

State of Wisconsin Investment Board Update

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Agenda



Performance



Cost Effectiveness



Asset Allocation



Market Update



SWIB News



Questions

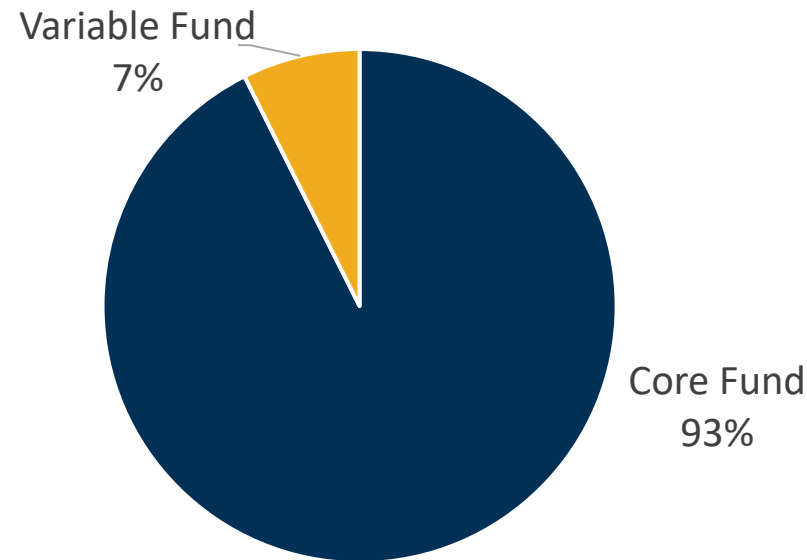


Performance



WRS Assets Under Management

Year-to-Date as of December 31, 2021



| Fund | 12/31/2020 AUM (in millions) | 12/31/2021 AUM (in millions) | 1-Year AUM Change (in millions) |
|---------------|---|---|--|
| Total WRS | \$129.8 | \$147.2 | \$17.4 |
| Core Fund | \$120.2 | \$136.3 | \$16.1 |
| Variable Fund | \$9.6 | \$10.9 | \$1.3 |

WRS Investment Performance

Year-to-Date as of December 31, 2021

| Core Fund | YTD | 5-Year | 10-Year | 20-Year | 30-Year |
|------------------|------------|---------------|----------------|----------------|----------------|
| Performance | 16.89% | 12.47% | 10.10% | 7.92% | 8.70% |
| Benchmark | 16.25% | 11.94% | 9.66% | 7.68% | 8.31% |
| | 0.65% | 0.53% | 0.44% | 0.24% | 0.39% |

| Variable Fund | YTD | 5-Year | 10-Year | 20-Year | 30-Year |
|----------------------|------------|---------------|----------------|----------------|----------------|
| Performance | 19.95% | 15.52% | 13.75% | 8.54% | 9.57% |
| Benchmark | 20.21% | 15.58% | 13.69% | 8.68% | 9.27% |
| | -0.27 | -0.06% | 0.06% | -0.14% | 0.30% |

Year-to-date (YTD) returns are net of all fees. Five-, 10-year returns are net of external manager fees. Thirty-year returns are gross of fees. YTD returns and benchmarks are subject to final valuation and adjustments that may occur during the calendar year. Excess returns may contain rounding differences.

Adding Value to the WRS

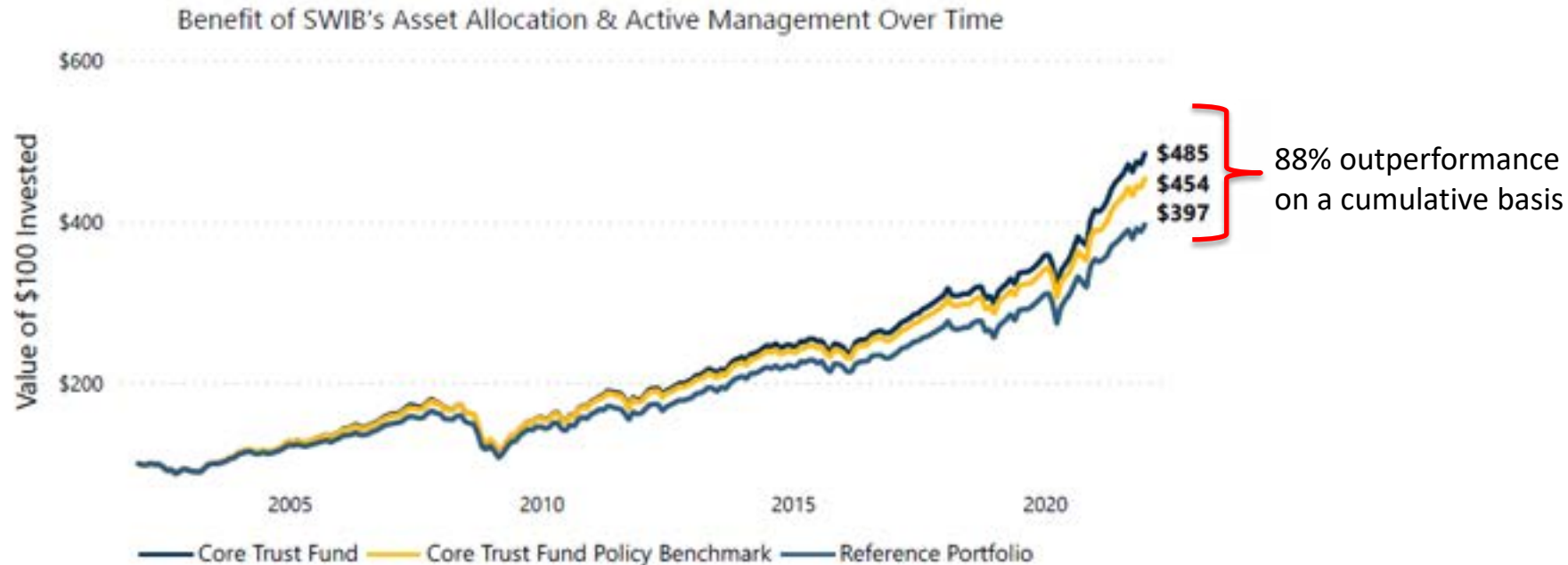
\$2.2 Billion

SWIB's investment management has added value to the WRS trust funds of more than \$2.2 billion over benchmark returns over the last five years.



CTF Performance vs. 60/40 Reference Portfolio*

January 2002 to December 2021



\$34.3bn total

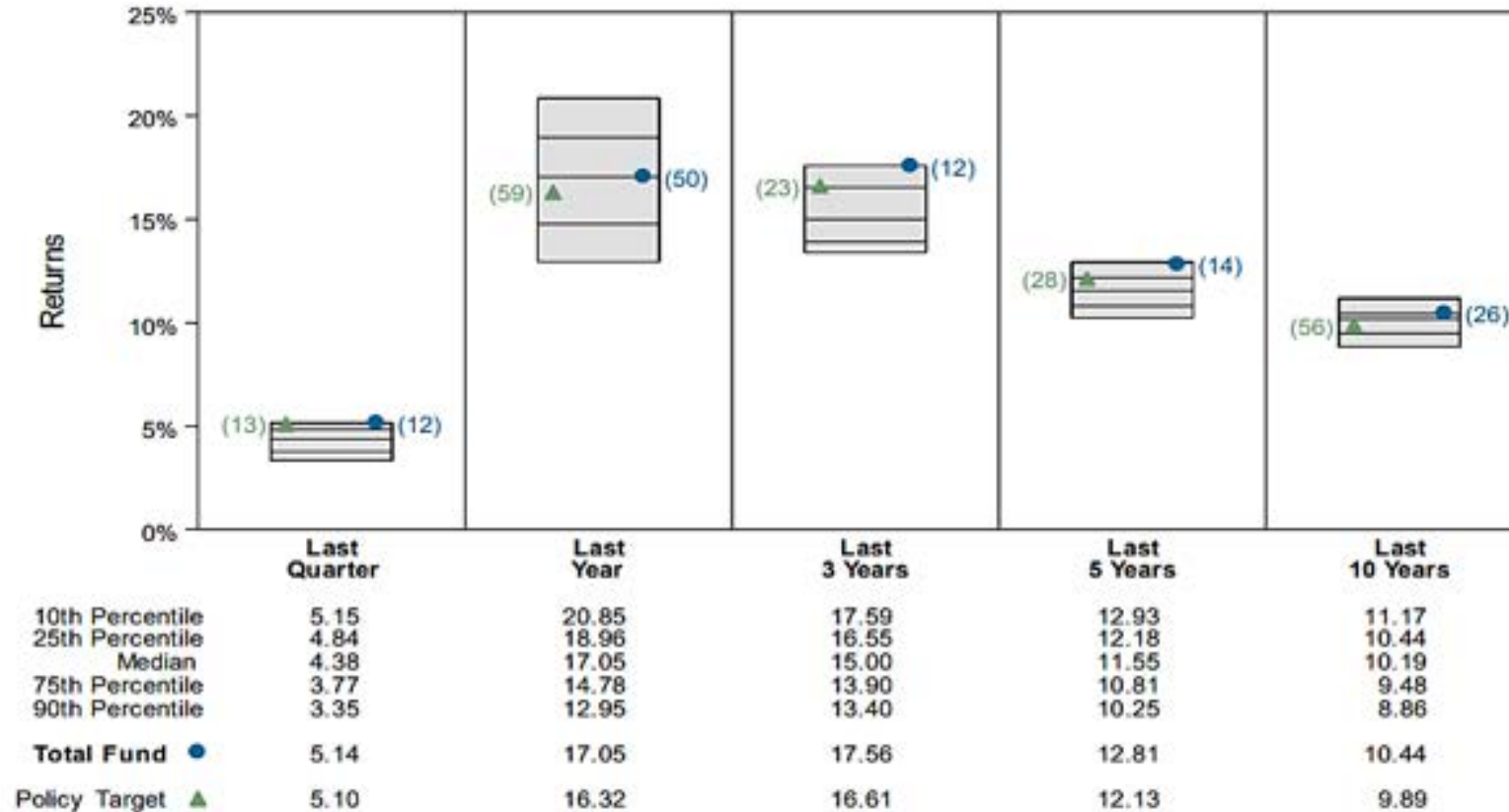
| Reference Portfolio Ending Value | Additional Policy Portfolio Return Above Reference* | Additional Active Portfolio Return | CTF Ending Value** |
|----------------------------------|---|------------------------------------|--------------------|
| 102.0bn | +\$23.2bn | +\$11.1bn | =\$136.3bn |

*The reference portfolio is 60% MSCI World and 40% Bloomberg Barclays Gov't/Credit (domestic)(rebalanced monthly). Core Trust Fund outperformance is calculated using gross returns.

**CTF beginning market value, as of January 1, 2002, was \$52.2 billion.

Cumulative Performance vs. Peers (Gross, 12/31/21)

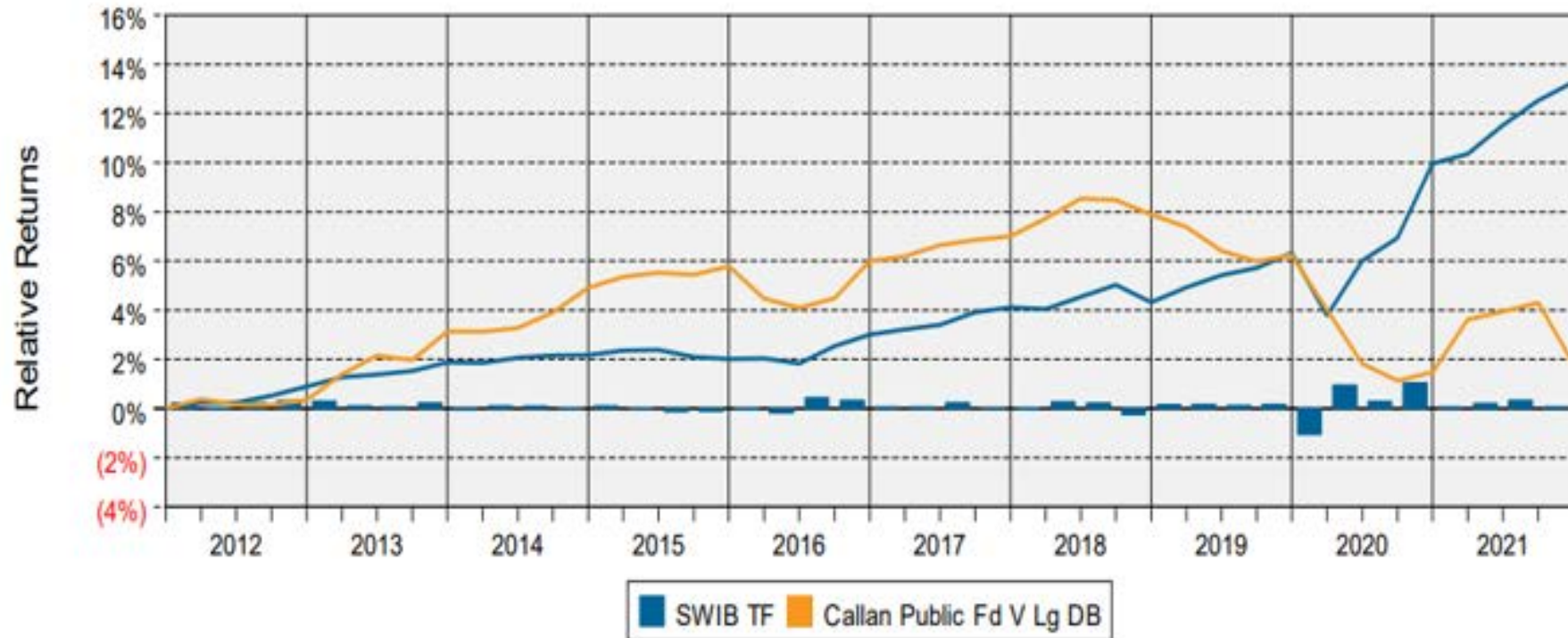
Callan Public Fund Spons- V Lg DB (>10B)



- Actual total returns are well above policy target returns for all periods shown.
- 10-year ranking vs. peers is near top quartile due to value-add above policy target, as target return was close to median.
- Top quartile rankings over medium term 2020 market volatility (and 2019) benefitted SWIB's risk-balanced stance vs. peers.

10-Year Return Consistency vs. Target (Gross, 12/31/21)

Cumulative and Quarterly Relative Return vs. Target



- Longer 10-year time frame shows similar consistency and risk control.
- Smooth accumulation of excess return over very long time periods.
- Annualized 10-year excess return of +55 basis points (bps) results in a cumulative excess return of +13.15%.
- Both actual return of 10.44% and policy target return of 9.89% are well above actuarially required return.

WRS Investment Performance

Year-to-Date as of February 28, 2022

| Core Fund | YTD | 5-Year | 10-Year |
|------------------|------------|---------------|----------------|
| Performance | -4.81% | 10.61% | 8.84% |
| Benchmark | -4.93% | 10.06% | 8.81% |

| Variable Fund | YTD | 5-Year | 10-Year |
|----------------------|------------|---------------|----------------|
| Performance | -7.43% | 12.51% | 11.73% |
| Benchmark | -7.45% | 12.58% | 11.70% |

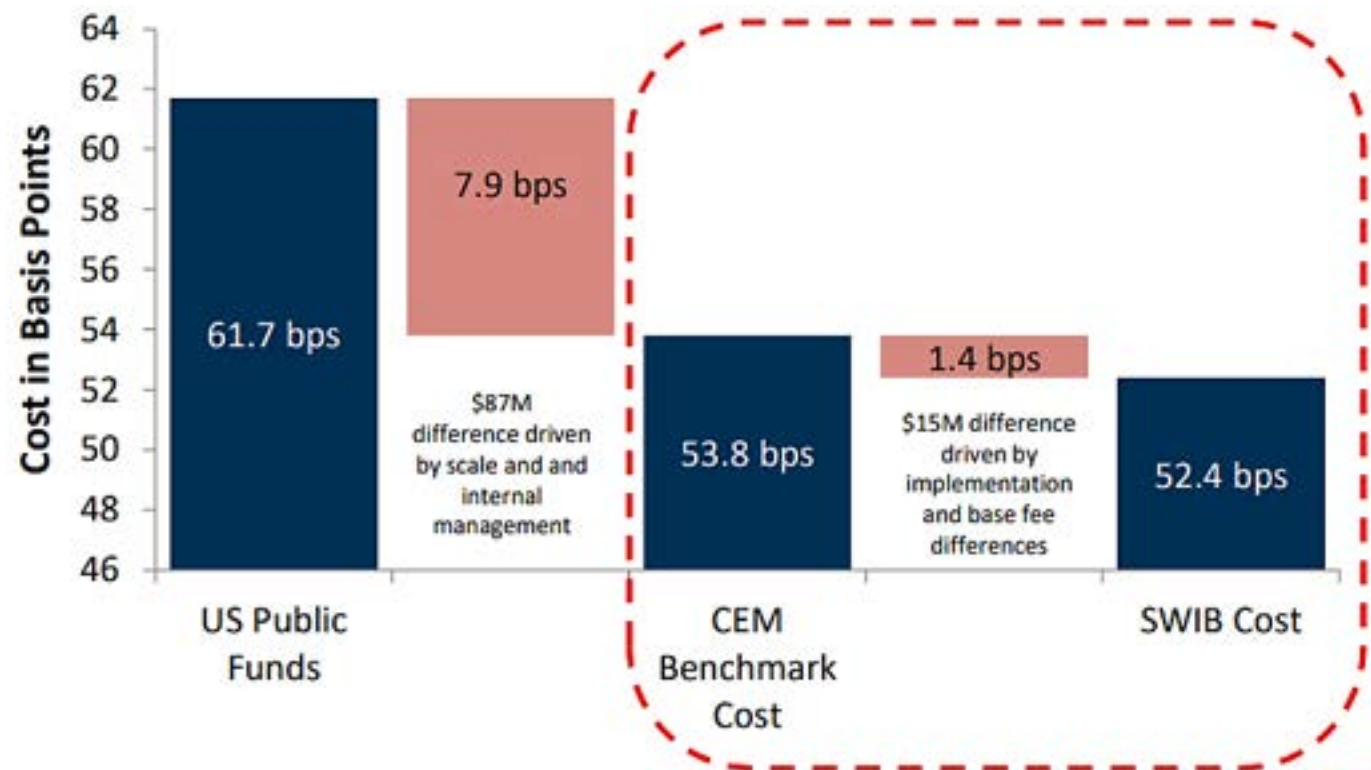
Year-to-date (YTD) returns are net of all fees. Five-, 10-year returns are net of external manager fees. YTD returns and benchmarks are subject to final valuation and adjustments that may occur during the calendar year.

\$ Cost Effectiveness

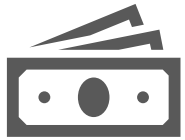


Total Costs Compare Favorably

SWIB's costs are 9.3 bps (\$103 million) lower than U.S. public fund average and 1.4 bps (\$15 million) lower than the CEM Benchmark, which is adjusted for investing style.



SWIB Cost Exceed the Peer Median



SWIB's costs were 6.2 bps higher than its peer group, due to relatively higher hedge fund performance fees.

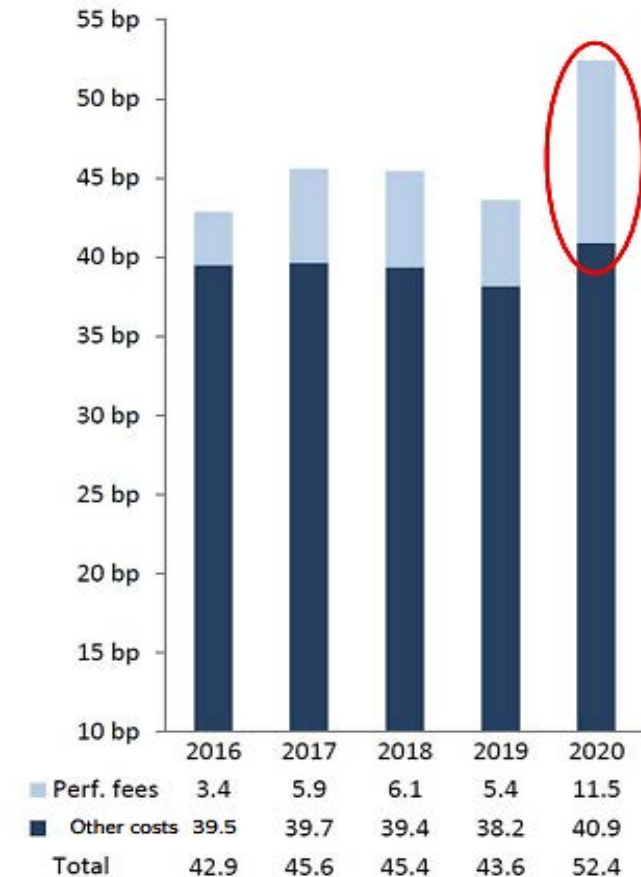


SWIB's hedge fund portfolio achieved top decile performance in 2020.



If hedge fund performance fees equaled the peer group median, SWIB's total cost would have been 0.7 bps below its peer group.

Trend in cost



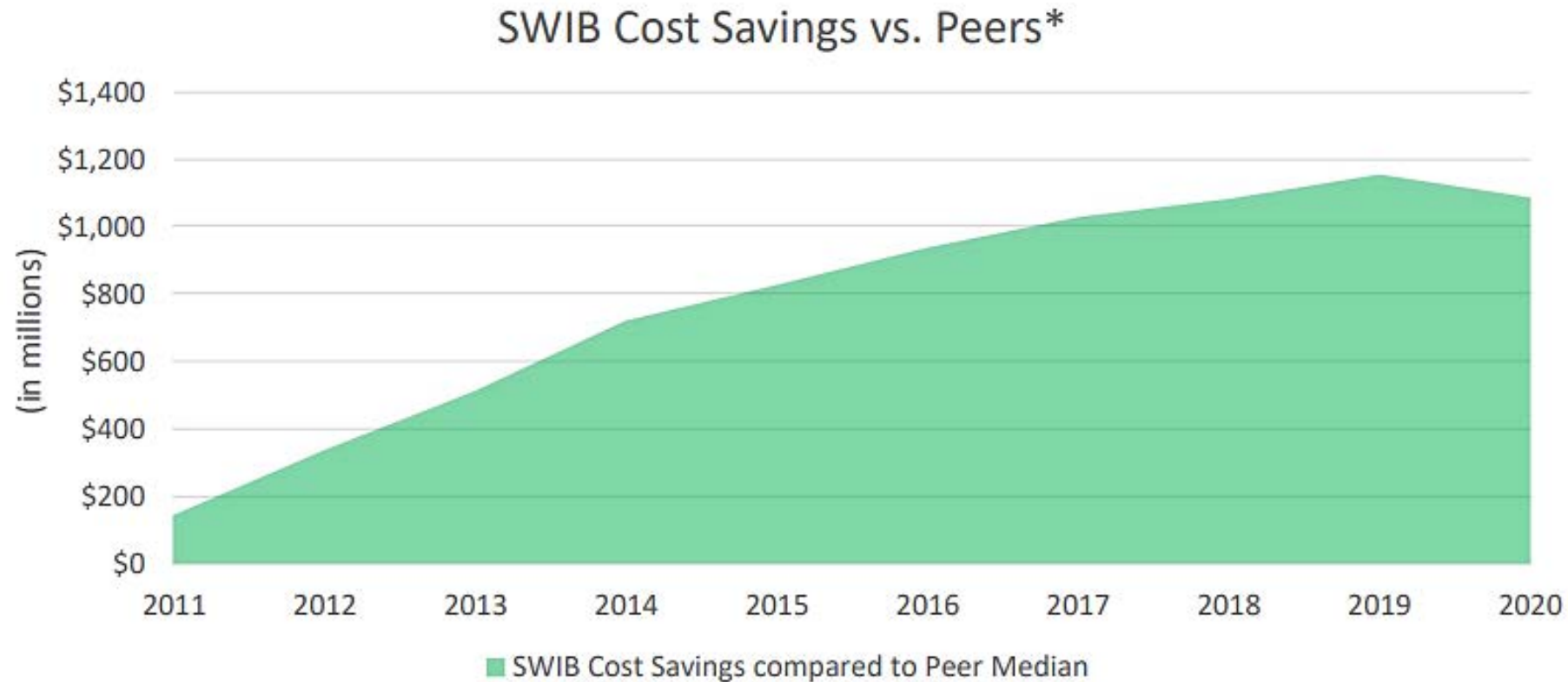
Internal Management Is More Cost Effective

SWIB's costs for internal active management remains considerably lower than the cost for external active management.

| Public Market Asset Type (Active Strategies) | Internal Management Cost (bps) | External Management Cost (bps) ¹ |
|---|--------------------------------------|---|
| Global Large Cap Equity | 15.1 | 41.9 |
| Small Cap Equity | 17.4 | 55.8 |
| Domestic Fixed Income | 7.3 | 12.6 |

¹External management costs represent the median cost for SWIB's CEM public fund peers for each asset class. SWIB engages external managers for Global Large Cap Equity at a cost of 23.1 bps and Domestic Fixed Income at a cost of 13.3 bps.

SWIB Saved \$1.1 Billion vs. Peers from 2011-2020



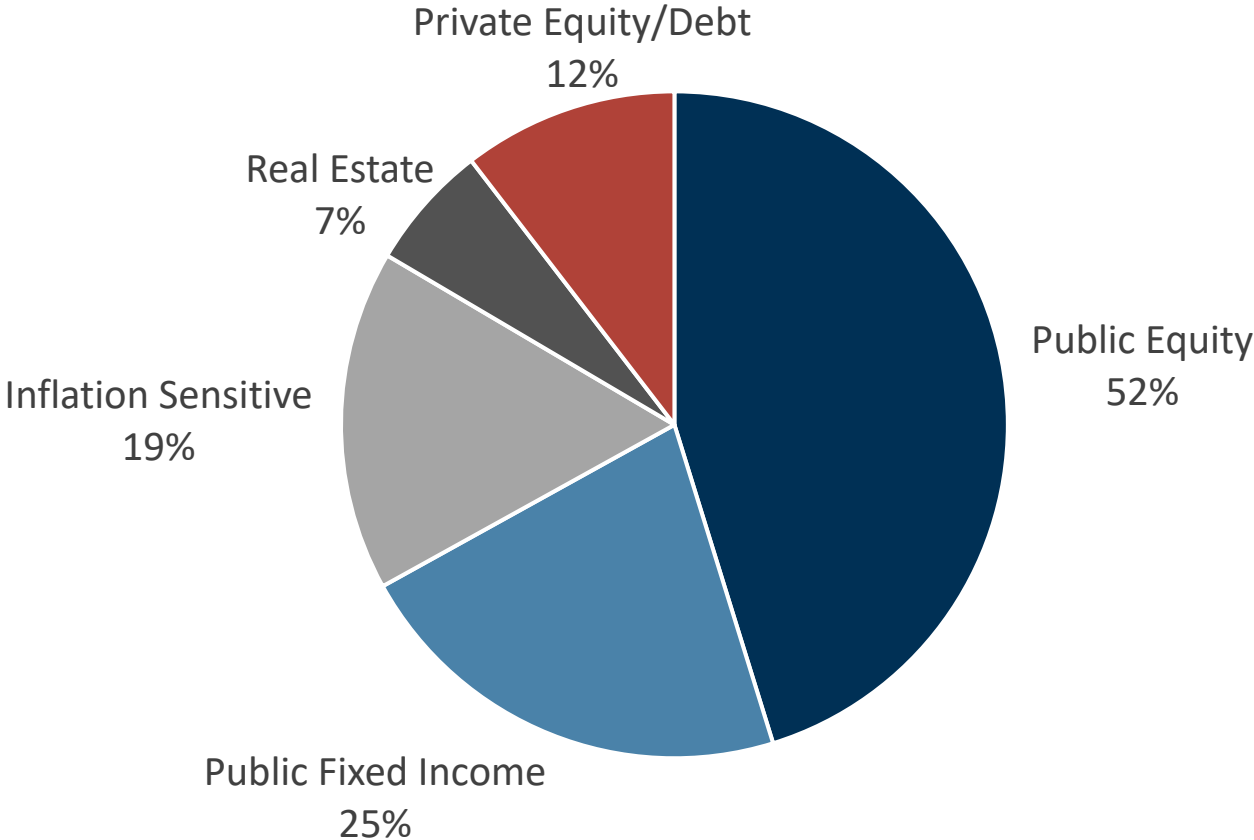
*This analysis compares SWIB's savings vs. the peer group median costs for every \$100 under management and multiplies that average savings by SWIB's median assets under management.



Asset Allocation



Asset Allocation Targets



Asset allocation target totals exceed 100% due to SWIB's overall leverage of Core Fund assets.

Long Term Target Returns and Risk

| | Former Policy Portfolio | Current Policy Portfolio | Rebalance Ranges |
|------------------------------|-------------------------|--------------------------|---|
| Public Equity | 51% | 52% | 46% - 58% |
| Public Fixed Income | 25% | 25% | 19% - 31% |
| Inflation Sensitive Assets | 16% | 19% | 14% - 24% |
| Private Equity/Debt | 11% | 12% | 7% - 17% |
| Real Estate | 8% | 7% | 3% - 11% |
| <u>Multi-Asset</u> | <u>4%</u> | | |
| Total | 115% | 115% | 110%* - 120% |
| <i>10 Yr Expected Return</i> | 5.2% | 5.4% | *SWIB Staff allowed to eliminate leverage, i.e., down to 100% |
| <i>30 Yr Expected Return</i> | 6.4% | 6.6% | |
| <i>Standard Deviation</i> | 12.5% | 13.1% | |
| <i>Sharpe Ratio 10 Yr</i> | 0.316 | 0.317 | |
| <i>Target Active Risk</i> | 1.2% | 1.2% | |

Asset allocation balances long-term returns and risk to get closer to 6.8% target.



Public Equity Allocation

Key Highlights

Equities includes full Global Market Capitalization (MSCI ACWI IWI)

- Include the full U.S. Market (large-cap, mid-cap, small-cap)
- Strategic about emerging markets allocation
 - Add EM Small Cap
 - EM index includes ~30% weight to China
 - Break out China exposure and allocate only ½ weight
 - Full weight to EM, ex-China.

Public Fixed Income/Inflation Sensitive Allocations

Key Highlights

- Maintain US Focus
- Focus on where alpha opportunities are in Fixed Income
 - Adds leveraged loans and move to 50%/25%/25% split in risky credit between high yield, loans, and emerging market debt.
 - Relative reduction in investment grade due to thin spreads
- Includes allocation to long Treasuries
- Increased allocation to TIPS to 19%, primarily through use of leverage

Stress Test Scenarios for Return Opportunities

2031 Results by %-tile of Investment Return Outcomes

| | ROR | StdDev | Contribution Rates | | | Dividend Rates | | | Highest | Worst Retiree |
|--------------------|-------|--------|--------------------|-------|-------|----------------|-------|-------|---------------|---------------|
| | | | 95th | 50th | 5th | 95th | 50th | 5th | Div. Dep. PRB | Funded % |
| 1 | 4.0% | 6.9% | 12.9% | 14.9% | 16.6% | 0.5% | -1.2% | -2.9% | 90%/yr50 | 59%/yr50 |
| 2 | 5.0% | 11.3% | 10.0% | 14.3% | 17.0% | 2.0% | -0.3% | -3.0% | 24%/yr50 | 76%/yr50 |
| Actuarial Rate → 3 | 6.0% | 15.5% | 7.7% | 13.6% | 17.4% | 4.5% | 0.7% | -3.2% | 10%/yr10 | 90%/yr10 |
| 4 | 7.0% | 20.4% | 4.0% | 12.9% | 17.9% | 6.6% | 1.6% | -3.5% | 13%/yr10 | 83%/yr10 |
| 5 | 8.0% | 26.3% | 0.0% | 12.2% | 18.6% | 9.0% | 2.4% | -4.1% | 16%/yr10 | 71%/yr10 |
| 6 | 9.0% | 33.7% | 0.0% | 11.7% | 19.6% | 11.6% | 3.2% | -5.2% | 21%/yr10 | 55%/yr10 |
| 7 | 10.0% | 44.0% | 0.0% | 11.4% | 21.2% | 14.6% | 3.7% | -7.1% | 28%/yr10 | 35%/yr10 |

- Because forward-looking return assumptions are lower than before, more risk is required to hit the same return targets.
- In 2019, Scenario 3 had a standard deviation of 10.7% to hit a 6% return target and Scenario 4 had a standard deviation of 14.7% to hit a 7% return target.



Market Update

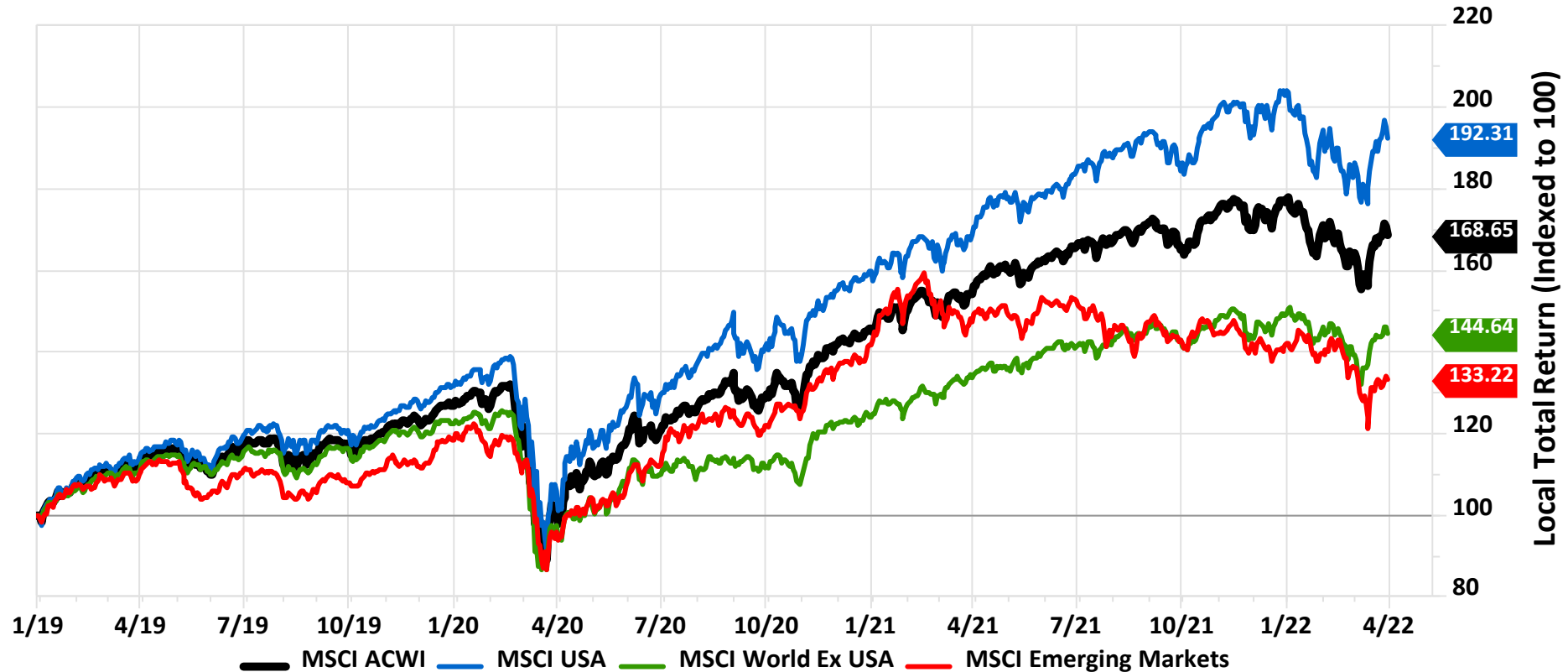


Global Equities - Performance

Equity markets are higher in the past few weeks

03/31/2022

Local Equity Performance



Global Equities - Valuation

U.S. P/E ratios have declined less than ex U.S.



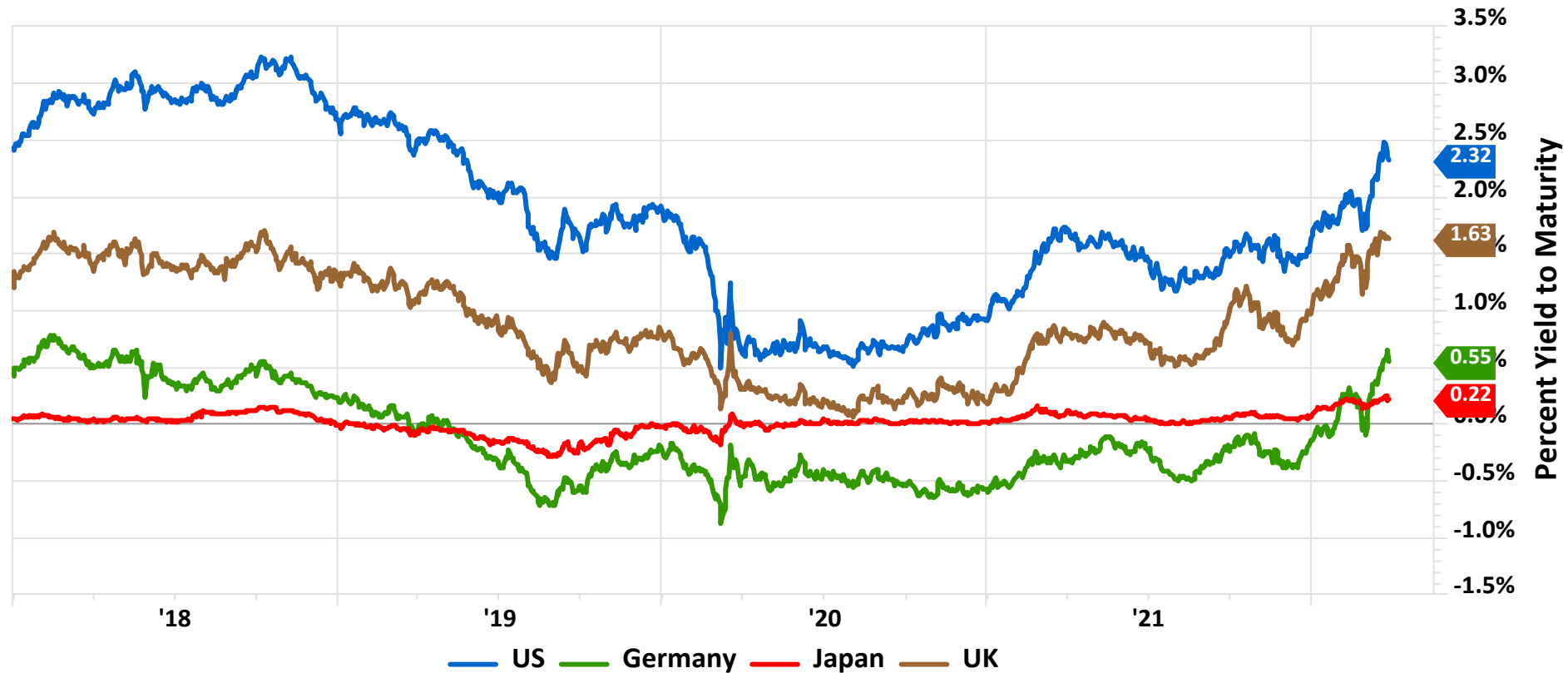
Data source: FactSet Market Aggregates – Next Twelve Month P/E Ratio, Monthly, 20-year Average with 1 Std. Dev. Bands.

Global Bonds

Yields have increased in recent weeks due to global monetary tightening expectations

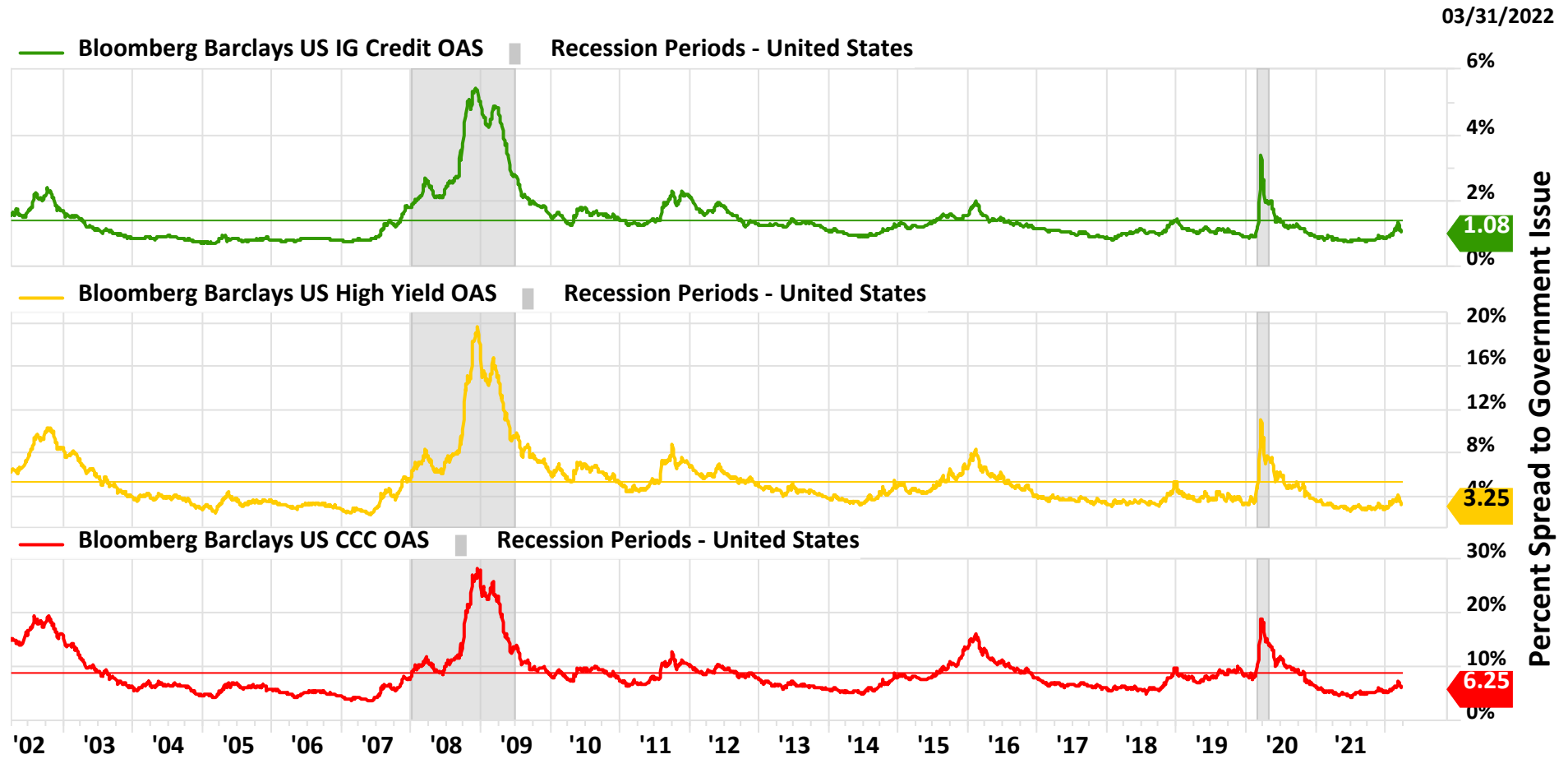
03/31/2022

10-Year Government Bond Yields



Credit Sectors

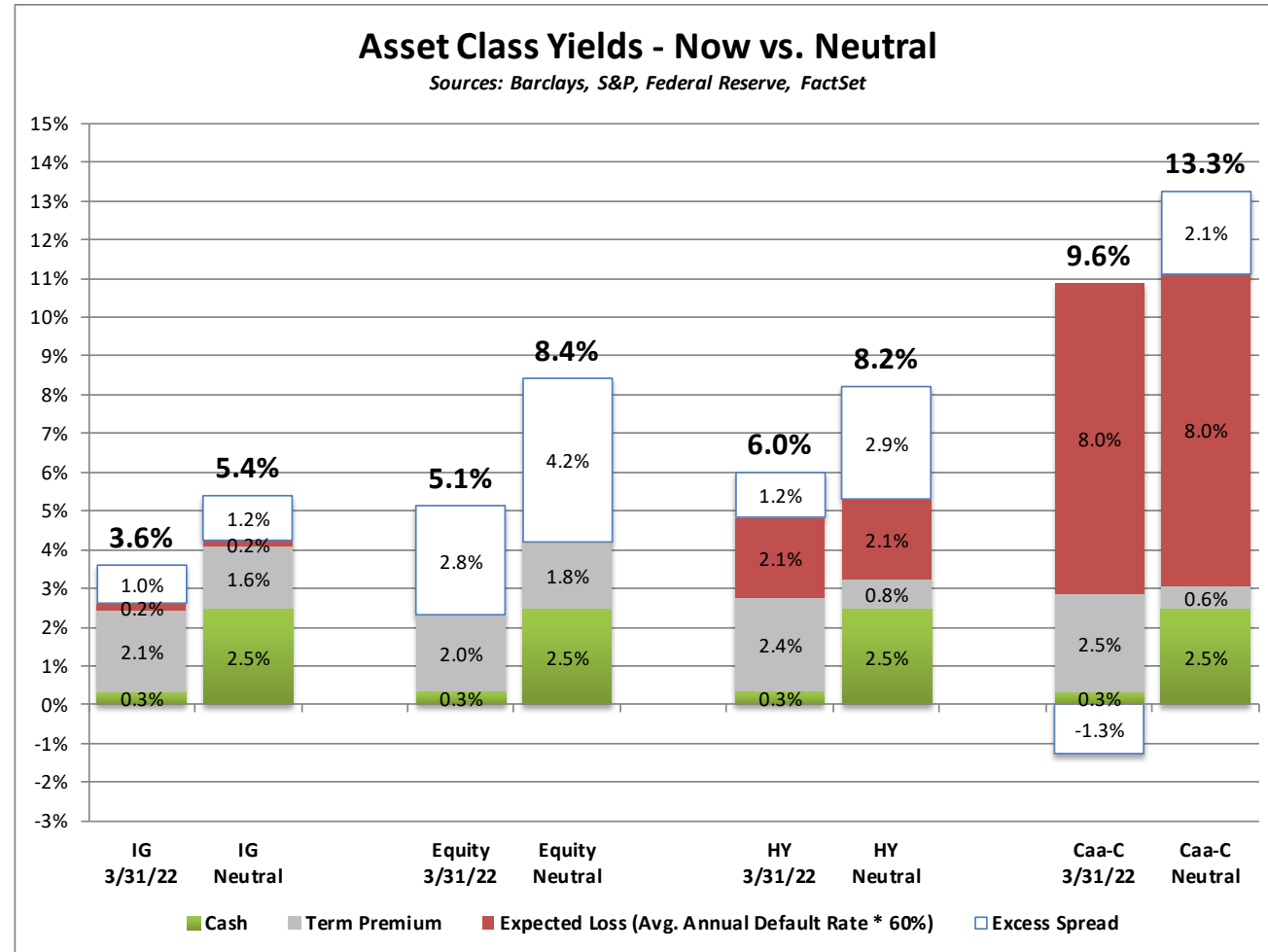
Spreads are higher recently, but below long-run averages



Data source: FactSet.

Asset Yields

Low cash rates and compressed risk premia reduce expected yields



U.S. Inflation

Medium term expectations reflect both Ukraine crisis and recent Fed policy action

As of: 04/01/2022

US 5 Year Breakeven Inflation

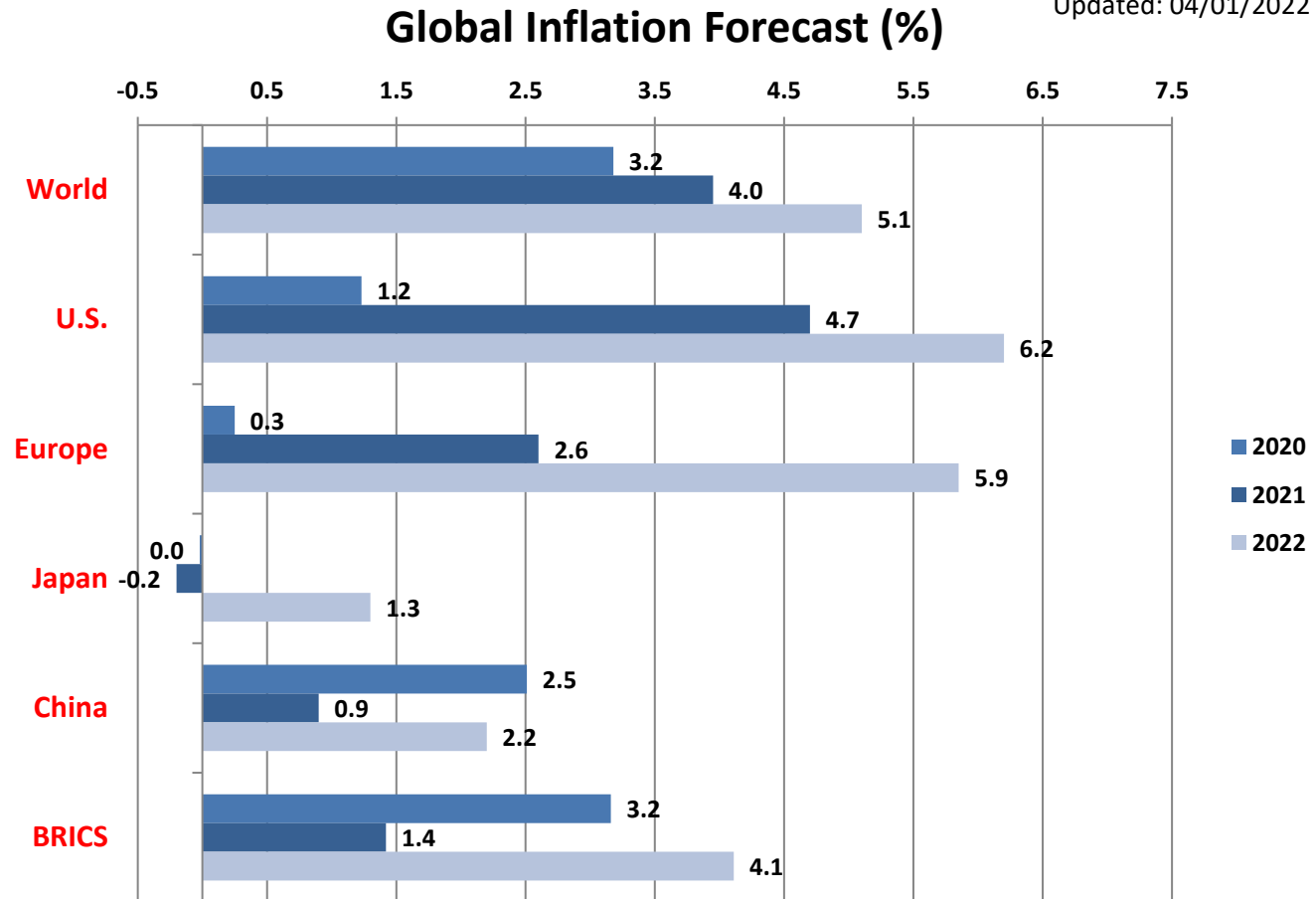


Data source: Bloomberg

Global Inflation

Inflation expected to accelerate globally in 2022

Updated: 04/01/2022





SWIB News



Board of Trustees Update



Clyde Tinnen



Kathy Blumenfeld



Esther Ancel



Barbara Nick

- Gov. Evers appointed Clyde Tinnen to the Board for a six-year term.
- Kathy Blumenfeld will serve on the Board as part of new role as secretary of the Department of Administration.
- Esther Ancel and Barbara Nick were reappointed to six-year terms.



New SWIB Podcast Episodes



www.swib.state.wi.us/podcasts

Check out the two newest episodes:

- Episode 15 – Dan Doonan, executive director of the National Institute on Retirement Security, talks “Pensionomics” and how the WRS is a strong economic pillar for Wisconsin.
- Episode 16 – Coming later this month, hear how technology plays an important part in SWIB’s management of the WRS trust funds.



Need More Information?



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? Questions

