Implementation	0.02%	-0.03%	0.01%	0.01%
Public Equity Management	0.00%	-0.17%	0.04%	0.30%
Total Excess Return	0.02%	-0.20%	0.05%	0.33%

- 5 bps of annualized excess return over five years primarily due to selection effect.

Portfolio Implementation: a combination of intentional style drift, allocation drift, and timing effects.

NOTES

- Performance attribution may result in residuals - small differences between attributes are not meaningful.

Separately Managed Funds Performance

Gross of Fees as of March 31, 2019

	Market Value (Millions)	Calendar YTD	1 Year	5 Years	10 Years / ITD ²
State Investment Fund (SIF)	\$13,425.0	0.61	2.16	0.80	0.49
SIF Benchmark		<u>0.60</u>	<u>2.15</u>	<u>0.79</u>	<u>0.45</u>
		0.01	0.01	0.01	0.04
State Life Insurance Fund	\$115.9	4.79	4.85	4.41	6.31
State Life Insurance Benchmark		<u>4.66</u>	<u>4.83</u>	<u>4.04</u>	<u>5.76</u>
		0.12	0.02	0.38	0.55
Historical Society Endowment Fund	\$17.3	11.49	7.92	8.63	13.03
Historical Society Endowment Benchmark		<u>11.25</u>	<u>7.91</u>	<u>8.52</u>	<u>12.99</u>
		0.24	0.02	0.11	0.04
Injured Patients & Families Compensation Fund	\$1,398.7	5.14	5.04	4.31	6.41
Injured Patients & Families Compensation Benchmark		<u>4.72</u>	<u>4.96</u>	<u>3.77</u>	<u>5.56</u>
		0.42	0.07	0.53	0.85
UW System Long Term Fund¹	\$449.2	7.13	4.25	N/A	4.25
UW System Benchmark		<u>7.09</u>	<u>3.90</u>	<u>N/A</u>	<u>3.90</u>
		0.04	0.36	N/A	0.36

¹ Performance start date of April 1, 2018

² Ten years annualized or since inception annualized

*Local Gov't Property Insurance Fund and Edvest Fund not shown. Funds are invested 100% in SIF

All returns are represented in percent

Exhibit H

Newton Applicant Tracking System

Main Dashboard

NEWTON | HOME | ANALYTICS | ADMIN | CREATE A CANDIDATE | REQUEST JOB APPROVAL | MARKETPLACE | HELP

My Jobs 22 | Executive 0 | Team Member 0 | Other Jobs 1 | Draft Jobs 12 | Approvals 8/8 | Filter by Job Title

Review Request | Schedule Phone Screen | Phone Screen Scheduled | Schedule Interview | Interview Scheduled | Offers

You have 56 Pending Thank You Letters. Your company has a total of 56. [Click here to manage them now.](#)

Job Title	Department	Applicant 1	Applicant 2	Applicant 3
Head of Risk & Analytics IT	Information Technology	0	1	4
Equity Analyst, Global Sector Portfolio (Sourcing/Targeted Outreach)	Public Equities	0	23	0
Investment Operations Analyst, Funds and Liquidity, Senior Advanced	Operations	0	0	0
Administrative Specialist	Administration	0	0	0
Equity Analyst, Global Sector Portfolio	Public Equities	1	13	44
Investment Reporting Analyst, Data Management	Data Management	7	0	0
Funds Alpha Specialist	Private Markets & Funds Alpha	0	0	7

Departments | All Departments | Data Management (2 Jobs) | Options

Newton Applicant Tracking System

Creating and Declining Applicants

Hire **Inactivate this Candidate**

We are going to pass because

BETTER FIT POSITION
Reassigning to a different role

CWID
Accepted another position
Compensation
Counter offer received
Long-term visa sponsorship
No response from the candidate
Promotion received
Relocation
Timing

COMPENSATION
Compensation requirement to high

CONFLICT OF INTEREST
Conflict of interest

EXPERIENCE
Does not meet minimum requirements
Insufficient industry experience
Insufficient related experience
More qualified candidate selected

NOT A FIT
SWIB Values

MIN. QUALIFICATIONS
Does not meet eligibility.

DUPLICATE
This candidate has already been submitted

JOB CLOSED
 There are currently no duplicate records to pass on **i**

JOB FILLED
We hired someone else for this role

This person declined us because

NO RESPONSE
No response from the candidate

CNI
They were not interested in this position

OTM
They were already off the market

There are currently no duplicate records to pass on **i**

NEWTON HOME ANALYTICS ADMIN CREATE A CANDIDATE REQUEST JOB APPROVAL MARKETPLACE HELP

Create a Candidate **Add a Tag**
Please complete the required fields (*) and click Save.

Parse Upload or Drag and Drop a Resume **i**

Job Title
 Candidate Type Candidate Source

First Name
 Last Name
 Preferred Name

Email
 Alternative Email
 Profile/Web Page

Address
 Address2
 Country: United States
 City, State, Zip None
 Phone # Mobile

Search String
 Posted

Comment **Make Private**

Newton Applicant Tracking System

Offer Approval Process

The screenshot shows the Newton Applicant Tracking System interface. The top navigation bar includes links for HOME, ANALYTICS, ADMIN, CREATE A CANDIDATE, REQUEST JOB APPROVAL, MARKETPLACE, and HELP. The main content area is titled "Candidate Details" and "Offer Details". The offer is for "Investment Operations Analyst, Senior (Middle Office)" and was approved on June 10, 2019, at 8:37 am.

The approval process is shown as a sequence of steps: New Approval (Emily Grosskopf, June 7), Offer Review (Victoria Tuc..., June 7), 1st Approver (Shirley Eckes, June 7), 2nd Approver (Julia Valenti..., June 7), and 3rd Approver (Rochelle Kl..., June 10). A note indicates that the offer was approved on June 10, 2019.

The main content area displays "Offer Approval Records - 5" and a PDF document titled "Offer Approval (5).pdf" dated Jun 10, 2019 8:37 am. The PDF content is as follows:

OFFER APPROVAL REQUEST

Candidate Name: Name
Job Title: Investment Operations Analyst, Senior (Middle Office)
Emily Grosskopf requested approval June 7, 2019 9:52 am
First Approval: Shirley Eckes, June 7, 2019 12:32 pm
Second Approval: Julia Valentine, June 7, 2019 12:46 pm
Final Approval: Rochelle Klaskin, June 10, 2019 6:37 am

Job Details

Department: Operations
Hiring Managers: Chelsey Barczak
Job ID: 438
Job Title: Investment Operations Analyst, Senior (Middle Office)
Budget Title: none
Vacancy Reason: New Position

Exhibit I

SWIB RECRUITMENT PHILOSOPHY

Adopted: October 2018

Revised: March 2019

The SWIB Recruitment Philosophy is designed to efficiently attract the highest caliber candidates that are needed to execute the organization's strategy of internally managing investment funds. This includes hiring candidates who:

- Bring a depth of investment industry expertise or other necessary functional experience to the organization;
- Embody SWIB's values and operating principles and are committed to excellence in everything they do;
- Consistently perform at the highest level and continuously strive to improve; and
- Are fully engaged, embrace SWIB's cross functional collaborative approach, and actively contribute to SWIB's success.

Key characteristics of the SWIB Recruitment Philosophy include:

- **Discovery/Name Generation/Sourcing:** SWIB competes for top talent and leverages business-related social media platforms as well as industry specific organizations such as the CFA Institute to attract industry like-minded individuals to learn more about SWIB's culture and career opportunities. SWIB will meet via phone, Skype or in-person with potential prospects to build out our talent pool whether current suitable positions exist in the organization or prior to a potential candidate's submission of an application to generate interest in the open position or business group.
- **Consideration/Application:** SWIB's recruiting team, senior leaders and hiring managers may hold exploratory conversations either via phone or in-person to learn more about individuals interested in specific opportunities or who have expressed general interest in a specific team within SWIB. The team additionally reviews employment applications of interested candidates in conjunction with job postings with hiring managers. Except as described below, SWIB job opportunities will generally be posted for a minimum of 14 days unless the position is cancelled or postponed at the discretion of the Executive Director/Chief Investment Officer. Candidates/prospects of one position may be referred to other hiring managers within SWIB for positions outside of the originally intended team. Candidates/prospects may also be reassigned at the discretion of the recruiting staff and/or a hiring manager within SWIB's applicant tracking software system to SWIB's talent pipeline folders and/or new active jobs. In the event of a reorganization of SWIB staff, the creation of a new position, or in the discretion of the Executive Director/Chief Investment Offer, a current SWIB employee may be promoted or reassigned outside of the standard recruiting process described herein to an existing or new position, and the job will not be required to be posted to internal or external candidates.
- **Interview:** SWIB attracts and needs to retain industry-focused talent to meet the ever-changing priorities of the organization. The recruiting team manages a full-lifecycle interview process to ensure hiring standards are met and that we understand the competitive candidate landscape for market comparisons and information. Generally, the recruiting team, in conjunction with the hiring manager, will identify an interview panel made up of SWIB employees who interact with the job function and/or division on a frequent basis. The recruiting team and/or hiring manager will generally speak with the interview panel, as necessary, to explain the job requirements and ensure any questions regarding core competencies of the

job are understood. The interview panel will be provided with candidates' resumes, position descriptions and itineraries, as well as additional materials and information that generally include an interview guide for panelists, guidance on non-discrimination in hiring, reminders on SWIB's diversity goals, information on background checks, and/or candidate special assignment materials (e.g., writing sample or presentation), if requested by the hiring manager from the candidate as part of the interview process.

- **Background check:** SWIB adheres to a strict background check process to ensure the safety and security of the employees in the organization. Candidates may begin the background check process in tandem with offer package formulation and SWIB offers are contingent upon successful completion of the background check process. For internal SWIB employees that are promoted or reassigned within the organization, they are exempt from the background check process. Any current consultant or intern working on behalf of SWIB will need to complete the background check process as part of the conversion to full or part-time status.
- **Job Offer:** After completion of the application and selection process, the recruiting team will work with the hiring manager to facilitate a job offer to the most qualified candidate. SWIB is a performance-based organization. SWIB has high expectations of its people. Our Compensation Philosophy is intended to attract and retain the necessary talent and ensure internal equity is aligned with SWIB's investment strategy and results. SWIB consistently reviews our Board-designated peer group for market competitive salary and bonus structures.
- **Search Firms:** On occasion and with the approval of the Executive Director/Chief Investment Officer and/or the Deputy Executive Director/Chief Administrative Officer, SWIB may use an outside search firm to help it source and secure a candidate for any given recruitment. Such search firm will generally follow principles similar to those included in this Recruitment Philosophy.

The recruiting team will be responsible for training hiring managers on the implementation of this Recruitment Philosophy and for maintaining the documentation of the hiring process in SWIB's applicant tracking system.