

**PUBLIC SCHOOL FUND INVESTMENT BOARD**  
**MEETING AGENDA, FEBRUARY 28, 2022**

**VIDEO CONFERENCE VIA ZOOM LINK:**

<https://us02web.zoom.us/j/86497066136?pwd=V2c4b3ZkNlQ2UWtJWk9aNk54YmM5dz09>

Meeting ID: 864 9706 6136

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**Public School Fund Investment Board Members**

Dave Young	- Colorado State Treasurer – Board Chair
Peter Calamari	- Platte River Equity
Jerome DeHerrera, Esq.	- Achieve Law Group
Wendy Dominguez	- Innovest Portfolio Solutions
Christine Scanlan	- State Land Board Commissioners

- |       |  |                                 |
|-------|--|---------------------------------|
| I.    | Call to Order  | D. Young Noon                   |
| II.   | Roll Call  | D. Young                        |
| III.  | Approval of Minutes from November 15, 2021                   | D. Young 12:03                  |
| IV.   | Investment Consultant RFP Update                             | S. Zimbelman 12:05 (5 min)      |
|       | a. Callan contract end date – June 30, 2022                  |                                 |
| V.    | House Bill 1164 update                                       | D. Young 12:10 (10 min)         |
| VI.   | Market Update (Quarter 4 – Ending Dec. 31, 2021)             | Callan 12:20 (10 min)           |
| VII.  | Performance Report (Fiscal Year Quarter 2 – Ending 12/31/21) | Callan 12:35 (15 min)           |
| VIII. | Asset Allocation & Cash deployment discussion                | Callan 12:50 (15 min)           |
| IX.   | Review of unrealized gains/losses                            | S. Zimbelman 1:00 (5 min)       |
| X.    | Review 2022 Board Meeting Calendar                           | S. Zimbelman 1:05 (5 min)       |
| XI.   | Fund Manager Presentation: Parametric                        | Parametric 1:10<br>(30 minutes) |
| XII.  | Other Business   | 1:40 (5 min)                    |
| XIII. | Public Comment   | 1:45 (5 min)                    |

XIV. Board Adjournment

2:00

Future Meeting Dates:

April 11, 2022 Noon

\*RFP Presentations

May 16, 2022 Noon

August 15, 2022 Noon



Public School Fund Investment Board Meeting  
Meeting Minutes November 15, 2021  
Held Via Zoom

**Board Members in**

**Attendance:**

Dave Young  
Peter Calamari  
Jerome DeHerrera  
Wendy Dominguez  
Christine Scanlan

**12:01 – 12:02 PM Welcome, roll call**

**12:02 – 12:04 PM Meeting minutes from the August 16, 2021 Board Meeting**

Ms. Dominguez made a motion to approve the August 16, 2021 Meeting minutes.

Mr. Calamari seconded the motion. The motion passed at 12:04 pm.

- Dave Young – Yes
- Peter Calamari – Yes
- Jerome DeHerrera – Excused\*
- Wendy Dominguez – Yes
- Christine Scanlan – Excused\*\*

\*Mr. DeHerrera joined at 12:10pm

\*\*Ms. Scanlan joined at 12:15pm

**12:04 – 12:10 PM Public School Permanent Fund Financial Report FY 2020-2021**

Eric Rothaus, Deputy Treasurer, provided a brief report on the Public School Permanent Fund Financial Report for FY 2020-2021. Per statutory requirement this report is provided to the General Assembly each year by November 1<sup>st</sup>. Mr. Rothaus noted that the distribution to the permanent fund was extraordinarily low as a result of legislative action in response to the pandemic. Those funds were redirected to the State Public Education Fund. Mr. Rothaus noted that this legislative action is not expected to continue. Janet Becker-Wold (Callan) made note that despite the Permanent Fund not receiving its typical distributions from the State Land Board, the Permanent Fund still had a material gain in the end mainly due to extraordinary market gains in Fiscal Year 2021. Bill Ryan (State Land Board) also noted that there was an initiative on the ballot, Proposition 119 (LEAP initiative), that did not pass. Had it passed it would have capped the distributions from the State Land Board to the Permanent Fund at \$20 million per year. Since this did not pass the State Land Board will be reverting to the distribution formulas that were in place in prior years. This is an informational item only.

**12:10 – 12:15 PM Introduction of new Portfolio Administrator**

Treasurer Young introduced Sarah Zimbelman as the new Portfolio Administrator. Sarah Zimbelman provided a brief introduction of herself and her background to the board.

**12:15 – 12:20 PM Conflict of Interest Policy Acknowledgement & Disclosure**

Sarah Zimbelman informed board members that it was time to renew their Conflict of Interest Policy Acknowledgement & Disclosure. Grant Sullivan (Attorney General Office) informed board members that if they had any specific questions they could reach out to him directly. Completed forms are due back to Sarah Zimbelman by the end of the year, 12/31/21.

**12:20 – 12:25 RFP Process Kickoff – Investment Consultant**

Sarah Zimbelman informed the Board that the current contract with the Board's investment consultant, Callan, ends on June 30, 2022. As such, Ms. Zimbelman, along with Eric Rothaus, will be working on drafting the RFP to solicit proposals for the new investment consultant contract to begin on July 1, 2022. Treasurer Young raised the question as to whether we are going through procurement or utilizing the elected official exemption for this process. Grant Sullivan (Attorney General Office) answered that we are exempt as a Board from the state procurement process, but noted the Board must follow general public procurement principles. In the past the Board has coordinated with the procurement office but has more flexibility through the exemption. Treasurer Young asked if this was because of the elected official provision. Mr. Sullivan replied that the Board statutes have a separate provision allowing for the exemption, and that has received sign off from the procurement office.

**12:25 – 12:40 PM Market Update (Quarter 3 – Ending Sept. 30, 2021)**

Presentation by Alex Browning from Callan

Mr. Calamari raised the question, what is the Permanent Fund's effective cap on equity exposure, is it just our investment policy? Ms. Becker-Wold (Callan) responded that there is no regulatory or statutory cap, that it is governed by the gain/loss provision and being able to manage that.

**12:40 – 12:55 PM Performance Report (Fiscal Year Quarter 1 – Ending 9/30/21)**

Presentation by Janet Becker-Wold from Callan

**12:55 – 1:05 PM Rebalancing Report**

Sarah Zimbelman informed the Board that the fund received a \$15.6M distribution from the Land Board in October 2021. Callan recommends allocating these funds according to the strategic targets established by the Board. Ms. Becker-Wold (Callan) recommended working with the State Treasurer's Office to allocate these funds to the strategic targets along with any rebalancing that needs to occur across the portfolios. There was consensus from all Board members. An official board vote was not needed since the allocations are within already approved investment guidelines.

**1:05 – 1:10 PM Review 2022 Board Meeting Calendar**

**1:10 – 1:35 PM Fund Manager Presentation: MacKay Shields**

Presentation by Joseph Maietta, Managing Director High Yield Team

**1:35 – 1:55 PM Fund Manager Presentation: Spectrum Preferred Securities Fund**

Presentation by Steven Solmonson, Sr. Vice President Spectrum Asset Management

**1:55 – 1:56 PM Other Business**

Board reviewed updated BEST map

**Next Meeting**

- February 28, 2021 at Noon

**1:57 – 1:58 PM Public comments**

- Written Comments
  - There were no written comments.
- Verbal Comments
  - There were no verbal comments.

**The meeting was adjourned at 1:59 pm.**

**RFP Schedule of Activities:**

Activity	Date	
1. RFP published on VSS System	1/28/2022	<input checked="" type="checkbox"/>
2. Prospective Proposer's Inquiry Deadline <i>No inquiries accepted after this date</i>	2/11/2022	<input checked="" type="checkbox"/>
3. Response to written inquiries on Vendor Self-Serve (VSS) ( <i>ESTIMATED</i> )	2/25/2022	<input checked="" type="checkbox"/>
<b>4. Proposal Submission Deadline</b>	<b>3/04/2022</b>	<input type="checkbox"/>
5. Evaluation of Written Proposals ( <i>ESTIMATED*</i> )	3/04/2022 to 3/25/2022	<input type="checkbox"/>
6. Reference calls and letters of clarification for questions ( <i>ESTIMATED - If applicable per Investment Board's evaluation</i> )	3/04/2022 to 3/25/2022	<input type="checkbox"/>
7. Proposer Interviews – to take place via web conferencing platform ( <i>ESTIMATED – If applicable per Investment Board's evaluation</i> )	3/28/2022	<input type="checkbox"/>
9. Finalist Presentations ( <i>ESTIMATED</i> )	4/11/2022	<input type="checkbox"/>
10. Contract Start Date	7/1/2022	<input type="checkbox"/>

\* Finalizing Review Team for Evaluation Process

February 28, 2022



## **Colorado Public School Permanent Fund**

Fourth Quarter 2021  
Performance Review

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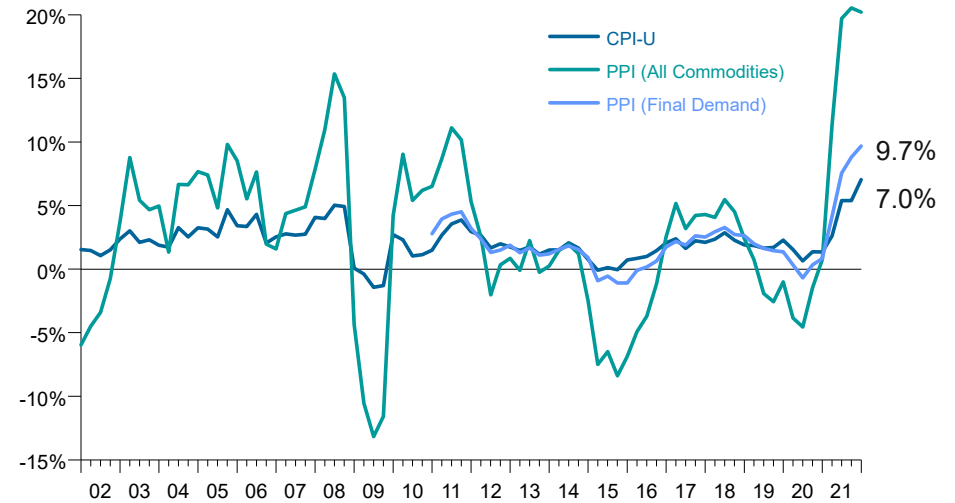
**Janet Becker-Wold, CFA**  
Senior Vice President & Manager

**Alex Browning**  
Senior Vice President

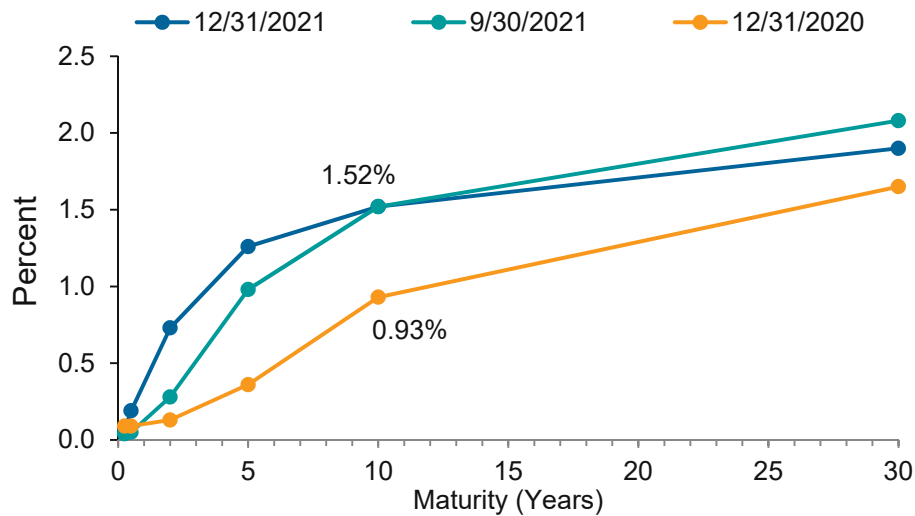
# U.S. Economy—Summary

## Fourth Quarter 2021

- Fourth quarter GDP reached 6.9%, up from 2.3% in the third quarter. GDP rose 5.7% in 2021.
- Inflation remains a concern heading into 2022. The CPI climbed 7.0% year-over-year as of December.
- The Federal Reserve has taken a more aggressive stance, with three rate hikes planned for 2022 and a sharp tapering of their asset-buying program.
- Employment continues to improve, with the unemployment rate down to 3.9% in December.

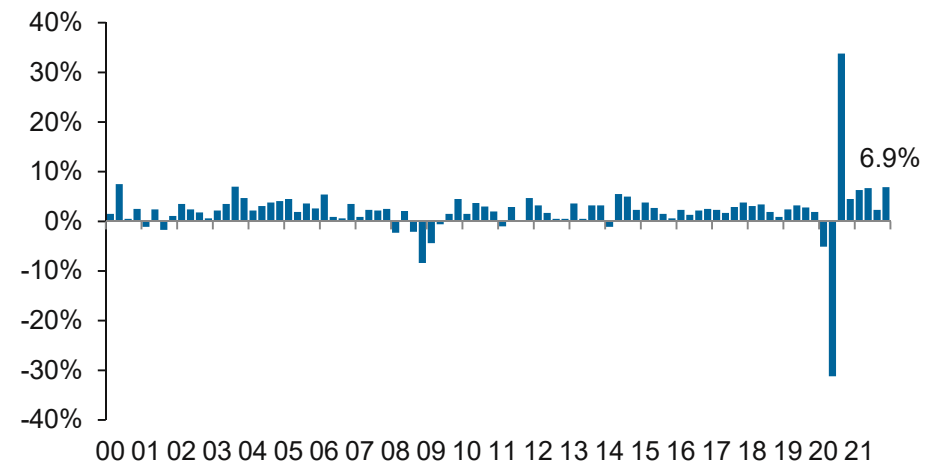


## U.S. Treasury Yield Curves



Sources: Bloomberg, Bureau of Labor Statistics, Callan

## Quarterly Real GDP Growth





# Contributors to Recent Inflation: Primary Categories

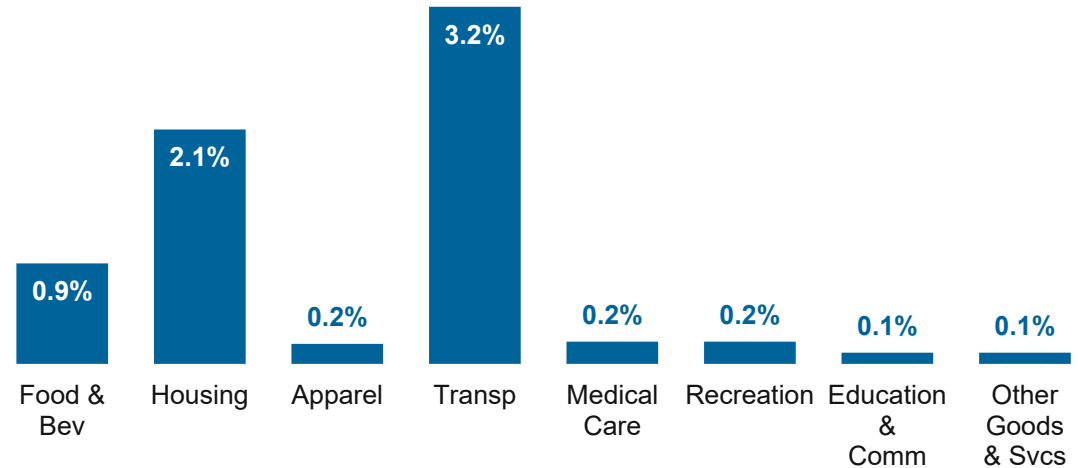
**Transportation, including new and used cars, parts, and gasoline, saw a spike in inflation.**

- Year-over-year prints are more than three times higher than any other category.
- With a meaningful 15% weight in the index, transportation also has the highest weighted contribution to headline CPI.

**Housing and food and beverage have also been significant contributors to headline CPI.**

- Inflation within these categories has been far lower than transportation, but their large index weights make them meaningful contributors to overall inflation.

Contribution to December 2021 YOY Inflation

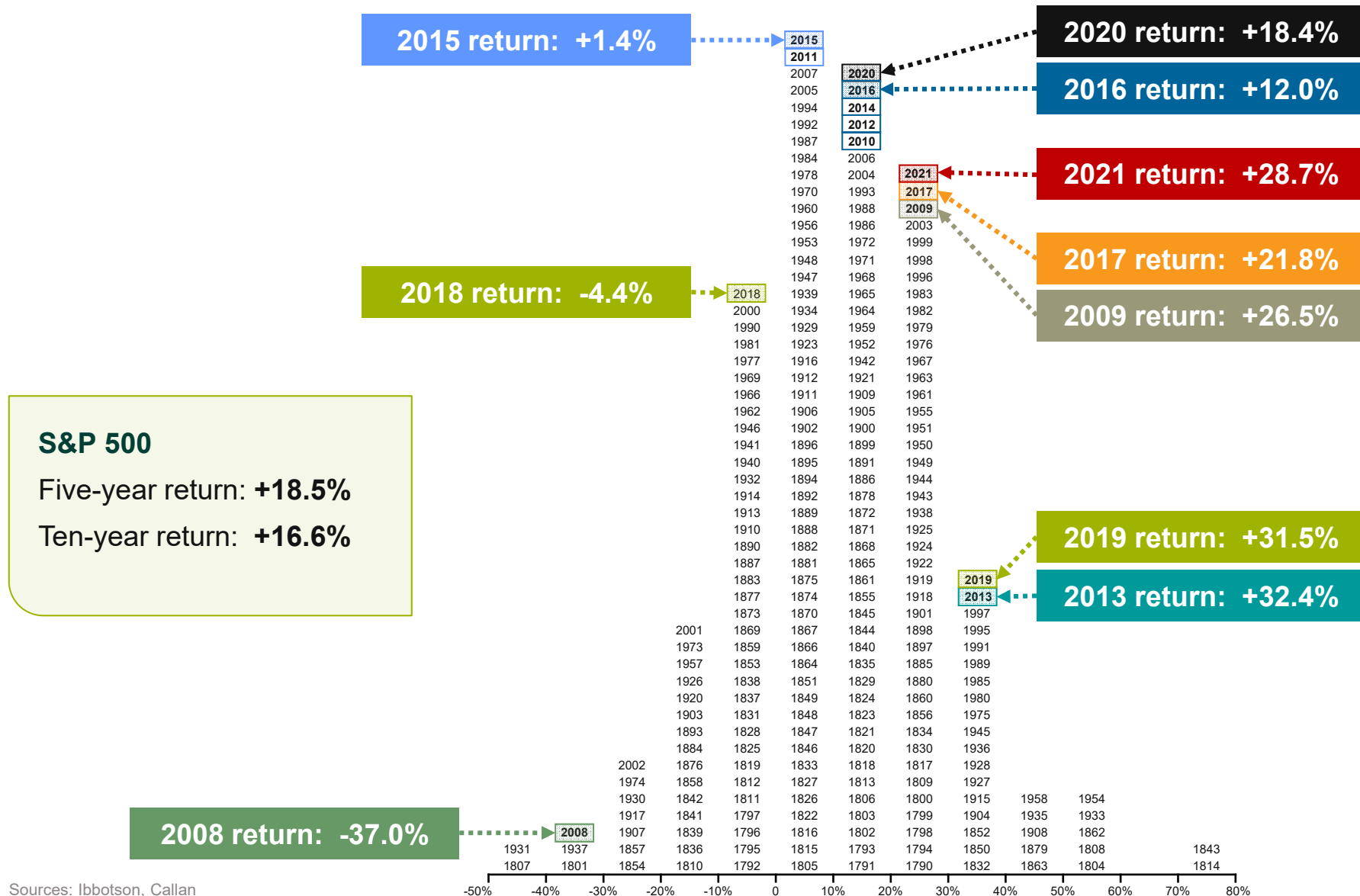


Primary Category	Primary Category Weight	Year-over-Year Change											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
All Items	100.0%	1.4%	1.7%	2.6%	4.2%	5.0%	5.4%	5.4%	5.3%	5.4%	6.2%	6.8%	7.0%
Food & Bev	15.2%	3.7%	3.5%	3.4%	2.3%	2.1%	2.4%	3.4%	3.7%	4.5%	5.1%	5.8%	6.0%
Housing	42.4%	1.8%	1.8%	2.1%	2.6%	2.9%	3.1%	3.4%	3.5%	3.9%	4.5%	4.8%	5.1%
Apparel	2.7%	-2.5%	-3.6%	-2.5%	1.9%	5.6%	4.9%	4.2%	4.2%	3.4%	4.3%	5.0%	5.8%
Transportation	15.2%	-1.3%	0.6%	5.8%	14.9%	20.0%	21.5%	19.4%	17.8%	16.6%	18.7%	21.1%	21.1%
Medical Care	8.9%	1.9%	2.0%	1.8%	1.5%	0.9%	0.4%	0.3%	0.4%	0.4%	1.3%	1.7%	2.2%
Recreation	5.8%	0.1%	0.8%	1.1%	2.1%	1.6%	2.4%	3.5%	3.4%	3.5%	3.9%	3.2%	3.3%
Education & Communication	6.8%	1.7%	1.7%	1.5%	1.7%	1.9%	2.1%	1.1%	1.2%	1.7%	1.8%	1.7%	1.6%
Other Goods & Svcs	3.2%	2.1%	2.1%	2.4%	2.7%	2.7%	2.5%	2.9%	3.5%	3.4%	4.2%	4.4%	4.5%

Source: U.S. Bureau of Labor Statistics

# Stock Market Returns by Calendar Year

2021 performance in perspective: History of the U.S. stock market (232 years of returns)



# Callan Periodic Table of Investment Returns

Cumulative Returns Ending December 31, 2021						Monthly Returns		
Last Quarter	Last Year	Last 3 Years	Last 5 Years	Last 7 Years	Last 10 Years	Oct 2021	Nov 2021	Dec 2021
Large Cap Equity	Large Cap Equity	Large Cap Equity	Large Cap Equity	Large Cap Equity	Large Cap Equity	Large Cap Equity	Real Estate	Dev ex-U.S. Equity
11.03%	28.71%	26.07%	18.47%	14.93%	16.55%	7.01%	2.50%	5.08%
Real Estate	Real Estate	US Small-Mid	US Small-Mid	US Small-Mid	US Small-Mid	US Small-Mid	U.S. Fixed Income	Large Cap Equity
7.69%	21.06%	21.91%	13.75%	11.74%	14.15%	4.90%	0.30%	4.48%
US Small-Mid	US Small-Mid	Dev ex-U.S. Equity	Emerging Market Equity	Real Estate	Real Estate	Dev ex-U.S. Equity	Large Cap Equity	US Small-Mid
3.82%	18.18%	14.07%	9.88%	8.62%	9.44%	2.98%	-0.69%	3.28%
Dev ex-U.S. Equity	Dev ex-U.S. Equity	Emerging Market Equity	Dev ex-U.S. Equity	Dev ex-U.S. Equity	Dev ex-U.S. Equity	Real Estate	High Yield	Real Estate
3.14%	12.62%	10.94%	9.63%	6.73%	7.84%	2.50%	-0.97%	2.50%
High Yield	High Yield	High Yield	Real Estate	High Yield	High Yield	Emerging Market Equity	Emerging Market Equity	Emerging Market Equity
0.71%	5.28%	8.83%	7.75%	6.15%	6.83%	0.99%	-4.08%	1.88%
U.S. Fixed Income	U.S. Fixed Income	Real Estate	High Yield	Emerging Market Equity	Emerging Market Equity	U.S. Fixed Income	US Small-Mid	High Yield
0.01%	-1.54%	8.24%	6.30%	6.11%	5.49%	-0.03%	-4.17%	1.87%
Emerging Market Equity	Emerging Market Equity	U.S. Fixed Income	U.S. Fixed Income	U.S. Fixed Income	U.S. Fixed Income	High Yield	Dev ex-U.S. Equity	U.S. Fixed Income
-1.31%	-2.54%	4.79%	3.57%	3.00%	2.90%	-0.17%	-4.68%	-0.26%

Sources: ● Bloomberg Barclays Aggregate ● Bloomberg Barclays Corp High Yield ● Bloomberg Barclays Global Aggregate ex US  
 ● NCREIF ODCE Val Wtd ● MSCI World ex USA ● MSCI Emerging Markets ● Russell 2500 ● S&P 500

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## Recent Activity and Plan Performance

# Quarterly Total Fund Highlights

As of December 31, 2021

**CO PSPF ended the quarter with \$1.35 billion in assets, up \$28.4 million from Q3 2021.**

- Investment gains were \$23.4 million while cash inflows were \$5.0 million over the quarter.

**The Total Fund gained 1.78% (-13 bps to Target) for the quarter and rose 3.78% (+26 bps to Target) for the trailing year.**

**The Total Equity Composite rose 6.24% and 18.86% for the quarter and year, respectively.**

- Domestic Equity returned 9.14% for the quarter and 25.72% for the year.
- International Equity lagged the U.S. with returns of 1.94% and 9.16% for the quarter and year, respectively.

**The Fixed Income Composite lagged its benchmark by 9 basis points with a return of -0.15%. For the year, the Composite fell 1.53%.**

- The Market Duration bond portfolio underperformed its benchmark by 15 basis points with a return of -0.14%. For the year, the portfolio was down 1.75%.
- The Janus Short Duration bond portfolio outperformed its benchmark by 23 bps with a loss of 0.23%. The portfolio rose 0.41% for the year outperforming the benchmark by 88 bps.

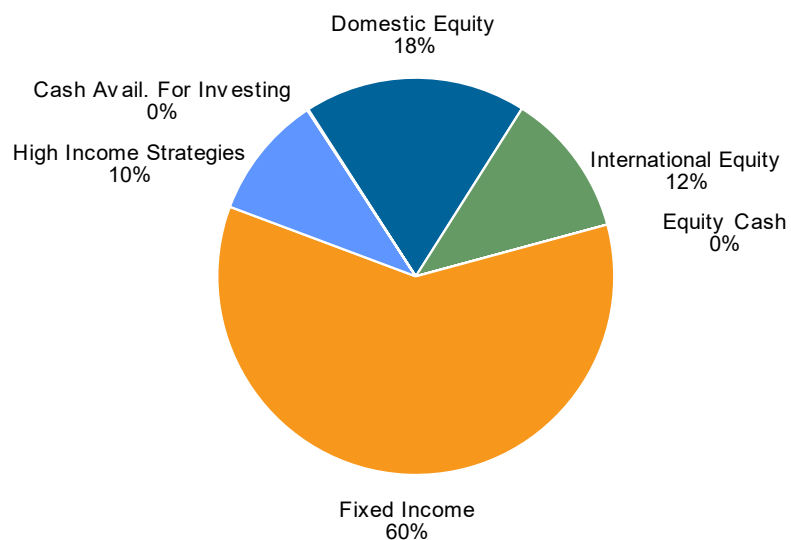
**The High Income Strategies Composite underperformed its benchmark for the quarter by 4 basis points with a return of 0.56%. For the trailing year, the Composite is up 5.13%, 12 bps ahead of the benchmark.**

- MacKay Shields' high yield bond portfolio gained 0.72% and 5.36% for the quarter and year, respectively.
- The Principal Spectrum preferred securities portfolio returned -0.34% and 3.85% for the quarter and year, respectively.

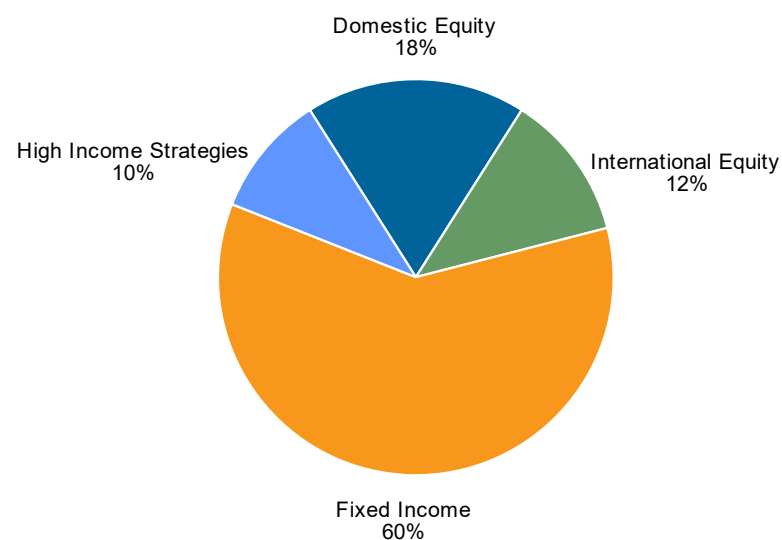
# Total Fund Asset Allocation

December 31, 2021

Actual Asset Allocation



Target Asset Allocation



Asset Class	\$000s Actual	Weight Actual	Target	Percent Difference	\$000s Difference
Domestic Equity	246,444	18.2%	18.0%	0.2%	2,956
International Equity	158,960	11.8%	12.0%	(0.2%)	(3,366)
Equity Cash	205	0.0%	0.0%	0.0%	205
Fixed Income	810,086	59.9%	60.0%	(0.1%)	(1,540)
High Income Strategies	136,008	10.1%	10.0%	0.1%	737
Cash Avail. For Investing	1,008	0.1%	0.0%	0.1%	1,008
Total	1,352,710	100.0%	100.0%		

## Asset Distribution

	December 31, 2021				September 30, 2021	
	Market Value	Weight	Net New Inv.	Inv. Return	Market Value	Weight
<b>Total Equity</b>	<b>\$405,608,216</b>	<b>29.98%</b>	<b>\$(4,611,224)</b>	<b>\$23,881,640</b>	<b>\$386,337,801</b>	<b>29.17%</b>
<b>Domestic Equity</b>	<b>\$246,444,056</b>	<b>18.22%</b>	<b>\$(6,378,965)</b>	<b>\$21,115,206</b>	<b>\$231,707,815</b>	<b>17.50%</b>
iShares S&P 1500 ETF (1)	246,444,056	18.22%	(6,378,965)	21,115,206	231,707,815	17.50%
<b>International Equity</b>	<b>\$158,959,603</b>	<b>11.75%</b>	<b>\$2,685,073</b>	<b>\$2,766,424</b>	<b>\$153,508,106</b>	<b>11.59%</b>
iShares MSCI Emerging ETF (1)	44,800,362	3.31%	628,083	(442,835)	44,615,114	3.37%
iShares MSCI Canada ETF (1)	14,629,801	1.08%	151,735	965,066	13,513,001	1.02%
iShares Core MSCI EAFE ETF (1)	99,529,439	7.36%	1,905,255	2,244,194	95,379,991	7.20%
Equity Cash	204,558	0.02%	(917,331)	10	1,121,879	0.08%
<b>Total Fixed Income</b>	<b>\$810,085,831</b>	<b>59.89%</b>	<b>\$9,208,483</b>	<b>\$(1,204,577)</b>	<b>\$802,081,925</b>	<b>60.57%</b>
<b>Market Duration</b>	<b>\$708,823,346</b>	<b>52.40%</b>	<b>\$8,507,643</b>	<b>\$(967,350)</b>	<b>\$701,283,053</b>	<b>52.96%</b>
Colorado Treasurer's Portfolio	708,823,346	52.40%	8,507,643	(967,350)	701,283,053	52.96%
<b>Short Duration</b>	<b>\$101,262,485</b>	<b>7.49%</b>	<b>\$700,840</b>	<b>\$(237,226)</b>	<b>\$100,798,872</b>	<b>7.61%</b>
Janus Henderson Short Duration (2)	101,262,485	7.49%	700,840	(237,226)	100,798,872	7.61%
<b>High Income Strategies</b>	<b>\$136,008,336</b>	<b>10.05%</b>	<b>\$381,342</b>	<b>\$726,778</b>	<b>\$134,900,215</b>	<b>10.19%</b>
<b>High Yield Fixed Income</b>	<b>\$116,258,397</b>	<b>8.59%</b>	<b>\$624,418</b>	<b>\$835,086</b>	<b>\$114,798,893</b>	<b>8.67%</b>
Mackay Shield US High Yield (3)	116,258,397	8.59%	624,418	835,086	114,798,893	8.67%
<b>Preferred Securities</b>	<b>\$19,749,939</b>	<b>1.46%</b>	<b>\$(243,076)</b>	<b>\$(108,308)</b>	<b>\$20,101,323</b>	<b>1.52%</b>
Principal Preferred Securities (3)	19,749,939	1.46%	(243,076)	(108,308)	20,101,323	1.52%
<b>Cash Available For Investing</b>	<b>\$1,007,599</b>	<b>0.07%</b>	<b>\$22,449</b>	<b>\$6,039</b>	<b>\$979,111</b>	<b>0.07%</b>
<b>Total Fund</b>	<b>\$1,352,709,982</b>	<b>100.0%</b>	<b>\$5,001,050</b>	<b>\$23,409,880</b>	<b>\$1,324,299,052</b>	<b>100.0%</b>

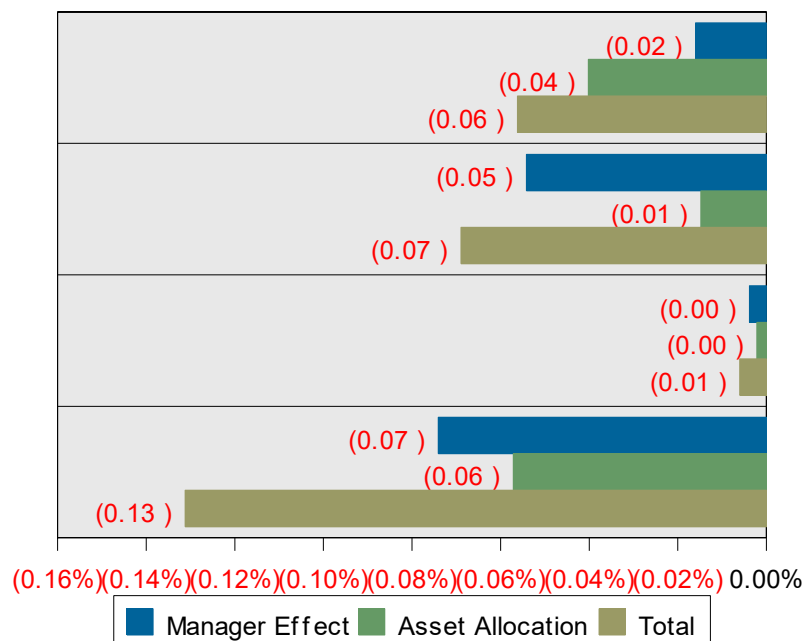
The Fund ended the quarter at \$1.35 billion, up \$28.4 million from September 30.

The market value increase resulted from \$5.0 million in net new investments and \$23.4 million of investment gains.

# One-Quarter Performance Attribution

As of December 31, 2021

Relative Attribution by Asset Class



Relative Attribution Effects for Quarter ended December 31, 2021

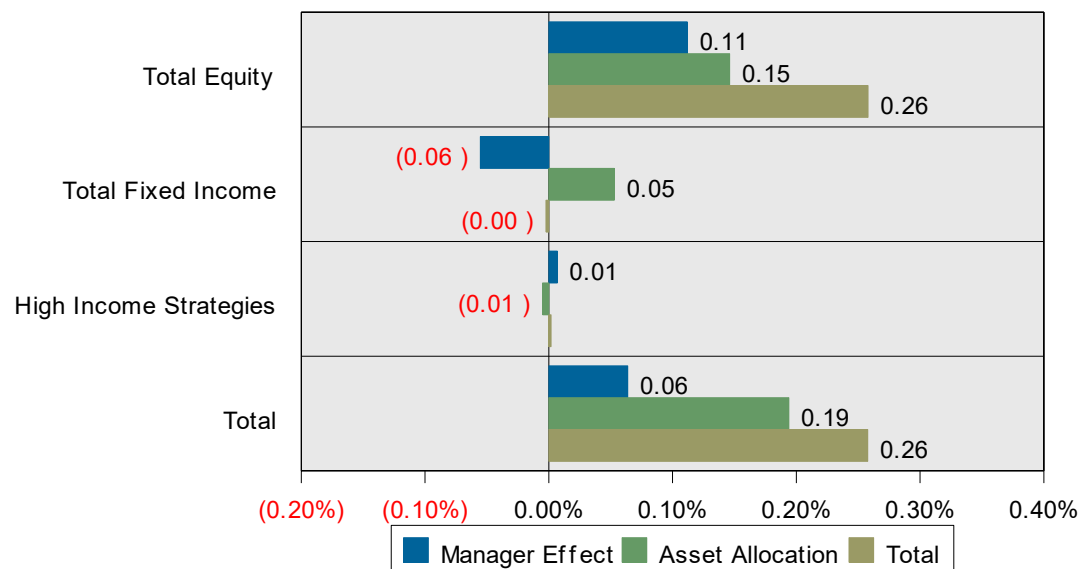
Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Total Equity	29%	30%	6.24%	6.29%	(0.02%)	(0.04%)	(0.06%)
Total Fixed Income	61%	60%	(0.15%)	(0.06%)	(0.05%)	(0.01%)	(0.07%)
High Income Strategies	10%	10%	0.56%	0.60%	(0.00%)	(0.00%)	(0.01%)
<b>Total</b>			<b>1.78%</b>	<b>1.91%</b>	<b>(0.07%)</b>	<b>(0.06%)</b>	<b>(0.13%)</b>



# One Year Performance Attribution

As of December 31, 2021

## One Year Relative Attribution Effects



## One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Total Equity	26%	25%	18.86%	18.30%	0.11%	0.15%	0.26%
Total Fixed Income	66%	67%	(1.53%)	(1.46%)	(0.06%)	0.05%	(0.00%)
High Income Strategies	8%	7%	5.13%	5.00%	0.01%	(0.01%)	0.00%
<b>Total</b>			<b>3.78%</b>	<b>3.52%</b>	<b>+ 0.06%</b>	<b>+ 0.19%</b>	<b>0.26%</b>

# Manager & Composite Cumulative Returns

As of December 31, 2021

	Last Quarter	Year to Date	Last 5 Years	Last 10 Years
<b>Total Equity</b>	<b>6.24%</b>	<b>18.86%</b>	-	-
60% Russell 3000/40% ACWI ex US	6.29%	18.30%	14.62%	12.69%
<b>Domestic Equity</b>	<b>9.14%</b>	<b>25.72%</b>	-	-
Russell 3000 Index	9.28%	25.66%	17.97%	16.30%
<b>International Equity</b>	<b>1.94%</b>	<b>9.16%</b>	-	-
MSCI ACWI ex US	1.82%	7.82%	9.61%	7.28%
<b>Total Fixed Income</b>	<b>(0.15%)</b>	<b>(1.53%)</b>	<b>3.52%</b>	<b>2.88%</b>
Total Fixed Income Benchmark (1)	(0.06%)	(1.46%)	3.36%	2.50%
<b>Market Duration</b>	<b>(0.14%)</b>	<b>(1.75%)</b>	<b>3.62%</b>	<b>2.93%</b>
Colorado Treasurer's Portfolio (2)	(0.14%)	(1.75%)	3.62%	2.93%
PSPF Custom Benchmark (3)	0.01%	(1.54%)	3.51%	2.58%
<b>Short Duration</b>	<b>(0.23%)</b>	<b>0.41%</b>	-	-
Janus Henderson Short Duration	(0.23%)	0.41%	-	-
Blmbg Gov/Cred 1-3 Yr	(0.56%)	(0.47%)	1.85%	1.39%
85% 1-3YR G/C; 15% 1-3YR BB (4)	(0.40%)	0.08%	2.26%	1.95%
<b>High Income Strategies</b>	<b>0.56%</b>	<b>5.13%</b>	-	-
High Income Strategies Benchmark (5)	0.60%	5.01%	6.38%	-
<b>High Yield Fixed Income</b>	<b>0.72%</b>	<b>5.36%</b>	-	-
Mackay Shield US High Yield	0.72%	5.36%	-	-
Blmbg High Yield	0.71%	5.28%	6.30%	6.83%
<b>Preferred Securities</b>	<b>(0.34%)</b>	<b>3.85%</b>	-	-
Principal Preferred Securities	(0.34%)	3.85%	-	-
ICE BofA US All Cap Secs	(0.02%)	3.42%	6.84%	-
<b>Total Fund w/o CAI (6)</b>	<b>1.78%</b>	<b>3.78%</b>	<b>5.23%</b>	<b>3.72%</b>
Total Fund Benchmark (6)	1.91%	3.52%	5.36%	3.49%

# Manager & Composite Fiscal Year Returns

	6/2021- 12/2021	FY 2021	FY 2020	FY 2019	FY 2018
<b>Total Equity</b>	<b>4.95%</b>	<b>41.59%</b>	<b>1.82%</b>	<b>5.64%</b>	<b>-</b>
60% Russell 3000/40% ACWI ex US	4.96%	40.77%	1.90%	5.92%	11.78%
<b>Domestic Equity</b>	<b>9.12%</b>	<b>44.30%</b>	<b>6.40%</b>	<b>8.85%</b>	<b>-</b>
Russell 3000 Index	9.17%	44.16%	6.53%	8.98%	14.78%
<b>International Equity</b>	<b>(1.20%)</b>	<b>37.78%</b>	<b>(4.71%)</b>	<b>0.67%</b>	<b>-</b>
MSCI ACWI ex US	(1.22%)	35.72%	(4.80%)	1.29%	7.28%
<b>Total Fixed Income</b>	<b>(0.15%)</b>	<b>(0.27%)</b>	<b>8.79%</b>	<b>7.38%</b>	<b>(0.39%)</b>
Total Fixed Income Benchmark (1)	(0.00%)	(0.26%)	8.28%	7.52%	(0.40%)
<b>Market Duration</b>	<b>(0.16%)</b>	<b>(0.55%)</b>	<b>9.26%</b>	<b>7.77%</b>	<b>(0.39%)</b>
Colorado Treasurer's Portfolio (2)	(0.16%)	(0.55%)	9.26%	7.77%	(0.39%)
PSPF Custom Benchmark (3)	0.06%	(0.33%)	8.74%	7.87%	(0.40%)
<b>Short Duration</b>	<b>(0.02%)</b>	<b>2.33%</b>	<b>4.41%</b>	<b>-</b>	<b>-</b>
Janus Henderson Short Duration	(0.02%)	2.33%	4.41%	-	-
Blmbg Gov/Cred 1-3 Yr	(0.47%)	0.44%	4.20%	4.27%	0.21%
85% 1-3YR G/C; 15% 1-3YR BB (4)	(0.27%)	1.70%	3.94%	4.59%	0.44%
<b>High Income Strategies</b>	<b>1.67%</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
High Income Strategies Benchmark (5)	1.45%	15.13%	0.46%	7.58%	2.39%
<b>High Yield Fixed Income</b>	<b>1.84%</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
Mackay Shield US High Yield	1.84%	-	-	-	-
Blmbg High Yield	1.60%	15.37%	0.03%	7.48%	2.62%
<b>Preferred Securities</b>	<b>0.71%</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
Principal Preferred Securities	0.71%	-	-	-	-
ICE BofA US All Cap Secs	0.59%	13.67%	2.86%	8.12%	1.14%
<b>Total Fund w/o CAI (6)</b>	<b>1.52%</b>	<b>8.30%</b>	<b>7.37%</b>	<b>6.94%</b>	<b>(0.36%)</b>
Total Fund Benchmark (6)	1.67%	7.98%	7.87%	7.49%	0.01%

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## Performance Footnotes

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- (1) Current quarter's Total Fixed Income Benchmark consists of 87.5% Bloomberg U.S. Aggregate and 12.5% Bloomberg Gov/Credit 1-3 Yrs.
  - (2) Includes cash returns starting July 2017.
  - (3) The PSPF Fixed Income Portfolio Custom Benchmark consisted of 37% U.S. Treasury 1-10 Year Index, 34% Mortgages 0-10 Year WAL Index, 19% AAA U.S. Agencies 1-10 Year Index and 10% U.S. Corporates AAA Rated 1-10 Years Index through March 31, 2017, 100% Bloomberg U.S. Aggregate, thereafter.
  - (4) Benchmark consists of 85% Bloomberg 1-3 Year Government/Credit Index and 15% BofAML 1-3 Year BB US Cash Pay High Yield Index.
  - (5) Benchmark consists of 85% Blmbg High Yield Index and 15% ICE BofA US All Cap Secs Index.
  - (6) Current quarter's Total Fund Benchmark consists of 18.0% Russell 3000, 12.0% MSCI ACWI ex US, 52.5% Bloomberg U.S. Aggregate, 7.5% Bloomberg Gov/Credit 1-3 Yrs, 8.5% Bloomberg US High Yield and 1.5% ICE BofA U.S. All Capital Securities Index.
- \*All composites and manager returns are shown gross-of-fees.

## Published Research Highlights from 4Q21

### A Guide to Reinsurance for Institutional Investors



### 2021 ESG Survey



### 2021 Cost of Doing Business Survey



### 2021 Investment Management Fee Study



### Recent Blog Posts

#### Understanding Return Forecasts for Public DB Plans

Brady O'Connell and John Pirone

#### Rising Rates! Why the Heck Do We Own Bonds?

Alex Browning and Adam Lozinski

#### How Investors Should Respond to China's Regulatory Crackdown

Fanglue Zhou

#### Additional Reading

*Private Equity Trends* quarterly newsletter

Active vs. Passive quarterly charts

*Capital Markets Review* quarterly newsletter

Monthly Updates to the Periodic Table

*Market Pulse Flipbook* quarterly markets update

# Callan Institute Events

Upcoming conferences, workshops, and webinars

## Callan College

### Intro to Investments - Learn the Fundamentals

This course is for institutional investors, including trustees and staff members of public plans, corporate plans, and nonprofits. This session familiarizes trustees and staff with basic investment theory, terminology, and practices.

**Join our next VIRTUAL session via Zoom** (3 sessions, 2-3 hours each):  
March 1-3, 2022

**Join our next LIVE session in San Francisco** (1½-day session):  
July 26-27, 2022

### Introductory Workshop for DC Plan Fiduciaries

This one-day workshop centers on the fundamentals of administering a defined contribution (DC) plan. Designed primarily for ERISA fiduciaries and supporting staff members, attendees will gain a better understanding of the key responsibilities of an ERISA fiduciary and best practices for executing those responsibilities.

**Join our LIVE session in San Francisco:**  
March 23, 2022

## Mark Your Calendar

### 2022 National Conference

April 25-27, 2022 – San Francisco  
Palace Hotel  
2 New Montgomery St., San Francisco, CA 94105

### 2022 June Regional Workshops

June 7, 2022 – Atlanta  
June 9, 2022 – Portland

*Watch your email for further details and an invitation.*

## Webinars & Research Café Sessions

### Webinar: DC Survey Results

February 23, 2022 – 9:30am (PT)

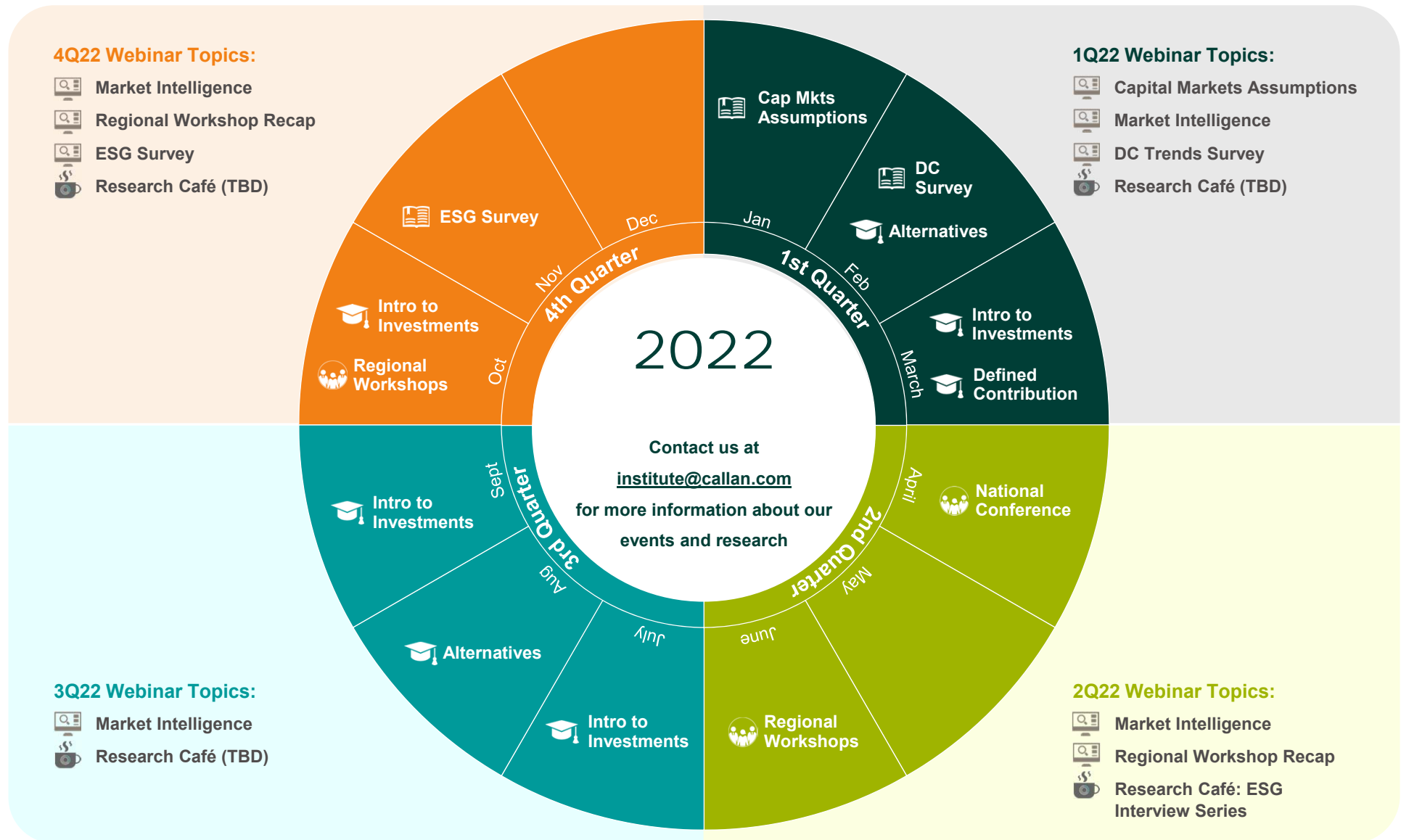
### Research Café: ESG Interview Series

April 6, 2022 – 9:30am (PT)

### Market Intelligence

April 14, 2022 – 9:30am (PT)

# Content Calendar – Callan Institute



December 31, 2021

**CO Public School Permanent Fund**

**Investment Measurement Service  
Quarterly Review**

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**December 31, 2021**

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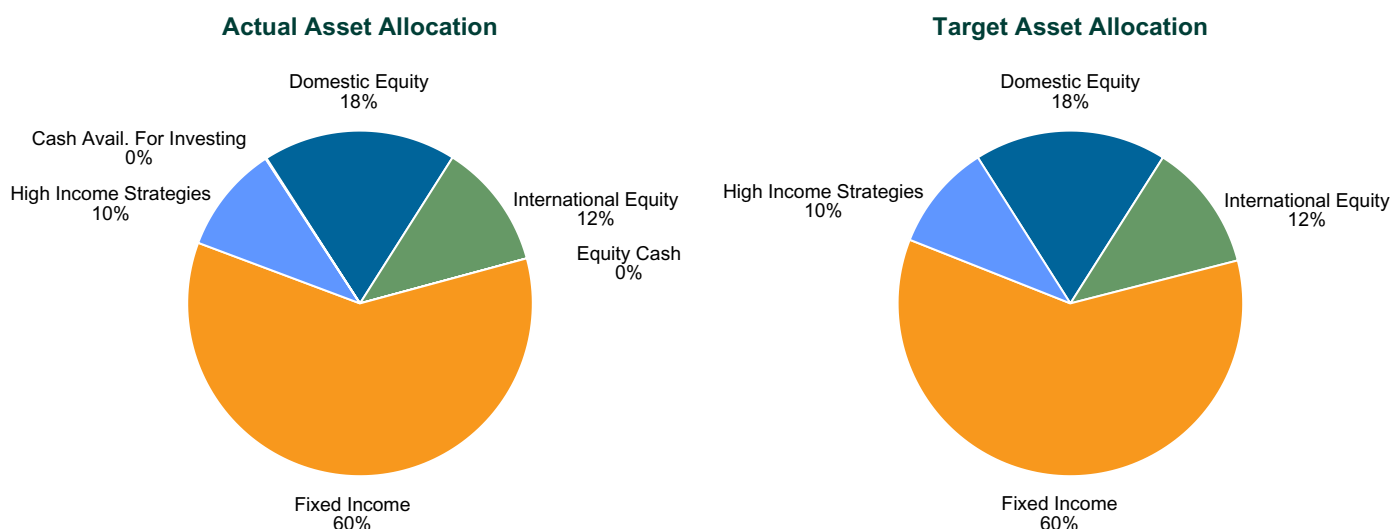
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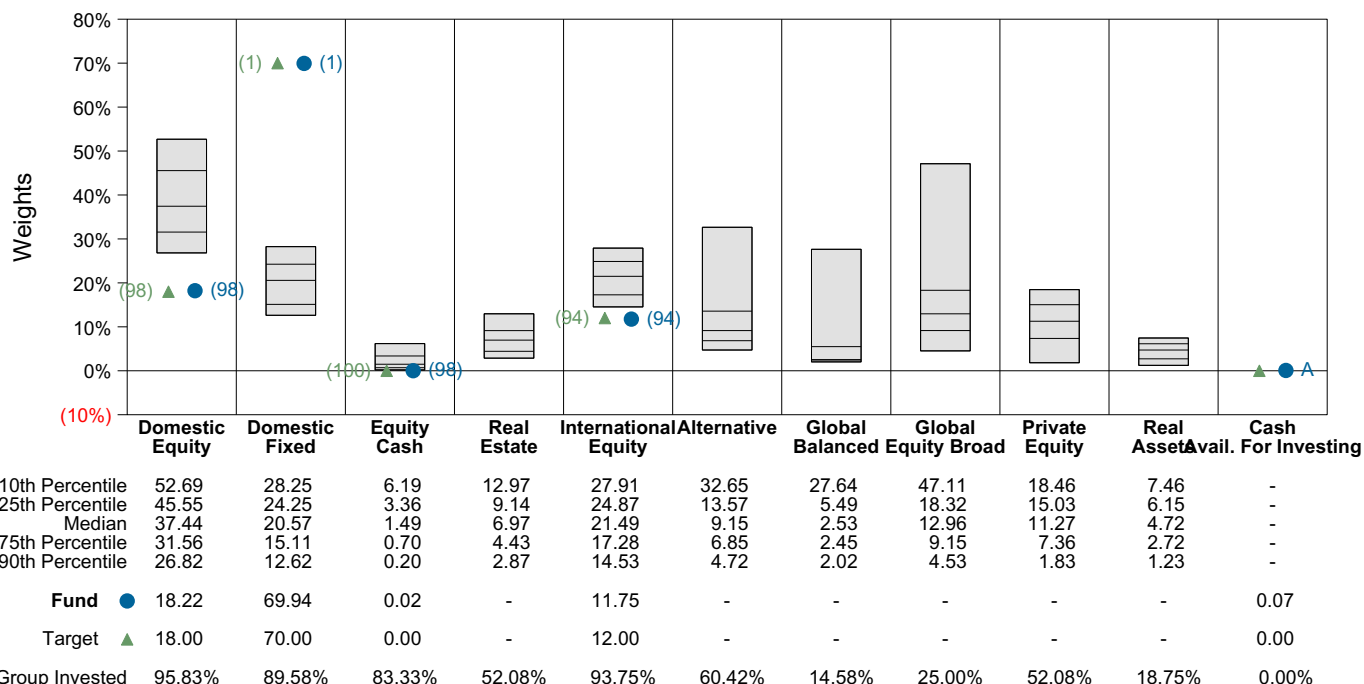
## Actual vs Target Asset Allocation As of December 31, 2021

The top left chart shows the Fund's asset allocation as of December 31, 2021. The top right chart shows the Fund's target asset allocation as outlined in the investment policy statement. The bottom chart ranks the fund's asset allocation and the target allocation versus the Callan Endow/Foundation - Mid (100M-1B).



Asset Class	\$000s Actual	Weight Actual	Target	Percent Difference	\$000s Difference
Domestic Equity	246,444	18.2%	18.0%	0.2%	2,956
International Equity	158,960	11.8%	12.0%	(0.2%)	(3,366)
Equity Cash	205	0.0%	0.0%	0.0%	205
Fixed Income	810,086	59.9%	60.0%	(0.1%)	(1,540)
High Income Strategies	136,008	10.1%	10.0%	0.1%	737
Cash Avail. For Investing	1,008	0.1%	0.0%	0.1%	1,008
Total	1,352,710	100.0%	100.0%		

### Asset Class Weights vs Callan Endow/Foundation - Mid (100M-1B)



\* Current Quarter Target = 52.5% Blmbg Aggregate, 18.0% Russell 3000 Index, 12.0% MSCI ACWI ex US, 8.5% Blmbg HY Corp, 7.5% Blmbg Gov/Cred 1-3 Yr and 1.5% ICE All US Cap Secs.

## Investment Manager Asset Allocation

The table below contrasts the distribution of assets across the Fund's investment managers as of December 31, 2021, with the distribution as of September 30, 2021. The change in asset distribution is broken down into the dollar change due to Net New Investment and the dollar change due to Investment Return.

### Asset Distribution Across Investment Managers

	December 31, 2021				September 30, 2021	
	Market Value	Weight	Net New Inv.	Inv. Return	Market Value	Weight
<b>Total Equity</b>	<b>\$405,608,216</b>	<b>29.98%</b>	<b>\$(4,611,224)</b>	<b>\$23,881,640</b>	<b>\$386,337,801</b>	<b>29.17%</b>
<b>Domestic Equity</b>	<b>\$246,444,056</b>	<b>18.22%</b>	<b>\$(6,378,965)</b>	<b>\$21,115,206</b>	<b>\$231,707,815</b>	<b>17.50%</b>
iShares S&P 1500 ETF (1)	246,444,056	18.22%	(6,378,965)	21,115,206	231,707,815	17.50%
<b>International Equity</b>	<b>\$158,959,603</b>	<b>11.75%</b>	<b>\$2,685,073</b>	<b>\$2,766,424</b>	<b>\$153,508,106</b>	<b>11.59%</b>
iShares MSCI Emerging ETF (1)	44,800,362	3.31%	628,083	(442,835)	44,615,114	3.37%
iShares MSCI Canada ETF (1)	14,629,801	1.08%	151,735	965,066	13,513,001	1.02%
iShares Core MSCI EAFE ETF (1)	99,529,439	7.36%	1,905,255	2,244,194	95,379,991	7.20%
Equity Cash	204,558	0.02%	(917,331)	10	1,121,879	0.08%
<b>Total Fixed Income</b>	<b>\$810,085,831</b>	<b>59.89%</b>	<b>\$9,208,483</b>	<b>\$(1,204,577)</b>	<b>\$802,081,925</b>	<b>60.57%</b>
<b>Market Duration</b>	<b>\$708,823,346</b>	<b>52.40%</b>	<b>\$8,507,643</b>	<b>\$(967,350)</b>	<b>\$701,283,053</b>	<b>52.96%</b>
Colorado Treasurer's Portfolio	708,823,346	52.40%	8,507,643	(967,350)	701,283,053	52.96%
<b>Short Duration</b>	<b>\$101,262,485</b>	<b>7.49%</b>	<b>\$700,840</b>	<b>\$(237,226)</b>	<b>\$100,798,872</b>	<b>7.61%</b>
Janus Henderson Short Duration (2)	101,262,485	7.49%	700,840	(237,226)	100,798,872	7.61%
<b>High Income Strategies</b>	<b>\$136,008,336</b>	<b>10.05%</b>	<b>\$381,342</b>	<b>\$726,778</b>	<b>\$134,900,215</b>	<b>10.19%</b>
<b>High Yield Fixed Income</b>	<b>\$116,258,397</b>	<b>8.59%</b>	<b>\$624,418</b>	<b>\$835,086</b>	<b>\$114,798,893</b>	<b>8.67%</b>
Mackay Shield US High Yield (3)	116,258,397	8.59%	624,418	835,086	114,798,893	8.67%
<b>Preferred Securities</b>	<b>\$19,749,939</b>	<b>1.46%</b>	<b>\$(243,076)</b>	<b>\$(108,308)</b>	<b>\$20,101,323</b>	<b>1.52%</b>
Principal Preferred Securities (3)	19,749,939	1.46%	(243,076)	(108,308)	20,101,323	1.52%
<b>Cash Available For Investing</b>	<b>\$1,007,599</b>	<b>0.07%</b>	<b>\$22,449</b>	<b>\$6,039</b>	<b>\$979,111</b>	<b>0.07%</b>
<b>Total Fund</b>	<b>\$1,352,709,982</b>	<b>100.0%</b>	<b>\$5,001,050</b>	<b>\$23,409,880</b>	<b>\$1,324,299,052</b>	<b>100.0%</b>

(1) Funded in December 2017.

(2) Funded in November 2018.

(3) Funded in July 2020.

## Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended December 31, 2021. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

### Returns for Periods Ended December 31, 2021

	Last Quarter	Year to Date	Last 5 Years	Last 10 Years
<b>Total Equity</b>	<b>6.24%</b>	<b>18.86%</b>	-	-
60% Russell 3000/40% ACWI ex US	6.29%	18.30%	14.62%	12.69%
<b>Domestic Equity</b>	<b>9.14%</b>	<b>25.72%</b>	-	-
Russell 3000 Index	9.28%	25.66%	17.97%	16.30%
<b>International Equity</b>	<b>1.94%</b>	<b>9.16%</b>	-	-
MSCI ACWI ex US	1.82%	7.82%	9.61%	7.28%
<b>Total Fixed Income</b>	<b>(0.15%)</b>	<b>(1.53%)</b>	<b>3.52%</b>	<b>2.88%</b>
Total Fixed Income Benchmark (1)	(0.06%)	(1.46%)	3.36%	2.50%
<b>Market Duration</b>	<b>(0.14%)</b>	<b>(1.75%)</b>	<b>3.62%</b>	<b>2.93%</b>
Colorado Treasurer's Portfolio (2)	(0.14%)	(1.75%)	3.62%	2.93%
PSPF Custom Benchmark (3)	0.01%	(1.54%)	3.51%	2.58%
<b>Short Duration</b>	<b>(0.23%)</b>	<b>0.41%</b>	-	-
Janus Henderson Short Duration	(0.23%)	0.41%	-	-
Blmbg Gov/Cred 1-3 Yr	(0.56%)	(0.47%)	1.85%	1.39%
85% 1-3YR G/C; 15% 1-3YR BB (4)	(0.40%)	0.08%	2.26%	1.95%
<b>High Income Strategies</b>	<b>0.56%</b>	<b>5.13%</b>	-	-
High Income Strategies Benchmark (5)	0.60%	5.01%	6.38%	-
<b>High Yield Fixed Income</b>	<b>0.72%</b>	<b>5.36%</b>	-	-
Mackay Shield US High Yield	0.72%	5.36%	-	-
Blmbg High Yield	0.71%	5.28%	6.30%	6.83%
<b>Preferred Securities</b>	<b>(0.34%)</b>	<b>3.85%</b>	-	-
Principal Preferred Securities	(0.34%)	3.85%	-	-
ICE BofA US All Cap Secs	(0.02%)	3.42%	6.84%	-
<b>Total Fund w/o CAI (6)</b>	<b>1.78%</b>	<b>3.78%</b>	<b>5.23%</b>	<b>3.72%</b>
Total Fund Benchmark (6)	1.91%	3.52%	5.36%	3.49%

(1) Current quarter's Total Fixed Income Benchmark consists of 88.4% Bloomberg U.S. Aggregate and 11.6% Bloomberg Gov/Credit 1-3 Yrs.

(2) Includes cash returns starting July 2017.

(3) The PSPF Fixed Income Portfolio Custom Benchmark consisted of 37% U.S. Treasury 1-10 Year Index, 34% Mortgages 0-10 Year WAL Index, 19% AAA U.S. Agencies 1-10 Year Index and 10% U.S. Corporates AAA Rated 1-10 Years Index through March 31, 2017, 100% Bloomberg U.S. Aggregate, thereafter.

(4) Benchmark consists of 85% Bloomberg 1-3 Year Government/Credit Index and 15% BofAML 1-3 Year BB US Cash Pay High Yield Index.

(5) Benchmark consists of 85% Blmbg High Yield Index and 15% ICE BofA US All Cap Secs Index.

(6) Current quarter's Total Fund Benchmark consists of 16.4% Russell 3000, 10.9% MSCI ACWI ex US, 57.0% Bloomberg U.S. Aggregate, 7.5% Bloomberg Gov/Credit 1-3 Yrs, 7.0% Bloomberg US High Yield and 1.3% ICE BofA U.S. All Capital Securities Index. See pg. 5 for full benchmark history. The Total Fund return calculations do not include Cash Available for Investing.

\*All composites and manager returns are shown gross-of-fees.

## Investment Manager Returns

The table below details the rates of return for the Fund's investment managers over various time periods ended June 30. Negative returns are shown in red, positive returns in black. Returns for one year or greater are annualized. The first set of returns for each asset class represents the composite returns for all the fund's accounts for that asset class.

	6/2021- 12/2021	FY 2021	FY 2020	FY 2019	FY 2018
<b>Total Equity</b>	<b>4.95%</b>	<b>41.59%</b>	<b>1.82%</b>	<b>5.64%</b>	<b>-</b>
60% Russell 3000/40% ACWI ex US	4.96%	40.77%	1.90%	5.92%	11.78%
<b>Domestic Equity</b>	<b>9.12%</b>	<b>44.30%</b>	<b>6.40%</b>	<b>8.85%</b>	<b>-</b>
Russell 3000 Index	9.17%	44.16%	6.53%	8.98%	14.78%
<b>International Equity</b>	<b>(1.20%)</b>	<b>37.78%</b>	<b>(4.71%)</b>	<b>0.67%</b>	<b>-</b>
MSCI ACWI ex US	(1.22%)	35.72%	(4.80%)	1.29%	7.28%
<b>Total Fixed Income</b>	<b>(0.15%)</b>	<b>(0.27%)</b>	<b>8.79%</b>	<b>7.38%</b>	<b>(0.39%)</b>
Total Fixed Income Benchmark (1)	(0.00%)	(0.26%)	8.28%	7.52%	(0.40%)
<b>Market Duration</b>	<b>(0.16%)</b>	<b>(0.55%)</b>	<b>9.26%</b>	<b>7.77%</b>	<b>(0.39%)</b>
Colorado Treasurer's Portfolio (2)	(0.16%)	(0.55%)	9.26%	7.77%	(0.39%)
PSPF Custom Benchmark (3)	0.06%	(0.33%)	8.74%	7.87%	(0.40%)
<b>Short Duration</b>	<b>(0.02%)</b>	<b>2.33%</b>	<b>4.41%</b>	<b>-</b>	<b>-</b>
Janus Henderson Short Duration	(0.02%)	2.33%	4.41%	-	-
Blmbg Gov/Cred 1-3 Yr	(0.47%)	0.44%	4.20%	4.27%	0.21%
85% 1-3YR G/C; 15% 1-3YR BB (4)	(0.27%)	1.70%	3.94%	4.59%	0.44%
<b>High Income Strategies</b>	<b>1.67%</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
High Income Strategies Benchmark (5)	1.45%	15.13%	0.46%	7.58%	2.39%
<b>High Yield Fixed Income</b>	<b>1.84%</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
Mackay Shield US High Yield	1.84%	-	-	-	-
Blmbg High Yield	1.60%	15.37%	0.03%	7.48%	2.62%
<b>Preferred Securities</b>	<b>0.71%</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
Principal Preferred Securities	0.71%	-	-	-	-
ICE BofA US All Cap Secs	0.59%	13.67%	2.86%	8.12%	1.14%
<b>Total Fund w/o CAI (6)</b>	<b>1.52%</b>	<b>8.30%</b>	<b>7.37%</b>	<b>6.94%</b>	<b>(0.36%)</b>
Total Fund Benchmark (6)	1.67%	7.98%	7.87%	7.49%	0.01%

(1) Current quarter's Total Fixed Income Benchmark consists of 88.4% Bloomberg U.S. Aggregate and 11.6% Bloomberg Gov/Credit 1-3 Yrs.

(2) Includes cash returns starting July 2017.

(3) The PSPF Fixed Income Portfolio Custom Benchmark consisted of 37% U.S. Treasury 1-10 Year Index, 34% Mortgages 0-10 Year WAL Index, 19% AAA U.S. Agencies 1-10 Year Index and 10% U.S. Corporates AAA Rated 1-10 Years Index through March 31, 2017, 100% Bloomberg U.S. Aggregate, thereafter.

(4) Benchmark consists of 85% Bloomberg 1-3 Year Government/Credit Index and 15% BofAML 1-3 Year BB US Cash Pay High Yield Index.

(5) Benchmark consists of 85% Blmbg High Yield Index and 15% ICE BofA US All Cap Secs Index.

(6) Current quarter's Total Fund Benchmark consists of 16.4% Russell 3000, 10.9% MSCI ACWI ex US, 57.0% Bloomberg U.S. Aggregate, 7.5% Bloomberg Gov/Credit 1-3 Yrs, 7.0% Bloomberg US High Yield and 1.3% ICE BofA U.S. All Capital Securities Index. See pg. 5 for full benchmark history. The Total Fund return calculations do not include Cash Available for Investing.

\*All composites and manager returns are shown gross-of-fees.

## Total Fund Benchmark Definition

### Inception to Dec 31, 2017

Market Duration	PFSF Fixed Income Benchmark	100%
-----------------	-----------------------------	------

### January 1st, 2018 - December 31st, 2018

US Equity	Russell 3000 Index	12.00%
International Equity	MSCI ACWI ex US	8.00%
Market Duration	Bloomberg Barclays Aggregate	72.00%
Short Duration	Bloomberg Barclays Gov/Cred 1-3 Yr	8.00%

### January 1st, 2019 - September 30th, 2020

US Equity	Russell 3000 Index	12.00%
International Equity	MSCI ACWI ex US	8.00%
Market Duration	Bloomberg Barclays Aggregate	72.00%
Short Duration	Bloomberg Barclays Gov/Cred 1-3 Yr	8.00%

### October 1st, 2020 - March 31st, 2021

US Equity	Russell 3000 Index	12.00%
International Equity	MSCI ACWI ex US	8.00%
Market Duration	Bloomberg Barclays Aggregate	67.50%
Short Duration	Bloomberg Barclays Gov/Cred 1-3 Yr	7.50%
High Yield	Bloomberg Barclays US High Yield	4.25%
Preferred Securities	ICE BofA U.S. All Capital Securities Index	0.75%

### April 1st, 2021 - June 30th, 2021

US Equity	Russell 3000 Index	14.70%
International Equity	MSCI ACWI ex US	9.80%
Market Duration	Bloomberg Barclays Aggregate	61.50%
Short Duration	Bloomberg Barclays Gov/Cred 1-3 Yr	7.50%
High Yield	Bloomberg Barclays US High Yield	5.50%
Preferred Securities	ICE BofA U.S. All Capital Securities Index	1.00%

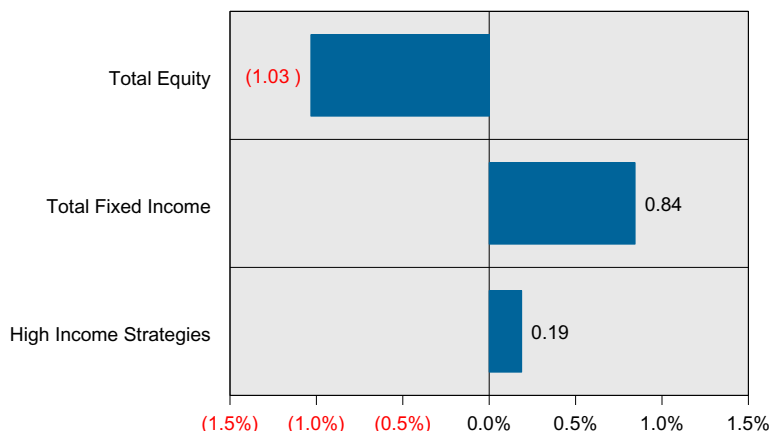
### July 1st, 2021 - Current

US Equity	Russell 3000 Index	16.35%
International Equity	MSCI ACWI ex US	10.90%
Market Duration	Bloomberg Barclays Aggregate	57.00%
Short Duration	Bloomberg Barclays Gov/Cred 1-3 Yr	7.50%
High Yield	Bloomberg Barclays US High Yield	7.00%
Preferred Securities	ICE BofA U.S. All Capital Securities Index	1.25%

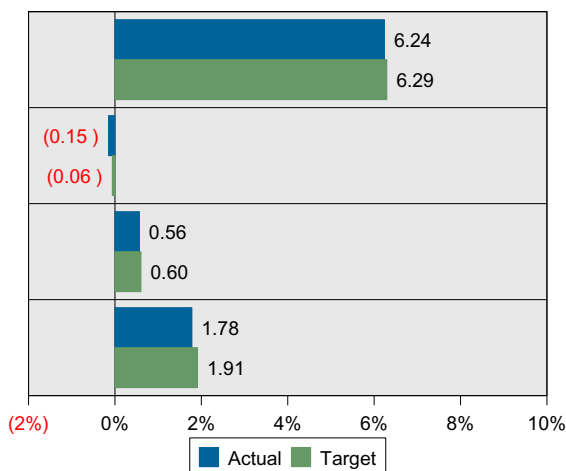
## Quarterly Total Fund Relative Attribution - December 31, 2021

The following analysis approaches Total Fund Attribution from the perspective of relative return. Relative return attribution separates and quantifies the sources of total fund excess return relative to its target. This excess return is separated into two relative attribution effects: Asset Allocation Effect and Manager Selection Effect. The Asset Allocation Effect represents the excess return due to the actual total fund asset allocation differing from the target asset allocation. Manager Selection Effect represents the total fund impact of the individual managers excess returns relative to their benchmarks.

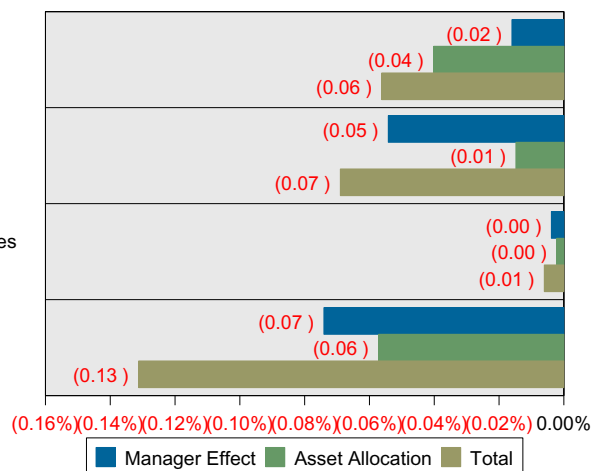
### Asset Class Under or Overweighting



### Actual vs Target Returns



### Relative Attribution by Asset Class



### Relative Attribution Effects for Quarter ended December 31, 2021

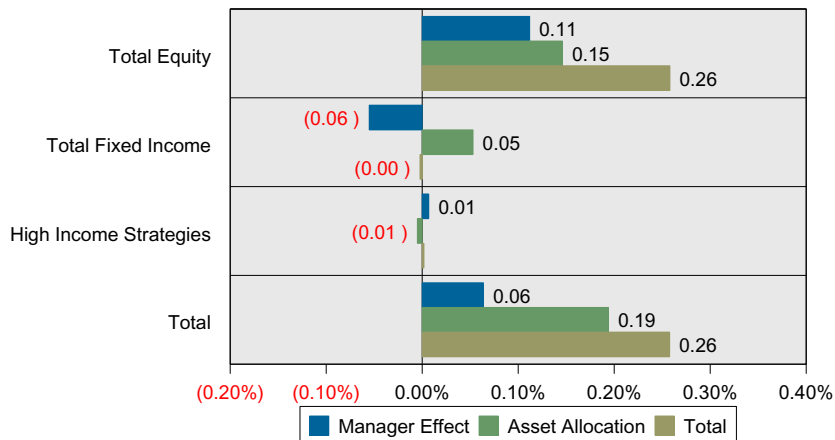
Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Total Equity	29%	30%	6.24%	6.29%	(0.02%)	(0.04%)	(0.06%)
Total Fixed Income	61%	60%	(0.15%)	(0.06%)	(0.05%)	(0.01%)	(0.07%)
High Income Strategies	10%	10%	0.56%	0.60%	(0.00%)	(0.00%)	(0.01%)
<b>Total</b>			<b>1.78%</b>	<b>1.91%</b>	<b>(0.07%)</b>	<b>(0.06%)</b>	<b>(0.13%)</b>

\* Current Quarter Target = 52.5% Blmbg Aggregate, 18.0% Russell 3000 Index, 12.0% MSCI ACWI ex US, 8.5% Blmbg HY Corp, 7.5% Blmbg Gov/Cred 1-3 Yr and 1.5% ICE All US Cap Secs.

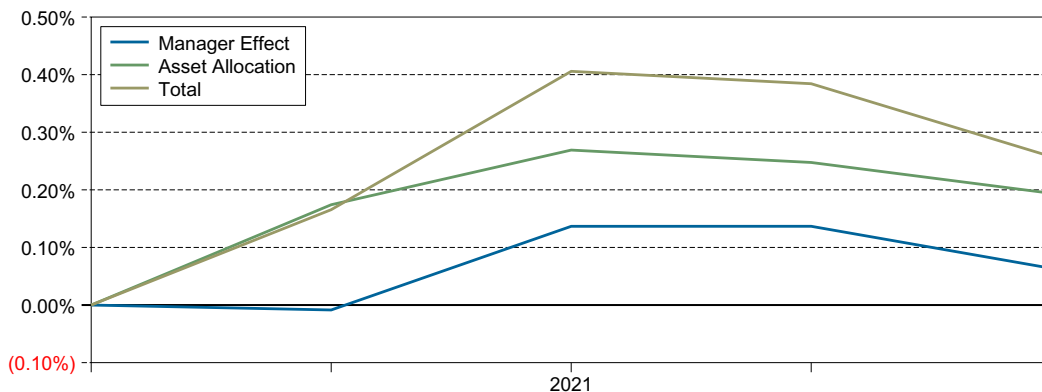
## Cumulative Total Fund Relative Attribution - December 31, 2021

The charts below accumulate the Total Fund Attribution Analysis (shown earlier) over multiple periods to examine the cumulative sources of excess total fund performance relative to target. These cumulative results quantify the longer-term sources of total fund excess return relative to target by asset class. These relative attribution effects separate the cumulative sources of total fund excess return into Asset Allocation Effect and Manager Selection Effect.

### One Year Relative Attribution Effects



### Cumulative Relative Attribution Effects



### One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Total Equity	26%	25%	18.86%	18.30%	0.11%	0.15%	0.26%
Total Fixed Income	66%	67%	(1.53%)	(1.46%)	(0.06%)	0.05%	(0.00%)
High Income Strategies	8%	7%	5.13%	5.00%	0.01%	(0.01%)	0.00%
<b>Total</b>			<b>3.78%</b>	<b>3.52%</b>	<b>+ 0.06%</b>	<b>+ 0.19%</b>	<b>0.26%</b>

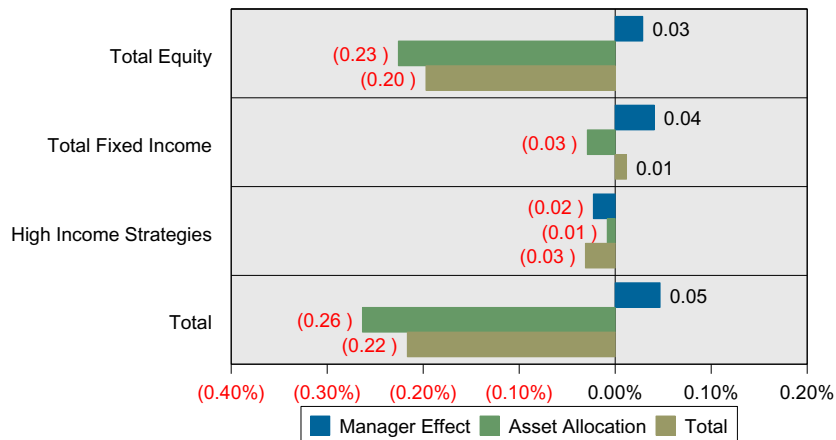
\* Current Quarter Target = 52.5% Blmbg Aggregate, 18.0% Russell 3000 Index, 12.0% MSCI ACWI ex US, 8.5% Blmbg HY Corp, 7.5% Blmbg Gov/Cred 1-3 Yr and 1.5% ICE All US Cap Secs.



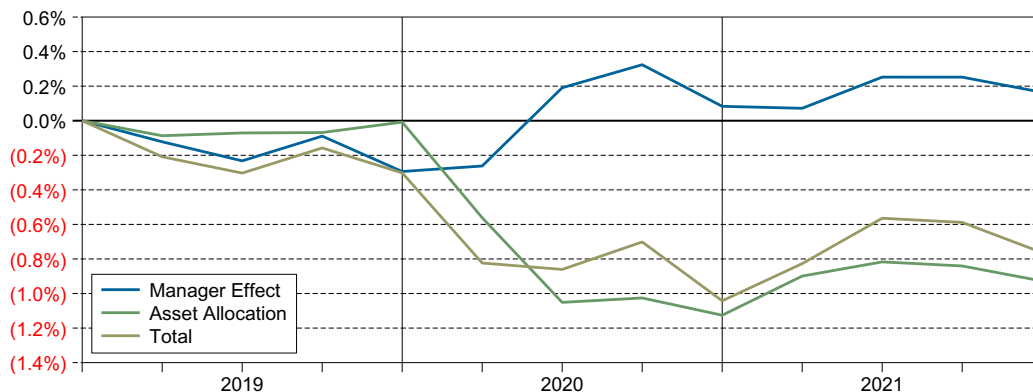
## Cumulative Total Fund Relative Attribution - December 31, 2021

The charts below accumulate the Total Fund Attribution Analysis (shown earlier) over multiple periods to examine the cumulative sources of excess total fund performance relative to target. These cumulative results quantify the longer-term sources of total fund excess return relative to target by asset class. These relative attribution effects separate the cumulative sources of total fund excess return into Asset Allocation Effect and Manager Selection Effect.

### Three Year Annualized Relative Attribution Effects



### Cumulative Relative Attribution Effects



### Three Year Annualized Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Total Equity	22%	22%	20.77%	20.65%	0.03%	(0.23%)	(0.20%)
Total Fixed Income	75%	75%	4.57%	4.53%	0.04%	(0.03%)	0.01%
High Income Strategies	3%	3%	-	-	(0.02%)	(0.01%)	(0.03%)
<b>Total</b>			<b>8.31%</b>	<b>= 8.53%</b>	<b>+ 0.05%</b>	<b>+ (0.26%)</b>	<b>(0.22%)</b>

\* Current Quarter Target = 52.5% Blmbg Aggregate, 18.0% Russell 3000 Index, 12.0% MSCI ACWI ex US, 8.5% Blmbg HY Corp, 7.5% Blmbg Gov/Cred 1-3 Yr and 1.5% ICE All US Cap Secs.



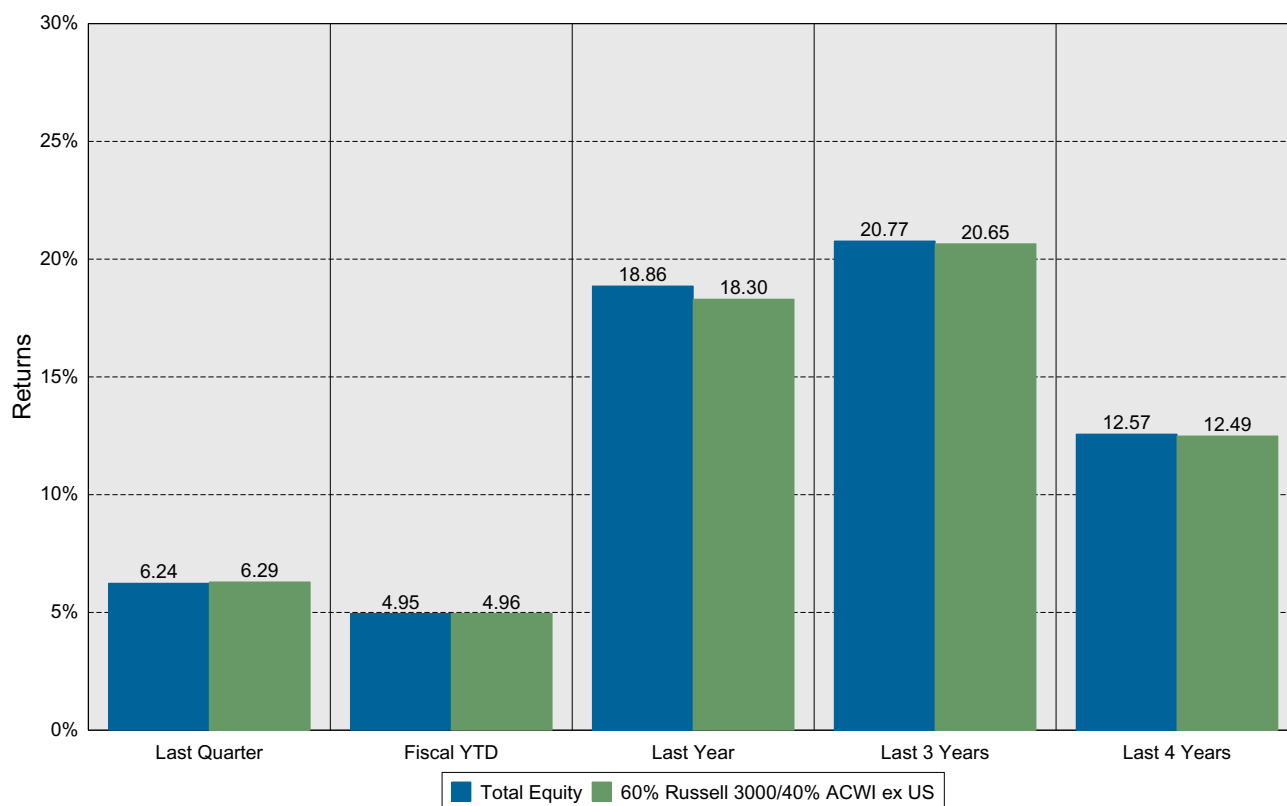
## Total Equity Period Ended December 31, 2021

### Inception Date

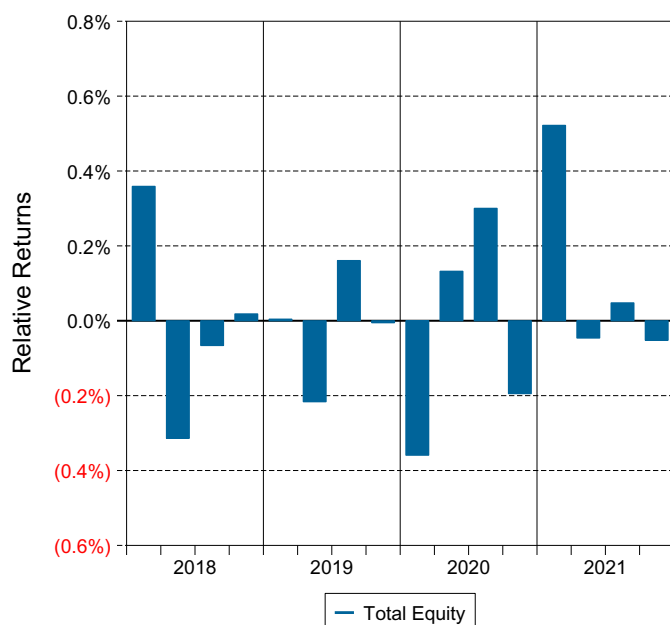
Parametric was funded December 12th, 2017.

### Quarterly Summary and Highlights

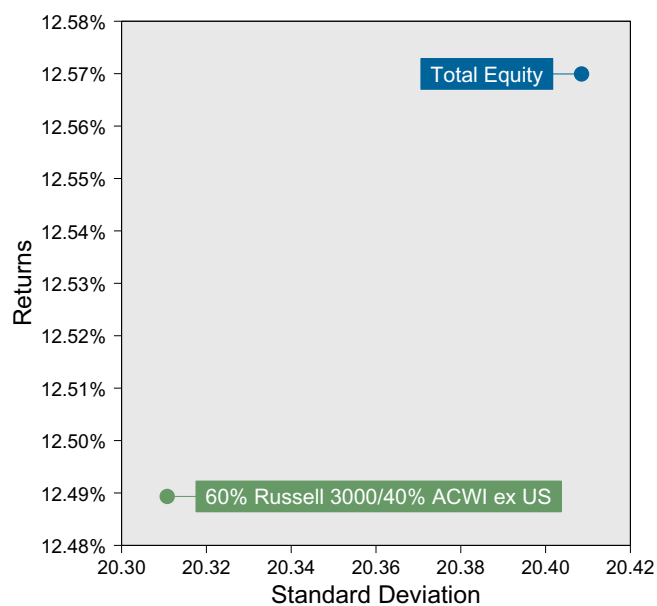
- Total Equity's portfolio underperformed the 60% Russell 3000/40% ACWI ex US by 0.06% for the quarter and outperformed the 60% Russell 3000/40% ACWI ex US for the year by 0.56%.



**Relative Returns vs  
60% Russell 3000/40% ACWI ex US**



**Annualized Four Year Risk vs Return**



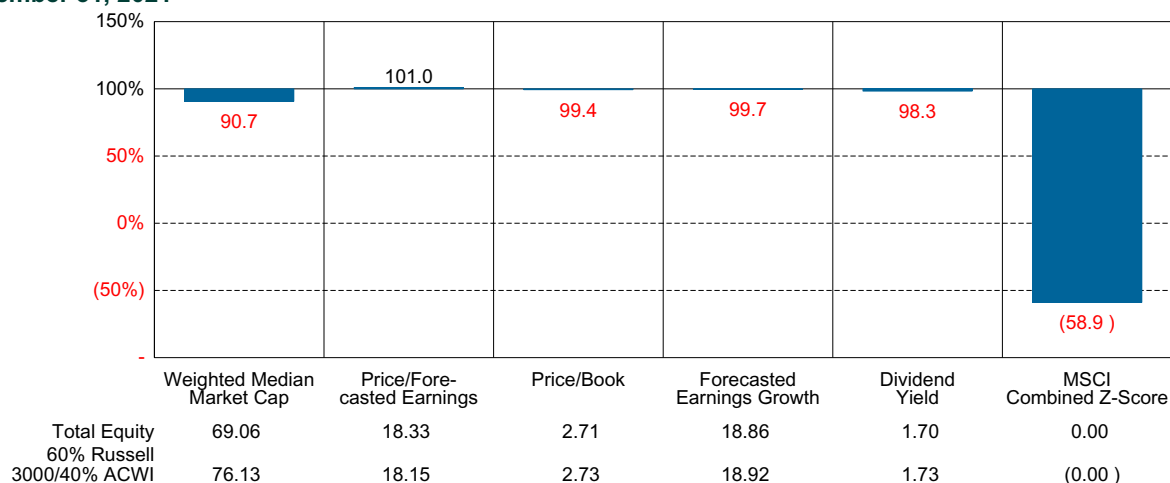
# Total Equity

## Equity Characteristics Analysis Summary

### Portfolio Characteristics

This graph compares the manager's portfolio characteristics relative to the benchmark's portfolio characteristics.

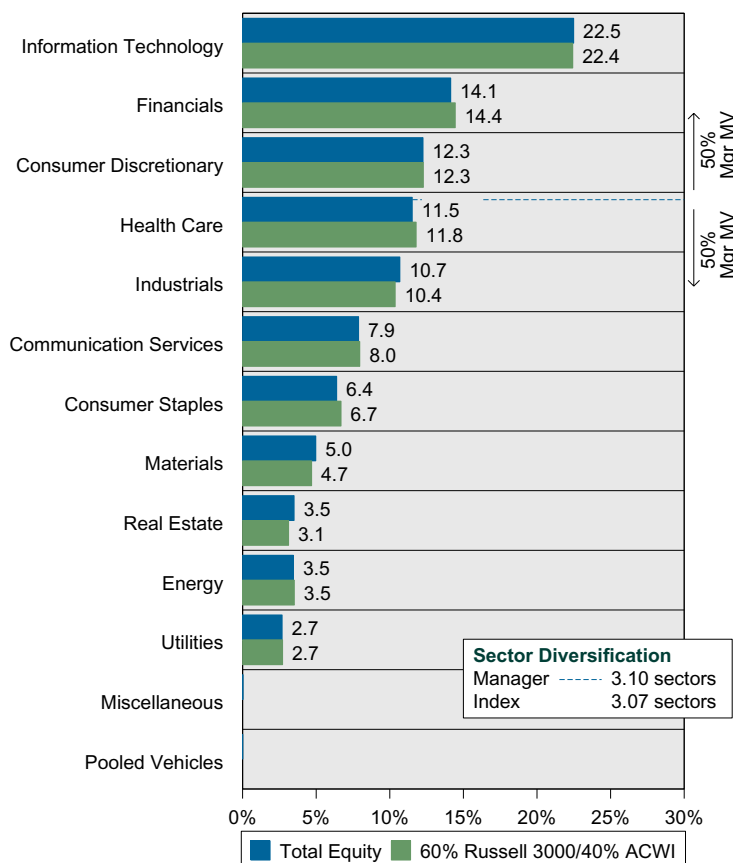
### Portfolio Characteristics Relative to 60% Russell 3000/40% ACWI as of December 31, 2021



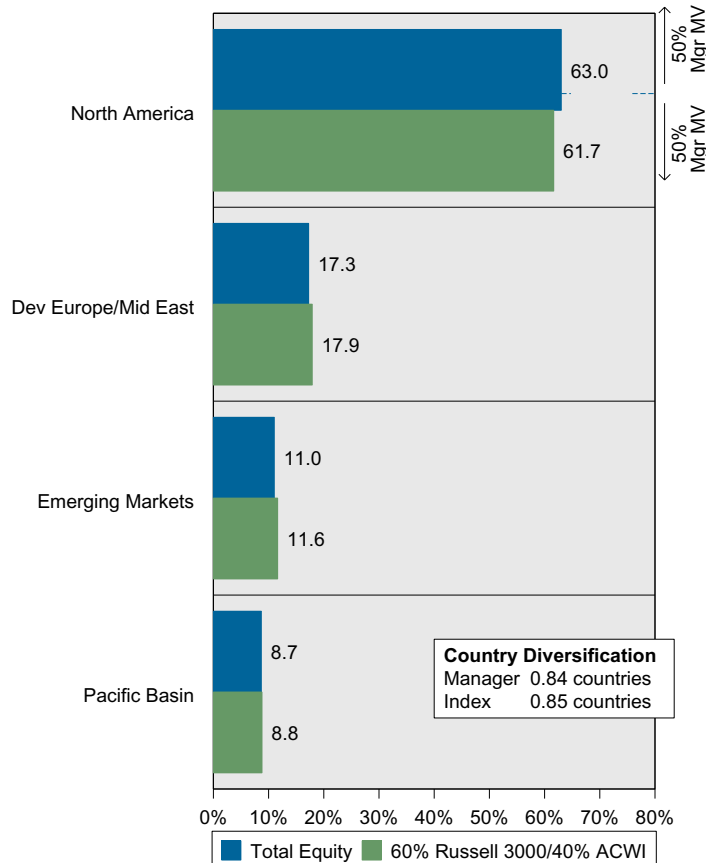
### Sector Weights

The graph below contrasts the manager's sector weights for the most recent quarter with those of the benchmark. The regional allocation chart also compares the manager's geographical region weights with those of the benchmark.

### Sector Allocation December 31, 2021



### Regional Allocation December 31, 2021



## Domestic Equity Period Ended December 31, 2021

### Inception Date

Parametric was funded December 12th, 2017.

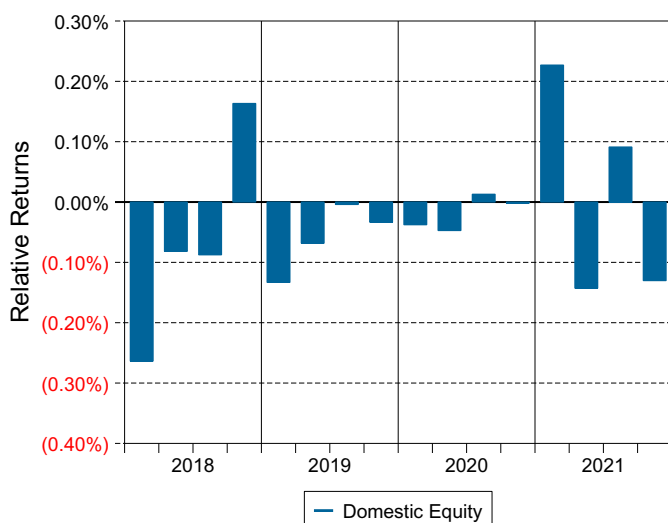
### Quarterly Summary and Highlights

- Domestic Equity's portfolio posted a 9.14% return for the quarter placing it in the 36 percentile of the EF- Domestic Equity group for the quarter and in the 50 percentile for the last year.
- Domestic Equity's portfolio underperformed the Russell 3000 Index by 0.14% for the quarter and outperformed the Russell 3000 Index for the year by 0.06%.

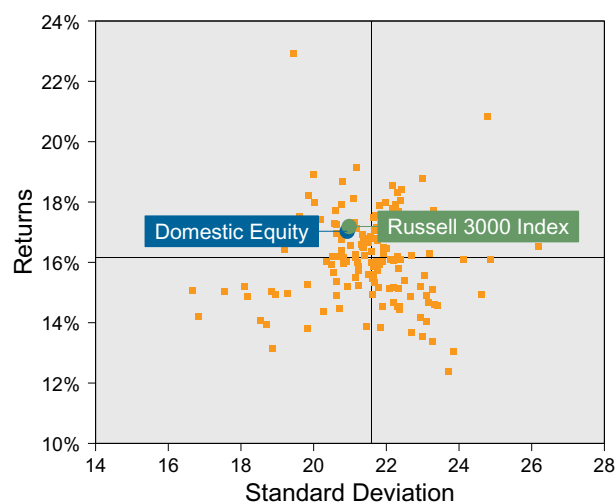
### Performance vs EF- Domestic Equity (Gross)



### Relative Return vs Russell 3000 Index



### EF- Domestic Equity (Gross) Annualized Four Year Risk vs Return

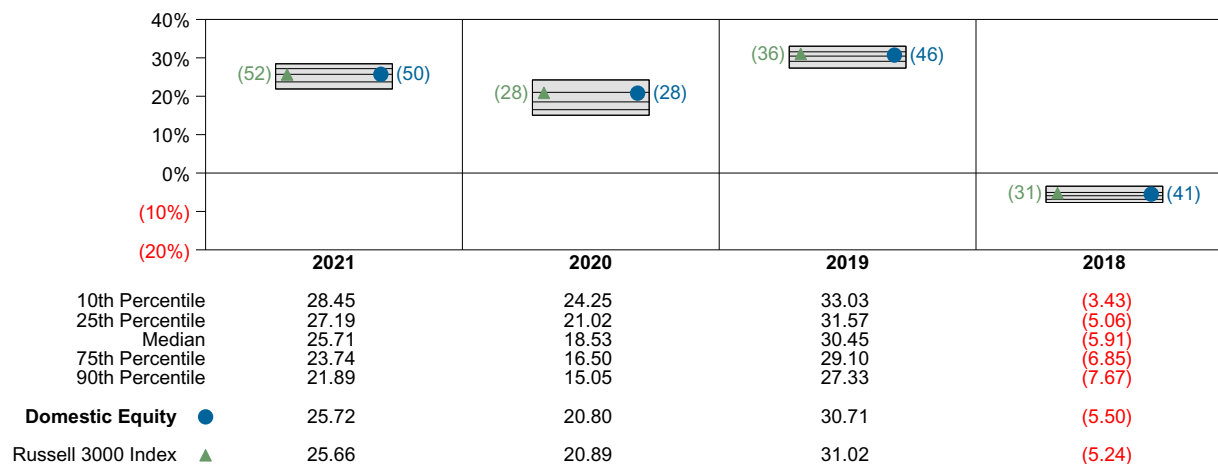


## Domestic Equity Return Analysis Summary

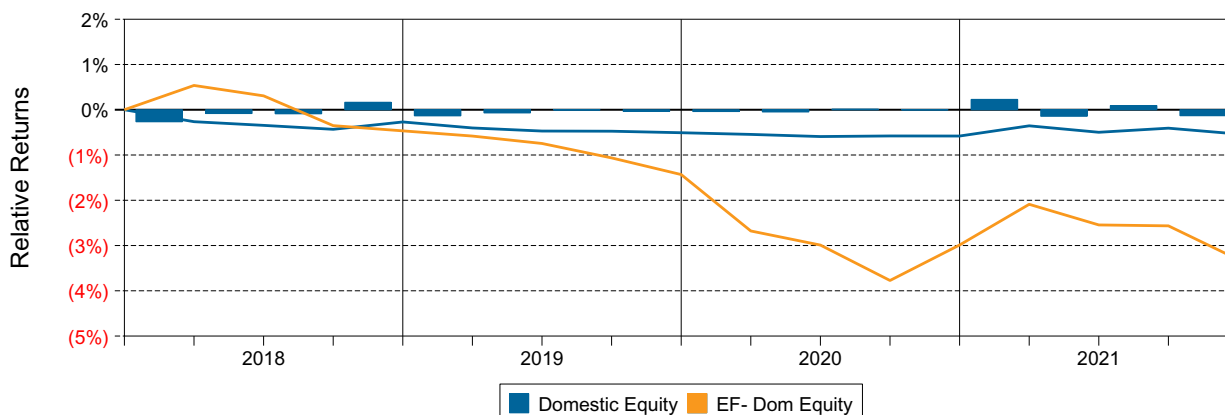
### Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

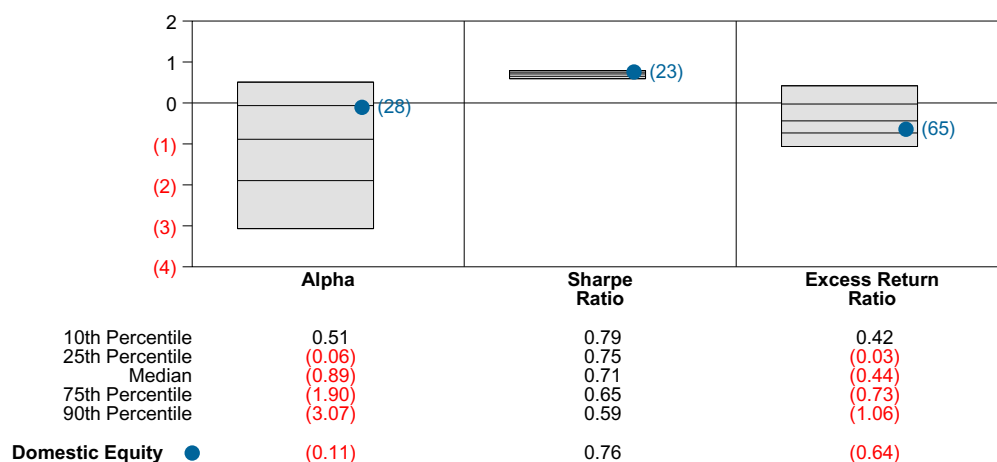
### Performance vs EF- Domestic Equity (Gross)



### Cumulative and Quarterly Relative Return vs Russell 3000 Index



### Risk Adjusted Return Measures vs Russell 3000 Index Rankings Against EF- Domestic Equity (Gross) Four Years Ended December 31, 2021

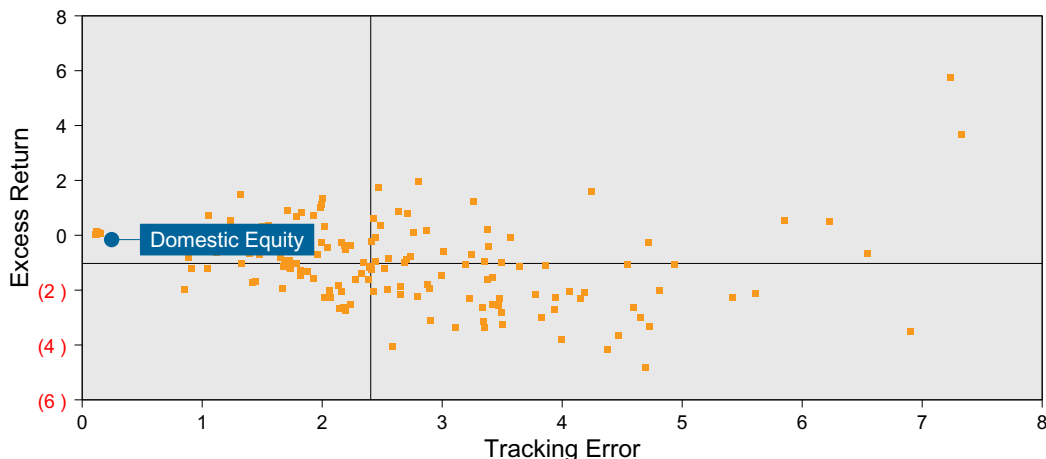


## Domestic Equity Risk Analysis Summary

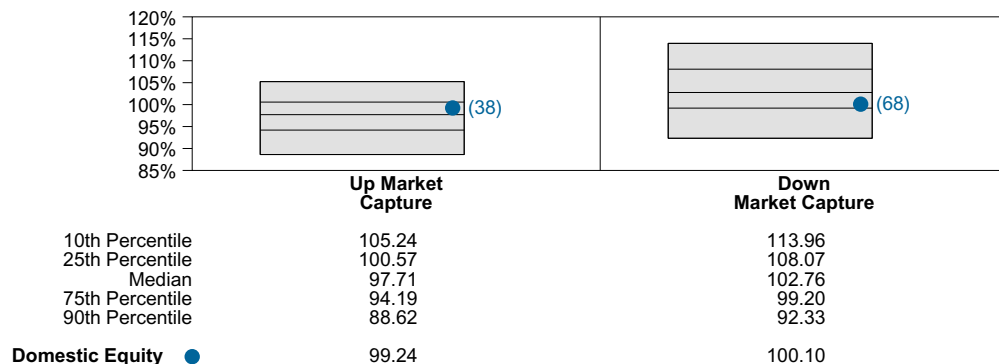
### Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

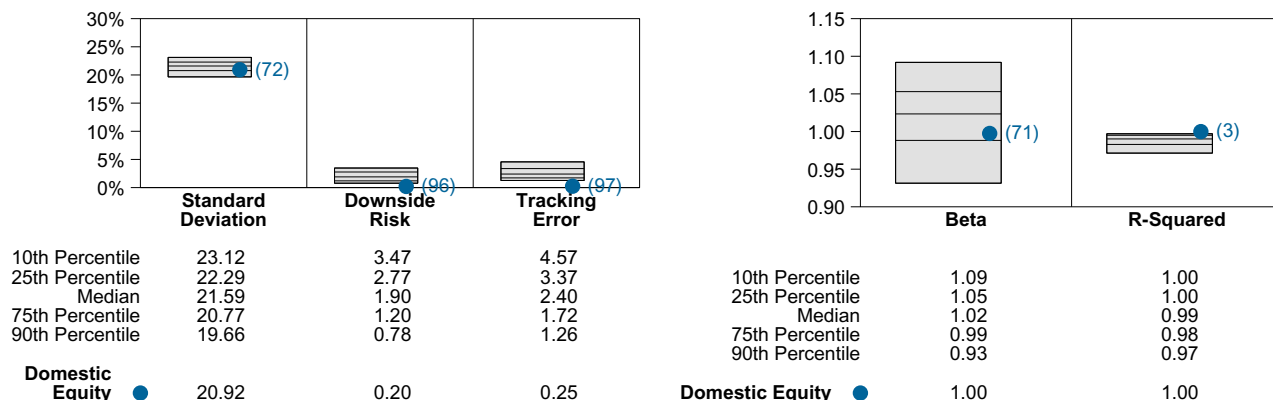
### Risk Analysis vs EF- Domestic Equity (Gross) Four Years Ended December 31, 2021



### Market Capture vs Russell 3000 Index Rankings Against EF- Domestic Equity (Gross) Four Years Ended December 31, 2021



### Risk Statistics Rankings vs Russell 3000 Index Rankings Against EF- Domestic Equity (Gross) Four Years Ended December 31, 2021

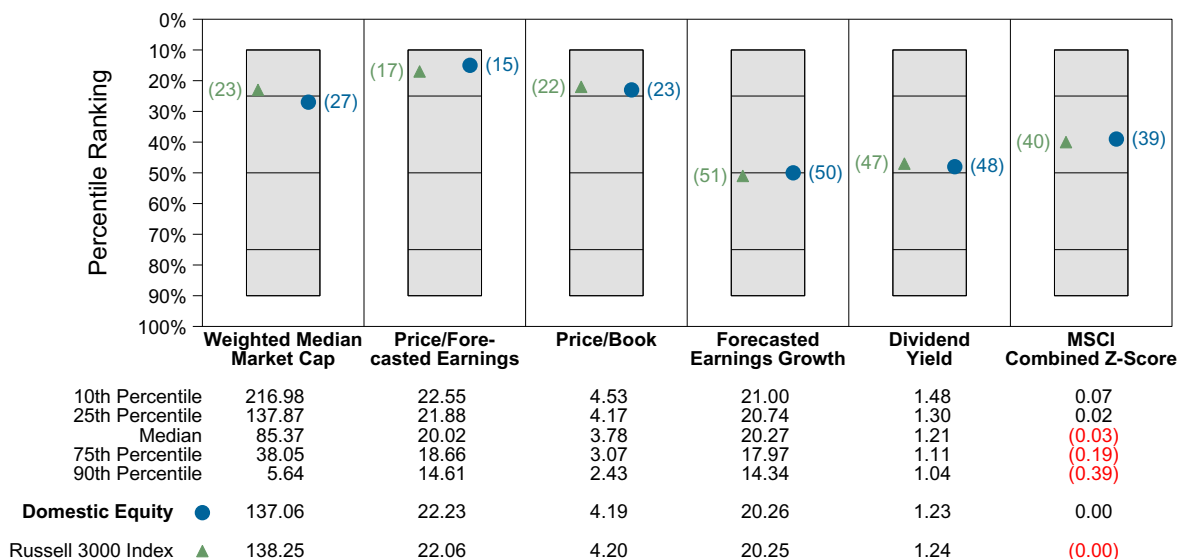


## Domestic Equity Equity Characteristics Analysis Summary

### Portfolio Characteristics

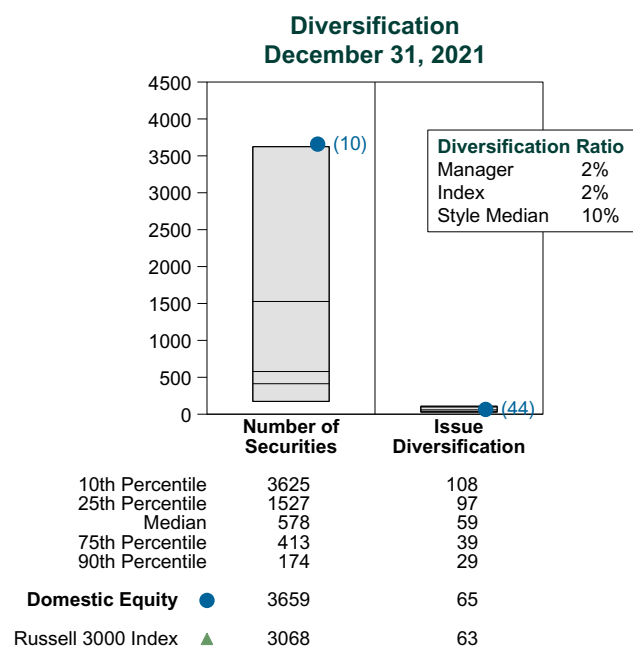
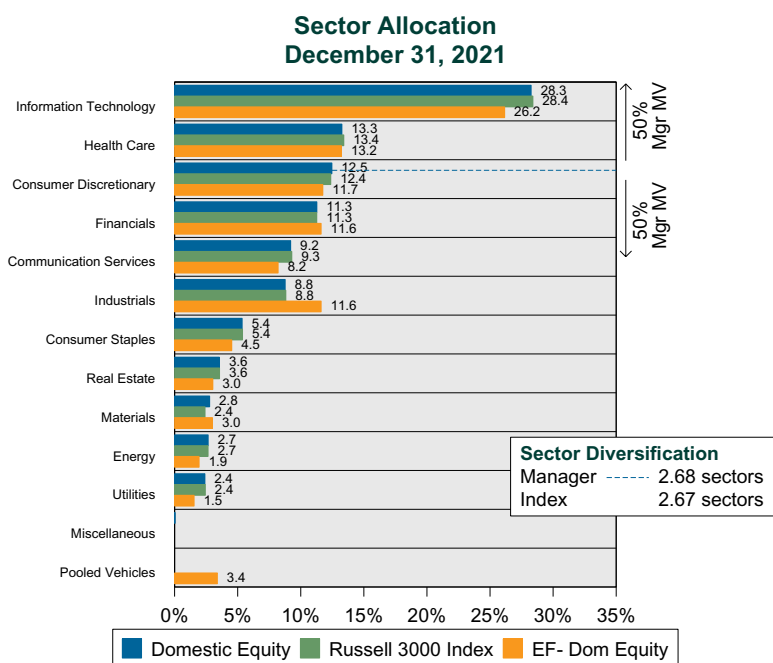
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

### Portfolio Characteristics Percentile Rankings Rankings Against EF- Domestic Equity as of December 31, 2021



### Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. Diversification by number and concentration of holdings are also compared to the benchmark and peer group. Issue Diversification represents by count, and Diversification Ratio by percent, the number of holdings that account for half of the portfolio's market value.





## International Equity Period Ended December 31, 2021

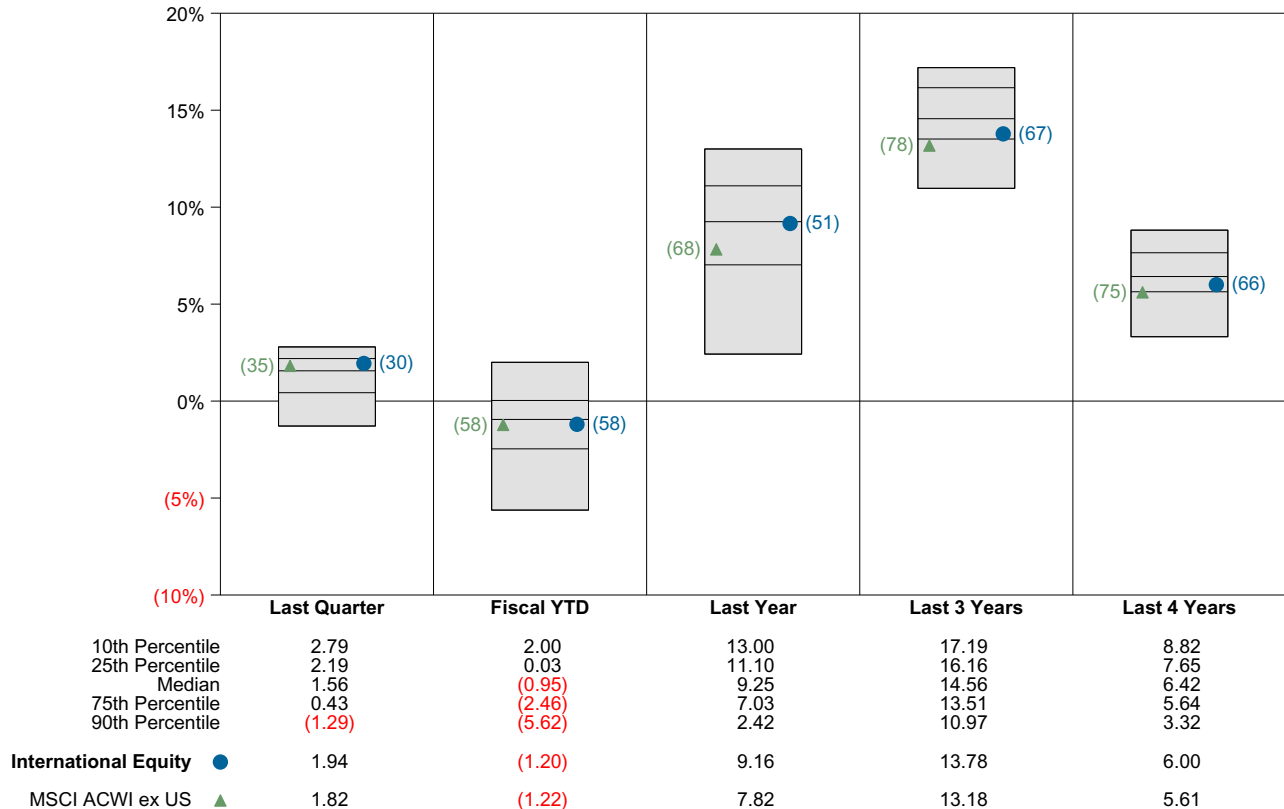
### Inception Date

Parametric was funded December 12th, 2017.

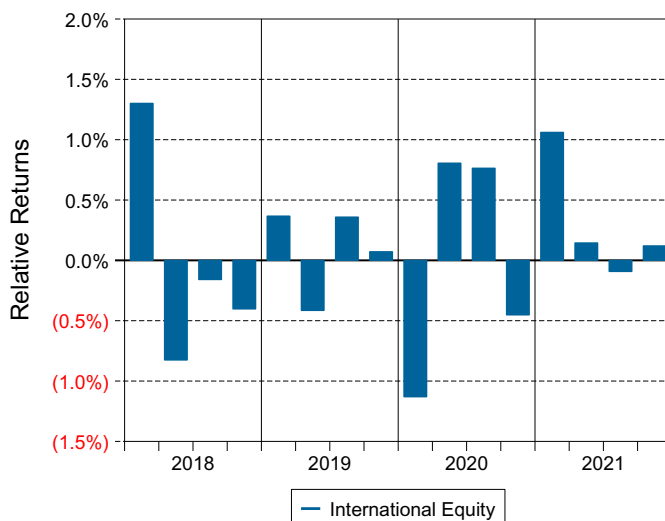
### Quarterly Summary and Highlights

- International Equity's portfolio posted a 1.94% return for the quarter placing it in the 30 percentile of the EF-International Equity group for the quarter and in the 51 percentile for the last year.
- International Equity's portfolio outperformed the MSCI ACWI ex US by 0.12% for the quarter and outperformed the MSCI ACWI ex US for the year by 1.33%.

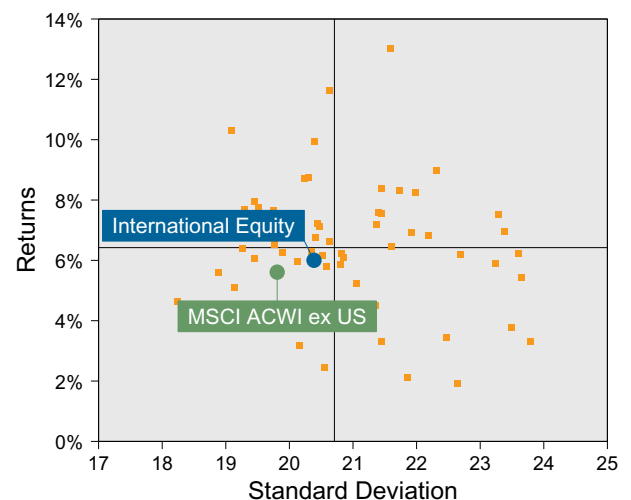
### Performance vs EF- International Equity (Gross)



### Relative Return vs MSCI ACWI ex US



### EF- International Equity (Gross) Annualized Four Year Risk vs Return

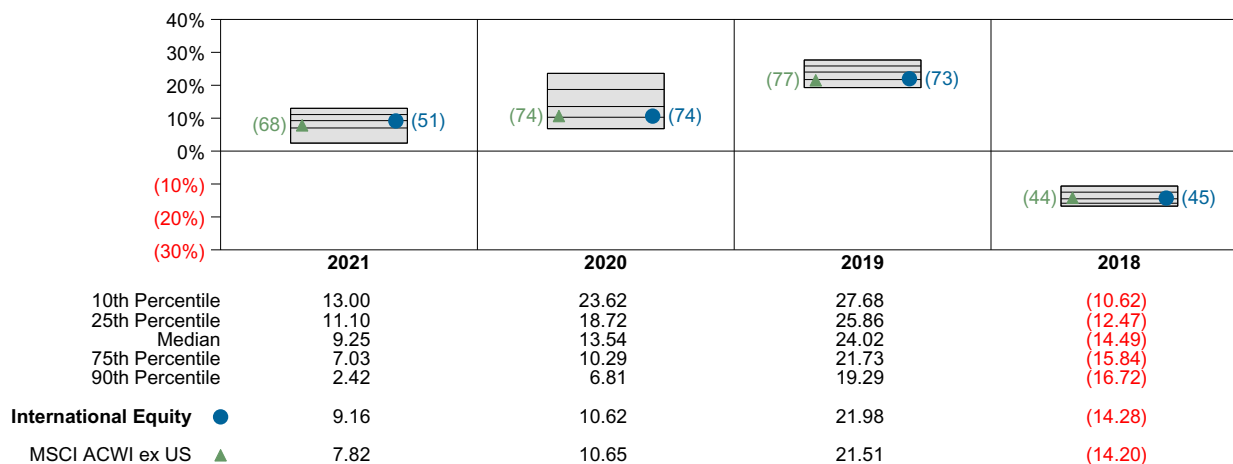


## International Equity Return Analysis Summary

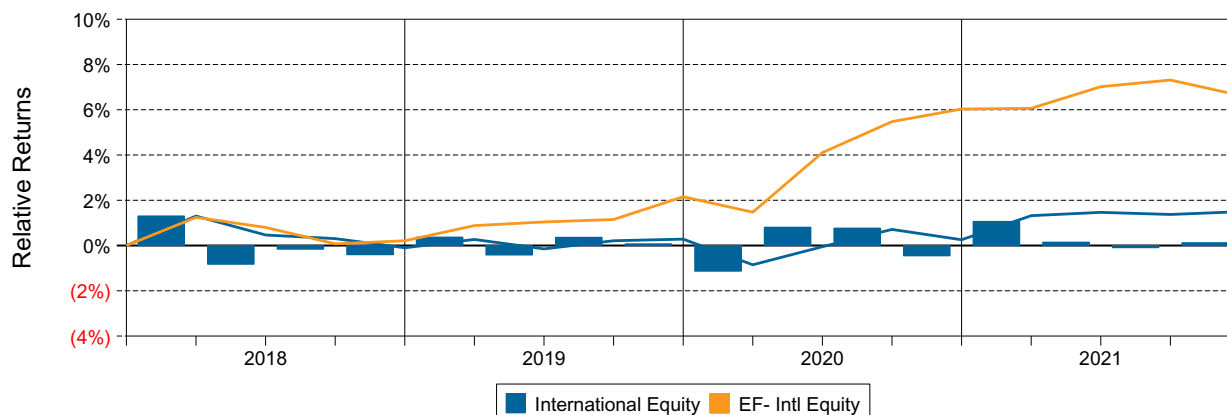
### Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

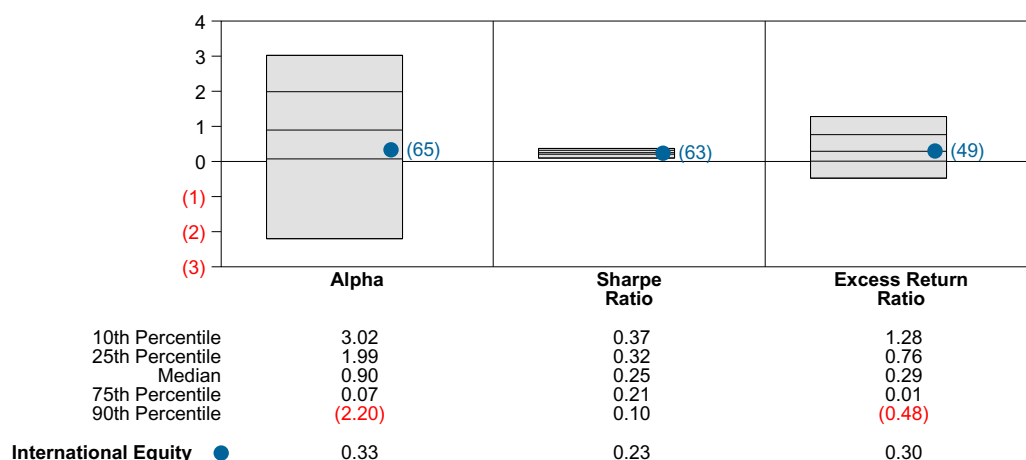
### Performance vs EF- International Equity (Gross)



### Cumulative and Quarterly Relative Return vs MSCI ACWI ex US



### Risk Adjusted Return Measures vs MSCI ACWI ex US Rankings Against EF- International Equity (Gross) Four Years Ended December 31, 2021

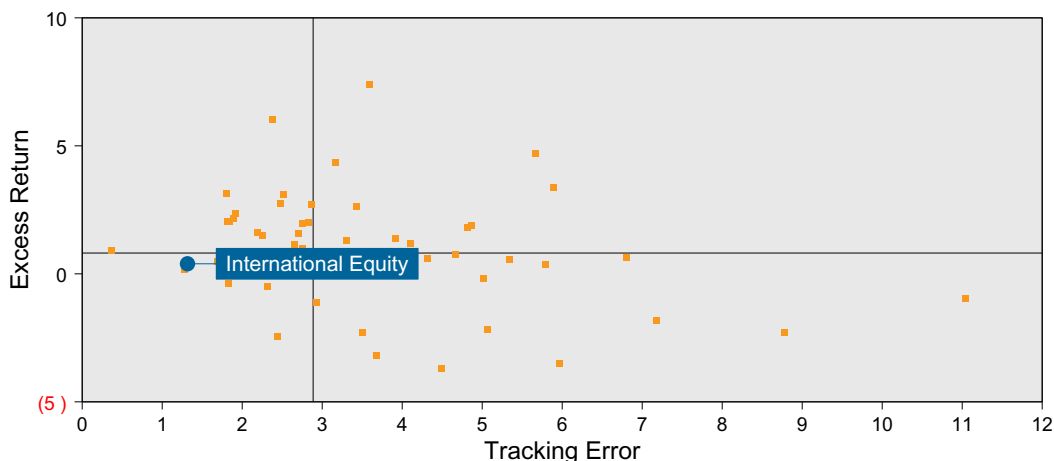


## International Equity Risk Analysis Summary

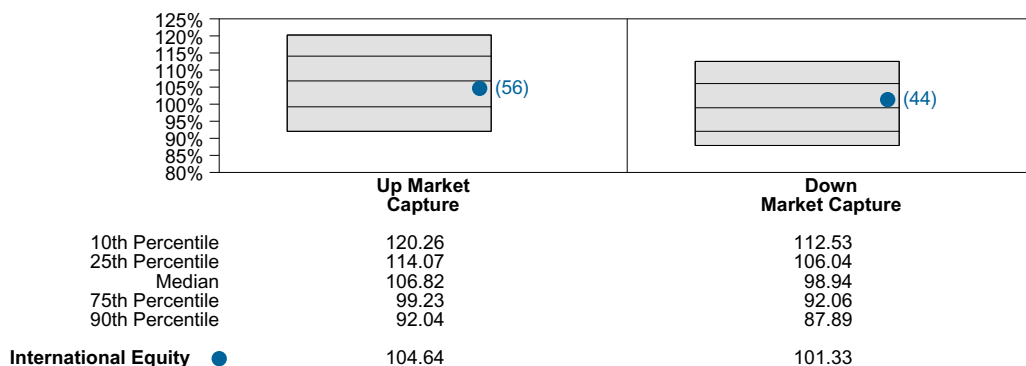
### Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows Up and Down Market Capture. The last two charts show the ranking of the manager's risk statistics versus the peer group.

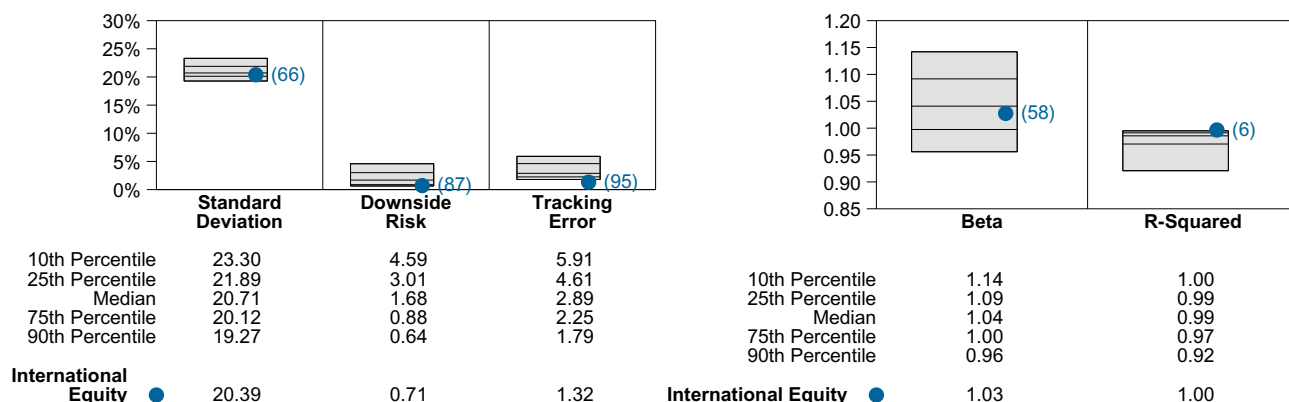
### Risk Analysis vs EF- International Equity (Gross) Four Years Ended December 31, 2021



### Market Capture vs MSCI ACWI ex US Rankings Against EF- International Equity (Gross) Four Years Ended December 31, 2021



### Risk Statistics Rankings vs MSCI ACWI ex US Rankings Against EF- International Equity (Gross) Four Years Ended December 31, 2021

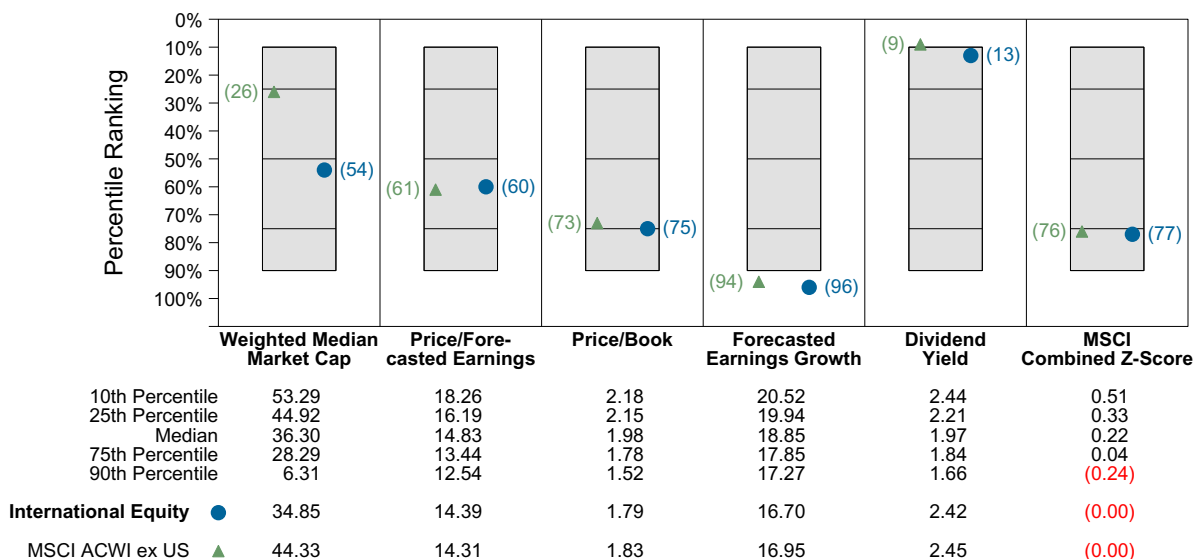


## International Equity Equity Characteristics Analysis Summary

### Portfolio Characteristics

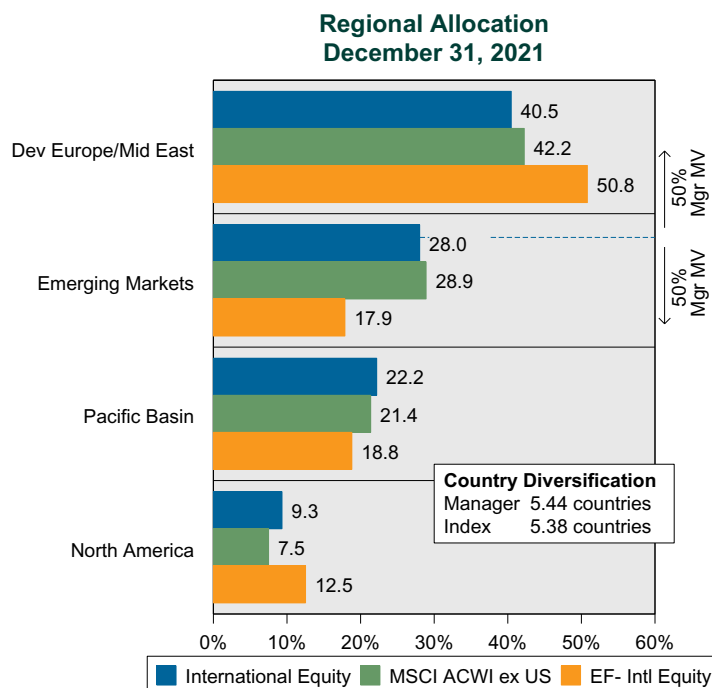
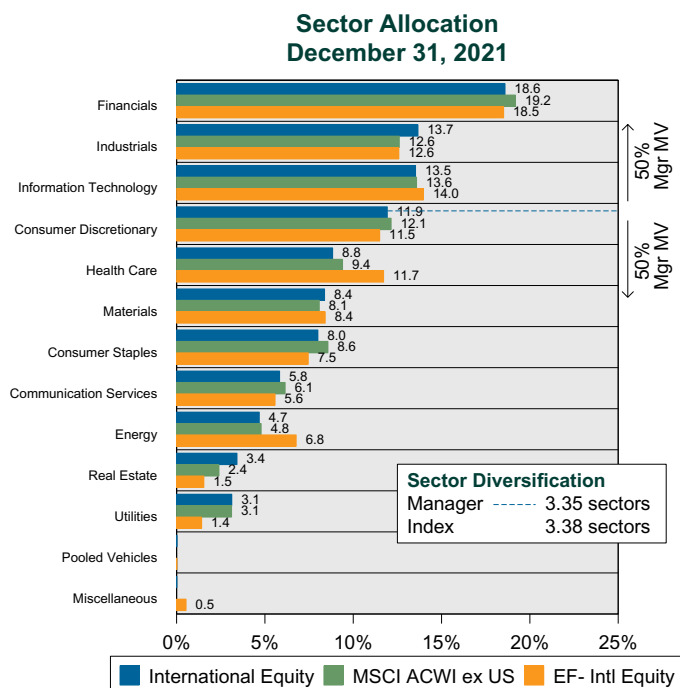
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

### Portfolio Characteristics Percentile Rankings Rankings Against EF- International Equity as of December 31, 2021



### Sector Weights

The graph below contrasts the manager's sector weights with those of the benchmark and median sector weights across the members of the peer group. The magnitude of sector weight differences from the index and the manager's sector diversification are also shown. The regional allocation chart compares the manager's geographical region weights with those of the benchmark as well as the median region weights of the peer group.





## Total Fixed Income Period Ended December 31, 2021

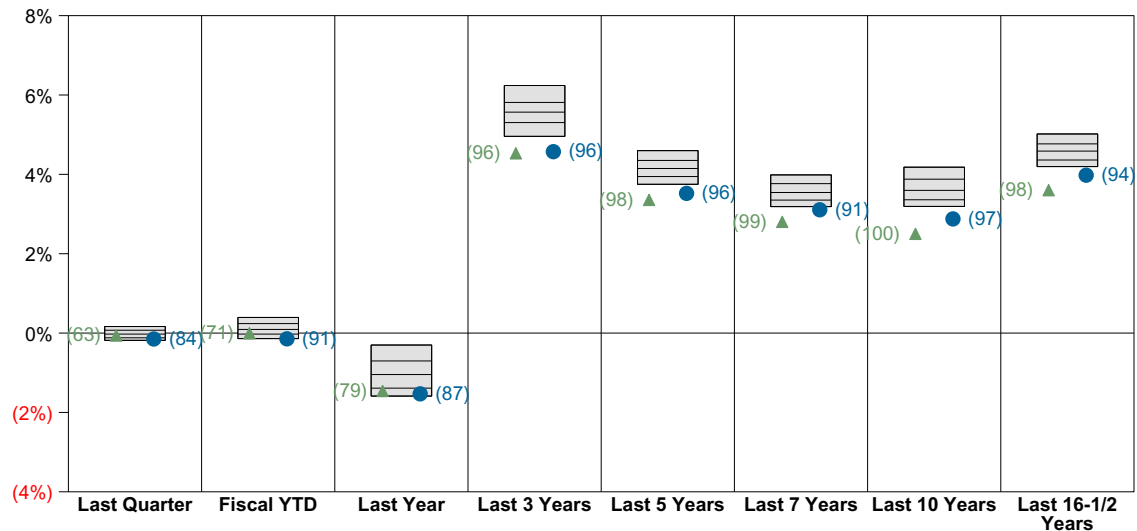
### Benchmark Definition

Total Fixed Income Benchmark consists of 100% PFSF Fixed Income Benchmark through December 31, 2018, 90% Bloomberg U.S. Aggregate and 10% Bloomberg Gov/Credit 1-3 Yrs through March 31, 2021, 89% Bloomberg U.S. Aggregate and 11% Bloomberg Gov/Credit 1-3 Yrs through June 30, 2021 and 88% Bloomberg U.S. Aggregate and 12% Bloomberg Gov/Credit 1-3 Yrs, thereafter.

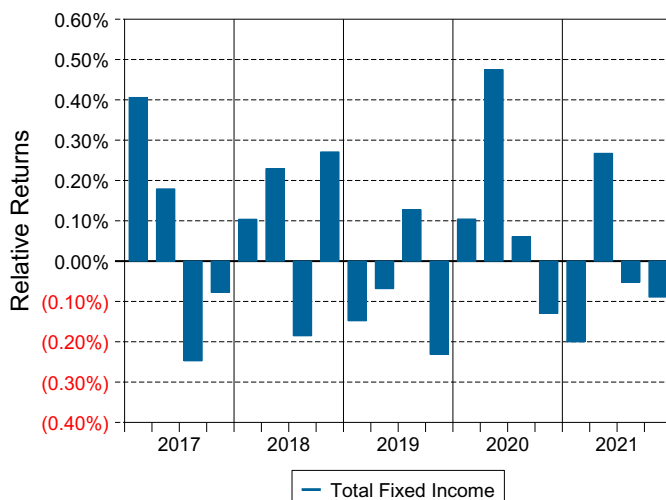
### Quarterly Summary and Highlights

- Total Fixed Income's portfolio posted a (0.15)% return for the quarter placing it in the 84 percentile of the Callan Core Bond Fixed Income group for the quarter and in the 87 percentile for the last year.
- Total Fixed Income's portfolio underperformed the Total Fixed Income Benchmark by 0.09% for the quarter and underperformed the Total Fixed Income Benchmark for the year by 0.07%.

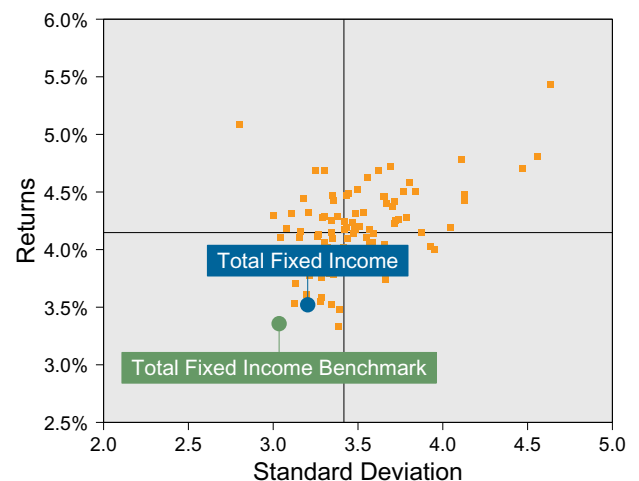
### Performance vs Callan Core Bond Fixed Income (Gross)



### Relative Returns vs Total Fixed Income Benchmark



### Callan Core Bond Fixed Income (Gross) Annualized Five Year Risk vs Return

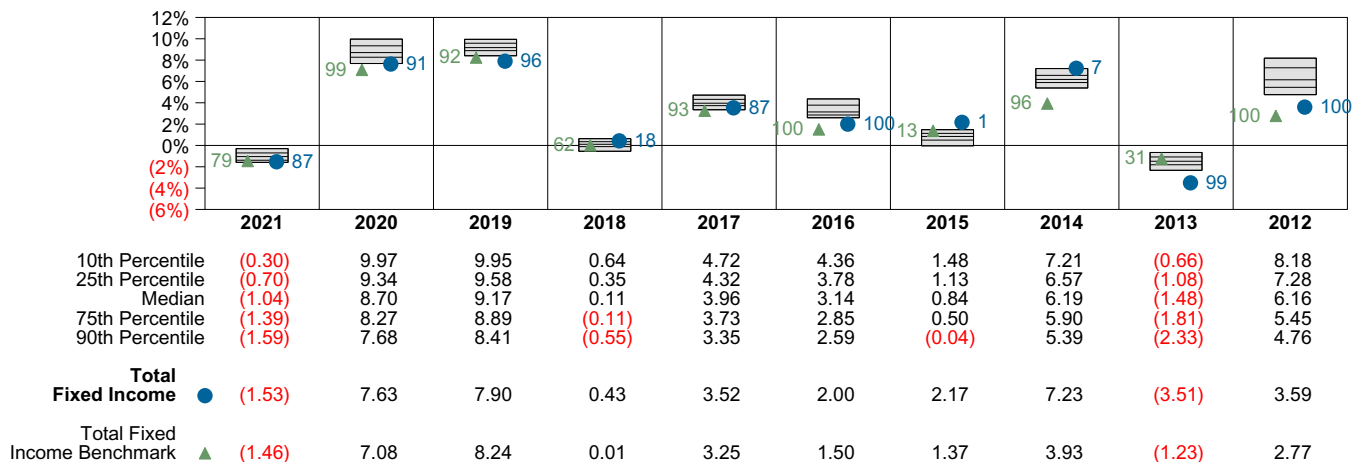


## Total Fixed Income Return Analysis Summary

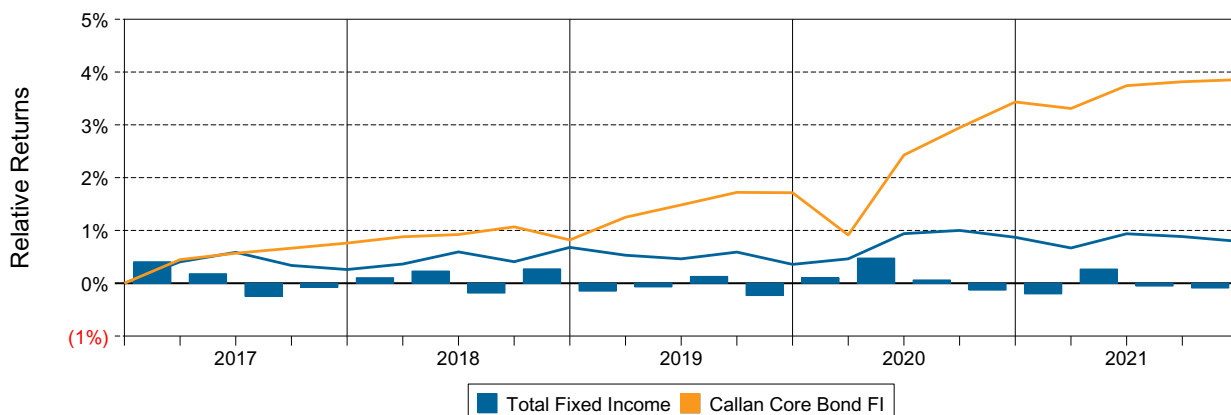
### Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

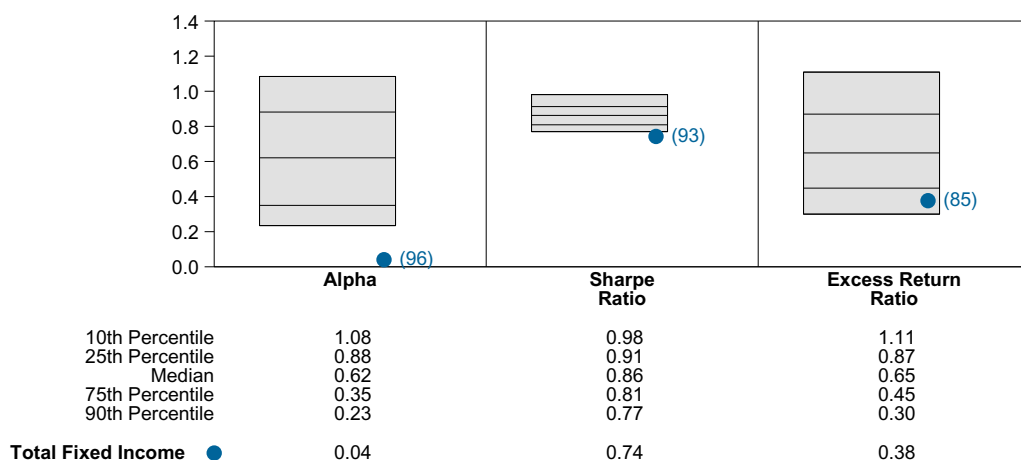
### Performance vs Callan Core Bond Fixed Income (Gross)



### Cumulative and Quarterly Relative Return vs Total Fixed Income Benchmark



### Risk Adjusted Return Measures vs Total Fixed Income Benchmark Rankings Against Callan Core Bond Fixed Income (Gross) Five Years Ended December 31, 2021

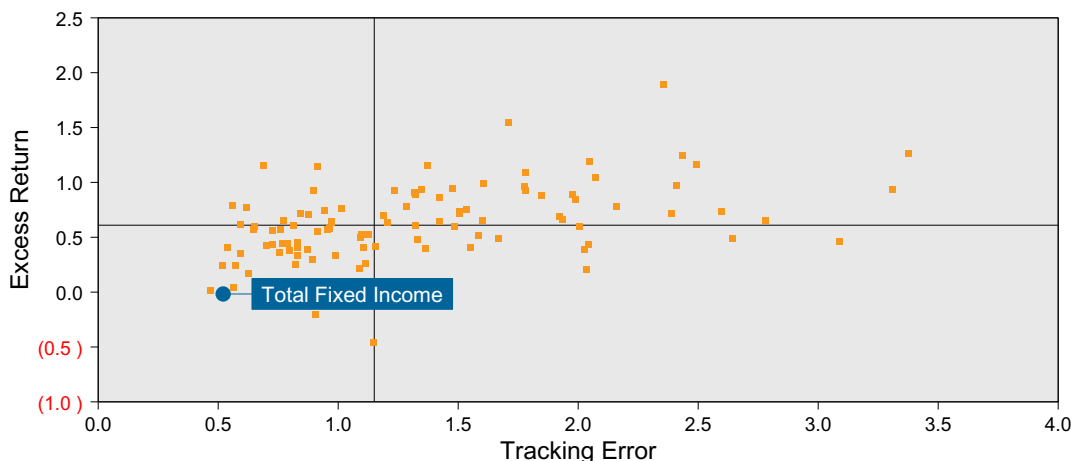


## Total Fixed Income Risk Analysis Summary

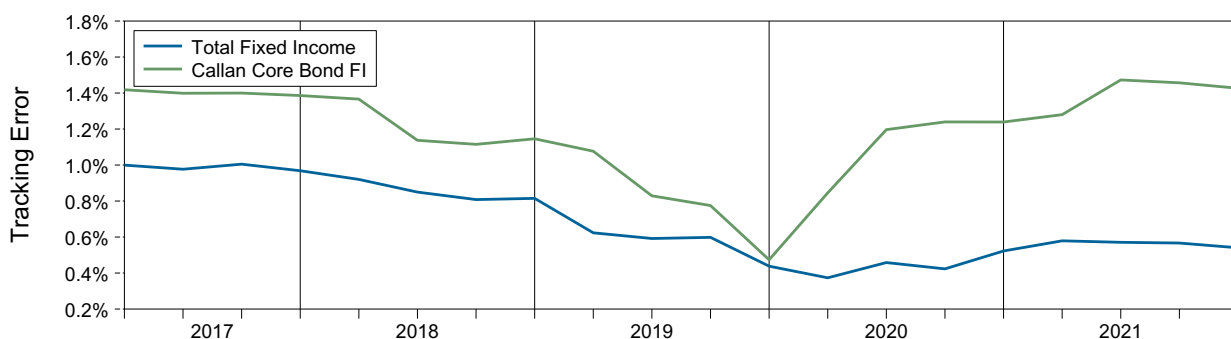
### Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

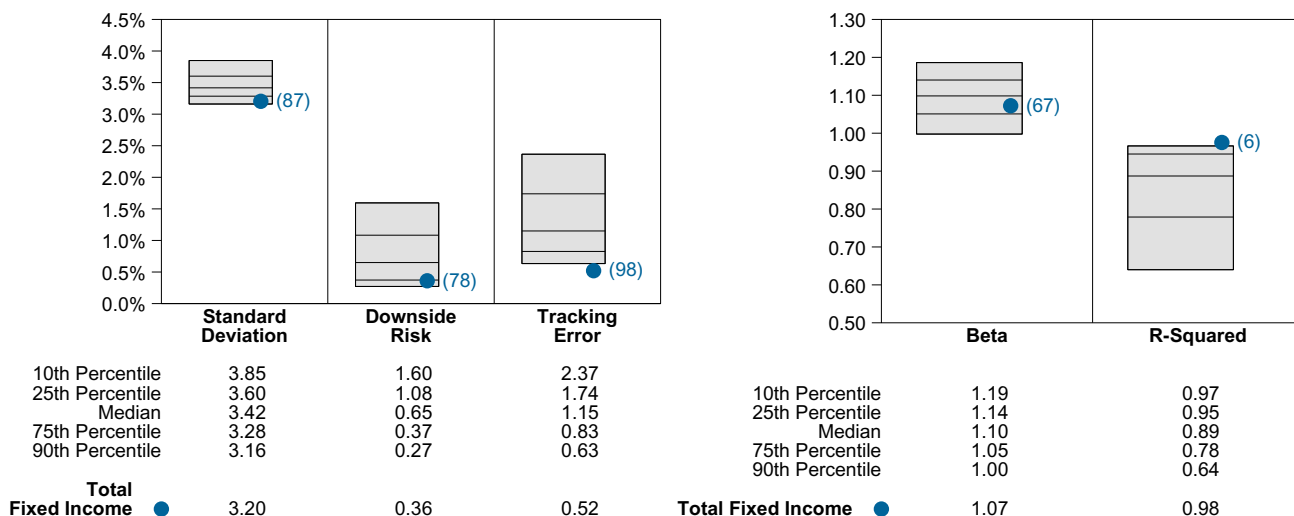
### Risk Analysis vs Callan Core Bond Fixed Income (Gross) Five Years Ended December 31, 2021



### Rolling 12 Quarter Tracking Error vs Total Fixed Income Benchmark



### Risk Statistics Rankings vs Total Fixed Income Benchmark Rankings Against Callan Core Bond Fixed Income (Gross) Five Years Ended December 31, 2021



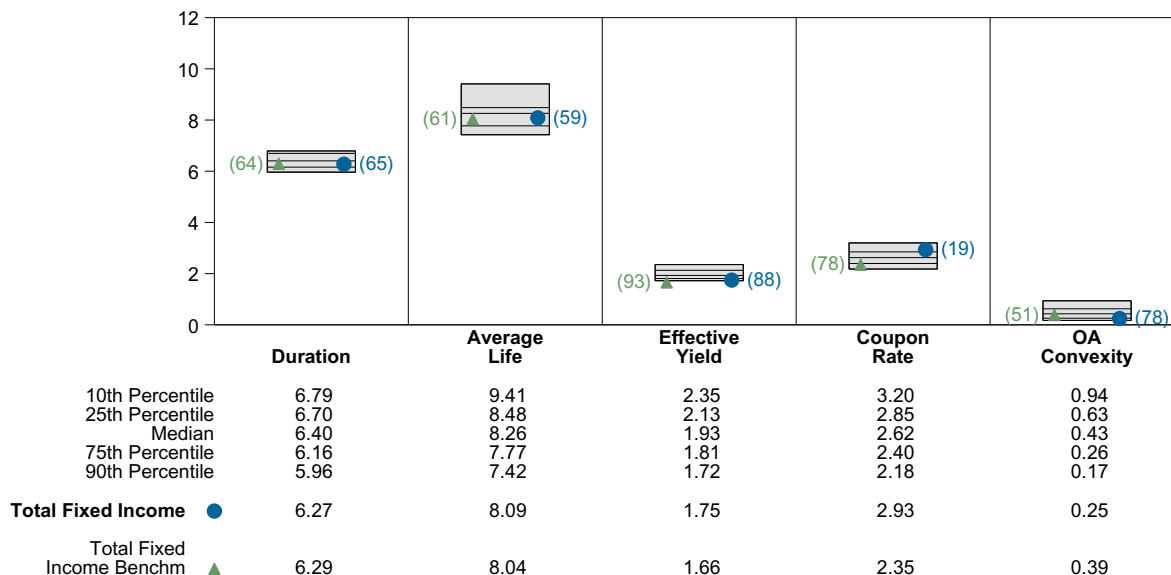


## Total Fixed Income Bond Characteristics Analysis Summary

### Portfolio Characteristics

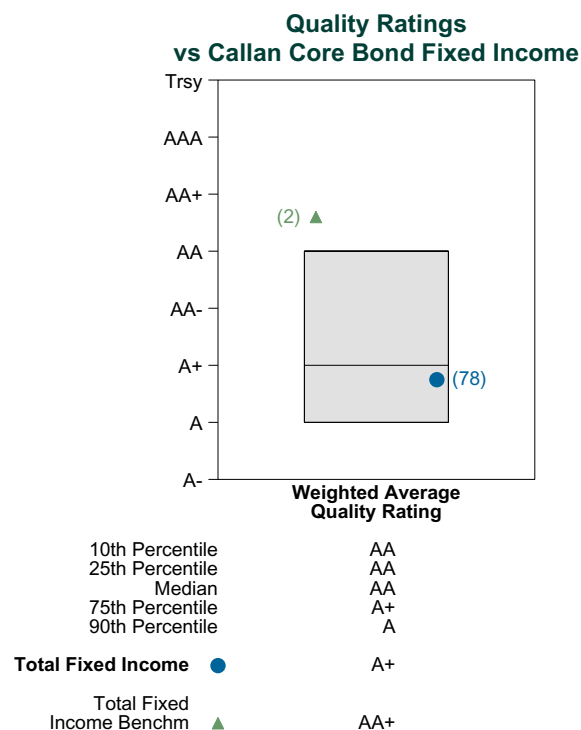
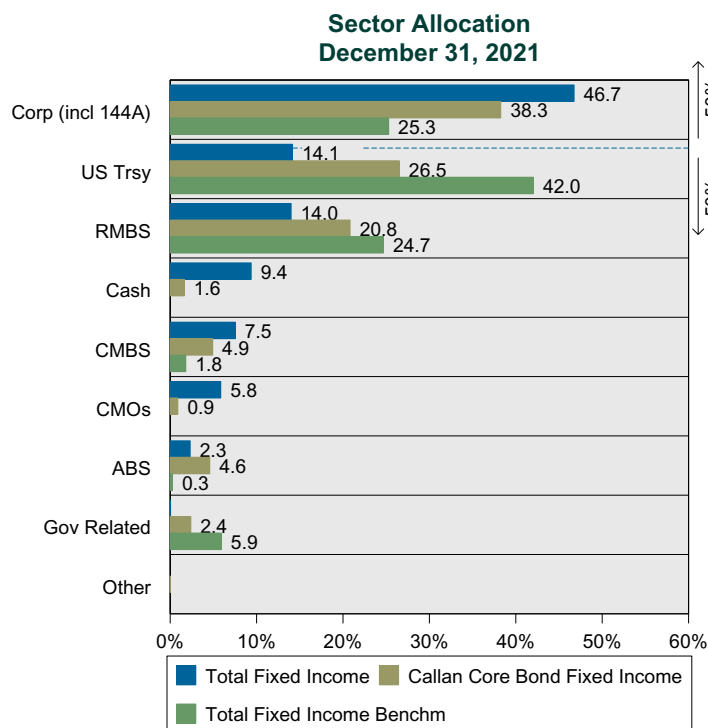
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style.

### Fixed Income Portfolio Characteristics Rankings Against Callan Core Bond Fixed Income as of December 31, 2021



### Sector Allocation and Quality Ratings

The first graph compares the manager's sector allocation with the average allocation across all the members of the manager's style. The second graph compares the manager's weighted average quality rating with the range of quality ratings for the style.

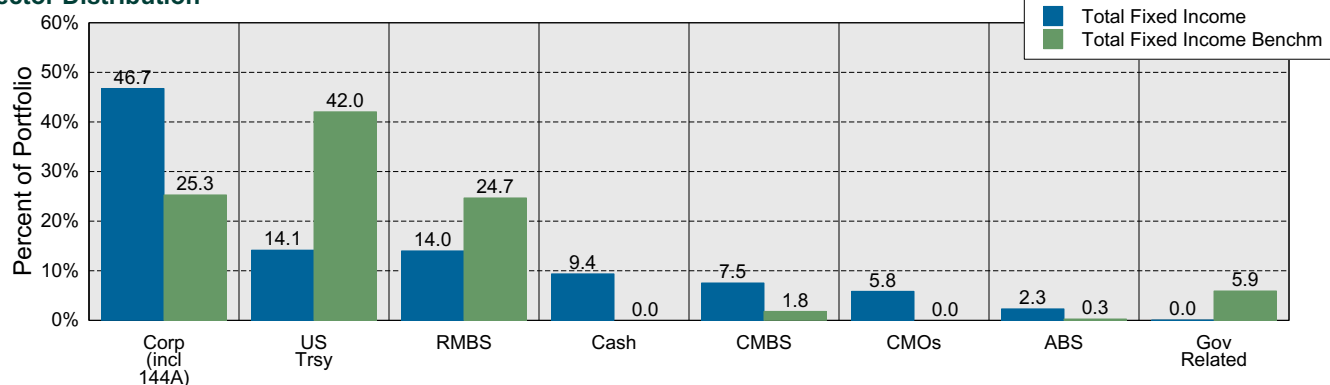


# Total Fixed Income Portfolio Characteristics Summary As of December 31, 2021

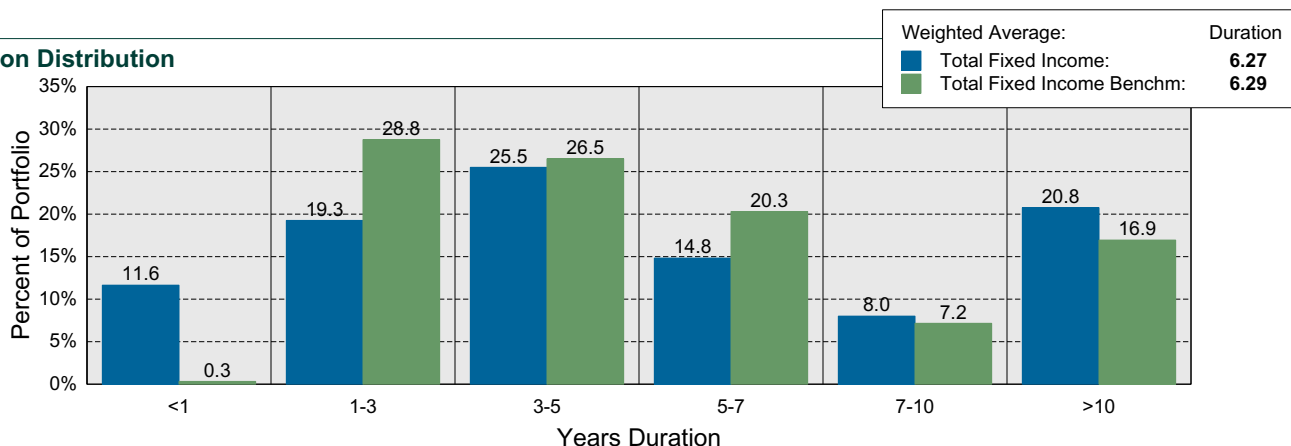
## Portfolio Structure Comparison

The charts below compare the structure of the portfolio to that of the index from the three perspectives that have the greatest influence on return. The first chart compares the two portfolios across sectors. The second chart compares the duration distribution. The last chart compares the distribution across quality ratings.

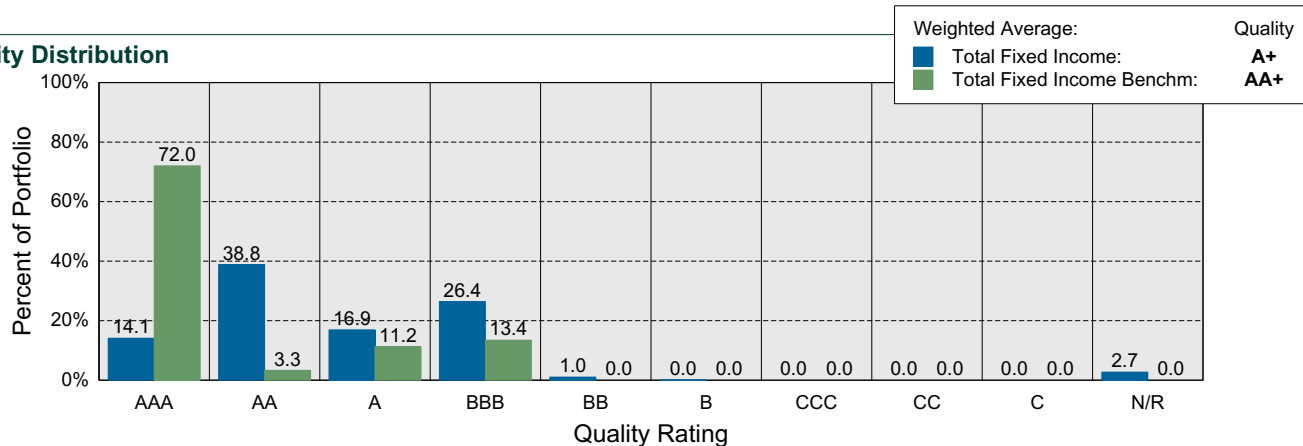
### Sector Distribution



### Duration Distribution



### Quality Distribution



## Colorado Treasurer's Portfolio Period Ended December 31, 2021

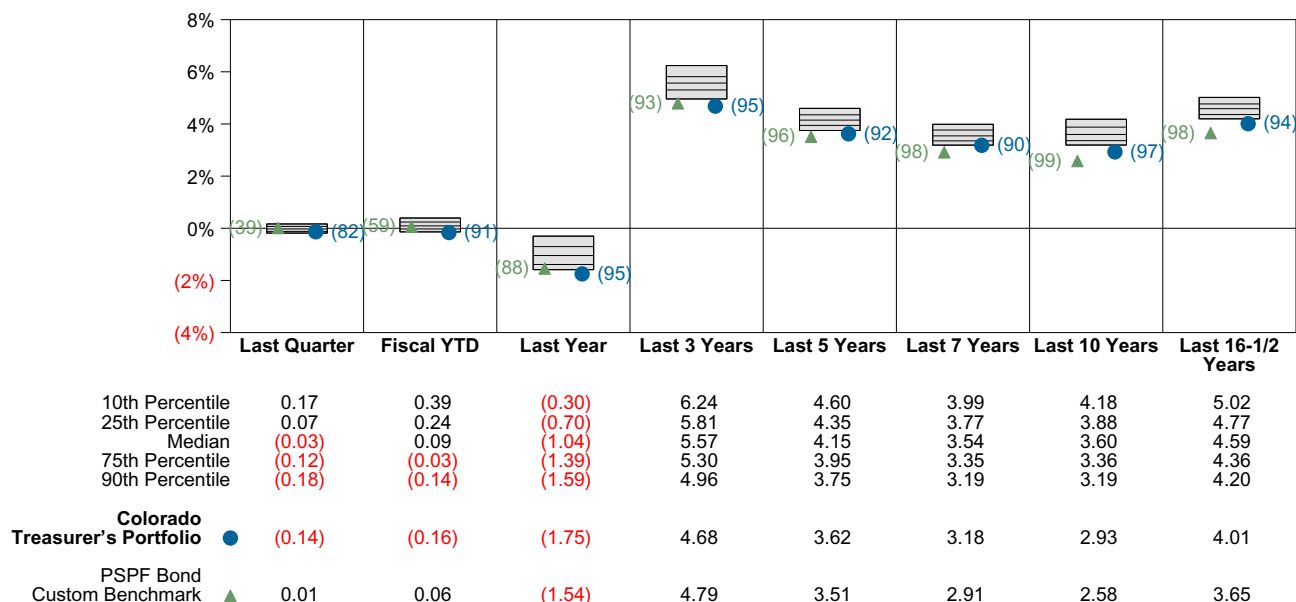
### Investment Philosophy

The Fixed Income Portfolio is managed by the Colorado State Treasury and was initially funded in 3Q 2005. The PSPF Custom Benchmark consisted of 37% U.S. Treasury 1-10 Year Index, 34% Mortgages 0-10 Year WAL Index, 19% AAA U.S. Agencies 1-10 Year Index and 10% U.S. Corporates AAA Rated 1-10 Years Index through March 31, 2017 and the Bloomberg U.S. Aggregate thereafter. It is important to note that the Fixed Income Portfolio has historically been managed under a buy and hold mandate for investment yield. The Callan Core Bond Fixed Income Manager Universe used to construct the floating bar chart exhibit below, representing 77 core fixed income managers and products, is largely composed of products following a total return mandate. The School Fund bond portfolio is subject to statutorily imposed net loss restrictions. As such, relative performance comparison of the Fixed Income Portfolio to this universe may not be entirely representative of relative performance.

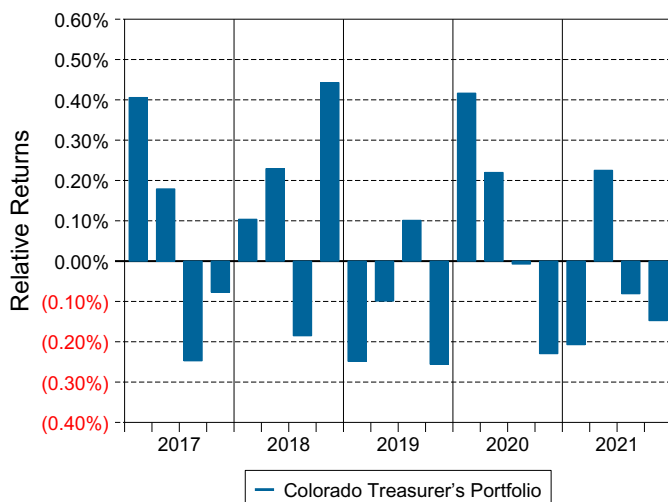
### Quarterly Summary and Highlights

- Colorado Treasurer's Portfolio's portfolio posted a (0.14)% return for the quarter placing it in the 82 percentile of the Callan Core Bond Fixed Income group for the quarter and in the 95 percentile for the last year.
- Colorado Treasurer's Portfolio's portfolio underperformed the PSPF Bond Custom Benchmark by 0.15% for the quarter and underperformed the PSPF Bond Custom Benchmark for the year by 0.21%.

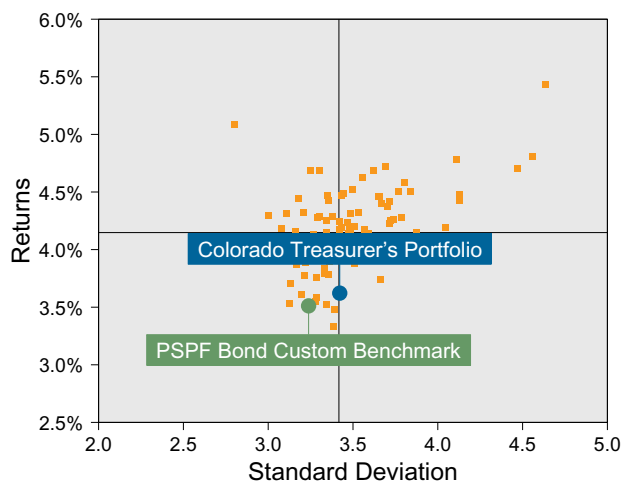
### Performance vs Callan Core Bond Fixed Income (Gross)



### Relative Returns vs PSPF Bond Custom Benchmark



### Callan Core Bond Fixed Income (Gross) Annualized Five Year Risk vs Return

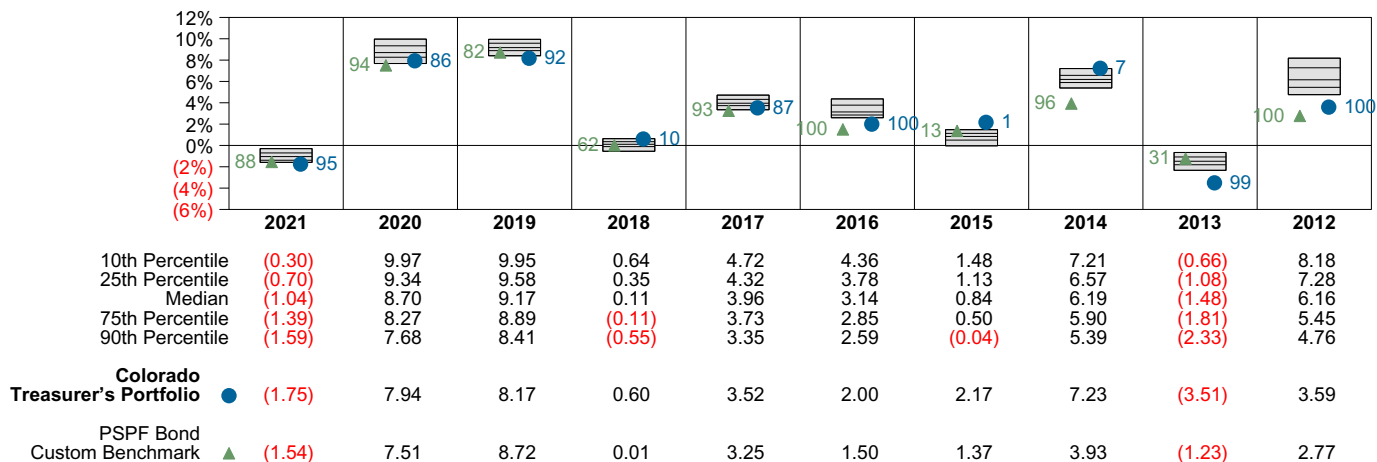


## Colorado Treasurer's Portfolio Return Analysis Summary

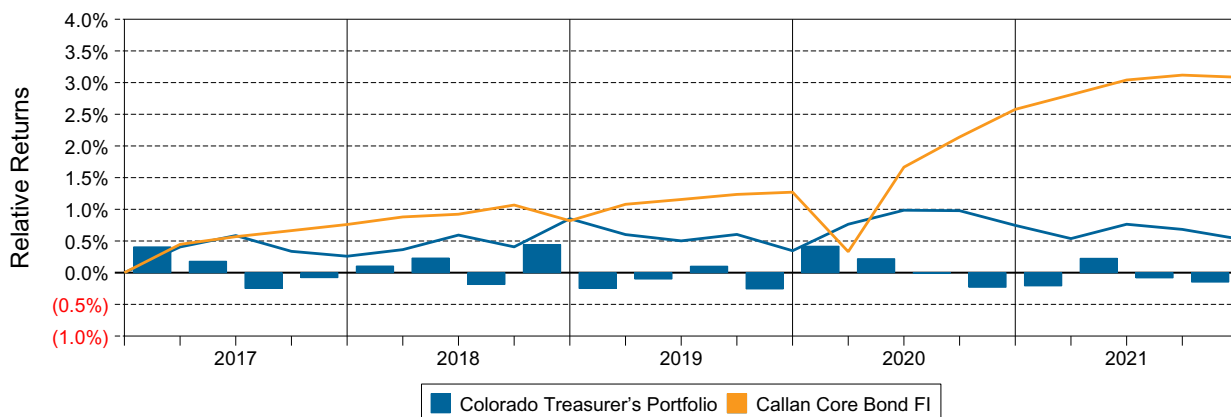
### Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

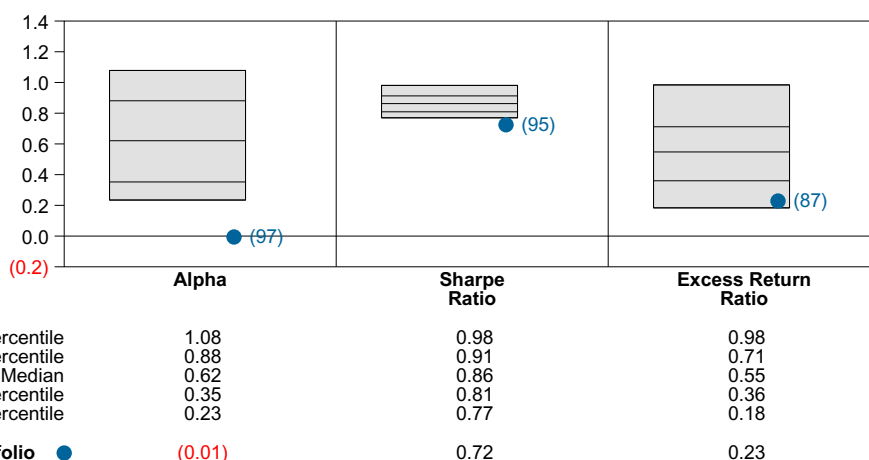
### Performance vs Callan Core Bond Fixed Income (Gross)



### Cumulative and Quarterly Relative Return vs PSPF Bond Custom Benchmark



### Risk Adjusted Return Measures vs PSPF Bond Custom Benchmark Rankings Against Callan Core Bond Fixed Income (Gross) Five Years Ended December 31, 2021

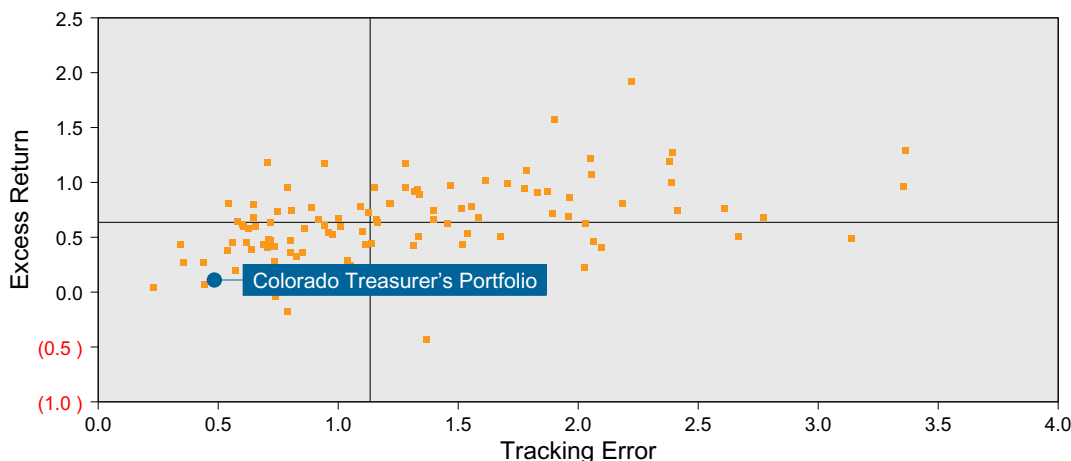


## Colorado Treasurer's Portfolio Risk Analysis Summary

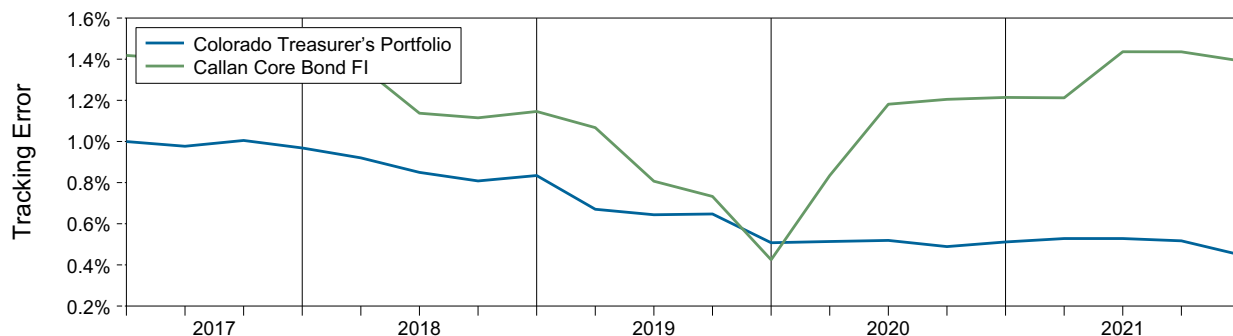
### Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

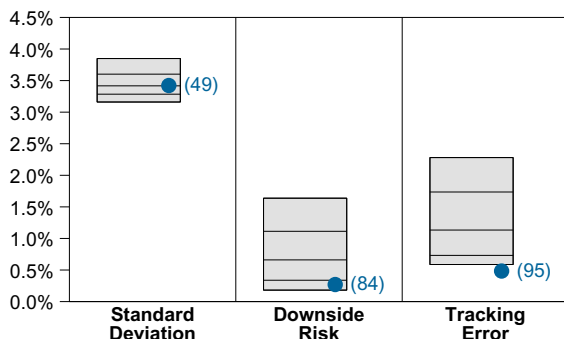
### Risk Analysis vs Callan Core Bond Fixed Income (Gross) Five Years Ended December 31, 2021



### Rolling 12 Quarter Tracking Error vs PSPF Bond Custom Benchmark



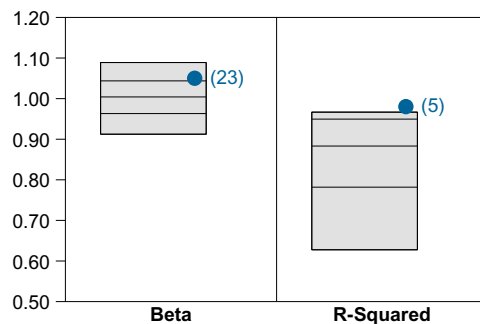
### Risk Statistics Rankings vs PSPF Bond Custom Benchmark Rankings Against Callan Core Bond Fixed Income (Gross) Five Years Ended December 31, 2021



10th Percentile	3.85
25th Percentile	3.60
Median	3.42
75th Percentile	3.28
90th Percentile	3.16

10th Percentile	1.64
25th Percentile	1.11
Median	0.66
75th Percentile	0.34
90th Percentile	0.18

10th Percentile	2.28
25th Percentile	1.74
Median	1.13
75th Percentile	0.73
90th Percentile	0.59



10th Percentile	1.09
25th Percentile	1.04
Median	1.00
75th Percentile	0.96
90th Percentile	0.91

10th Percentile	0.97
25th Percentile	0.95
Median	0.88
75th Percentile	0.78
90th Percentile	0.63

Colorado Treasurer's Portfolio ●

3.42

0.27

0.48

Colorado Treasurer's Portfolio ●

1.05

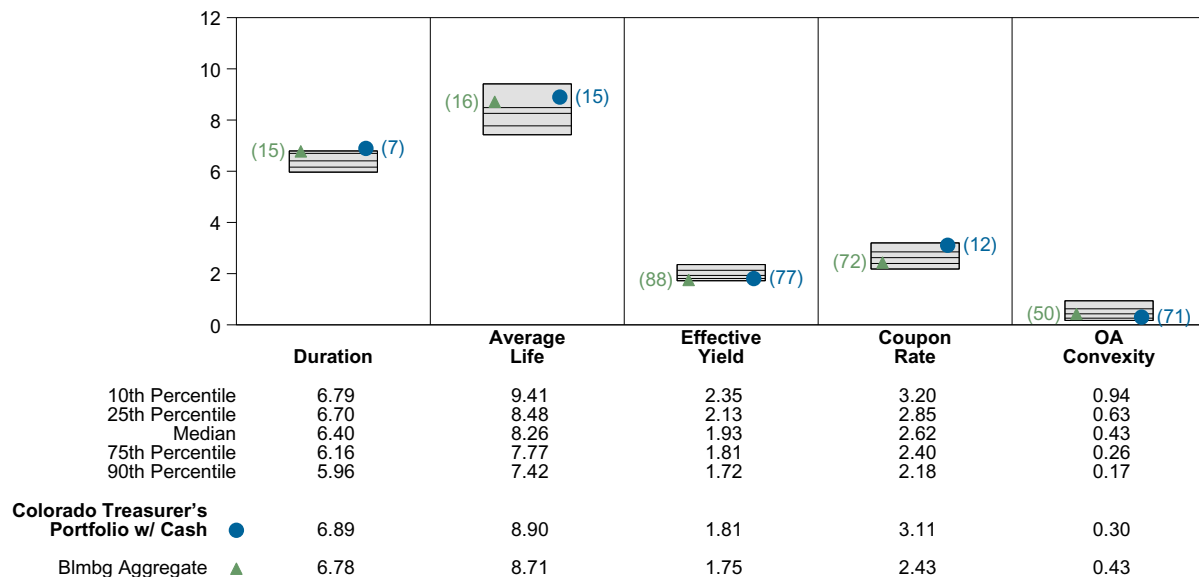
0.98

## Colorado Treasurer's Portfolio w/ Cash Bond Characteristics Analysis Summary

### Portfolio Characteristics

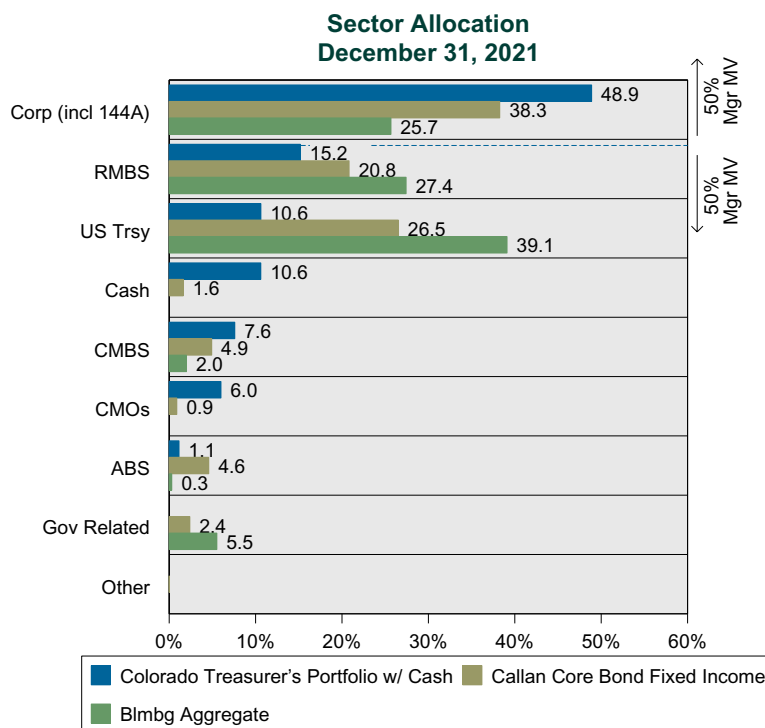
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style. Fixed Income Portfolio characteristics includes Cash Pool allocation.

### Fixed Income Portfolio Characteristics Rankings Against Callan Core Bond Fixed Income as of December 31, 2021

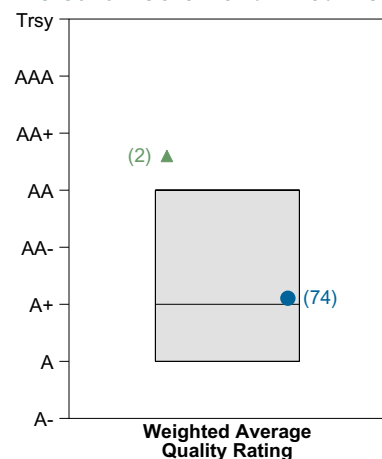


### Sector Allocation and Quality Ratings

The first graph compares the manager's sector allocation with the average allocation across all the members of the manager's style. The second graph compares the manager's weighted average quality rating with the range of quality ratings for the style.



#### Quality Ratings vs Callan Core Bond Fixed Income



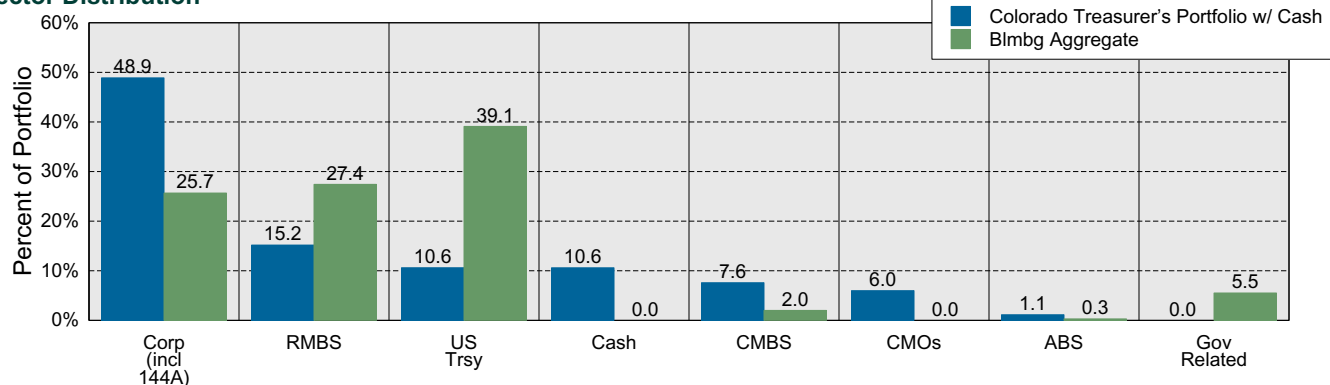
10th Percentile	AA
25th Percentile	AA
Median	AA
75th Percentile	A+
90th Percentile	A
Colorado Treasurer's Portfolio w/ Cash	A+
Blmbg Aggregate	AA+

# Colorado Treasurer's Portfolio w/ Cash Portfolio Characteristics Summary As of December 31, 2021

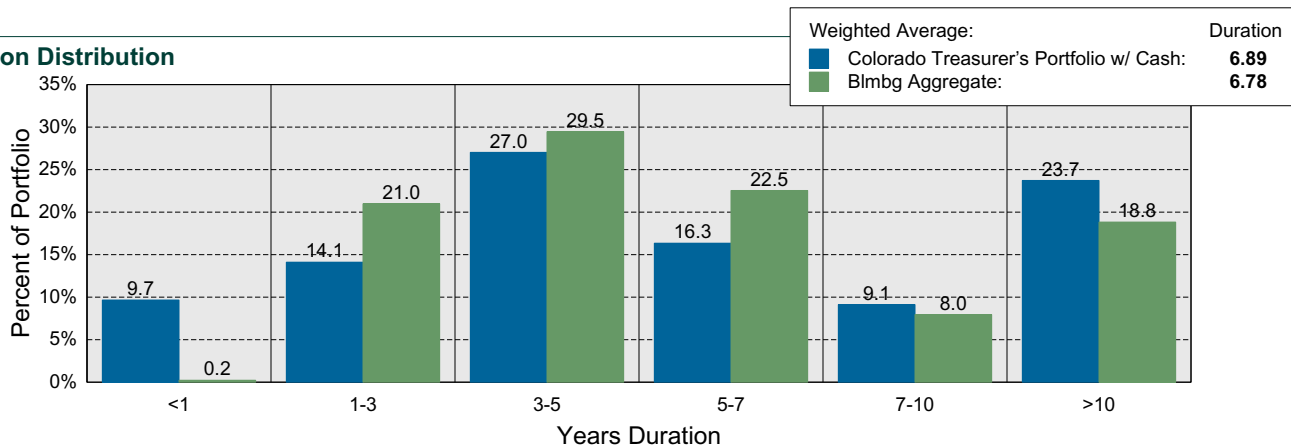
## Portfolio Structure Comparison

The charts below compare the structure of the portfolio to that of the index from the three perspectives that have the greatest influence on return. The first chart compares the two portfolios across sectors. The second chart compares the duration distribution. The last chart compares the distribution across quality ratings.

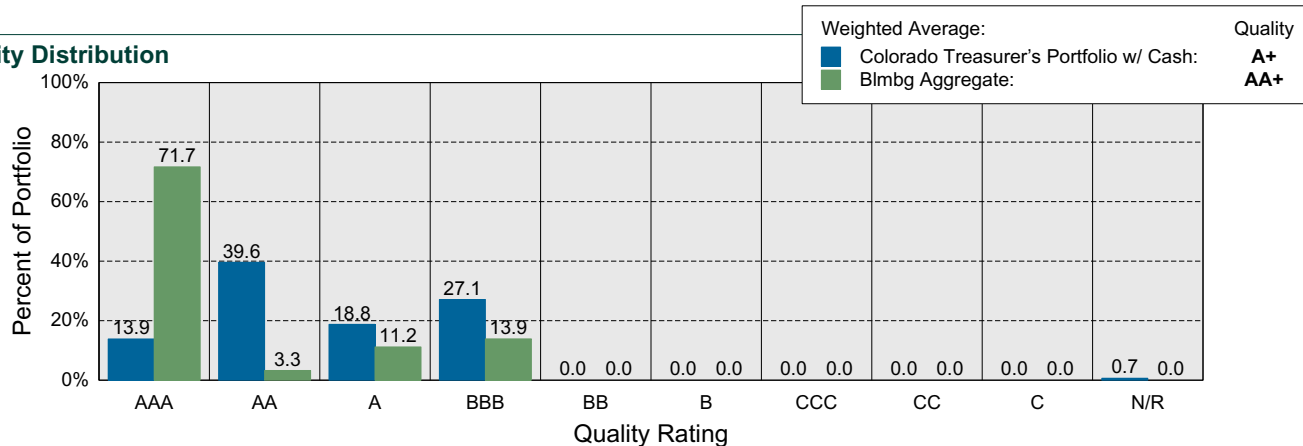
### Sector Distribution



### Duration Distribution



### Quality Distribution



## Janus Henderson Short Duration Period Ended December 31, 2021

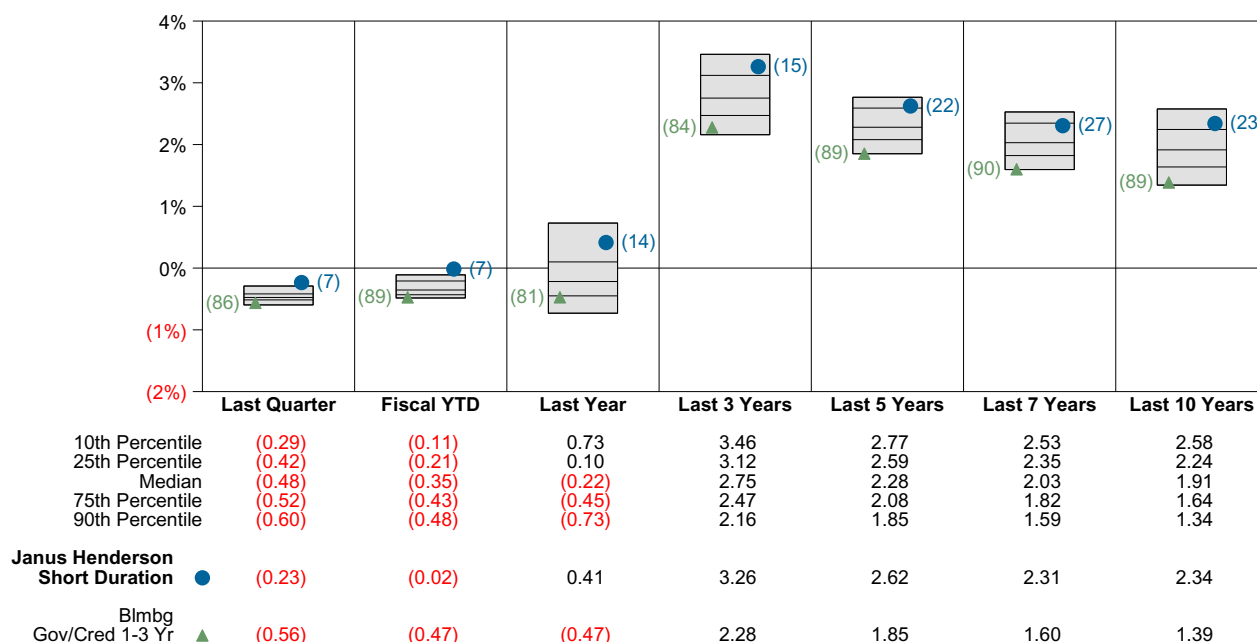
### Investment Philosophy

Janus Henderson believes a bottom-up, fundamentally driven investment process that focuses on credit-oriented investments can generate risk-adjusted outperformance over time. A comprehensive bottom-up view drives decision-making at a macro level, enabling them to make informed decisions about allocations to all sectors of the fixed income universe. The Short Duration Fixed Income strategy emphasizes risk-adjusted performance and capital preservation with value generated principally from prudent credit selection and credit sector positioning. The Janus Henderson short duration portfolio was funded November 9th, 2018. Prior returns represent the manager's composite returns.

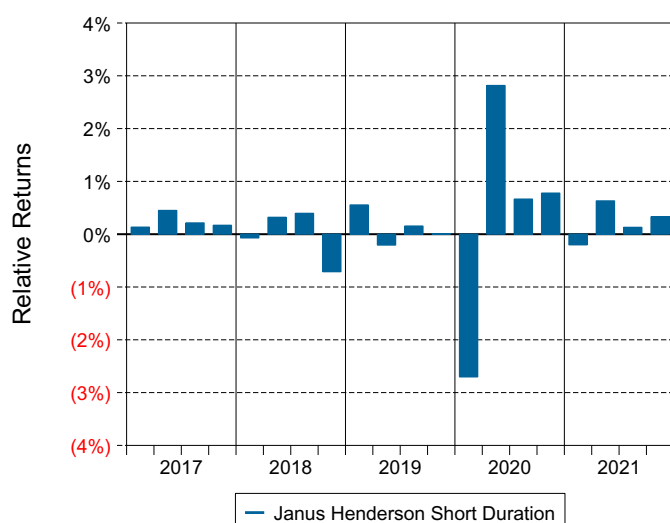
### Quarterly Summary and Highlights

- Janus Henderson Short Duration's portfolio posted a (0.23)% return for the quarter placing it in the 7 percentile of the Callan Short Term Fixed Income group for the quarter and in the 14 percentile for the last year.
- Janus Henderson Short Duration's portfolio outperformed the Blmbg Gov/Cred 1-3 Yr by 0.33% for the quarter and outperformed the Blmbg Gov/Cred 1-3 Yr for the year by 0.89%.

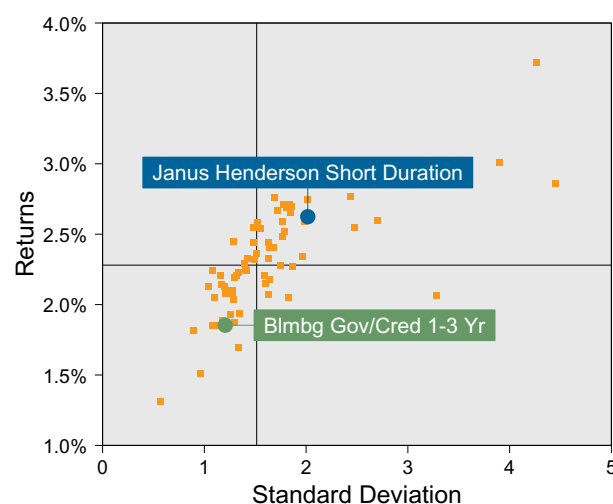
### Performance vs Callan Short Term Fixed Income (Gross)



### Relative Return vs Blmbg Gov/Cred 1-3 Yr



### Callan Short Term Fixed Income (Gross) Annualized Five Year Risk vs Return



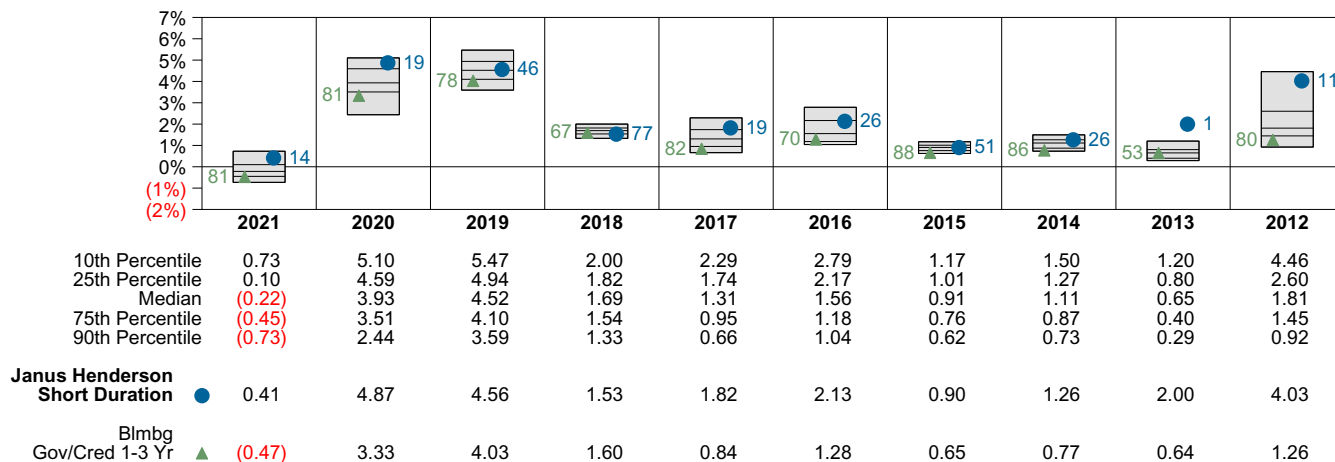


# Janus Henderson Short Duration Return Analysis Summary

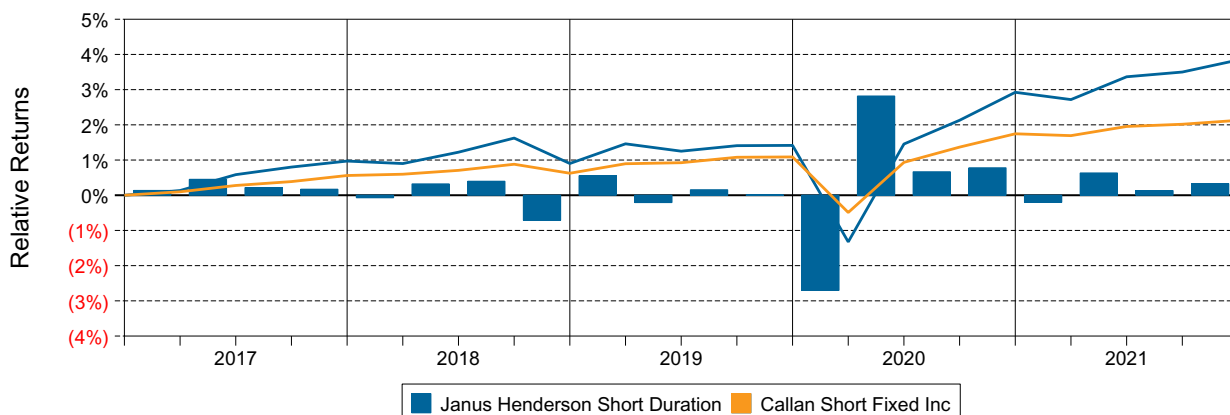
## Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

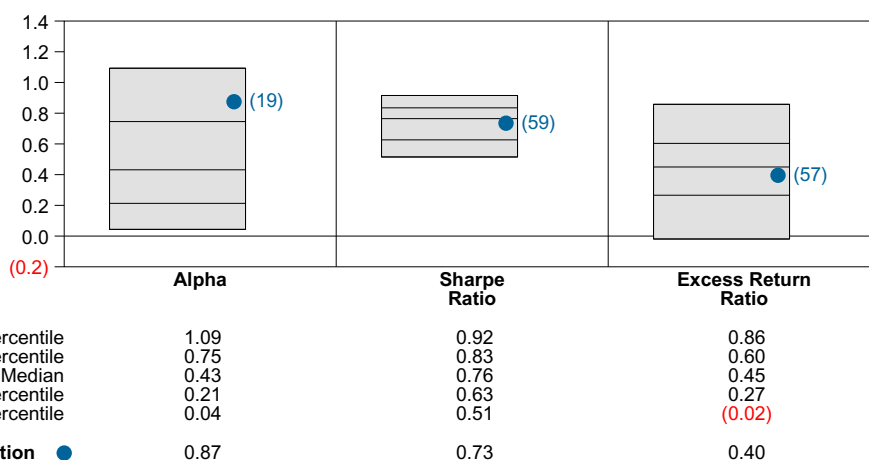
## Performance vs Callan Short Term Fixed Income (Gross)



## Cumulative and Quarterly Relative Return vs Bimbg Gov/Cred 1-3 Yr



## Risk Adjusted Return Measures vs Bimbg Gov/Cred 1-3 Yr Rankings Against Callan Short Term Fixed Income (Gross) Five Years Ended December 31, 2021

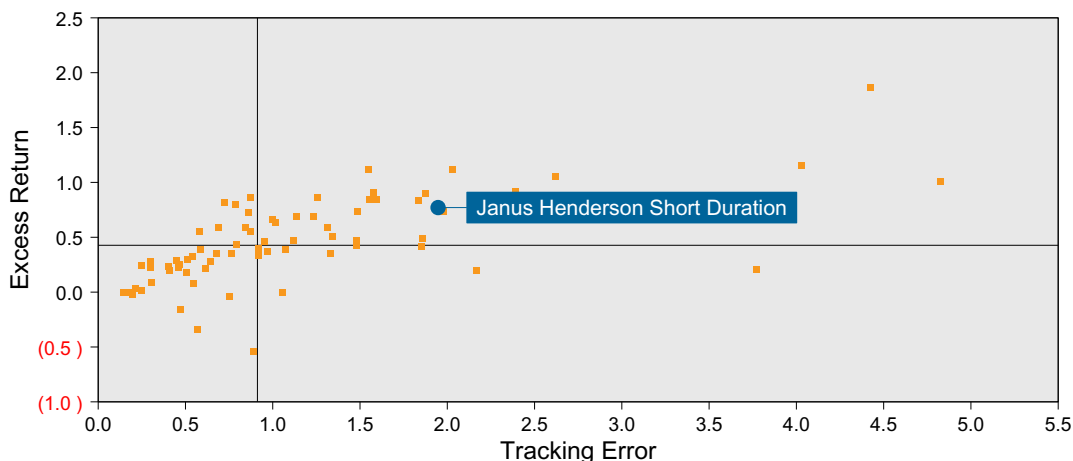


## Janus Henderson Short Duration Risk Analysis Summary

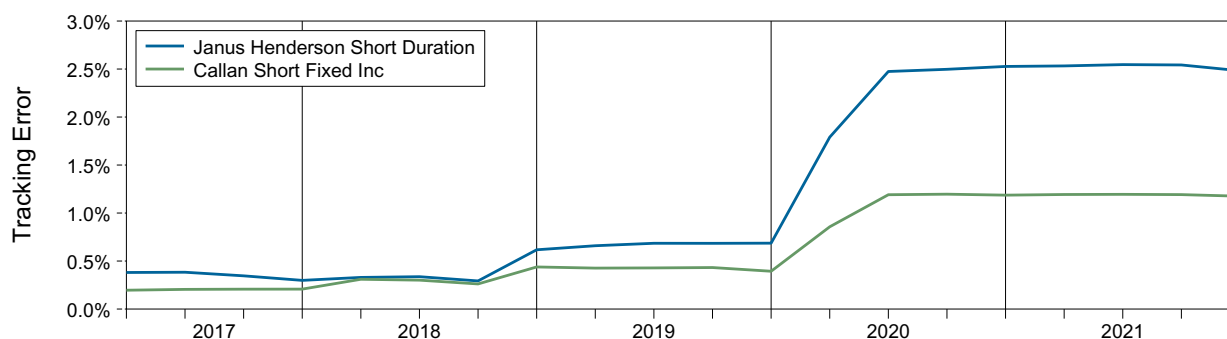
### Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

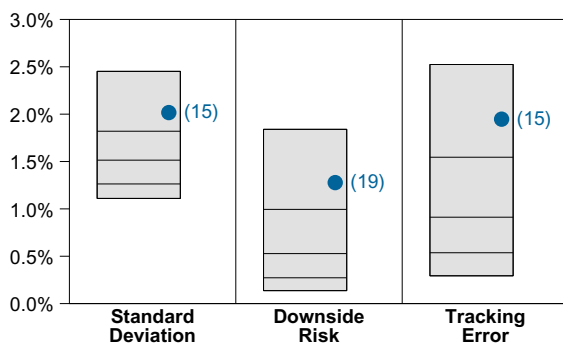
### Risk Analysis vs Callan Short Term Fixed Income (Gross) Five Years Ended December 31, 2021



### Rolling 12 Quarter Tracking Error vs Blmbg Gov/Cred 1-3 Yr

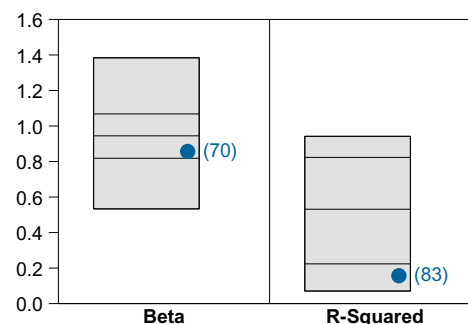


### Risk Statistics Rankings vs Blmbg Gov/Cred 1-3 Yr Rankings Against Callan Short Term Fixed Income (Gross) Five Years Ended December 31, 2021



10th Percentile	2.45	1.84	2.52
25th Percentile	1.82	0.99	1.55
Median	1.51	0.53	0.91
75th Percentile	1.26	0.27	0.54
90th Percentile	1.11	0.14	0.29

Janus Henderson Short Duration ● 2.02 1.28 1.95



10th Percentile	1.38	0.94
25th Percentile	1.07	0.82
Median	0.94	0.53
75th Percentile	0.82	0.22
90th Percentile	0.53	0.07

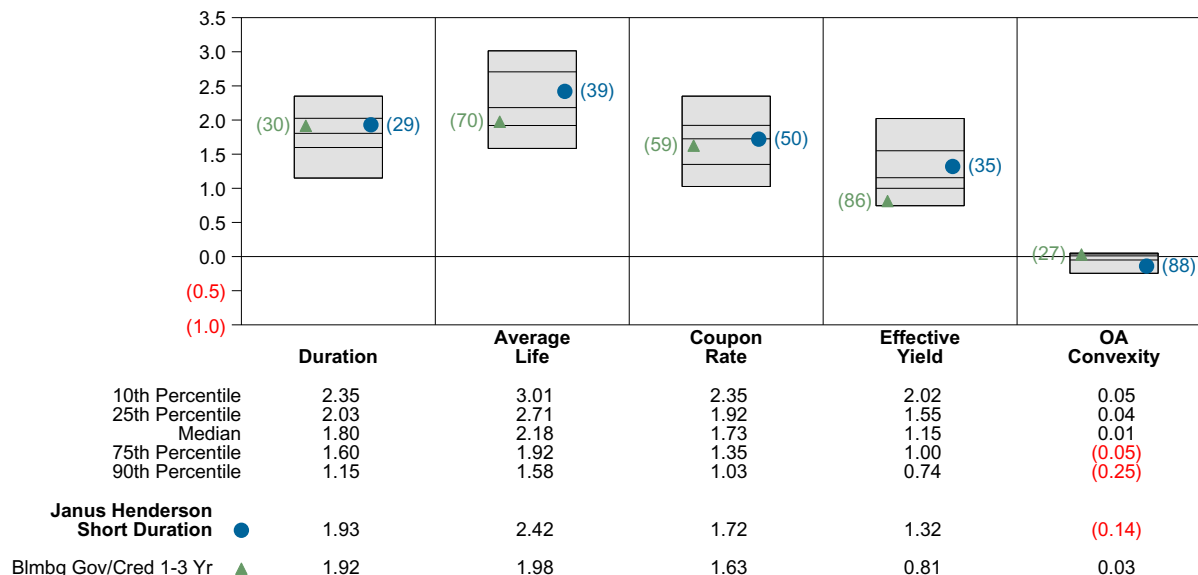
Janus Henderson Short Duration ● 0.86 0.16

# Janus Henderson Short Duration Bond Characteristics Analysis Summary

## Portfolio Characteristics

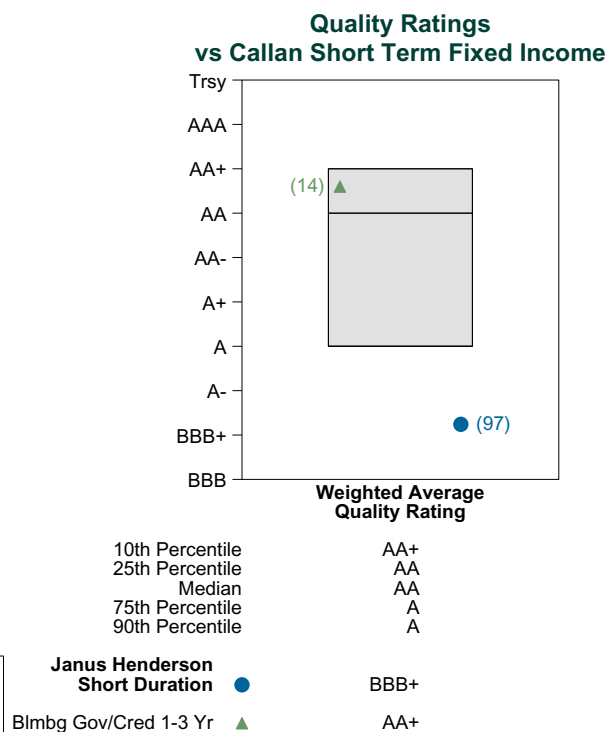
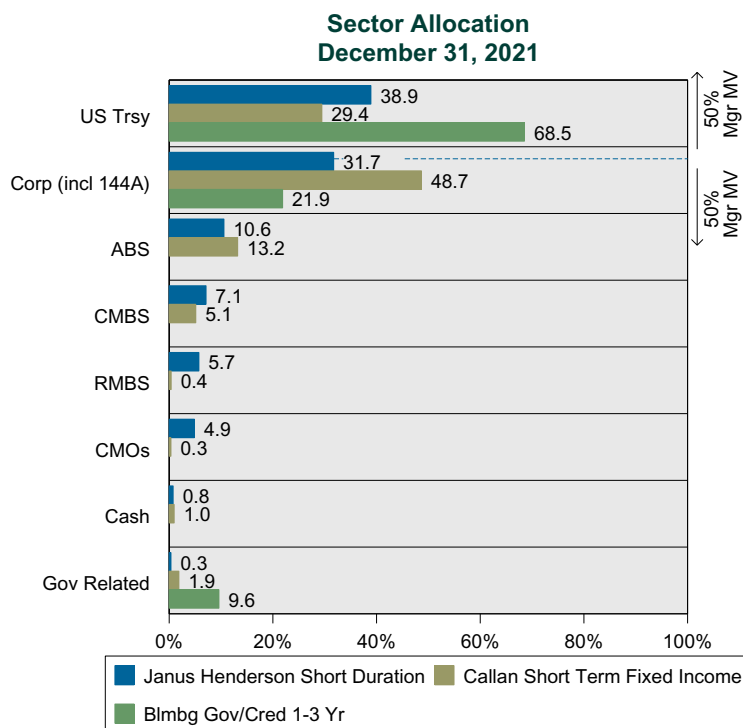
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style. Fixed Income Portfolio characteristics includes Cash Pool allocation.

## Fixed Income Portfolio Characteristics Rankings Against Callan Short Term Fixed Income as of December 31, 2021



## Sector Allocation and Quality Ratings

The first graph compares the manager's sector allocation with the average allocation across all the members of the manager's style. The second graph compares the manager's weighted average quality rating with the range of quality ratings for the style.

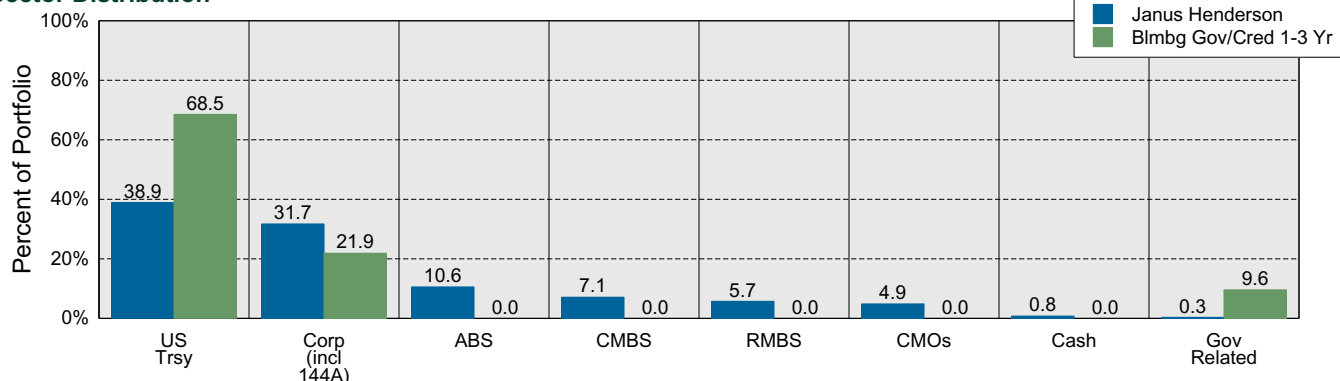


# Janus Henderson Portfolio Characteristics Summary As of December 31, 2021

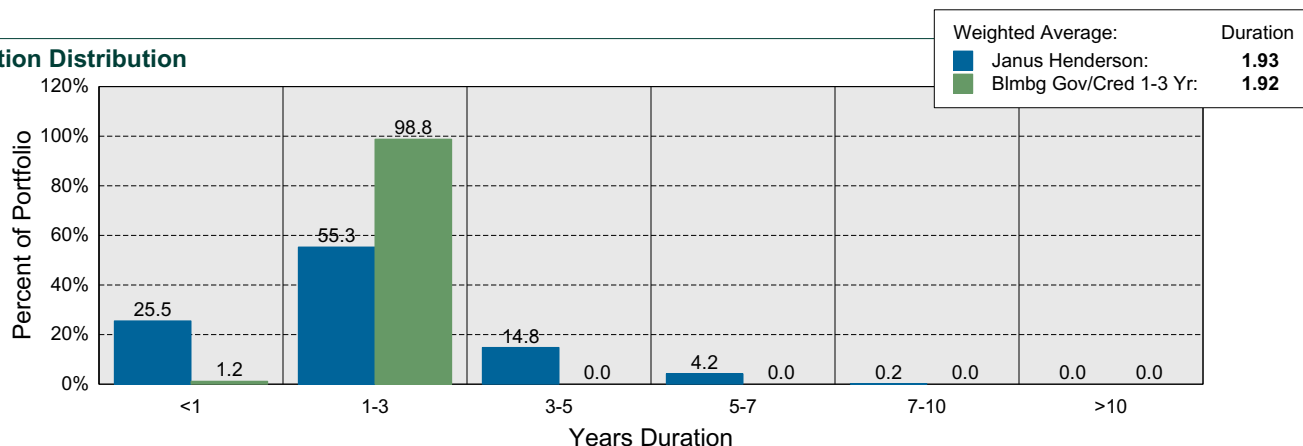
## Portfolio Structure Comparison

The charts below compare the structure of the portfolio to that of the index from the three perspectives that have the greatest influence on return. The first chart compares the two portfolios across sectors. The second chart compares the duration distribution. The last chart compares the distribution across quality ratings.

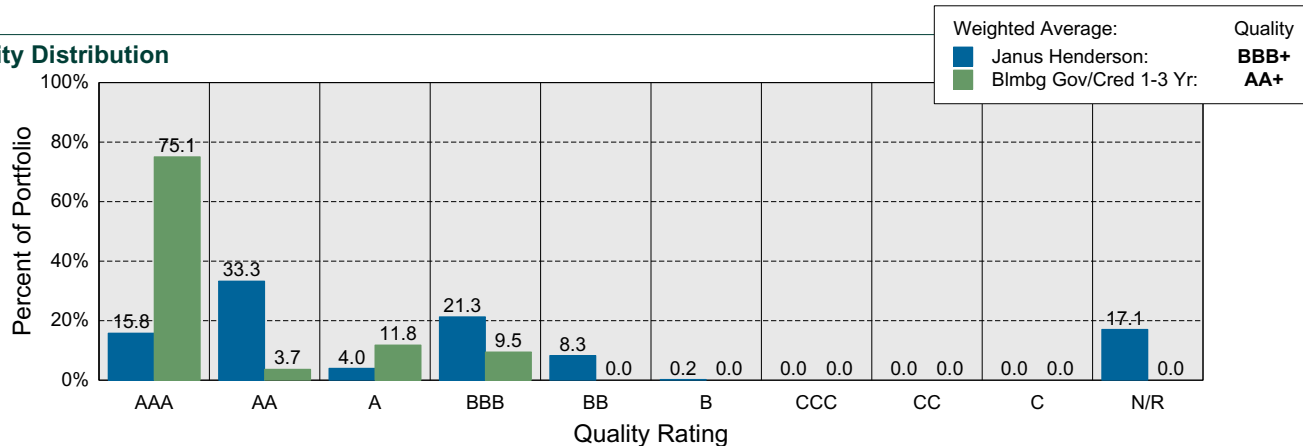
### Sector Distribution



### Duration Distribution



### Quality Distribution





## High Income Strategies Period Ended December 31, 2021

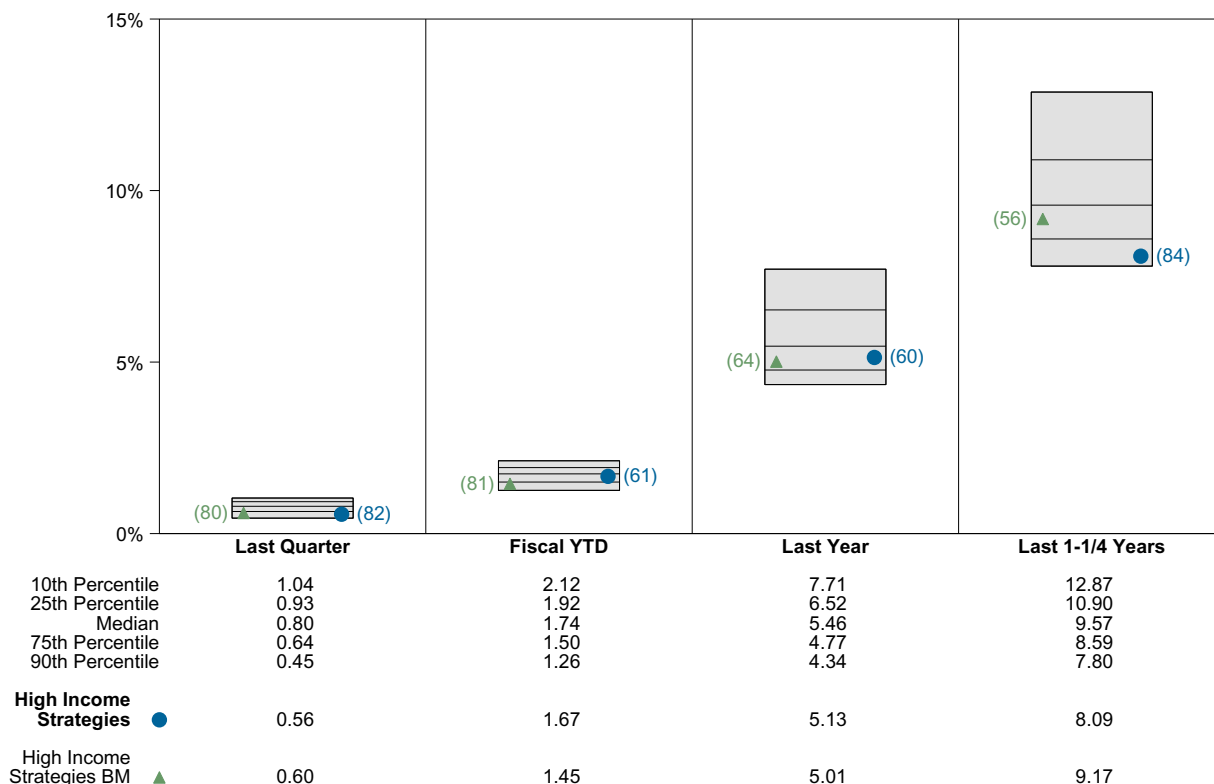
### Benchmark Definition

The High Income Strategies Benchmark consists of 85% Blmbg High Yield Index and 15% ICE BofA US All Cap Secs Index.

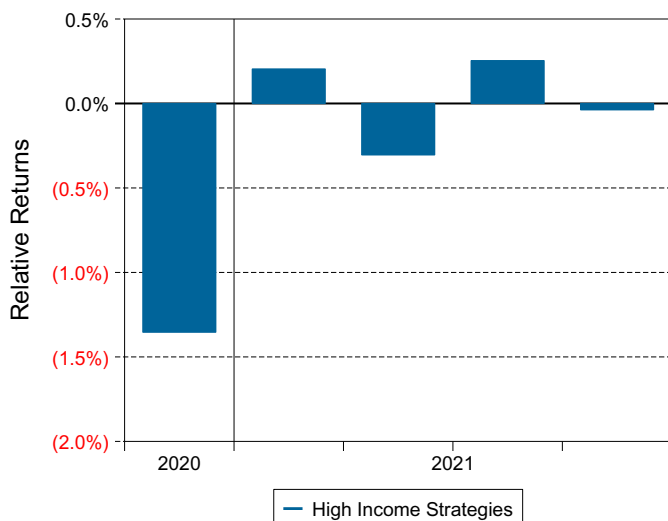
### Quarterly Summary and Highlights

- High Income Strategies's portfolio posted a 0.56% return for the quarter placing it in the 82 percentile of the Callan High Yield Fixed Income group for the quarter and in the 60 percentile for the last year.
- High Income Strategies's portfolio underperformed the High Income Strategies BM by 0.04% for the quarter and outperformed the High Income Strategies BM for the year by 0.12%.

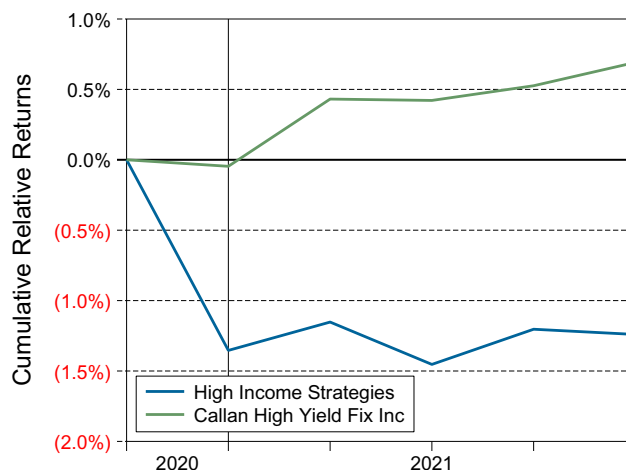
### Performance vs Callan High Yield Fixed Income (Gross)



### Relative Return vs High Income Strategies BM



### Cumulative Returns vs High Income Strategies BM



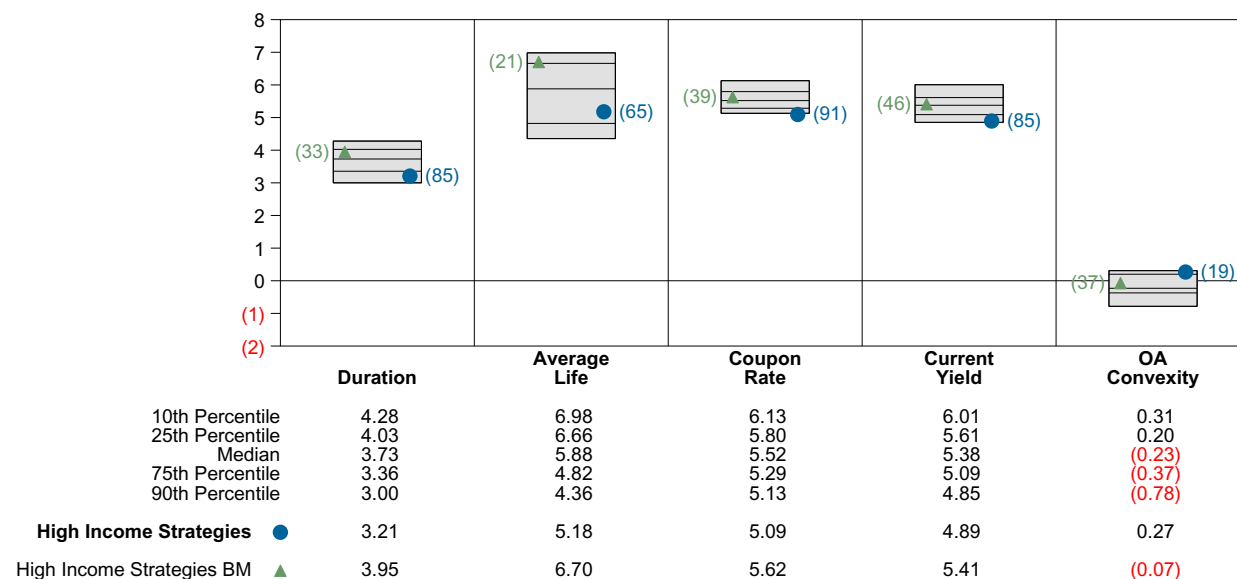
# High Income Strategies

## Bond Characteristics Analysis Summary

### Portfolio Characteristics

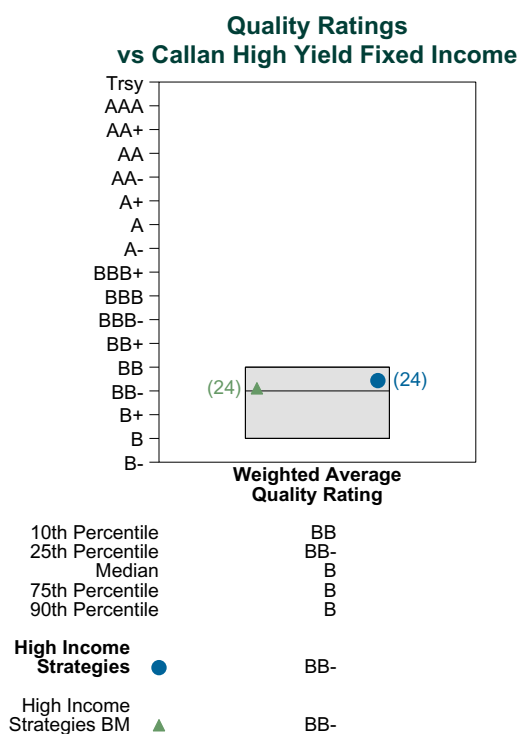
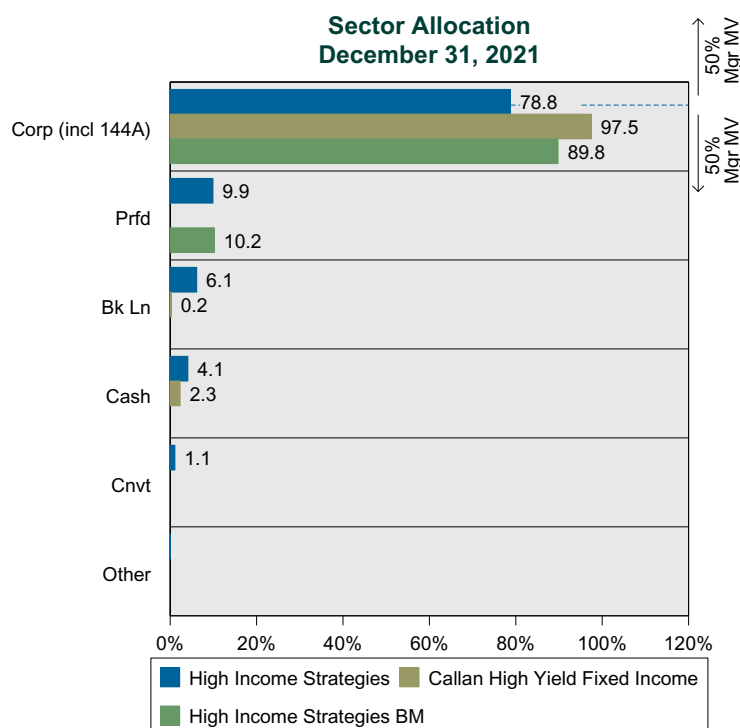
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style. Fixed Income Portfolio characteristics includes Cash Pool allocation.

### Fixed Income Portfolio Characteristics Rankings Against Callan High Yield Fixed Income as of December 31, 2021



### Sector Allocation and Quality Ratings

The first graph compares the manager's sector allocation with the average allocation across all the members of the manager's style. The second graph compares the manager's weighted average quality rating with the range of quality ratings for the style.

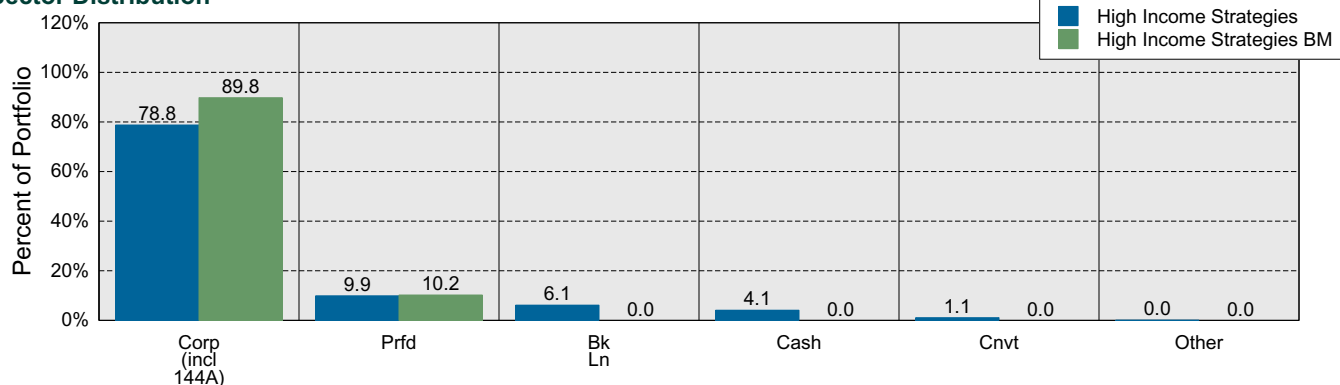


# High Income Strategies Portfolio Characteristics Summary As of December 31, 2021

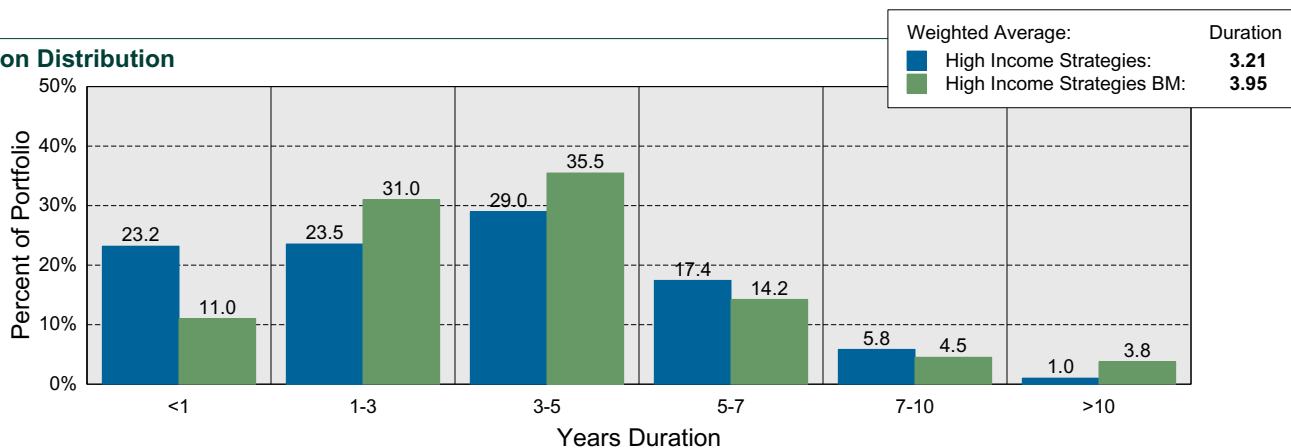
## Portfolio Structure Comparison

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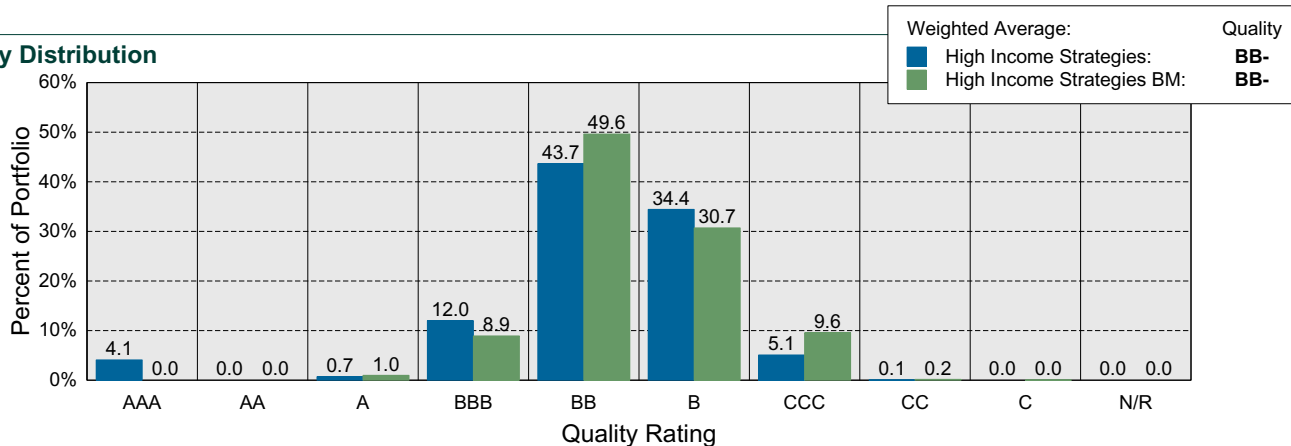
### Sector Distribution



### Duration Distribution



### Quality Distribution





## Mackay Shield US High Yield Period Ended December 31, 2021

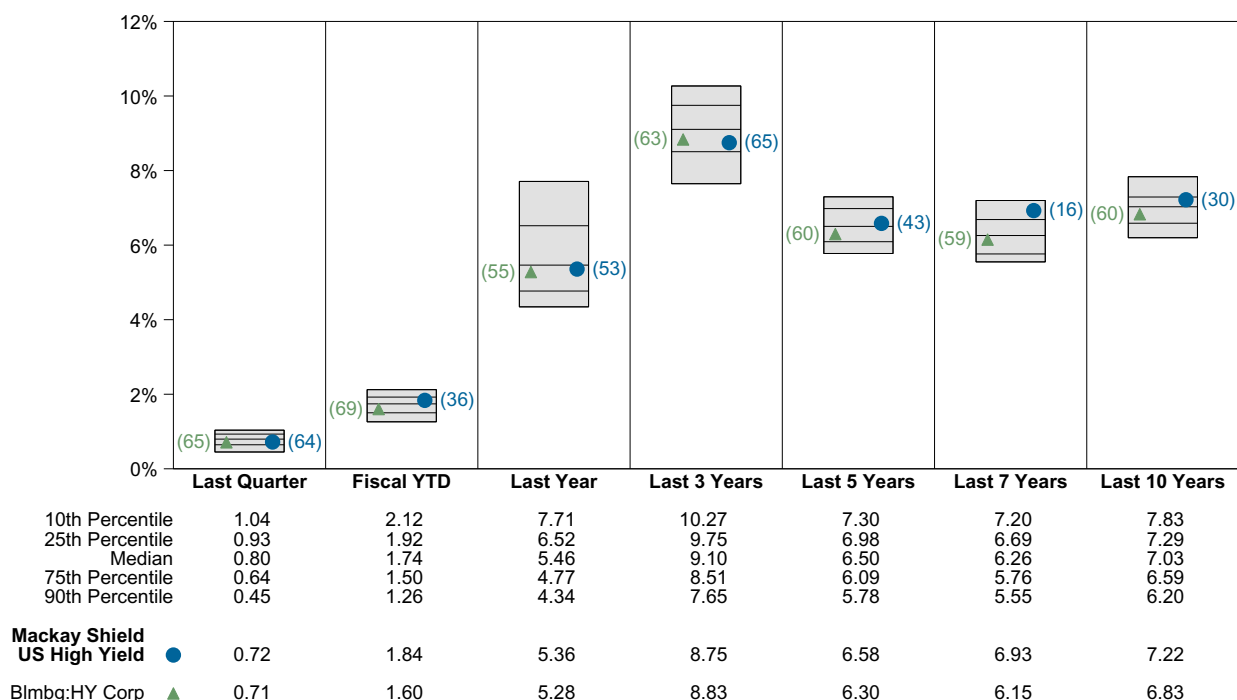
### Investment Philosophy

Mackay relies on rigorous fundamental analysis to select companies with strong free cash flow and asset coverage in its quest to maximize yield, adjusted for default risk. The strategy is well diversified with sector and quality weights a residual of the security selection process. Mackay believes that long-term value is best created by avoiding downside risk (i.e. defaults) while selecting companies with attractive valuations and a catalyst for spread compression. Mackay Shield US High Yield was funded July 24, 2020. Returns prior to inception reflect the manager's high yield composite returns.

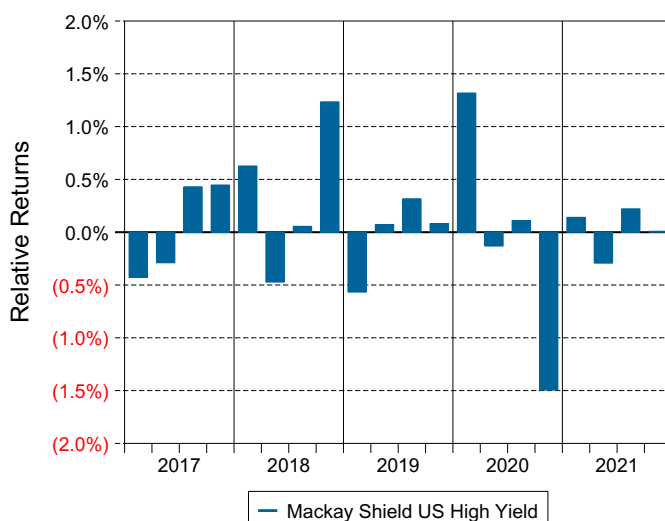
### Quarterly Summary and Highlights

- Mackay Shield US High Yield's portfolio posted a 0.72% return for the quarter placing it in the 64 percentile of the Callan High Yield Fixed Income group for the quarter and in the 53 percentile for the last year.
- Mackay Shield US High Yield's portfolio outperformed the Blmbg:HY Corp by 0.01% for the quarter and outperformed the Blmbg:HY Corp for the year by 0.08%.

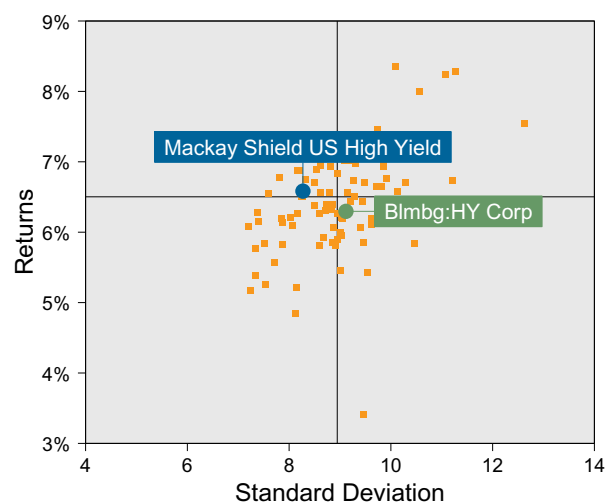
### Performance vs Callan High Yield Fixed Income (Gross)



### Relative Return vs Blmbg:HY Corp



### Callan High Yield Fixed Income (Gross) Annualized Five Year Risk vs Return

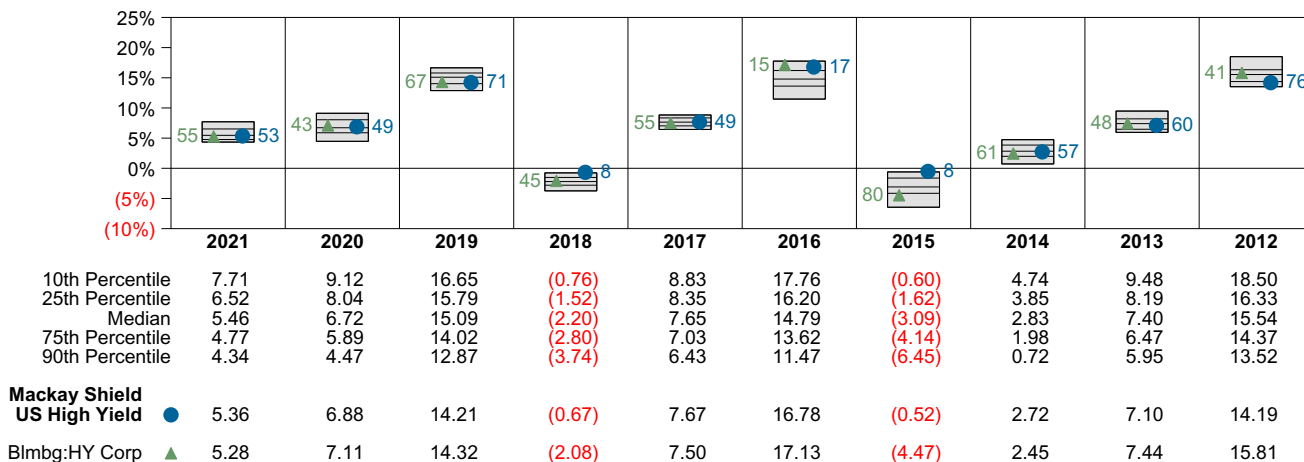


## Mackay Shield US High Yield Return Analysis Summary

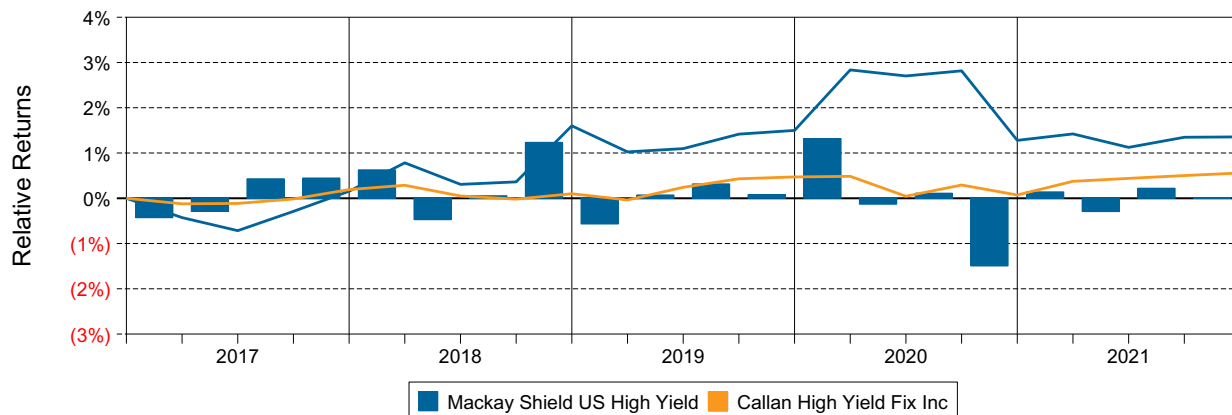
### Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

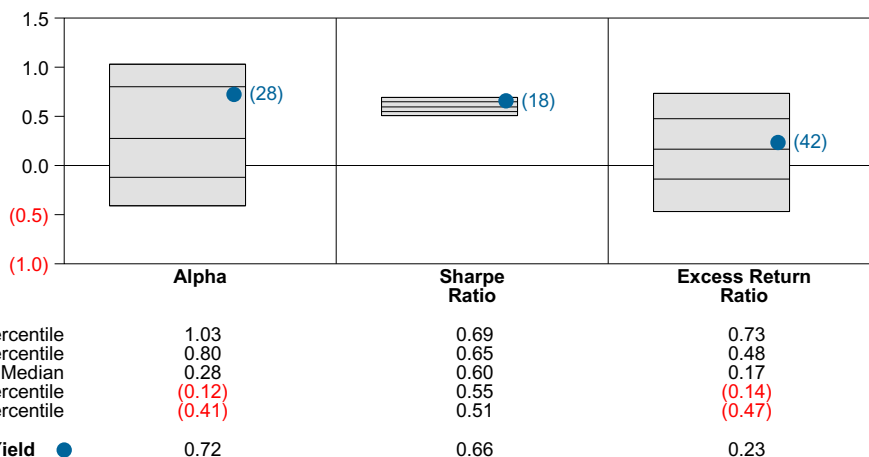
### Performance vs Callan High Yield Fixed Income (Gross)



### Cumulative and Quarterly Relative Return vs Bmbg:HY Corp



### Risk Adjusted Return Measures vs Bmbg:HY Corp Rankings Against Callan High Yield Fixed Income (Gross) Five Years Ended December 31, 2021

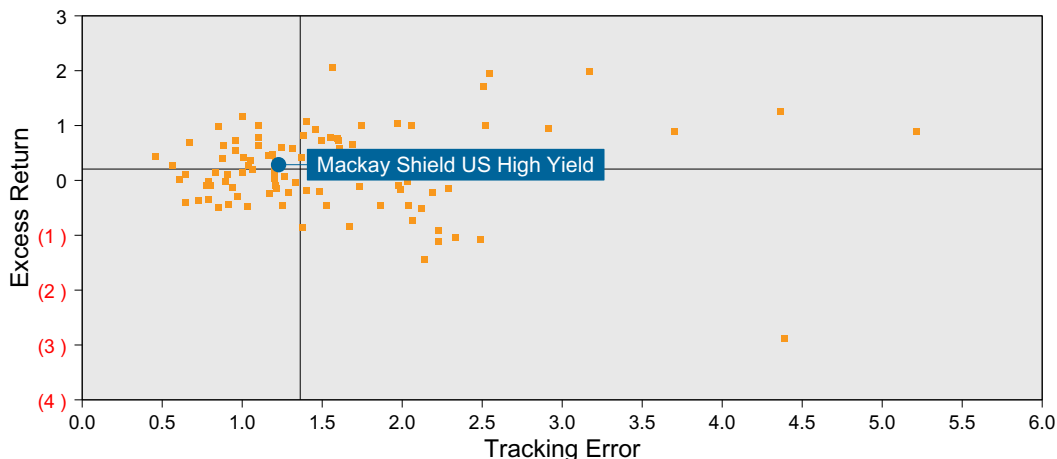


## Mackay Shield US High Yield Risk Analysis Summary

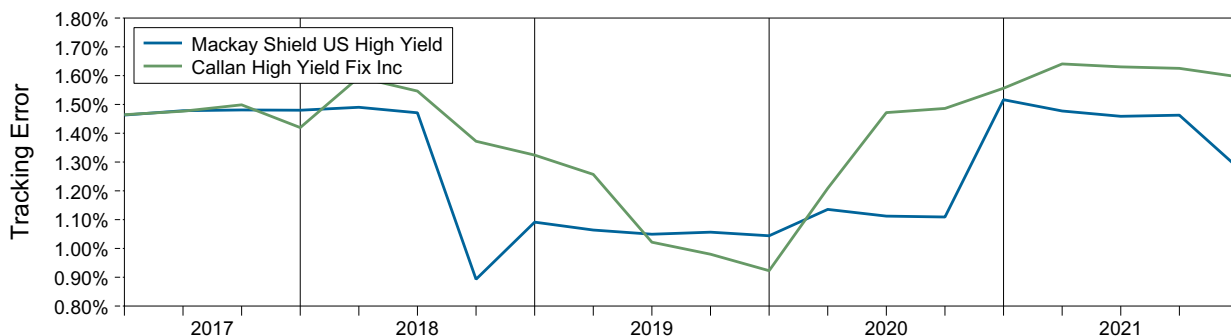
### Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

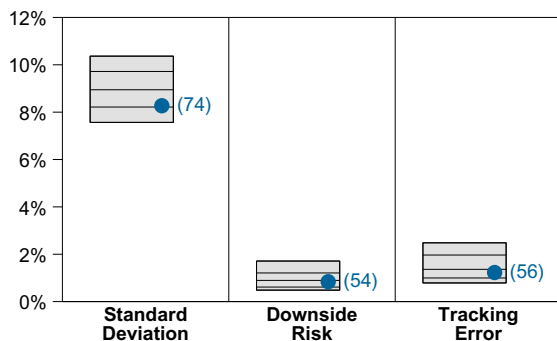
### Risk Analysis vs Callan High Yield Fixed Income (Gross) Five Years Ended December 31, 2021



### Rolling 12 Quarter Tracking Error vs Blmbg:HY Corp

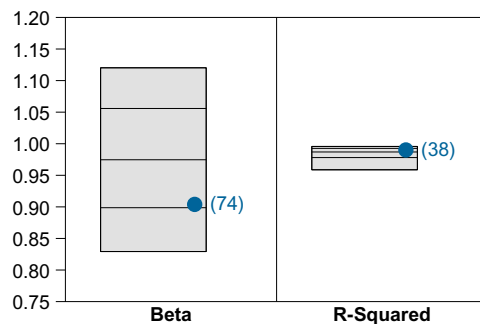


### Risk Statistics Rankings vs Blmbg:HY Corp Rankings Against Callan High Yield Fixed Income (Gross) Five Years Ended December 31, 2021



10th Percentile	10.37	1.71	2.48
25th Percentile	9.72	1.21	1.97
Median	8.95	0.90	1.36
75th Percentile	8.22	0.61	1.00
90th Percentile	7.57	0.48	0.79

Mackay Shield US High Yield ● 8.27 0.84 1.23



10th Percentile	1.12	1.00
25th Percentile	1.06	0.99
Median	0.97	0.99
75th Percentile	0.90	0.98
90th Percentile	0.83	0.96

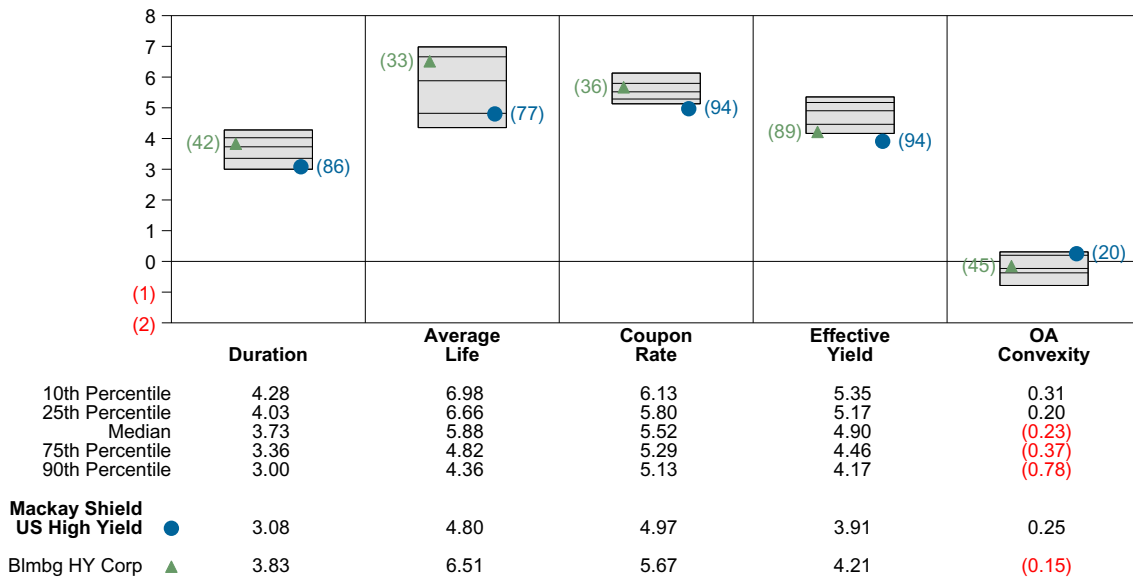
Mackay Shield US High Yield ● 0.90 0.99

## Mackay Shield US High Yield Bond Characteristics Analysis Summary

### Portfolio Characteristics

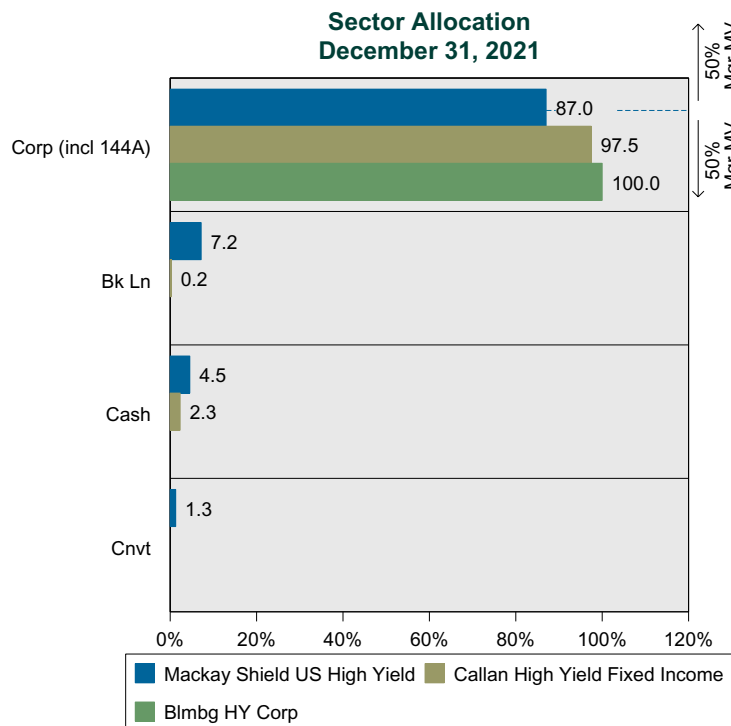
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style. Fixed Income Portfolio characteristics includes Cash Pool allocation.

### Fixed Income Portfolio Characteristics Rankings Against Callan High Yield Fixed Income as of December 31, 2021

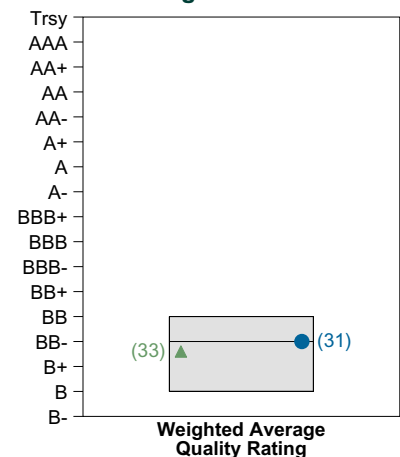


### Sector Allocation and Quality Ratings

The first graph compares the manager's sector allocation with the average allocation across all the members of the manager's style. The second graph compares the manager's weighted average quality rating with the range of quality ratings for the style.



#### Quality Ratings vs Callan High Yield Fixed Income



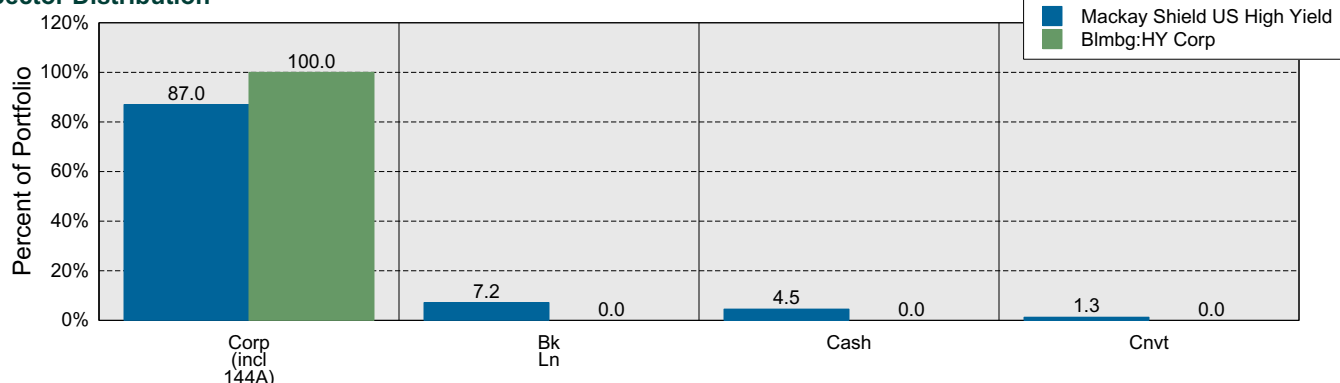
10th Percentile	BB
25th Percentile	BB-
Median	B
75th Percentile	B
90th Percentile	B
<b>Mackay Shield US High Yield</b>	BB-
Blmbg HY Corp	BB-

# Mackay Shield US High Yield Portfolio Characteristics Summary As of December 31, 2021

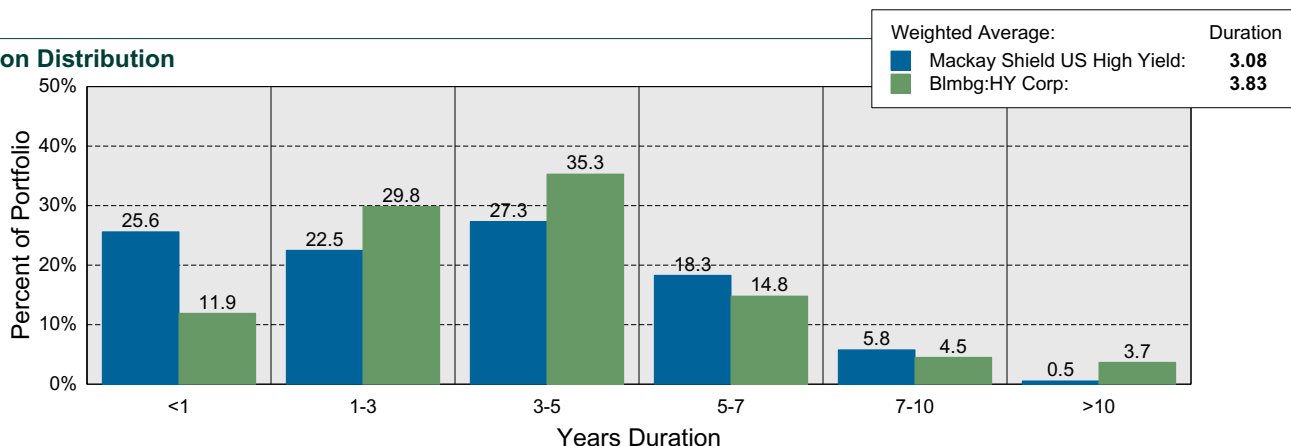
## Portfolio Structure Comparison

The charts below compare the structure of the portfolio to that of the index from the three perspectives that have the greatest influence on return. The first chart compares the two portfolios across sectors. The second chart compares the duration distribution. The last chart compares the distribution across quality ratings.

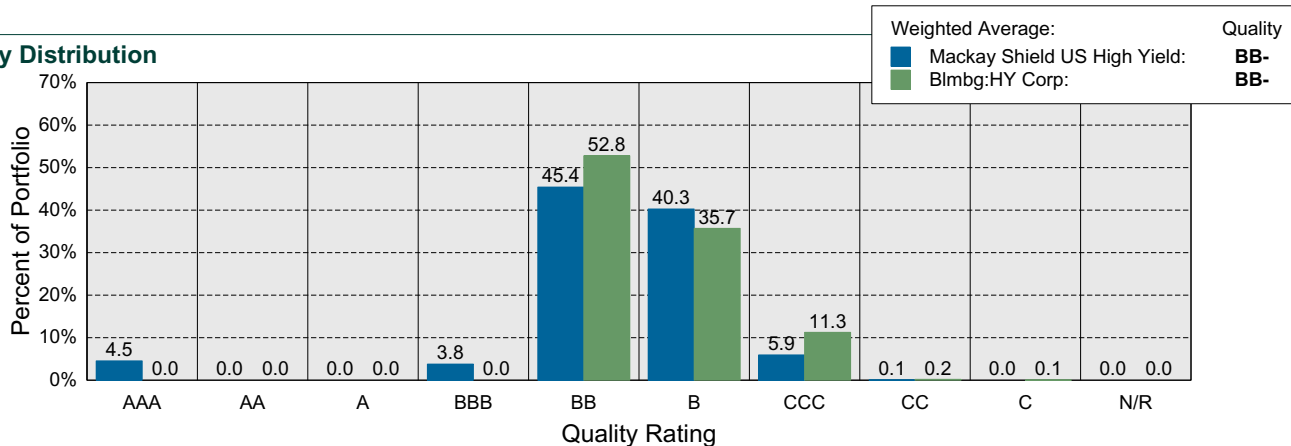
### Sector Distribution



### Duration Distribution



### Quality Distribution



## Principal Preferred Securities Period Ended December 31, 2021

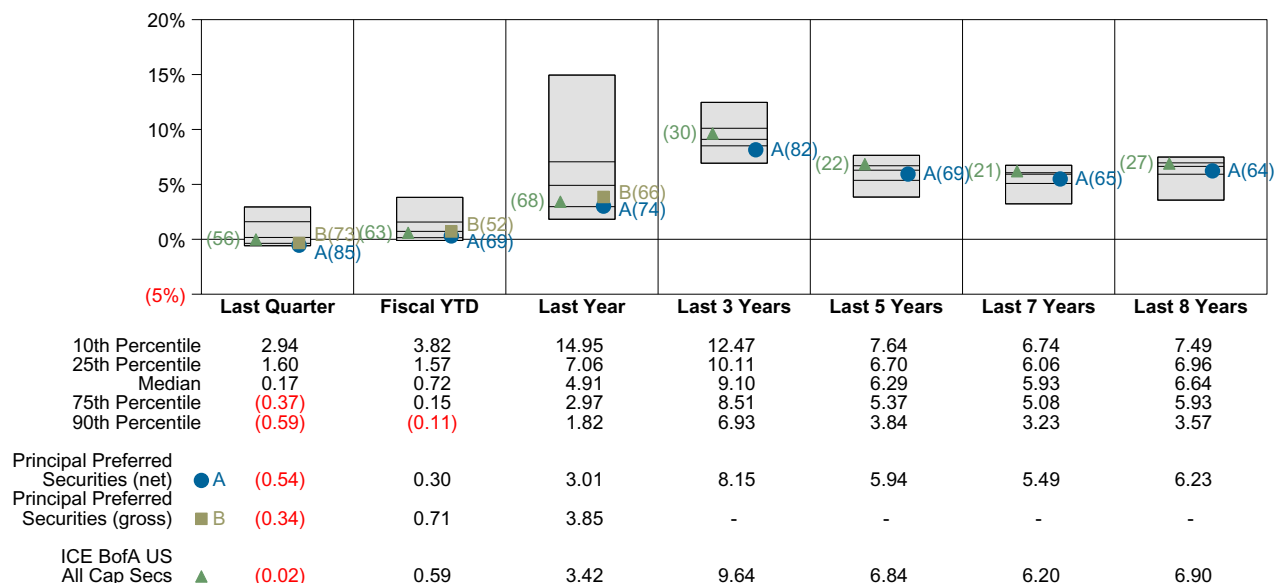
### Investment Philosophy

Spectrum is a wholly owned subsidiary of Principal Global Investors. The firm has an exclusive focus on preferred securities globally. The firm employs an active approach to managing this sector with an emphasis on income as well as total return. Preferred securities are structurally subordinated fixed income investments that come in many flavors, each with unique structures and with many different labels. Common characteristics, however, are that they are subordinate to senior investment grade debt, pay a specified coupon, and are callable by the issuer. Credit quality typically ranges from BBB+ to BB. Coupon payments can be deferrable, non-deferrable and cumulative or non-cumulative. These attributes make the instruments complex and active management requires skill and experience in this sector. Principal Preferred Securities was funded July 30, 2020. Returns prior to inception reflect the Principal Preferred Securities mutual fund historical returns.

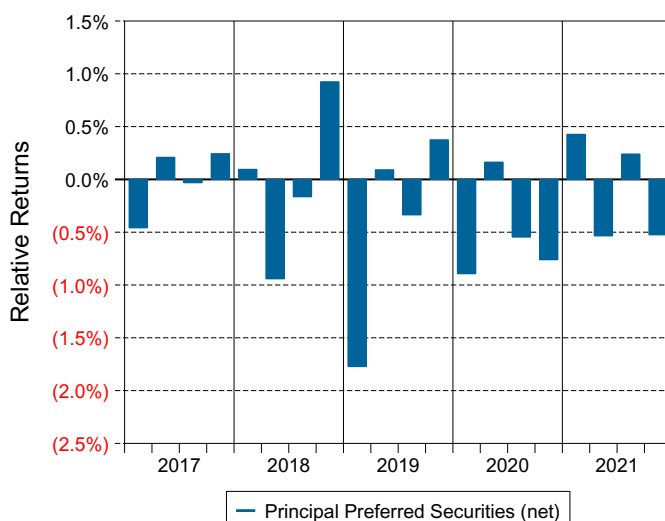
### Quarterly Summary and Highlights

- Principal Preferred Securities (net)'s portfolio posted a (0.54)% return for the quarter placing it in the 85 percentile of the Morningstar Preferred Stock Funds group for the quarter and in the 74 percentile for the last year.
- Principal Preferred Securities (net)'s portfolio underperformed the ICE BofA US All Cap Secs by 0.52% for the quarter and underperformed the ICE BofA US All Cap Secs for the year by 0.41%.

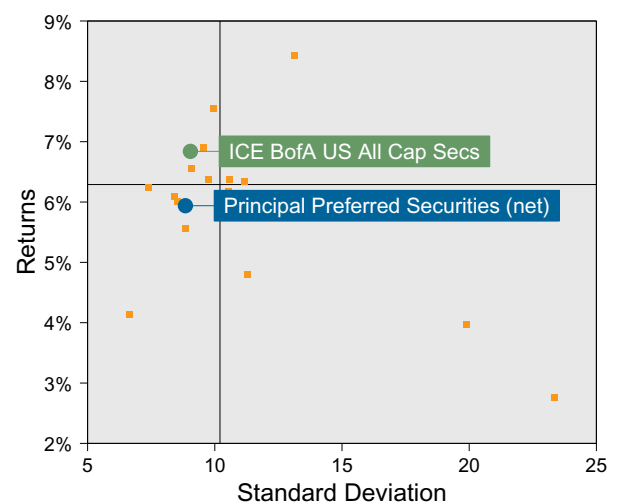
### Performance vs Morningstar Preferred Stock Funds (Net)



### Relative Return vs ICE BofA US All Cap Secs



### Morningstar Preferred Stock Funds (Net) Annualized Five Year Risk vs Return

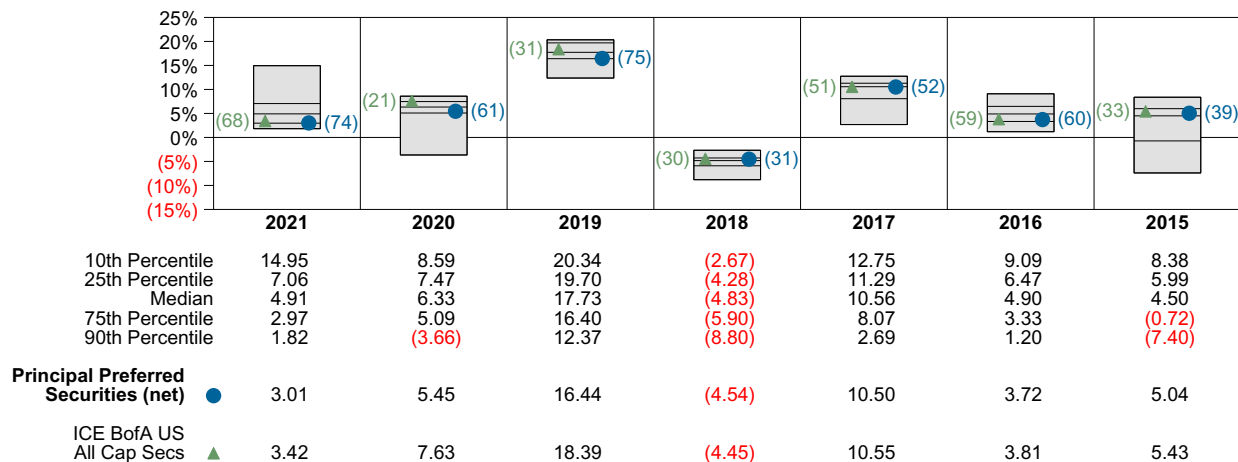


## Principal Preferred Securities (net) Return Analysis Summary

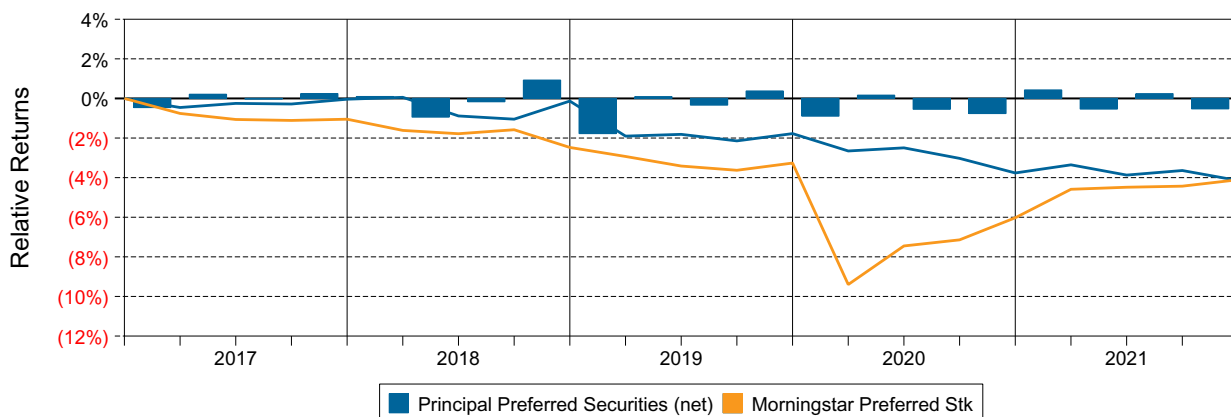
### Return Analysis

The graphs below analyze the manager's return on both a risk-adjusted and unadjusted basis. The first chart illustrates the manager's ranking over different periods versus the appropriate style group. The second chart shows the historical quarterly and cumulative manager returns versus the appropriate market benchmark. The last chart illustrates the manager's ranking relative to their style using various risk-adjusted return measures.

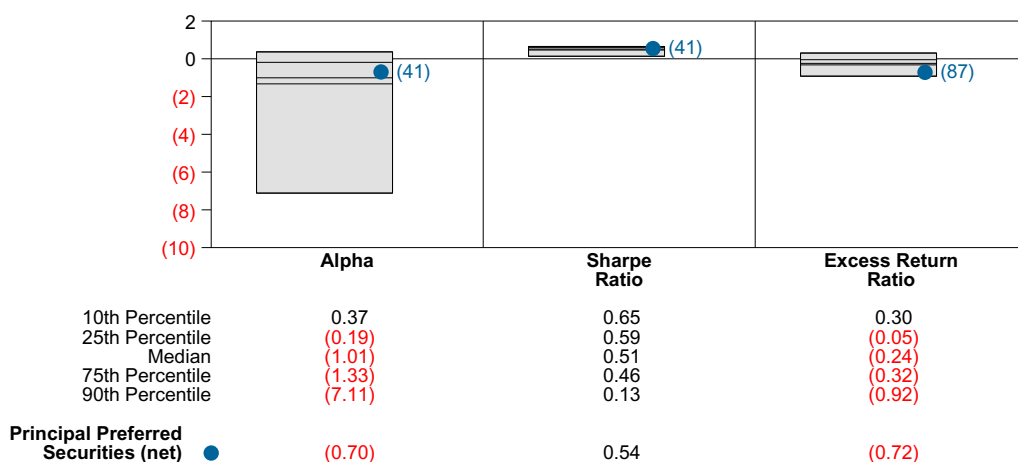
### Performance vs Morningstar Preferred Stock Funds (Net)



### Cumulative and Quarterly Relative Return vs ICE BofA US All Cap Secs



### Risk Adjusted Return Measures vs ICE BofA US All Cap Secs Rankings Against Morningstar Preferred Stock Funds (Net) Five Years Ended December 31, 2021

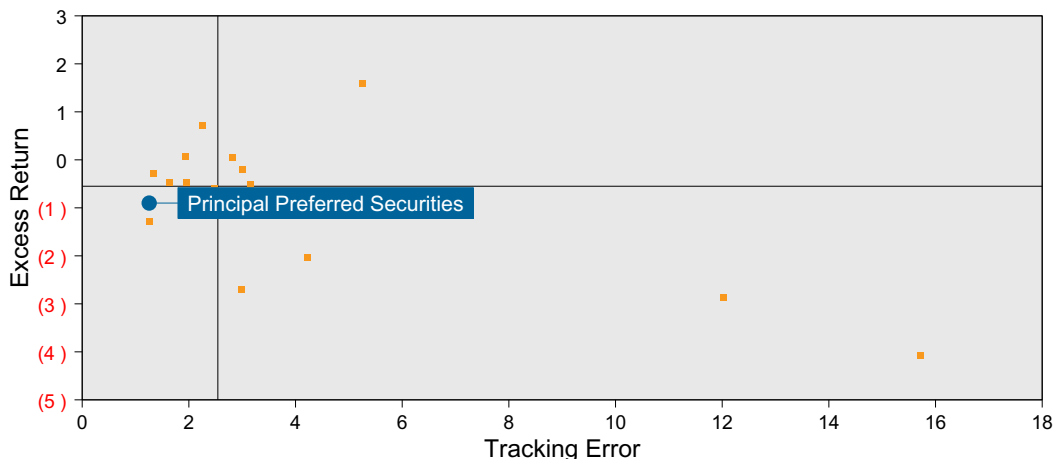


## Principal Preferred Securities Risk Analysis Summary

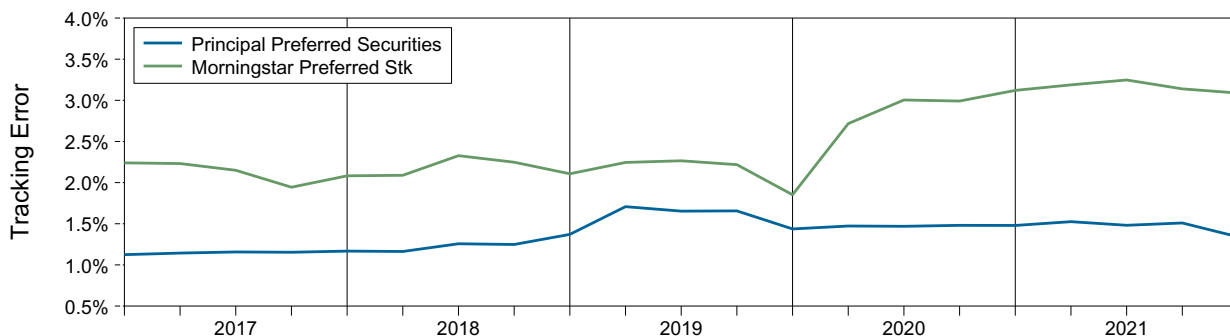
### Risk Analysis

The graphs below analyze the risk or variation of a manager's return pattern. The first scatter chart illustrates the relationship, called Excess Return Ratio, between excess return and tracking error relative to the benchmark. The second chart shows tracking error patterns versus the benchmark over time. The last two charts show the ranking of the manager's risk statistics versus the peer group.

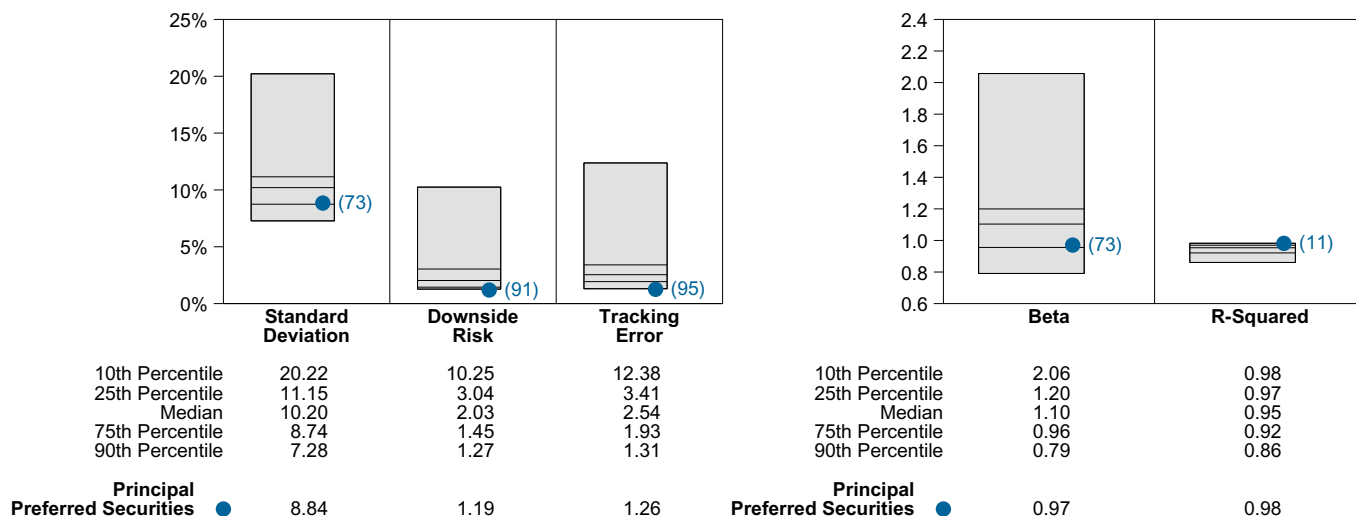
### Risk Analysis vs Morningstar Preferred Stock Funds (Net) Five Years Ended December 31, 2021



### Rolling 12 Quarter Tracking Error vs ICE BofA US All Cap Secs



### Risk Statistics Rankings vs ICE BofA US All Cap Secs Rankings Against Morningstar Preferred Stock Funds (Net) Five Years Ended December 31, 2021



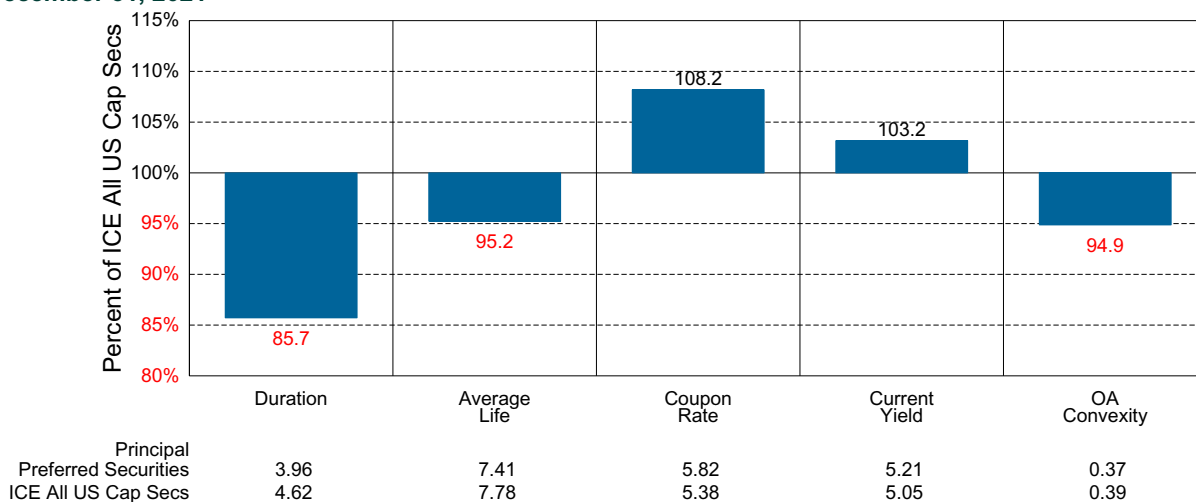


## Principal Preferred Securities Bond Characteristics Analysis Summary

### Portfolio Characteristics

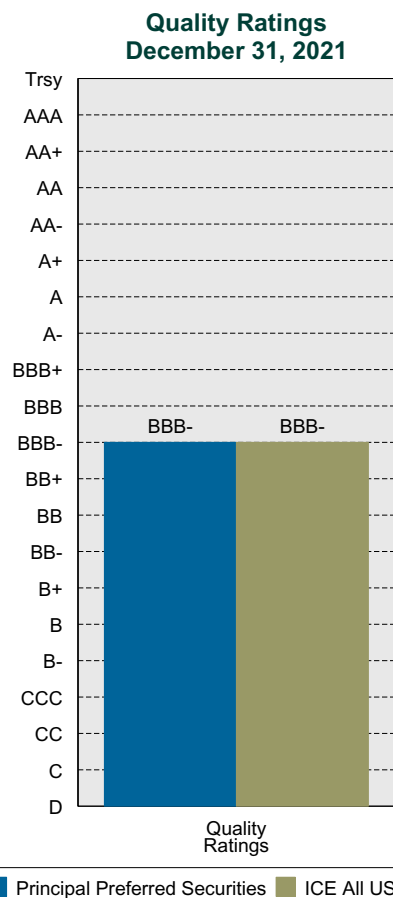
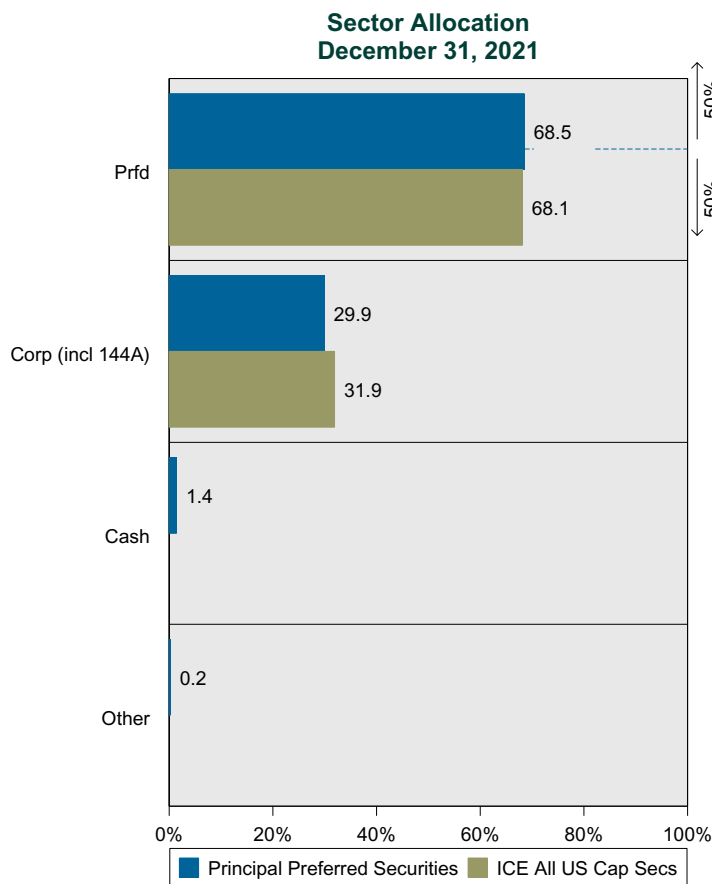
This graph compares the manager's portfolio characteristics with the range of characteristics for the portfolios which make up the manager's style group. This analysis illustrates whether the manager's current holdings are consistent with other managers employing the same style. Fixed Income Portfolio characteristics includes Cash Pool allocation.

### Portfolio Characteristics Relative to ICE All US Cap Secs as of December 31, 2021



### Sector Allocation and Quality Ratings

The first graph compares the manager's sector weights for the most recent quarter with those of the benchmark. The second graph compares the manager's weighted average quality rating with those of the benchmark.

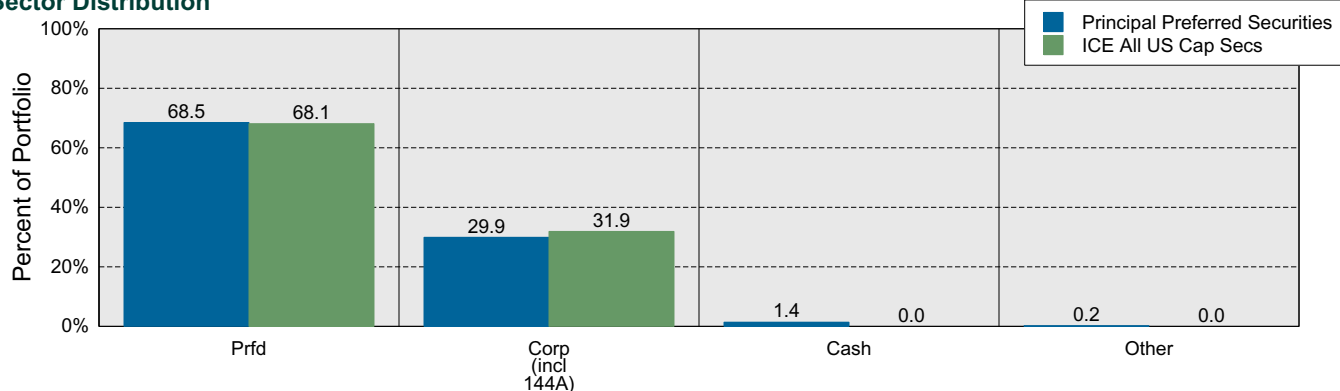


# Principal Preferred Securities Portfolio Characteristics Summary As of December 31, 2021

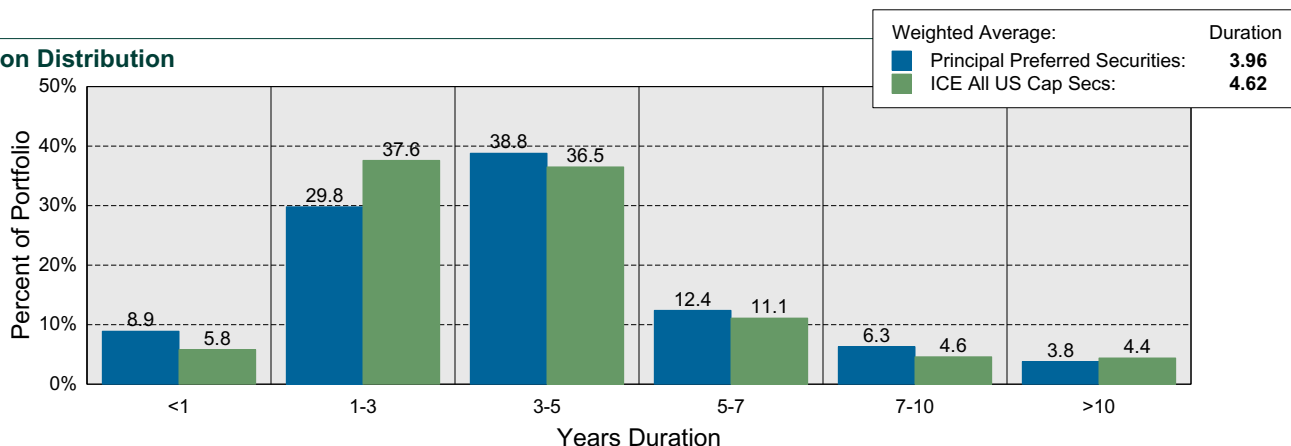
## Portfolio Structure Comparison

The charts below compare the structure of the portfolio to that of the index from the three perspectives that have the greatest influence on return. The first chart compares the two portfolios across sectors. The second chart compares the duration distribution. The last chart compares the distribution across quality ratings.

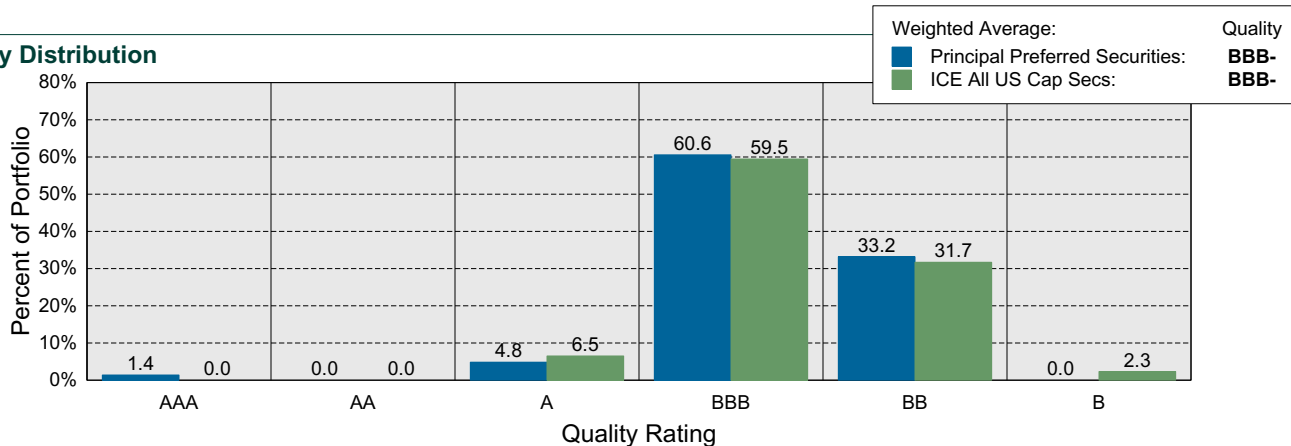
### Sector Distribution



### Duration Distribution



### Quality Distribution





## Quarterly Highlights

The Callan Institute provides research to update clients on the latest industry trends and carefully structured educational programs to enhance the knowledge of industry professionals. Visit [www.callan.com/research-library](http://www.callan.com/research-library) to see all of our publications, and [www.callan.com/blog](http://www.callan.com/blog) to view our blog. For more information contact Barb Gerraty at 415-274-3093 / [institute@callan.com](mailto:institute@callan.com).

## New Research from Callan's Experts

**2021 Investment Management Fee Study** | The purpose of this study, the ninth we have done, is to provide a detailed analysis on institutional investment management fee levels and trends across multiple asset classes and mandate sizes, for both active and passive management.

**2021 Nuclear Decommissioning Funding Study** | This study offers key insights into the status of nuclear decommissioning funding to make peer comparisons more accurate and relevant.

**2021 Private Equity Fees and Terms Study** | This study is intended to help institutional investors better evaluate private equity funds, serving as an industry benchmark when comparing a partnership's terms to its peers.

**2021 Cost of Doing Business Survey** | In this survey, Callan compares the costs of administering and operating funds across all types of tax-exempt and tax-qualified organizations in the U.S. We identify practices to help institutional investors manage expenses.

**A Guide to Reinsurance for Institutional Investors** | Reinsurance investments are a potential option for institutional investors looking to diversify both equity and rate risks while also offering attractive risk-adjusted returns. Sean Lee examines how insurance-linked securities can be incorporated into institutional investors' portfolios.

**2021 ESG Survey** | Callan's ninth annual survey assessing the status of environmental, social, and governance (ESG) investing in the U.S. institutional investment market.

## Blog Highlights

**Rising Rates! Why the Heck Do We Own Bonds?** | Investment grade bonds spin off yield and participate in rising rate markets through principal reinvestment, and their return distribution

provides downside protection that counter-balances growth-oriented portfolio investments. Despite frustratingly low expected returns, IG bonds can still contribute meaningfully to the long-term investment goals of most institutional investors.

**Understanding Return Forecasts for Public DB Plans** | It is important for decision makers to understand that actuaries and investment consultants offer assumptions on expected return that are inherently different: Actuarial discount rates assume a static return over time with no variability, whereas investment consultants estimate a median and a range of expected returns based on expected risk.

## Quarterly Periodicals

**Private Equity Trends, 3Q21** | A high-level summary of private equity activity in the quarter through all the investment stages

**Active vs. Passive Charts, 3Q21** | A comparison of active managers alongside relevant benchmarks over the long term

**Market Pulse Flipbook, 3Q21** | A quarterly market reference guide covering trends in the U.S. economy, developments for institutional investors, and the latest data on the capital markets

**Capital Markets Review, 3Q21** | Analysis and a broad overview of the economy and public and private market activity each quarter across a wide range of asset classes

**Hedge Fund Quarterly, 3Q21** | Commentary on developments for hedge funds and multi-asset class (MAC) strategies

**Real Assets Reporter, 3Q21** | A summary of market activity for real assets and private real estate during the quarter

## Events

A complete list of all upcoming events can be found on our website: [callan.com/events-education](http://callan.com/events-education).

*Please mark your calendar and look forward to upcoming invitations:*

### **2022 DC Survey Results Webinar** **February 23, 2022 – 9:30 am (PT)**

### **National Conference** **April 25-27, 2022, in San Francisco**

**For more information about events, please contact Barb Gerraty: 415-274-3093 / [gerraty@callan.com](mailto:gerraty@callan.com)**

## Education: By the Numbers

**50+**

Unique pieces of research the Institute generates each year

**525**

Attendees (on average) of the Institute's annual National Conference

**3,700**

Total attendees of the "Callan College" since 1994

## Education

Founded in 1994, the "Callan College" offers educational sessions for industry professionals involved in the investment decision-making process.

### **Introduction to Investments**

#### **March 1-3, 2022 – Virtual**

This program familiarizes institutional investor trustees and staff and asset management advisers with basic investment theory, terminology, and practices. Our virtual session is held over three days with virtual modules of 2.5-3 hours, while the in-person session lasts one-and-a-half days. This course is designed for individuals with less than two years of experience with asset-management oversight and/or support responsibilities. Virtual tuition is \$950 per person and includes instruction and digital materials. In-person tuition is \$2,350 per person and includes instruction, all materials, breakfast and lunch on each day, and dinner on the first evening with the instructors.

Additional information including registration can be found at: [callan.com/events/ccintro-march/](http://callan.com/events/ccintro-march/)

### **Introductory Workshop for DC Plan Fiduciaries**

#### **March 23, 2022 – San Francisco**

This one-day workshop centers on the fundamentals of administering a defined contribution (DC) plan. Designed primarily for ERISA fiduciaries and supporting staff members, attendees will gain a better understanding of the key responsibilities of an ERISA fiduciary and best practices for executing those responsibilities. Additionally, we will cover the basics of capital markets theory and DC investment menu design principles; investment manager evaluation, selection, and monitoring; best practices for evaluating fees; the regulatory and legal landscape; and industry trends. This workshop is complimentary and open to institutional investor clients.

Additional information including dates and registration can be found at: [callan.com/events/mar-dc-college/](http://callan.com/events/mar-dc-college/)



**"Research is the foundation of all we do at Callan, and sharing our best thinking with the investment community is our way of helping to foster dialogue to raise the bar across the industry."**

Greg Allen, CEO and Chief Research Officer



## List of Callan's Investment Manager Clients

Confidential – For Callan Client Use Only

Callan takes its fiduciary and disclosure responsibilities to clients very seriously. We recognize that there are numerous potential conflicts of interest encountered in the investment consulting industry, and that it is our responsibility to manage those conflicts effectively and in the best interest of our clients. At Callan, we employ a robust process to identify, manage, monitor, and disclose potential conflicts on an ongoing basis.

The list below is an important component of our conflicts management and disclosure process. It identifies those investment managers that pay Callan fees for educational, consulting, software, database, or reporting products and services. We update the list quarterly because we believe that our fund sponsor clients should know the investment managers that do business with Callan, particularly those investment manager clients that the fund sponsor clients may be using or considering using. Please note that if an investment manager receives a product or service on a complimentary basis (e.g., attending an educational event), they are not included in the list below. Callan is committed to ensuring that we do not consider an investment manager's business relationship with Callan, or lack thereof, in performing evaluations for or making suggestions or recommendations to its other clients. Please refer to Callan's ADV Part 2A for a more detailed description of the services and products that Callan makes available to investment manager clients through our Institutional Consulting Group, Independent Adviser Group, and Fund Sponsor Consulting Group. Due to the complex corporate and organizational ownership structures of many investment management firms, parent and affiliate firm relationships are not indicated on our list.

Fund sponsor clients may request a copy of the most currently available list at any time. Fund sponsor clients may also request specific information regarding the fees paid to Callan by particular fund manager clients. Per company policy, information requests regarding fees are handled exclusively by Callan's Compliance department.

### Manager Name

abrdn (Aberdeen Standard Investments)  
Acadian Asset Management LLC  
Adams Street Partners, LLC  
AEGON USA Investment Management Inc.  
AllianceBernstein  
Allianz  
Allspring Global Investments (formerly Wells Fargo Asset Mgmt)  
American Century Investments  
AQR Capital Management  
Ares Management LLC  
Ariel Investments, LLC  
Aristotle Capital Management, LLC  
Atlanta Capital Management Co., LLC  
Aviva Investors  
AXA Investment Managers  
Baillie Gifford International, LLC  
Baird Advisors  
Barings LLC

### Manager Name

Baron Capital Management, Inc.  
Barrow, Hanley, Mewhinney & Strauss, LLC  
BlackRock  
BMO Global Asset Management  
BNP Paribas Asset Management  
BNY Mellon Asset Management  
Boston Partners  
Brandes Investment Partners, L.P.  
Brandywine Global Investment Management, LLC  
Brookfield Asset Management  
Brown Brothers Harriman & Company  
Cambiar Investors, LLC  
Capital Group  
Carillon Tower Advisers  
CastleArk Management, LLC  
Causeway Capital Management LLC  
Chartwell Investment Partners  
ClearBridge Investments, LLC

**Manager Name**

Cohen &amp; Steers Capital Management, Inc.

Columbia Threadneedle Investments North America

Credit Suisse Asset Management, LLC

Crescent Capital Group LP

D.E. Shaw Investment Management, LLC

DePrince, Race &amp; Zollo, Inc.

Dimensional Fund Advisors L.P.

Doubleline

Duff &amp; Phelps Investment Management Co.

DWS

EARNEST Partners, LLC

Eaton Vance Management

Epoch Investment Partners, Inc.

Fayez Sarofim &amp; Company

Federated Hermes, Inc.

Fidelity Institutional Asset Management

Fiera Capital Corporation

First Hawaiian Bank Wealth Management Division

First Sentier Investors (formerly First State Investments)

Fisher Investments

Franklin Templeton

GAM (USA) Inc.

GCM Grosvenor

GlobeFlex Capital, L.P.

GoldenTree Asset Management, LP

Goldman Sachs

Guggenheim Investments

GW&amp;K Investment Management

Harbor Capital Group Trust

Heitman LLC

Hotchkis &amp; Wiley Capital Management, LLC

Income Research + Management Inc.

Insight Investment

Intech Investment Management LLC

Intercontinental Real Estate Corporation

Invesco

J.P. Morgan

Janus

Jennison Associates LLC

Jobs Peak Advisors

**Manager Name**

J O Hambro Capital Management Limited

KeyCorp

Lazard Asset Management

LGIM America (formerly Legal &amp; General Inv. Mgmt. America)

Lincoln National Corporation

Longview Partners

Loomis, Sayles &amp; Company, L.P.

Lord Abbett &amp; Company

LSV Asset Management

MacKay Shields LLC

Macquarie Investment Management (MIM)

Manning &amp; Napier Advisors, LLC

Manulife Investment Management

McKinley Capital Management, LLC

Mellon

MetLife Investment Management

MFS Investment Management

MidFirst Bank

Mondrian Investment Partners Limited

Montag &amp; Caldwell, LLC

Morgan Stanley Investment Management

MUFG Union Bank, N.A.

Natixis Investment Managers

Neuberger Berman

Newton Investment Management

Ninety One North America, Inc. (formerly Investec Asset Mgmt.)

Northern Trust Asset Management

Nuveen

P/E Investments

Pacific Investment Management Company

Parametric Portfolio Associates LLC

Partners Group (USA) Inc.

Pathway Capital Management

Peregrine Capital Management, LLC

PFM Asset Management LLC

PGIM Fixed Income

PGIM Quantitative Solutions LLC

PineBridge Investments

Polen Capital Management, LLC

Principal Global Investors



Manager Name
Putnam Investments, LLC
RBC Global Asset Management
Regions Financial Corporation
Richard Bernstein Advisors LLC
Riverbridge Partners LLC
Robeco Institutional Asset Management, US Inc.
Rothschild & Co. Asset Management US
S&P Dow Jones Indices
Schroder Investment Management North America Inc.
Securian Asset Management, Inc.
SLC Management
Smith Graham & Co. Investment Advisors, L.P.
State Street Global Advisors
Stone Harbor Investment Partners L.P.
Strategic Global Advisors, LLC
T. Rowe Price Associates, Inc.
The TCW Group, Inc.

Manager Name
Thompson, Siegel & Walmsley LLC
Thornburg Investment Management, Inc.
Tri-Star Trust Bank
UBS Asset Management
VanEck
Versus Capital Group
Victory Capital Management Inc.
Virtus Investment Partners, Inc.
Vontobel Asset Management
Voya
Waterton Associates LLC
WCM Investment Management
WEDGE Capital Management
Wellington Management Company, LLP
Western Asset Management Company LLC
Westfield Capital Management Company, LP
William Blair & Company LLC

February 2022



## **Colorado Public School Permanent Fund**

2022 Asset Allocation Update &  
Rebalancing Recommendation

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**Janet Becker-Wold, CFA**  
Senior Vice President & Manager

**Alex Browning**  
Senior Vice President

# Summary of Important Changes for 2022 Capital Markets Assumptions

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- Cash return increased 0.20%
- Inflation assumption increased 0.25% (from 2.00% to 2.25%)
- No change in return or risk assumptions for public equity
- No change in return or risk assumption for core fixed income or short duration.
- TIPS and High Yield return projections lowered by 0.45%

# 2022 Projected Risk and Returns

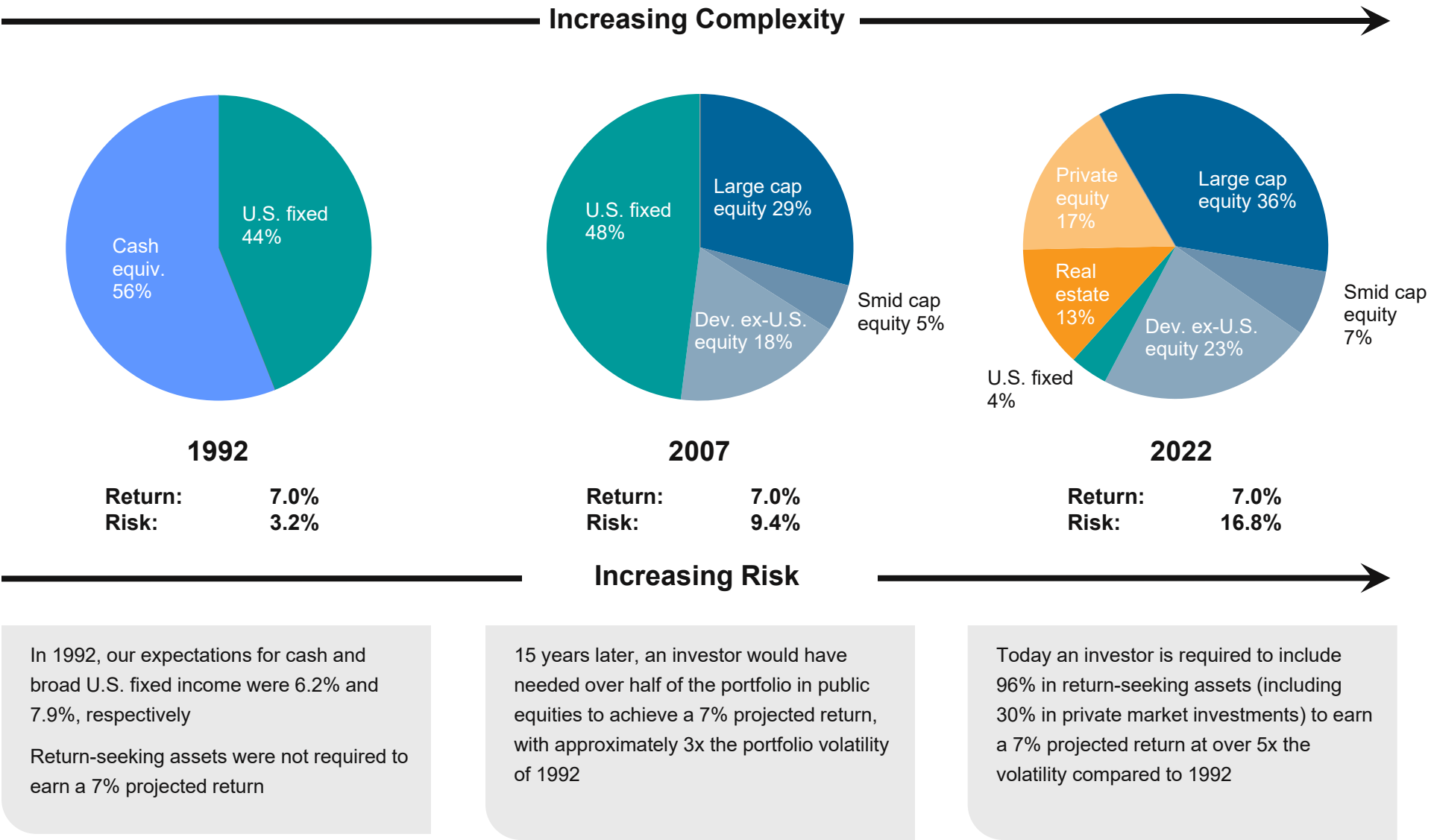
## PSPF Asset Classes

### Summary of Callan's Long-Term Capital Market Assumptions (2022 – 2031)

		Projected Return			Projected Risk
		1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation
Asset Class	Index				
Equities					
Large Cap U.S. Equity	S&P 500	7.85%	6.50%	4.25%	17.70%
Smid Cap U.S. Equity	Russell 2500	8.75%	6.70%	4.45%	21.30%
Global ex-U.S. Equity	MSCI ACWI ex USA	8.70%	6.80%	4.55%	20.70%
Developed ex-U.S. Equity	MSCI World ex USA	8.25%	6.50%	4.25%	19.90%
Emerging Market Equity	MSCI Emerging Markets	9.80%	6.90%	4.65%	25.15%
Fixed Income					
Short Duration Gov/Credit	Bloomberg 1-3 Year Gov/Credit	1.50%	1.50%	-0.75%	2.00%
Core U.S. Fixed	Bloomberg Aggregate	1.80%	1.75%	-0.50%	3.75%
High Yield	Bloomberg High Yield	4.40%	3.90%	1.65%	10.75%

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

# 7.0% Expected Returns Over Past 30 Years



Source: Callan

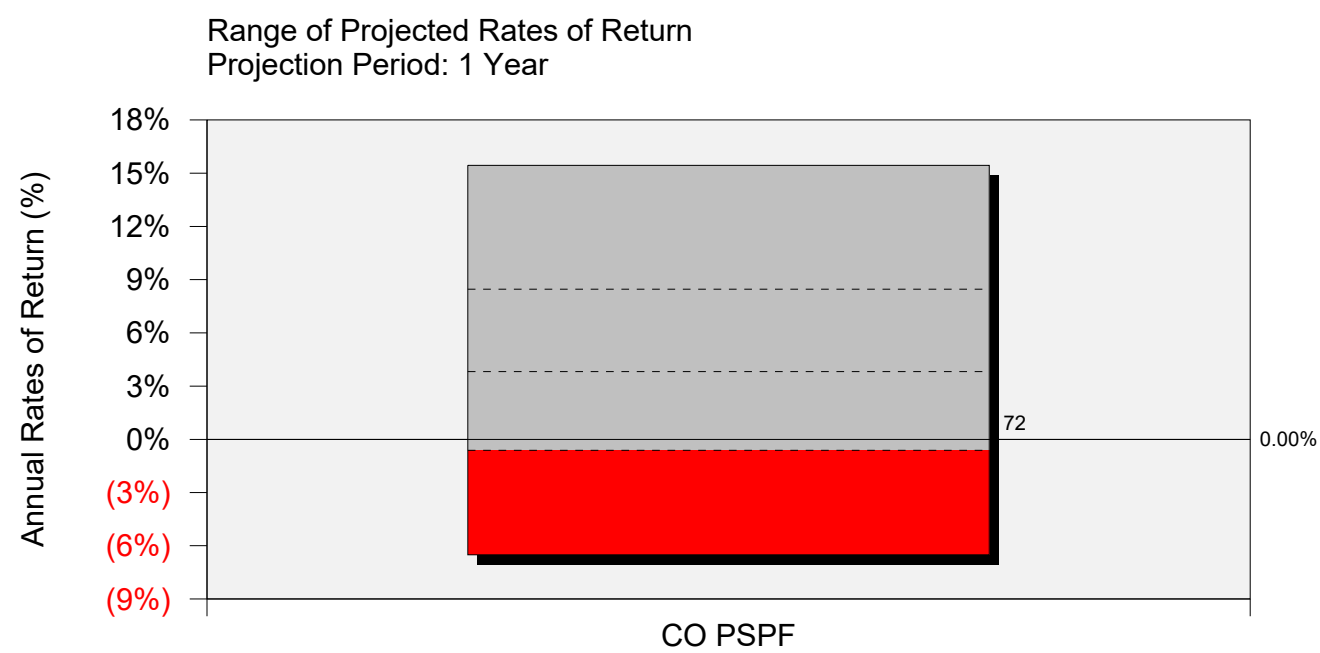
# Projected Return and Risk for Colorado Public School Permanent Fund (PSPF)

Utilizing Callan's 2022 Capital Market Projections

Portfolio Component	CO PSPF
Broad US Equity	18
Global ex-US Equity	12
Core US Fixed	52
High Yield	10
Short Duration Gov't/Credit	8
Totals	100
10 Yr. Geometric Mean Return	3.83%
Projected Standard Deviation	6.43%
10 Yr. Simulated Sharpe Ratio	0.40%

# Range of Returns - One Year Period

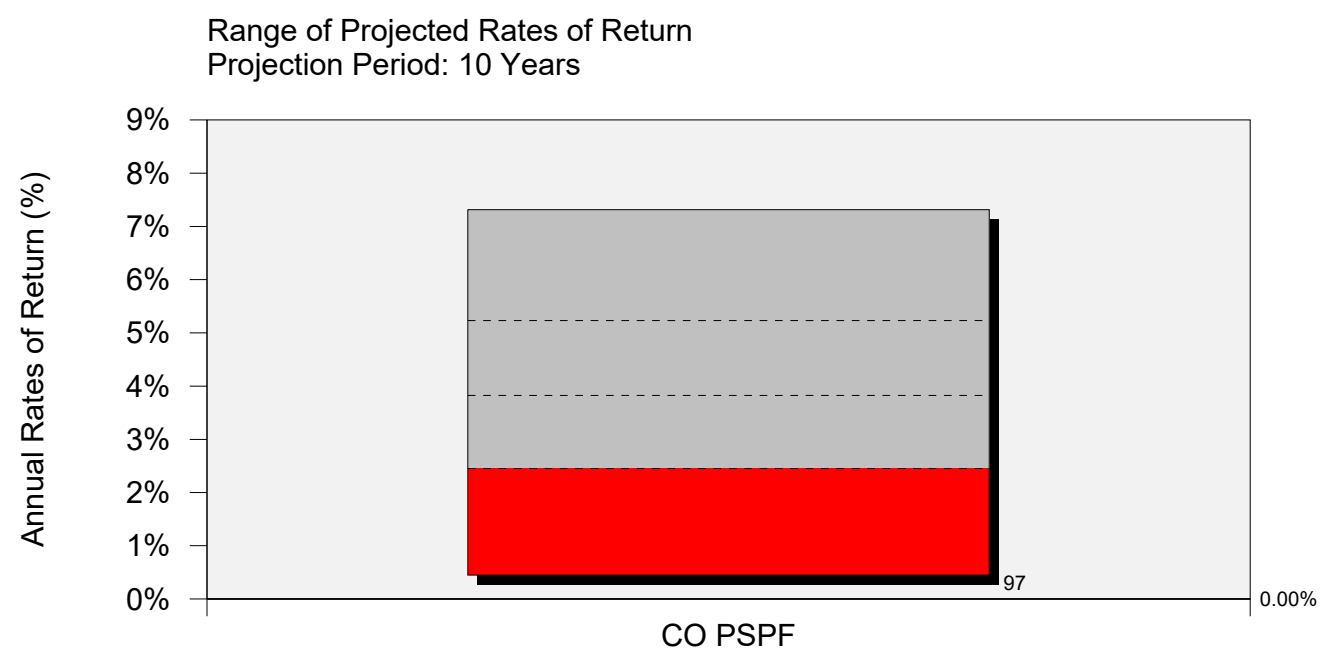
5<sup>th</sup> – 95<sup>th</sup> Percentile



5th Percentile	15.4%
25th Percentile	8.5%
Median	3.8%
75th Percentile	(0.6%)
95th Percentile	(6.5%)
Prob > 0.00%	71.8%

# Range of Projected Returns - Ten Year Period

5<sup>th</sup> to 95<sup>th</sup> Percentile

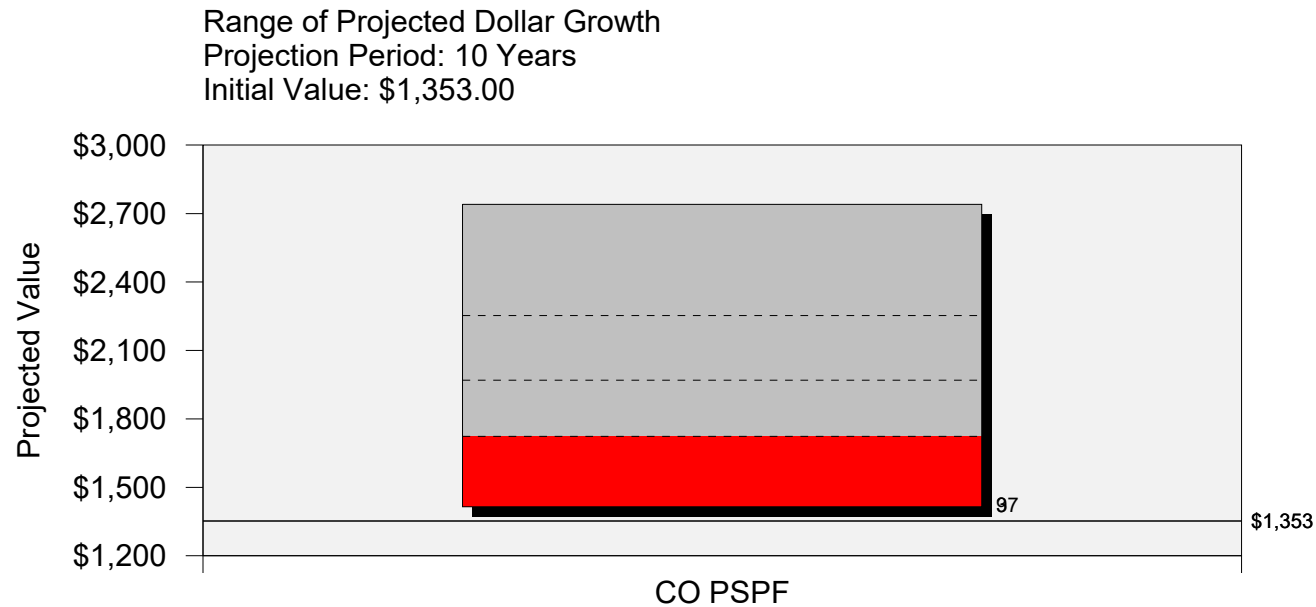


5th Percentile	7.3%
25th Percentile	5.2%
Median	3.8%
75th Percentile	2.5%
95th Percentile	0.4%
Prob > 0.00%	96.9%



## Projected Market Values – 10 Year Period

5<sup>th</sup> to 95<sup>th</sup> Percentile



5th Percentile	\$2,740.17
25th Percentile	\$2,253.17
Median	\$1,969.63
75th Percentile	\$1,723.90
95th Percentile	\$1,414.89
Prob > \$1,353	96.9%
Prob < \$1,353	3.1%

Note that project dollar values do not include incoming cash flows or disbursements.

# Asset Allocation and Rebalancing Guidelines

## Colorado Public School Fund Investment Board – Investment Policy Statement (IPS)

ASSET CLASSES	STRUCTURE	Lower Limit	Strategic Allocation	Upper Limit
<u>Equities:</u>				
	Domestic Equity	14%	18.0%	22%
	International Equity	8%	12.0%	16%
Total Equities		24%	30.0%	36%
<u>Fixed Income:</u>				
	Market Duration Bonds	45%	52.5%	60%
	Short Duration Bonds	5%	7.5%	10%
Total Fixed Income		60%	60.0%	70%
<u>High Income Strategies:</u>				
	High Yield Fixed Income	4.5%	8.5%	12.5%
	Preferred Securities	0%	1.5%	3.0%
Total High Income Strategies		5%	10.0%	15%
Total Portfolio			100%	

The IPS states:

The asset allocation of the PSPF will be reviewed monthly by the Portfolio Administrator and at least quarterly by the PSFIB. The goal of the review is to evaluate whether action should be taken to rebalance the PSPF toward the IPS strategic asset allocation ranges.

When available, cash inflows will be deployed in a manner consistent with the strategic asset allocation and individual asset class structures. **The PSFIB may deviate from the aforementioned allocation of cash inflows if deemed to be in the best interest of the PSPF.**

All actions authorized by the PSFIB will be executed by the Portfolio Administrator as soon as practicable with guidance provided by the PSFIB as needed or requested.

## Rebalancing Recommendation: \$21.1 million in Cash Available For Investing

Asset values as of January 31, 2022

Target	1/31/2022 Actual (\$)	Additional Funds Per Target (\$)	Additional Funds No IG Bonds (\$)	No IG Bonds Total New MV (\$)	New MV (%)	% Diff From Target
<b>52.5% BOND</b>	688,638,893	10,812,512		688,638,893	51.9%	-0.6%
<b>7.5% SHORT DURATION</b>	100,034,950	1,544,645		100,034,950	7.5%	0.0%
<b>30.0% EQUITY</b>	386,521,656	6,178,578	18,500,000	405,021,656	30.5%	0.5%
<b>8.5% HIGH YIELD</b>	112,075,622	1,750,597	1,750,000	113,825,622	8.6%	0.1%
<b>1.5% PREFERRED SECURITIES</b>	19,263,219	308,929	345,000	19,608,219	1.5%	0.0%
<b>CASH AVAILABLE</b>	21,095,262	500,261	500,261	500,261	0.0%	0.0%
<b>100.0%</b>	<b>1,327,629,601</b>	<b>21,095,262</b>	21,095,261	<b>1,327,629,601</b>	100%	0.0%

Callan and the Portfolio Administrator have reviewed the asset allocation and recommend that the Cash Available for Investing be deployed into all asset classes excluding investment grade bonds (Market Duration and Short Duration).

The new asset allocation deviates slightly from the Target and is well within the established rebalancing ranges.

The \$18.5 million additional funding to Parametric (equity) will be invested 60% U.S. and 40% non-US equity (per policy).

\$500,000 is held back in cash per Treasury to assist with timing issues regarding income earned and bond price amortizations.

Callan

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## APPENDIX

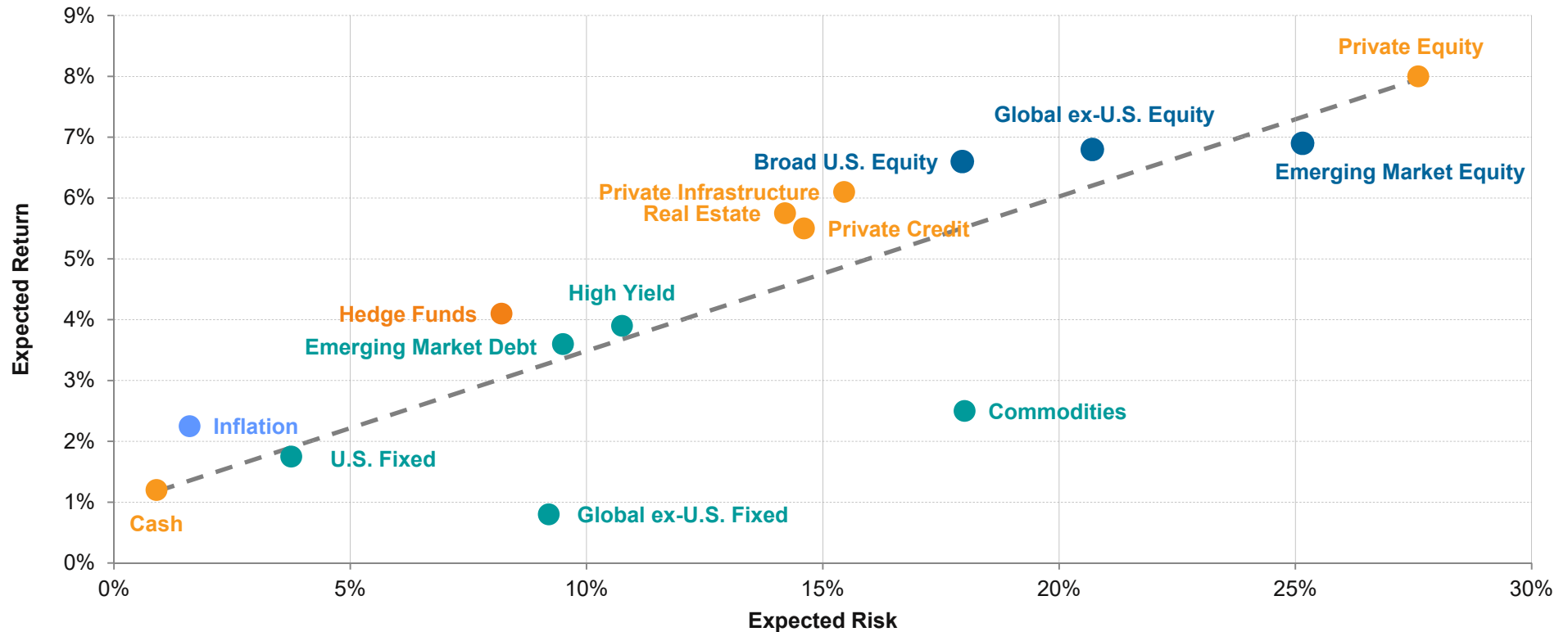
## 2022–2031 Callan Capital Markets Assumption Correlations

Broad U.S. Equity	1.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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- Relationships between asset classes are as important as standard deviation
- To determine portfolio mixes, Callan employs mean-variance optimization
- Return, standard deviation, and correlation determine the composition of efficient asset mixes

# Relationship Between Expected Return and Risk – Capital Market Line

Visualizing Callan's 2022–2031 capital markets assumptions



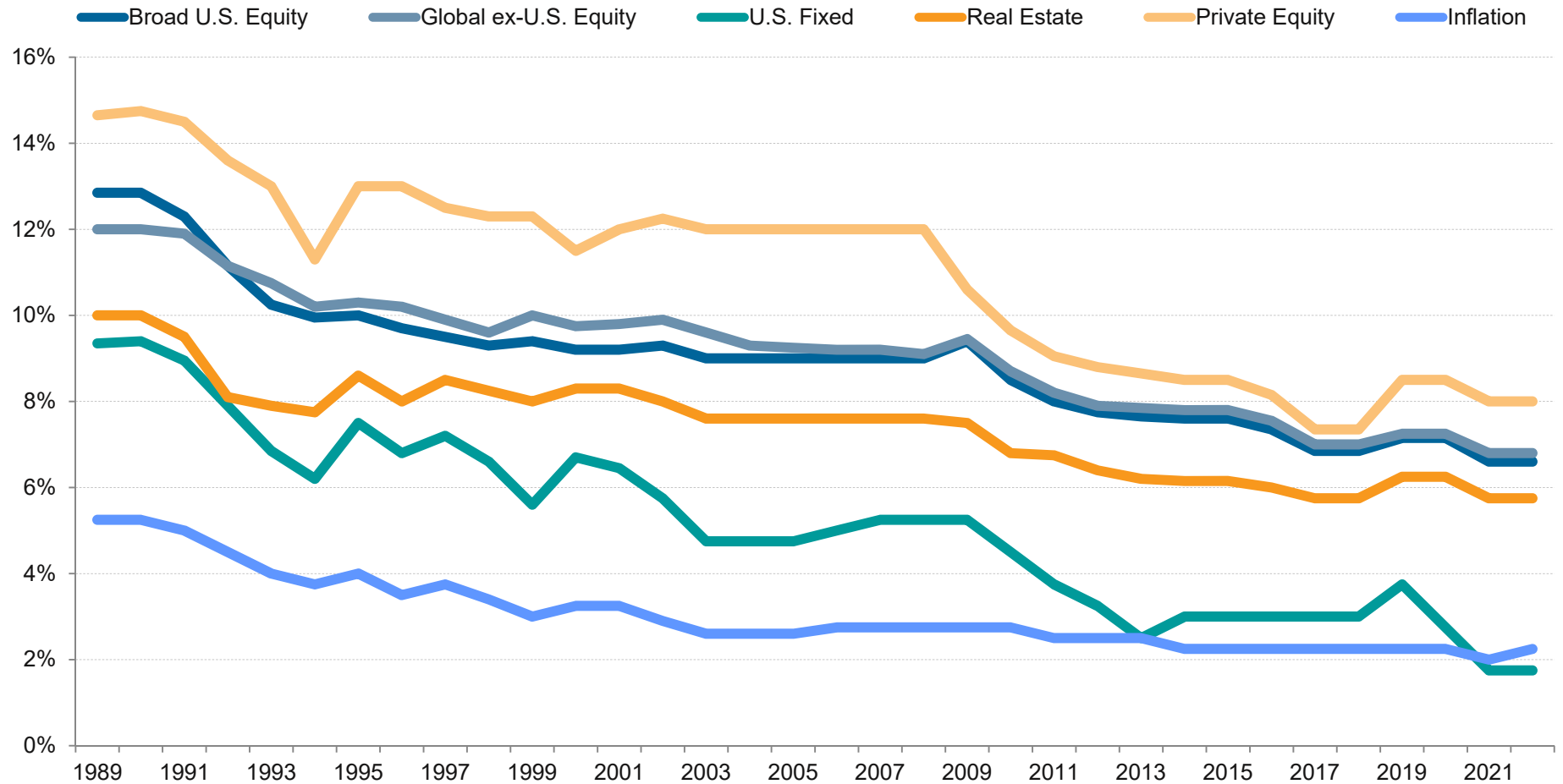
## Our forecasts link expected return to risk

For example, investors demand a greater return from private equity than public equity as compensation for higher risk

Source: Callan

# Return Projections: Major Asset Classes

1989–2022



Source: Callan

**CO PUBLIC SCHOOL PERMANENT FUND  
FINANCIAL REPORT - December 31, 2021**

<b>Fund Activity</b>	<b>6 Months Ended Dec 31, 2021</b>	<b>FY End June 30, 2021</b>	<b>FY End June 30, 2020</b>	<b>FY End June 30, 2019</b>
Beginning Fund Value (Cash + Investments)	1,333,667,415	1,260,932,051	1,148,213,997	1,033,797,716
Transfers to PSPF:				
State Land Board Rents, Royalties, & NSE Funds	34,799,331	515,169	61,534,527	65,778,937
Marijuana Excise Tax allocation		-	-	5,849,826
Escheats Fund	4,253	109,211	158,354	83,705
Realized Gains / (Losses)	5,634,159	7,300,693	8,891,469	256,256
Change in unrealized Market Gain/ (Loss)	(2,350,004)	64,810,291	42,133,704	42,447,558
<b>Ending Fund Value</b>	<b>1,371,755,154</b>	<b>1,333,667,415</b>	<b>1,260,932,051</b>	<b>1,148,213,997</b>

<b>Income / Expense Summary</b>	<b>6 Months Ended Dec 31, 2021</b>	<b>FY End June 30, 2021</b>	<b>FY End June 30, 2020</b>	<b>FY End June 30, 2019</b>
Total Portfolio Earned Income	16,699,093	31,757,543	31,463,648	29,792,092
Total Expenses	(274,867)	(861,651)	(561,082)	(428,146)
change in income receivable	(91,803)	(585,940)	(507,951)	(194,801)
<b>Net Income Available for Distribution</b>	<b>16,332,423</b>	<b>30,309,952</b>	<b>30,394,615</b>	<b>29,169,145</b>



## **2022 PLANNING - PUBLIC SCHOOL FUND INVESTMENT BOARD**

### **February 28 Quarterly Meeting**

Fund Manager presentation: Parametric  
Asset Allocation modeling (total fund level)  
Investment Consultant RFP Update  
  
Q-4 Market Update  
FY Q-2 Performance Report  
YTD Financial Report & Forecast  
Rebalancing / Review of unrealized gains/losses

### **May 16 Quarterly Meeting**

Vote on Investment Consultant (May hold separate meeting in April)  
Vote on 1 year extension: MacKay Shields (July 20; total contract end 2025)  
Asset class structure review (at portfolio level)  
Annual review of IPS  
Fund Manager presentation: Janus Henderson  
  
Q-1 Market Update  
FY Q-3 Performance Report  
YTD Financial Report & Forecast  
Rebalancing / Review of unrealized gains/losses

### **August 15 Quarterly Meeting**

Vote on 1 year extension: Janus Henderson (Oct. 11; total contract end 2023)  
Vote on Parametric (Nov. 1; total contract end 2022 - May require RFP)  
Vote on 1 year extension: Portfolio Administrator (Oct. 25; total contract end 2026)  
Tentative: OMA education and review of Communication and Open Meetings Policy required every 3 years  
Fund Manager presentation: Maruti More  
Review fiscal year end report for submission to State agencies  
Board Membership (terms end in August)  
  
Q-2 Market Update  
FY End Q-4 Performance Report  
YTD Financial Report & Forecast  
Rebalancing / Review of unrealized gains/losses

### **November 14 Quarterly Meeting**

Fund Manager presentation: MacKay Shields  
Review of Spectrum Preferred Securities Fund - Steve Solomon  
Conflict of Interest Policy Acknowledgement & Disclosure  
Education presentation by Callan  
  
Q-3 Market Update  
FY Q-1 Performance Report  
YTD Financial Report & Forecast  
Rebalancing / Review of unrealized gains/losses

### **Other Dates to be set:**

New Board member orientation - progression of asset allocation; reporting; IPS  
OMA education and review of Communication and Open Meetings Policy required every 3 years  
Scheduled for August 2022 (next due Aug. 2025)

# Colorado Public School Fund Investment Board Portfolio Review

**February 28, 2022**

**Dan Ryan**

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*Managing Director - Portfolio Management*

Parametric Portfolio Associates® LLC

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# Firm Overview

# Parametric Overview

We help institutional investors build, manage, and protect their portfolios.



*Extensive, established  
investment capabilities*

Industry pioneers in overlay solutions and custom indexing, Parametric is a trusted fiduciary for institutional asset owners.



*Focus on transparency  
and repeatability*

We provide research- and rules-based solutions with a quantitative approach. Our solutions span global markets, asset classes, and instrument types.



*Extension of staff  
partnership*

We help investors solve specific portfolio challenges, implementing tailored solutions via a high-touch service model.

**\$428B**

Firmwide AUM, including  
\$200B in institutional assets

**500+**

Institutional client  
relationships

**149**

Investment professionals, including  
107 CFA charter holders and 9 PhDs

**30+**

Years of investment experience across  
equities, fixed income, and derivatives

Asset figures are approximate as of 12/31/2021

<sup>1</sup>AUM includes overlay exposure, and both discretionary and nondiscretionary assets of Parametric Portfolio Associates® LLC (the Firm).  
Please refer to the disclosures for additional information regarding the Firm



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Fourth Quarter 2021 – Custom Core® equity

# Institutional Capabilities

We offer a comprehensive platform for investors seeking to:

- ✓ Eliminate inefficiencies
- ✓ Create custom exposures
- ✓ Capitalize on market opportunities
- ✓ Address strategic and episodic risks

## Efficient implementation

Flexible exposure management programs tailored to fit specific needs

### Solution ideas

- Cash securitization
- Rebalancing
- Transition exposure
- Custom equity exposures
- Custom fixed income exposures
- Responsible investing (ESG)

## Return enhancement

Systematic strategies that seek alpha across asset classes

### Solution ideas

- Alternative risk premia
- Systematic alpha
- Portable alpha
- Commodity management
- Tax management

## Risk mitigation

Customizable tools that address and manage specific portfolio risks

### Solution ideas

- Tail-risk strategies
- Market and security hedging programs
- Asset and liability hedging
- Currency management

Investing involves market and program specific risks. All investments are subject to loss.

# The Parametric Difference



## Collaborative, client-centric approach

Clients are supported by a high-touch, consultative team with decades of experience structuring and executing custom strategies.



## The next level of implementation refinement

Our investments in technology and thoughtful trade execution deliver highly competitive solutions across markets.



## Comprehensive, transparent investment approach

Clients gain comprehensive exposure management tools with daily reporting delivered in a customizable format.

# Diversity, Equity, and Inclusion

## Our mission

We aspire to be an industry leader in our representation of a truly diverse and inclusive workforce to reflect the communities in which we live and work.

## Our principles



### Accountability

Senior leadership teams take actions to improve diversity, equity, and inclusion.



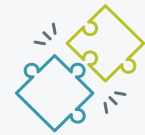
### Advancement

Through training and education, we support all employees along their career journeys.



### Representation

We boost representation through targeted recruitment, development, and retention.



### Culture

We aim to foster an atmosphere of inclusion and belonging.

## Helping our clients stay true to their DEI missions

We offer you customizable ways to pursue your missions through our wide array of responsible investing strategies, including portfolio construction and active ownership.

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*"Making sustained, meaningful progress in our firm's DEI agenda is a top priority for Parametric. Our employees deserve it, our clients expect it, and we perform better as a business because of it." —Brian Langstraat, CEO*

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# Representative Client List as of December 31, 2021

## > **Public**

East Bay Municipal Utility District  
Fairfax County Retirement Systems  
Houston Police Officers' Pension System  
Manhattan & Bronx Surface Transit Operating Authority Pension Plan  
Marin County Employees' Retirement Association  
Massachusetts Pension Reserves Investment Management Board  
New Mexico Public Employees' Retirement Association  
Oakland Police and Fire Retirement System  
Orange County Employees Retirement System  
San Mateo County Employees' Retirement Association  
Teachers Retirement System of Louisiana  
Utah School & Institutional Trust Funds Office  
Wisconsin Investment Board

## > **Endowments**

Carnegie Institution of Washington  
Florida State University  
Indiana University Foundation  
Pepperdine University  
Texas Christian University  
University of Michigan  
University of Minnesota

## > **Faith Based**

Catholic Diocese of Fort Worth  
Covenant Ministries of Benevolence  
Ministers & Missionaries' Benefit Board of American Baptist Churches  
Pension Fund of the Christian Church  
YMCA Retirement Fund

## > **Healthcare**

Advocate Aurora Health, Inc.  
North Memorial Health Care  
Trinity Health

## > **Taft-Hartley**

Board of Trustees ABC-NABET Retirement Trust Fund  
Boilermaker-Blacksmith National Pension Trust  
Greater Pennsylvania Carpenters' Pension Fund  
Chicago Laborers' Pension & Welfare Funds  
International Union of Painters and Allied Trades  
SEIU Benefit Funds  
Teamsters, Western Pennsylvania

## > **Foundations**

The John D. & Catherine T. MacArthur Foundation  
The McKnight Foundation  
Strada Education Network, Inc.  
Wisconsin Alumni Research Foundation

## > **Corporate**

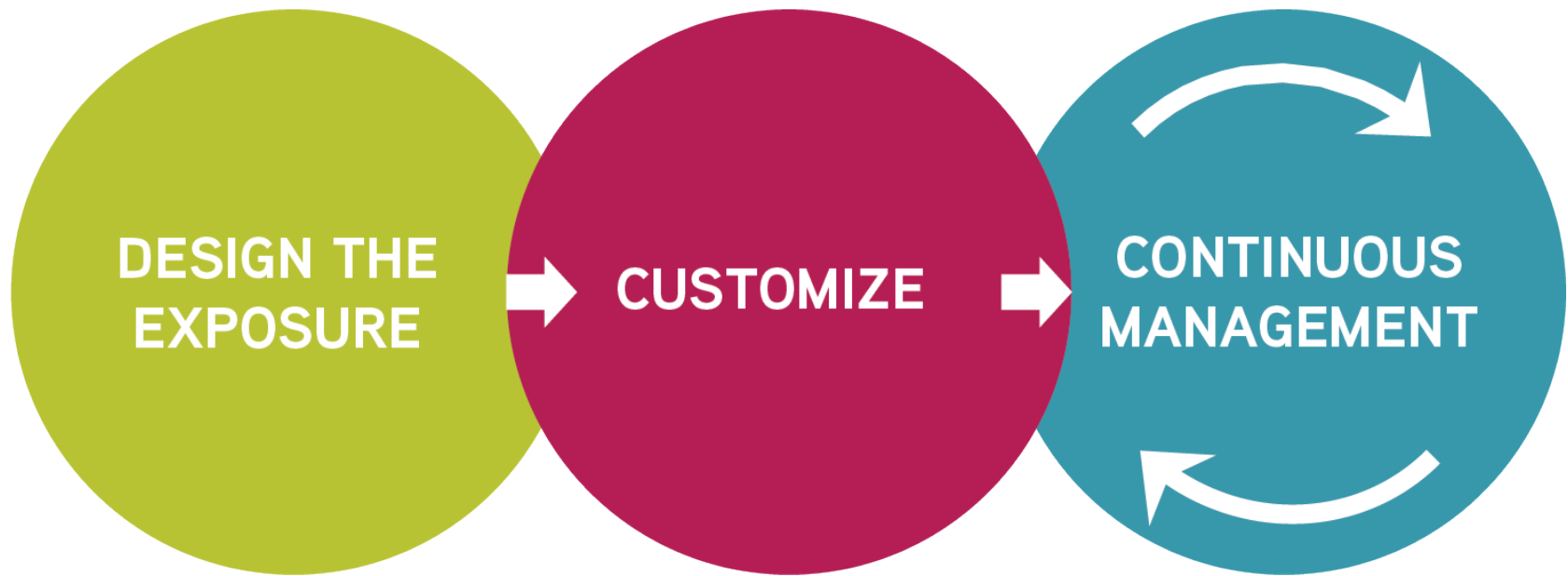
The Boeing Company  
Eversource Energy  
3M Company  
Target Corporation  
Raytheon Technologies Corporation

It is not known whether the listed clients approve or disapprove of the adviser. The partial list of clients included herein were selected as being representative of the different types of institutional clients and businesses serviced by Parametric. Performance-based data was not a determining factor in their selection.



# Portfolio Review

# Custom Core<sup>®</sup> Equity Investment Process



# Design the Exposure



You can blend Parametric strategies and licensed benchmarks to create a portfolio that represents a custom geographic exposure or investment style

## Licensed benchmarks

### Cap-weighted benchmarks

- US, International, Global

### Responsible investing benchmarks

- MSCI ESG
- KLD 400

### Factor benchmarks

- MSCI Factor Indexes
- S&P® Factor Indexes

## Parametric strategies

### Responsible investing strategies

- FFV Catholic Values
- Fossil Free
- ESG
- Jewish Values
- Shariah Compliant

### Factor strategies

- Value
- Dividend Yield
- Momentum
- Quality
- Low Volatility
- Value, Size, Profitability
- Value, Momentum, Profitability

# Colorado Public School Fund Investment Board's Portfolio

Portfolio structure:

---

**Objective:** Provide global equity exposure while adhering to CPSFIB's gain/loss requirement

**Custom benchmark:** 60% Russell 3000 Index/40% MSCI ACWI ex-US Index

**Instruments:** Exchange Traded Funds (ETFs)

**Target tracking error:** +/- 1% per annum

**Rebalancing:** Coordinated with tracking error and gain/loss realization goals

CPSFIB Customizations:

---

**Loss Avoidance:** Managed to be gain/loss neutral; gains or losses only realized after consultation with CPSFIB staff and Callan

**Individual equity securities prohibited:** Utilize basket of ETFs

**Dividends:** Swept quarterly

**Consultative management:** Regular discussions with CPSFIB staff and Callan to review positioning, performance, gain/loss needs

**Customizable:** Will strive to realize gains to offset losses elsewhere in CPSFIB portfolio, when directed to do so

# Customize



Parametric offers many customization options to help investors manage risk in their portfolios. Here are a few examples.

## Exposure Options

- > Index blending
- > Factor tilts
- > Management of in-kind assets
- > ETF management
- > Call-writing overlays
- > Sector and industry exclusions

## Responsible Investing

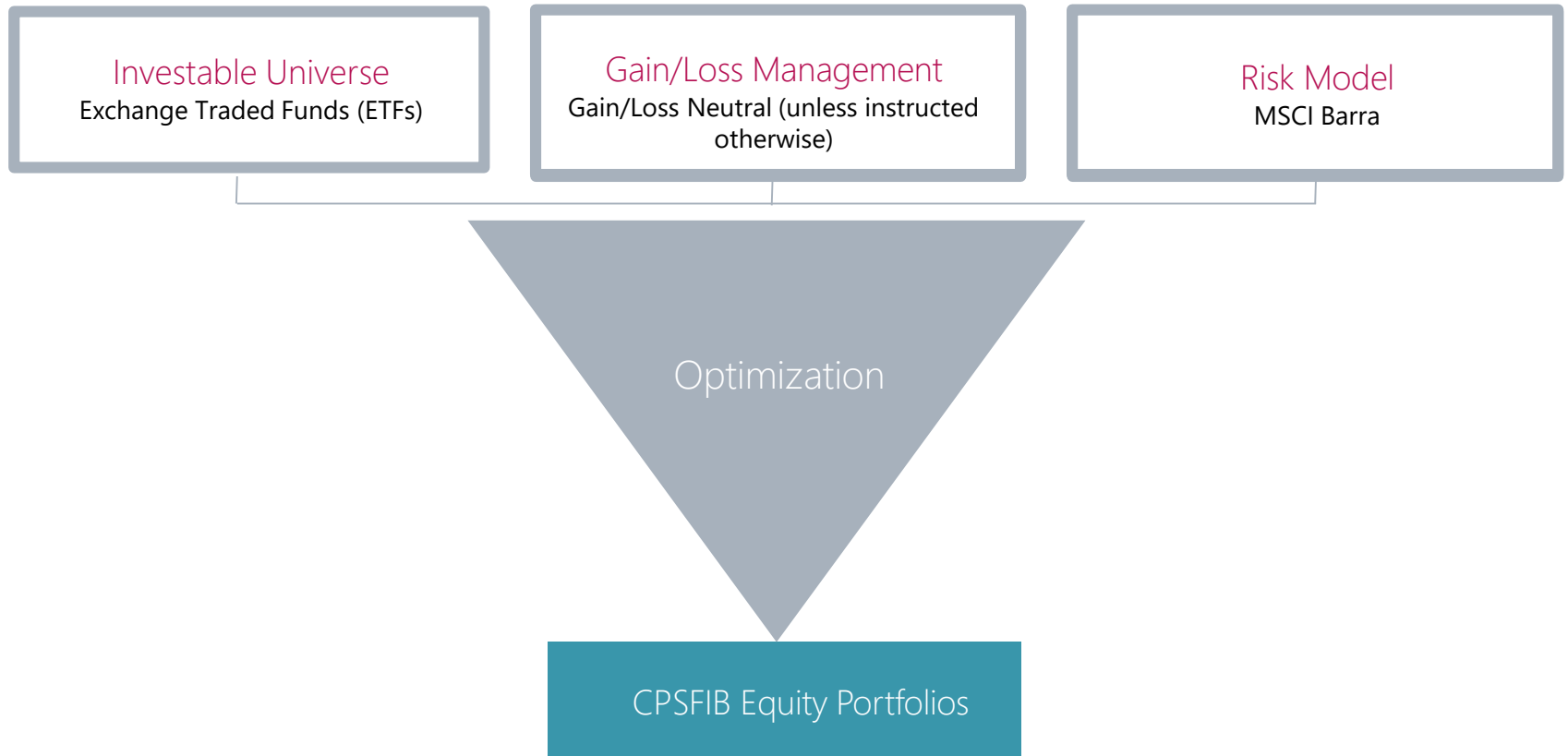
- > Screens
- > Integrations
- > Socially responsible indexes
- > Proxy voting
- > Shareholder resolutions

Customization options vary by firm and platform.



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# Equity Investment Process



# Colorado Public School Fund Investment Board Relationship Review

<b>December 12, 2017:</b>	Initial investment of \$50,000,000
<b>2018:</b>	Additional investment of \$165,000,000
<b>2019:</b>	Additional investment of \$11,000,000
<b>2020:</b>	Net Additional investment of \$3,075,000
<b>2021:</b>	Net Additional investment of \$65,400,000
<b>December 31, 2021:</b>	\$405,608,203

## Performance as of December 31, 2021

*Periods over one year are annualized*

	MTD	QTD	1 Year	3 Year	2018	2019	2020	Since Inception*
Colorado Public School Fund Investment Board (Gross-of-Fees)	3.69	6.22	18.81	20.72	-8.82	26.99	16.60	12.75
Colorado Public School Fund Investment Board (Net-of-Fees)	3.68	6.19	18.72	20.62	-8.90	26.87	16.51	12.66
60% Russell 3000 / 40% ACWI ex US	4.01	6.29	18.30	20.65	-8.83	27.15	17.13	12.69

\*Inception date: 12/12/2017

Performance reflects the deduction of brokerage commissions and the reinvestment of dividends and other earnings. Performance for periods of less than one year has not been annualized. Performance, cost basis, unrealized gain/losses, and realized gains/losses calculated and reported by Parametric may vary from official custodial statements based on different accounting procedures, reporting dates or valuation methodologies for certain securities. This information has not been audited and is subject to change without notice. Past performance is not indicative of future results. It is not possible to invest directly in an index; they are unmanaged and do not reflect the deduction of fees, taxes and expenses. See Disclosures for additional information.



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Fourth Quarter 2021 – Custom Core® equity

# Portfolio Characteristics

## Colorado Public School Fund Investment Board As of December 31, 2021

Characteristics	Portfolio	Benchmark
Number Of Holdings	9,369	5,397
Dividend Yield	1.66	1.69
Weighted Avg. Cap. (millions)	\$376,012	\$381,047

Sector Weights (%)	Portfolio	Benchmark
Communication Services	7.90	7.96
Consumer Discretionary	12.26	12.28
Consumer Staples	6.39	6.69
Energy	3.45	3.52
Financials	14.14	14.45
Health Care	11.54	11.80
Industrials	10.69	10.38
Information Technology	22.45	22.40
Materials	4.99	4.69
Real Estate	3.51	3.12
Utilities	2.69	2.71

Source: Parametric as of 12/31/2021. Sectors, as of the date indicated, are based on weightings, not performance. Information is as of the date indicated and is subject to change at any time. It is not possible to invest directly in an index.



# Portfolio Characteristics

## Colorado Public School Fund Investment Board As of December 31, 2021

		Weight	Cost Basis	Market Value	Unrealized Gain/Loss	Dividend Yield
<b>EWC</b>	ISHARES MSCI CANADA	3.61%	\$11,569,152	\$14,629,801	\$3,060,650	2.5%
<b>ITOT</b>	ISHARES CORE S&P TOTAL US STOCK MKT ETF	60.76%	\$156,934,699	\$246,444,049	\$89,509,350	1.2%
<b>IEMG</b>	ISHARES CORE MSCI EMERGING	11.05%	\$42,163,743	\$44,800,361	\$2,636,618	2.3%
<b>IEFA</b>	ISHARES TR CORE MSCI EAFE	24.50%	\$89,147,175	\$99,383,384	\$10,236,209	2.4%
	US Dollars	0.09%	\$350,607	\$350,607		
<b>TOTAL</b>		<b>100%</b>	<b>\$300,165,376</b>	<b>\$405,608,203</b>	<b>\$105,442,827</b>	<b>1.7%</b>

Source: Parametric and FactSet as of 12/31/2021. Sectors, as of the date indicated, are based on weightings, not performance. Information is as of the date indicated and is subject to change at any time. It is not possible to invest directly in an index.

# Country Weights

Colorado Public School Fund Investment Board  
As of December 31, 2021

Weights (%)	Portfolio	Benchmark
Argentina	0.00	0.02
Australia	1.80	1.83
Austria	0.08	0.06
Belgium	0.25	0.23
Brazil	0.46	0.46
Canada	3.32	3.01
Chile	0.05	0.04
China	3.19	3.71
Colombia	0.02	0.02
Cyprus	0.02	0.00
Czech Republic	0.01	0.02
Denmark	0.64	0.69
Egypt	0.01	0.01
Finland	0.28	0.26
France	2.56	2.98
Germany	2.04	2.28
Greece	0.03	0.02
Hong Kong	0.70	0.77
Hungary	0.02	0.03
India	1.51	1.44
Indonesia	0.17	0.17
Ireland	0.12	0.18
Israel	0.26	0.20
Italy	0.60	0.64
Japan	5.67	5.73
Kuwait	0.07	0.07

	Portfolio	Benchmark
Malaysia	0.17	0.16
Mexico	0.22	0.24
Netherlands	1.10	1.25
New Zealand	0.08	0.05
Norway	0.23	0.17
Peru	0.02	0.03
Philippines	0.08	0.08
Poland	0.09	0.09
Portugal	0.05	0.05
Qatar	0.09	0.09
Russia	0.33	0.41
Saudi Arabia	0.36	0.39
Singapore	0.33	0.31
South Africa	0.35	0.36
South Korea	1.46	1.48
Spain	0.53	0.57
Sweden	1.10	1.05
Switzerland	2.37	2.66
Taiwan	1.87	1.86
Thailand	0.21	0.19
Turkey	0.04	0.03
United Arab Emirates	0.12	0.13
United Kingdom	3.80	3.77
United States	61.13	59.72

Source: Parametric and FactSet as of 12/31/2021. Countries, as of the date indicated, are based on weightings, not performance. Information is as of the date indicated and is subject to change at any time. It is not possible to invest directly in an index.

# Appendices

# Parametric Investment Committee: Custom Core<sup>®</sup>

**Thomas Lee, CFA**  
Chief Investment Officer

## Investment Strategy

**Paul Bouchey, CFA**  
Global Head of Research

**Jennifer Sireklove, CFA**  
Managing Director, Investment Strategy

**Jeremy Milleson**  
Director, Investment Strategy

## Portfolio Management

**Thomas Seto**  
Head of Investment Management

**Jim Reber\***  
Managing Director, Portfolio Management

**Gordon Wotherspoon\***  
Managing Director, Advisor Channel  
Portfolio Management

\*non voting members

# Biographies

## Thomas Lee, CFA

### Chief Investment Officer

Tom is a member of Parametric's Executive Committee and leads Parametric's Research, Strategy, Portfolio Management, and Trading teams, coordinating resources, aligning priorities, and establishing processes for achieving clients' investment objectives. Tom has coauthored articles on topics ranging from liability-driven investing to the volatility risk premium. He is a voting member of all the firm's investment committees. Prior to joining Parametric in 1994 (originally as an employee of the Clifton Group, which was acquired by Parametric in 2012), Tom spent two years working for the Board of Governors of the Federal Reserve in Washington, DC. He earned a BS in economics and an MBA in finance from the University of Minnesota. A CFA charterholder, Tom is a member of the CFA Society of Minnesota. of the CFA Society of Seattle.

## Jennifer Sireklove, CFA

### Managing Director, Investment Strategy

Jennifer leads the Investment Strategy Team at Parametric, which is responsible for all aspects of Parametric's equity-based investment strategies. In addition, she has direct investment responsibility for Parametric's Emerging Markets and International Equity Strategies and chairs Parametric's Stewardship Committee. Previously she helped build Parametric's active ownership and custom ESG portfolio construction practices. Prior to joining Parametric in 2013, she worked in equity research, primarily covering the energy, utility, and industrial sectors at firms including D.A. Davidson and McAdams Wright Ragen. Jennifer earned an MBA in finance and accounting from the University of Chicago and a BA in economics from Reed College. A CFA charterholder since 2006, Jennifer is a member of the CFA Society of Seattle.

## Dan Ryan

### Senior Director, Client Relationship Management

Dan is responsible for managing client relationships throughout the western US. Prior to joining Parametric in 2013, Dan was vice president and senior relationship manager at State Street Global Advisors. He earned a BA in history from the University of Michigan.

## Thomas Seto

### Head of Investment Management

Thomas is responsible for all portfolio management and trading related to our equity strategies. Prior to joining Parametric in 1998, Thomas served as the head of US Equity Index investments at Barclays Global Investors. He earned an MBA in finance from the University of Chicago Booth School of Business and a BS in electrical engineering from the University of Washington.

## Paul Bouchey, CFA

### Global Head of Research

Paul leads Parametric's research and development activities across equity and derivative strategies. He is the Co-Editor of the Journal of Wealth Management and has authored numerous journal articles on tax management, risk management, and factor investing. Paul earned a BA in mathematics and physics from Whitman College and an MS in computational finance and risk management from the University of Washington. A CFA charterholder, he is a member of the CFA Society of Seattle.

## Jeremy Milleson

### Director, Investment Strategy

Jeremy is responsible for assisting in the continued evolution of Parametric's Custom Core® Strategies. He works closely with clients and advisors to design, develop, and implement custom portfolio solutions. Prior to joining Parametric in 2012, Jeremy worked as an instructor in economics at the University of Washington and also worked for Bernstein Investment Research and Management and Banc of America Investment Services. He earned MA and BS degrees in economics from the University of Washington.

## Jim Reber

### Managing Director, Portfolio Management

James is responsible for portfolio management of Parametric's Private Client Direct Group, primarily serving Parametric's wealth management and family office client base. The Private Client Direct Group manages US, non-US, and global Custom Core® portfolios. Prior to joining Parametric in 2004, James was a senior associate with Standard and Poor's Corporate Value Consulting Group, providing financial valuation services to IT and technology industries. He earned an MBA from the University of Washington and a BS in chemical engineering from Michigan State University.

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*Disclosures continued on the next page.*

# Disclosure Continued

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