



Executive Summary First Quarter 2023

Arkansas Public Employees
Retirement System

Brianne Weymouth, CAIA
Senior Vice President

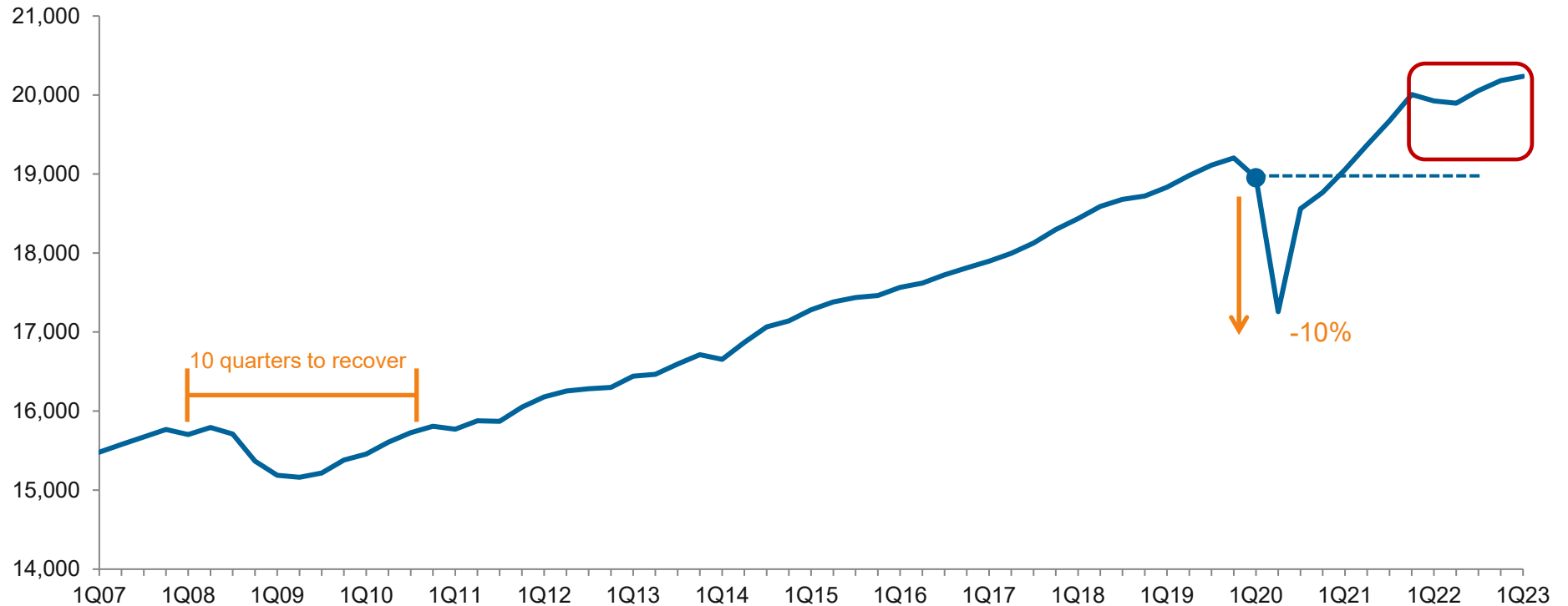
John Jackson, CFA
Senior Vice President

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GDP Rose 1.1% in 1Q, Building on the Rebound in 3Q and 4Q

However, widespread expectations for a recession in 2023

Seasonally Adjusted Real GDP in Billions of Dollars Through 3/31/23



GDP rose 1.1% in 1Q23, after 2.1% growth in 2022.

- ▶ 2022 saw GDP decline in the first two quarters before gains of 3.2% in 3Q22 and 2.6% in 4Q.
- ▶ 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 Up Together in 4Q22 and 1Q23

Declines for stocks and bonds in first three quarters of 2022 eased by market rebound

S&P 500 up 7.5% in both 1Q23 and 4Q22.

- Loss through first three quarters of 2022 was 23.8%; rebound in last two quarters reduced the loss to -9.7%. Similar loss reduction across all equity market segments: developed, emerging, small cap

Fixed income recovered as high inflation began to ease, leading to speculation about interest rates

- Bloomberg Aggregate: up 3% in 1Q, after a 1.9% rise in 4Q22, lowering the loss since the start of 2022 to 8.4%
- CPI-U: +5% year-over year for 1Q, down from 6.5% for the year ended Dec. 2022
- ▶ Inflation hit the highest rate (9%) in decades in June.
- ▶ Economic data show growth slowed in 2022; GDP gained only 1.1% in 1Q
 - Job market remains solid, providing support to Fed efforts to fight inflation

Returns for Periods ended 3/31/23

	Quarter	Year to Date	1 Year	5 Years	10 Years	25 Years
U.S. Equity						
Russell 3000	7.18	7.18	-8.58	10.45	11.73	7.45
S&P 500	7.50	7.50	-7.73	11.19	12.24	7.39
Russell 2000	2.74	2.74	-11.61	4.71	8.04	6.84
Global ex-U.S. Equity						
MSCI World ex USA	8.02	8.02	-2.74	3.80	4.91	4.39
MSCI Emerging Markets	3.96	3.96	-10.70	-0.91	2.00	--
MSCI ACWI ex USA Small Cap	4.70	4.70	-10.37	1.67	5.06	6.45
Fixed Income						
Bloomberg Aggregate	2.96	2.96	-4.78	0.91	1.36	4.03
90-day T-Bill	1.07	1.07	2.50	1.41	0.87	1.90
Bloomberg Long Gov/Credit	5.76	5.76	-13.40	0.63	2.35	5.56
Bloomberg Global Agg ex-US	3.06	3.06	-10.72	-3.17	-0.99	2.80
Real Estate						
NCREIF Property	-1.81	-1.81	-1.63	6.71	8.34	8.79
FTSE Nareit Equity	2.68	2.68	-19.22	6.02	5.97	8.01
Alternatives						
CS Hedge Fund Index	0.92	0.92	1.06	4.25	4.24	5.81
Cambridge Private Equity*	-1.84	-1.84	-3.77	16.84	15.31	14.31
Bloomberg Commodity	-5.36	-5.36	-12.49	5.36	-1.72	1.80
Gold Spot Price	8.76	8.76	1.65	8.40	2.21	7.81
Inflation - CPI-U	1.70	1.70	4.98	3.88	2.63	2.51

*Cambridge PE data as of 3Q22 and CS Hedge fund data as of 4Q22.

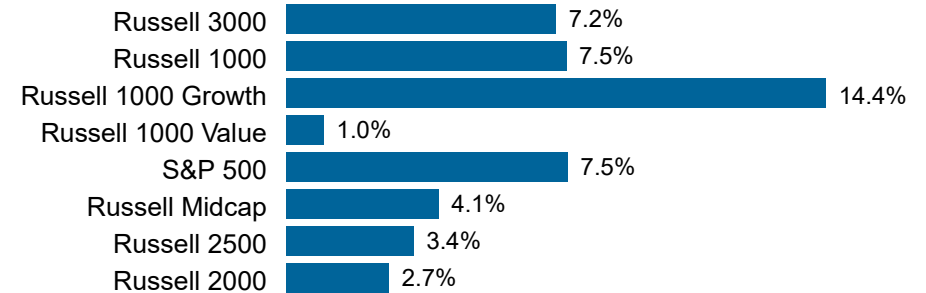
Sources: Bloomberg, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

U.S. Equity Performance: 1Q23

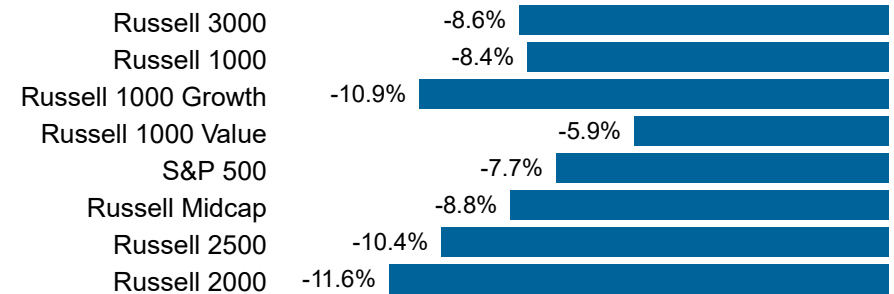
Large cap growth stocks lead broad indices higher; small cap indices hurt by regional bank sell-off

- ▶ The S&P 500 posted a second straight quarter of positive performance, gaining 7.5%; large cap growth led all styles, advancing 14.4%; Russell 2000 Value was an exception with a slight decline (0.7%) due to greater exposure to Financials, specifically small banks.
- ▶ Three sectors comprising 44% of S&P 500 (63% of Russell 1000 Growth) drove performance: Technology (+21.8%), Communication Services (+20.5%), and Consumer Discretionary (+16.1%). Financials, Energy, and Health Care were negative but had only a modest impact given smaller weights in these benchmarks.
- ▶ Small caps (Russell 2000) underperformed large caps (Russell 1000) and growth outperformed value during the quarter, a reversal of trend from 2022. Greater exposure to small banks in Russell 2000 (8.3%) versus Russell 1000 (3.3%) was one differentiator; strong returns for mega-cap Technology also increased divergence.

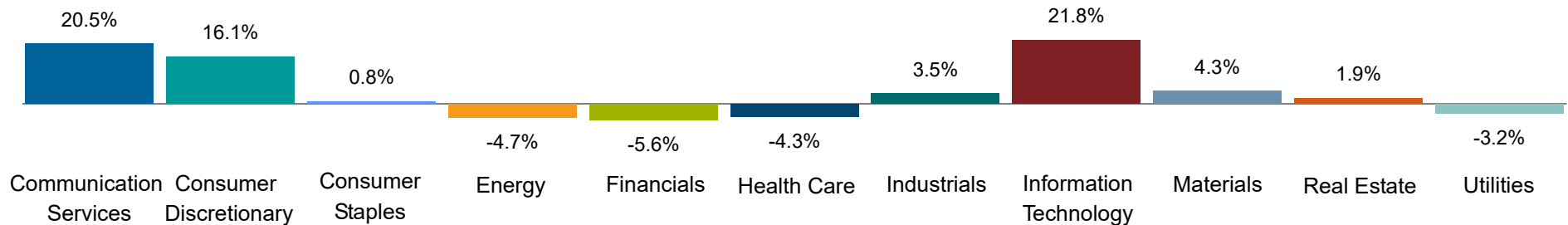
U.S. Equity: Quarter Ended 3/31/23



U.S. Equity: One-Year Returns Ended 3/31/23



Industry Sector Quarterly Performance (S&P 500) as of 3/31/23



Sources: FTSE Russell, S&P Dow Jones Indices

Global/Global ex-U.S. Equity Performance: 1Q23

A reversal of 2022

1Q23 brought global and global ex-U.S. equity markets back to black.

Positive results despite hiccups

- ▶ The first quarter of the year was marked by the collapse of Silicon Valley Bank and Credit Suisse, which sent fears of a banking crisis across global markets.
- ▶ Despite a Fed hike during the period, investors began to price in lower rate expectations.
- ▶ Europe outperformed other regions, making up ground lost in 2022 as inflation eased and recession fears lessened.

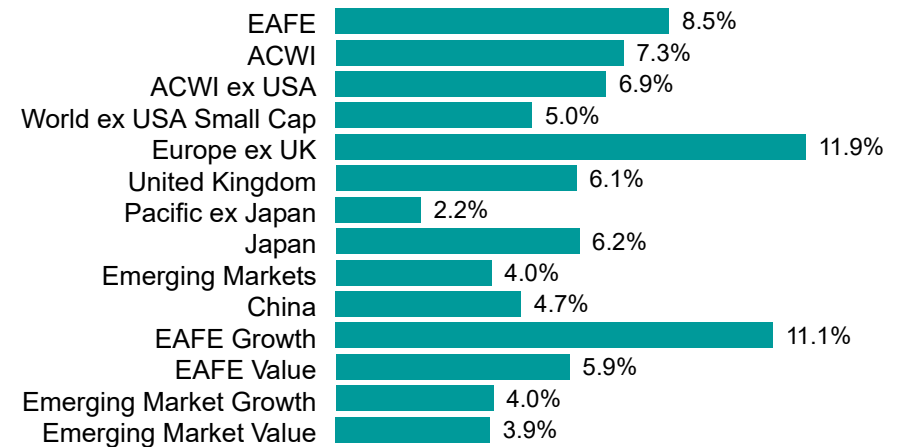
Growth vs. value

- ▶ Growth outpaced value across developed and emerging markets.
 - In a reversal from 2022, investors preferred growth alongside a drawdown in banks; Information Technology was the largest outperformer.

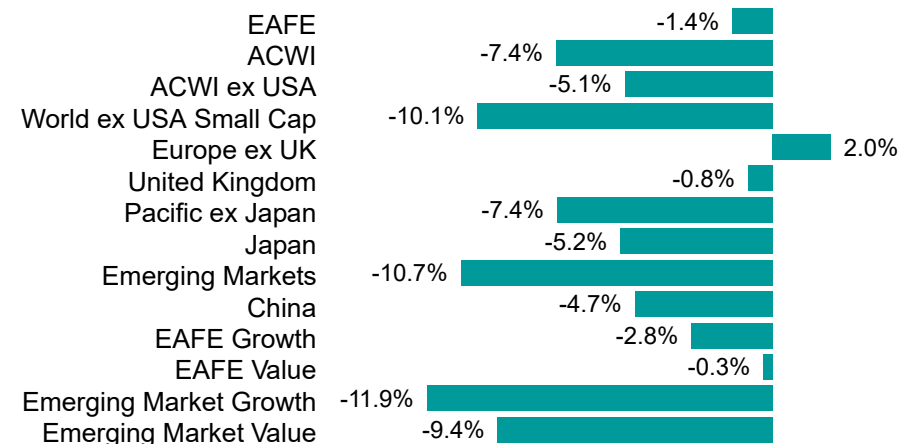
U.S. dollar vs. other currencies

- ▶ After some strength early in the quarter, the U.S. dollar declined 1% as interest rate differentials narrowed globally.

Global Equity Returns: Quarter Ended 3/31/23



Global Equity Returns: One Year Ended 3/31/23



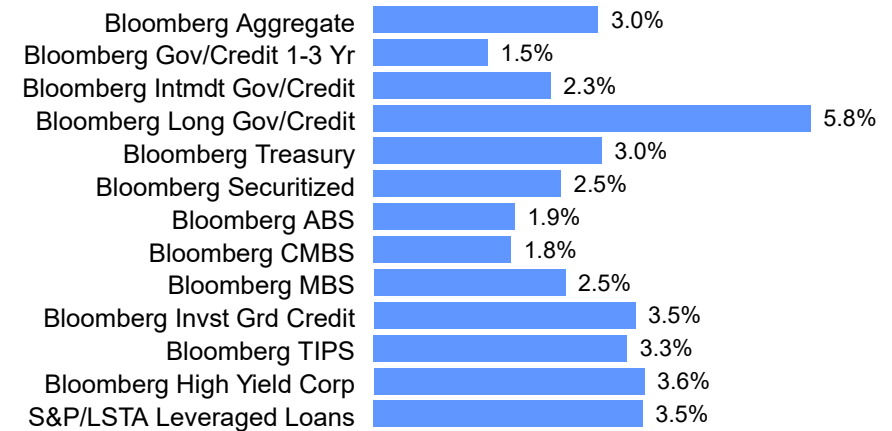
Source: MSCI

U.S. Fixed Income Performance: 1Q23

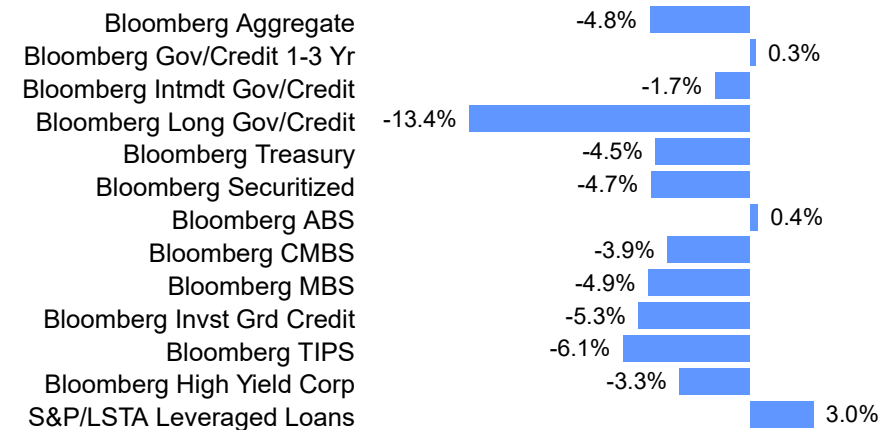
U.S. Fed remains hawkish as it looks to stem inflation

- ▶ The Bloomberg Aggregate rose 3.0% in 1Q, but monthly returns were mixed.
 - January: + 3.1%
 - February: - 2.6%
 - March: +2.5%
- ▶ Sector performance was mixed over the quarter with residential and commercial mortgages underperforming U.S Treasuries and corporates outperforming.
- ▶ The U.S. Fed delivered another 0.25% hike in March, taking the policy range to 4.75% – 5.00%, the highest since September 2007.
 - Median expectation from Fed is 5.1% for year-end 2023; the is market pricing in Fed cuts by year-end
 - Inflation moderated but still high and job market remains tight
- ▶ The 10-year U.S. Treasury yield fell by 0.41% and yields fell across the curve as fears of another banking crisis developed.
 - The yield curve remained inverted as of quarter-end by 0.58% for the 2-year/10-year and 1.16% bps for the 1-year/10-year.
- ▶ TIPS (Bloomberg TIPS: +3.3%) did well; 10-year breakeven spreads were 2.3% as of quarter-end.
- ▶ High yield (Bloomberg High Yield Index: +3.6%) outperformed, but dispersion within the Index is meaningfully higher than it was two years ago.

U.S. Fixed Income Returns: Quarter Ended 3/31/23

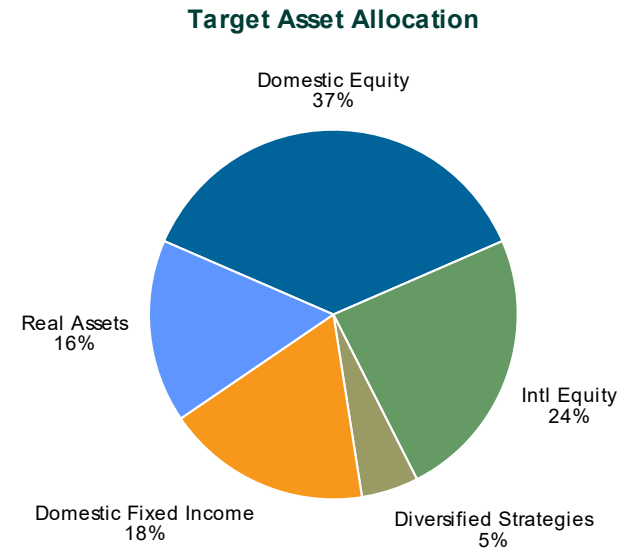
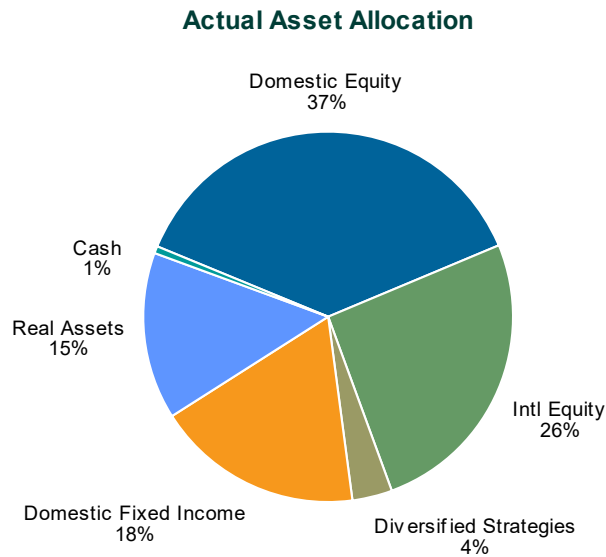


U.S. Fixed Income Returns: One Year Ended 3/31/23



Sources: Bloomberg, S&P Dow Jones Indices

Actual vs. Target Asset Allocation



Asset Class	\$000s Actual	Weight Actual	Target	Percent Difference	\$000s Difference
Domestic Equity	3,918,443	37.5%	37.0%	0.5%	49,318
Intl Equity	2,687,987	25.7%	24.0%	1.7%	178,284
Diversified Strategies	368,955	3.5%	5.0%	(1.5%)	(153,900)
Domestic Fixed Income	1,891,248	18.1%	18.0%	0.1%	8,971
Real Assets	1,528,110	14.6%	16.0%	(1.4%)	(145,025)
Cash	62,352	0.6%	0.0%	0.6%	62,352
Total	10,457,095	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

	March 31, 2023			December 31, 2022		
	Market Value	Weight	Net New Inv.	Inv. Return	Market Value	Weight
Domestic Equity	\$3,918,443,496	37.47%	\$20,327,703	\$209,197,953	\$3,688,917,840	36.61%
Lazard Asset Mgmt	484,668,553	4.63%	(333,446)	40,251,511	444,750,488	4.41%
CastleArk Mgmt. LLC	473,673,331	4.53%	(28,366,932)	45,611,451	456,428,811	4.53%
Mellon S&P 500 Index Fd	707,709,001	6.77%	90,930,285	44,603,023	572,175,693	5.68%
Horrell Capital Passive	197,571,669	1.89%	(79,084)	2,812,156	194,838,596	1.93%
Wellington Management	453,391,465	4.34%	(28,357,179)	12,905,455	468,843,189	4.65%
Intech	403,212,951	3.86%	(11,889,130)	32,105,859	382,996,223	3.80%
LSV Asset Management	340,690,199	3.26%	(492,803)	(1,267,913)	342,450,915	3.40%
Stephens Investment Mgmt.	447,039,914	4.27%	(679,335)	26,818,649	420,900,601	4.18%
Froley Rev y Investment	410,486,413	3.93%	(404,672)	5,357,762	405,533,323	4.03%
International Equity	\$2,687,986,721	25.70%	\$(2,243,733)	\$225,531,383	\$2,464,699,071	24.46%
Artisan Partners	665,237,299	6.36%	(800,272)	65,819,617	600,217,955	5.96%
Mellon ACWI ex US Fund	591,970,420	5.66%	(87,290)	38,795,686	553,262,024	5.49%
Baillie Gifford Overseas	537,078,131	5.14%	(484,798)	53,362,315	484,200,614	4.81%
Lazard Asset Mgmt.	554,570,423	5.30%	(393,902)	45,853,176	509,111,149	5.05%
Acadian ACW ex US SmallCap	185,843,339	1.78%	(245,944)	9,766,785	176,322,498	1.75%
Franklin Templeton Intl SmallCap	153,010,339	1.46%	(231,526)	11,928,963	141,312,901	1.40%
Manning & Napier Advisors	276,771	0.00%	0	4,840	271,930	0.00%
Diversified Strategies	\$368,954,633	3.53%	\$(137,207,758)	\$8,353,121	\$497,809,270	4.94%
AQR Capital	152,329,880	1.46%	0	7,322,098	145,007,782	1.44%
Blackstone Alt. Asset Mgmt.	216,624,753	2.07%	(543,215)	1,991,869	215,176,098	2.14%
Newton Capital	0	0.00%	(136,664,543)	(960,847)	137,625,390	1.37%
Domestic Fixed Income	\$1,891,248,460	18.09%	\$(914,673)	\$61,186,044	\$1,830,977,089	18.17%
DoubleLine Capital	601,078,385	5.75%	(276,931)	19,359,412	581,995,904	5.78%
MacKay Shields	641,605,091	6.14%	(307,983)	21,383,646	620,529,428	6.16%
PGIM	648,564,984	6.20%	(329,759)	20,442,986	628,451,757	6.24%
Real Assets	\$1,528,110,361	14.61%	\$39,378,850	\$(40,154,621)	\$1,528,886,132	15.17%
Energy	\$11,539	0.00%	\$(3,810)	\$419	\$14,929	0.00%
CastleArk Glob Energy Fd	11,539	0.00%	(3,810)	419	14,929	0.00%
REITS	\$11,296,627	0.11%	\$(10,252,106)	\$426,188	\$21,122,545	0.21%
MCM EB DV Non-SL REIT Fd	11,296,627	0.11%	(10,252,106)	426,188	21,122,545	0.21%
Core Real Estate	\$965,721,693	9.24%	\$(3,985,969)	\$(37,766,567)	\$1,007,474,229	10.00%
Invesco Real Estate	593,984,936	5.68%	(538,981)	(25,157,715)	619,681,632	6.15%
Heitman Real Estate Trust LP	371,736,757	3.55%	(3,446,988)	(12,608,852)	387,792,597	3.85%
Value Add Real Estate	\$376,304,570	3.60%	\$47,030,158	\$(5,530,881)	\$334,805,293	3.32%
Clarion Lion Industrial Trust	82,847,966	0.79%	42,365,881	(1,073,440)	41,555,525	0.41%
Harrison Street Fund VIII	42,264,968	0.40%	3,783,727	5,757,917	32,723,324	0.32%
Heitman Value Partners IV	54,701,966	0.52%	(207,086)	(1,304,310)	56,213,363	0.56%
LaSalle Inc & Growth VI LP	5,529,404	0.05%	18,827	(390,108)	5,900,685	0.06%
LaSalle Inc & Growth VII LP	34,956,511	0.33%	1,802,494	(2,238,219)	35,392,235	0.35%
Starwood SOF XII	17,300,976	0.17%	(238,816)	282,163	17,257,629	0.17%
TA Associates Realty Fund X	33,304	0.00%	373	(2,056)	34,987	0.00%
TA Associates Realty Fund XI	30,131,198	0.29%	(979,933)	(2,176,111)	33,287,242	0.33%
TA Associates Realty Fund XII	108,538,277	1.04%	484,691	(4,386,717)	112,440,303	1.12%
Farmland	\$87,599,327	0.84%	\$7,036,248	\$2,059,114	\$78,503,965	0.78%
IFC Core Farmland Fund	51,510,687	0.49%	(470,384)	1,981,071	50,000,000	0.50%
PGIM Agriculture	36,088,640	0.35%	7,506,632	78,043	28,503,965	0.28%
Timber	\$87,176,606	0.83%	\$(445,672)	\$657,106	\$86,965,172	0.86%
Pinnacle	87,176,606	0.83%	(445,672)	657,106	86,965,172	0.86%
Cash	\$62,351,579	0.60%	\$(1,912,538)	\$305,505	\$63,958,611	0.63%
Total Fund	\$10,457,095,250	100.0%	\$(82,572,149)	\$464,419,385	\$10,075,248,013	100.0%

Asset Class Performance and Market Values

	Market Value \$(Dollars)	Ending Weight	Last Quarter	Fiscal YTD	Last Year	Last 3 Years	Last 5 Years
Domestic Equity	\$3,918,443,496	37.70%	5.69%	8.28%	(9.16%)	18.20%	9.73%
Russell 3000 Index	-	-	7.18%	9.75%	(8.58%)	18.48%	10.45%
International Equity	\$2,687,986,721	25.86%	9.15%	14.07%	(2.11%)	14.17%	4.34%
Benchmark****	-	-	6.56%	9.85%	(5.84%)	10.46%	2.13%
Diversified Strategies	\$368,954,633	3.55%	1.90%	3.21%	(1.58%)	7.13%	4.93%
Diversified Strategy Trgt**	-	-	5.82%	6.48%	(5.86%)	8.67%	5.61%
Domestic Fixed Income	\$1,891,248,460	18.19%	3.34%	0.95%	(5.25%)	(0.19%)	1.54%
Blmbg Aggregate	-	-	2.96%	(0.09%)	(4.78%)	(2.77%)	0.91%
Real Assets	\$1,528,110,361	14.70%	(2.56%)	(5.96%)	0.30%	12.65%	8.01%
CPIU + 4%	-	-	2.64%	4.83%	8.99%	9.36%	7.88%
REITS	\$11,296,627	0.11%	2.76%	(3.81%)	(21.31%)	11.30%	4.38%
S&P DJ US Select REIT	-	-	2.77%	(3.51%)	(20.98%)	11.32%	4.66%
Core Real Estate	\$965,721,693	9.29%	(3.76%)	(7.35%)	0.36%	8.07%	7.08%
NFI-ODCE Eq Wt Net	-	-	(3.50%)	(7.70%)	(3.69%)	8.17%	7.13%
Value Add Real Estate	\$376,304,570	3.62%	(1.46%)	(4.55%)	7.55%	18.85%	16.45%
NCREIF Total Index	-	-	(1.81%)	(4.71%)	(1.63%)	7.15%	6.71%
Farmland	\$87,599,327	0.84%	2.64%	2.67%	-	-	-
NCREIF Farmland Index	-	-	2.08%	7.33%	8.88%	7.53%	6.52%
Timber	\$87,176,606	0.84%	0.76%	6.55%	15.60%	6.96%	3.57%
NCREIF Timberland Index	-	-	1.75%	9.27%	11.31%	8.09%	5.54%
Total Fund***	\$10,394,743,671	100.00%	4.64%	5.76%	(5.15%)	12.55%	6.53%
Benchmark*	-	-	5.48%	7.17%	(3.97%)	10.99%	6.56%

- **Domestic Equity** underperformed the benchmark in the first quarter and over the last 5-year period.
- **International Equity** outperformed the benchmark in the first quarter and leads its benchmark over longer time period.
- **Diversified Strategies** underperformed the target return in the first quarter and trails the target over longer time periods.
- **Domestic Fixed Income** outperformed the benchmark in the first quarter and leads the index over longer trailing time periods due to its Core Plus orientation.
- **Real Assets** underperformed the benchmark in the first 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

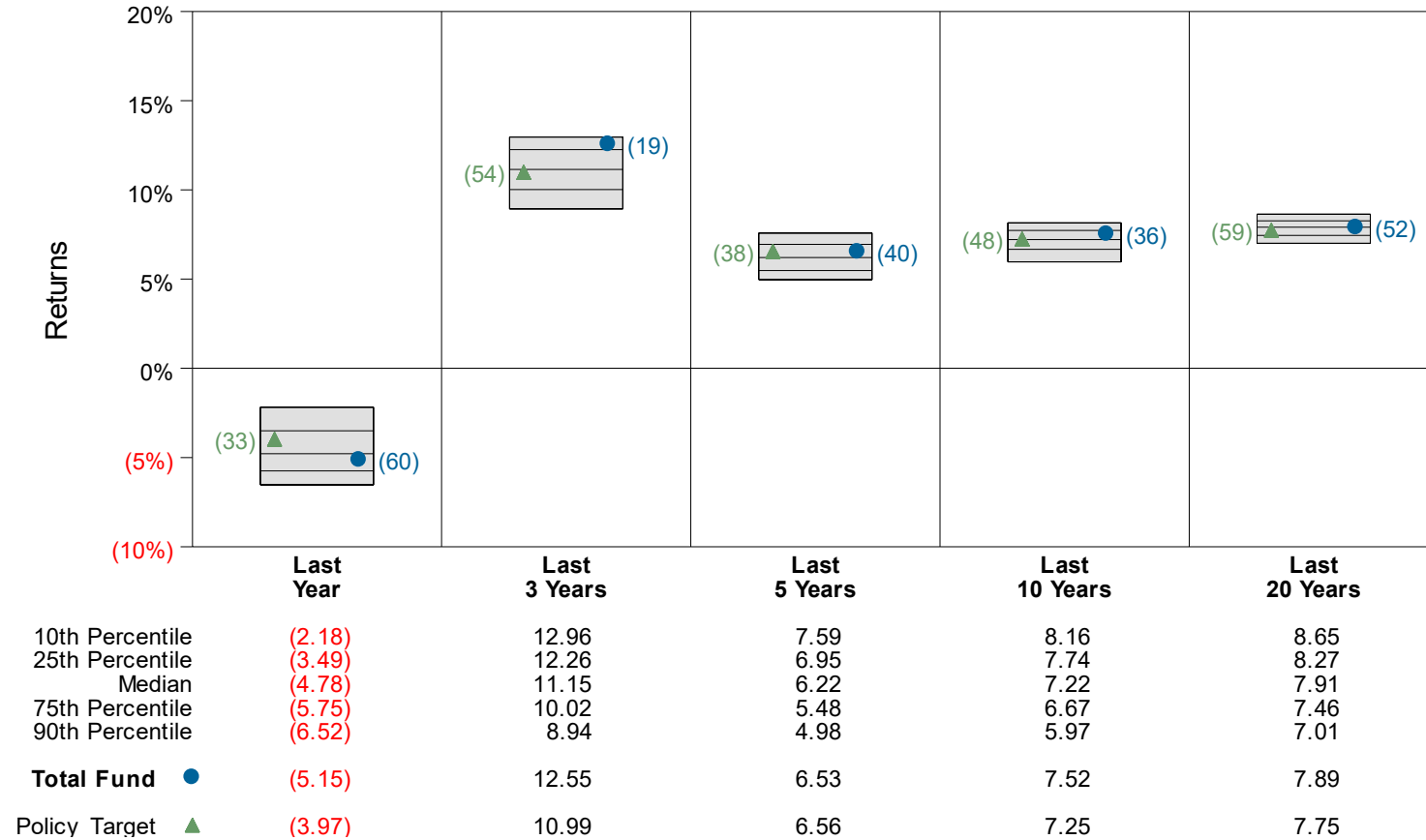
** 60% MSCI World and 40% Bloomberg Aggregate.

*** 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 60th percentile of its peer group.
- Over the trailing 3- and 10-year periods, the fund has outpaced its benchmark and finished ahead of its peer group median.
- Over the last 5 years, the fund finished in line with its benchmark and ranks at the 40th percentile 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	
Total Domestic Equity	5.69%	85	8.28%	88	(9.16%)	83	18.20%	78	9.73%	63
Russell 3000 Index	7.18%	19	9.75%	38	(8.58%)	70	18.48%	66	10.45%	21
Pub Pln- Dom Equity	6.52%		9.63%		(8.00%)		18.81%		9.90%	
Lazard Asset Mgmt.	9.05%	27	8.88%	52	(6.06%)	40	15.75%	78	9.83%	50
Russell 3000 Index	7.18%	32	9.75%	46	(8.58%)	58	18.48%	58	10.45%	43
Callan All Cap Broad	4.91%		9.07%		(7.54%)		19.50%		9.87%	
CastleArk	10.17%	26	12.27%	32	(8.56%)	57	21.47%	40	12.43%	16
Russell 3000 Growth Index	13.85%	9	12.56%	28	(10.88%)	79	18.23%	59	13.02%	8
Callan All Cap Broad	4.91%		9.07%		(7.54%)		19.50%		9.87%	
Mellon S&P 500 Index Fd	7.50%	23	9.99%	29	(7.73%)	47	18.50%	49	10.87%	46
S&P 500 Index	7.50%	23	9.98%	29	(7.73%)	47	18.60%	45	11.19%	40
Callan Large Cap Core	6.73%		9.34%		(7.85%)		18.47%		10.62%	
Horrell Capital - Passive	1.44%	75	10.40%	42	(2.78%)	29	22.33%	29	11.15%	31
Bloomberg Arkansas Index	(1.57%)	99	8.11%	63	(0.60%)	13	34.13%	7	13.57%	5
S&P 500 Index	7.50%	32	9.98%	43	(7.73%)	54	18.60%	58	11.19%	30
Callan All Cap Broad	4.91%		9.07%		(7.54%)		19.50%		9.87%	
Wellington Management	2.66%	20	8.89%	31	(3.87%)	37	19.09%	69	8.24%	52
Russell 1000 Value Index	1.01%	37	7.17%	61	(5.91%)	74	17.93%	84	7.50%	70
Callan Large Cap Value	0.42%		8.02%		(4.52%)		20.57%		8.28%	
Intech	8.51%	82	3.51%	97	(19.51%)	95	12.78%	80	9.05%	89
Russell 1000 Growth Index	14.37%	28	12.67%	37	(10.90%)	40	18.58%	20	13.66%	14
Callan Large Cap Growth	13.09%		11.56%		(11.85%)		15.62%		11.62%	
LSV Asset Management	(0.38%)	82	9.02%	35	(3.69%)	27	29.60%	22	5.50%	67
Russell 2000 Value Index	(0.66%)	84	2.74%	84	(12.96%)	87	21.01%	80	4.55%	84
Callan Small Cap Value	1.18%		7.73%		(6.40%)		25.13%		6.17%	
Stephens Investment Mgmt.	6.37%	63	8.60%	71	(11.77%)	60	16.13%	60	8.46%	55
Russell 2000 Growth Index	6.07%	67	10.72%	46	(10.60%)	48	13.36%	84	4.26%	94
Callan Small Cap Growth	7.16%		10.41%		(10.81%)		16.93%		8.98%	
Froley Revy Investment	1.32%	82	2.79%	87	(13.58%)	94	13.80%	26	8.55%	28
ML All Conv	3.75%	27	5.70%	55	(10.84%)	89	14.93%	12	9.57%	16
Callan Convert Bonds DB	2.74%		5.75%		(7.00%)		10.74%		6.52%	

- **Total Domestic Equity** underperformance over the last year has weighed on long-term results, as the composite trails the benchmark and peer group median over the trailing 3- and 5-year periods.
- Lazard and Wellington led their respective benchmarks and ranked in the top half of peers for the quarter. Both managers finished in line with their peer group median over the last 5-year period.
- CastleArk trailed its benchmark but ranked at the 26th percentile of peers for the quarter. The fund ranks favorably relative to peers over long-term periods and has outperformed the benchmark over the last 3 years.
- Froley Revy and Intech lagged their respective benchmarks for the quarter and ranked below median of peers. Froley Revy trails the benchmark but ranks in the top half of peers over longer periods but while Intech lags the benchmark and peers.
- LSV outperformed the benchmark for the quarter and for all time periods shown above.

Investment Manager Returns and Peer Group Rankings

	Last Quarter		Fiscal YTD		Last Year		Last 3 Years		Last 5 Years	
International Equity	9.15%	7	14.07%	20	(2.11%)	16	14.17%	23	4.34%	17
Benchmark(1)	6.56%	84	9.85%	79	(5.84%)	85	10.46%	86	2.13%	85
Pub Pln- Intl Equity	7.42%		11.68%		(3.71%)		12.96%		3.14%	
Artisan Partners	10.97%	14	19.79%	5	6.75%	3	22.82%	1	8.47%	1
MSCI EAFE	8.47%	59	15.36%	41	(1.38%)	47	12.99%	59	3.52%	58
Callan NonUS Eq	8.76%		14.61%		(1.87%)		13.77%		3.99%	
Mellon ACWI ex US Fund	7.01%	85	10.26%	93	(4.81%)	81	12.14%	78	2.83%	76
MSCI ACWI ex US	6.87%	87	10.03%	94	(5.07%)	84	11.80%	80	2.47%	83
Callan NonUS Eq	8.76%		14.61%		(1.87%)		13.77%		3.99%	
Baillie Gifford Overseas	11.02%	14	16.07%	32	(6.59%)	90	9.16%	96	3.42%	60
MSCI ACWIxUS Gross	7.00%	86	10.38%	92	(4.57%)	79	12.32%	74	2.97%	74
Callan NonUS Eq	8.76%		14.61%		(1.87%)		13.77%		3.99%	
Lazard Asset Mgmt.	9.01%	43	12.16%	79	(1.75%)	49	12.69%	66	2.98%	74
MSCI ACWIxUS Gross	7.00%	86	10.38%	92	(4.57%)	79	12.32%	74	2.97%	74
Callan NonUS Eq	8.76%		14.61%		(1.87%)		13.77%		3.99%	
Acadian ACW ex US SmallCap	5.54%	74	10.52%	67	(8.16%)	66	-	-	-	-
MSCI ACWI ex US Small Cap	4.70%	85	8.70%	86	(10.37%)	82	15.04%	46	1.67%	43
Callan Intl Small Cap	6.62%		11.81%		(6.89%)		14.88%		1.51%	
Franklin Templeton Intl SmallCap	8.44%	23	10.38%	69	(3.74%)	25	-	-	-	-
MSCI ACWI ex US Small Cap	4.70%	85	8.70%	86	(10.37%)	82	15.04%	46	1.67%	43
Callan Intl Small Cap	6.62%		11.81%		(6.89%)		14.88%		1.51%	
Diversified Strategies	1.90%		3.21%		(1.58%)		7.13%		4.93%	
Diversified Strategy Trgt**	5.82%		6.48%		(5.86%)		8.67%		5.61%	
AQR Capital	5.05%	20	4.55%	46	(9.07%)	92	5.33%	66	3.47%	54
Diversified Strategy Trgt**	5.82%	10	6.48%	30	(5.86%)	64	8.67%	46	5.61%	21
Intl/Global Balanced DB	3.58%		4.36%		(4.21%)		7.83%		3.67%	
Blackstone Alt. Asset Mgmt.	0.92%	91	4.65%	45	5.26%	3	8.70%	46	5.71%	20
T-Bills + 4%	2.03%	78	5.36%	35	6.50%	2	4.89%	71	5.41%	23
Intl/Global Balanced DB	3.58%		4.36%		(4.21%)		7.83%		3.67%	

- Total **International Equity** leads the benchmark over longer time periods and ranks in the top quartile of peers.
- All managers led their respective benchmarks during the first quarter. Artisan, Baillie Gifford, Lazard, and Franklin Templeton ranked in the top half of peers.
- Over the 5-year period, Artisan and Baillie Gifford have outperformed their respective benchmarks. Lazard matched the benchmark return over the last 5 years.
- **Diversified Strategies** lagged its target in the first quarter and trails its benchmark over the last 3- and 5-year periods.
- AQR trailed its target return but ranked in the top quartile of peers for the quarter, while BAAM underperformed its target and ranked in the fourth quartile of peers.
- BAAM has outpaced its target return and ranks in the top half of peers over the trailing 3- and 5-year periods.

(1) MSCI EAFE through 12/31/2020; MSCI ACWI ex US IMI (Net) thereafter
 **60% MSCI World/40% Blmbg Aggregate

Investment Manager Returns and Peer Group Rankings

	Last Quarter		Fiscal YTD		Last Year		Last 3 Years		Last 5 Years	
Domestic Fixed Income	3.34%	19	0.95%	47	(5.25%)	85	(0.19%)	35	1.54%	50
Blmbg Aggregate Index	2.96%	62	(0.09%)	89	(4.78%)	72	(2.77%)	96	0.91%	91
Pub Pln- Dom Fixed	3.06%		0.87%		(4.30%)		(0.74%)		1.52%	
DoubleLine Capital	3.33%	47	0.76%	54	(4.76%)	47	(0.24%)	37	1.03%	94
MacKay Shields	3.45%	30	1.08%	45	(5.44%)	80	0.11%	21	1.91%	22
PGIM	3.26%	56	0.99%	47	(5.50%)	82	(0.48%)	44	1.64%	48
Blmbg Aggregate Index	2.96%	83	(0.09%)	86	(4.78%)	48	(2.77%)	99	0.91%	96
Callan Core Plus FI	3.31%		0.83%		(4.79%)		(0.64%)		1.63%	
Real Assets	(2.56%)		(5.96%)		0.30%		12.65%		8.01%	
CPIU + 4%	2.64%		4.83%		8.99%		9.36%		7.88%	
REITS	2.76%		(3.81%)		(21.31%)		11.30%		4.38%	
S&P DJ US Select REIT	2.77%		(3.51%)		(20.98%)		11.32%		4.66%	
MCM EB DV Non-SL REIT Fd	2.76%	59	(3.81%)	65	(21.31%)	86	11.30%	53	4.38%	90
S&P DJ US Select REIT	2.77%	58	(3.51%)	58	(20.98%)	83	11.32%	51	4.66%	86
Callan Real Estate REIT	3.07%		(3.20%)		(18.99%)		11.37%		7.16%	
Core Real Estate	(3.76%)		(7.35%)		0.36%		8.07%		7.08%	
NCREIF NFI-ODCE Eq Wt Net	(3.50%)		(7.70%)		(3.69%)		8.17%		7.13%	
Invesco Real Estate	(4.06%)	89	(7.49%)	70	(3.00%)	72	6.61%	78	6.97%	67
Heitman Real Estate Trust LP***	(3.28%)	81	(7.12%)	67	6.08%	13	10.44%	22	7.32%	46
NCREIF NFI-ODCE Eq Wt Net	(3.50%)	83	(7.70%)	74	(3.69%)	80	8.17%	43	7.13%	57
Callan OE Core Cmngld RE	(1.45%)		(5.04%)		(0.87%)		7.75%		7.21%	
Value Add Real Estate	(1.46%)		(4.55%)		7.55%		18.85%		16.45%	
NCREIF Total Index	(1.81%)		(4.71%)		(1.63%)		7.15%		6.71%	
Clarion Lion Industrial Trust	(1.27%)		-		-		-		-	
Harrison Street Fund VIII	15.75%		15.82%		20.75%		-		-	
Heitman Value Partners IV	(2.32%)		3.64%		15.11%		20.39%		-	
LaSalle Inc & Growth VI LP	(6.59%)		(32.17%)		(31.61%)		(14.00%)		(7.35%)	
LaSalle Inc & Growth VII LP	(6.02%)		(8.94%)		(5.02%)		8.53%		10.05%	
Starwood SOF XII	1.66%		9.45%		21.42%		-		-	
TA Associates Realty Fund X	(5.82%)		19.30%		53.70%		12.32%		17.36%	
TA Associates Realty Fund XI	(6.74%)		(25.45%)		(9.84%)		19.06%		17.26%	
TA Associates Realty Fund XII	(3.88%)		(5.20%)		10.64%		25.57%		-	
NCREIF Total Index	(1.81%)		(4.71%)		(1.63%)		7.15%		6.71%	
Farmland	2.64%		2.67%		-		-		-	
IFC Core Farmland Fund	4.00%		-		-		-		-	
PGIM Agriculture	0.27%		0.44%		-		-		-	
NCREIF Farmland Index	2.08%		7.33%		8.88%		7.53%		6.52%	
Timber	0.76%		6.55%		15.60%		6.96%		3.57%	
Pinnacle	0.76%		6.55%		15.60%		6.96%		3.57%	
NCREIF Timberland Index	1.75%		9.27%		11.31%		8.09%		5.54%	
Total Fund	4.64%	43	5.76%	53	(5.15%)	60	12.55%	19	6.53%	40
Benchmark*	5.48%	12	7.17%	10	(3.97%)	33	10.99%	54	6.56%	38
Callan Public Fund Spr DB	4.55%		5.83%		(4.78%)		11.15%		6.22%	

- **Domestic Fixed Income** leads the index over the last 3- and 5-year periods. All three managers delivered excess returns over the benchmark in the first quarter and have outperformed over longer periods.
- The **Real Assets** composite leads the benchmark over longer periods, driven by strong results from Value-Add Real Estate. In the first quarter, REITS matched the benchmark return, Value-Add Real Estate and Farmland outperformed their respective benchmarks, while Core Real Estate and Timber underperformed.
- The **Total Fund** underperformed its benchmark but ranked in the top half of peers for the quarter. The Fund has delivered excess returns versus the benchmark in the last three years 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.

Organizational Developments

There were no notable organizational developments this quarter.

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.

Work Plan Update

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

- Presented at the February 2023 meeting

Private Equity Education, Pacing Study Review and Secondaries Manager Search Results

- Additional Private Equity education provided on May 16th, 2023
- Private Equity Pacing Study results and Secondaries Search Results presented at the May 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 March 31, 2023

Asset Class	Effective Actual Weight	Effective Target Weight	Actual Return	Target Return	Manager Effect	Asset Allocation	Total Relative Return
Domestic Equity	37%	37%	5.69%	7.18%	(0.55%)	(0.00%)	(0.55%)
Domestic Fixed Income	18%	18%	3.34%	2.96%	0.07%	(0.01%)	0.06%
International Equity	25%	24%	9.15%	6.56%	0.64%	0.00%	0.64%
Diversified Strategies	4%	5%	1.90%	5.82%	(0.17%)	(0.00%)	(0.18%)
Real Assets	16%	16%	(2.56%)	2.64%	(0.82%)	0.01%	(0.81%)
Total			4.64%	= 5.48%	+ (0.83%)	+ (0.01%)	(0.84%)

- Active management was the primary detractor for the quarter. Real Assets, Domestic Equity, and Diversified Strategies managers wiped out positive active management contributions from International Equity and Fixed Income. Variance from policy weights had a small negative impact overall.

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	38%	37%	(9.16%)	(8.58%)	(0.23%)	(0.19%)	(0.42%)
Domestic Fixed Income	18%	18%	(5.25%)	(4.78%)	(0.09%)	(0.06%)	(0.16%)
International Equity	24%	24%	(2.11%)	(5.84%)	0.91%	(0.09%)	0.82%
Diversified Strategies	5%	5%	(1.58%)	(5.86%)	0.22%	0.00%	0.22%
Real Assets	15%	16%	0.30%	8.99%	(1.18%)	(0.45%)	(1.64%)
Total			(5.15%)	= (3.97%)	+ (0.39%)	+ (0.79%)	(1.18%)

- Over the last year, active management and deviations from target policy weights had a negative impact on relative performance. International Equity managers added the most value for the period, but Fixed Income, International Equity, and Real Assets managers detracted. The asset allocation effect was negative, driven by an underweight to Real Assets.

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%	9.73%	10.45%	(0.28%)	0.06%	(0.21%)
Domestic Fixed Income	17%	18%	1.54%	0.91%	0.07%	(0.05%)	0.02%
International Equity	25%	24%	4.34%	2.13%	0.56%	(0.08%)	0.48%
Diversified Strategies	5%	5%	4.93%	5.61%	(0.03%)	0.00%	(0.03%)
Real Assets	14%	16%	8.01%	7.88%	(0.14%)	(0.15%)	(0.28%)
Total			6.53%	= 6.56%	+ 0.18%	+ (0.21%)	(0.03%)

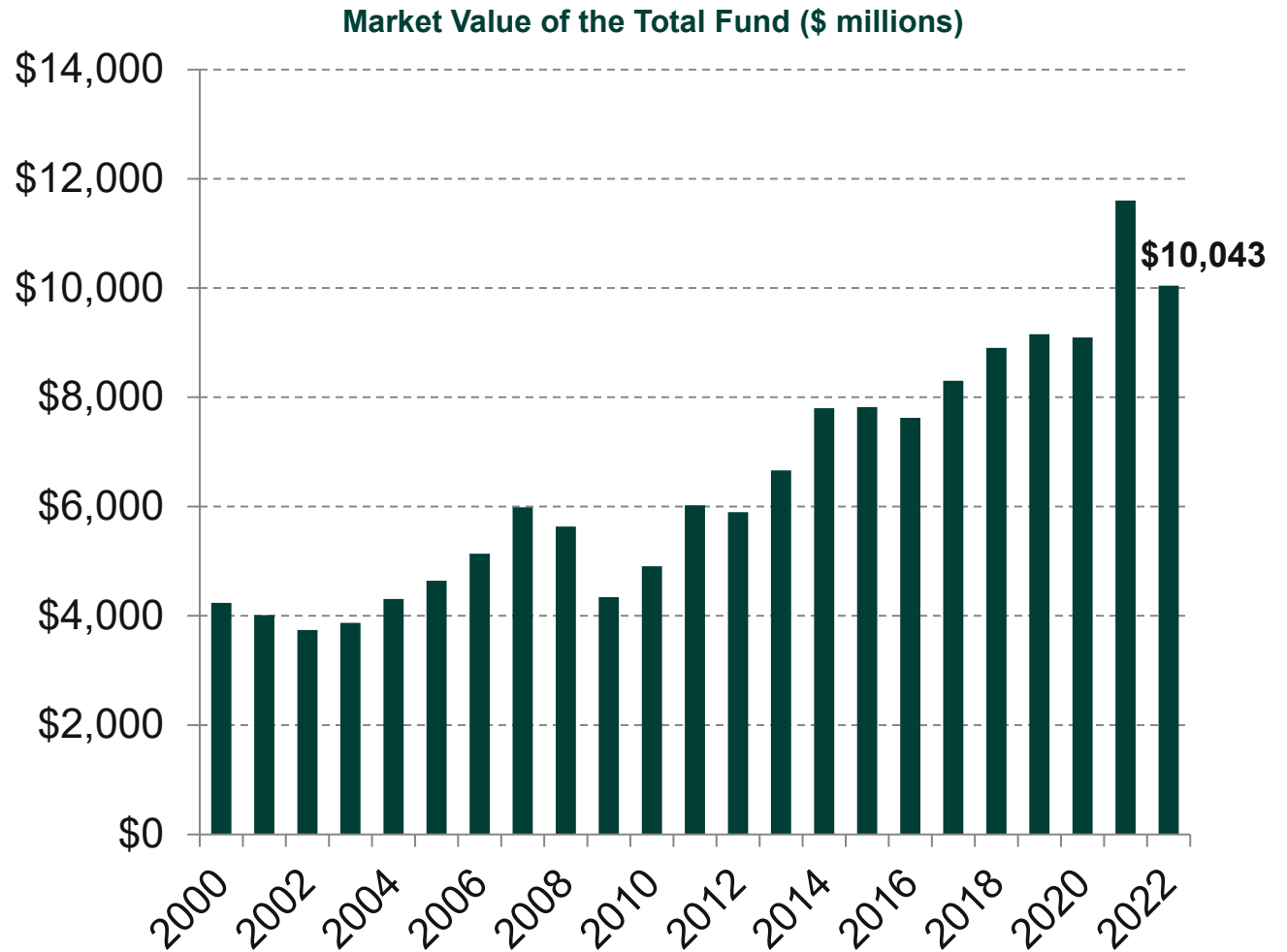
- The Fund has kept pace with its policy benchmark return over the last five years. Active management within International Equity and Fixed Income added the most value over the period. Positive contributions from active management were negated by variance from policy weights.

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



Private Equity Pacing Analysis Update

Commitment Pacing

Private Equity Commitment Pacing Requirements

- Private equity commitments are invested over multiple years; therefore, it is necessary to create a forecast of the timing of cash inflows, outflows, and the invested value of the portfolio in the future.
- The projection determines the appropriate amount and sequencing of investments to achieve a strategic target and maintain the targeted exposure throughout.
- Because private equity assets cannot be easily rebalanced, a strong pacing discipline is important to avoid being over- or under-allocated to the asset class.
- Pacing analyses should be refreshed annually to monitor portfolio development and make appropriate future commitment refinements as market conditions vary.

Implementation Scenarios

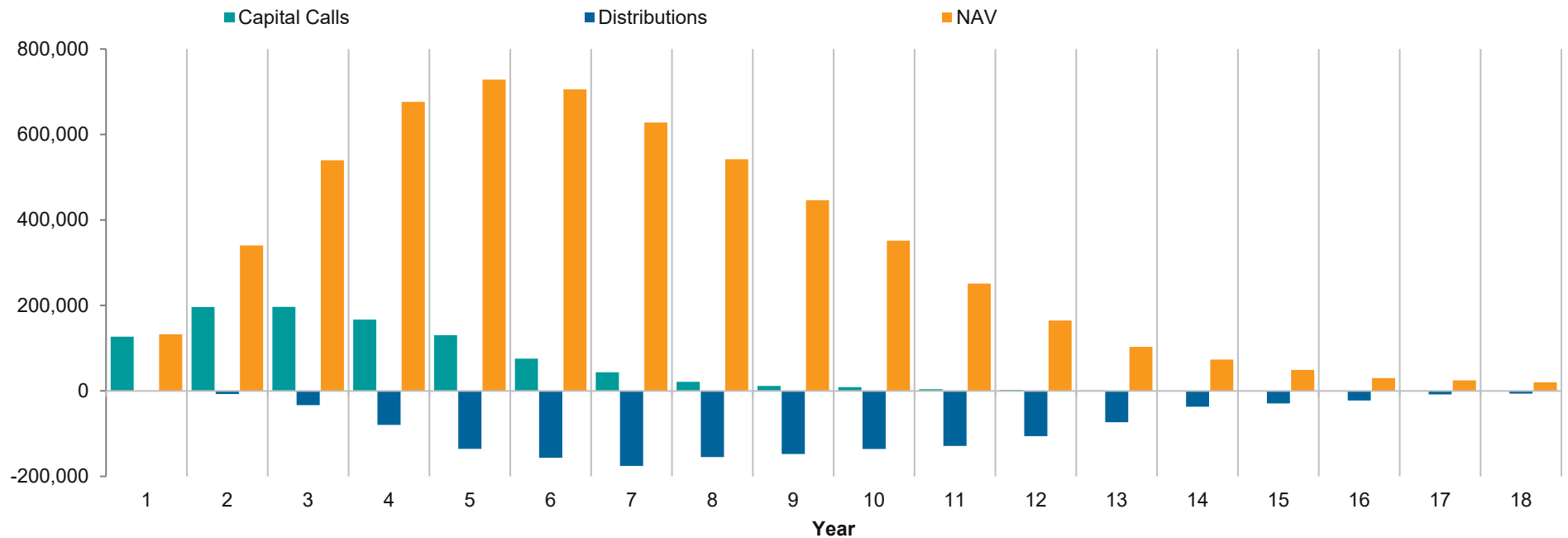
- At the February 2023 APERS Board Meeting, Callan presented a Private Equity Pacing Analysis which proposed that 75% of private equity investments be deployed through Secondary investments, and 25% of capital to Primary Investments.
- Based on the feedback and questions received from the Trustees at the February 2023 Board Meeting, Callan has provided an additional Private Equity Pacing Scenario which allocates 50% to Secondary Investments and 50% to Primary Investments.

Sample Timeline of a Private Equity Fund – *Primary Strategy*

A Finite Life

The net asset value (NAV) builds as capital is called from LPs and then declines as capital and earnings are distributed back to them.

Annual Cash Flows of a \$1 Million Commitment



- Please note that a Secondary Strategy would occur approximately in year 3-5 of the life cycle of a private equity investment.

Model Assumptions

The private equity pacing model takes multiple factors into consideration:

- Market Value of the Fund
- Total Fund Expected Return
- Total Fund Cash Flows
- Total Fund Growth Rate
- Proposed private equity target allocation of 5% of Fund assets
- Historical private equity industry average cash flows from the Refinitiv/Cambridge private equity database

The pacing model does not specify which managers will be hired, but provides a framework for implementing the private equity allocation.

- Once specific managers are selected, the pacing model will be further refined, as necessary, to match the managers' expected investment timing.

Pacing Analysis – 75% Secondaries/25% Primaries

Implementation – 75% Secondary Investments / 25% Primary Investments

Implementation

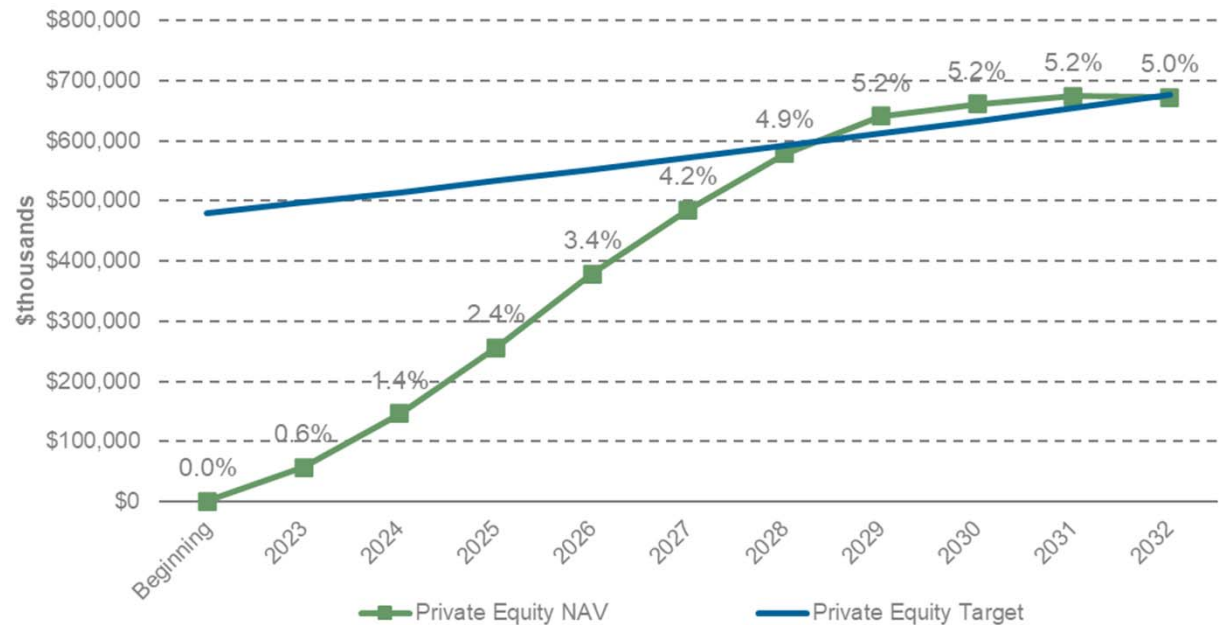
- With direction from Staff, the implementation will target an allocation of 75% of commitments to *secondary investments*, and 25% of commitments to *primary investments* employing fund-of-funds vehicles.
- The 75% in secondary investments is intended to achieve more rapid development of private equity invested net asset value (NAV) and generate accelerated distributions relative to primary investments.
- It is expected that the 25% in primary investments fund-of-funds will provide long-term return enhancement.
- Callan expects two separate searches will be necessary and recommends first conducting the *Secondaries* search followed by the *Primary* Fund of Fund search.

Future Commitments and Private Equity NAV Growth

5% Allocation - Projected Future Commitments (\$ millions)

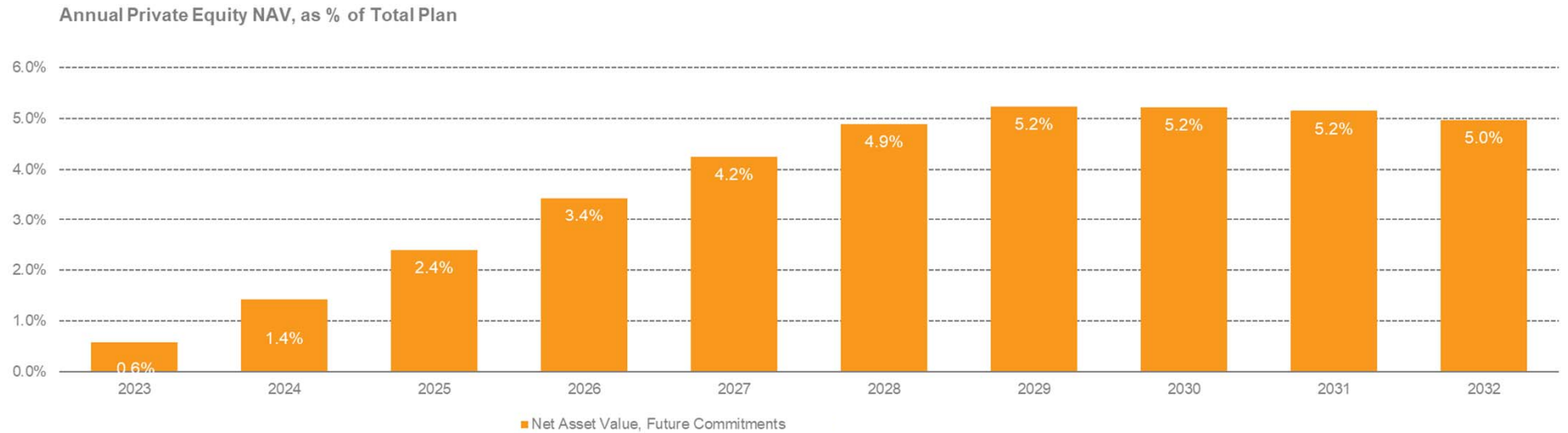
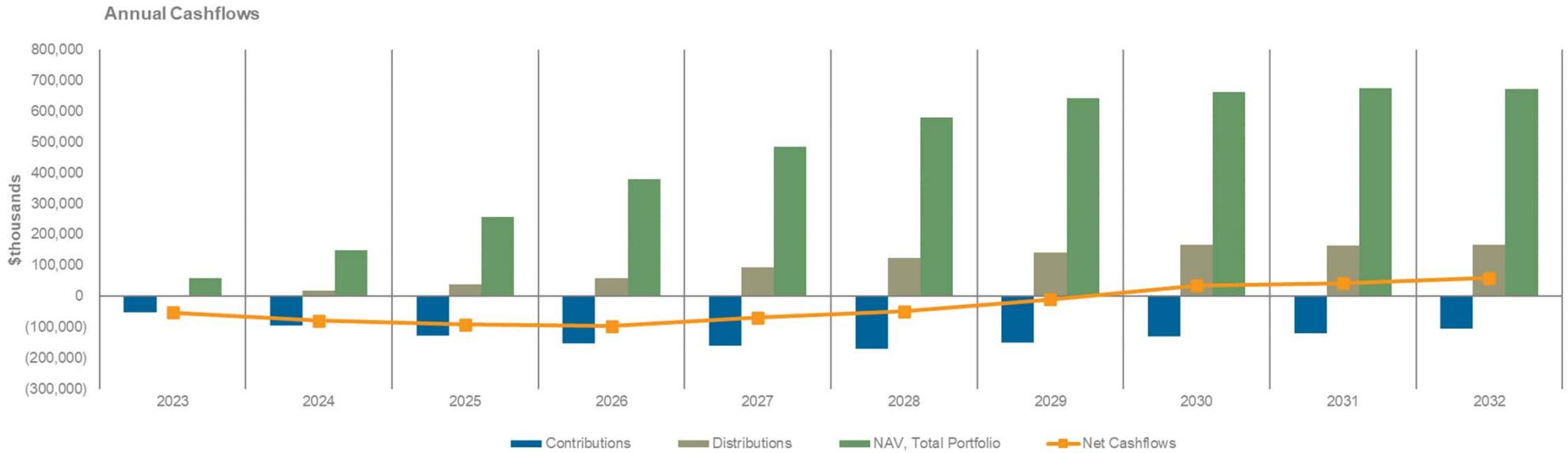
Year	Secondary	Primary FOF	Total
2023	\$500,000	\$75,000	\$575,000
2024	\$0	\$50,000	\$50,000
2025	\$0	\$50,000	\$50,000
2026	\$450,000	\$50,000	\$500,000
2027	\$0	\$50,000	\$50,000
2028	\$0	\$50,000	\$50,000
2029	\$200,000	\$50,000	\$250,000
2030	\$0	\$25,000	\$25,000
2031	\$0	\$25,000	\$25,000
2032	\$200,000	\$25,000	\$225,000
\$ Total	\$1,350,000	\$450,000	\$1,800,000
% Total	75%	25%	100%

Private Equity NAV vs. Target, \$



- The left table shows the expected future commitments to secondaries and fund-of-funds (FOFs) for APERS to achieve a proposed 5% private equity target as seen in the right graph.
 - The graph indicates APERS should approach being fully funded in the 2028 timeframe.
 - Secondaries will be invested in the underlying partnerships more quickly than commitments to Primary fund-of-funds.
- The larger initial commitments will help bridge the gap to full funding, and commitments are then reduced as the portfolio approaches its target.
- Patience is required for private equity portfolios to achieve full funding, as committing more capital in the early years will compromise vintage year diversification.

APERS Private Equity Expected Annual Cash-Flows and Allocation



Pacing Analysis – 50% Secondaries/50% Primaries

Implementation – 50% Secondary Investments / 50% Primary Investments

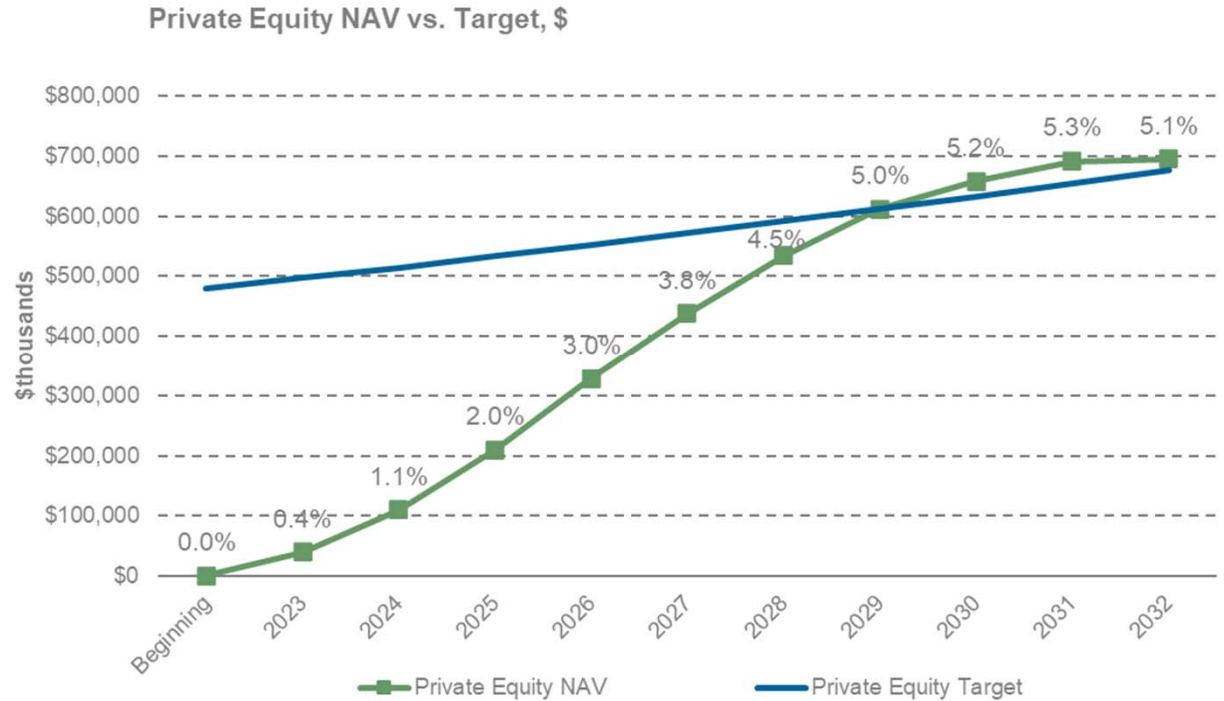
Implementation

- With direction from Staff, the implementation will target an allocation of 50% of commitments to *secondary investments*, and 50% of commitments to *primary investments* employing fund-of-funds vehicles.
- The 50% in secondary investments is intended to achieve more rapid development of private equity invested net asset value (NAV) and generate accelerated distributions relative to primary investments.
- It is expected that the 50% in primary investments fund-of-funds will provide long-term return enhancement.
- Callan expects two separate searches will be necessary and recommends first conducting the *Secondaries* search followed by the *Primary* Fund of Fund search.

Future Commitments and Private Equity NAV Growth

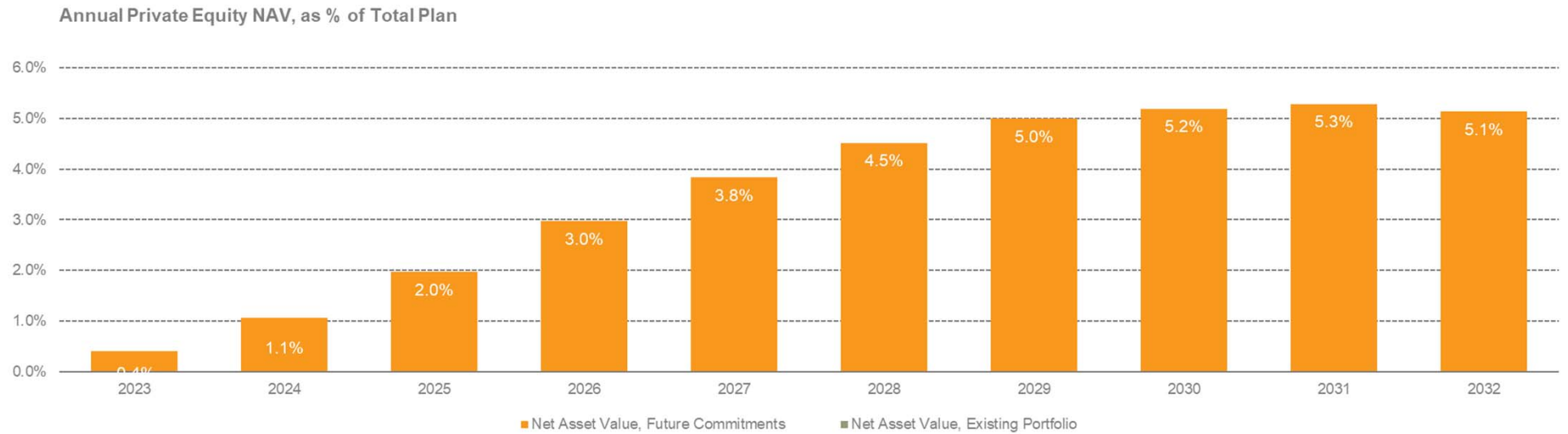
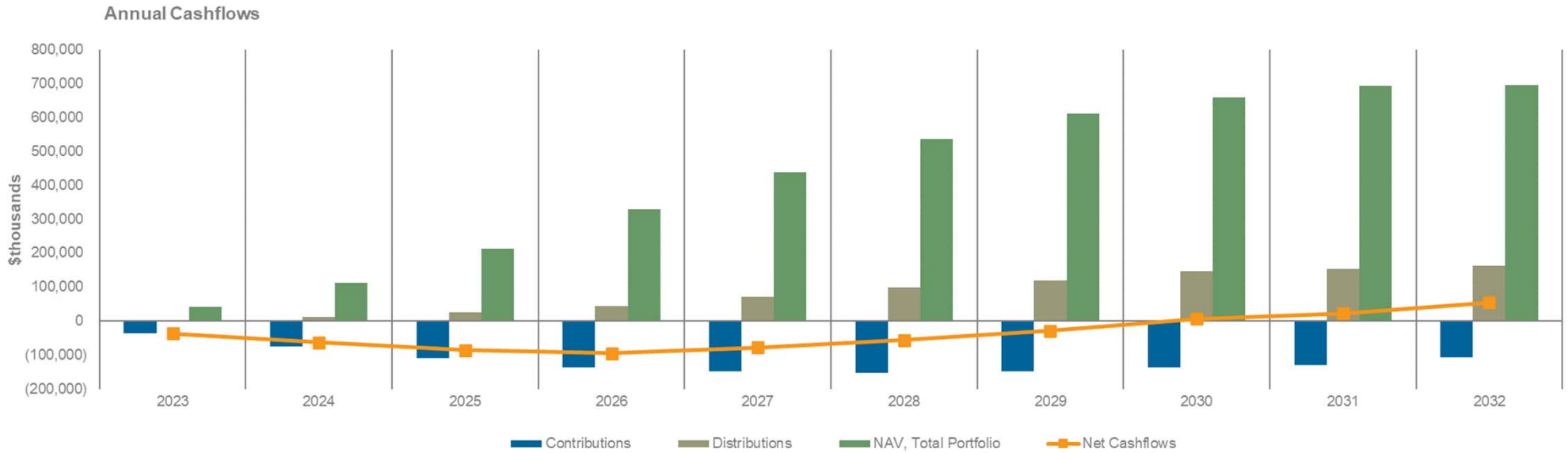
5% Allocation - Projected Future Commitments (\$ millions)

Year	Secondary	Primary FOF	Total
2023	\$300,000	\$150,000	\$450,000
2024	\$0	\$125,000	\$125,000
2025	\$0	\$100,000	\$100,000
2026	\$250,000	\$75,000	\$325,000
2027	\$0	\$75,000	\$75,000
2028	\$0	\$75,000	\$75,000
2029	\$200,000	\$50,000	\$250,000
2030	\$0	\$50,000	\$50,000
2031	\$0	\$50,000	\$50,000
2032	\$50,000	\$50,000	\$100,000
\$ Total	\$800,000	\$800,000	\$1,600,000
% Total	50%	50%	100%



- The left table shows the expected future commitments to secondaries and fund-of-funds (FOFs) for APERS to achieve a proposed 5% private equity target as seen in the right graph.
 - The graph indicates APERS should approach being fully funded in the 2029 timeframe.
 - Secondaries will be invested in the underlying partnerships more quickly than commitments to Primary fund-of-funds.
- The larger initial commitments will help bridge the gap to full funding, and commitments are then reduced as the portfolio approaches its target.
- Patience is required for private equity portfolios to achieve full funding, as committing more capital in the early years will compromise vintage year diversification.

APERS Private Equity Expected Annual Cash-Flows and Allocation



Summary

Pacing Analysis

- If APERS implements a private equity program, it is anticipated that a proposed 5% target exposure could be achieved in the 2028-2029 timeframe regardless of the mix of Primary and Secondary Funds.
 - A higher starting allocation to Secondary Funds increases the value of the private equity in the years leading up to achieving the 5% target.
- Private equity investment requires patience as committing too much too soon will negate the benefits of vintage year diversification.
- The commitments to fund-of-funds will be partly dependent on the selected manager's method of raising and deploying its fund-of-funds vehicles.
- Commitments will gradually decline as the allocation approaches its target.

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