South Dakota Retirement System

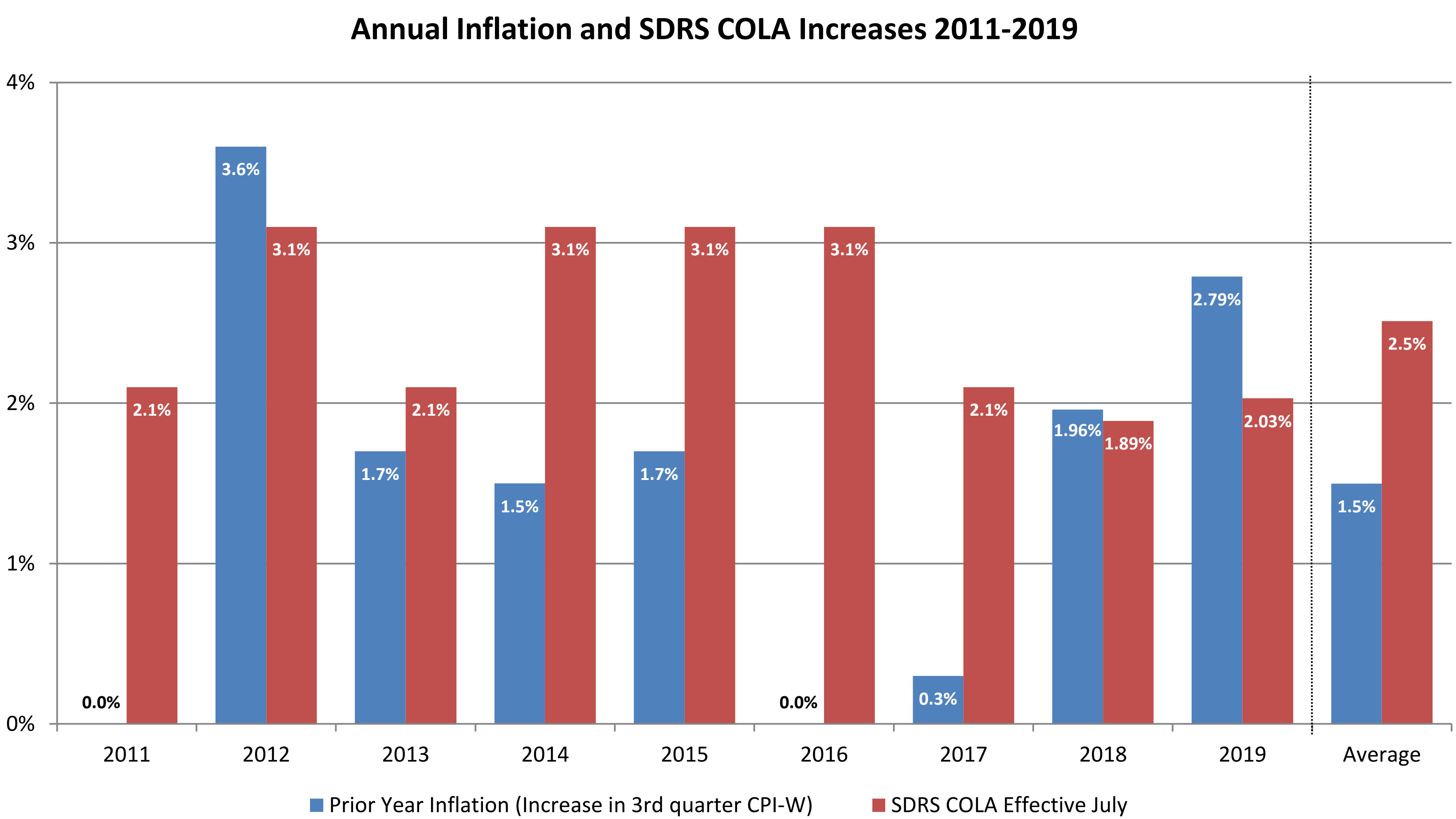
Projected Funded Status as of June 30, 2019, Risk Analysis, and SDRS Comparisons

June 5, 2019

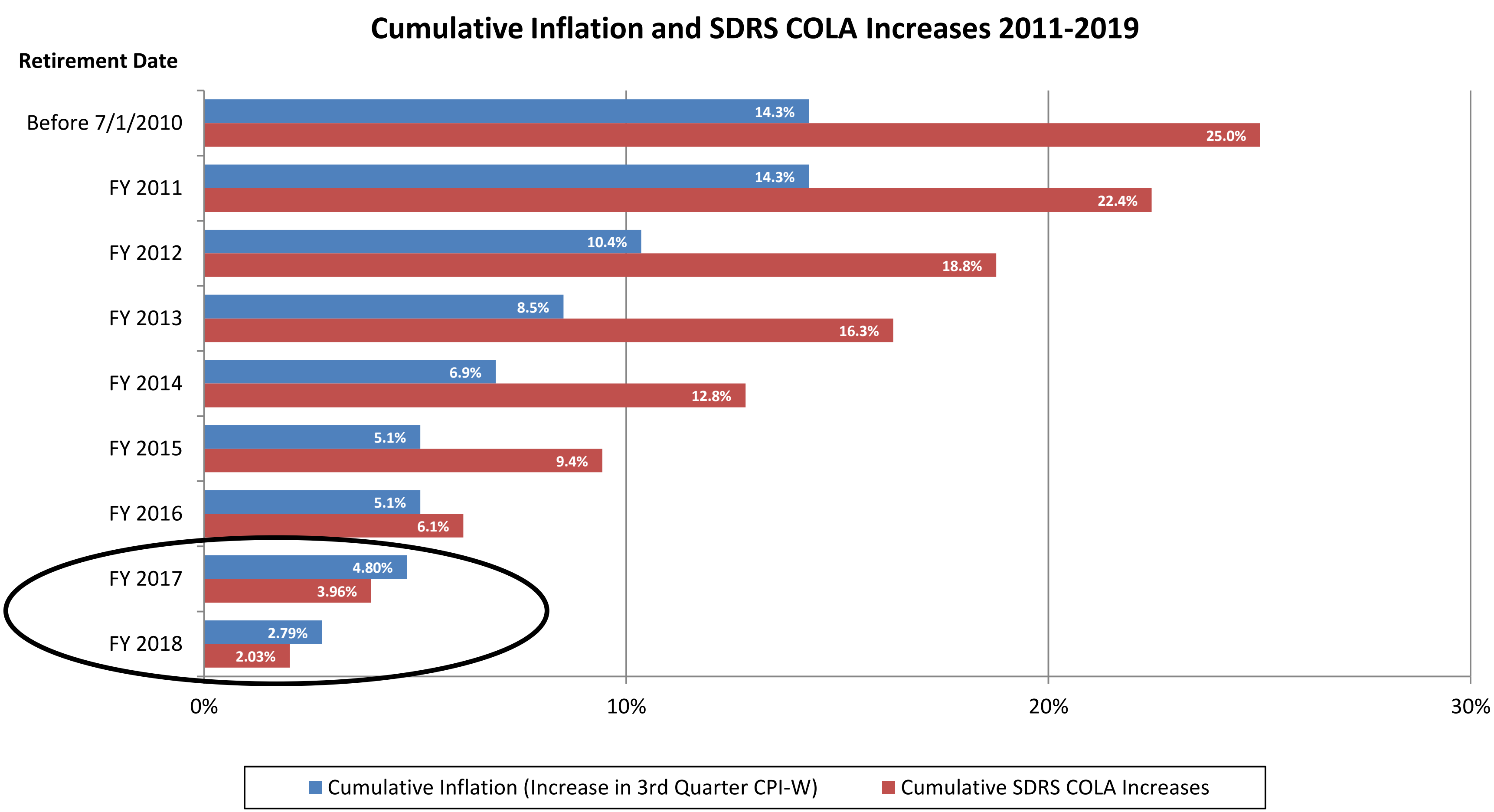
Projected Funded Status and COLAs

- SDRS contributions are fixed and benefits are variable based on affordability
- COLA is primary variable benefit and will vary directly with both inflation and long-term affordability
- Fair Value Funded Ratio (FVFR) is expected to remain at 100% but:
  - Investment returns significantly or sustained below 6.5% assumption may result in COLA of 0.5%, a FVFR less than 100%, and a required Corrective Action recommendation
  - Returns significantly or sustained above the 6.5% assumption could increase the FVFR above 100%
- The following exhibits examine:
  - SDRS COLAs and inflation since 2010
  - Projected FVFR at June 30, 2019 and corresponding COLA range
  - Risk analysis showing:
    - Projected COLA ranges at June 30, 2020 through June 30, 2022 based on ranges of investment returns
    - Likelihoods based on SDIC June 2018 investment portfolio statistics (mean expected return of 6.19% with 15.4% one-year standard deviation)

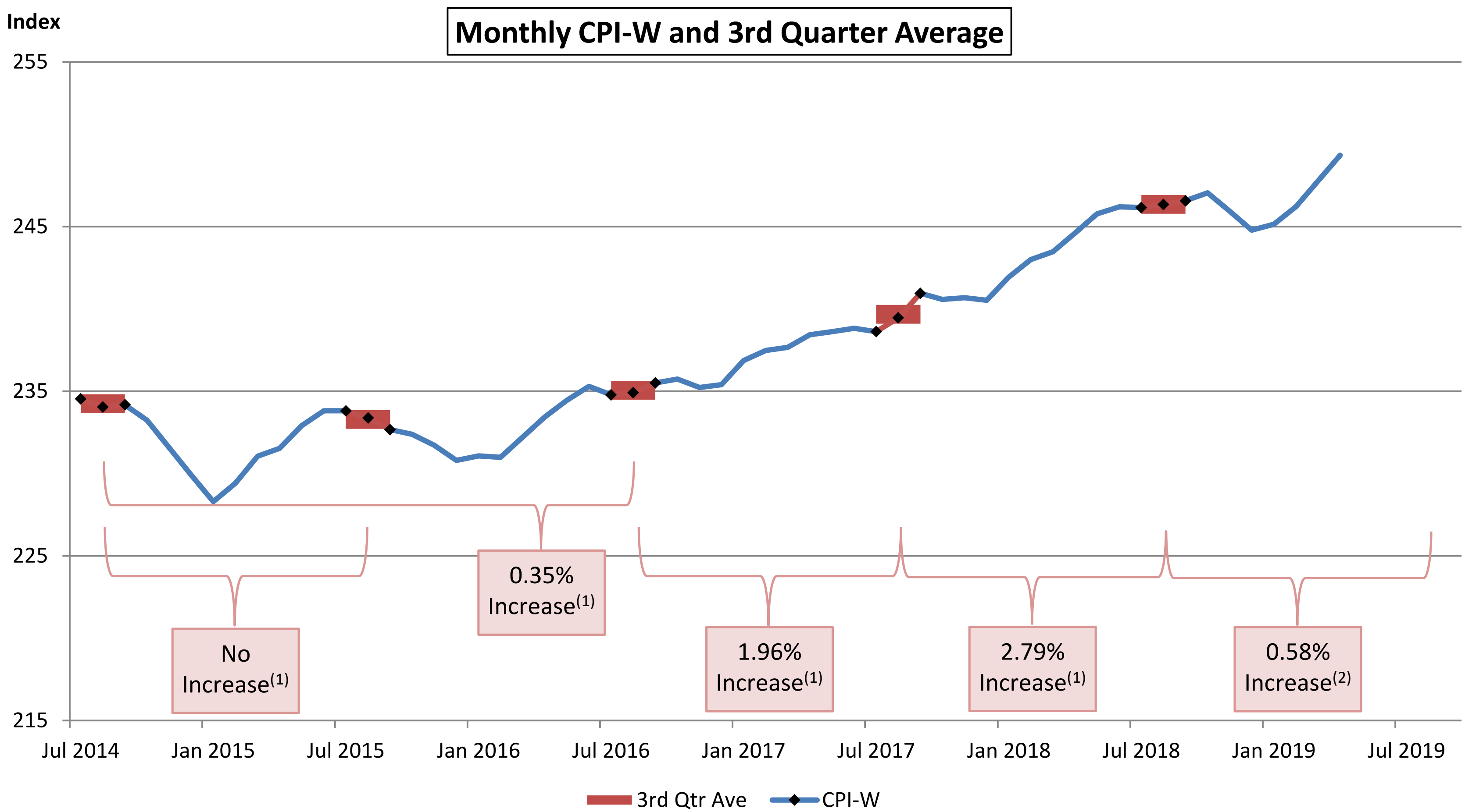
Inflation and SDRS COLAs Since 2010



Inflation and SDRS COLAs Since 2010



Inflation Measurement for Social Security and SDRS COLAs



(1) Increase in the third calendar quarter average over the prior highest third calendar quarter average is the specified inflation measurement for the Social Security COLA effective the following January and the SDRS COLA effective the following July

(2) Increase in most recent three-month average over July to September, 2018 average (through 7 months). April, 2019 index is up 1.21% from the 2018 average.

Projected Funded Status as of June 30, 2019 and 2020 Maximum COLA*

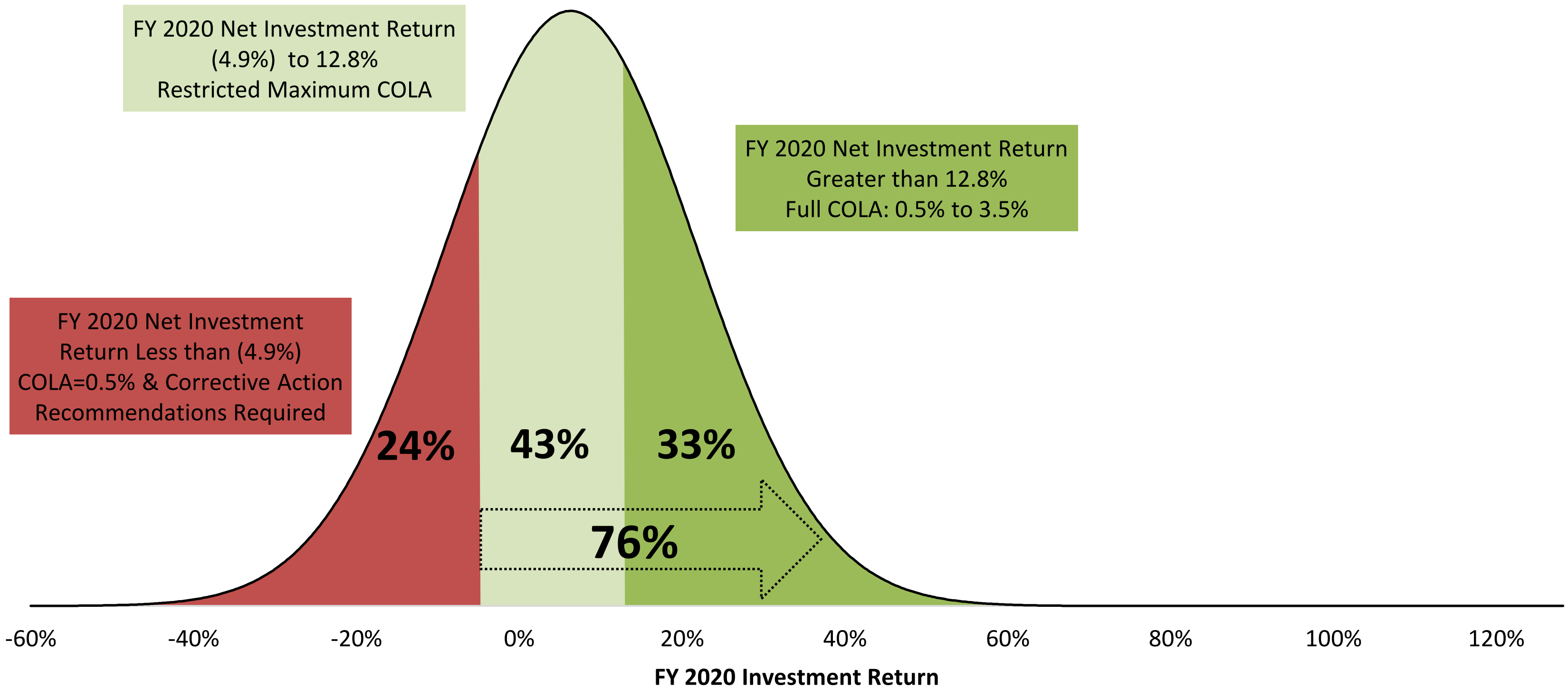
If Net Investment Return for FYE June 30, 2019 is:		Step 1: Determine Baseline FVFR (Using Baseline COLA assumption of 2.25%)	Step 2: Determine Restricted Maximum COLA (Resulting in FVFR of 100%)	Step 3: Determine FVFR (Using Baseline COLA or Restricted Maximum COLA, if applicable)
(8.3%)	Minimum Return to Avoid Corrective Actions	84%	0.50%	100%
6.5%	Assumed Return	98%	2.04%	100%
(5.0%)	Return Examples	87%	0.88%	100%
(2.5%)	Return Examples	89%	1.15%	100%
0.0%	Return Examples	92%	1.41%	100%
2.5%	Return Examples	94%	1.66%	100%
5.0%	Return Examples	96%	1.90%	100%
7.5%	Return Examples	99%	2.13%	100%
8.8%	Minimum Return for 100% FVFR with Baseline COLA	100%	Unrestricted: 3.5%	100%

* Before consideration of liability gains/losses for year ending June 30, 2019. June 30, 2018 Baseline FVFR was 97.7% and Restricted Maximum COLA was 2.03%.

Risk Analysis

- Actuarial standards now require identification & assessment of future funding risks (ASOP 51)
- Assessment methods can include scenario tests, sensitivity tests, stochastic modeling, stress tests, and comparing liability to “risk-free” liability
- The most significant and immediate risk to SDRS is investment risk
- Investment returns will first impact the variable SDRS COLA
  - Less than assumed will reduce restricted maximum COLA or require corrective actions
  - Greater than assumed will increase maximum or enable full COLA range
- However, the variable COLA will not be sufficient to maintain 100% FVFR in all cases and additional corrective actions may be required
- The following exhibits show the likelihood of restrictions to the COLA and additional corrective actions over the next three years based on the expected volatility of investment returns

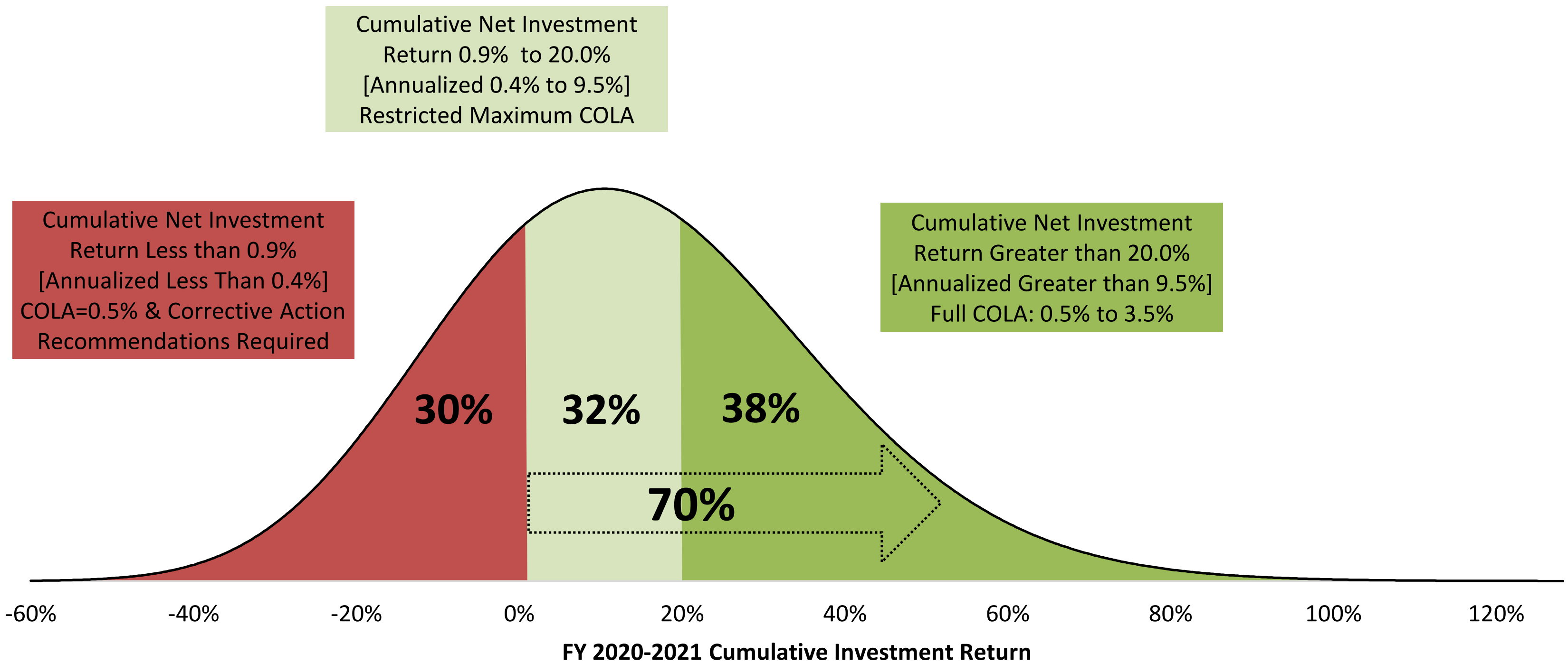
Projected Future COLA Ranges: 2021
Assuming 2.5% Net Investment Return for FY19



- Following an assumed net investment return of 2.5% for FY19, the likelihoods for 2021 COLA ranges, which are primarily driven by FY20 investment returns, are:
  - 33% likelihood that the baseline COLA will be payable (CPI-W between 0.5% and 3.5%)
  - 43% likelihood that the COLA will have a restricted maximum (CPI-W between 0.5% and the restricted maximum)
  - 24% likelihood that a 0.5% COLA will be payable and additional Corrective Action recommendations will be required

* Before consideration of liability gains/losses. Likelihoods based on SDIC 2018 investment portfolio statistics. Assumes 2.25% annual inflation.

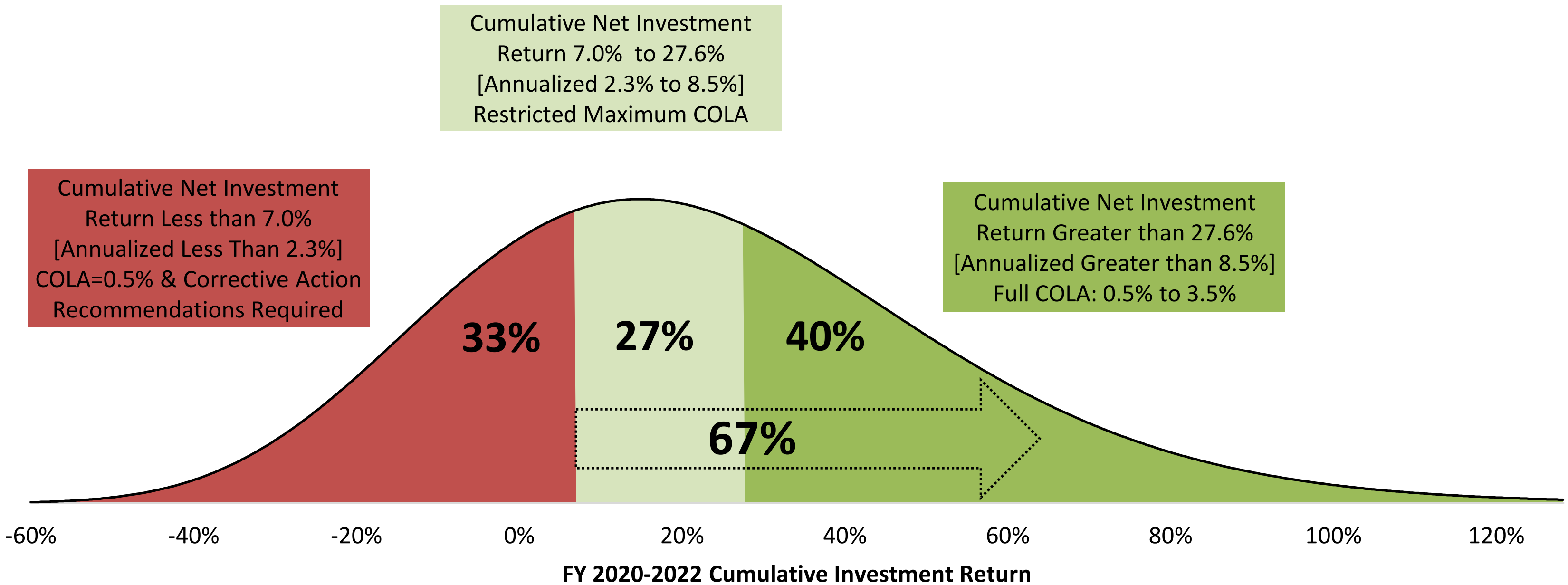
Projected Future COLA Ranges: 2022
Assuming 2.5% Net Investment Return for FY19



- Following an assumed net investment return of 2.5% for FY19, the likelihoods for 2022 COLA ranges, which are primarily driven by FY20 and FY21 investment returns, are:
  - 38% likelihood that the baseline COLA will be payable (CPI-W between 0.5% and 3.5%)
  - 32% likelihood that the COLA will have a restricted maximum (CPI-W between 0.5% and the restricted maximum)
  - 30% likelihood that a 0.5% COLA will be payable and additional Corrective Action recommendations will be required

* Before consideration of liability gains/losses. Likelihoods based on SDIC 2018 investment portfolio statistics. Assumes 2.25% annual inflation.

Projected Future COLA Ranges: 2023
Assuming 2.5% Net Investment Return for FY19

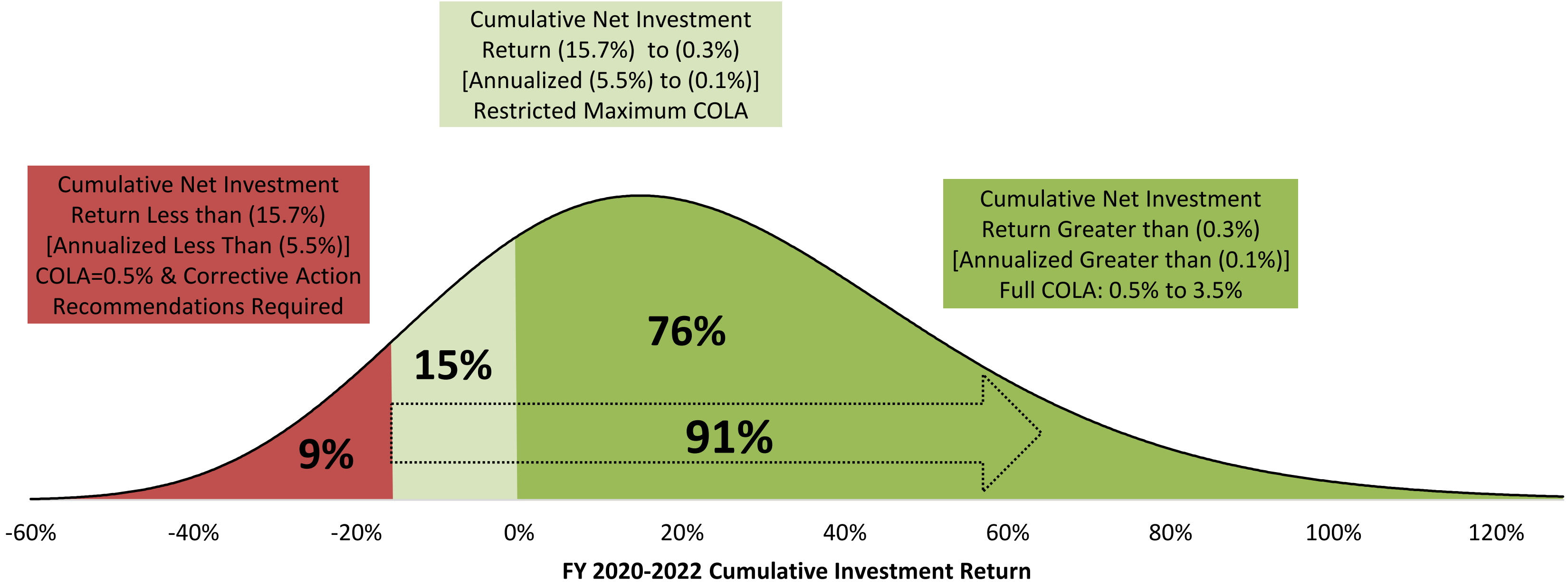


- Following an assumed net investment return of 2.5% for FY19, the likelihoods for 2023 COLA ranges, which are primarily driven by FY20, FY21, and FY22 investment returns, are:
  - 40% likelihood that the baseline COLA will be payable (CPI-W between 0.5% and 3.5%)
  - 27% likelihood that the COLA will have a restricted maximum (CPI-W between 0.5% and the restricted maximum)
  - 33% likelihood that a 0.5% COLA will be payable and additional Corrective Action recommendations will be required

* Before consideration of liability gains/losses. Likelihoods based on SDIC 2018 investment portfolio statistics. Assumes 2.25% annual inflation.

Projected Future COLA Ranges: 2023

if Starting Baseline FVFR = 120%



- If the starting baseline FVFR is 120%, the likelihoods for 2023 COLA ranges, which are primarily driven by FY20, FY21, and FY22 investment returns, are:
  - 76% likelihood that the baseline COLA will be payable (CPI-W between 0.5% and 3.5%)
  - 15% likelihood that the COLA will have a restricted maximum (CPI-W between 0.5% and the restricted maximum)
  - 9% likelihood that a 0.5% COLA will be payable and additional Corrective Action recommendations will be required

* Before consideration of liability gains/losses. Likelihoods based on SDIC 2018 investment portfolio statistics. Assumes 2.25% annual inflation.

Projected Funded Status and Risk Analysis Summary

- Absent a significant run up or downturn in investment markets, the FVFR will be 100% at June 30, 2019
  - Net FY19 returns greater than approximately **9%** would result in an unrestricted 2020 COLA (COLA equal to inflation between 0.5% and 3.5%)
  - Net FY19 returns less than approximately **-8%** would reduce the 2020 restricted maximum COLA to 0.5% and also require corrective action recommendations
- Results to date would indicate a FY20 SDRS COLA equal to inflation – but inflation and investment returns can change quickly and dramatically
- Assuming FY19 net investment returns remain at approximately 2.5%, the likelihood of additional required corrective action recommendations in the near future varies from approximately 24% (one year) to approximately 33% (three years)

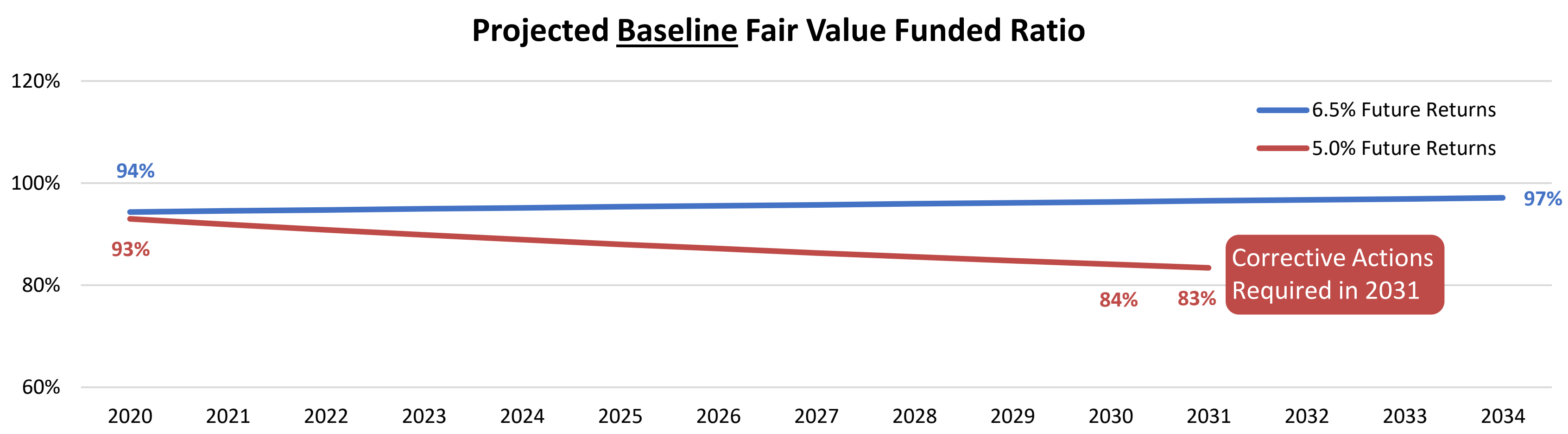
Stress Testing

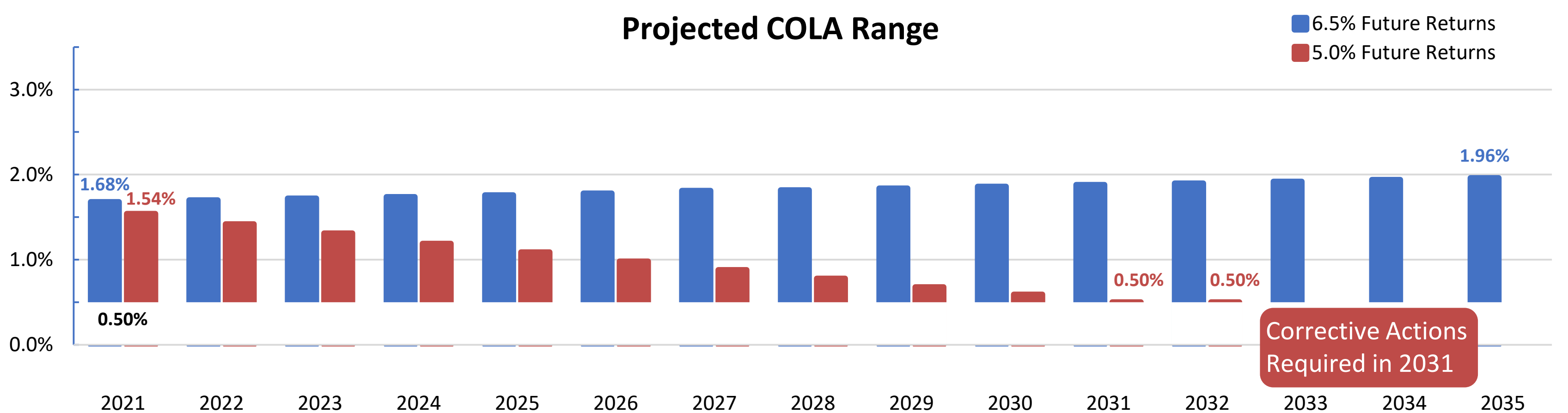
- Stress testing is one risk assessment method listed in ASOP 51
- A few organizations are advocating mandatory standardized stress testing:
  - Striving to have their version endorsed as appropriate standard approach
  - Working to have state legislatures require standard approach
  - Often includes funding implications of a sustained, significant economic downturn without recognizing the impact of future plan adjustments
- To be valuable, risk analysis must:
  - Be tailored to each plan specifics
  - Include actions that will be taken in an economic downturn
  - Answer questions specific to each system
  - Offer decision-useful information
- SDRS has actively assessed risks prior to these requirements and has focused on SDRS specifics identifying the economic conditions that would require corrective actions and the likelihood of those events

Additional Risk Assessments

- Additional insight can be gained from scenario testing – examining the impact of specified conditions or events on SDRS
- The following exhibits compare future results if investment returns equal the assumed 6.5% with the results if future returns are 5% and:
  - All other experience matches assumptions
  - FY 2019 net investment returns equal 2.5%
- Results are stable under the 6.5% scenario with gradual increases in the restricted maximum COLA
- Under the 5.0% return scenario, funding will slowly deteriorate until reaching the corrective action threshold in 2031

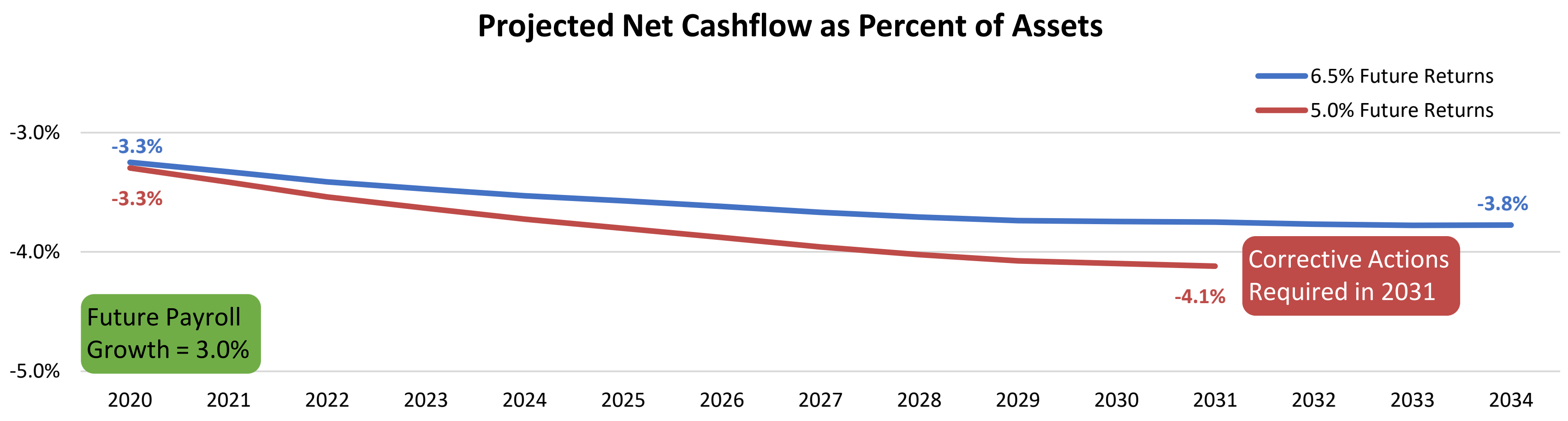
Additional Risk Assessments: 5% Investment Returns





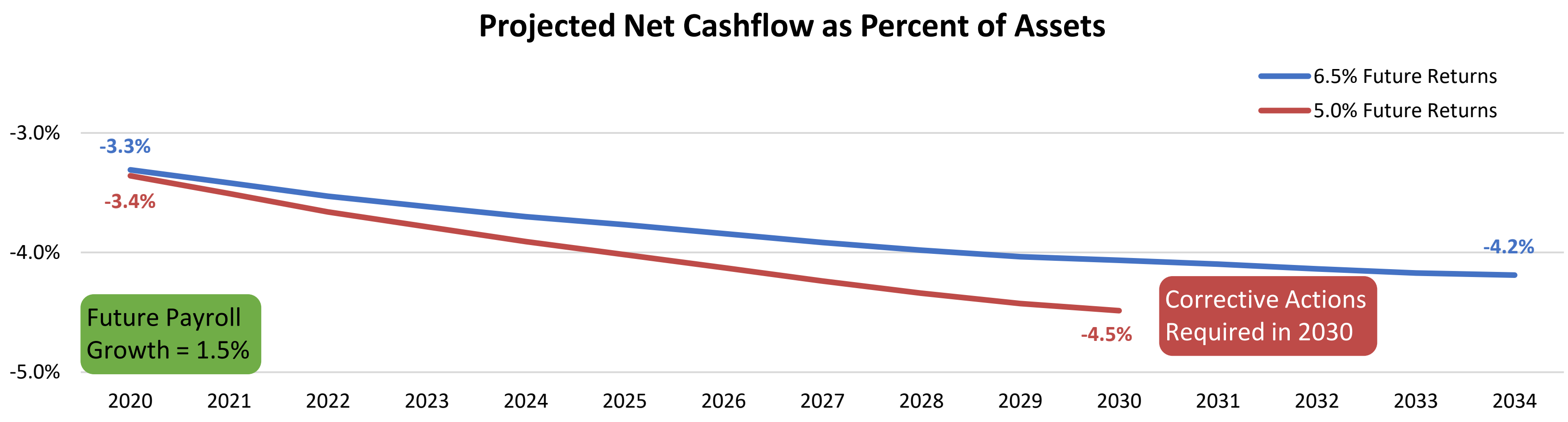
Additional Risk Assessments: Negative Cash Flow

- The amount of negative cash flow (contributions less benefit payments and expenses) is also an important risk factor since it can also impact future investment returns
  - The projected negative cash flow is expected to grow from approximately 3% to almost 4% of beginning of year assets with a 6.5% return
  - If returns are 5.0% per year, the negative cash flow grows more rapidly

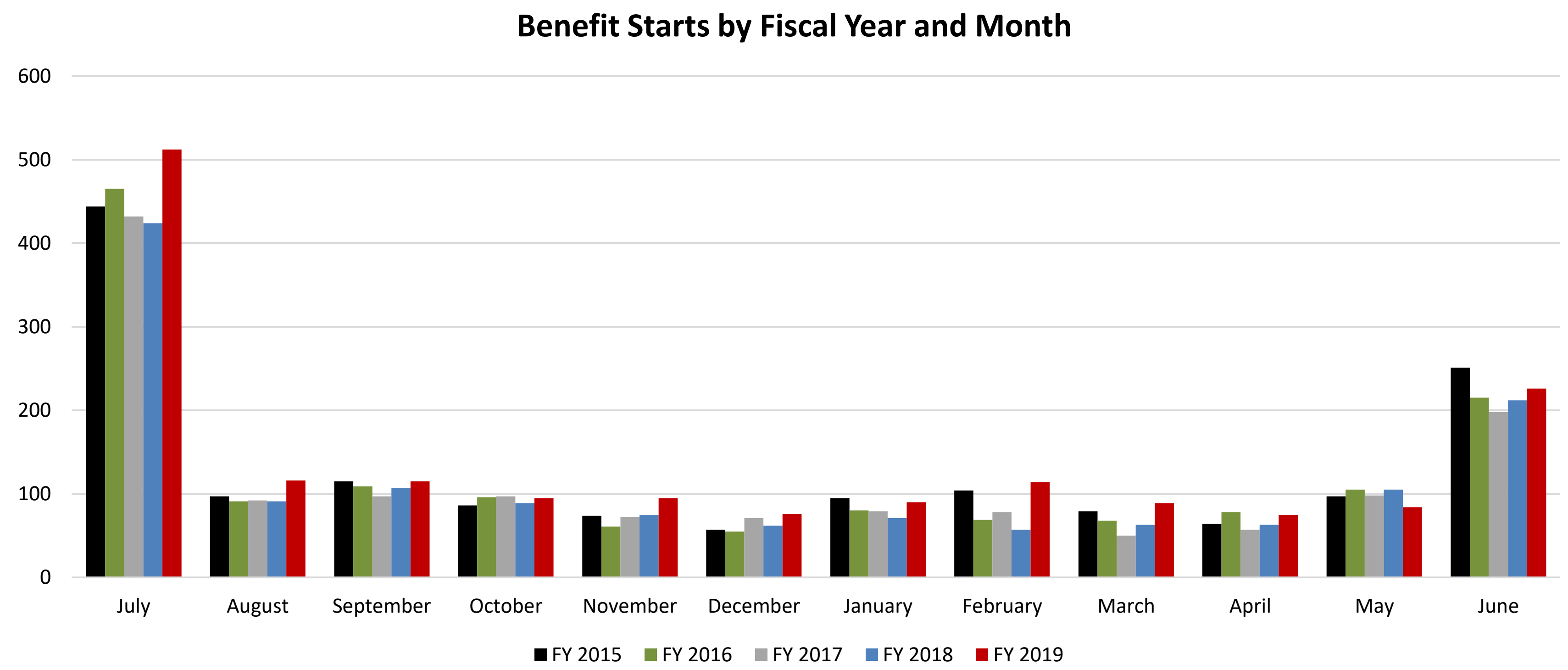


Additional Risk Assessments: Negative Cash Flow

- Changes in the growth of covered payroll can also influence cash flows
  - If payroll growth slows to 1.5% per year, the projected negative cash flow will be larger
  - Investment return less than the assumed 6.5% together with lower payroll growth results in even larger negative cash flow

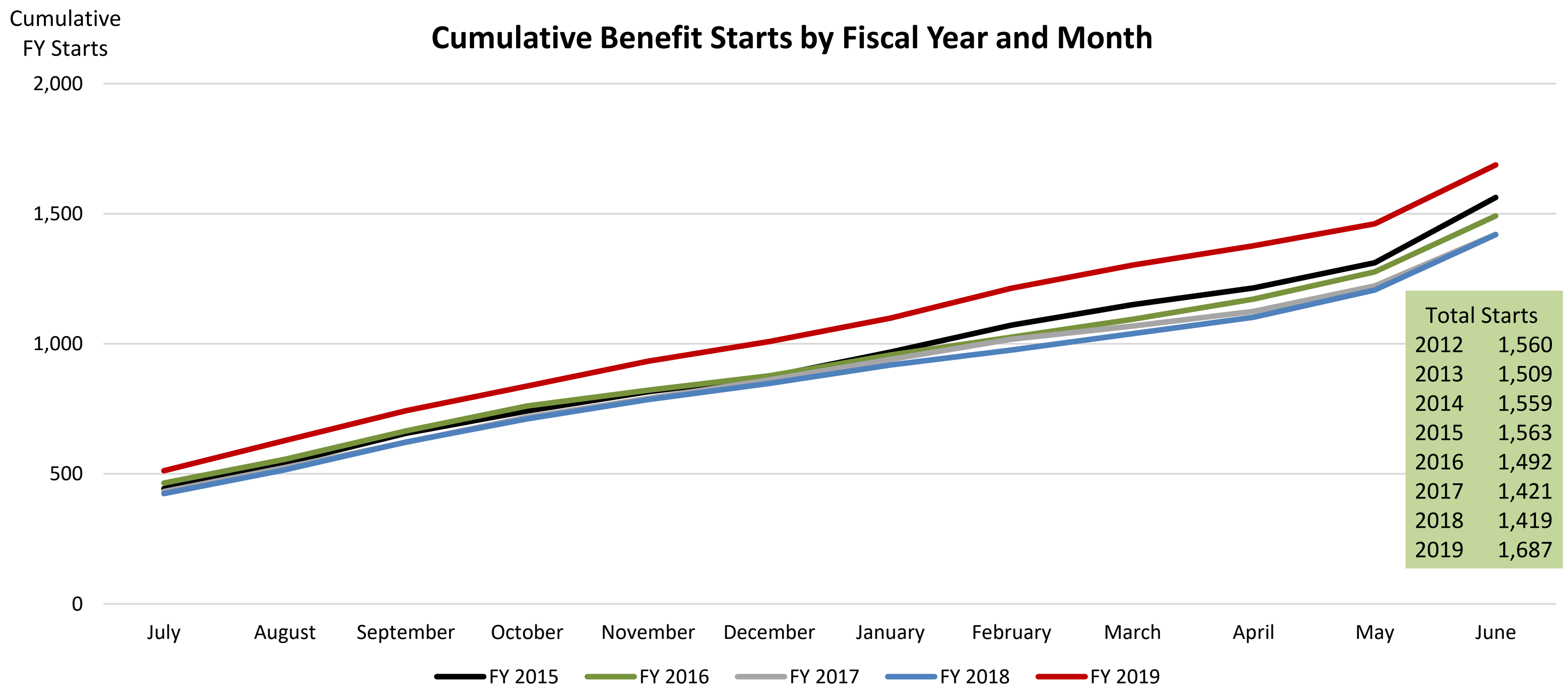


Cash Flow Considerations: Benefit Starts



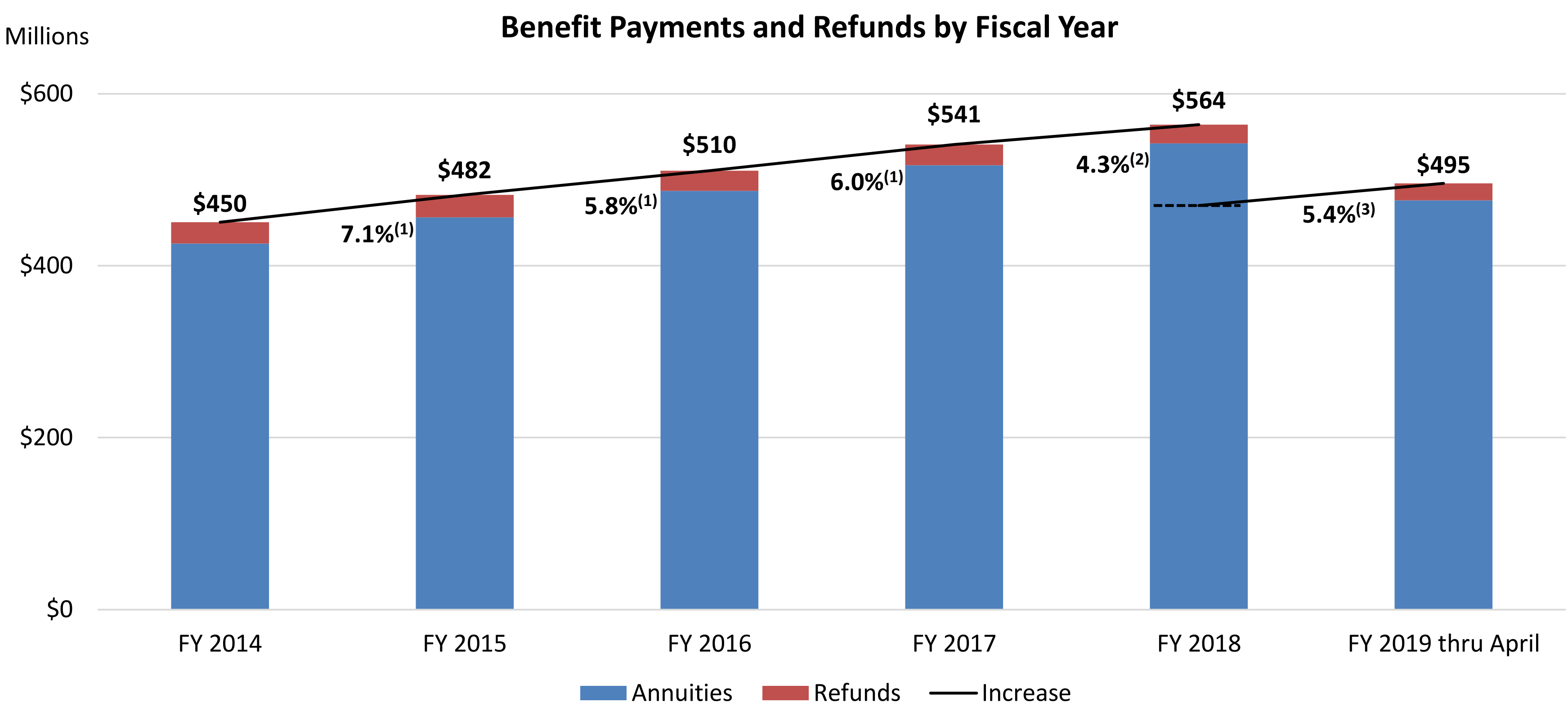
- As expected, the number of benefit starts during FY19 is up considerably from prior years

Cash Flow Considerations: Benefit Starts



- After three years of declining retirements, the number of retirements in FY19 is up 19%
- We expect the elevated number of retirements to continue through FY 2022
- All South Dakota public employers will need to replace a large portion of their workforce

Historical Cash Flow Growth



(1) Increase includes 3.1% COLA.
(2) Increase includes 2.1% COLA.
(3) Increase in FY 2019 through April over FY 2018 through April. Increase includes 1.89% COLA.

- Projected benefit payment increase was 6%. Through April, payments had increased 5.4%.

Summary of Additional Risk Assessments

- Automatically adjusting features of SDRS will stabilize the funded status and cash flow requirements under many scenarios
- However, severe or sustained economic downturns or slowdowns may result in SDRS reaching corrective action thresholds and may increase the cash flow requirements
- Identifying and monitoring risks will remain critical
- Refining an action plan will help drive decisions in a crisis

Public Plan Criticism

- Frequent criticism of public plans focuses on high and consistently increasing contribution requirements, increasing unfunded liability and their perceived causes
- Most frequently cited causes:
  - Contributions have been less than actuarial requirements
  - Defined benefit plans are unsustainable:
    - Benefits are too generous
    - Can be manipulated by employee or employer actions
    - Retirement can last longer than career
  - Assumptions are too optimistic and assumed investment return should be reduced
    - Recent returns have been less than assumed
    - Benefits should be valued on "risk-free" discount rate
    - Arguments often conflated, touting "risk-free" discount rate as more realistic assumed investment return
  - Actuarial practices that have not highlighted the risks of inadequate funding
- A combination of these causes has frequently magnified the problem

SDRS is Different

SDRS

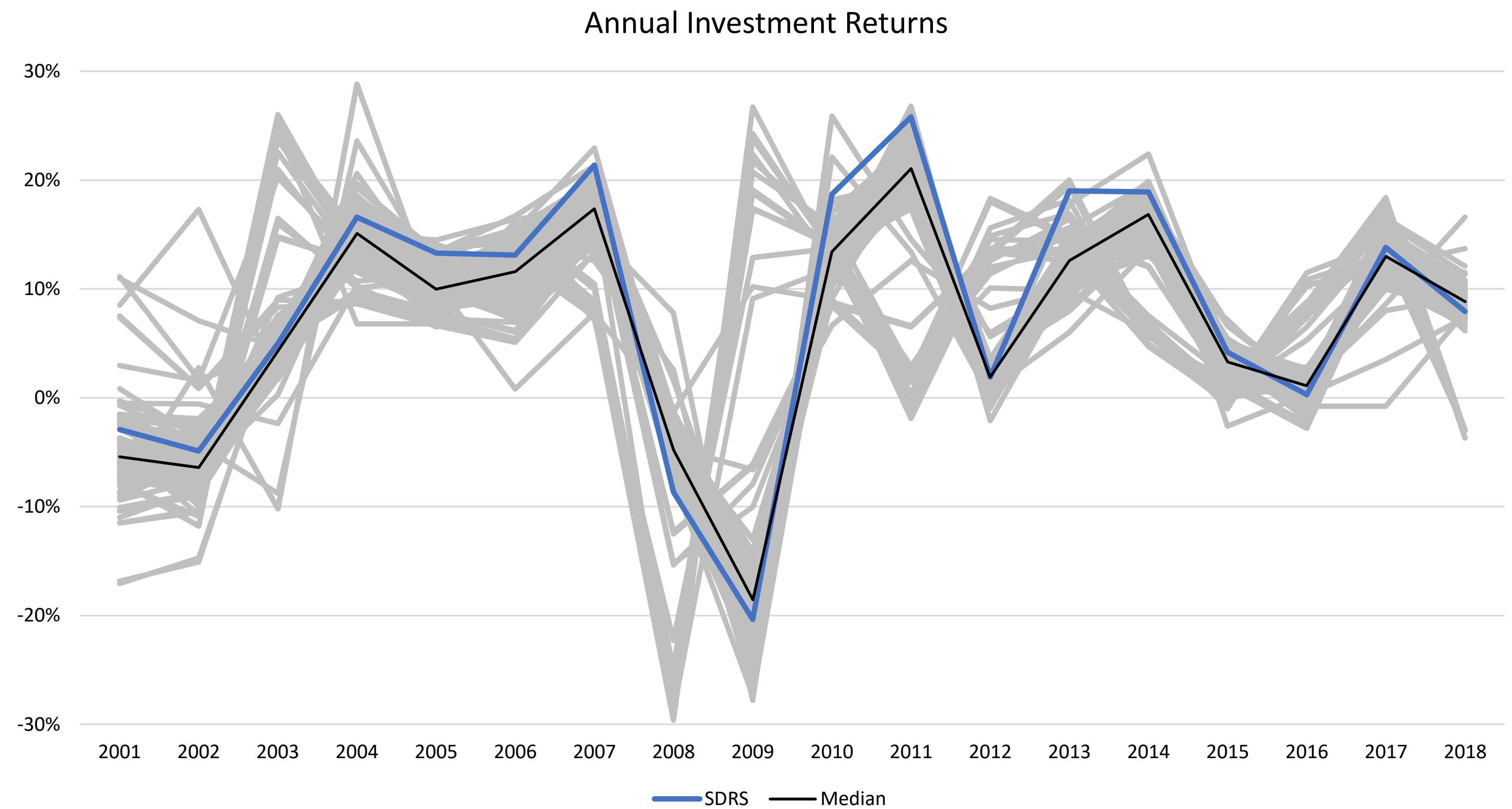
- Fixed member and employer contributions
- Variable benefits
- Statutory thresholds delineating acceptable funding measurements
  - Corrective actions required if thresholds not met
- 6.5% investment return assumption
- **SDIC invests assets**

Typical State Retirement System

- Fixed member, variable employer contributions
- Fixed benefits
- No pre-determined limits on measurements
  - No definitive call to action
- 7.25% investment return assumption
- Responsibility for asset management may be combined with administration, or separate

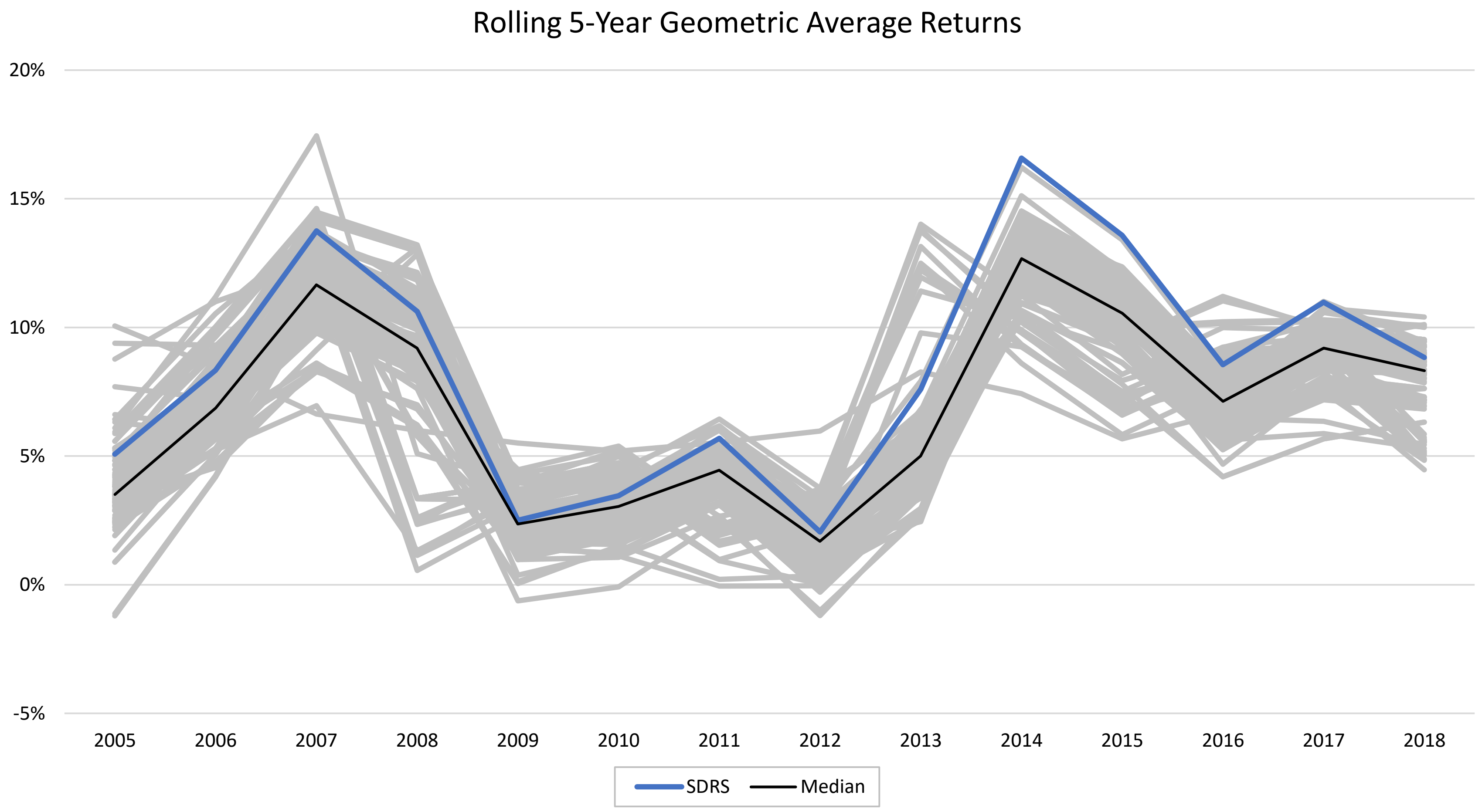
These structural and operational differences have been key to SDRS success

SDIC Results: Statewide Pension Plan One-Year Returns



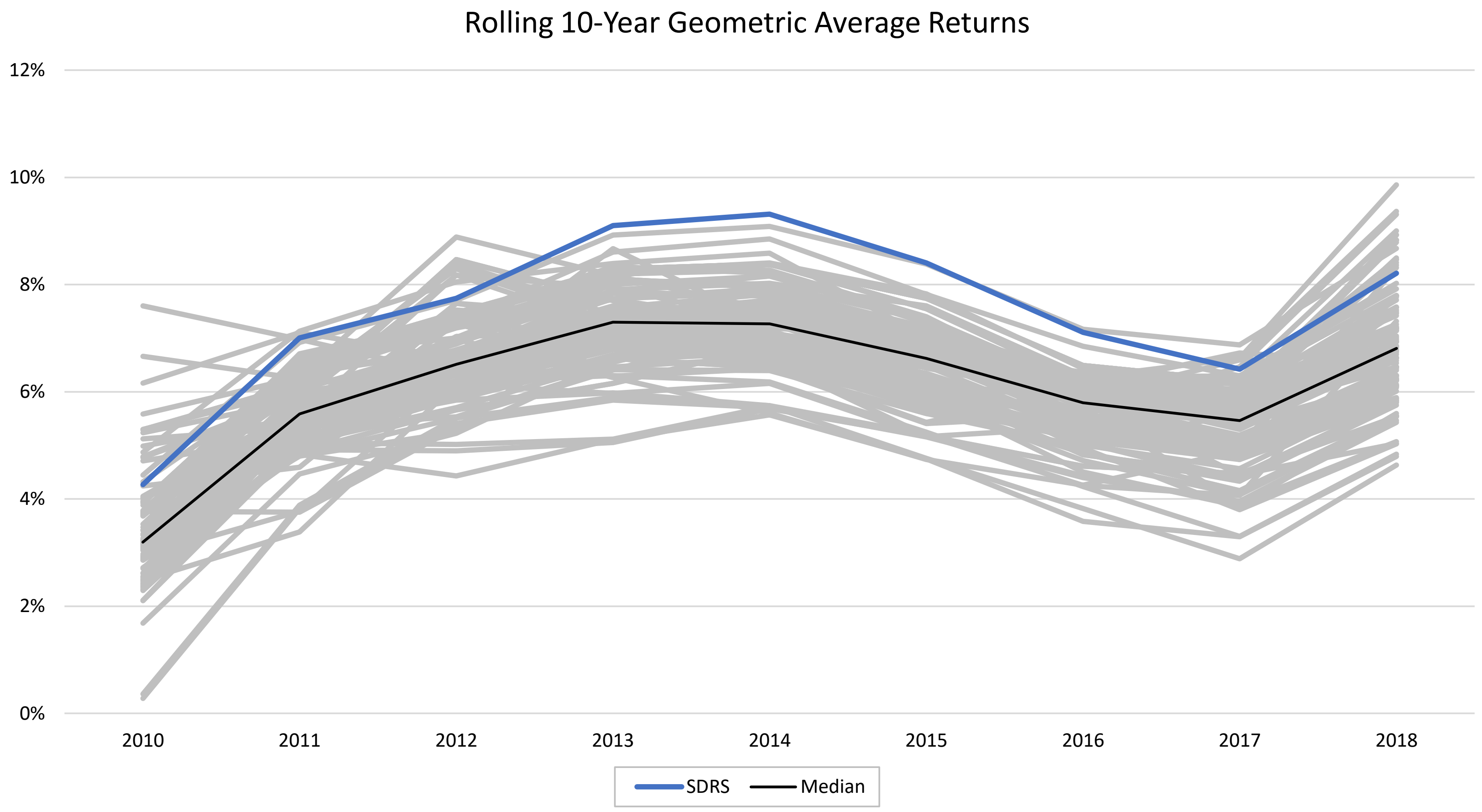
Investment return data on 114 statewide plans from Public Plans Database. Calendar year 2018 returns assumed to be -3% if not yet reported.

SDIC Results: Statewide Pension Plan Five-Year Returns



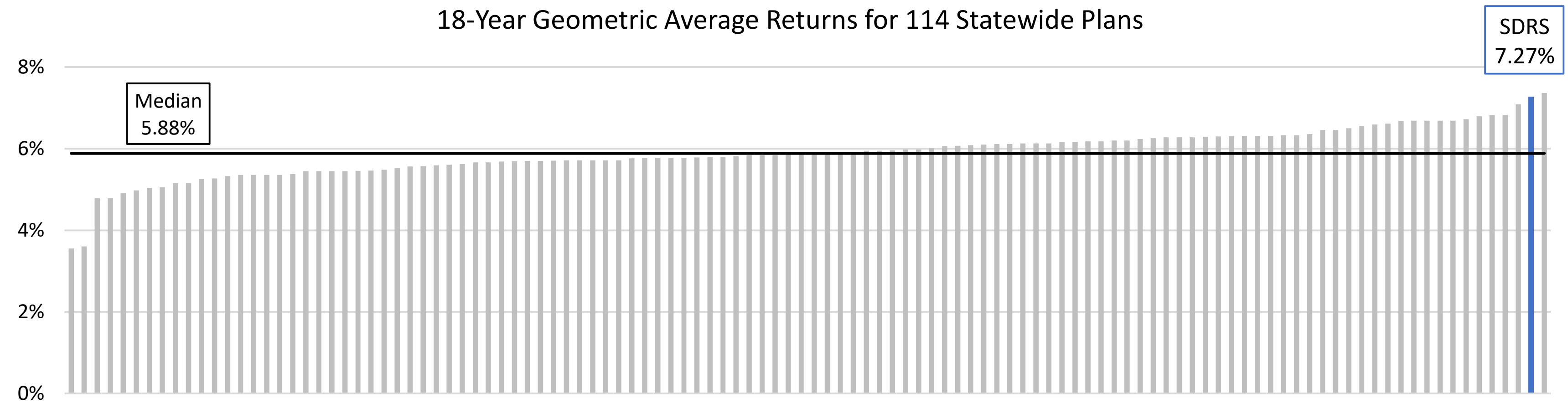
Investment return data on 114 statewide plans from Public Plans Database. Calendar year 2018 returns assumed to be -3% if not yet reported.

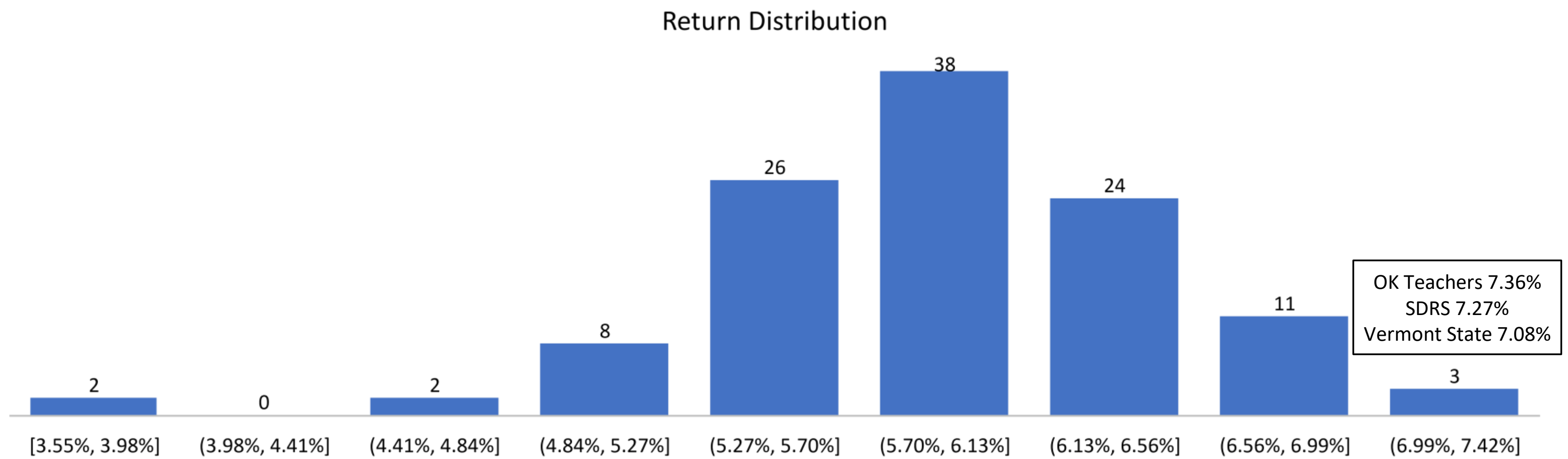
SDIC Results: Statewide Pension Plan 10-Year Returns



Investment return data on 114 statewide plans from Public Plans Database. Calendar year 2018 returns assumed to be -3% if not yet reported.

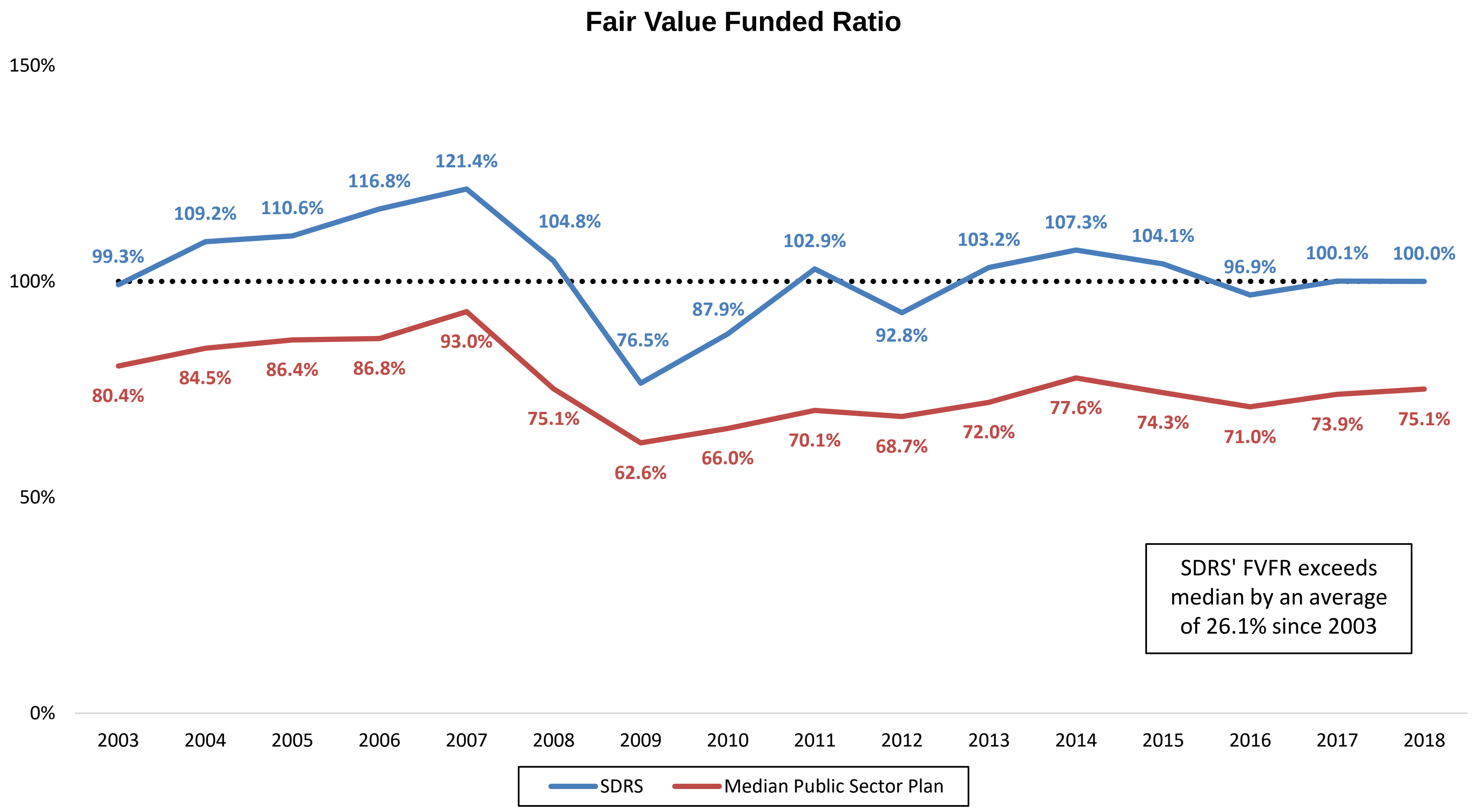
SDIC Results: Statewide Pension Plan 18-Year Returns





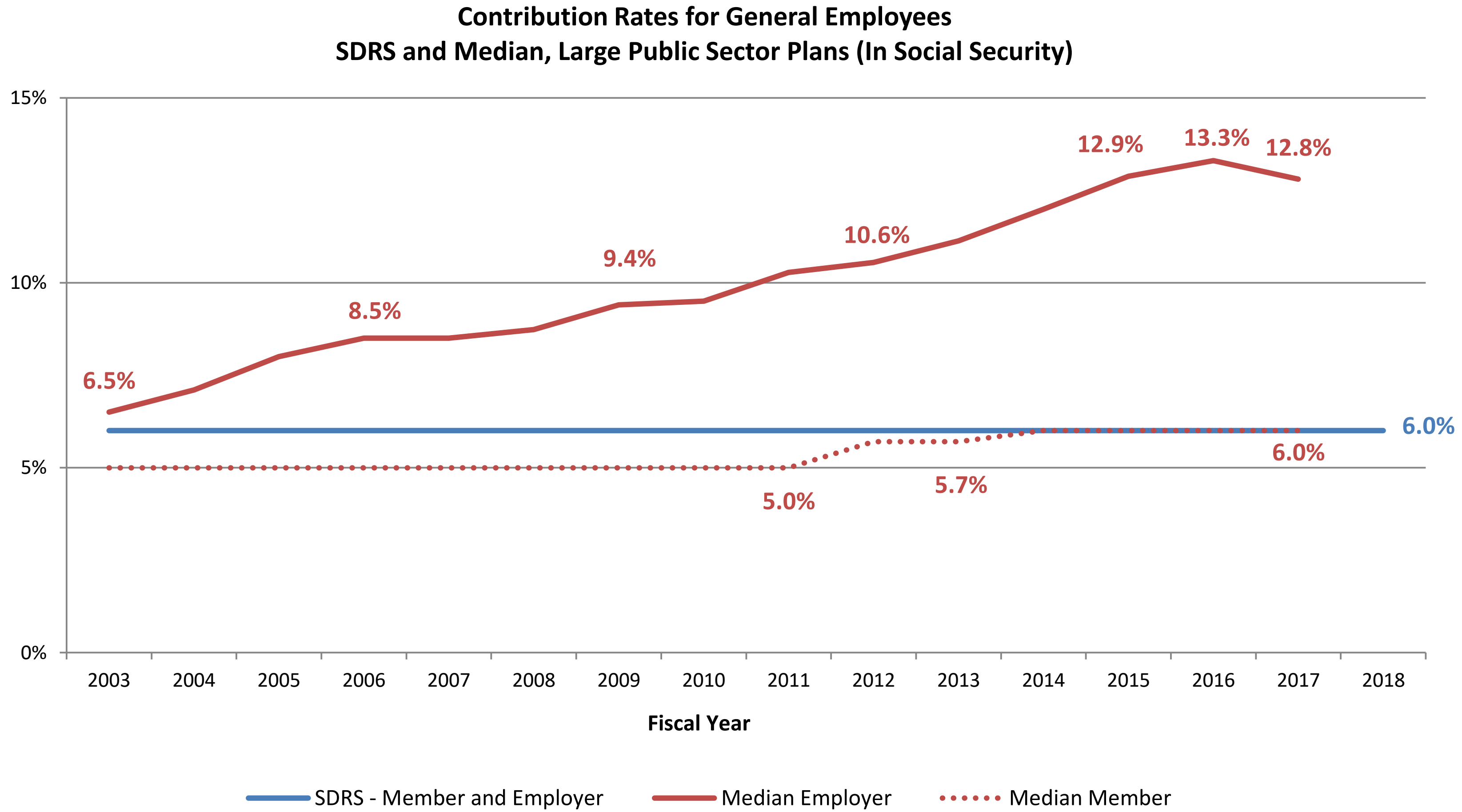
Investment return data on 114 statewide plans from Public Plans Database. Calendar year 2018 returns assumed to be -3% if not yet reported.

SDRS Results: Funded Status Comparisons



Data from Public Plans Database. Many calendar year 2018 results are not yet reported and when reported will likely reduce the 2018 median plan funded ratio.

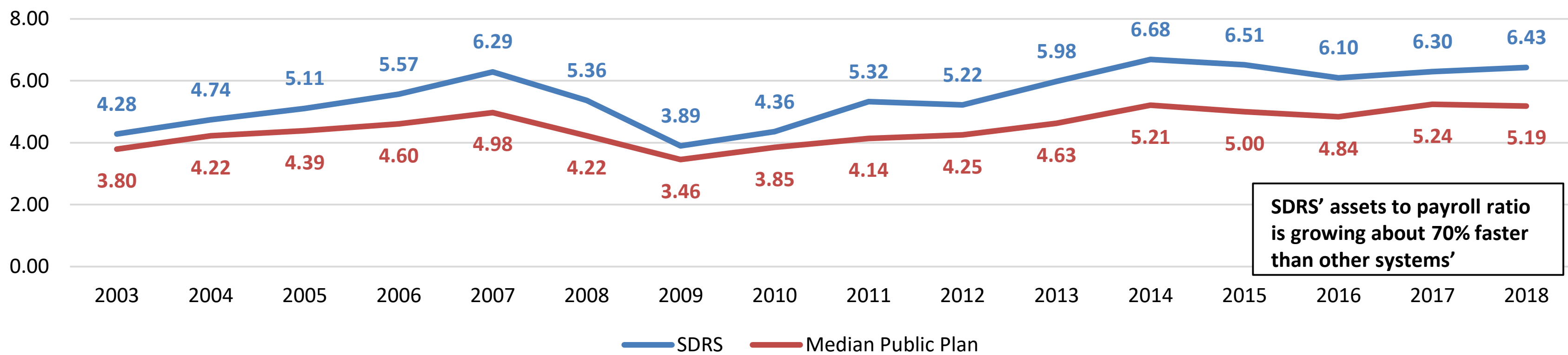
SDRS Results: Contribution Comparisons



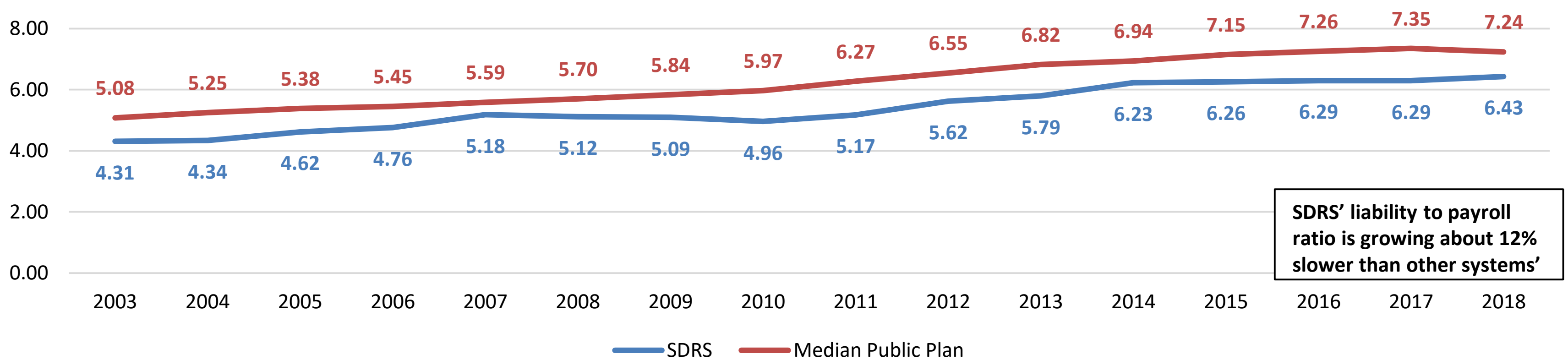
Data from NASRA Public Fund Survey.

SDRS Results:
Plan Maturity Comparisons

Fair Value of Assets to Active Payroll Ratio



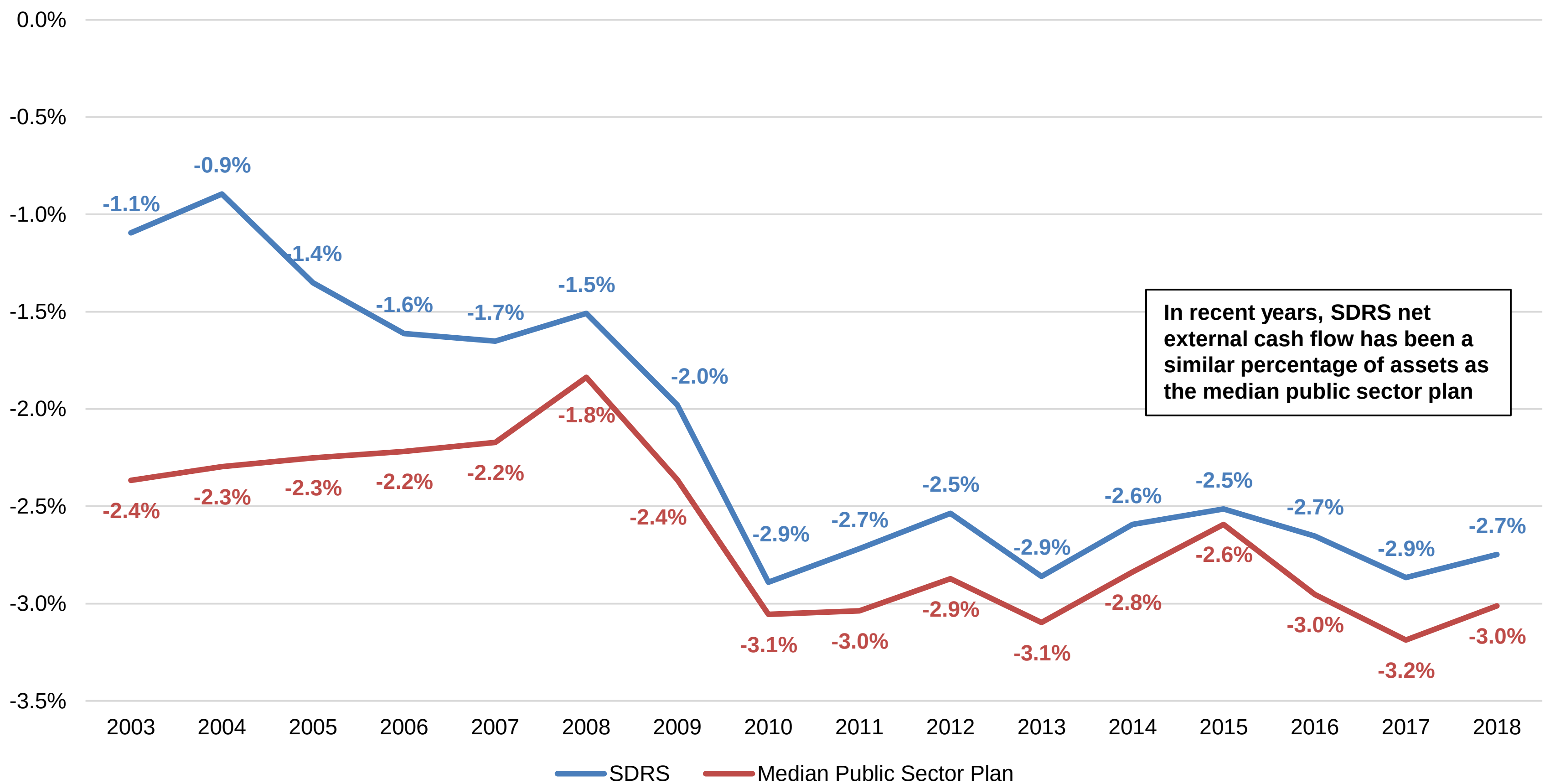
Accrued Liability to Active Payroll Ratio



Median public sector plan data from Public Plan Database.

SDRS Results: Cash Flow Comparisons

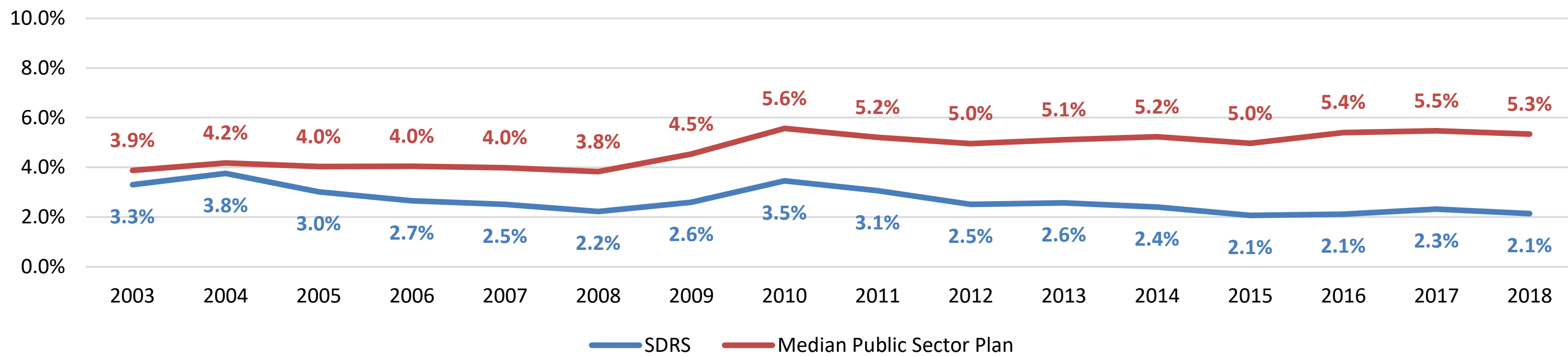
Net External Cash Flow as a Percentage of Beginning Assets



Median public sector plan data from Public Plan Database.

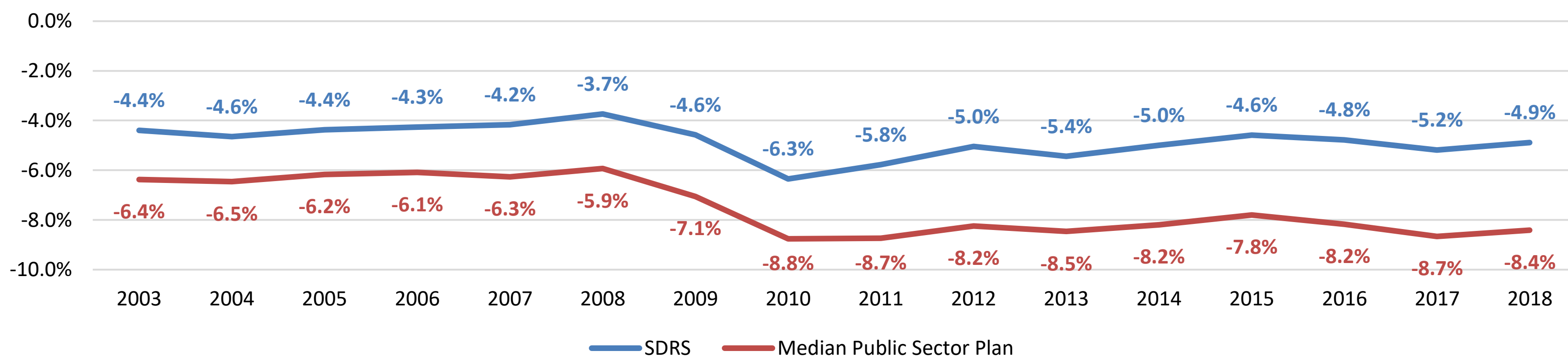
Cash Flow Comparisons

Contributions as a Percentage of Beginning Assets



But both SDRS contributions and expenses are a smaller percentage of assets than the median plan

Benefits and Expenses as a Percentage of Beginning Assets



Median public sector plan data from Public Plan Database.

Summary of SDRS Success

- Investment performance has been the primary driver
- Fixed contributions, variable benefits, benefit improvement discipline, and statutory requirements for corrective actions have been important factors
- Investment assumptions aligned with SDIC outlook
- Risks evaluated and communicated
- Planning, goal setting, and monitoring results