



## **Executive Summary Fourth Quarter 2022**

Arkansas Public Employees  
Retirement System

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Senior Vice President

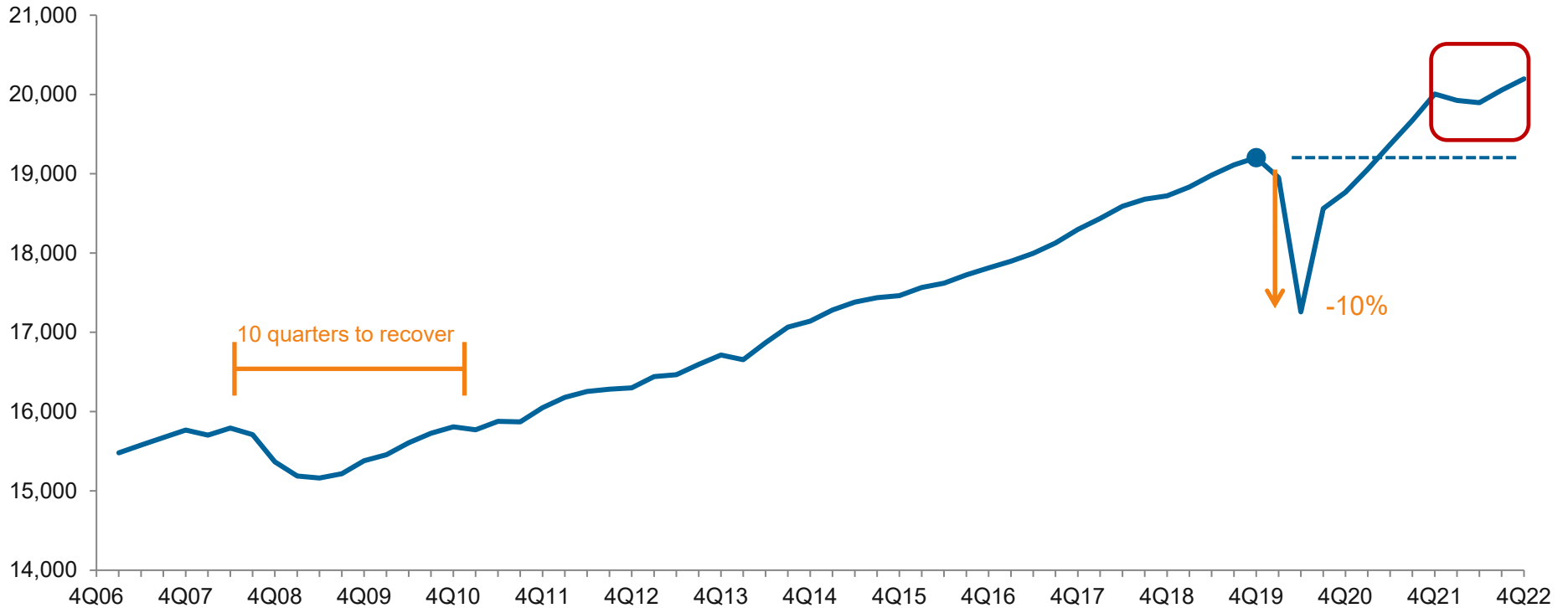
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Senior Vice President

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# GDP Dropped for Two Straight Quarters in 1Q and 2Q, but Rebounded in 3Q and 4Q

Recovered pre-pandemic level in 2Q21 after deepest drop in 75 years

Seasonally Adjusted Real GDP in Billions of Dollars Through 12/31/22



GDP growth in 2022 slowed compared to 2021 but rebounded after declines in the first two quarters of last year.

- ▶ 4Q22 GDP rose 2.9%, after a 3.2% rise in 3Q, a 0.6% drop in 2Q, and a 1.6% decline in 1Q.
- ▶ Loss of business and consumer confidence followed the start of the conflict in Ukraine.
- ▶ Consumer wealth hit by stock and bond market drop, and now a sharp slowdown in residential housing, as mortgage rates doubled from the start of the year.

Source: Federal Reserve Bank of St. Louis

# Equity and Fixed Income Markets Down Together in 2022

Declines for both stocks and bonds for three straight quarters are extremely unusual

## Global equity markets down sharply in 2022 despite rebound in 4Q

- Similar impact across all equity market segments: developed, emerging, small cap

## Fixed income down with sharply higher inflation and interest rates

- Bloomberg Aggregate: -13% for the year, worst year ever for the index by a wide margin
- CPI-U: +6.5% for the year ended Dec. 2022
- ▶ Number of times stocks and bonds have been down together
  - 38 quarters in almost 100 years, about 10% of the quarters
  - But just twice on annual basis
- ▶ Inflation at highest rate in decades
- ▶ Economic data show growth hit ‘pause’
  - GDP rose 2.9% in 4Q22, after a 3.2% rise in 3Q, a 0.6% drop in 2Q, and a 1.6% decline in 1Q.

## Returns for Periods ended 12/31/22

	Quarter	Year to Date	1 Year	5 Years	10 Years	25 Years
<b>U.S. Equity</b>						
Russell 3000	7.18	-19.21	-19.21	8.79	12.13	7.68
S&P 500	7.56	-18.11	-18.11	9.42	12.56	7.64
Russell 2000	6.23	-20.44	-20.44	4.13	9.01	7.13
<b>Global ex-U.S. Equity</b>						
MSCI World ex USA	16.18	-14.29	-14.29	1.79	4.59	4.65
MSCI Emerging Markets	9.70	-20.09	-20.09	-1.39	1.44	--
MSCI ACWI ex USA Small Cap	13.31	-19.97	-19.97	0.67	5.24	6.87
<b>Fixed Income</b>						
Bloomberg Aggregate	1.87	-13.01	-13.01	0.02	1.06	3.97
90-day T-Bill	0.84	1.46	1.46	1.26	0.76	1.91
Bloomberg Long Gov/Credit	2.61	-27.09	-27.09	-1.21	1.57	5.38
Bloomberg Global Agg ex-US	6.81	-18.70	-18.70	-3.07	-1.64	2.71
<b>Real Estate</b>						
NCREIF:NFI-ODCE Eq Wt Net	-5.08	7.56	7.56	8.31	9.46	7.77
FTSE Nareit Equity	5.24	-24.37	-24.37	3.68	6.53	7.87
<b>Alternatives</b>						
CS Hedge Fund Index	0.92	1.06	1.06	4.25	4.24	5.81
Cambridge Private Equity*	-1.84	-3.77	-3.77	16.84	15.31	14.31
Bloomberg Commodity	2.22	16.09	16.09	6.44	-1.28	1.87
Gold Spot Price	9.22	-0.13	-0.13	6.88	0.86	7.64
<b>Inflation - CPI-U</b>	0.00	6.45	6.45	3.78	2.60	2.47

\*Cambridge PE data through 09/30/22.

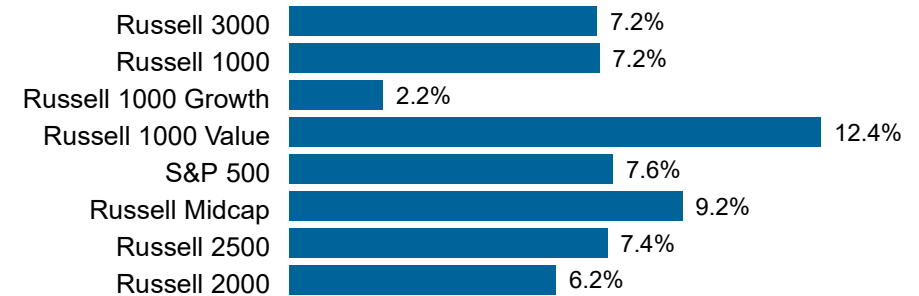
Sources: Bloomberg, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

# U.S. Equity Performance: 4Q22

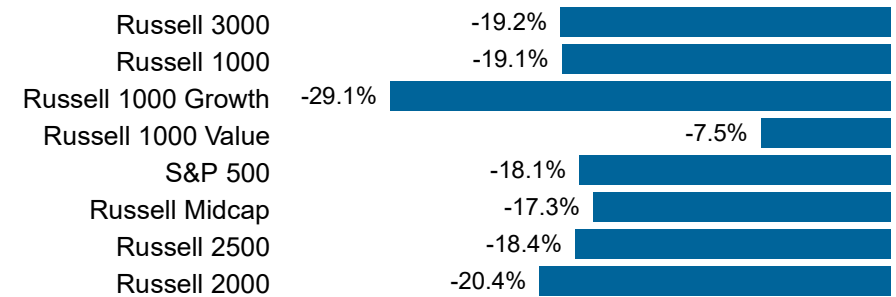
## Markets retrace in December after gains in the prior two months

- ▶ The S&P 500 Index posted positive returns in both October and November but fell in December. The index was up 7.6% during 4Q22 but ended 2022 down 18.1%.
- ▶ Energy was the best-performing sector during the quarter and 2022, returning 23% and 66% respectively. Consumer Discretionary and Communication Services were the only two sectors that posted negative returns in 4Q.
- ▶ Value stocks outperformed growth across the market capitalization spectrum, and for both 4Q and the full year.
- ▶ Large cap stocks (Russell 1000) outperformed small caps (Russell 2000) last quarter and for the year.
- ▶ Continued macroeconomic concerns (e.g., inflation, potential recession, geopolitical issues) led to higher volatility and a down-year for U.S. equities.

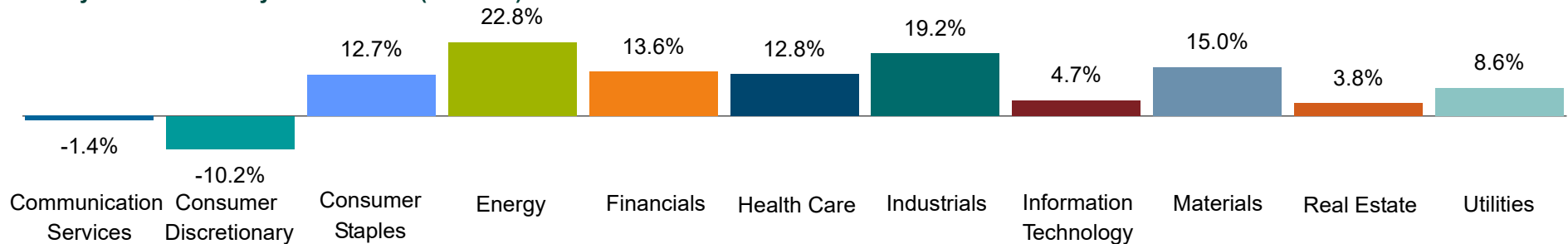
### U.S. Equity Returns: Quarter Ended 12/31/22



### U.S. Equity Returns: One Year Ended 12/31/22



### Industry Sector Quarterly Performance (S&P 500) as of 12/31/22



Sources: FTSE Russell, S&P Dow Jones Indices

# Global/Global ex-U.S. Equity Performance: 4Q22

## Ending on a high note

4Q22 was a bright spot during a tough calendar year in global and global ex-U.S. equity markets.

### Encouraging signs

- ▶ Lower-than-expected U.S. inflation data buoyed market optimism at the end of the year.
- ▶ The Fed slowed its pace of tightening with further slowing expected in 2023.
- ▶ China reversed its zero-COVID policies, prompting exuberance from investors.

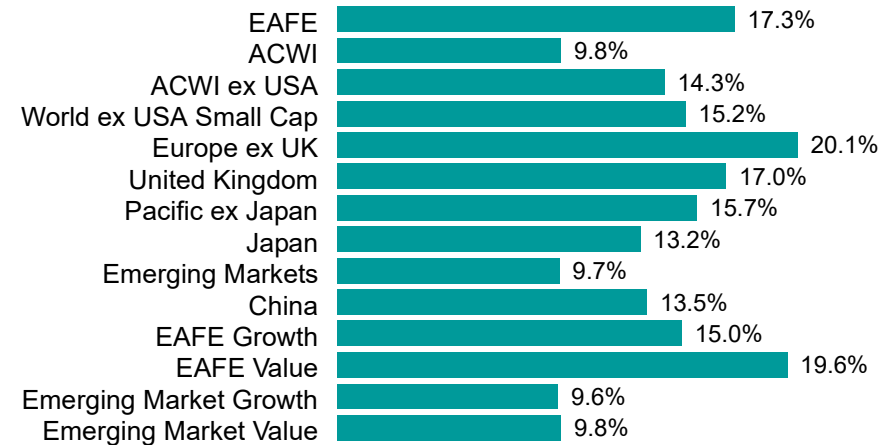
### Growth vs. value

- ▶ Value outpaced growth across developed and emerging markets.
  - Economically sensitive sectors (e.g., Financials and Industrials) benefited from the anticipation of improved growth; Energy was the largest outperformer.

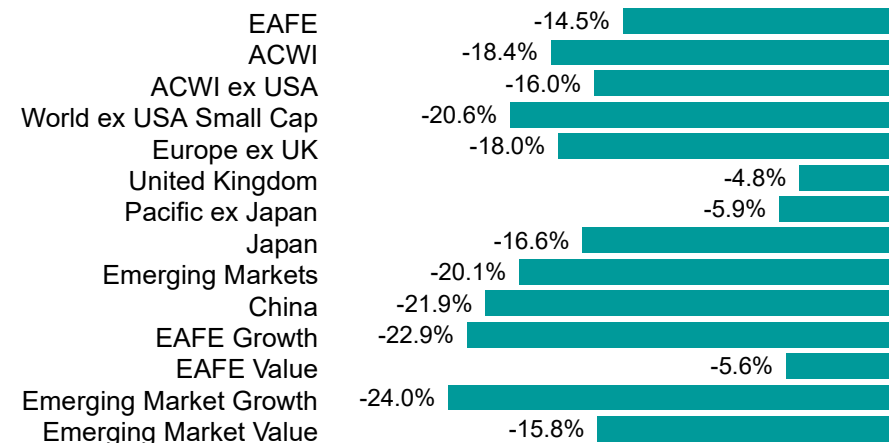
### U.S. dollar vs. other currencies

- ▶ After reaching a multi-decade high, the dollar fell against all major currencies with signs of inflation easing.
  - Despite the 7.7% decline in 4Q22, the dollar still gained nearly 8% over the full year.

### Global Equity Returns: Quarter Ended 12/31/22



### Global Equity Returns: One Year Ended 12/31/22



Source: MSCI

# U.S. Fixed Income Performance: 4Q22

## Bonds were up in 4Q but 2022 results remain negative

- ▶ Aggregate: positive return driven by coupon income and spread tightening; interest rates rose modestly
- ▶ Rates were volatile intra-quarter
  - UST 10-year yield: high 4.22% on 11/7; low 3.42% on 12/7
  - Curve remained inverted at quarter-end; 10-year yield 3.88% and 2-year yield 4.41%; most since 1981
- ▶ Fed raised rates, bringing target to 4.25%-4.50%
  - Median expectation from Fed is 5.1% for year-end 2023
  - Inflation showed signs of moderating but job market remained tight with solid wage growth

## Corporates and mortgages outperformed Treasuries in 4Q but underperformed for the year

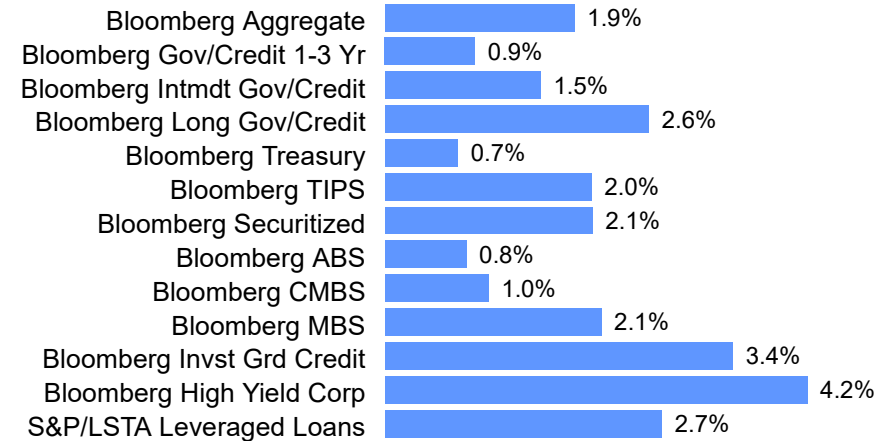
- ▶ 4Q: Corporates +289 bps excess return; MBS +110 bps
- ▶ 2022: Corporates -125 bps excess return; MBS -223 bps
- ▶ MBS had worst month ever (September: -191 bps) and best month ever (November: +135 bps) in excess returns.

## Valuations fair

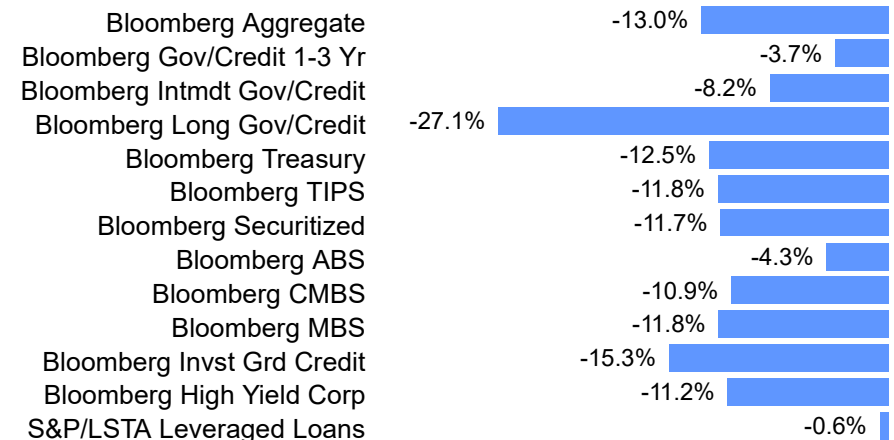
- ▶ While absolute yields are higher, spreads have not widened materially and most are close to historical averages.
- ▶ An economic slowdown/recession could impact credit spreads.
- ▶ Higher yields boosting forward-looking return outlooks across sectors

Sources: Bloomberg, S&P Dow Jones Indices

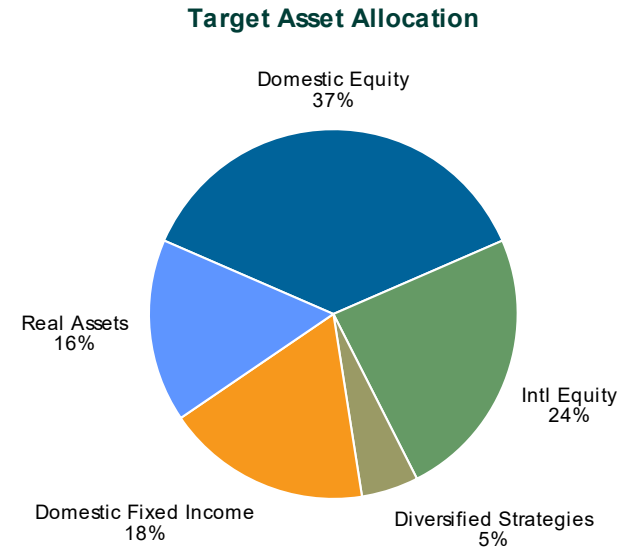
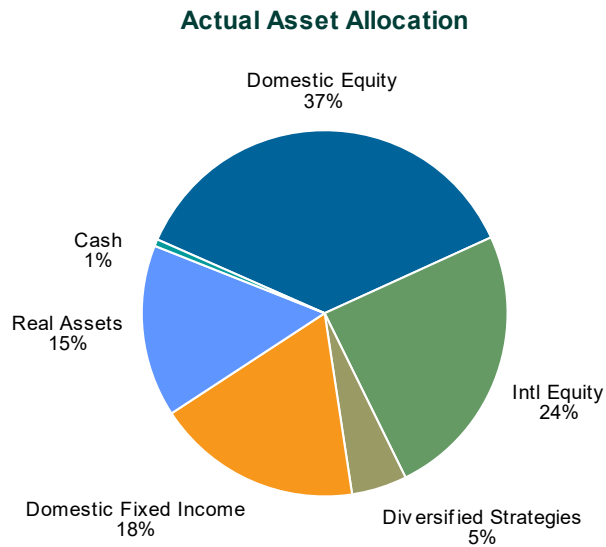
## U.S. Fixed Income Returns: Quarter Ended 12/31/22



## U.S. Fixed Income Returns: One Year Ended 12/31/22



# Actual vs. Target Asset Allocation



Asset Class	\$000s Actual	Weight Actual	Target	Percent Difference	\$000s Difference
Domestic Equity	3,688,918	36.6%	37.0%	(0.4%)	(38,924)
Intl Equity	2,464,699	24.5%	24.0%	0.5%	46,640
Diversified Strategies	497,809	4.9%	5.0%	(0.1%)	(5,953)
Domestic Fixed Income	1,830,977	18.2%	18.0%	0.2%	17,432
Real Assets	1,528,886	15.2%	16.0%	(0.8%)	(83,154)
Cash	63,959	0.6%	0.0%	0.6%	63,959
Total	10,075,248	100.0%	100.0%		

- The APERS Investment Policy states that rebalancing to the target asset allocation should take place when the actual asset allocation falls outside of a +/- 5% range from the target asset allocation. All asset classes are within their allowable ranges.

# Investment Manager Asset Allocation

	December 31, 2022			September 30, 2022		
	Market Value	Weight	Net New Inv.	Inv. Return	Market Value	Weight
<b>Domestic Equity</b>	<b>\$3,688,917,840</b>	<b>36.61%</b>	<b>\$(65,892,289)</b>	<b>\$229,880,182</b>	<b>\$3,524,929,947</b>	<b>36.74%</b>
Lazard Asset Mgmt	444,750,488	4.41%	(313,092)	27,433,370	417,630,211	4.35%
CastleArk Mgmt. LLC	456,428,811	4.53%	(364,347)	24,299,525	432,493,634	4.51%
Mellon S&P 500 Index Fd	572,175,693	5.68%	(37,769,328)	43,122,053	566,822,969	5.91%
Horrell Capital Passive	194,838,596	1.93%	(72,471)	18,236,023	176,675,043	1.84%
Wellington Management	468,843,189	4.65%	(12,584,487)	54,181,790	427,245,886	4.45%
Intech	382,996,223	3.80%	(13,297,603)	(2,391,493)	398,685,318	4.16%
LSV Asset Management	342,450,915	3.40%	(435,811)	41,707,271	301,179,455	3.14%
Stephens Investment Mgmt.	420,900,601	4.18%	(658,771)	14,429,830	407,129,542	4.24%
Froley Revy Investment	405,533,323	4.03%	(396,379)	8,861,813	397,067,889	4.14%
<b>International Equity</b>	<b>\$2,464,699,071</b>	<b>24.46%</b>	<b>\$(2,059,341)</b>	<b>\$327,285,227</b>	<b>\$2,139,473,185</b>	<b>22.30%</b>
Artisan Partners	600,217,955	5.96%	(683,349)	94,222,226	506,679,078	5.28%
Mellon ACWI ex US Fund	553,262,024	5.49%	(79,321)	69,212,844	484,128,501	5.05%
Baillie Gifford Overseas	484,200,614	4.81%	(438,171)	62,056,105	422,582,679	4.40%
Lazard Asset Mgmt.	509,111,149	5.05%	(346,379)	62,732,054	446,725,475	4.66%
Acadian ACW ex US SmallCap	176,322,498	1.75%	(276,214)	20,365,554	156,233,157	1.63%
Franklin Templeton Intl SmallCap	141,312,901	1.40%	(235,908)	18,674,128	122,874,682	1.28%
Manning & Napier Advisors	271,930	0.00%	0	22,316	249,614	0.00%
<b>Diversified Strategies</b>	<b>\$497,809,270</b>	<b>4.94%</b>	<b>\$(723,159)</b>	<b>\$16,098,522</b>	<b>\$482,433,907</b>	<b>5.03%</b>
AQR Capital	145,007,782	1.44%	0	7,151,116	137,856,666	1.44%
Blackstone Alt. Asset Mgmt.	215,176,098	2.14%	(538,975)	5,090,201	210,624,872	2.20%
Newton Capital	137,625,390	1.37%	(184,185)	3,857,206	133,952,369	1.40%
<b>Domestic Fixed Income</b>	<b>\$1,830,977,089</b>	<b>18.17%</b>	<b>\$(897,592)</b>	<b>\$40,248,597</b>	<b>\$1,791,626,083</b>	<b>18.67%</b>
DoubleLine Capital	581,995,904	5.78%	(272,686)	9,124,267	573,144,323	5.97%
MacKay Shields	620,529,428	6.16%	(299,993)	16,639,065	604,190,355	6.30%
PGIM	628,451,757	6.24%	(324,913)	14,485,265	614,291,405	6.40%
<b>Real Assets</b>	<b>\$1,528,886,132</b>	<b>15.17%</b>	<b>\$42,711,176</b>	<b>\$(68,185,076)</b>	<b>\$1,554,360,032</b>	<b>16.20%</b>
<b>Energy</b>	<b>\$14,929</b>	<b>0.00%</b>	<b>\$0</b>	<b>\$79</b>	<b>\$14,849</b>	<b>0.00%</b>
CastleArk Glob Energy Fd	14,929	0.00%	0	79	14,849	0.00%
<b>REITS</b>	<b>\$21,122,545</b>	<b>0.21%</b>	<b>\$(42,570,576)</b>	<b>\$4,283,960</b>	<b>\$59,409,161</b>	<b>0.62%</b>
MCM EB DV Non-SL REIT Fd	21,122,545	0.21%	(42,570,576)	4,283,960	59,409,161	0.62%
<b>Core Real Estate</b>	<b>\$1,007,474,229</b>	<b>10.00%</b>	<b>\$(4,394,324)</b>	<b>\$(55,104,611)</b>	<b>\$1,066,973,164</b>	<b>11.12%</b>
Invesco Real Estate	619,681,632	6.15%	(867,256)	(32,079,112)	652,628,000	6.80%
Heitman Real Estate Trust LP	387,792,597	3.85%	(3,527,068)	(23,025,499)	414,345,164	4.32%
<b>Value Add Real Estate</b>	<b>\$334,805,293</b>	<b>3.32%</b>	<b>\$34,788,395</b>	<b>\$(17,996,508)</b>	<b>\$318,013,406</b>	<b>3.31%</b>
Clarion Lion Industrial Trust	41,555,525	0.41%	42,500,000	(944,475)	-	-
Harrison Street Fund VIII	32,723,324	0.32%	2,312,500	(73,813)	30,484,637	0.32%
Heitman Value Partners IV	56,213,363	0.56%	(705,117)	580,148	56,338,332	0.59%
LaSalle Inc & Growth VI LP	5,900,685	0.06%	(6,203)	(1,663,794)	7,570,682	0.08%
LaSalle Inc & Growth VII LP	35,392,235	0.35%	1,869,693	(655,724)	34,178,267	0.36%
Starwood SOF XII	17,257,629	0.17%	(236,882)	77,617	17,416,894	0.18%
TA Associates Realty Fund X	34,987	0.00%	(891)	6,093	29,785	0.00%
TA Associates Realty Fund XI	33,287,242	0.33%	(11,739,338)	(9,948,015)	54,974,595	0.57%
TA Associates Realty Fund XII	112,440,303	1.12%	794,633	(5,374,544)	117,020,214	1.22%
<b>Farmland</b>	<b>\$78,503,965</b>	<b>0.78%</b>	<b>\$55,583,511</b>	<b>\$6,584</b>	<b>\$22,913,870</b>	<b>0.24%</b>
IFC Core Farmland Fund	50,000,000	0.50%	30,011,700	0	19,988,300	0.21%
PGIM Agriculture	28,503,965	0.28%	25,571,811	6,584	2,925,570	0.03%
<b>Timber</b>	<b>\$86,965,172</b>	<b>0.86%</b>	<b>\$(695,830)</b>	<b>\$625,420</b>	<b>\$87,035,582</b>	<b>0.91%</b>
Pinnacle	86,965,172	0.86%	(695,830)	625,420	87,035,582	0.91%
<b>Cash</b>	<b>\$63,958,611</b>	<b>0.63%</b>	<b>\$(38,120,644)</b>	<b>\$263,933</b>	<b>\$101,815,322</b>	<b>1.06%</b>
<b>Total Fund</b>	<b>\$10,075,248,013</b>	<b>100.0%</b>	<b>\$(64,981,850)</b>	<b>\$545,591,386</b>	<b>\$9,594,638,477</b>	<b>100.0%</b>



# Asset Class Performance and Market Values

	Market Value \$(Dollars)	Ending Weight	Last Quarter	Fiscal YTD	Last Year	Last 3 Years	Last 5 Years
<b>Domestic Equity</b> Russell 3000 Index	\$3,688,917,840 -	36.85% -	6.49% 7.18%	2.45% 2.40%	(19.10%) (19.21%)	7.42% 7.07%	8.76% 8.79%
<b>International Equity</b> Benchmark****	\$2,464,699,071 -	24.62% -	15.31% 14.15%	4.51% 3.09%	(17.63%) (16.58%)	1.45% (0.80%)	2.34% 0.53%
<b>Diversified Strategies</b> Diversified Strategy Trgt**	\$497,809,270 -	4.97% -	3.34% 6.61%	1.29% 0.62%	(5.26%) (15.90%)	2.56% 2.43%	4.49% 4.14%
<b>Domestic Fixed Income</b> Blmbg Aggregate	\$1,830,977,089 -	18.29% -	2.25% 1.87%	(2.32%) (2.97%)	(13.79%) (13.01%)	(2.14%) (2.71%)	0.64% 0.02%
<b>Real Assets</b> CPIU + 4%	\$1,528,886,132 -	15.27% -	(4.27%) 0.98%	(3.49%) 2.14%	9.39% 10.46%	11.13% 8.92%	8.71% 7.78%
<b>REITS</b> S&P DJ US Select REIT	\$21,122,545 -	0.21% -	4.42% 4.76%	(6.39%) (6.11%)	(26.26%) (25.96%)	(1.79%) (1.37%)	- 2.50%
<b>Core Real Estate</b> NFI-ODCE Eq Wt Net	\$1,007,474,229 -	10.06% -	(5.18%) (5.08%)	(3.73%) (4.35%)	12.12% 7.56%	9.55% 9.72%	8.23% 8.31%
<b>Value Add Real Estate</b> NCREIF Total Index	\$334,805,293 -	3.34% -	(5.06%) (3.50%)	(3.13%) (2.95%)	19.52% 5.53%	19.61% 8.06%	17.35% 7.46%
<b>Farmland</b> NCREIF Farmland Index	\$78,503,965 -	0.78% -	0.03% 1.98%	0.03% 4.00%	- 9.54%	- 6.78%	- 6.38%
<b>Timber</b> NCREIF Timberland Index	\$86,965,172 -	0.87% -	0.72% 4.89%	5.75% 7.39%	15.53% 12.90%	6.78% 7.51%	3.49% 5.37%
<b>Total Fund***</b> Benchmark*	\$10,011,289,402 -	100.00% -	5.73% 6.88%	1.07% 1.61%	(13.74%) (12.59%)	4.59% 4.09%	5.59% 5.30%

- **Domestic Equity** underperformed the benchmark in the fourth quarter and has kept pace with the benchmark over the last 5-year period.
- **International Equity** outperformed the benchmark in the fourth quarter and leads its benchmark over the last 3- and 5-year periods.
- **Diversified Strategies** underperformed the target return in the fourth quarter but leads the target over longer time periods shown above.
- **Domestic Fixed Income** outperformed the benchmark in the fourth quarter and leads the index over longer trailing time periods due to its Core Plus orientation.
- **Real Assets** trailed the benchmark in the fourth quarter but has outperformed over longer periods.

\* Benchmark consists of 37% Russell 3000 Index, 24% MSCI ACWI ex US IMI Index, 18% Blmbg Aggregate Index, 16% CPI All Urban Cons +4%, 3% MSCI World Index and 2% Blmbg Aggregate Index

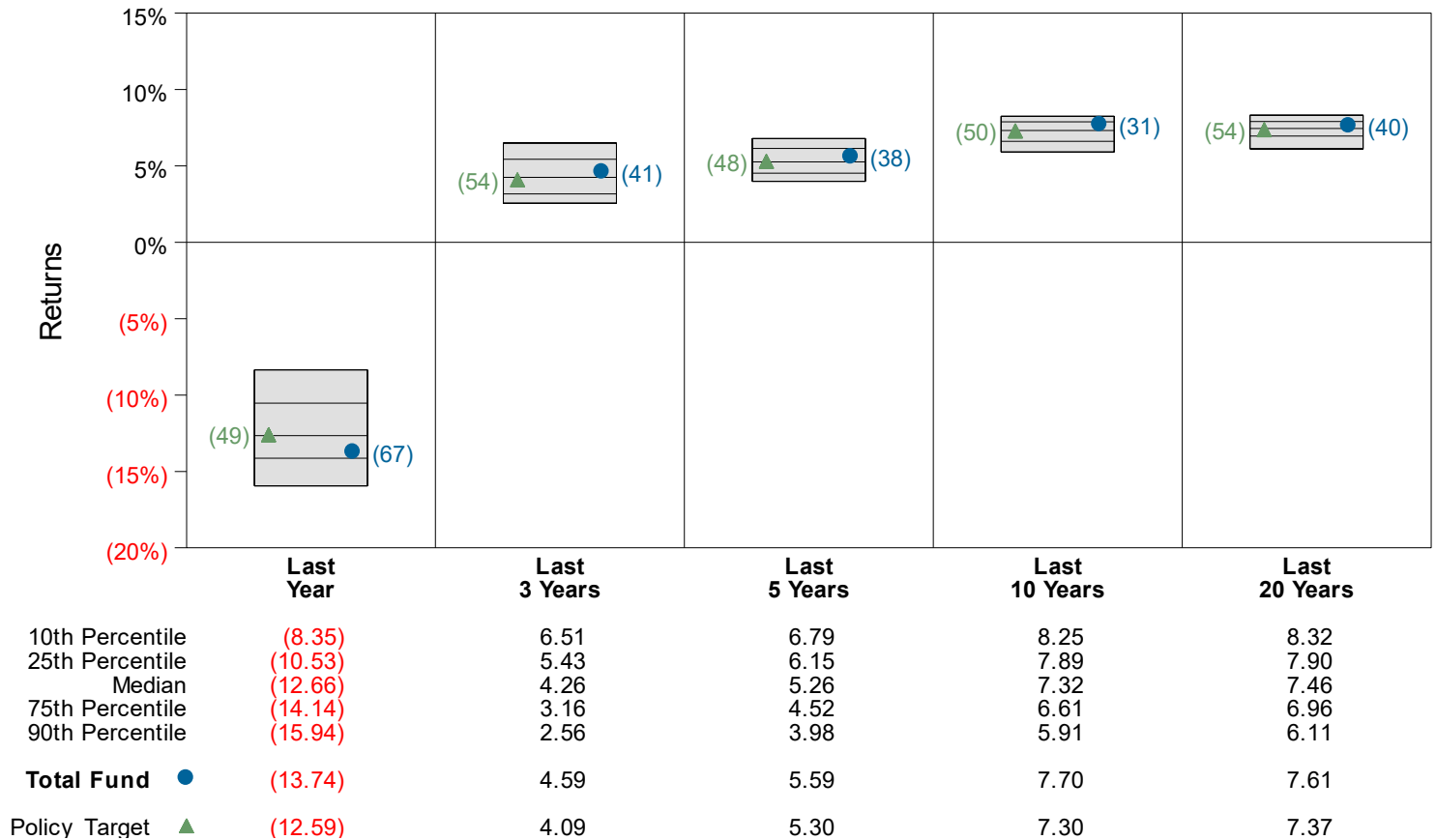
\*\* 60% MSCI World and 40% Bloomberg Aggregate.

\*\*\* Performance excludes In-House Cash Accounts.

\*\*\*\* MSCI EAFE through 12/31/2020; MSCI ACWI ex US IMI (Net) thereafter

# Total Fund Performance

## Callan Public Fund Sponsor Database



The Total Fund underperformed its policy target for the last year and ranked at the 67<sup>th</sup> percentile of its peer group. Over the remaining trailing periods, the fund has outpaced the benchmark return and ranked in the top half of peers.

*Policy Target consists of 37% Russell 3000 Index, 24% MSCI ACWI ex US IMI Index, 18% Blmbg Aggregate Index, 16% CPI All Urban Cons +4%, 3% MSCI World Index and 2% Blmbg Aggregate Index*

# Investment Manager Returns and Peer Group Rankings

	Last Quarter		Fiscal YTD		Last Year		Last 3 Years		Last 5 Years	
<b>Total Domestic Equity</b>	<b>6.49%</b>	<b>93</b>	<b>2.45%</b>	<b>72</b>	<b>(19.10%)</b>	<b>72</b>	<b>7.42%</b>	<b>35</b>	<b>8.76%</b>	<b>32</b>
Russell 3000 Index	7.18%	71	2.40%	74	(19.21%)	76	7.07%	46	8.79%	32
Pub Pln- Dom Equity	7.62%		2.85%		(18.16%)		7.00%		8.40%	
Lazard Asset Mgmt.	6.57%	71	(0.16%)	77	(18.59%)	67	4.41%	84	8.07%	65
Russell 3000 Index	7.18%	69	2.40%	67	(19.21%)	71	7.07%	56	8.79%	44
Callan All Cap Broad	10.33%		4.25%		(14.08%)		7.91%		8.56%	
CastleArk	5.62%	72	1.91%	68	(22.29%)	73	10.73%	13	11.22%	10
Russell 3000 Growth Index	2.31%	90	(1.13%)	86	(28.97%)	83	7.32%	55	10.45%	25
Callan All Cap Broad	10.33%		4.25%		(14.08%)		7.91%		8.56%	
Mellon S&P 500 Index Fd	7.56%	57	2.32%	56	(18.11%)	61	7.15%	72	9.12%	52
S&P 500 Index	7.56%	57	2.31%	56	(18.11%)	61	7.66%	63	9.42%	43
Callan Large Cap Core	7.71%		2.47%		(17.42%)		7.96%		9.24%	
Horrell Capital - Passive	10.32%	50	8.83%	18	(7.86%)	31	11.25%	11	10.64%	23
Bloomberg Arkansas Index	7.72%	67	9.83%	10	(1.40%)	17	17.63%	2	13.86%	1
S&P 500 Index	7.56%	68	2.31%	67	(18.11%)	63	7.66%	53	9.42%	35
Callan All Cap Broad	10.33%		4.25%		(14.08%)		7.91%		8.56%	
Wellington Management	12.58%	66	6.07%	68	(6.90%)	73	6.97%	67	7.34%	54
Russell 1000 Value Index	12.42%	67	6.11%	67	(7.54%)	80	5.96%	93	6.67%	71
Callan Large Cap Value	13.33%		6.90%		(4.92%)		7.79%		7.55%	
INTECH	(0.77%)	90	(4.61%)	90	(33.20%)	76	3.88%	76	7.78%	90
Russell 1000 Growth Index	2.20%	67	(1.48%)	57	(29.14%)	42	7.79%	29	10.96%	25
Callan Large Cap Growth	3.59%		(1.13%)		(29.99%)		6.21%		9.95%	
LSV Asset Management	13.85%	13	9.44%	13	(4.22%)	13	8.30%	38	4.83%	63
Russell 2000 Value Index	8.42%	91	3.42%	78	(14.48%)	83	4.70%	77	4.13%	84
Callan Small Cap Value	10.92%		5.36%		(10.56%)		7.24%		5.28%	
Stephens Investment Mgmt.	3.54%	57	2.10%	64	(27.17%)	51	5.19%	41	8.58%	44
Russell 2000 Growth Index	4.13%	45	4.38%	27	(26.36%)	45	0.65%	90	3.51%	95
Callan Small Cap Growth	3.89%		3.15%		(27.01%)		4.94%		8.44%	
SSI Investment Mgmt	2.23%	85	1.45%	79	(19.41%)	87	7.72%	24	8.79%	22
ML All Conv	1.59%	92	1.88%	71	(18.71%)	82	8.12%	21	9.29%	12
Callan Convert Bonds DB	3.97%		2.54%		(12.44%)		5.08%		5.90%	

- Total **Domestic Equity** trailed the Russell 3000 Index in the fourth quarter and ranked at the 93<sup>rd</sup> percentile of peers. The asset class is in line with its benchmark over the last 5-year period, and it ranks ahead of its peer group median over the trailing 3- and 5-year periods.
- LSV led its benchmark and ranked ahead of its peer group median for the quarter and has outperformed the benchmark over the trailing 1-, 3-, and 5-year periods.
- CastleArk, Wellington, and Froyley Revy (formerly SSI) beat their respective benchmarks but ranked in the bottom half of peers for the quarter. CastleArk and Wellington lead their benchmarks over longer periods. Froyley Revy (formerly SSI) has underperformed the benchmark but ranks in the top quartile of peers over the last 3- and 5-year periods.
- Stephens and Intech lagged their respective benchmarks for the quarter and ranked below median of peers. Stephens has outperformed over longer periods while Intech lags the benchmark and peers.

# Investment Manager Returns and Peer Group Rankings

	Last Quarter		Fiscal YTD		Last Year		Last 3 Years		Last 5 Years	
<b>International Equity</b>	<b>15.31%</b>	<b>47</b>	<b>4.51%</b>	<b>39</b>	<b>(17.63%)</b>	<b>72</b>	<b>1.45%</b>	<b>42</b>	<b>2.34%</b>	<b>30</b>
Benchmark(1)	14.15%	79	3.09%	75	(16.58%)	43	(0.80%)	86	0.53%	91
Pub Pln- Intl Equity	15.14%		3.95%		(16.88%)		1.14%		1.94%	
Artisan Partners	18.61%	16	7.95%	8	(5.53%)	3	6.76%	1	5.52%	4
MSCI EAFE	17.34%	30	6.36%	28	(14.45%)	42	0.87%	60	1.54%	63
Callan NonUS Eq	16.03%		5.35%		(15.29%)		1.39%		1.99%	
Mellon ACWI ex US Fund	14.30%	77	3.04%	85	(15.83%)	52	0.37%	69	1.19%	71
MSCI ACWI ex US	14.28%	77	2.96%	86	(16.00%)	53	0.07%	73	0.88%	77
Callan NonUS Eq	16.03%		5.35%		(15.29%)		1.39%		1.99%	
Baillie Gifford Overseas	14.70%	70	4.55%	66	(31.98%)	98	(1.86%)	94	1.14%	71
MSCI ACWIxUS Gross	14.37%	76	3.16%	84	(15.57%)	51	0.53%	66	1.36%	67
Callan NonUS Eq	16.03%		5.35%		(15.29%)		1.39%		1.99%	
Lazard Asset Mgmt.	14.05%	78	2.89%	86	(15.38%)	50	(0.16%)	77	1.58%	62
MSCI ACWIxUS Gross	14.37%	76	3.16%	84	(15.57%)	51	0.53%	66	1.36%	67
Callan NonUS Eq	16.03%		5.35%		(15.29%)		1.39%		1.99%	
Acadian ACW ex US SmallCap	13.05%	86	4.72%	45	(13.50%)	13	-	-	-	40
MSCI ACWI ex US Small Cap	13.31%	83	3.83%	70	(19.97%)	43	1.07%	34	0.67%	40
Callan Intl Small Cap	16.02%		4.52%		(20.64%)		0.14%		0.06%	
Franklin Templeton Intl SmallCap	15.22%	66	1.79%	92	(22.27%)	60	-	-	-	40
MSCI ACWI ex US Small Cap	13.31%	83	3.83%	70	(19.97%)	43	1.07%	34	0.67%	40
Callan Intl Small Cap	16.02%		4.52%		(20.64%)		0.14%		0.06%	
<b>Diversified Strategies</b>	<b>3.34%</b>		<b>1.29%</b>		<b>(5.26%)</b>		<b>2.56%</b>		<b>4.49%</b>	
Diversified Strategy Trgt**	6.61%		0.62%		(15.90%)		2.43%		4.14%	
AQR Capital	5.19%	63	(0.48%)	66	(15.36%)	72	(1.81%)	81	2.11%	59
Diversified Strategy Trgt**	6.61%	37	0.62%	52	(15.90%)	78	2.43%	42	4.14%	26
Intl/Global Balanced DB	5.75%		0.68%		(11.87%)		1.61%		2.56%	
Blackstone Alt. Asset Mgmt.	2.42%	87	3.69%	16	4.81%	3	5.23%	15	5.82%	13
T-Bills + 4%	1.80%	88	3.26%	18	5.46%	2	4.72%	20	5.26%	16
Intl/Global Balanced DB	5.75%		0.68%		(11.87%)		1.61%		2.56%	
Newton Capital	2.88%	86	(0.47%)	66	(7.61%)	19	3.59%	30	5.15%	17
LIBOR + 4%	1.95%	88	3.51%	17	5.80%	2	4.84%	19	5.37%	16
Intl/Global Balanced DB	5.75%		0.68%		(11.87%)		1.61%		2.56%	

- Total International Equity outperformed the benchmark and ranked at the 47<sup>th</sup> percentile of peers for the quarter. Artisan, Baillie Gifford, and Franklin Templeton led their benchmarks, while Lazard and Acadian underperformed.
- Over the last 3- and 5-year periods, Total International Equity leads the benchmark and ranks in the top half of peers.
- Diversified Strategies lagged its target in the fourth quarter. AQR trailed its target return and ranked in the third quartile of peers. BAAM and Newton outperformed their respective targets but ranked in the fourth quartile of peers for the quarter.
- The Diversified Strategies portfolio beat its benchmark over the last 3- and 5-year periods.

(1) MSCI EAFE through 12/31/2020; MSCI ACWI ex US IMI (Net) thereafter

\*\*60% MSCI World/40% Blmgb Aggregate

# Investment Manager Returns and Peer Group Rankings

	Last Quarter		Fiscal YTD		Last Year		Last 3 Years		Last 5 Years	
<b>Domestic Fixed Income</b>	<b>2.25%</b>	<b>30</b>	<b>(2.32%)</b>	<b>57</b>	<b>(13.79%)</b>	<b>80</b>	<b>(2.14%)</b>	<b>69</b>	<b>0.64%</b>	<b>56</b>
Blmbg Aggregate Index	1.87%	61	(2.97%)	78	(13.01%)	70	(2.71%)	95	0.02%	97
Pub Pln- Dom Fixed	1.98%		(2.21%)		(12.05%)		(1.44%)		0.79%	
DoubleLine Capital	1.59%	83	(2.48%)	60	(12.47%)	25	(2.48%)	89	0.23%	94
MacKay Shields	2.76%	13	(2.29%)	51	(14.47%)	88	(1.58%)	31	0.91%	30
PGIM	2.36%	31	(2.20%)	46	(14.32%)	87	(2.41%)	87	0.73%	51
Blmbg Aggregate Index	1.87%	66	(2.97%)	84	(13.01%)	42	(2.71%)	93	0.02%	96
Callan Core Plus FI	2.09%		(2.27%)		(13.28%)		(1.90%)		0.74%	
<b>Real Assets</b>	<b>(4.27%)</b>		<b>(3.49%)</b>		<b>9.39%</b>		<b>11.13%</b>		<b>8.71%</b>	
CPIU + 4%	0.98%		2.14%		10.46%		8.92%		7.78%	
<b>REITS</b>	<b>4.42%</b>		<b>(6.39%)</b>		<b>(26.26%)</b>		<b>(1.79%)</b>		-	
S&P DJ US Select REIT	4.76%		(6.11%)		(25.96%)		(1.37%)		2.50%	
MCM EB DV Non-SL REIT Fd	4.42%	42	(6.39%)	56	(26.26%)	74	(1.79%)	92	-	
S&P DJ US Select REIT	4.76%	28	(6.11%)	46	(25.96%)	63	(1.37%)	88	2.50%	91
Callan Real Estate REIT	4.26%		(6.14%)		(24.92%)		1.05%		4.96%	
<b>Core Real Estate</b>	<b>(5.18%)</b>		<b>(3.73%)</b>		<b>12.12%</b>		<b>9.55%</b>		<b>8.23%</b>	
NCREIF NFI-ODCE Eq Wt Net	(5.08%)		(4.35%)		7.56%		9.72%		8.31%	
Invesco Real Estate	(4.92%)	73	(3.58%)	74	7.72%	67	8.68%	60	8.39%	33
Heitman Real Estate Trust LP***	(5.61%)	84	(3.97%)	75	19.74%	9	10.97%	27	8.51%	33
NFI-ODCE Equal Weight Net	(5.08%)	75	(4.35%)	84	7.56%	68	9.72%	44	8.31%	33
Callan OE Core Cmngld RE	1.21%		0.76%		8.33%		9.11%		8.11%	
<b>Value Add Real Estate</b>	<b>(5.06%)</b>		<b>(3.13%)</b>		<b>19.52%</b>		<b>19.61%</b>		<b>17.35%</b>	
NCREIF Total Index	(3.50%)		(2.95%)		5.53%		8.06%		7.46%	
Harrison Street Fund VIII	(0.23%)		0.06%		4.32%		-		-	
Heitman Value Partners IV	1.04%		6.10%		25.61%		19.18%		-	
LaSalle Inc & Growth VI LP	(21.99%)		(27.39%)		(25.95%)		(11.74%)		(5.51%)	
LaSalle Inc & Growth VII LP	(1.85%)		(3.11%)		4.92%		11.63%		11.95%	
Starwood SOF XII	0.45%		7.66%		-		-		-	
TA Associates Realty Fund X	20.53%		26.67%		56.92%		15.82%		19.75%	
TA Associates Realty Fund XI	(19.21%)		(20.06%)		10.03%		22.95%		19.25%	
TA Associates Realty Fund XII	(4.59%)		(1.37%)		32.23%		-		-	
NCREIF Total Index	(3.50%)		(2.95%)		5.53%		8.06%		7.46%	
<b>Farmland</b>	<b>0.03%</b>		<b>0.03%</b>		-		-		-	
IFC Core Farmland Fund	0.00%		-		-		-		-	
PGIM Agriculture	0.17%		0.17%		-		-		-	
NCREIF Farmland Index	1.98%		4.00%		9.54%		6.78%		6.38%	
<b>Timber</b>	<b>0.72%</b>		<b>5.75%</b>		<b>15.53%</b>		<b>6.78%</b>		<b>3.49%</b>	
Pinnacle	0.72%		5.75%		15.53%		6.78%		3.49%	
NCREIF Timberland Index	4.89%		7.39%		12.90%		7.51%		5.37%	
<b>Total Fund</b>	<b>5.73%</b>	<b>50</b>	<b>1.07%</b>	<b>54</b>	<b>(13.74%)</b>	<b>67</b>	<b>4.59%</b>	<b>41</b>	<b>5.59%</b>	<b>38</b>
Benchmark*	6.88%	18	1.61%	33	(12.59%)	49	4.09%	54	5.30%	48
Callan Public Fund Spr DB	5.72%		1.18%		(12.66%)		4.26%		5.26%	

- **Domestic Fixed Income** outperformed the Bloomberg Aggregate Index in the fourth quarter and ranked in the top third of peers. MacKay Shields and PGIM finished ahead of the benchmark, while DoubleLine underperformed. The Fixed Income composite leads the index over longer periods.
- The **Real Assets** composite trailed its real return benchmark during the quarter. The REITS, Value-Add Real Estate, Core Real Estate, Farmland, and Timber allocations underperformed their respective benchmarks. The composite leads the benchmark over longer periods.
- The **Total Fund** underperformed its benchmark and finished at the 50<sup>th</sup> percentile of peers for the quarter. The Fund has delivered excess returns versus the benchmark and ranks in the top half of peers over the last 3- and 5-year periods.

\*Policy Target consists of 37% Russell 3000 Index, 24% MSCI ACWI ex US IMI Index, 18% Blmbg Aggregate Index, 16% CPI All Urban Cons +4%, 3% MSCI World Index and 2% Blmbg Aggregate Index  
 \*\*\* Funded July 8, 2015. Performance prior to October 1, 2015 represents fund composite returns.

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## Organizational Developments

**PGIM Fixed Income** – On January 11<sup>th</sup>, 2023, PGIM Fixed Income (PGIM FI) announced three retirements and appointments which will take place over the next 12 months across senior leadership, multi-sector, and U.S. investment grade credit teams.

Michael Lillard, Head of Fixed Income, will retire in April 2024 and John Vibert, President of PGIM FI, will assume Lillard's responsibilities as CEO and President of PGIM FI effective January 1, 2024. In Vibert's current role he works with Lillard on the strategic direction and overall management of the firm. He also oversees the global CLO business and will continue to upon his appointment to CEO. Craig Dewling and Greg Peters will remain co-chief investment officers and report to Vibert when he assumes the role of CEO. Lillard will serve as an adviser to the firm for the period from January through April 2024.

Michael Collins, Senior PM on multi-sector products, will retire in April 2024. Multi-sector portfolios will continue to be led by Portfolio Managers Greg Peters, Rich Piccirillo, Robert Tipp, and Lindsay Rosner. They do not currently plan on adding additional resources.

Terrence Wheat, Co-Head of Investment Grade Corporate Bonds, will retire in April 2024. Current Co-Head David Del Vecchio will maintain his responsibilities, and Rajat Shah, Senior Portfolio Manager, U.S. Investment Grade Corporate Bonds will be appointed as co-head effective January 1, 2024. As co-heads, they maintain responsibility for day-to-day decisions for the U.S. Investment Grade Corporate bond portfolios and U.S. corporate relative-value decisions. They will continue to report to Richard Greenwood, Head of Credit.

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## Organizational Developments

**Franklin Templeton Investments** – Alan Bartlett, Chief Investment Officer of Templeton Global Equity Group (TGEG), has indicated his intention to leave Franklin Templeton to move on to the next phase of his career. Alan will transition his existing responsibilities as of March 31, 2023.

In early 2022, Manraj Sekhon was named head of Templeton Global Equity Investments (TGEI) which combined the businesses of Franklin Templeton Emerging Markets Equity (FT EME) and Templeton Global Equity Group (TGEG) under a single umbrella, retaining the integrity of their respective investment philosophies and processes while continuing to share best practices. Following Alan's departure, Manraj will assume the role of CIO for TGEI as of March 31, 2023. Manraj is a seasoned investor and investment executive, having been leading FT EME since 2018, and with more than 25 years of experience researching and investing in global and international markets and managing investment teams and processes. Manraj will continue to report to Terrence Murphy, Head of Public Markets.

**Newton Investment Management** – Newton Global Real Return PM Suzanne Hutchins passed away suddenly of natural causes on December 13<sup>th</sup>, 2022. While Hutchins was an important lead portfolio manager for the fund, the strategy has always utilized a team-based approach to making investment decisions. Suzanne was one of three key portfolio managers on the strategy alongside Aron Pataki and Andy Warwick. While Warwick is a relatively newer addition to Newton, as of 2018, both are seasoned professionals.

Newton announced that Andy Warwick and Aron Pataki will lead the Global Real Return team as co-heads. The team consists of eight people and the team is not planning to hire a new person. However, they've attempted to redistribute her responsibilities among the team. Warwick will be leading when it comes to investment decisions regarding equities, quantitative strategies, and complex derivatives. Pataki will be leading when it comes to investment decisions regarding currencies, commodities, and fixed income.

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# Work Plan Update

## Asset Liability Study

- Completed in February 2019. The Board decided to keep the current asset allocation unchanged

## Investment Policy Review and Update – Completed in August 2019

### Non-US Equity Structure Study

- The Board reviewed the Non-US Equity Structure Study at the November 2019 Board Meeting
- The Board selected a structure which included a new allocation to Non-US Small Cap Equity
- The Non-US Small Cap Equity search was concluded in November 2020 with the selection of Acadian Asset Management and Franklin Templeton Investments

### Real Assets Structure Study

- The Board reviewed the Real Assets Structure at the February 2021 meeting. The Board chose to eliminate the Energy equity allocation, in favor of additional Core and Core Plus real estate, and Farmland. Additional Allocations to Value-add real estate were also approved
- At the May 2021 Board Meeting, the Board approved the Real Estate Pacing Study and new commitments to Starwood and Harrison Street Partners
- At the November 2021 Board Meeting, Farmland managers were interviewed and both IFC and PGIM were allocated \$50 million.
- Core Plus Real Estate Manager Interviews occurred at the February Board Meeting, all three managers, Carlyle, Principal, and Clarion, were hired to manage \$85 million.

### Domestic Equity Structure Study

- Presented at the August 2022 Board Meeting. The Board decided to maintain the current Domestic Equity Structure.

### Private Equity Education and Total Fund Asset Allocation Review

- Private equity education was provided at the Trustee Workshop in October 2022. In the November 2022 meeting the Board received an asset allocation review which included portfolios containing private equity.
- The Board requested that Callan complete a Private Equity pacing analysis using a 5% private equity target allocation for the Fund.



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## Work Plan Update

### Total Fund Asset Allocation Review Update and Private Equity Pacing Study Analysis

- Presented at the February 2023 meeting

### Upcoming Projects:

- **Potential Searches and additional work on Private Equity**
- **Investment Policy Review**
- **Fixed Income Structure Study**

# Total Fund Relative Attribution

## Relative Attribution Effects for Quarter ended December 31, 2022

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return		
Domestic Equity	37%	37%	6.49%	7.18%	(0.25%)	(0.00%)	(0.25%)		
Domestic Fixed-Income	19%	18%	2.25%	1.87%	0.07%	(0.05%)	0.03%		
International Equity	23%	24%	15.31%	14.15%	0.26%	(0.11%)	0.15%		
Diversified Strategies	5%	5%	3.34%	6.61%	(0.17%)	(0.00%)	(0.17%)		
Real Assets	17%	16%	(4.27%)	0.98%	(0.87%)	(0.04%)	(0.91%)		
<b>Total</b>			<b>5.73%</b>	<b>6.88%</b>	<b>+</b>	<b>(0.96%)</b>	<b>+</b>	<b>(0.19%)</b>	<b>(1.15%)</b>

## One Year Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return		
Domestic Equity	39%	37%	(19.10%)	(19.21%)	0.03%	(0.22%)	(0.19%)		
Domestic Fixed-Income	18%	18%	(13.79%)	(13.01%)	(0.15%)	(0.04%)	(0.19%)		
International Equity	24%	24%	(17.63%)	(16.58%)	(0.28%)	(0.10%)	(0.38%)		
Diversified Strategies	5%	5%	(5.26%)	(15.90%)	0.48%	0.01%	0.49%		
Real Assets	14%	16%	9.39%	10.46%	(0.17%)	(0.71%)	(0.88%)		
<b>Total</b>			<b>(13.74%)</b>	<b>(12.59%)</b>	<b>+</b>	<b>(0.09%)</b>	<b>+</b>	<b>(1.06%)</b>	<b>(1.15%)</b>

## Five Year Annualized Relative Attribution Effects

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return		
Domestic Equity	40%	37%	8.76%	8.79%	(0.02%)	0.06%	0.04%		
Domestic Fixed-Income	17%	18%	0.64%	0.02%	0.07%	(0.04%)	0.03%		
International Equity	25%	24%	2.34%	0.53%	0.46%	(0.08%)	0.38%		
Diversified Strategies	5%	5%	4.49%	4.14%	0.01%	0.00%	0.02%		
Real Assets	14%	16%	8.71%	7.78%	(0.02%)	(0.15%)	(0.17%)		
<b>Total</b>			<b>5.59%</b>	<b>5.30%</b>	<b>+</b>	<b>0.50%</b>	<b>+</b>	<b>(0.21%)</b>	<b>0.29%</b>

- Active management and variance from policy weights were negative overall for the quarter. Real Assets, Domestic Equity, and Diversified Strategies managers detracted for the quarter, while International Equity and Fixed Income managers added value.

- Over the last year, active management detracted overall. Managers within Diversified Strategies added the most value for the period, but Fixed Income, International Equity, and Real Assets managers detracted. Variance from policy weights detracted, driven by an underweight to Real Assets and an overweight to Domestic Equity.

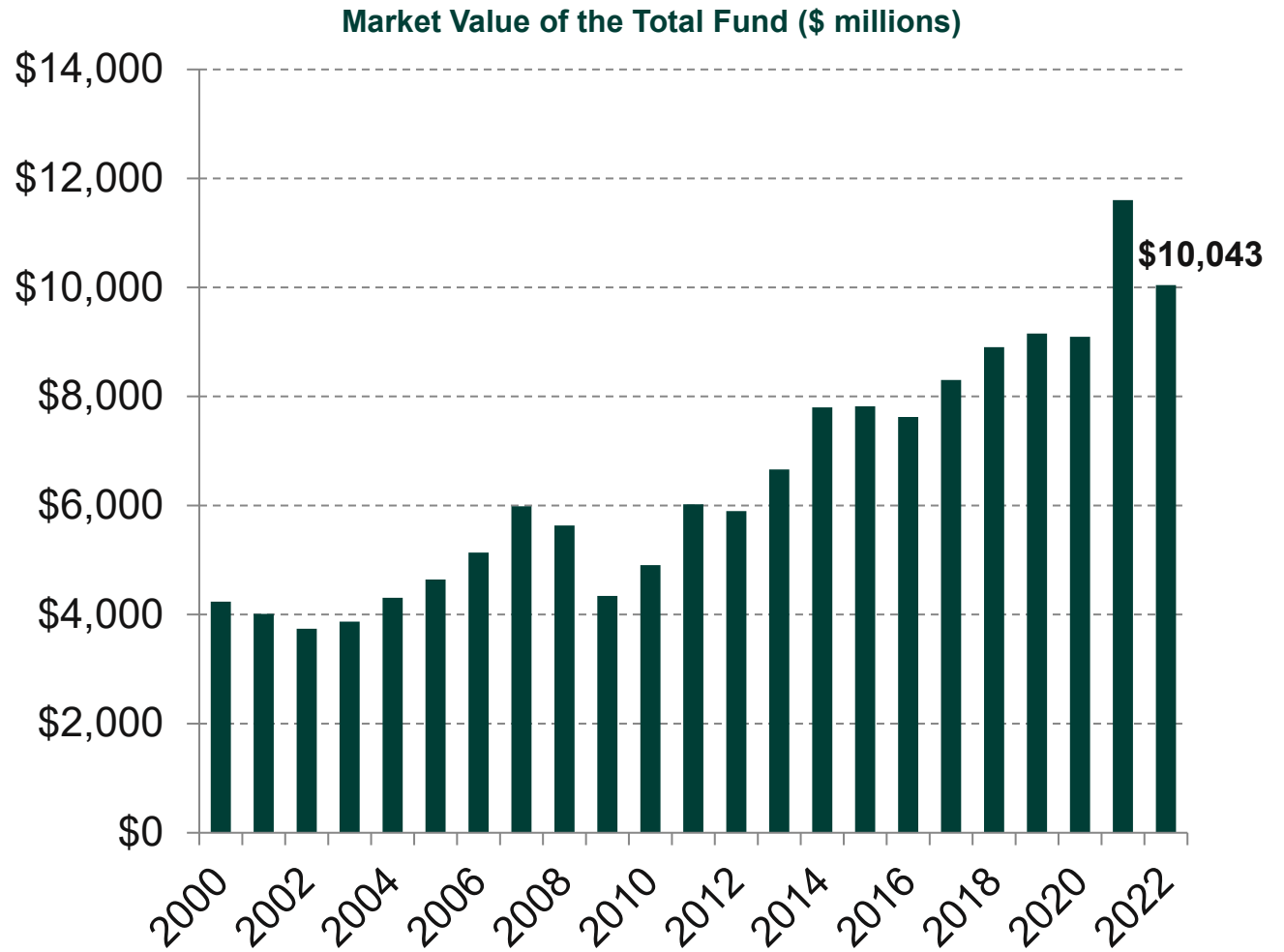
- Outperformance over the last five years is attributable to positive active management. Fixed Income, International Equity, and Diversified Strategies managers added value during the period. An underweight to Real Assets was the largest detractor, as variance from policy weights was a headwind to relative results.

*Policy Target* consists of 37% Russell 3000 Index, 24% MSCI ACWI ex US IMI Index, 18% Blmbg Aggregate Index, 16% CPI All Urban Cons +4%, 3% MSCI World Index and 2% Blmbg Aggregate Index

# Historical Market Values of the Total Fund

## Fiscal Year-End Market Values

Fiscal Year Ending	Market Value
2000	\$4,236,749,732
2001	\$4,012,745,608
2002	\$3,739,381,695
2003	\$3,869,787,673
2004	\$4,307,589,827
2005	\$4,642,924,118
2006	\$5,136,985,259
2007	\$5,985,111,493
2008	\$5,633,155,289
2009	\$4,341,419,711
2010	\$4,907,734,835
2011	\$6,022,965,592
2012	\$5,896,862,618
2013	\$6,662,631,673
2014	\$7,800,291,923
2015	\$7,820,289,128
2016	\$7,624,665,446
2017	\$8,301,352,120
2018	\$8,904,393,859
2019	\$9,153,121,783
2020	\$9,093,497,703
2021	\$11,602,695,185
2022	\$10,042,629,672



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## Important Disclosures

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