2019 Fall Forum
“Benchmarking in Practice”

Moderator:
Ken Schiebel, CFA, Head of Portfolio Strategies
PFM Asset Management, LLC

October 8, 2019
What is a Benchmark?

Purpose of a Benchmark:
- To evaluate success of the investment program
- To measure performance objectively
- To provide an assessment of risk and return

Important Considerations:
- Nature and use of the funds
- Portfolio objectives (e.g. safety, liquidity, return, growth)
- Time horizon
- Regulatory/policy constraints (investment types, maturity, quality)

A Benchmark Should:
- Align with the portfolio objectives
- Be an independent representation of market performance
- Act as a reasonable yardstick
- Guide investment expectations
Benchmarking Starts With Defining Objectives and Strategy

OBJECTIVES
- Safety
- Liquidity
- Return
- Growth

STRATEGY
- Total Return
- Earnings
- Yield
- Liability Driven

BENCHMARK
- 1-10 Year Treasury Index
- Barclays US Bond Aggregate
- Multi-Asset Benchmark
Defining Your Objectives

**Yield**
- Objective: Earn a specified yield
- Focus on current conditions
- Will vary widely year to year

**Earnings Target**
- Objective: Meet a specified dollar earnings target or budget
- Shorter-term horizon (1-2 years)
- Focus on current conditions; lacks long-term consistency

**Total Return**
- Objective: Meet/exceed the return of a market index
- Investment industry’s standard approach
- Longer-term/full cycle horizon
- Includes earnings + capital appreciation

**Liability Driven**
- Objective: Match assets to liabilities
- Combination of both short and longer-term time horizons
- Can limit investment choices & upside
- Focus on protecting enterprise value (e.g. surplus)
## Selecting a Benchmarking Approach

<table>
<thead>
<tr>
<th>Approach</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yield</strong></td>
<td>Easy to measure, easy to understand, easy to forecast over short term, can be aligned with investment income budgeting</td>
<td>Focus on short-term income rather than long-growth, difficult to forecast longer-term, limited guidance to investment process</td>
</tr>
<tr>
<td><strong>Earnings Target</strong></td>
<td>Easy to measure and track, easy to understand, easy to forecast over short term, can be directly aligned with investment income budgeting process</td>
<td>Focus on short-term income rather than long-growth, does not account for market value changes or portfolio growth/loss</td>
</tr>
<tr>
<td><strong>Total Return</strong></td>
<td>Industry standard approach, reflects the “true value” of portfolio, better measure of manager performance</td>
<td>Focus on long-term growth rather than current earnings or yield, more difficult to understand and calculate</td>
</tr>
<tr>
<td><strong>Liability Driven</strong></td>
<td>Customizable to organization, focus on cash flows, encourages more passive investing</td>
<td>More difficult to implement, may limit investment choices and upside, harder to incorporate non-bond investment (e.g. equities)</td>
</tr>
</tbody>
</table>
Total Return Benchmark Characteristics

- **Pre-Specification**
  - Benchmark should be determined in advance
  - All parties agree at the onset

- **Compatibility**
  - Aligned with investor’s objectives
  - Appropriate composition and risk characteristics

- **Clarity**
  - Composition of benchmark is clear and defined
  - Weights of sectors/assets are identifiable

- **Investability**
  - Composed of assets that can be bought and sold

- **Measurable**
  - Return is readily available or calculable

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**EXAMPLE BENCHMARKS:**
- 3 month T-Bill Index
- 1-5 year Treasury Index
- 1-10 year Gov’t/Corporate Index
- Bloomberg Barclays U.S. Aggregate Bond Index
- S&P 500
- MSCI EAFE Index

## Incorporating the Regulatory Environment

<table>
<thead>
<tr>
<th>Regulatory Environment</th>
<th>Benchmark Examples</th>
</tr>
</thead>
</table>
| **Restrictive**        | Short-Term Fixed Income  
• 3-month T-Bill Index  
• 1-5 year Treasury Index |
| **Less Restrictive**   | Broader Fixed Income  
• 1-10 year Government/Corporate index  
• Barclays Aggregate US Bond Index |
| **Liberal**            | Multi-Asset Class (Equity & Fixed Income)  
• 30% Russell 3000  
• 70% Barclays Aggregate US Bond Index |
| **Customized**         | Custom  
• 18% Russell 3000  
• 12% MSCI ACWI ex-US  
• 60% Barclays Aggregate US Bond Index |
## Defining the Investment Universe

<table>
<thead>
<tr>
<th>Category</th>
<th>Asset Classes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traditional Fixed-Income</strong></td>
<td>U.S. Treasuries, Federal Agencies, Municipal Securities, Negotiable Bank CDs, Commercial Paper, Bankers’ Acceptances, Corporate Notes</td>
</tr>
<tr>
<td></td>
<td>Asset-Backed Securities (ABS), Supranational, Repurchase Agreements, Money Market Funds, Bond Mutual Funds, Local Gov’t Investment Pools</td>
</tr>
<tr>
<td><strong>Broader Fixed-Income</strong></td>
<td>High Yield Bonds, Foreign Sovereign, Fixed-Income ETFs, Private Placements</td>
</tr>
<tr>
<td></td>
<td>Convertibles, Non-U.S. Dollar Investment Grade, Emerging Markets Debt, Bank Loans</td>
</tr>
<tr>
<td><strong>Multi-Asset Class</strong></td>
<td>Domestic Equities (Large, Mid, Small Cap), International Equities (Large, Mid, Small Cap), Emerging Markets, Preferred Stock, Equity Mutual Funds and ETFs</td>
</tr>
<tr>
<td><strong>Alternative Investments</strong></td>
<td>Commodities, Real Estate, Hedge Funds, Private Equity</td>
</tr>
<tr>
<td></td>
<td>Venture Capital, Tangible Assets, Derivatives, Futures, Options, Swaps</td>
</tr>
</tbody>
</table>
## Restricted Regulatory Example: California Government Code

<table>
<thead>
<tr>
<th>Security Type</th>
<th>1 Day</th>
<th>180 Days</th>
<th>270 Days</th>
<th>1 Year</th>
<th>5 Years</th>
<th>Over 5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Treasuries</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Requires Approval</td>
</tr>
<tr>
<td>Federal Agencies</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Requires Approval</td>
</tr>
<tr>
<td>Municipal Securities</td>
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<td></td>
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<td>Requires Approval</td>
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<tr>
<td>Negotiable Certificates of Deposit</td>
<td>✓</td>
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<td></td>
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<td>Requires Approval</td>
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<tr>
<td>Commercial Paper</td>
<td>✓</td>
<td></td>
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<td>Prohibited</td>
<td>X Prohibited</td>
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<tr>
<td>Bankers’ Acceptances</td>
<td>✓</td>
<td></td>
<td>X</td>
<td>Prohibited</td>
<td>X Prohibited</td>
<td></td>
</tr>
<tr>
<td>Medium-Term Corporate Notes</td>
<td>✓</td>
<td></td>
<td>X</td>
<td>Prohibited</td>
<td>X Prohibited</td>
<td></td>
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<tr>
<td>Asset-Backed Securities (ABS)</td>
<td>✓</td>
<td></td>
<td>X</td>
<td>Prohibited</td>
<td>X Prohibited</td>
<td></td>
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<tr>
<td>Supranationals</td>
<td>✓</td>
<td></td>
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<td>Prohibited</td>
<td>X Prohibited</td>
<td></td>
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<tr>
<td>Repurchase Agreements</td>
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<td>Prohibited</td>
<td>X Prohibited</td>
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<tr>
<td>Money Market Funds/Bond Mutual Funds</td>
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<td></td>
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<td>Prohibited</td>
<td>X Prohibited</td>
<td></td>
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<tr>
<td>Local Government Investment Pools</td>
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<td></td>
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<td>Prohibited</td>
<td>X Prohibited</td>
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<tr>
<td>Foreign Sovereign</td>
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<td>Prohibited</td>
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<tr>
<td>Fixed-Income ETFs</td>
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<td>Prohibited</td>
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<tr>
<td>High-Yield Bonds</td>
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<td>Prohibited</td>
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<td>Non-U.S. Dollar Investment Grade</td>
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<td>Emerging Markets</td>
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<td>Prohibited</td>
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<td>Bank Loans</td>
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<td>Domestic Equities (Large, Mid, Small Cap)</td>
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<td>Prohibited</td>
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<td>International Equities (Large, Mid, Small Cap)</td>
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<td></td>
<td>Prohibited</td>
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<tr>
<td>Emerging Markets</td>
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<td>Prohibited</td>
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<tr>
<td>Preferred Stock</td>
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<td>Equity Mutual Funds and ETFs</td>
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<td>Prohibited</td>
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<td>Real Estate</td>
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<td>Hedge Funds</td>
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<td>Prohibited</td>
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<td>Private Equity</td>
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<td></td>
<td></td>
<td>Prohibited</td>
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<td>Venture Capital</td>
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<td></td>
<td></td>
<td>Prohibited</td>
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<td>Tangible Assets</td>
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<td></td>
<td></td>
<td>Prohibited</td>
</tr>
<tr>
<td>Complex Derivatives, Futures and Options</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>Prohibited</td>
</tr>
</tbody>
</table>
Investment Approach for Insurance Portfolios

- Investment strategy is tailored to each account’s specific characteristics, including: ✓ lines of business, ✓ expected liabilities and ✓ confidence level

Sample Breakdown

- Self Insurance
- Surplus/Net Position
- Claims Reserves
- Operating Funds
- Multi-Asset Class, including broad fixed-income and equities
- Liability-matched fixed income
- Cash, money market funds, short-term fixed income
## Risk/Reward of a Short-Term Fixed-Income Strategy

<table>
<thead>
<tr>
<th>Index</th>
<th>As of June 30, 2019</th>
<th>Past 10 Years Ending June 30, 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yield</td>
<td>Duration</td>
</tr>
<tr>
<td>3-month T-Bill Index</td>
<td>2.09%</td>
<td>0.23</td>
</tr>
<tr>
<td>1-3 yr Treasury Index</td>
<td>1.80%</td>
<td>1.88</td>
</tr>
<tr>
<td>1-5 yr Treasury Index</td>
<td>1.77%</td>
<td>2.63</td>
</tr>
<tr>
<td>1-10 yr Treasury Index</td>
<td>1.80%</td>
<td>3.72</td>
</tr>
<tr>
<td>Barclays U.S. Aggregate Bond Index</td>
<td>2.49%</td>
<td>6.00</td>
</tr>
</tbody>
</table>

Notes:
- ICE BofA Merrill Lynch (BAML) Indices provided by Bloomberg Financial Markets.
- Performance numbers for periods one year and greater are presented on an annualized basis.
Duration and Its Impact on Market Value

Impact of Rate Change on Portfolios of Varying Durations

- 3 Month T-Bill: 0.23
- 1-3 Year U.S. Treasury: 1.88
- 1-5 Year U.S. Treasury: 2.63
- 1-10 Year U.S. Treasury: 3.72
- Barclays Agg.: 6.00

Source: All data as of 6/30/2019. Bloomberg. Indexes are ICE Bank of America Merrill Lynch (BAML) indexes and Barclays US Aggregate Index.
Impact of Rate Changes on Total Return

2 Year U.S. Treasury Yield

<table>
<thead>
<tr>
<th>1-5 Year UST Index</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income Return</td>
<td>0.81%</td>
<td>1.53%</td>
<td>0.93%</td>
<td>0.41%</td>
<td>0.38%</td>
<td>0.76%</td>
<td>0.98%</td>
<td>1.29%</td>
<td>1.42%</td>
<td>1.98%</td>
</tr>
<tr>
<td>Change in Market Value</td>
<td>-0.58%</td>
<td>+2.08%</td>
<td>+2.43%</td>
<td>+0.50%</td>
<td>-0.57%</td>
<td>+0.48%</td>
<td>0.00%</td>
<td>-0.20%</td>
<td>-0.77%</td>
<td>-0.46%</td>
</tr>
<tr>
<td>Total Return</td>
<td>0.23%</td>
<td>3.61%</td>
<td>3.36%</td>
<td>0.91%</td>
<td>-0.19%</td>
<td>1.24%</td>
<td>0.98%</td>
<td>1.09%</td>
<td>0.65%</td>
<td>1.52%</td>
</tr>
</tbody>
</table>

Source: Bloomberg.
Risk/Reward of a Various Fixed-Income Strategies

Quarterly Index Returns
June 2009 – June 2019

Notes:
• Performance on trade-date basis, gross (i.e., before fees) in accordance with the CFA Institute’s Global Investment Performance Standards (GIPS).
• ICE Bank of America Merrill Lynch (BAML) Indices provided by Bloomberg Financial Markets.
Longer Strategies Have Historically Led to Greater Growth

Growth of $10 Million Over 10 Years

Thousands

Barclays
1-10 Treasury
1-5 Treasury
1-3 Treasury
3M T Bill

Notes: ICE BofAML indices provided by Bloomberg Financial Markets.
Risk/Reward of a Various Fixed-Income Strategies

Rolling 5 Year Returns

- Barclays
- 1-10 Treasury
- 1-5 Treasury
- 1-3 Treasury
- 3M T Bill

Notes: ICE BofAML indices provided by Bloomberg Financial Markets, returns are annualized
Evolving Risks in Fixed-Income

Barclays Aggregate U.S. Bond Index Statistics

Yield

Duration (years)

Sector Allocation

Corporate Duration

Source: Barclays, Bloomberg as of 7/31/2019.

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Multi-Asset Class Portfolios

**STRATEGY**

- Allocation to a broad range of asset classes
- Seek enhanced returns greater than existing fixed-income portfolios
- Multi-asset class portfolios are exposed to greater volatility
Efficient Frontier – Intermediate-Term Assumptions

*For illustrative purposes only*
Developing a Tailored Strategic Allocation

Sample Multi-Asset Class Portfolios*

<table>
<thead>
<tr>
<th>Expected Returns</th>
<th>Expected Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% Fixed Income</td>
<td>20/80</td>
</tr>
<tr>
<td>60/40</td>
<td></td>
</tr>
<tr>
<td>80/20</td>
<td></td>
</tr>
<tr>
<td>100% Equity</td>
<td></td>
</tr>
</tbody>
</table>

*For Illustrative purposes only

Legend:
- Domestic Large-Cap Equity
- Domestic Mid/Small-Cap Equity
- International Equity
- Fixed Income
- Alternative Asset Classes

© PFM
Multi-Asset Class Benchmarks

**Russell 3000 Index**
Tracks the performance of the 3,000 largest U.S.-traded stocks which represent about 98% of all U.S. incorporated equity securities.

**MSCI ACWI ex-US Index**
Monitors international exposure apart from U.S. investments which includes both developed and emerging markets.

**Barclays Aggregate**
Represents intermediate term investment grade bonds traded in United States.

![Multi-Asset Benchmarks Combinations](chart.png)

*For illustrative purposes only*
Multi-Asset Class Portfolio: 60/40 Model

US Equity 39.00%
International Developed Equity 15.00%
US Corp 10.00%
EM Equity 6.00%
EM Debt 5.00%
High Yield 5.00%
Core Fixed Income 20.00%
Int'l Developed Equity 15.00%

*For illustrative purposes only
**Multi-Asset Custom Benchmark**

- PFM will construct a custom benchmark based on the strategic asset class targets established in client’s Investment Policy Statement:
  - **Domestic Equity** – Russell 3000 Index
  - **International Equity** – MSCI ACWI ex US Index
  - **Fixed Income** – Barclays Aggregate Index

<table>
<thead>
<tr>
<th>Asset Classes</th>
<th>Asset Weightings</th>
<th>Asset Weightings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target</td>
<td>Range</td>
</tr>
<tr>
<td>Growth Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic Equity</td>
<td>39%</td>
<td>19% - 59%</td>
</tr>
<tr>
<td>International Equity</td>
<td>21%</td>
<td>1% - 41%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>0% - 20%</td>
</tr>
<tr>
<td>Income Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed Income</td>
<td>40%</td>
<td>20% - 60%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>0% - 20%</td>
</tr>
<tr>
<td>Real Return Assets</td>
<td>0%</td>
<td>0% - 20%</td>
</tr>
<tr>
<td>Cash Equivalents</td>
<td>0%</td>
<td>0% - 20%</td>
</tr>
</tbody>
</table>

**Blended Benchmark**

- 39% Russell 3000
- 21% MSCI ACWI ex US
- 40% Barclays Aggregate

*For illustrative purposes only*
Return Projections – Intermediate-Term Assumptions

*For illustrative purposes only; “40/60” is 40% Barclays US Bond Aggregate, 60% Russell 3000.
Pool Managers Viewpoint

1. Pool Demographics
2. Strategy/Portfolio Composition
3. Philosophy
4. Benchmarks Used
Panelists

Philip Brown
Chief Fiscal Officer
Schools Excess Liability Fund (CA)

Phil is responsible for SELF’s day-to-day financial operations, the annual budget and audit as well as the management of SELF’s investment portfolio, among other duties. He brings more than 25 years of accounting and financial management experience to SELF and holds a degree in accounting from California State University, Sacramento.

Kevin Crawford
Executive Director
New York Municipal Insurance Reciprocal (NY)

Kevin is the Executive Director of NYMIR, a statewide, municipally owned underwriter of property and casualty insurance for over 880 of New York’s local governments. Before taking the position at NYMIR, he served as General Counsel to the Association of Towns of the State of New York for more than 20 years. He received his B.S. in Civil Engineering from Union College and his Juris Doctor from the New England School of Law in Boston, MA.

James deSpelder
CRASIF Administrator
County Road Association Self-Insurance Fund (MI)

Jim is an attorney with expertise in insurance law and managing group self-insurance funds. His group fund administration experience includes the MASB-SEG Property and Casualty Pool, the Middle Cities Risk Management Trust and the Middle Cities Workers’ Compensation Fund.
**SELF Excess Liability Fund**

**Portfolio Statistics**

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Par Amount Invested</td>
<td>$21,233,070</td>
</tr>
<tr>
<td>Average Duration</td>
<td>2.2 years</td>
</tr>
<tr>
<td>Average Yield at Cost</td>
<td>2.11%</td>
</tr>
<tr>
<td>Benchmark</td>
<td>0-5 Yr US Treasury Index</td>
</tr>
</tbody>
</table>

**Sector Allocation**

- **Federal Agency**: 9%
- **U.S. Treasury**: 37%
- **Supranational**: 5%
- **Certificates of Deposit**: 9%
- **Commercial Paper**: 2%
- **Agency MBS**: 1%
- **ABS**: 5%
- **Corporate**: 30%
- **Municipal**: 2%

**Credit Quality**

- **AAA**: 13%
- **AA**: 54%
- **A**: 24%
- **BBB**: 4%
- **A-1/A-1+**: 5%

**Duration Distribution**

- **0-1 Yr**: 12%
- **1-2 Yr**: 23%
- **2-3 Yr**: 27%
- **3-4 Yr**: 21%
- **4-5 Yr**: 17%
- **5-6 Yr**: 18%
- **6+ Yr**: 8%
- **SELF (-200)**: 11%
- **Benchmark**: 0%

Data as of September 30, 2019.
SELF Workers Compensation Fund

**Portfolio Statistics**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Par Amount Invested</td>
<td>$52,950,901</td>
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<tr>
<td>Average Duration</td>
<td>3.7 years</td>
</tr>
<tr>
<td>Average Yield at Cost</td>
<td>2.21%</td>
</tr>
<tr>
<td>Benchmark</td>
<td>1-10 Yr US Treasury Index</td>
</tr>
</tbody>
</table>

**Sector Allocation**

- U.S. Treasury: 52%
- Federal Agency: 13%
- Certificates of Deposit: 3%
- Agency MBS: 1%
- Municipal: 2%
- ABS: 4%
- Corporate: 25%

**Credit Quality**

- AAA: 72%
- A: 18%
- BBB: 3%
- AAA: 7%

**Duration Distribution**

- SELF (-220)
- Benchmark

- 0-2 Yr: 27% 25%
- 2-4 Yr: 36% 35%
- 4-6 Yr: 19% 23%
- 6-8 Yr: 12% 14%
- 8-10 Yr: 5% 3%

Data as of September 30, 2019.
NYMIR (Property/Casualty)

Portfolio Statistics

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Value</td>
<td>$170,145,973</td>
</tr>
<tr>
<td>Average Duration</td>
<td>2.12 years</td>
</tr>
<tr>
<td>Average Yield at Cost</td>
<td>1.73%</td>
</tr>
<tr>
<td>Benchmarks</td>
<td>1-5 year Treasury index 1-10 year Treasury index 75% equity/25% fixed</td>
</tr>
</tbody>
</table>

Data as of September 30, 2019.
CRASIF (Workers Compensation)

Portfolio Statistics

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Value</td>
<td>$32,488,911</td>
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<tr>
<td>Average Duration</td>
<td>2.64 years</td>
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<tr>
<td>Average Yield at Cost</td>
<td>1.93%</td>
</tr>
<tr>
<td>Benchmarks</td>
<td>0-5 Year Treasury index 1-10 Year Govt/Corp Russell 3000</td>
</tr>
</tbody>
</table>

Credit Quality (S&P)

- AAA: 12%
- AA: 53%
- A: 13%
- BBB: 3%
- NR: 19%

Sector Allocation

- Federal Agency/GSE: 4%
- Corporate: 22%
- U.S.: 10%
- Supranational: 30%
- MBS: 4%
- Mutual Fund - Domestic Equity: 1%
- MMF: <1%
- Supranational: 20%

Duration Distribution (Fixed income)

- 0-2 Yr: 40%
- 2-4 Yr: 30%
- 4-6 Yr: 10%
- 6-8 Yr: 5%

1. Data as of August 31, 2019
2. Sector allocation excludes cash balances.
3. Average yield at cost and at market calculations exclude Mutual Fund – Domestic Equity values.
Questions?
Thank You!
Disclosures

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