

**Wilshire**

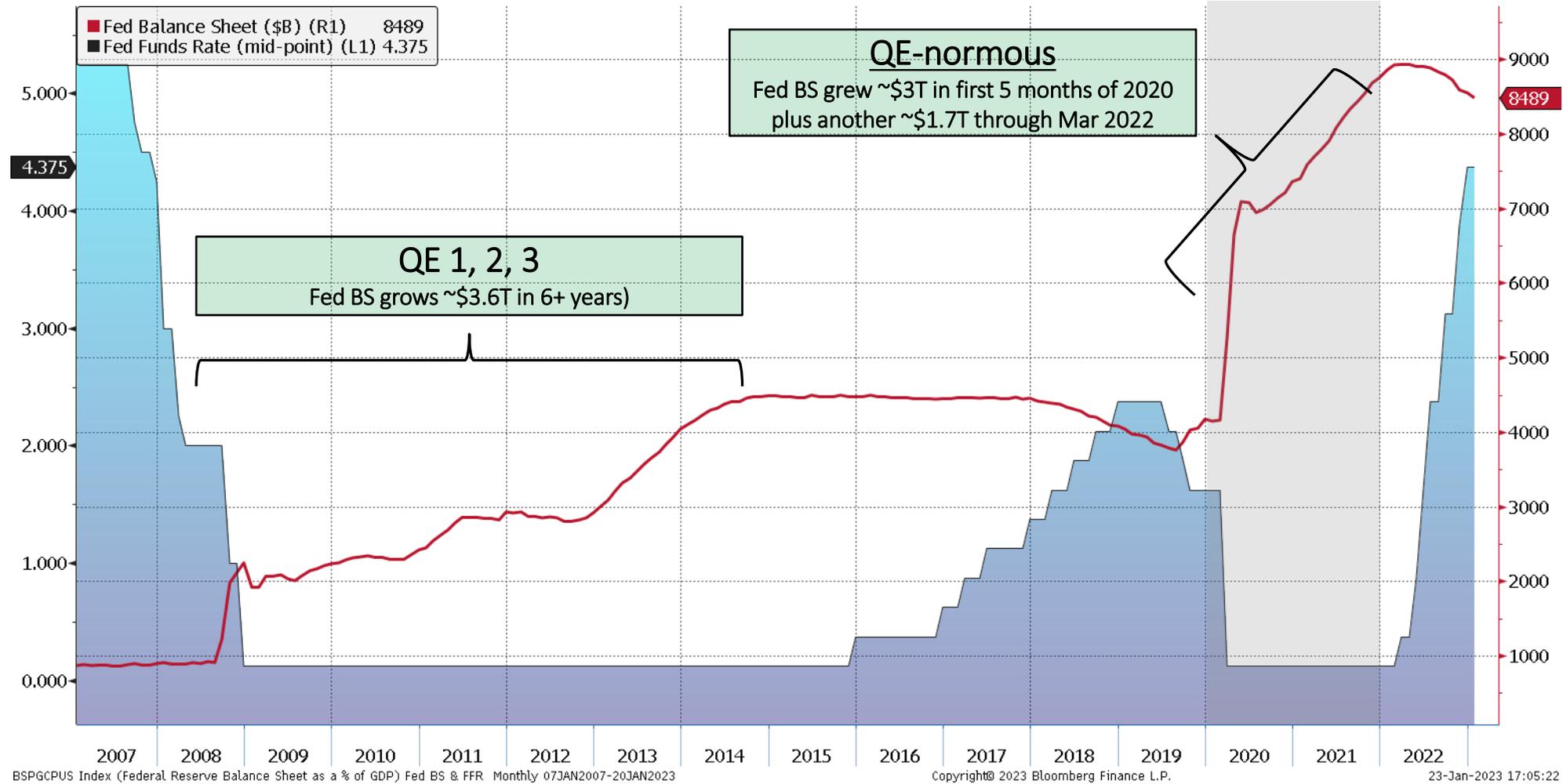
# California Public Employees' Retirement System

Performance Review

Fourth Quarter 2022

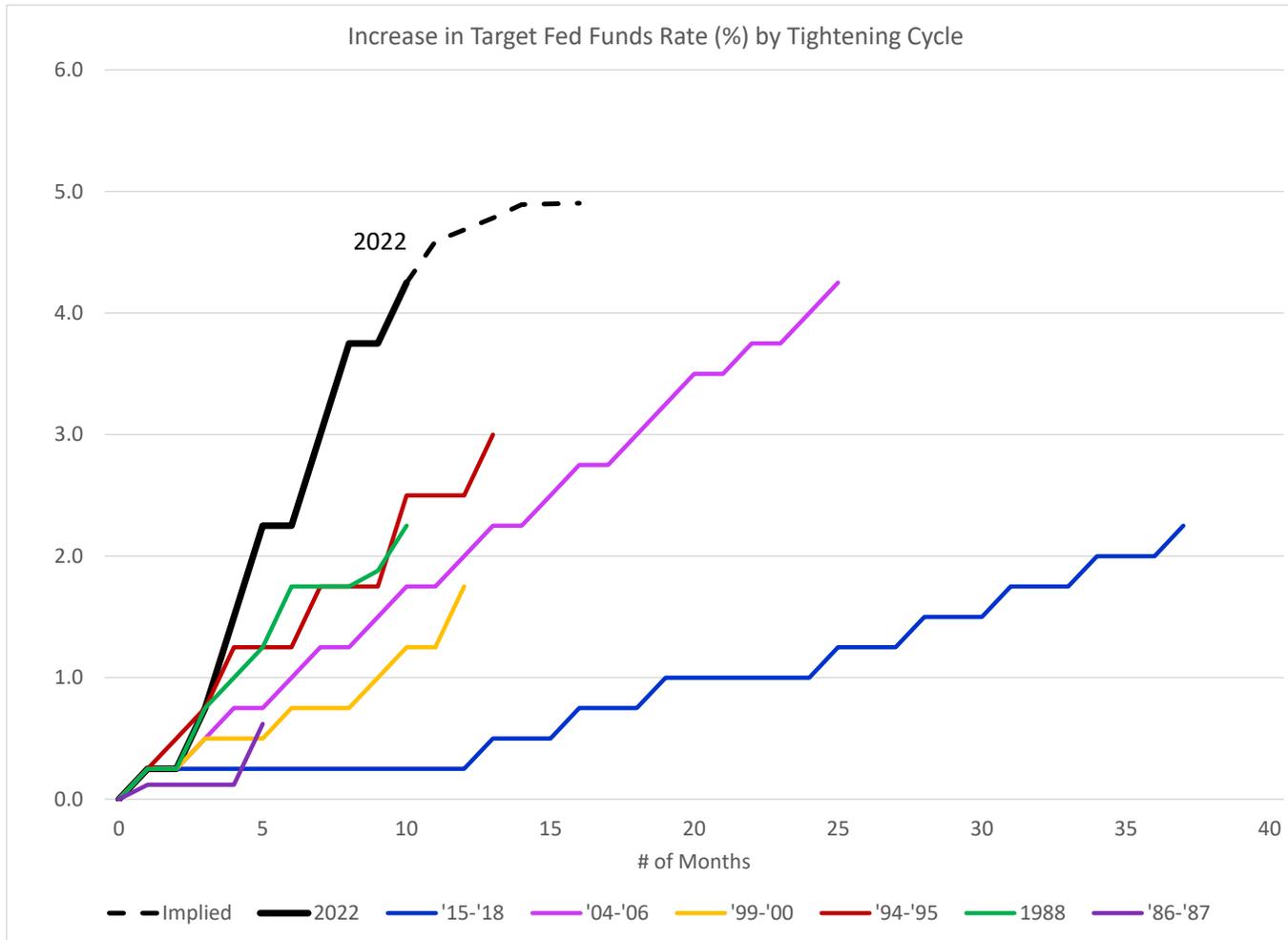
# Economic Review

## The Fed: Zero Rates & QE to \$8T and Beyond...



Data Source: Bloomberg

## The Shift to Tightening: Most Aggressive in Modern Era: Will “Bring Some Pain”



Data Source: Bloomberg

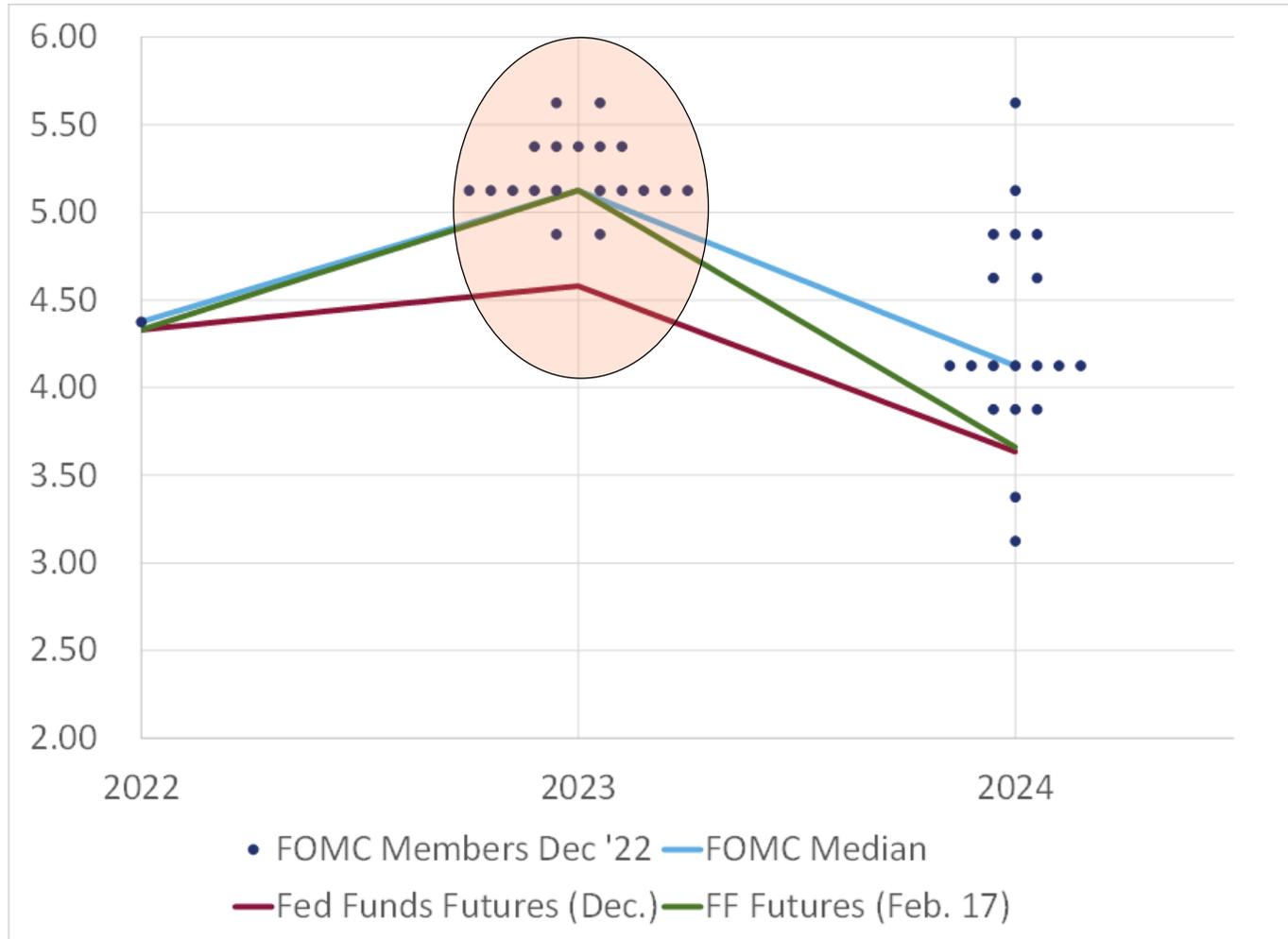
*“While higher interest rates, slower growth, and softer labor market conditions will bring down inflation, they will also bring some pain to households and businesses. These are the unfortunate costs of reducing inflation. But a failure to restore price stability would mean far greater pain.”*



Jerome Powell

August 2022, Jackson Hole

## The Fed Outlook vs. Market Consensus



Data Source: Bloomberg

- The market's Dec 2023 implied Fed Funds Rate is below every FOMC member's forecast
  - More recent market expectations have converged with the Dec '22 views of the FOMC for YE '23
  - 2024 market expectations remain below the FOMC
- Why the divergence: A Fed credibility issue or just a difference in view?
- How might this play out?
  - What if the Fed's wrong?
  - What if the market is wrong?

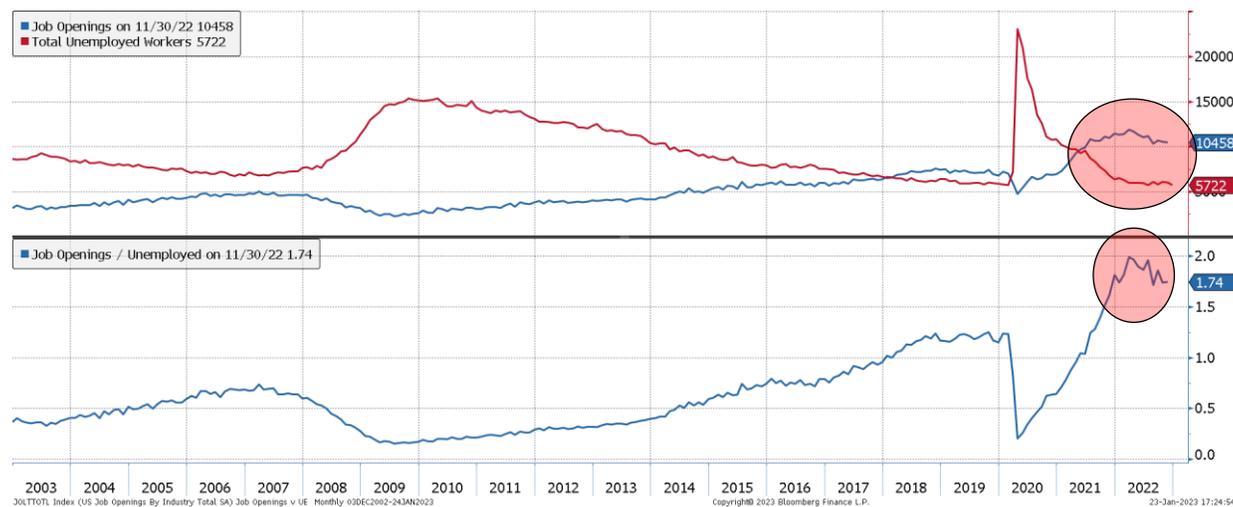
## The Fed's Dashboard: Realized & Expected Inflation



Data Source: Bloomberg

- Realized inflation has begun to ease off extreme levels
  - CPI 6.5% v. 9.1% in June 2022
  - Core CPI stabilizing ~5%
  - Wage inflation remains elevated (~6%)
- Inflation expectations remain well-anchored
  - Expectational anchoring at higher levels would make the Fed's job even more challenging
  - These expectations are likely at the heart of the divergence between market and Fed outlooks (i.e., the Fed would likely pause now if they believed these expectations would be realized)

## The Fed's Dashboard: Economic Growth & Labor Market



Data Source: Bloomberg

The market seems a bit more confident in the prospects of a “soft landing” as inflation has subsided in recent months

- However, lots more liquidity to be drained
- Powell’s “Sully” Sullenberger moment...



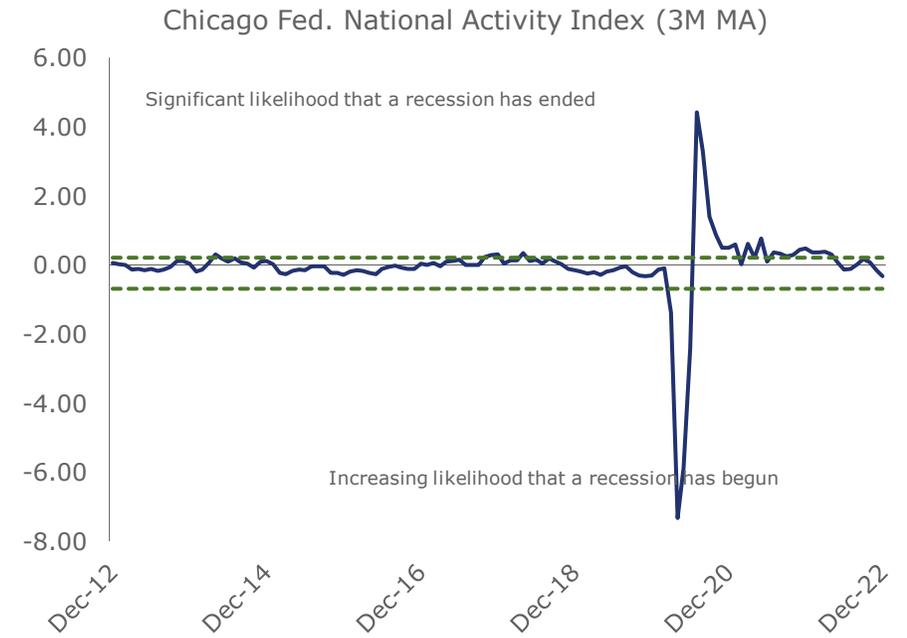
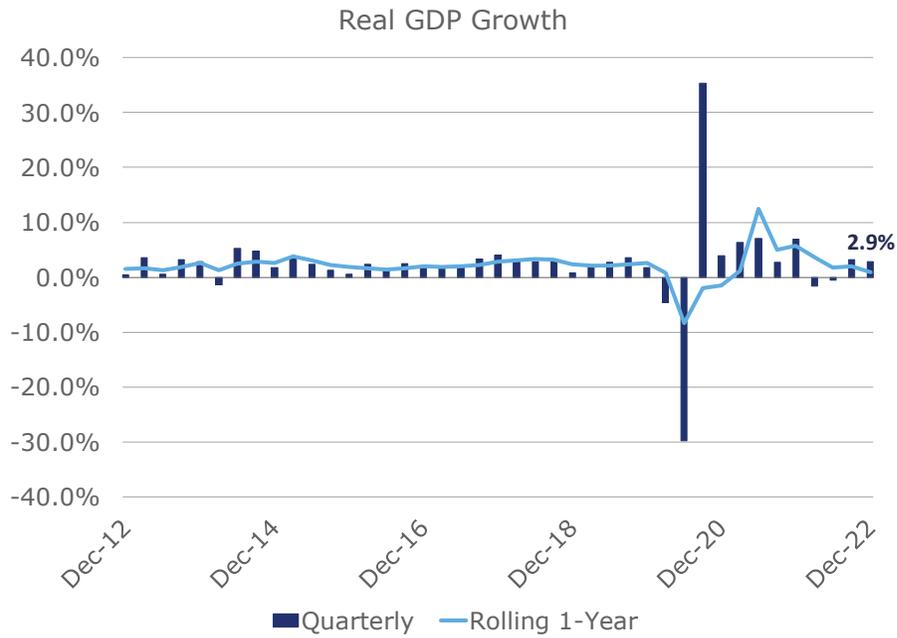
*“We’re going to be in the Hudson”*

Chesley Burnett "Sully" Sullenberger III  
 Pilot of US Airways 1549, January 15, 2009

Labor markets remain tight

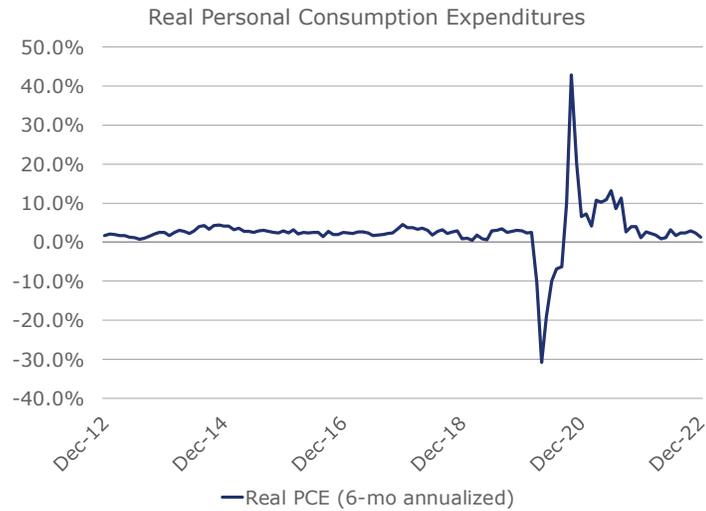
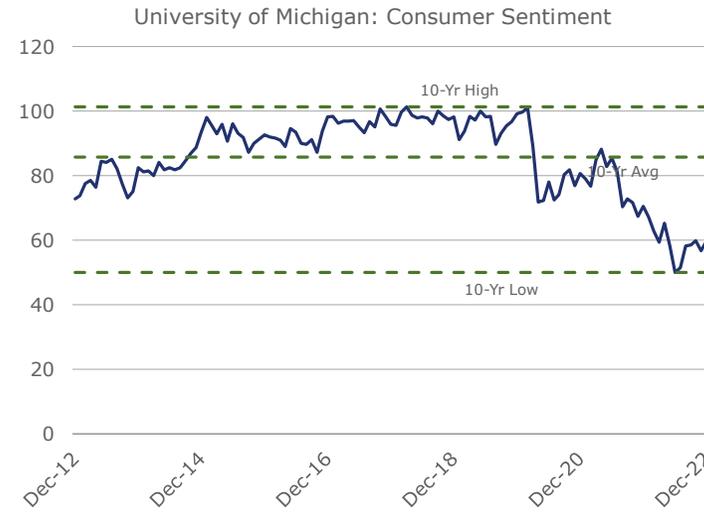
- Difficult to see inflation pressures return to Fed target without these tensions reversing
- Recent jobs reports remain strong (good news for economic resilience but challenges the market’s benign inflation expectations)

# Economic Growth



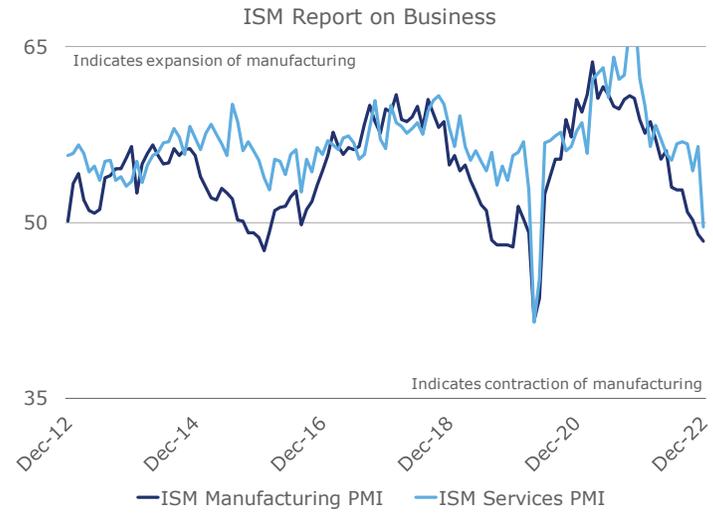
Data Sources: Bloomberg

# Consumer Activity



Data Sources: Bloomberg

# Business Activity



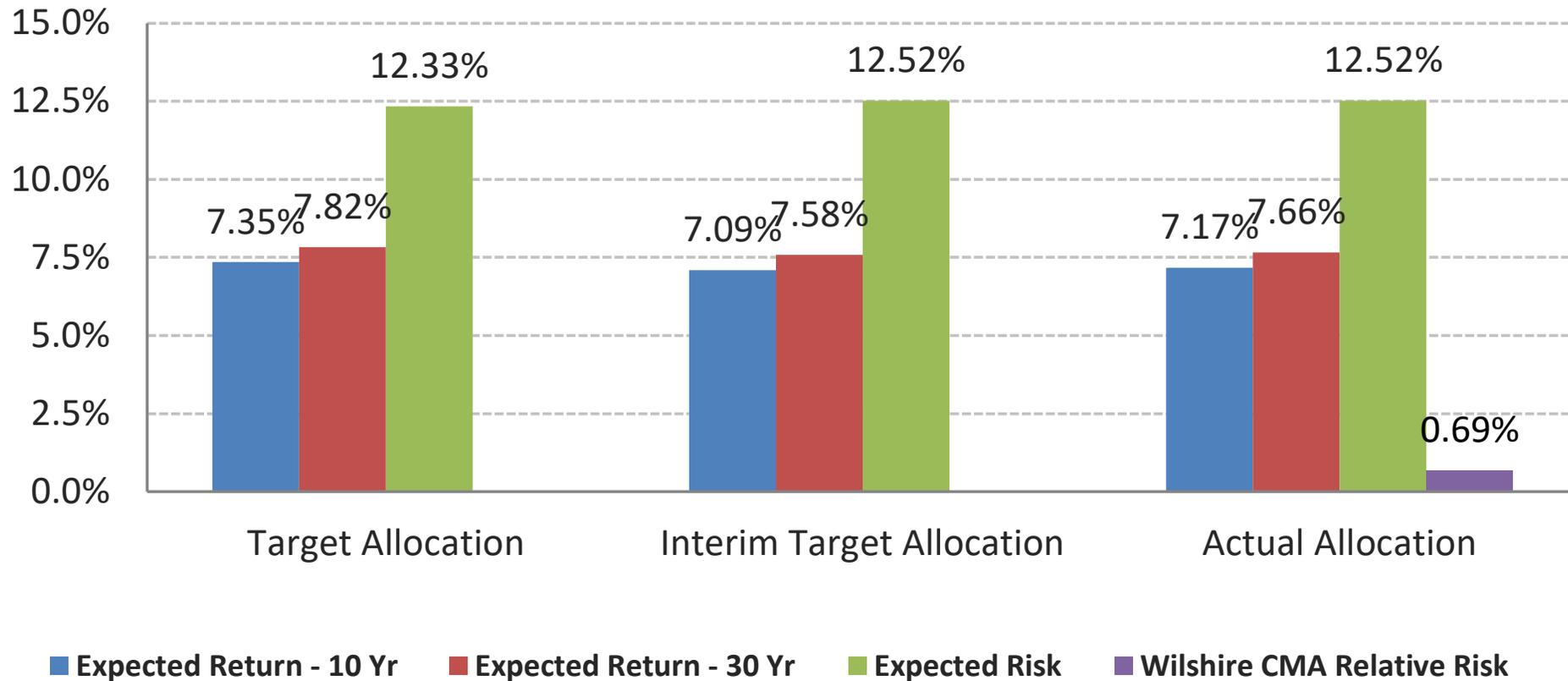
Data Sources: Bloomberg

## December 2022 Asset Class Assumptions

	Equity						Fixed Income						Real Assets						
	US Stock	Dev ex-US Stock	Emg Stock	Global ex-US Stock	Global Stock	Private Equity	Cash	Core Bond	LT Core Bond	TIPS	High Yield	Private Credit	Dev ex-US Bond (Hdg)	US RES	Global RES	Private RE	Cmdty	Real Assets	US CPI
Compound Return (%)	6.50	7.25	7.50	7.60	7.05	9.90	4.00	4.90	4.90	3.95	6.55	8.85	3.05	5.65	5.80	6.20	6.25	6.65	2.25
Expected Risk (%)	17.00	18.00	26.00	19.10	17.10	29.00	0.75	4.70	9.80	6.00	10.00	12.75	4.00	17.50	16.45	14.00	16.00	12.35	1.75
Cash Yield (%)	1.75	3.25	2.80	3.10	2.25	0.00	4.00	5.10	5.25	4.40	9.65	5.10	3.75	3.95	3.95	2.25	4.00	3.15	0.00
Growth Exposure	8.00	8.00	8.00	8.00	8.00	14.00	0.00	-0.95	-2.40	-3.00	4.00	5.10	-1.00	6.00	6.00	3.50	0.00	2.70	0.00
Inflation Exposure	-3.00	0.00	5.00	1.45	-1.30	-3.75	0.00	-2.50	-6.80	2.50	-1.00	-1.50	-3.00	1.00	1.80	1.00	12.00	5.25	1.00
<b>Correlations</b>																			
US Stock	1.00																		
Dev ex-US Stock (USD)	0.81	1.00																	
Emerging Mkt Stock	0.74	0.74	1.00																
Global ex-US Stock	0.84	0.95	0.89	1.00															
Global Stock	0.95	0.91	0.84	0.94	1.00														
Private Equity	0.72	0.63	0.61	0.67	0.73	1.00													
Cash Equivalents	-0.05	-0.09	-0.05	-0.08	-0.06	0.00	1.00												
Core Bond	0.28	0.13	0.00	0.08	0.20	0.30	0.18	1.00											
LT Core Bond	0.31	0.15	0.01	0.11	0.24	0.31	0.11	0.94	1.00										
TIPS	-0.05	0.00	0.15	0.06	-0.01	-0.03	0.20	0.60	0.48	1.00									
High Yield Bond	0.54	0.39	0.49	0.46	0.53	0.31	-0.10	0.24	0.32	0.05	1.00								
Private Credit	0.68	0.55	0.58	0.60	0.68	0.44	0.00	0.24	0.30	0.00	0.76	1.00							
Dev ex-US Bond (Hdg)	0.16	0.25	-0.01	0.16	0.17	0.26	0.10	0.68	0.66	0.39	0.26	0.22	1.00						
US RE Securities	0.58	0.47	0.44	0.49	0.57	0.49	-0.05	0.17	0.22	0.10	0.56	0.62	0.05	1.00					
Global RE Securities	0.64	0.57	0.54	0.60	0.65	0.55	-0.05	0.17	0.21	0.11	0.61	0.68	0.04	0.96	1.00				
Private Real Estate	0.55	0.45	0.45	0.49	0.54	0.50	-0.05	0.19	0.25	0.09	0.58	0.63	0.05	0.79	0.78	1.00			
Commodities	0.25	0.34	0.39	0.38	0.32	0.28	0.00	-0.03	-0.03	0.25	0.29	0.29	-0.10	0.25	0.28	0.25	1.00		
Real Assets	0.62	0.63	0.65	0.69	0.67	0.57	-0.03	0.22	0.24	0.30	0.64	0.69	0.04	0.78	0.84	0.76	0.64	1.00	
Inflation (CPI)	-0.10	-0.15	-0.13	-0.15	-0.13	-0.10	0.10	-0.12	-0.12	0.15	-0.08	0.00	-0.08	0.05	0.04	0.05	0.44	0.22	1.00

# CalPERS PERF Expected Return and Risk Estimates

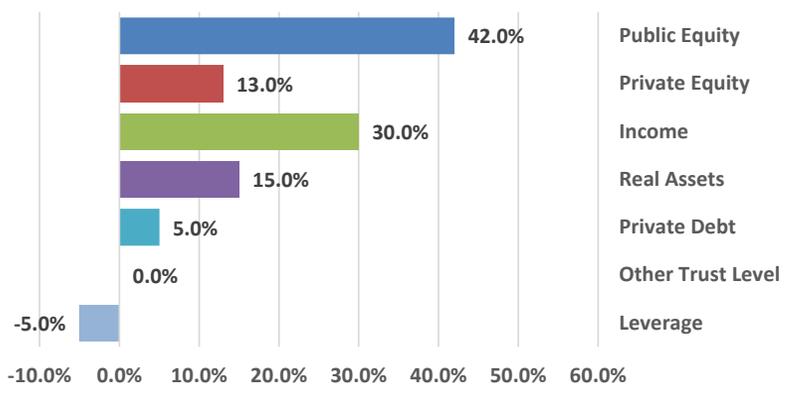
As of December 31, 2022



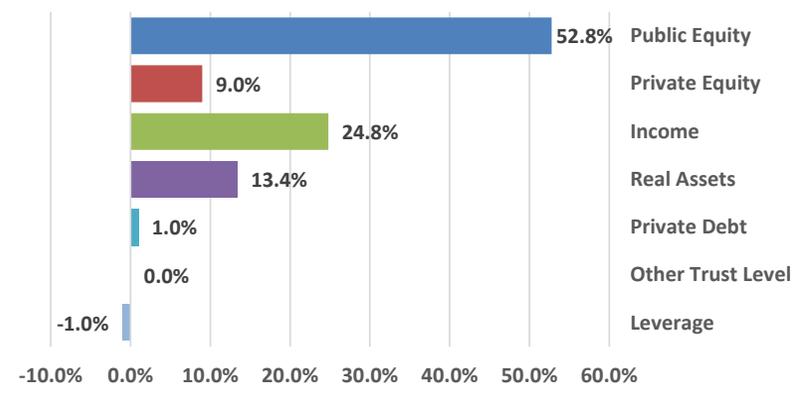
# CalPERS PERF Assets and Risk Allocation

As of December 31, 2022

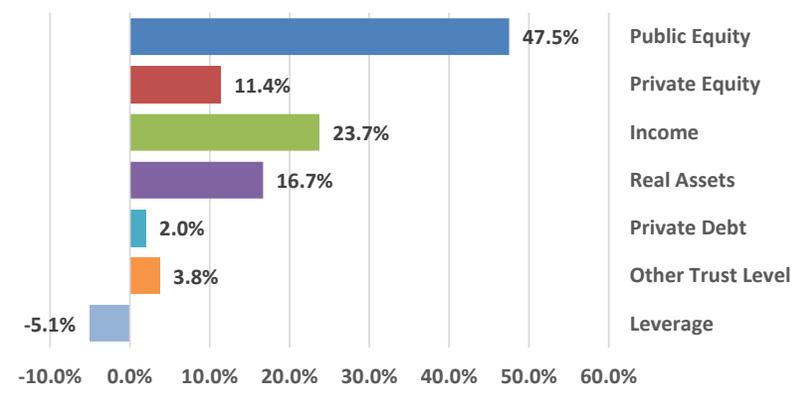
**Target Asset Allocation**



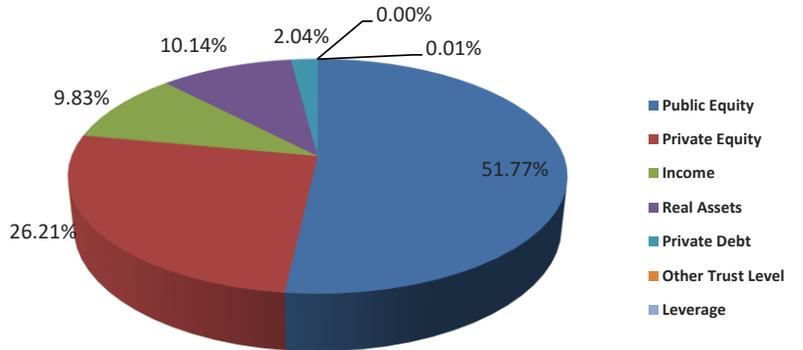
**Interim Target Asset Allocation**



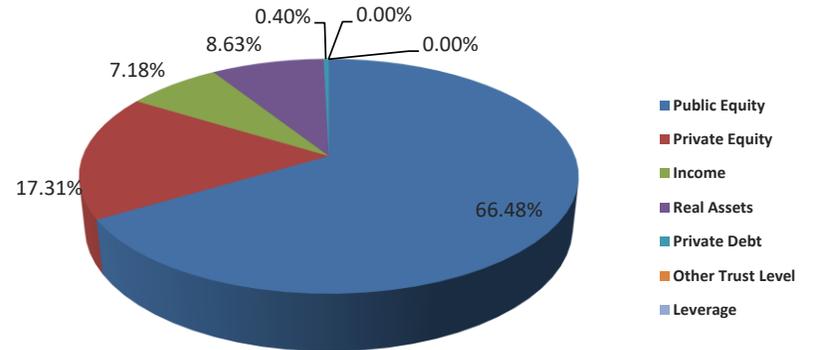
**Actual Asset Allocation**



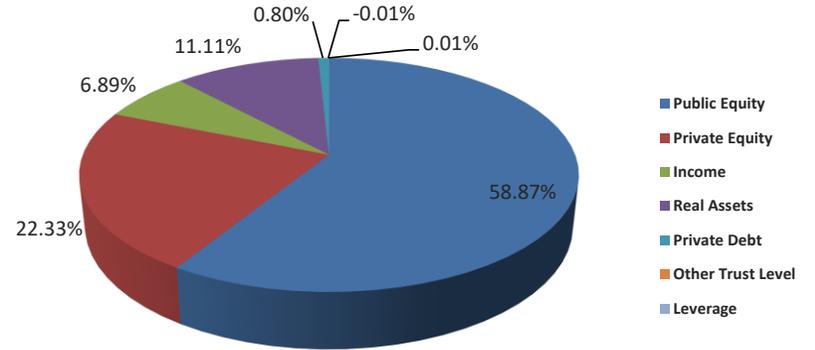
**Contribution to Total Risk - Target Allocation**



**Contribution to Total Risk - Interim Target**



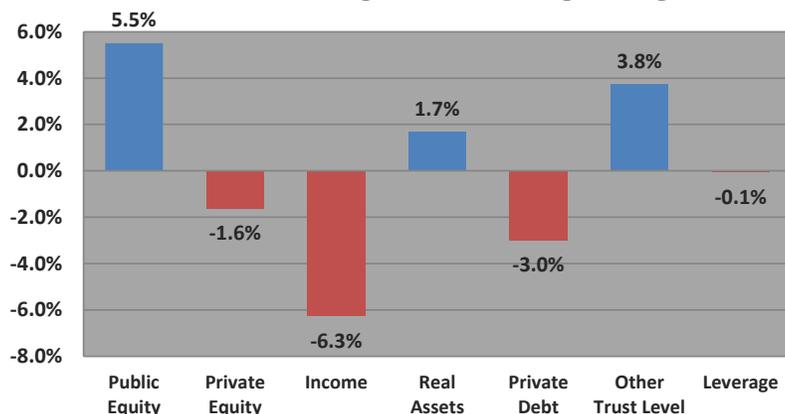
**Contribution to Total Risk - Actual Allocation**



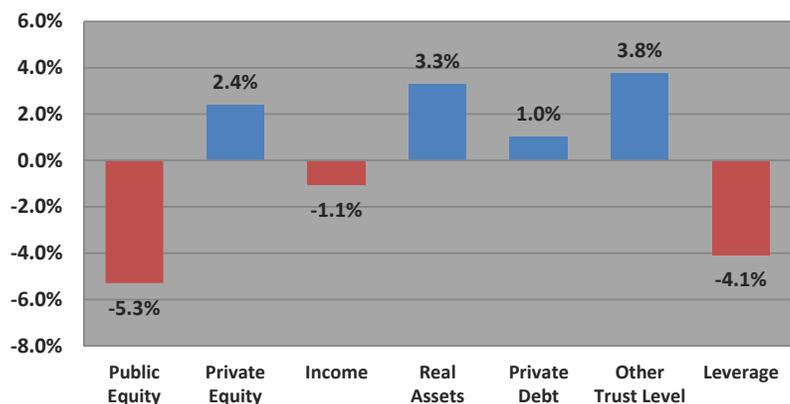
# CalPERS PERF Drivers of Expected Excess Risk

As of December 31, 2022

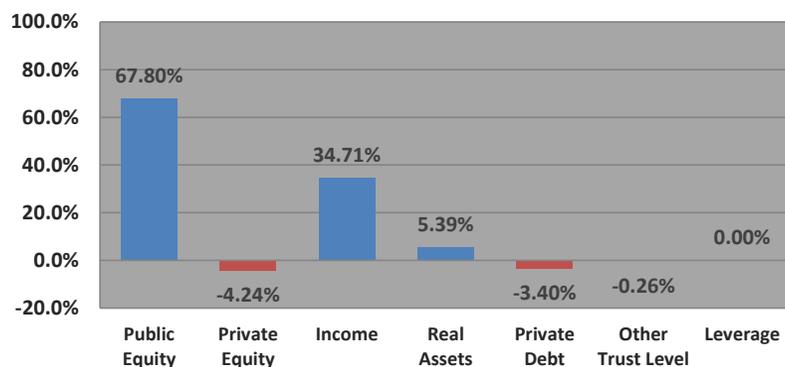
**Allocation vs. Long-Term Strategic Targets**



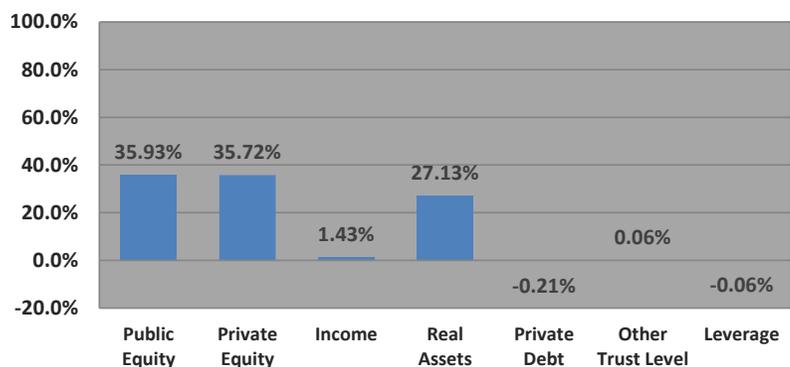
**Allocation vs. Interim Targets**



**Contribution to Tracking Error vs. Long-Term Strategic Targets**



**Contribution to Tracking Error vs. Interim Targets**



- This excess risk forecast is based on asset allocation variance only.
- Other sources of risk (structural within asset classes, manager/program specific source of tracking error, covariance, etc.) are not considered here.

# CalPERS Total Fund Performance

# CalPERS PERF – Performance

## As of December 31, 2022

	Asset Value						VaR	5-Year Ratios	
	(\$Billion)	Quarter	1-Year	3-Year	5-Year	10-Year		(\$Billion)	Sharpe
<b>CALPERS PERF</b>	\$ 442.2	5.5%	-11.2%	4.2%	5.0%	7.0%	\$ 59.4	0.4	0.2
<i>CalPERS PERF Policy Benchmark</i>		4.7%	-12.6%	3.3%	4.7%	6.7%		0.4	0.0
<i>Actuarial Rate</i>		1.7%	6.8%	6.9%	7.1%	7.3%			
<b>PUBLIC EQUITY*</b>	\$ 210.1	9.9%	-15.8%	4.1%	5.3%	8.5%	\$ 40.6	0.2	0.2
<i>Public Equity Policy Benchmark</i>		9.8%	-16.0%	3.8%	5.2%	8.4%		0.2	0.0
<b>PRIVATE EQUITY</b>	\$ 50.3	0.1%	-2.3%	15.3%	12.1%	12.4%	\$ 19.0	1.3	0.3
<i>Private Equity Policy Benchmark</i>		-6.3%	-19.6%	5.7%	6.5%	10.8%		0.3	0.0
<b>INCOME*</b>	\$ 105.0	2.6%	-18.5%	-3.6%	-0.1%	1.6%	\$ 5.9	-0.2	1.0
<i>Income Policy Benchmark</i>		2.7%	-18.4%	-3.7%	-0.4%	1.0%		-0.2	0.0
<b>REAL ASSETS</b>	\$ 73.7	0.0%	14.3%	9.8%	7.9%	9.2%	\$ 10.9	1.7	-0.2
<i>Real Assets Policy Benchmark</i>		0.2%	20.9%	11.3%	9.1%	9.5%		1.3	0.0
<b>PRIVATE DEBT</b>	\$ 8.9	1.8%	-.%	-.%	-.%	-.%	\$ 0.7	N/A	N/A
<i>Private Debt Blended Benchmark</i>		1.6%	-.%	-.%	-.%	-.%		N/A	N/A
<b>OTHER TRUST LEVEL</b>	\$ 16.6							N/A	N/A
<b>LEVERAGE</b>	\$ (22.4)							N/A	N/A
<b>TERMINATED AGENCY POOL</b>	\$ 0.2	1.8%	-21.4%	-2.0%	0.7%	-.%		N/A	N/A
<b>CalPERS PERF PLUS TAP</b>	\$ 442.4	5.5%	-11.2%	4.2%	5.0%	7.0%		N/A	N/A

\* The CalPERS PERF asset values shown include derivative exposure.

# CalPERS PERF – Attribution (Quarter)

As of December 31, 2022

Asset Class	Actual (%)		Benchmark (%)		Difference (%)		Total Fund Return Contribution (%)		
	Weight *	Return	Weight *	Return	Weight	Return	Actual Allocation	Active Management	Total
<b>Public Equity</b>	<b>47.49</b>	<b>9.91</b>	<b>47.61</b>	<b>9.79</b>	<b>-0.11</b>	<b>0.12</b>	<b>-0.03</b>	<b>0.06</b>	<b>0.03</b>
Public Equity - Cap Weighted	35.04	10.02	35.11	9.84	-0.07	0.18	-0.02	0.06	0.03
Public Equity - Factor Weighted	12.45	9.67	12.50	9.71	-0.04	-0.04	0.00	0.00	-0.01
<b>Private Equity</b>	<b>11.32</b>	<b>0.09</b>	<b>11.37</b>	<b>-6.62</b>	<b>-0.05</b>	<b>6.70</b>	<b>0.01</b>	<b>0.76</b>	<b>0.77</b>
<b>Income</b>	<b>23.60</b>	<b>2.61</b>	<b>23.94</b>	<b>2.74</b>	<b>-0.34</b>	<b>-0.13</b>	<b>0.04</b>	<b>-0.25</b>	<b>-0.21</b>
Treasury	3.69	-0.07	5.29	-0.07	-1.59	0.00	0.10	0.00	0.10
Mortgage-Backed Securities	5.39	2.06	5.52	2.05	-0.12	0.01	0.01	0.00	0.01
Investment Grade Credit	5.75	4.45	5.76	4.84	-0.02	-0.39	0.00	-0.02	-0.02
High Yield	4.61	4.33	4.63	4.32	-0.01	0.01	0.00	0.00	0.00
EM Sovereign	2.73	-	2.74	8.01	-0.01	-8.01	0.00	-0.22	-0.23
Total Fund Income	1.42	-0.42	0.00	-0.07	1.42	-0.35	-0.07	-0.01	-0.08
<b>Real Assets</b>	<b>16.71</b>	<b>-0.03</b>	<b>16.72</b>	<b>0.24</b>	<b>-0.01</b>	<b>-0.27</b>	<b>0.00</b>	<b>-0.05</b>	<b>-0.05</b>
<b>Private Debt</b>	<b>1.89</b>	<b>1.81</b>	<b>1.89</b>	<b>1.60</b>	<b>-0.01</b>	<b>0.21</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Other Trust Level</b>	<b>3.74</b>	<b>-</b>	<b>0.00</b>	<b>-</b>	<b>3.74</b>	<b>-</b>	<b>-0.14</b>	<b>0.03</b>	<b>-0.11</b>
LLER	3.19	1.95	0.00	0.97	3.19	0.98	-0.12	0.03	-0.09
Opportunistic Strategies	0.05	1.54	0.00	0.97	0.05	0.56	0.00	0.00	0.00
Other PERF	0.04	-	0.00	-	0.04	-	0.00	0.00	0.00
TLPM	0.47	-	0.00	-	0.47	-	-0.02	0.00	-0.02
<b>Leverage</b>	<b>-4.75</b>	<b>-</b>	<b>-1.53</b>	<b>-</b>	<b>-3.22</b>	<b>-</b>	<b>0.14</b>	<b>0.00</b>	<b>0.14</b>
<b>Monthly Linked Return</b>	<b>100.00</b>	<b>5.27</b>	<b>100.00</b>	<b>4.71</b>		<b>0.56</b>	<b>0.01</b>	<b>0.55</b>	<b>0.56</b>
<b>Residual</b>		<b>0.23</b>		<b>0.00</b>		<b>0.23</b>			<b>0.23</b>
<b>Total PERF</b>		<b>5.50</b>		<b>4.71</b>		<b>0.79</b>			<b>0.79</b>

\* Average period weight displayed.

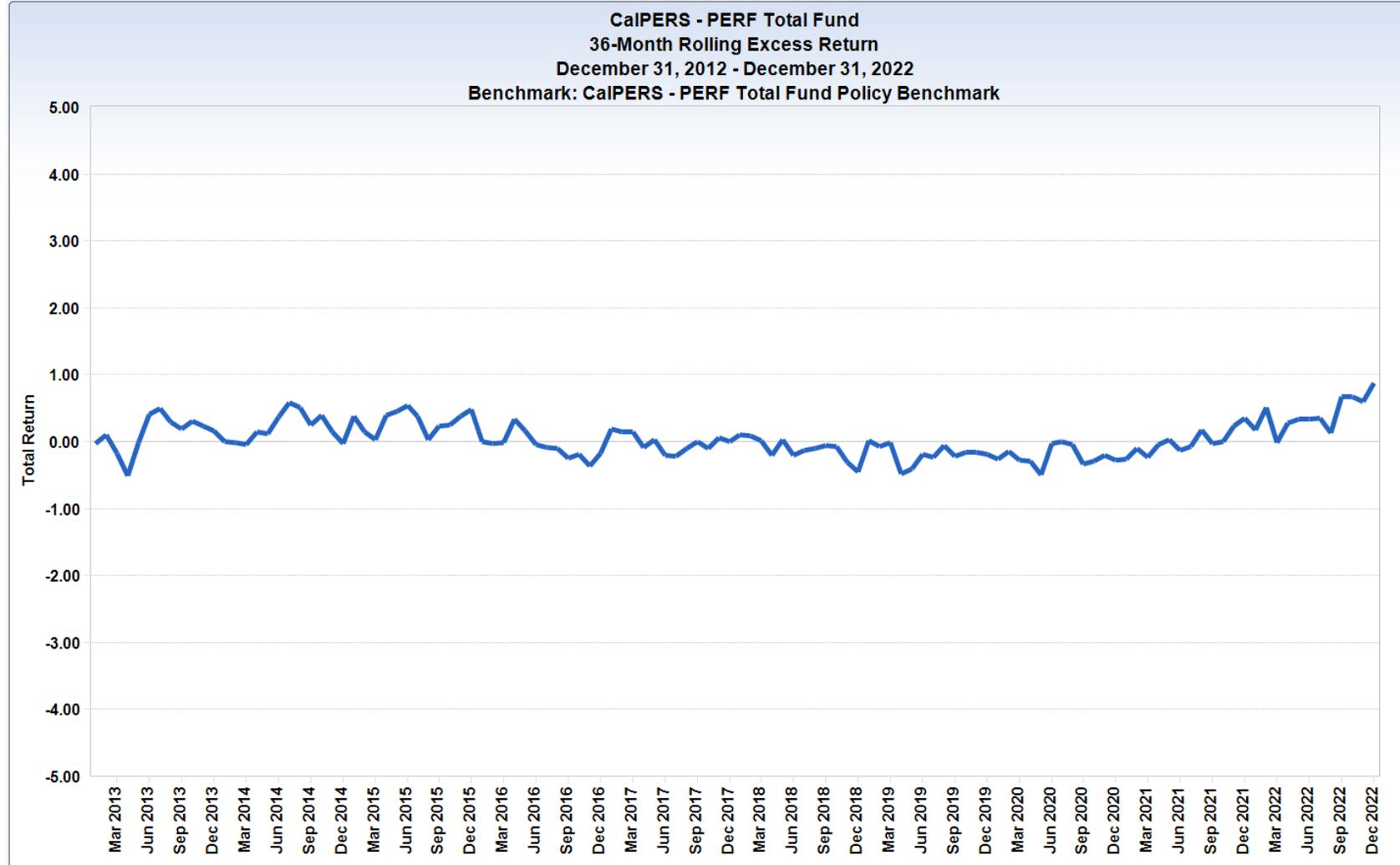
# CalPERS PERF – Attribution (Fiscal YTD)

As of December 31, 2022

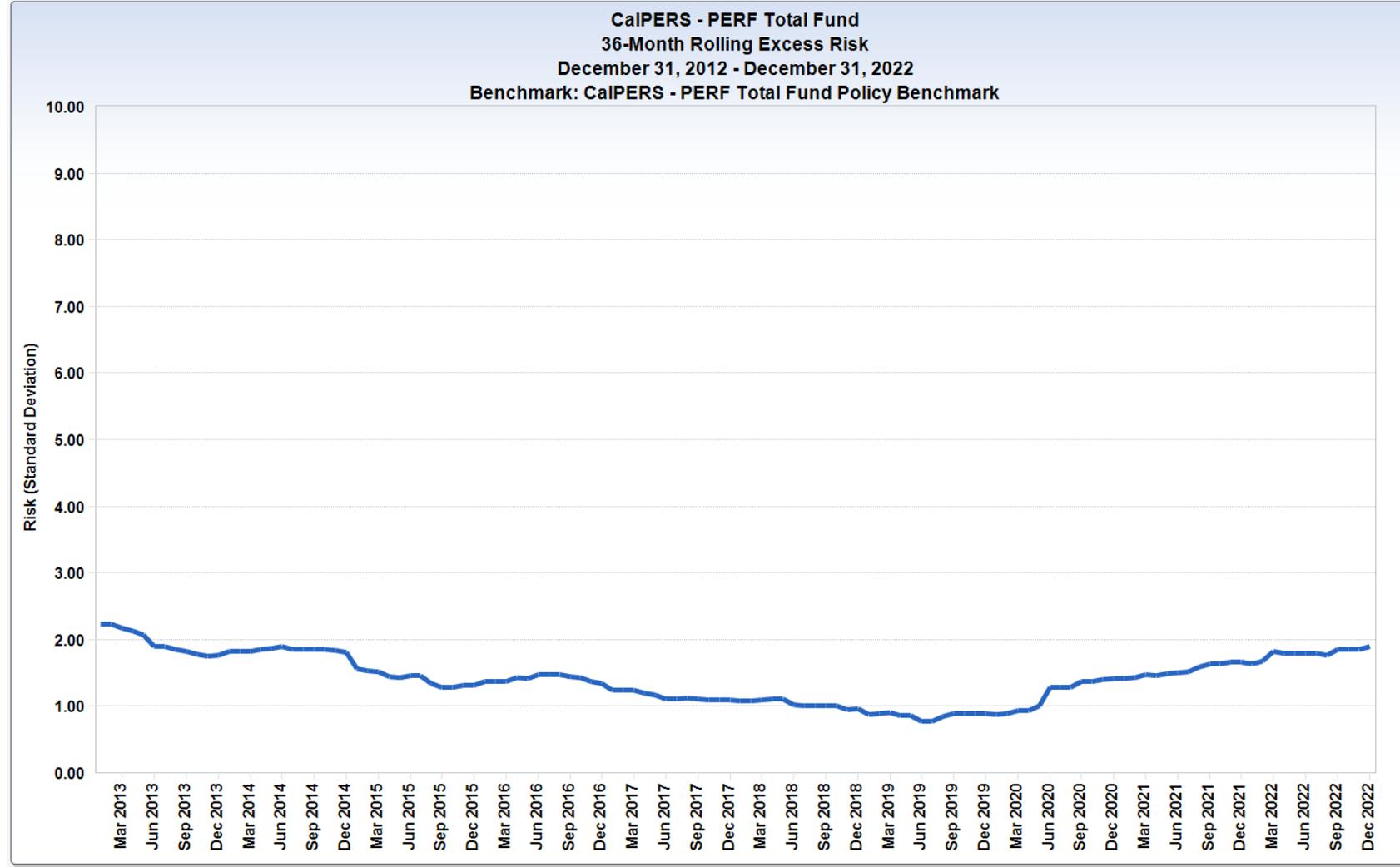
Asset Class	Actual (%)		Benchmark (%)		Difference (%)		Total Fund Return Contribution (%)		
	Weight *	Return	Weight *	Return	Weight	Return	Actual Allocation	Active Management	Total
<b>Public Equity</b>	<b>46.88</b>	<b>2.30</b>	<b>46.96</b>	<b>2.22</b>	<b>-0.07</b>	<b>0.08</b>	<b>-0.02</b>	<b>0.04</b>	<b>0.01</b>
Public Equity - Cap Weighted	33.61	2.68	33.65	2.57	-0.05	0.11	-0.02	0.04	0.02
Public Equity - Factor Weighted	13.28	1.81	13.30	1.83	-0.02	-0.02	0.00	0.00	-0.01
<b>Private Equity</b>	<b>11.33</b>	<b>-6.02</b>	<b>11.34</b>	<b>-21.26</b>	<b>-0.02</b>	<b>15.24</b>	<b>0.00</b>	<b>1.81</b>	<b>1.81</b>
<b>Income</b>	<b>24.58</b>	<b>-3.48</b>	<b>24.83</b>	<b>-3.41</b>	<b>-0.25</b>	<b>-0.07</b>	<b>0.07</b>	<b>-0.13</b>	<b>-0.07</b>
Treasury	4.87	-8.35	6.49	-8.35	-1.62	0.00	0.14	0.00	0.14
Mortgage-Backed Securities	6.08	-3.22	6.22	-3.26	-0.14	0.04	0.01	0.00	0.02
Investment Grade Credit	5.88	-3.08	5.89	-2.94	-0.01	-0.14	0.00	-0.01	-0.01
High Yield	4.40	3.70	4.34	3.71	0.06	-0.02	0.03	0.00	0.03
EM Sovereign	1.88	-	1.89	2.98	-0.01	-2.98	0.00	-0.13	-0.13
Total Fund Income	1.47	-8.73	0.00	-8.35	1.47	-0.38	-0.10	-0.01	-0.11
<b>Real Assets</b>	<b>16.22</b>	<b>2.75</b>	<b>16.20</b>	<b>4.69</b>	<b>0.02</b>	<b>-1.94</b>	<b>0.01</b>	<b>-0.36</b>	<b>-0.35</b>
<b>Private Debt</b>	<b>1.46</b>	<b>-</b>	<b>1.70</b>	<b>-3.47</b>	<b>-0.24</b>	<b>-</b>	<b>0.05</b>	<b>0.09</b>	<b>0.14</b>
<b>Other Trust Level</b>	<b>3.75</b>	<b>-</b>	<b>0.00</b>	<b>-</b>	<b>3.75</b>	<b>-</b>	<b>0.08</b>	<b>0.01</b>	<b>0.09</b>
LLER	3.02	2.24	0.00	1.57	3.02	0.67	0.11	0.02	0.13
Opportunistic Strategies	0.28	-5.94	0.00	1.57	0.28	-7.51	-0.05	0.00	-0.05
Other PERF	0.04	-	0.00	-	0.04	-	0.00	0.00	0.00
TLPM	0.41	-	0.00	-	0.41	-	0.02	0.00	0.02
<b>Leverage</b>	<b>-4.21</b>	<b>-</b>	<b>-1.04</b>	<b>-</b>	<b>-3.18</b>	<b>-</b>	<b>-0.09</b>	<b>0.00</b>	<b>-0.09</b>
<b>Monthly Linked Return</b>	<b>100.00</b>	<b>0.07</b>	<b>100.00</b>	<b>-1.46</b>		<b>1.54</b>	<b>0.10</b>	<b>1.45</b>	<b>1.54</b>
<b>Residual</b>		<b>0.04</b>		<b>0.00</b>		<b>0.03</b>			<b>0.03</b>
<b>Total PERF</b>		<b>0.11</b>		<b>-1.46</b>		<b>1.57</b>			<b>1.57</b>

\* Average period weight displayed.

# CalPERS PERF – Rolling Excess Return



# CalPERS PERF – Rolling Tracking Error



# CalPERS Affiliate Investment Programs – Performance

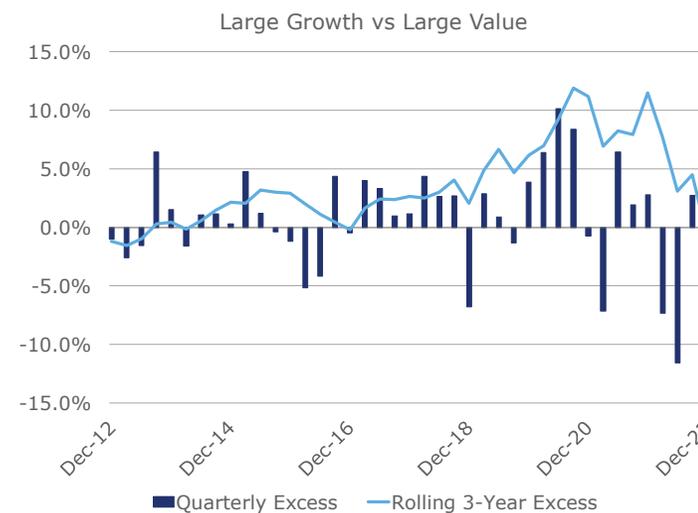
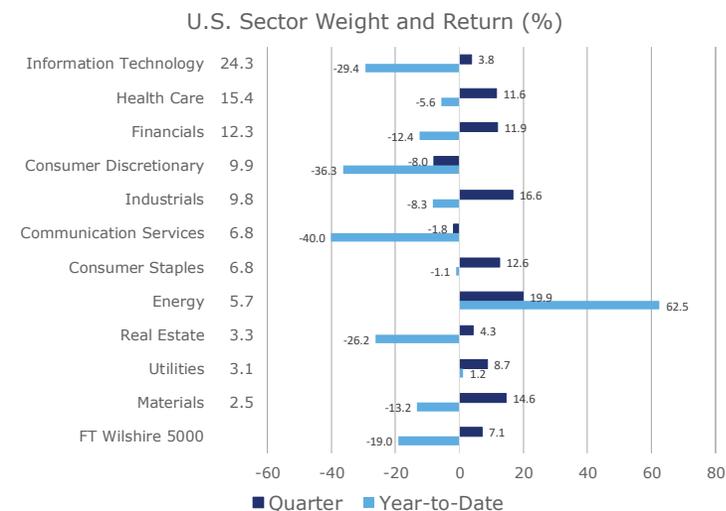
As of December 31, 2022

	Asset Value (\$Million)	Quarter	1-Year	3-Year	5-Year	10-Year
<b>Judges I</b>	\$ 47.6	1.0%	1.8%	0.8%	1.4%	0.9%
91-Day Treasury Bill		0.8%	1.5%	0.7%	1.3%	0.8%
<b>Judges II</b>	\$ 2,134.0	7.1%	-17.2%	1.7%	3.6%	5.8%
Weighted Policy Benchmark		7.0%	-17.3%	1.5%	3.4%	5.5%
<b>Legislators' Retirement System</b>	\$ 95.6	4.0%	-16.6%	-0.1%	2.2%	3.6%
Weighted Policy Benchmark		4.2%	-16.5%	-0.2%	2.1%	3.4%
<b>Long-Term Care ("LTC")</b>	\$ 4,675.1	3.7%	-16.3%	-0.7%	1.7%	2.7%
Weighted Policy Benchmark		3.9%	-16.2%	-0.8%	1.6%	2.5%
<b>CERBT Strategy 1</b>	\$ 13,213.5	6.8%	-17.8%	1.9%	3.7%	5.9%
CERBT Strategy 1 Policy Benchmark		6.9%	-17.9%	1.7%	3.5%	5.6%
<b>CERBT Strategy 2</b>	\$ 1,682.6	5.5%	-17.6%	0.6%	2.8%	4.6%
CERBT Strategy 2 Policy Benchmark		5.6%	-17.6%	0.5%	2.7%	4.4%
<b>CERBT Strategy 3</b>	\$ 743.1	4.4%	-16.4%	-0.1%	2.2%	3.5%
CERBT Strategy 3 Policy Benchmark		4.6%	-16.3%	-0.2%	2.1%	3.3%
<b>CEPPT Strategy 1</b>	\$ 71.4	5.5%	-15.8%	0.6%	-.-%	-.-%
CEPPT Strategy 1 Policy Benchmark		5.5%	-15.9%	0.6%	-.-%	-.-%
<b>CEPPT Strategy 2</b>	\$ 33.2	3.8%	-14.2%	-1.1%	-.-%	-.-%
CEPPT Strategy 2 Policy Benchmark		4.0%	-14.1%	-1.1%	-.-%	-.-%
<b>Health Care Fund</b>	\$ 200.5	1.7%	-13.2%	-2.8%	0.0%	1.2%
Barclays U.S. Aggregate		1.9%	-13.0%	-2.7%	0.0%	1.1%
<b>Supplemental Contribution Plan</b>	\$ 102.9	NM	NM	NM	NM	NM
CalPERS Custom SCP Plan Index		NM	NM	NM	NM	NM
<b>457 Program</b>	\$ 1,900.9	NM	NM	NM	NM	NM
CalPERS Custom 457 Plan Index		NM	NM	NM	NM	NM

# Appendix 1: Asset Class Performance Detail

# U.S. Equity Market

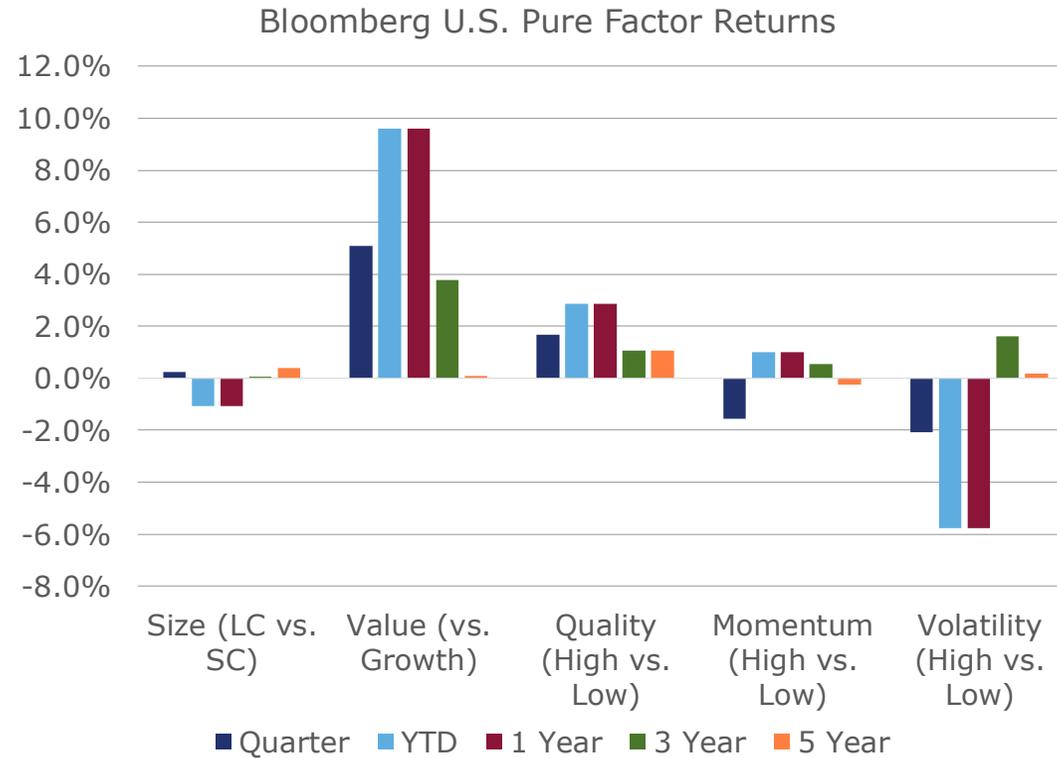
As of 12/30/2022	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
FT Wilshire 5000	7.1	-19.0	-19.0	7.4	9.0	12.3
Wilshire U.S. Large Cap	7.1	-19.0	-19.0	7.7	9.4	12.6
Wilshire U.S. Small Cap	7.9	-18.7	-18.7	4.4	5.1	9.7
Wilshire U.S. Large Growth	0.8	-29.5	-29.5	7.1	10.0	13.6
Wilshire U.S. Large Value	13.8	-5.5	-5.5	8.1	8.7	11.5
Wilshire U.S. Small Growth	7.1	-23.1	-23.1	3.2	5.1	9.9
Wilshire U.S. Small Value	8.7	-14.2	-14.2	5.6	5.0	9.3
Wilshire REIT Index	4.0	-26.8	-26.8	-0.5	3.4	6.3
MSCI USA Min. Vol. Index	9.8	-9.2	-9.2	5.1	8.6	11.9
FTSE RAFI U.S. 1000 Index	12.5	-7.4	-7.4	9.6	9.1	12.2



Data Sources: Bloomberg, Wilshire Atlas

## U.S. Factor Returns

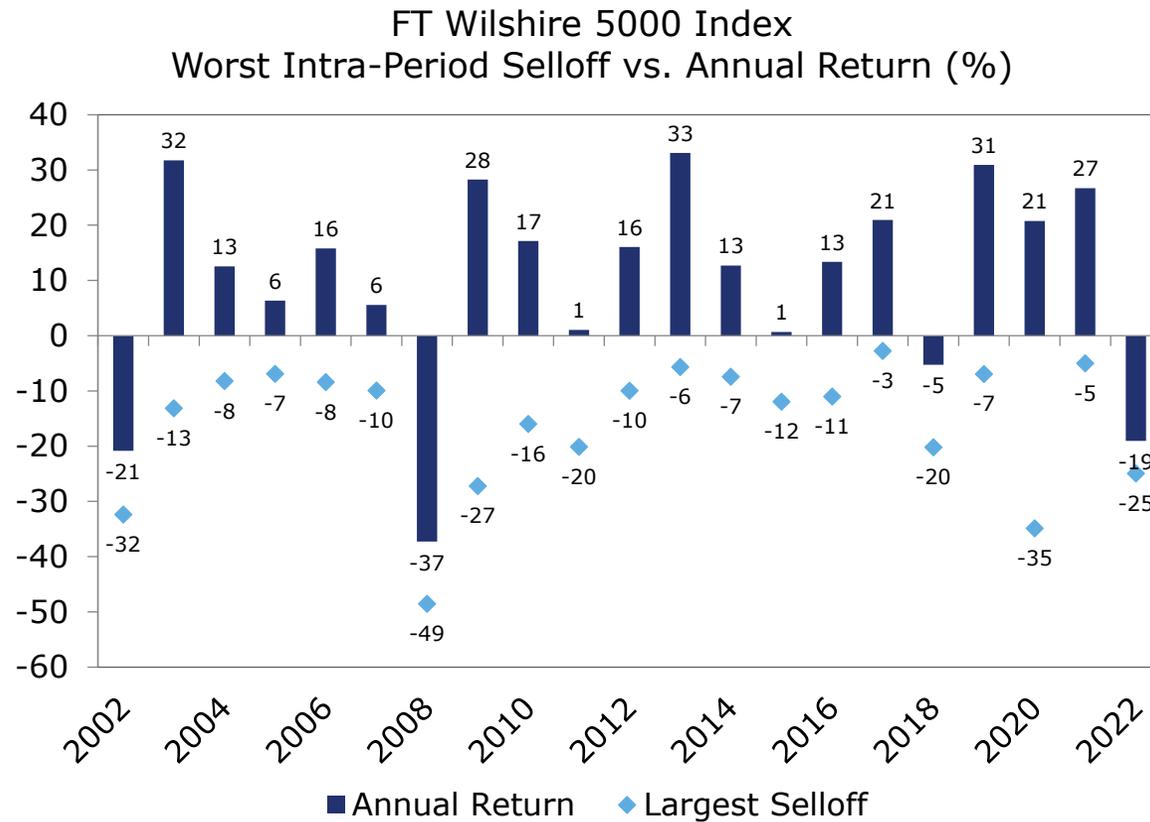
- Factor returns represent the contribution from large cap, value, etc. stocks within Bloomberg's Portfolio & Risk Analytics module
- Value and low volatility have mostly outperformed this year



Data Sources: Bloomberg

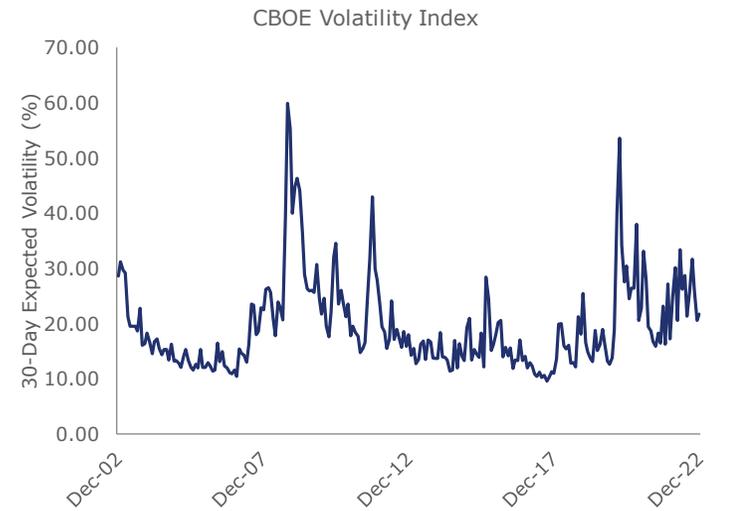
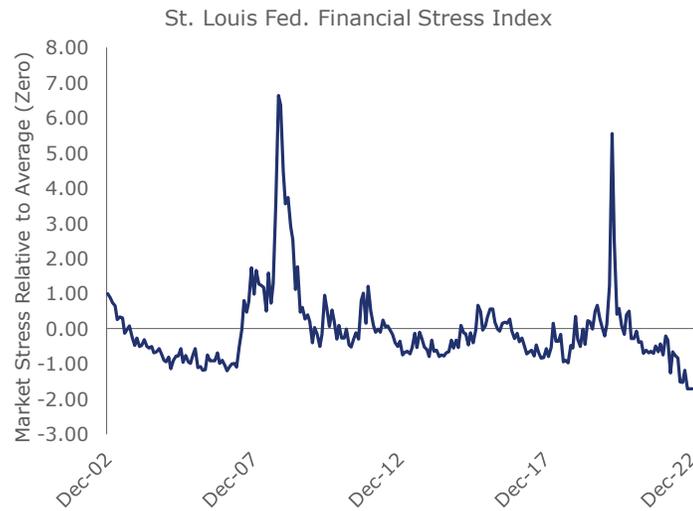
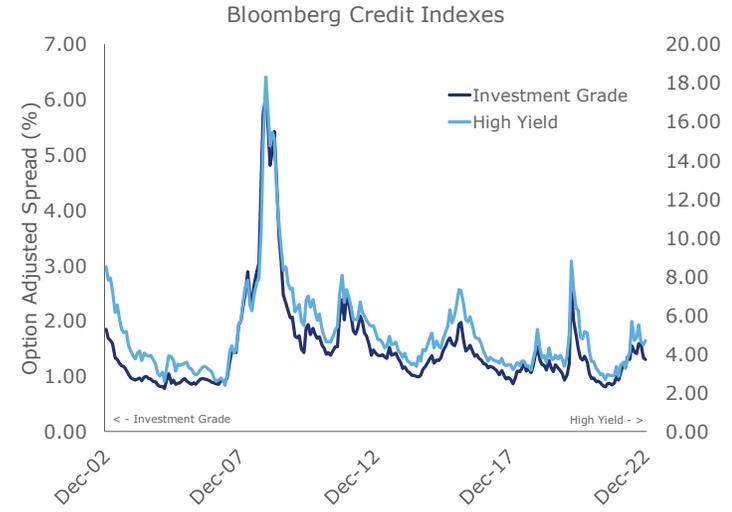
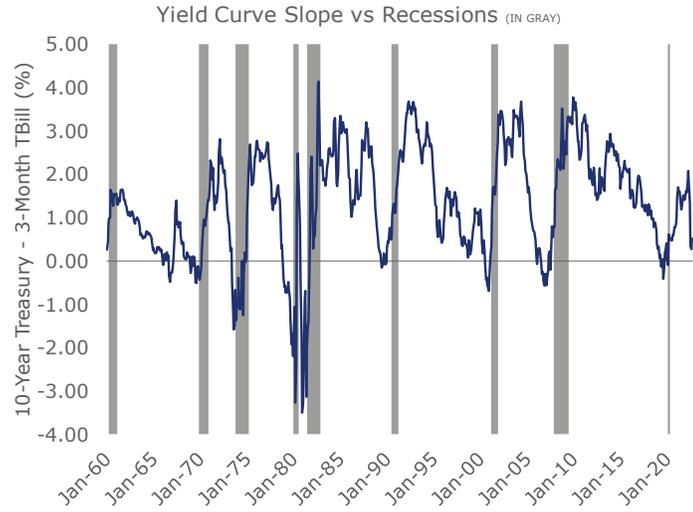
## Annual Equity Market Selloffs

U.S. equity suffered its worse year since the 2008 global financial crisis



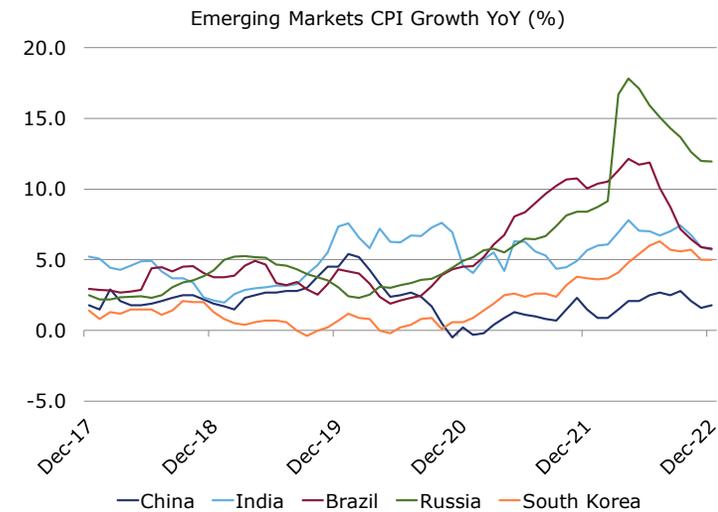
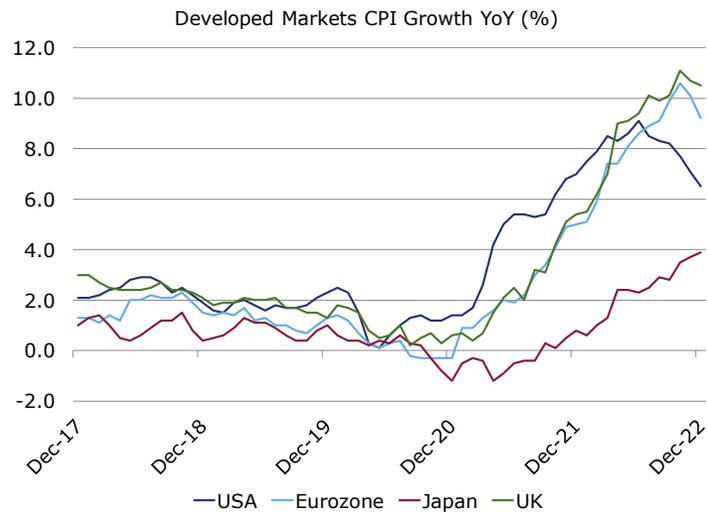
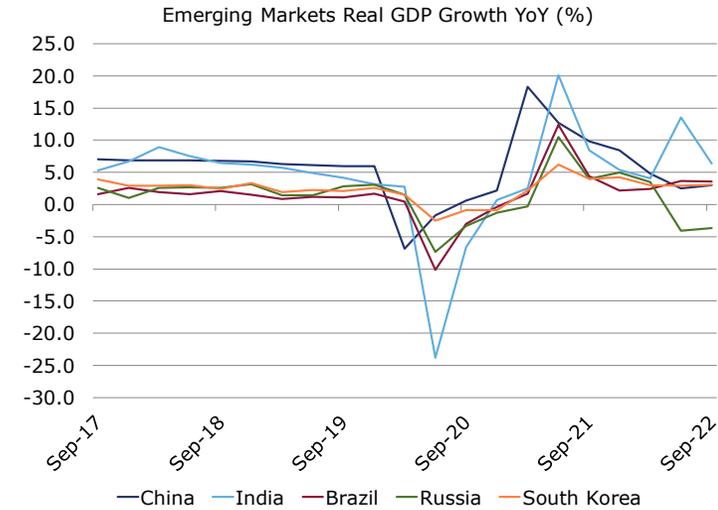
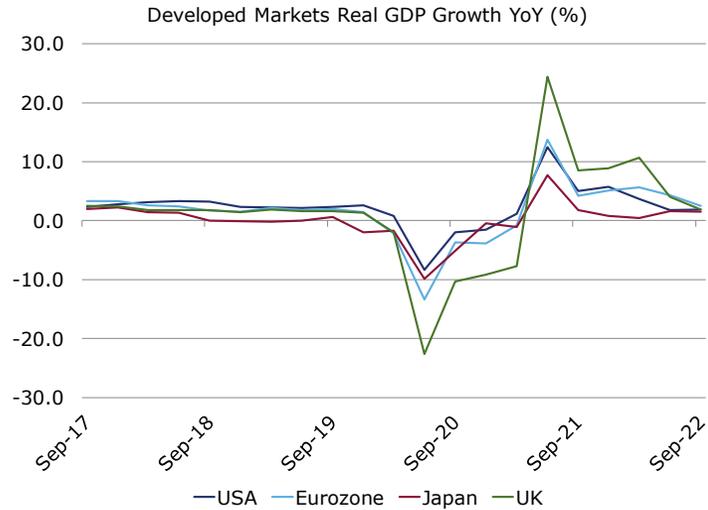
Data Sources: Wilshire Web, Bloomberg

# Risk Monitor



Data Sources: Bloomberg

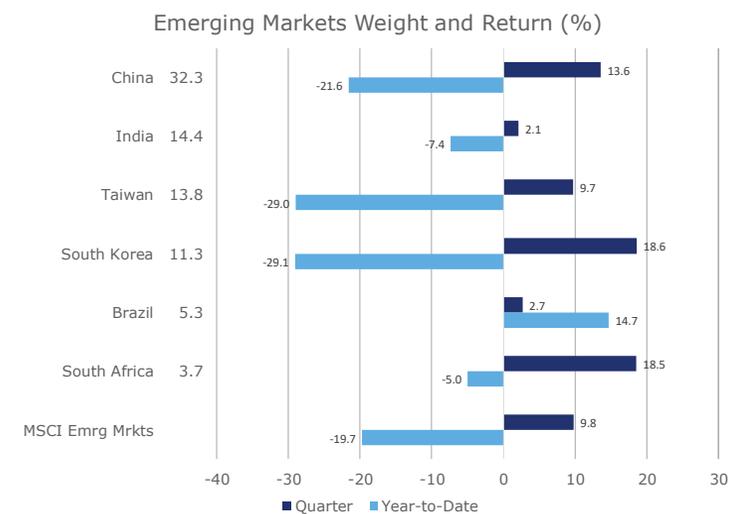
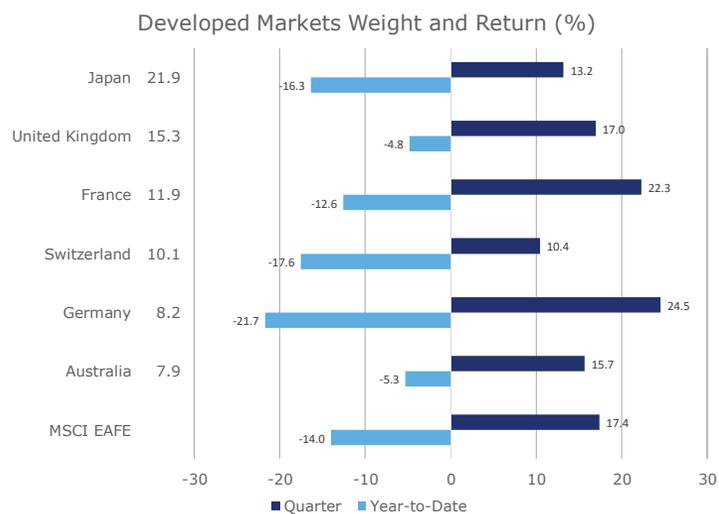
# Non-U.S. Growth and Inflation



Data Sources: Bloomberg

## Non-U.S. Equity Market

As of 12/30/2022	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
MSCI ACWI ex-US (\$G)	14.4	-15.6	-15.6	0.5	1.4	4.3
MSCI EAFE (\$G)	17.4	-14.0	-14.0	1.3	2.0	5.2
MSCI Emerging Markets (\$G)	9.8	-19.7	-19.7	-2.3	-1.0	1.8
MSCI Frontier Markets (\$G)	9.2	-17.8	-17.8	-5.7	-3.8	0.2
MSCI ACWI ex-US Growth (\$G)	12.9	-22.8	-22.8	-0.1	1.8	5.0
MSCI ACWI ex-US Value (\$G)	15.7	-8.7	-8.7	0.8	0.6	3.6
MSCI ACWI ex-US Small (\$G)	13.4	-19.6	-19.6	1.5	1.1	5.6
MSCI ACWI Minimum Volatility	8.6	-9.8	-9.8	2.2	5.2	8.4
MSCI EAFE Minimum Volatility	12.5	-14.6	-14.6	-2.6	0.6	5.1
FTSE RAFI Developed ex-US	18.3	-9.0	-9.0	2.7	1.7	4.9
MSCI EAFE LC (G)	8.8	-6.5	-6.5	4.1	4.3	8.1
MSCI Emerging Markets LC (G)	6.7	-15.2	-15.2	0.5	1.7	5.0



Data Sources: Bloomberg

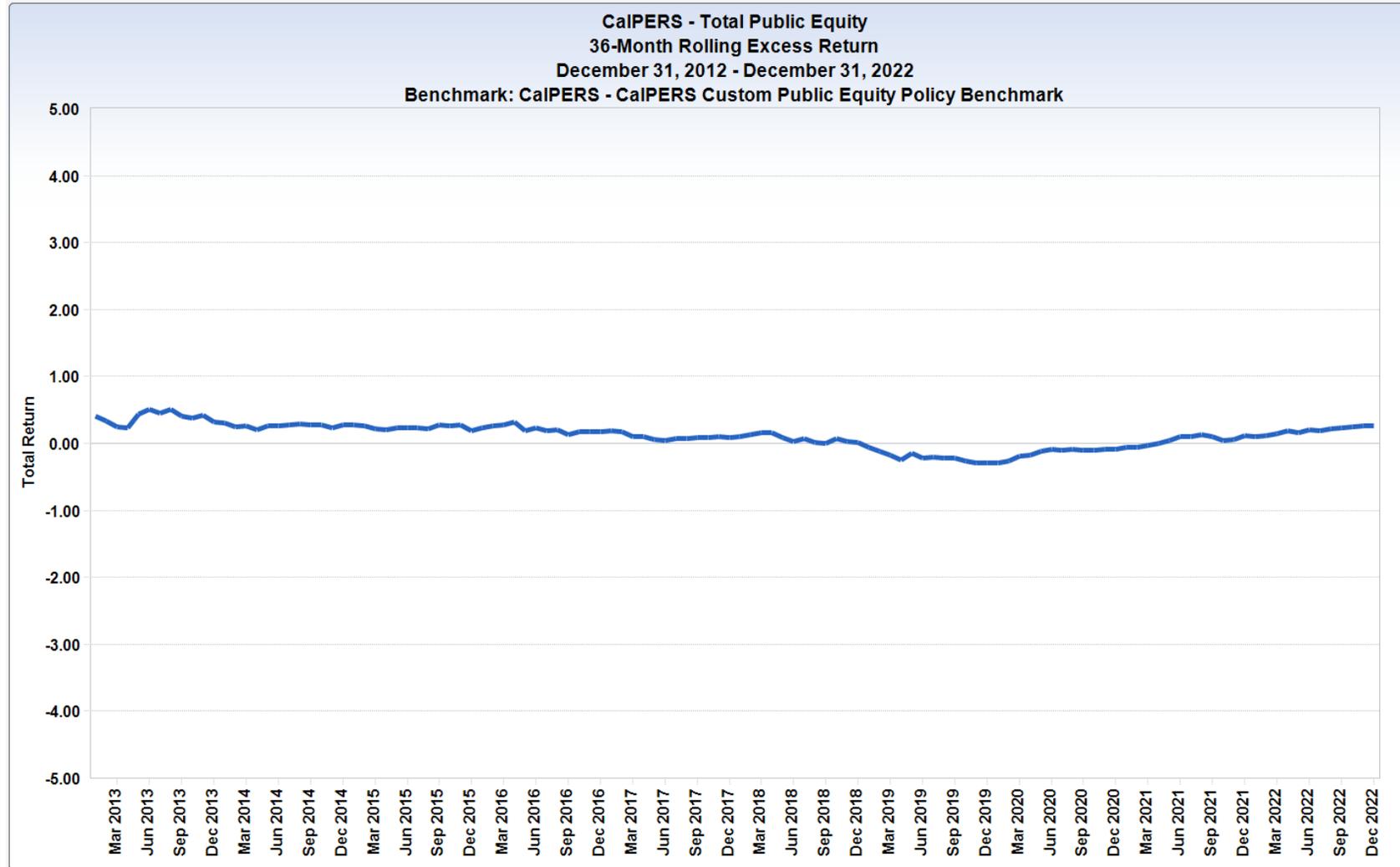
# CalPERS Public Equity – Performance

As of December 31, 2022

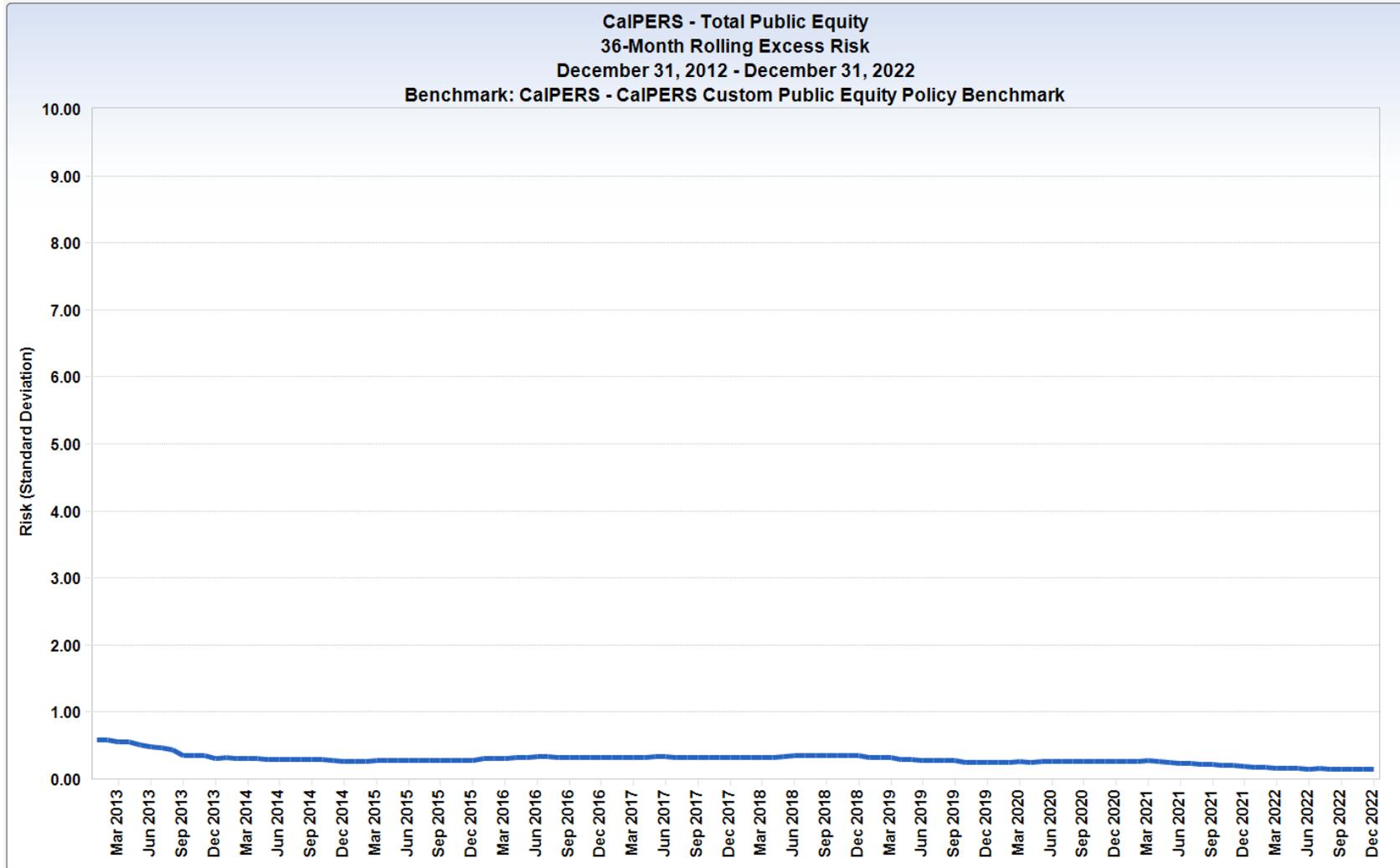
	Asset Value (\$Billion)	Quarter	1-Year	3-Year	5-Year	10-Year	VaR (\$Billion)	5-Year Ratios Sharpe	Info
<b>PUBLIC EQUITY*</b>	\$ 210.1	9.9%	-15.8%	4.1%	5.3%	8.5%	\$ 40.6	0.2	0.2
<i>Public Equity Policy Benchmark</i>		9.8%	-16.0%	3.8%	5.2%	8.4%		0.2	0.0
<b>PUBLIC EQUITY - CAP WEIGHTED*</b>	\$ 156.9	10.0%	-17.9%	4.7%	5.6%	8.7%	\$ 33.1	0.2	0.2
<i>CalPERS Custom FTSE Global Benchmark</i>		9.8%	-18.2%	4.4%	5.5%	8.5%		0.2	0.0
<b>PUBLIC EQUITY - FACTOR WEIGHTED</b>	\$ 53.2	9.7%	-11.0%	2.2%	-.-%	-.-%	\$ 8.3	N/A	N/A
<i>CalPERS Custom FTSE Factor Weighted Benchmark</i>		9.7%	-10.9%	2.1%	-.-%	-.-%		N/A	N/A

\* The CalPERS asset values shown include derivative exposure.

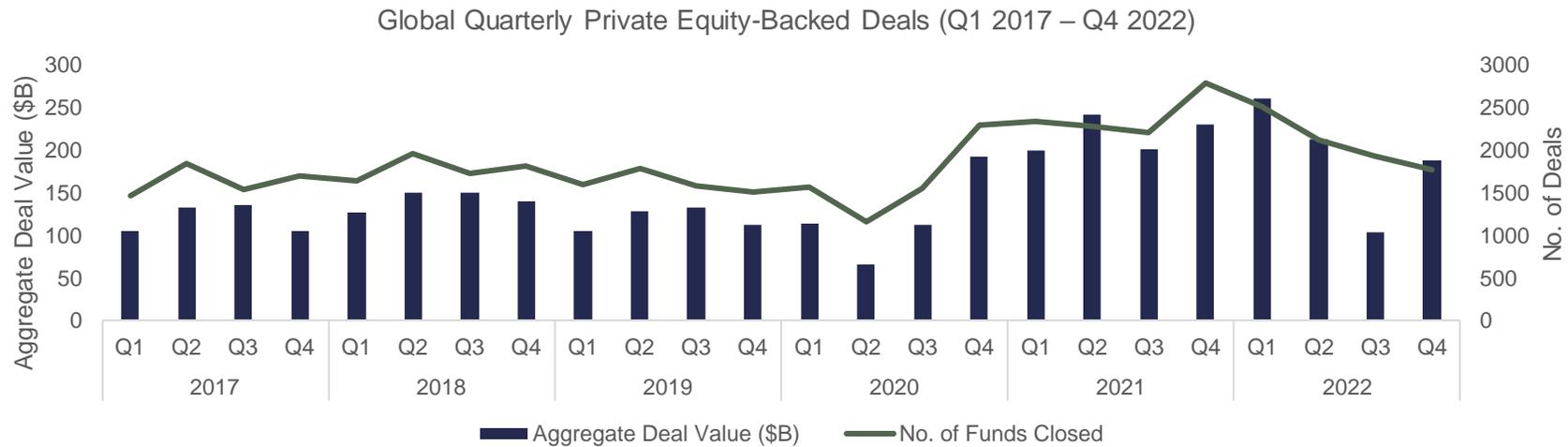
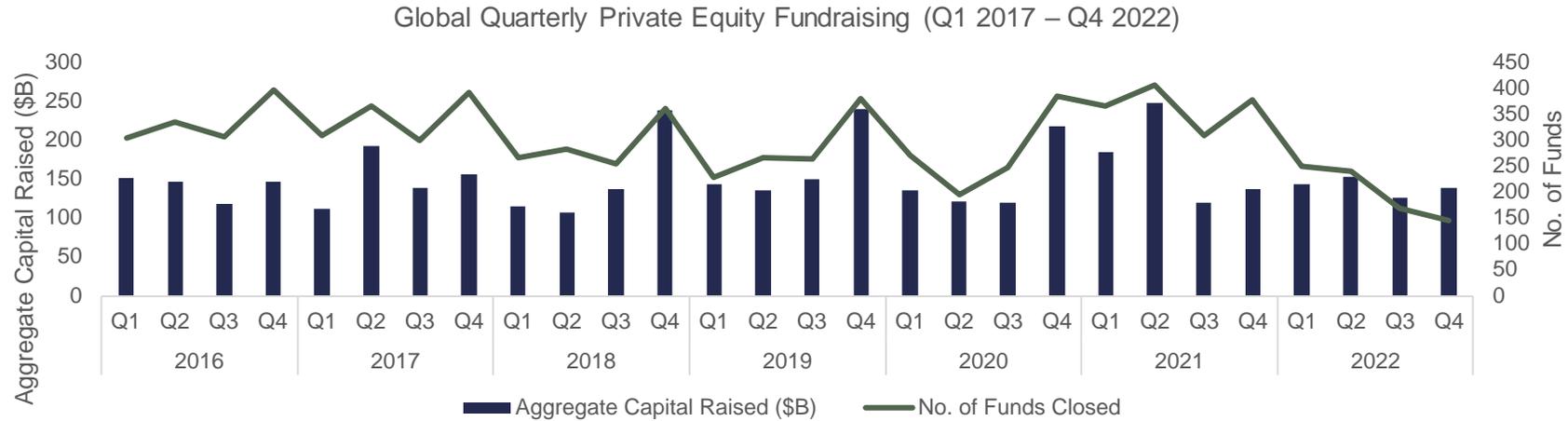
# CalPERS Public Equity – Rolling Excess Return



# CalPERS Public Equity – Rolling Tracking Error



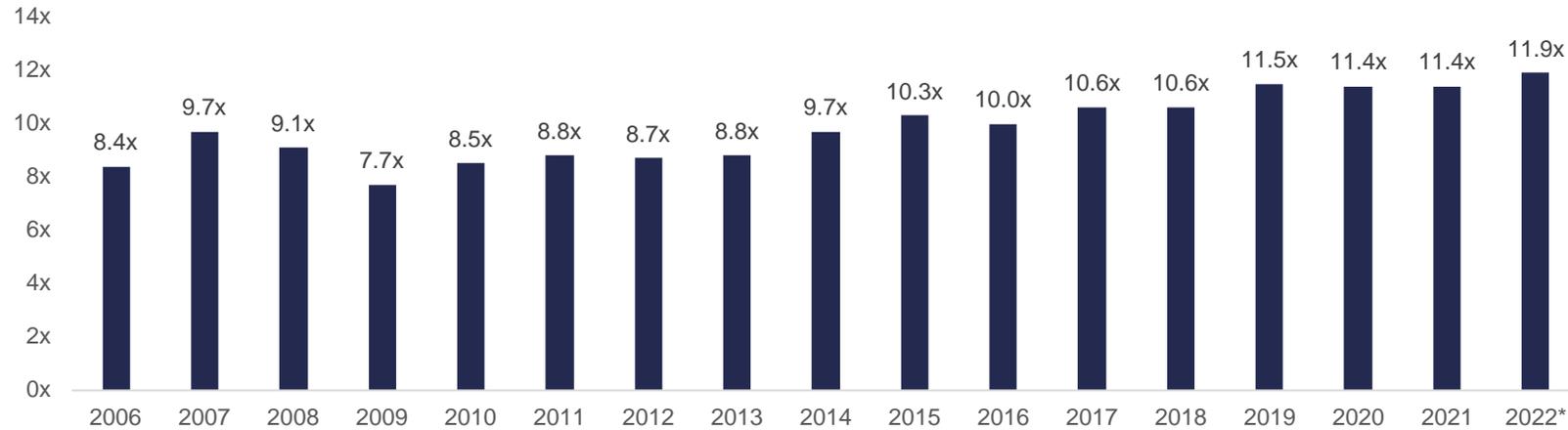
## Private Equity – Fundraising & Investment Activity



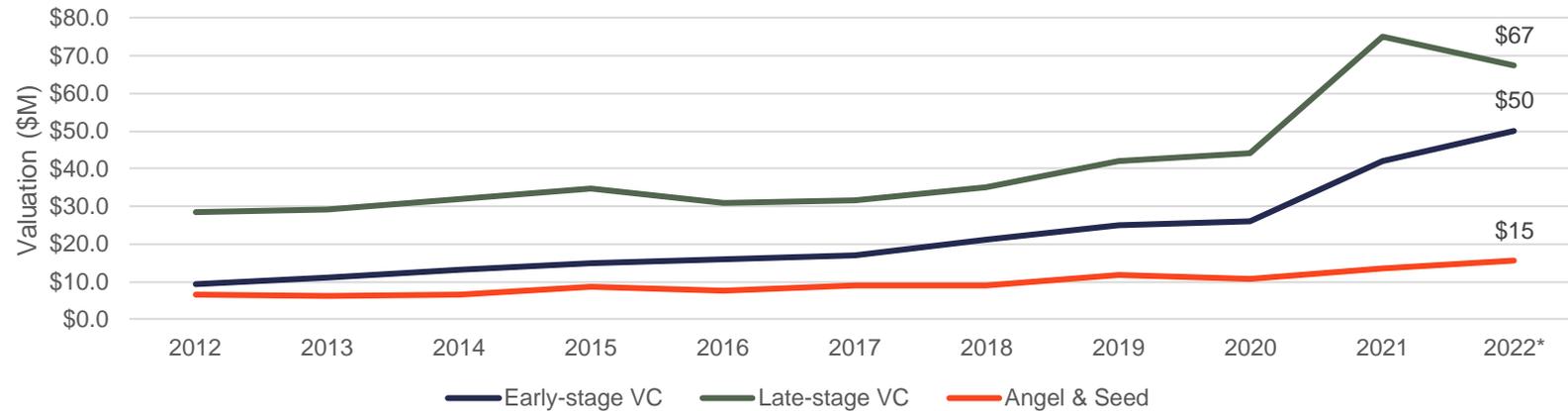
Source: Preqin, as of December 31, 2022.

## Private Equity – Pricing & Valuations

LBO Purchase Price Multiples (2006 – Q4 2022)

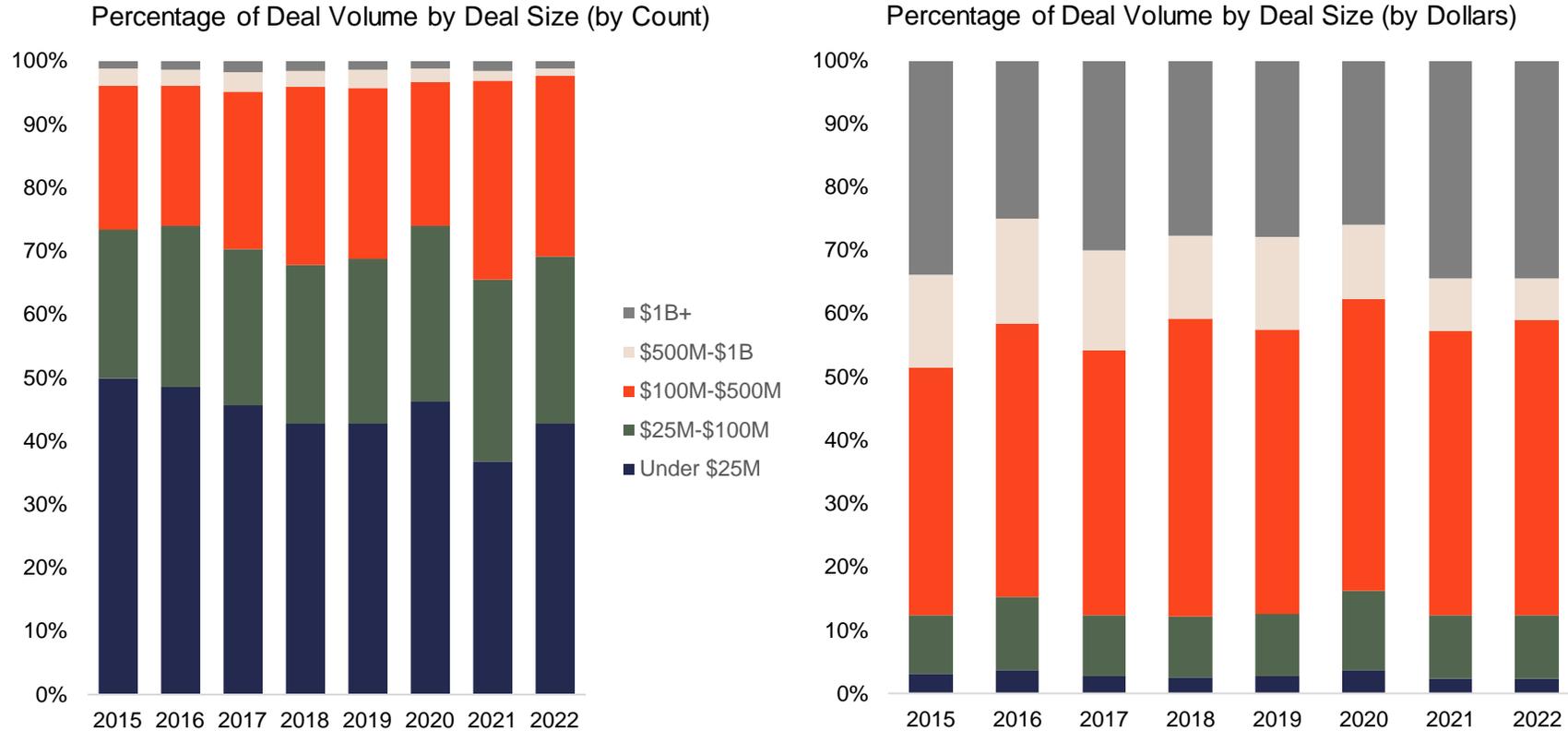


U.S. Median Pre-Value by Stage (2012 – Q4 2022)



Source: S&P LBO; Pitchbook, \*as of December 31, 2022.

## U.S. Investment Activity by Deal Size

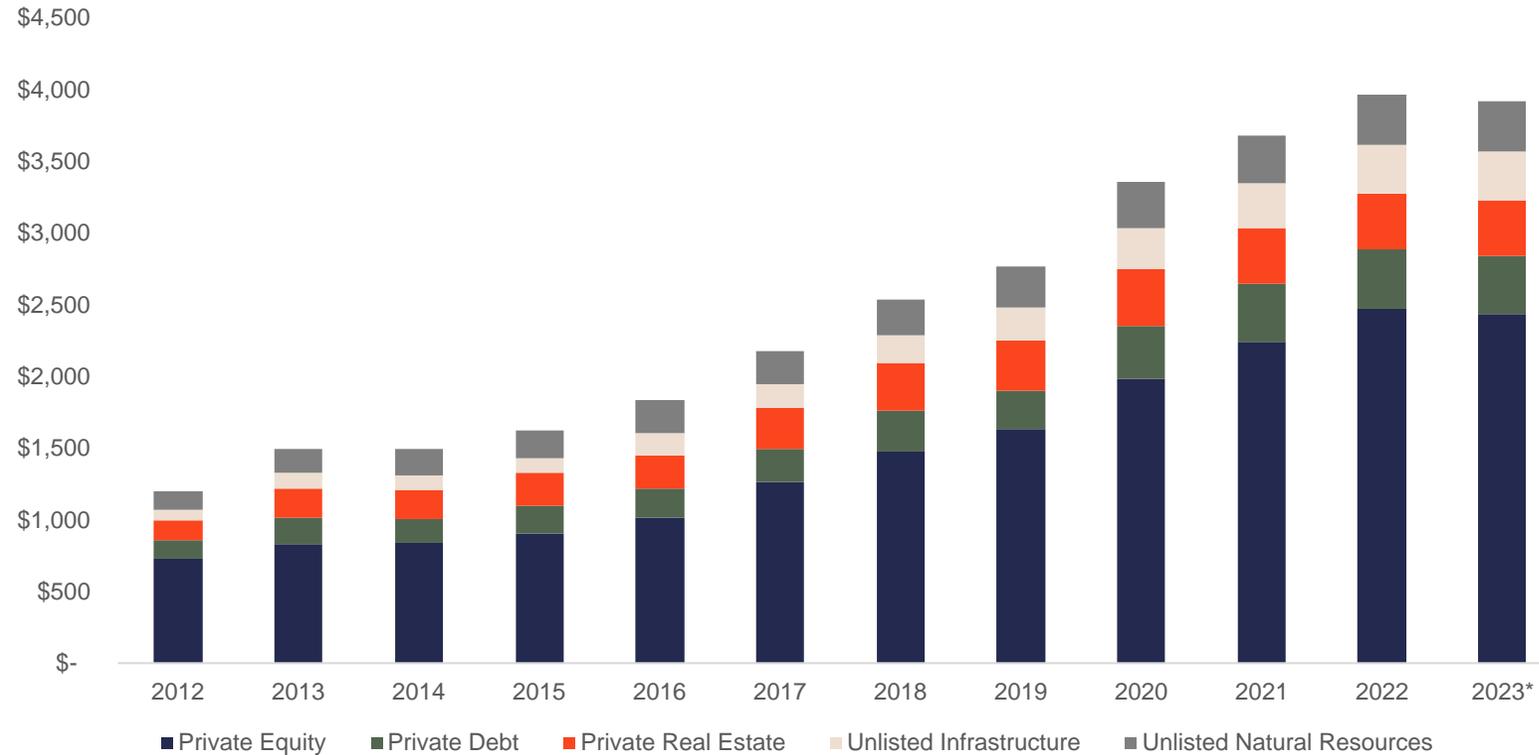


- Deal volume has shifted to be dominated by middle-market deals with investment sizes between \$100-500 million through the end of 2022
- Deals with below \$100 million check sizes comprised only 12% of all deal volume by amount of capital invested during 2022

Source: Pitchbook, \*as of December 31, 2022.

## Private Capital Dry Powder

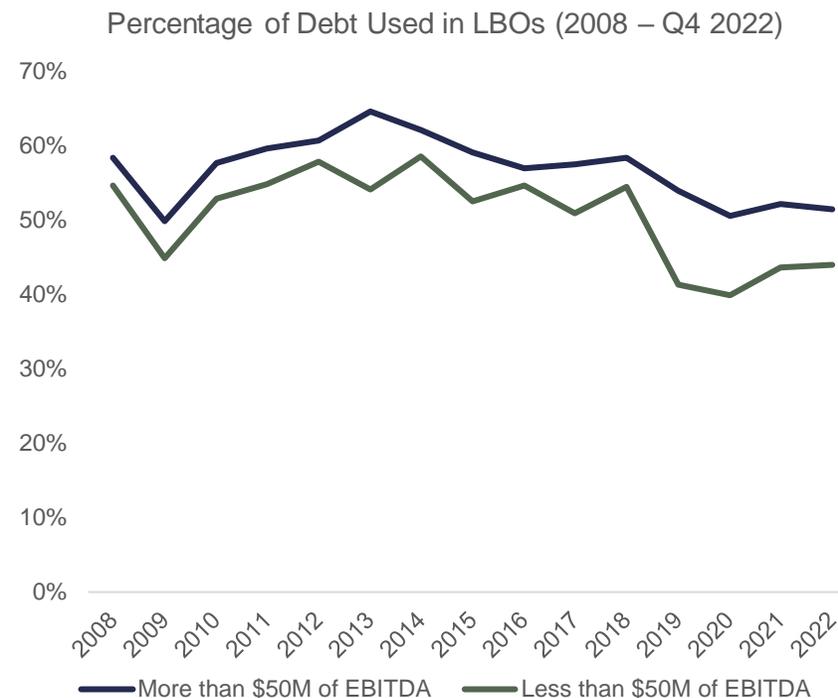
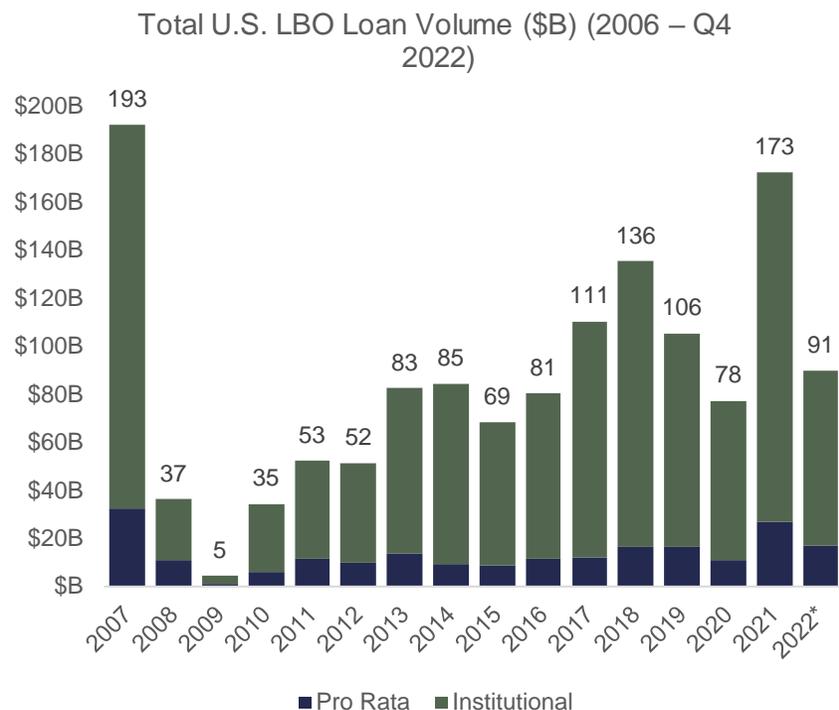
Private Capital Dry Powder by Fund Type (2012 – February 2023)



- Global private capital dry power continues to increase, topping \$3.9 trillion across all fund types
- Private equity comprises just under 62% of total dry powder in the market as of February 2023

Source: Preqin, \*as of February 2, 2022.

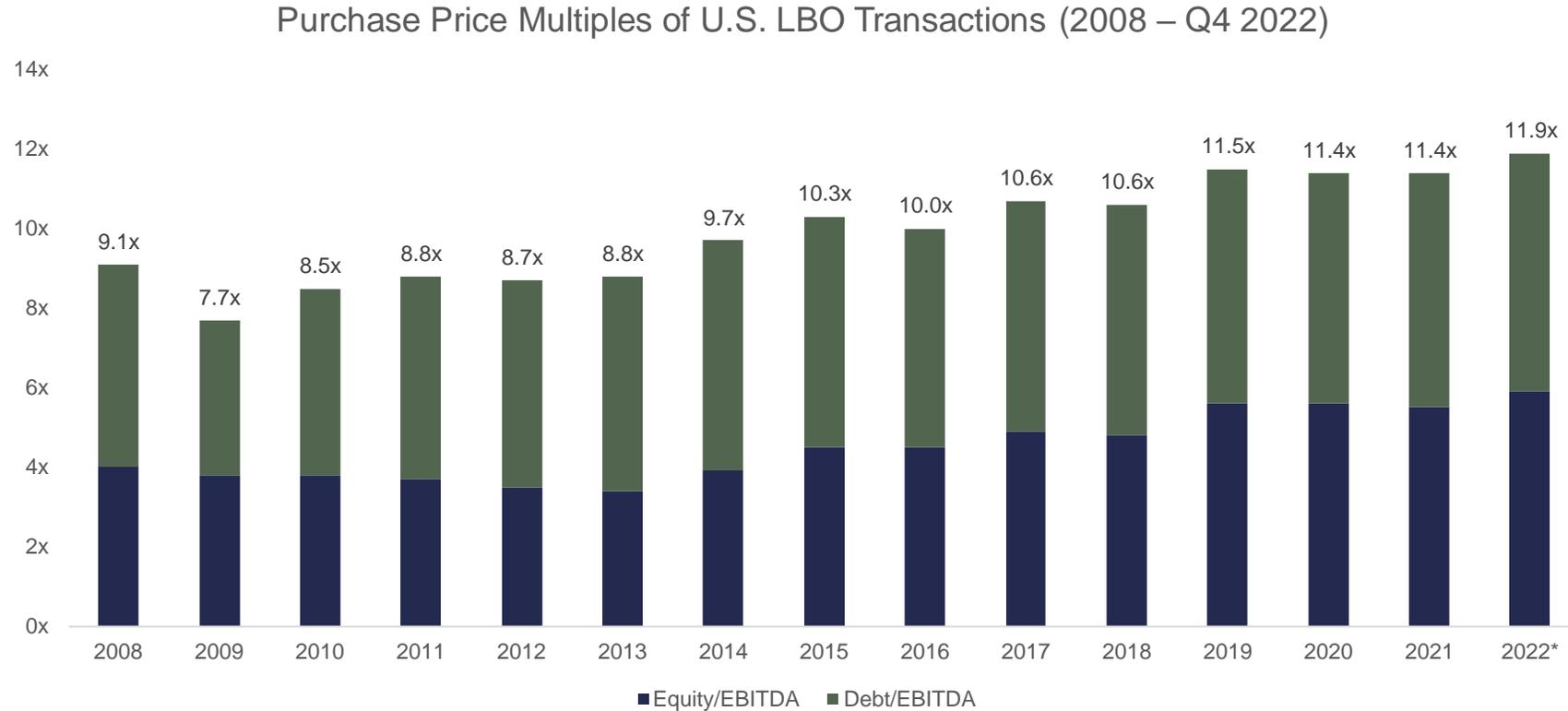
## Private Equity – U.S. Debt Markets



- 2022 has generated approximately \$91 billion in loan volume as of Q4 2022, which has slowed down comparatively to the 2021 pace of \$173 billion
- As debt multiples have increased, the percentage of debt used to finance leveraged buyouts through Q4 2022 has increased from the 2021 marks

Source: S&P LBO, \*as of December 31, 2022. "Less than \$50M of EBITDA" data for 2020 and 2022 not yet available.

## Private Equity – U.S. LBO Purchase Price Multiples



- Purchase price multiples for U.S. LBOs have remained steady from 2019 to 2021 and have increased through Q4 2022 compared to previous years.

Source: S&P LBO, \*as of December 31, 2022.

# CalPERS Private Equity – Performance

As of December 31, 2022

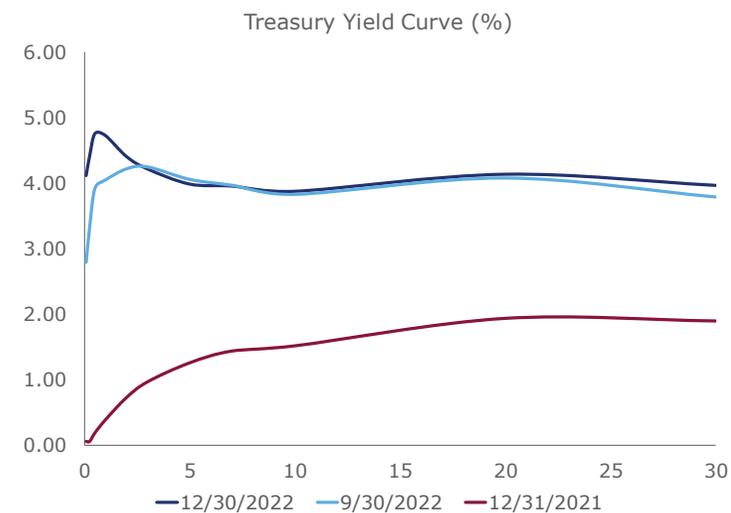
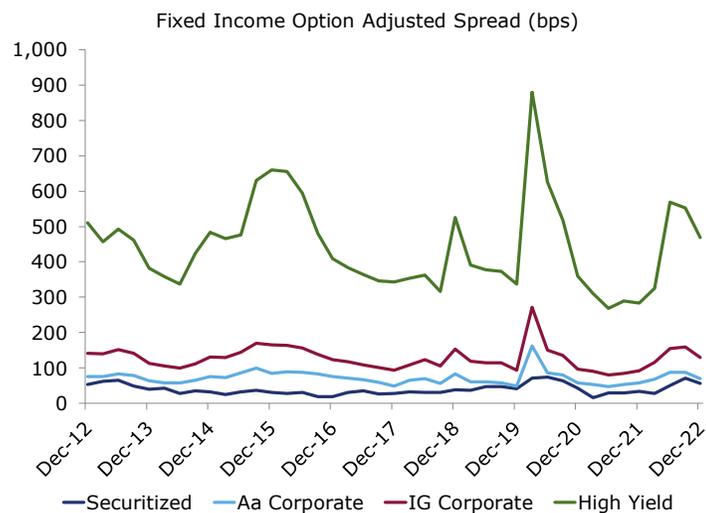
	Asset Value (\$Billion)	Quarter	1-Year	3-Year	5-Year	10-Year	VaR (\$Billion)	5-Year Ratios	
								Sharpe	Info
<b>PRIVATE EQUITY</b>	\$ 50.3	0.1%	-2.3%	15.3%	12.1%	12.4%	\$ 19.0	1.3	0.3
<i>CalPERS Custom Private Equity Benchmark</i>		-6.3%	-19.6%	5.7%	6.5%	10.8%		0.3	0.0

	Asset Value (\$Billion)	Quarter	1-Year	3-Year	5-Year	10-Year	VaR (\$Billion)	5-Year Ratios	
								Sharpe	Info
<i>Private Equity</i>									
Private Equity Partnership Investments	\$ 50.3	0.1%	-2.2%	15.4%	12.2%	12.4%		N/A	N/A
Private Equity Distribution Stock	\$ 0.0	-11.9%	-56.2%	-45.6%	-21.3%	-17.4%		N/A	N/A

## U.S. Fixed Income

As of 12/30/2022	YTW	DUR.	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg Aggregate	4.7	6.2	1.9	-13.0	-13.0	-2.7	0.0	1.1
Bloomberg Treasury	4.2	6.1	0.7	-12.5	-12.5	-2.6	-0.1	0.6
Bloomberg Gov't-Rel.	4.8	5.2	1.9	-11.1	-11.1	-2.4	0.3	1.1
Bloomberg Securitized	4.8	5.7	2.0	-11.7	-11.7	-3.1	-0.4	0.8
Bloomberg Corporate	5.4	7.1	3.6	-15.8	-15.8	-2.9	0.5	2.0
Bloomberg LT Gov't/Credit	4.9	14.3	2.6	-27.1	-27.1	-6.2	-1.2	1.6
Bloomberg LT Treasury	4.1	16.2	-0.6	-29.3	-29.3	-7.4	-2.2	0.6
Bloomberg LT Gov't-Rel.	5.5	11.6	4.2	-22.7	-22.7	-5.9	-0.8	1.6
Bloomberg LT Corporate	5.6	13.0	5.4	-25.6	-25.6	-5.7	-0.8	2.2
Bloomberg U.S. TIPS *	3.8	7.6	2.0	-11.8	-11.8	1.2	2.1	1.1
Bloomberg High Yield	9.0	3.9	4.2	-11.2	-11.2	0.0	2.3	4.0
S&P/LSTA Leveraged Loan	9.1	0.3	2.7	-0.6	-0.6	2.5	3.3	3.7
Treasury Bills	4.4	0.3	0.9	1.3	1.3	0.7	1.2	0.8

\* Yield and Duration statistics are for a proxy index based on similar maturity, the Bloomberg Barclays U.S. Treasury 7-10 Year Index

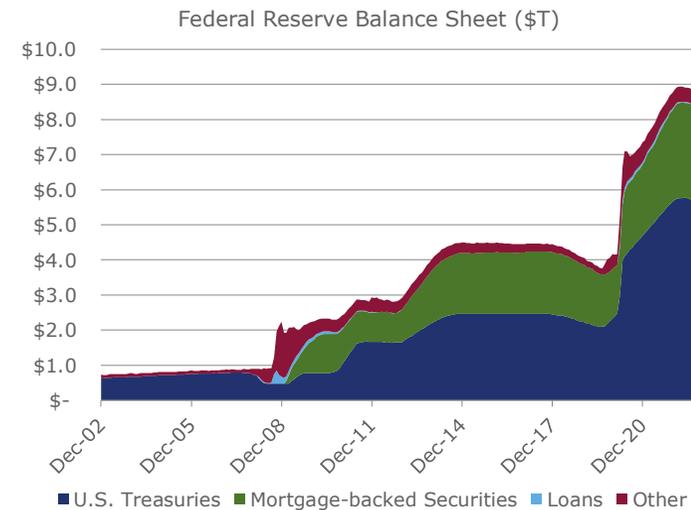
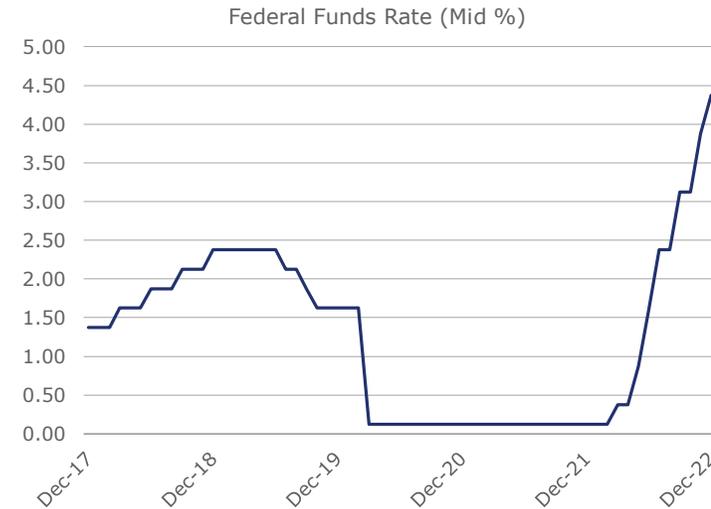


Data Sources: Bloomberg

## Federal Reserve

- After 300 basis point increase in the Fed-funds rate through September, the FOMC increased the rate an additional 125 basis points during Q4
- Federal Reserve has added more than \$4.5 trillion in assets to their balance sheet during the past two years
- QE4 was larger than the 3 phases of quantitative easing – combined – following the global financial crisis

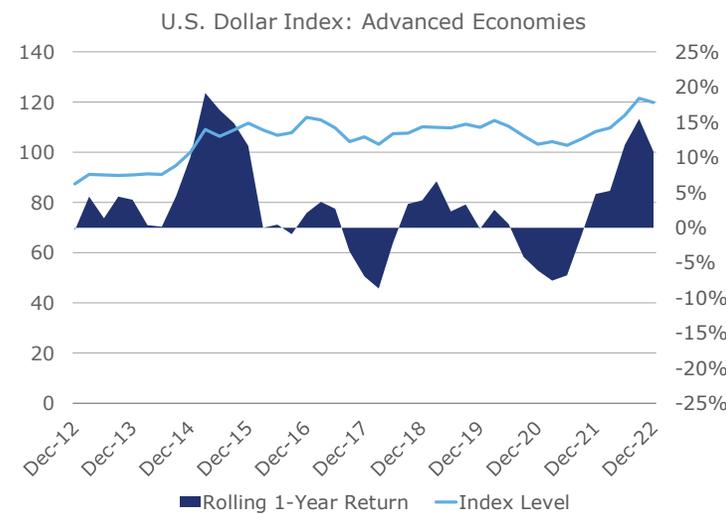
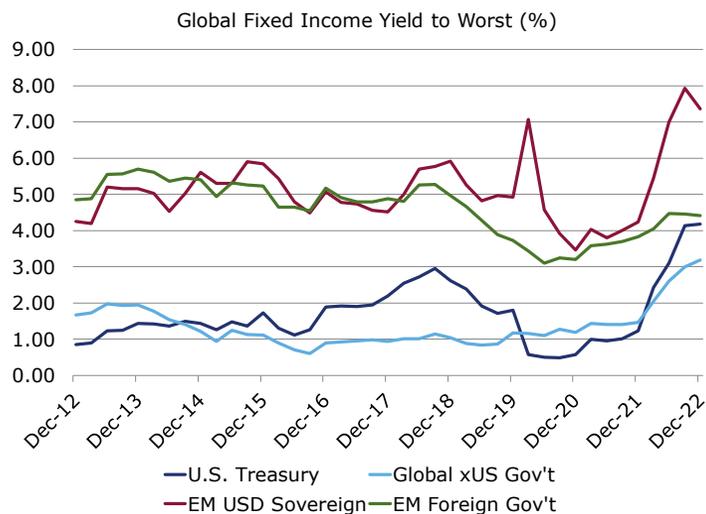
	Announced	Closed	Amount (bil)
QE1	11/25/2008	3/31/2010	\$1,403
QE2	11/3/2010	6/29/2012	\$568
QE3	9/13/2012	10/29/2014	\$1,674
QE4	3/23/2020	3/15/2022	\$4,779



# Non-U.S. Fixed Income

As of 12/30/2022	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
<b>Developed Markets</b>						
Bloomberg Global Aggregate xUS	6.8	-18.7	-18.7	-5.9	-3.1	-1.6
Bloomberg Global Aggregate xUS *	0.2	-9.8	-9.8	-2.6	0.5	2.1
Bloomberg Global Inflation Linked xUS	5.8	-29.6	-29.6	-7.0	-4.0	-0.9
Bloomberg Global Inflation Linked xUS *	-1.7	-21.1	-21.1	-3.5	-0.4	2.7
<b>Emerging Markets (Hard Currency)</b>						
Bloomberg EM USD Aggregate	6.6	-15.3	-15.3	-3.9	-0.4	1.7
<b>Emerging Markets (Foreign Currency)</b>						
Bloomberg EM Local Currency Gov't	5.9	-8.4	-8.4	-1.7	0.1	0.2
Bloomberg EM Local Currency Gov't *	1.9	-2.7	-2.7	-0.3	2.0	1.9
Euro vs. Dollar	9.2	-5.8	-5.8	-1.5	-2.3	-2.1
Yen vs. Dollar	10.4	-12.2	-12.2	-6.1	-3.0	-4.0
Pound vs. Dollar	8.2	-10.7	-10.7	-3.0	-2.2	-2.9

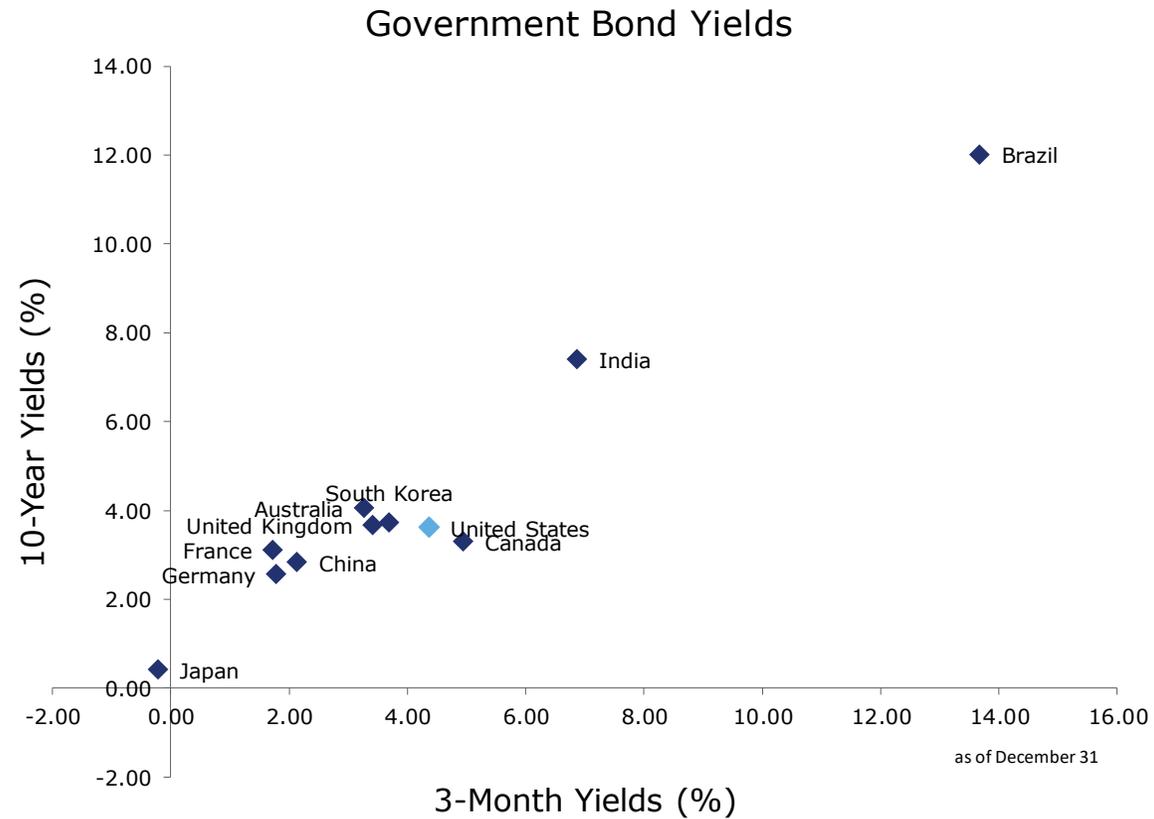
\* Returns are reported in terms of local market investors, which removes currency effects.



Data Sources: Bloomberg

## Global Interest Rates

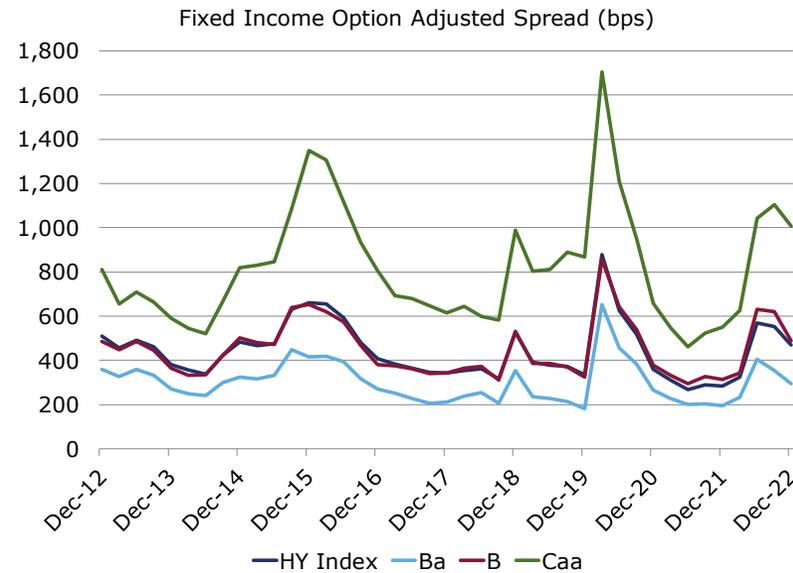
Short-term rates have turned positive in most larger countries; longer-term rates around 4% in the U.K., Australia, South Korea and the U.S.



Data Sources: Bloomberg

## High Yield Bond Market

As of 12/31/2022		YTW	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg High Yield		9.0	4.2	-11.2	-11.2	0.0	2.3	4.0
S&P LSTA Leveraged Loan		9.1	3.8	-0.6	-0.6	1.9	3.1	3.2
<b>High Yield Quality Distribution</b>	<b>Weight</b>							
Ba U.S. High Yield	49.9%	7.2	4.3	-10.8	-10.8	0.9	3.0	4.4
B U.S. High Yield	38.6%	9.2	4.9	-10.3	-10.3	-0.5	2.2	3.6
Caa U.S. High Yield	10.7%	14.3	0.5	-16.3	-16.3	-2.4	-0.4	3.5
Ca to D U.S. High Yield	0.7%	36.3	13.8	-10.4	-10.4	1.1	0.4	-5.0



Data Sources: Bloomberg

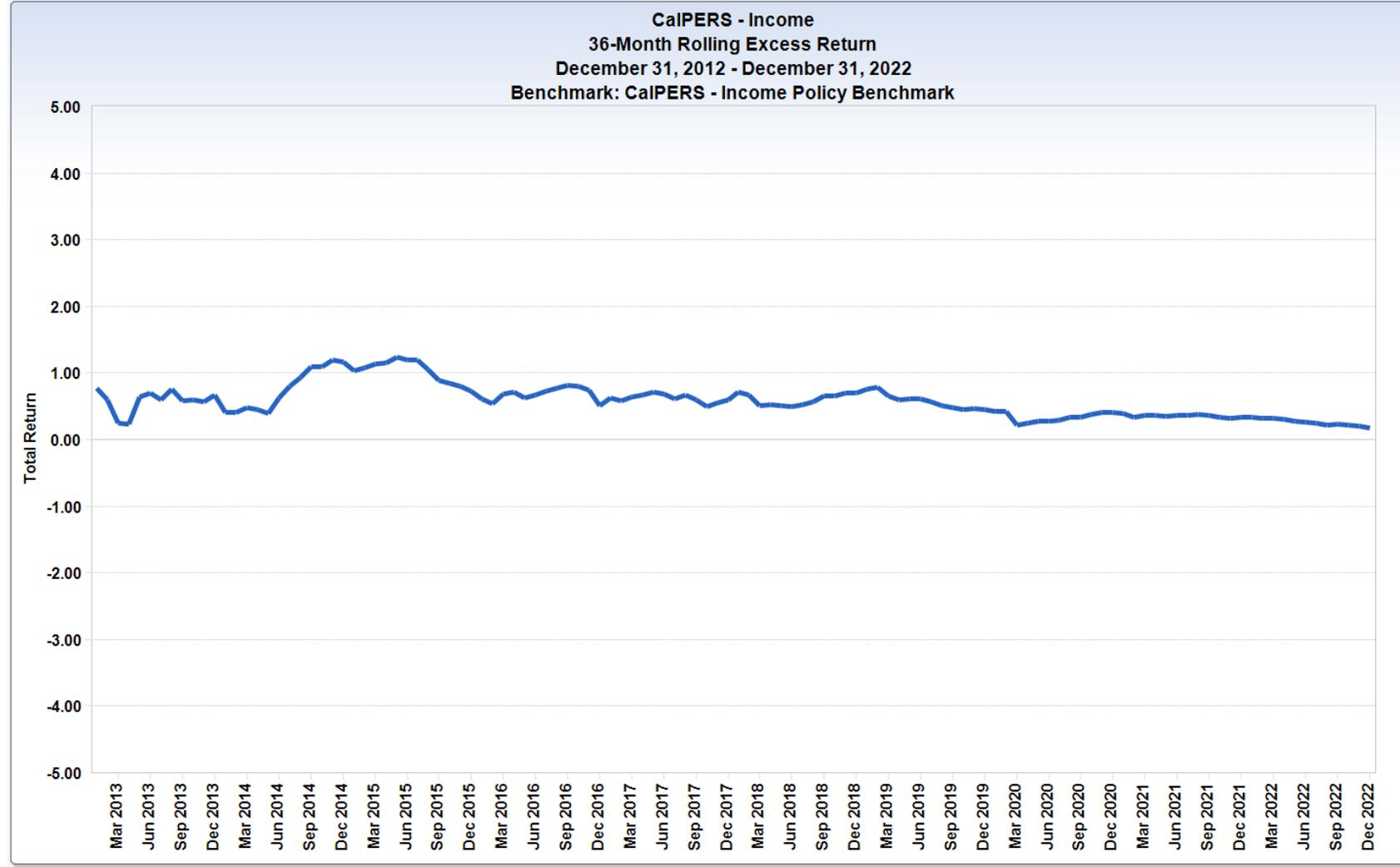
# CalPERS Income – Performance

As of December 31, 2022

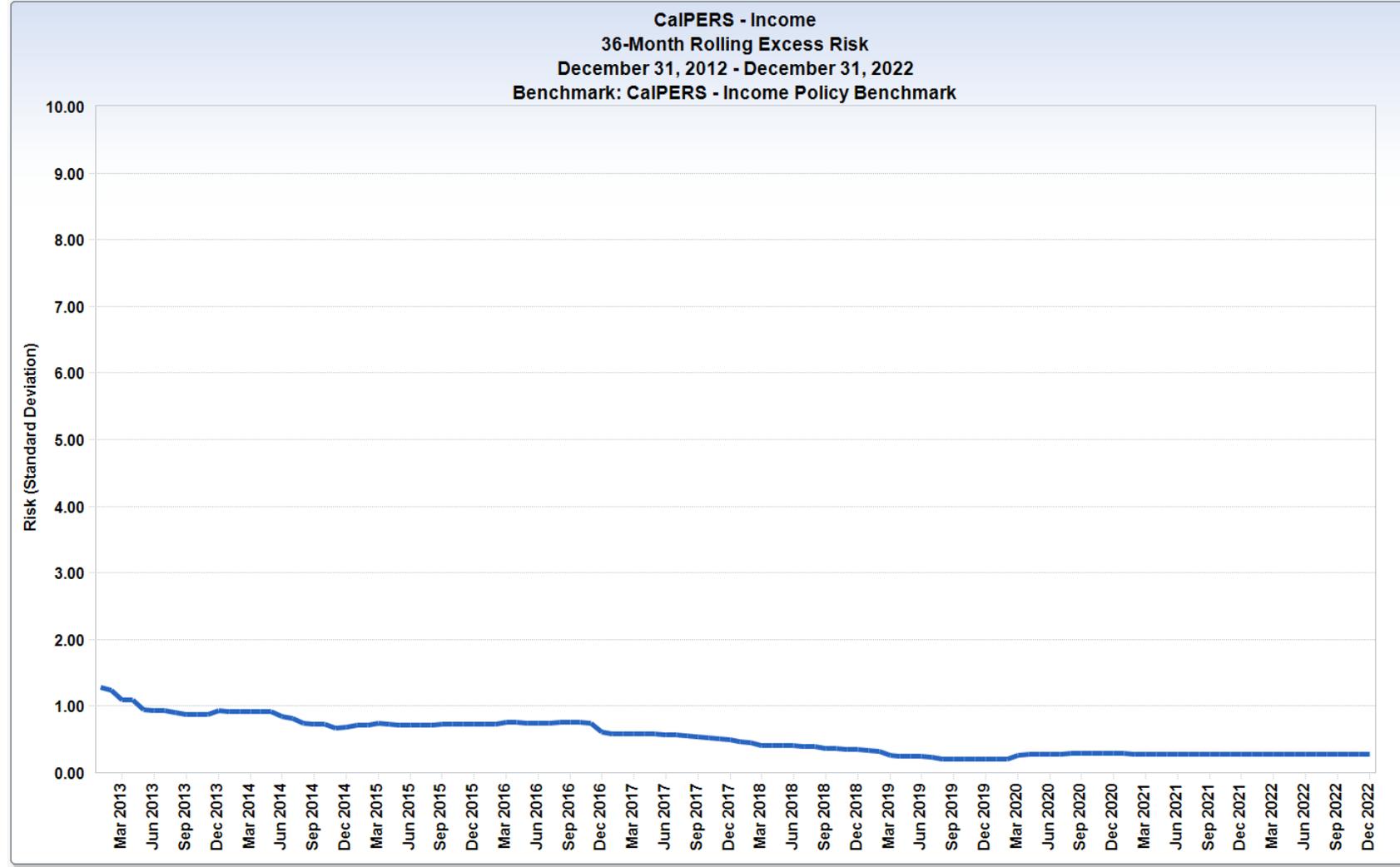
	Asset Value (\$Billion)	Quarter	1-Year	3-Year	5-Year	10-Year	VaR (\$Billion)	5-Year Ratios Sharpe	Info
<b>INCOME*</b>	\$ 105.0	2.6%	-18.5%	-3.6%	-0.1%	1.6%	\$ 5.9	-0.2	1.0
<i>Income Policy Benchmark</i>		2.7%	-18.4%	-3.7%	-0.4%	1.0%		-0.2	0.0
<b>Treasury*</b>	\$ 14.7	-0.1%	-24.9%	-6.3%	-1.8%	0.2%	\$ 2.1	-0.3	-0.2
<b>Total Fund Income</b>	\$ 6.2	-0.4%	-25.3%	-.%	-.%	-.%	\$ 0.9	N/A	N/A
<i>CalPERS Custom Treasury Benchmark</i>		-0.1%	-24.9%	-6.1%	-1.7%	0.2%		-0.3	0.0
<b>Mortgage-Backed Securities</b>	\$ 23.6	2.1%	-11.8%	-3.0%	-0.2%	1.6%	\$ 0.1	-0.3	0.7
<i>Bloomberg LMTG</i>		2.1%	-11.7%	-3.1%	-0.4%	0.8%		-0.4	0.0
<b>Investment Grade Credit</b>	\$ 25.7	4.5%	-22.8%	-4.5%	0.1%	2.7%	\$ 2.6	-0.1	1.0
<i>Bloomberg LCORPXSOV</i>		4.8%	-22.6%	-4.8%	-0.3%	2.1%		-0.1	0.0
<b>High Yield</b>	\$ 20.3	4.3%	-10.2%	-0.4%	-.%	-.%	\$ 2.0	N/A	N/A
<i>BBG US High Yield BB/B Liquid Index</i>		4.3%	-10.2%	-0.4%	-.%	-.%		N/A	N/A
<b>EM Sovereign</b>	\$ 14.5	-.%	-.%	-.%	-.%	-.%	\$ 0.8	N/A	N/A

\* The CalPERS asset values shown include derivative exposure.

# CalPERS Income – Rolling Excess Return

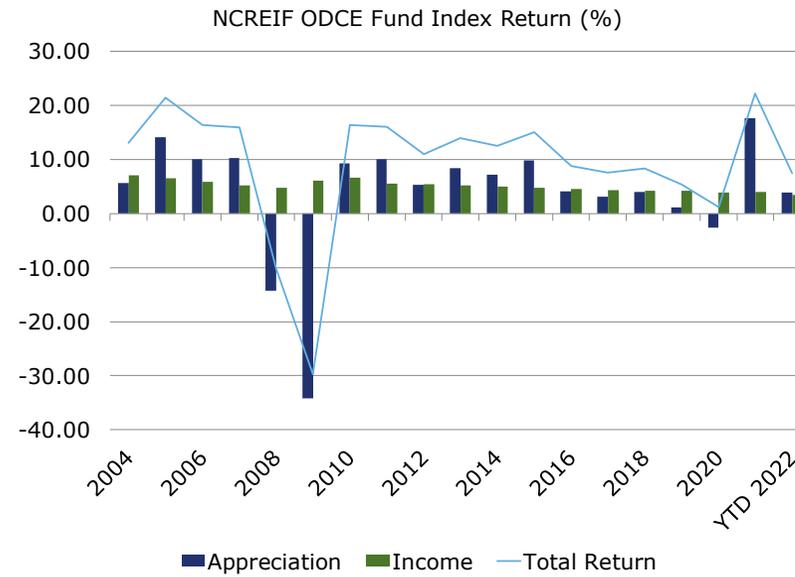
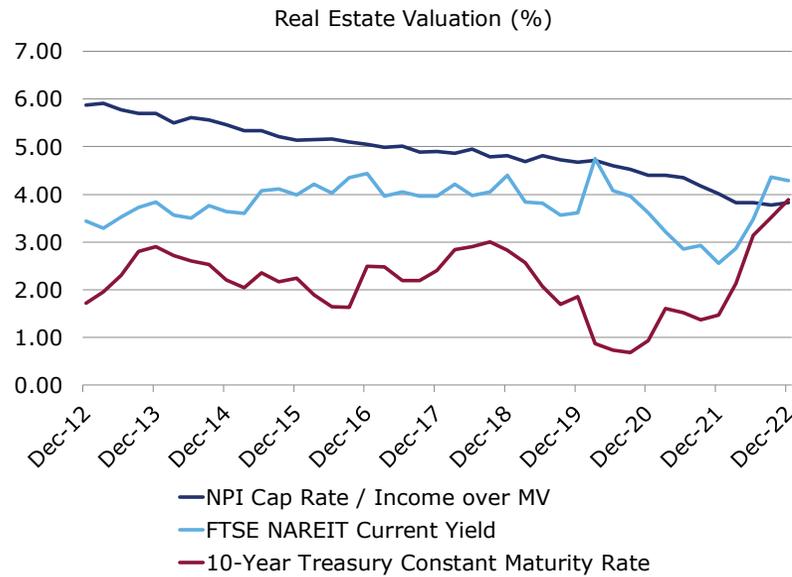


# CalPERS Income – Rolling Tracking Error



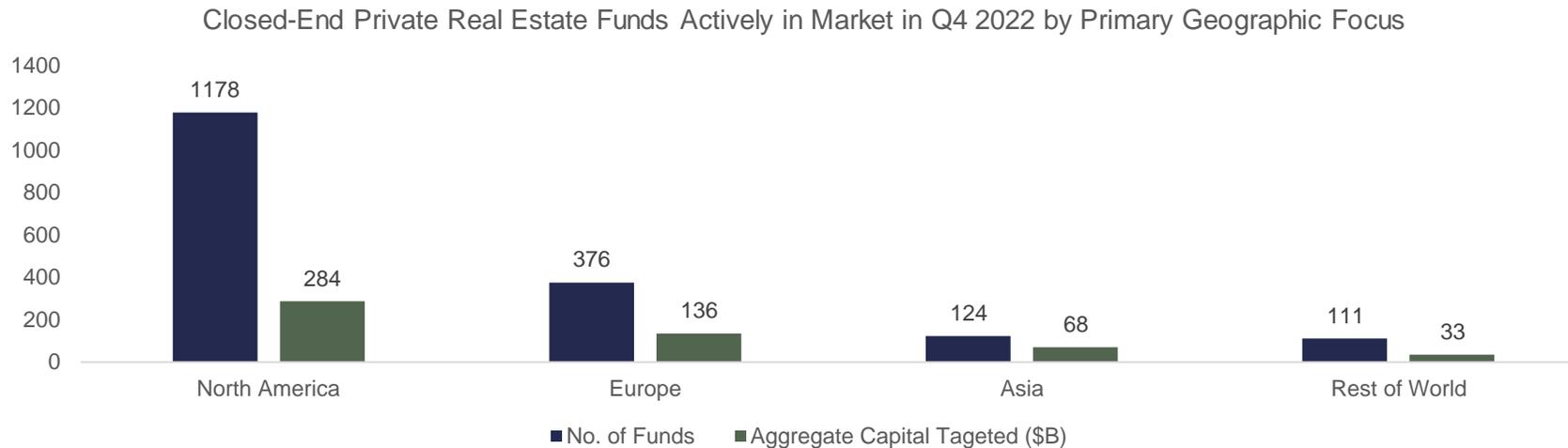
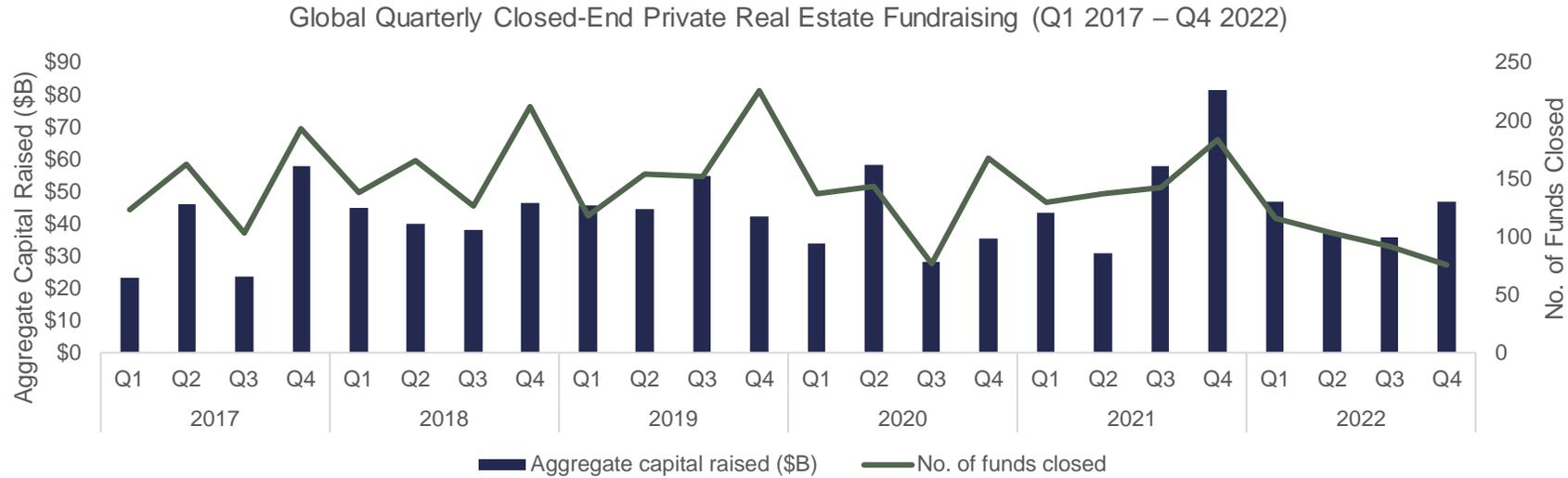
# Real Assets

As of 12/30/2022	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
Bloomberg U.S. TIPS	2.0	-11.8	-11.8	1.2	2.1	1.1
Bloomberg Commodity Index	2.2	16.1	16.1	12.7	6.4	-1.3
Bloomberg Gold Index	9.5	-0.7	-0.7	4.7	5.7	0.0
Wilshire Global RESI Index	6.4	-24.9	-24.9	-2.7	1.6	4.8
NCREIF ODCE Fund Index	-5.0	7.5	7.5	9.9	8.7	10.1
NCREIF Timberland Index	4.9	12.9	12.9	7.5	5.4	5.8
FTSE Global Core Infrastructure 50/50	9.2	-4.1	-4.1	2.3	5.5	7.9
Alerian Midstream Energy	8.4	21.5	21.5	8.8	6.8	n.a.
Bitcoin	-14.9	-64.3	-64.3	32.2	3.3	103.6



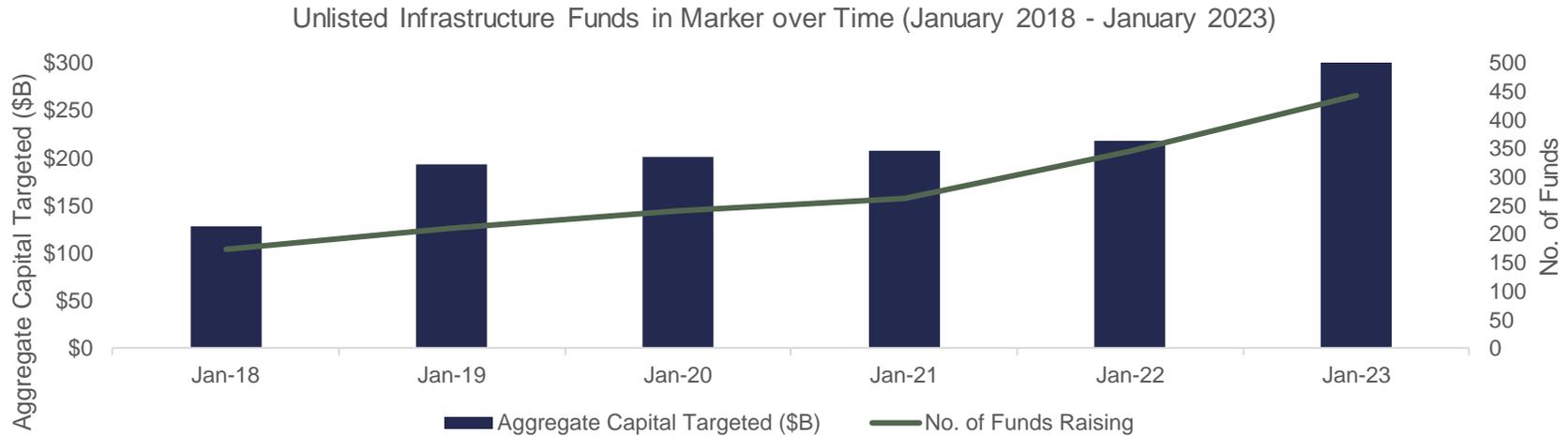
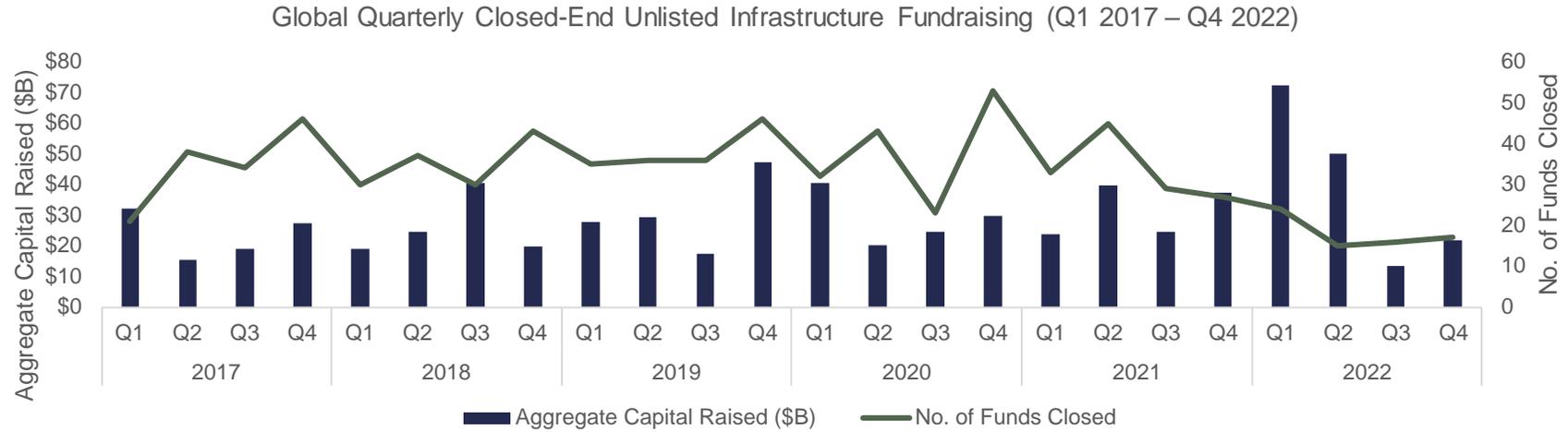
Data Sources: Bloomberg, National Council of Real Estate Investment Fiduciaries

## Private Real Estate – Fundraising Activity



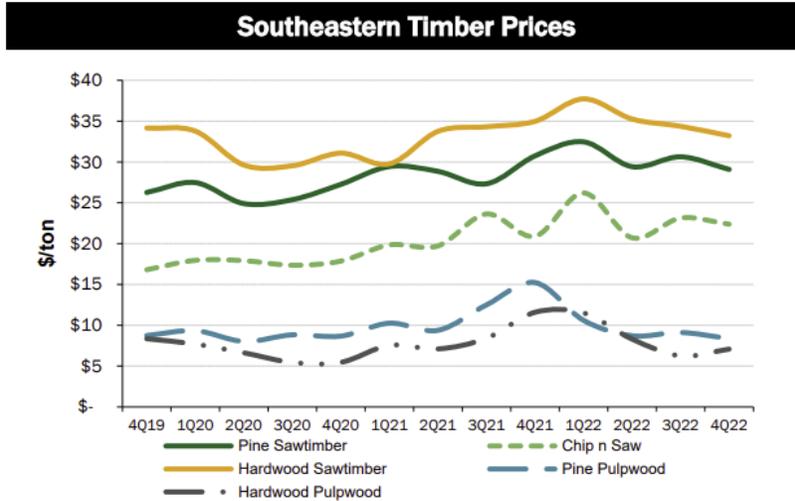
Source: Preqin, as of December 31, 2022.

## Unlisted Infrastructure – Fundraising & Investment Activity

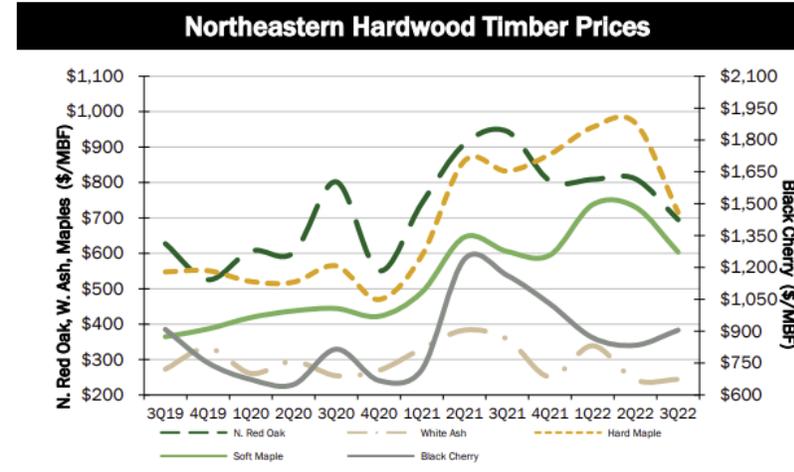


Source: Preqin, as of January 31, 2023.

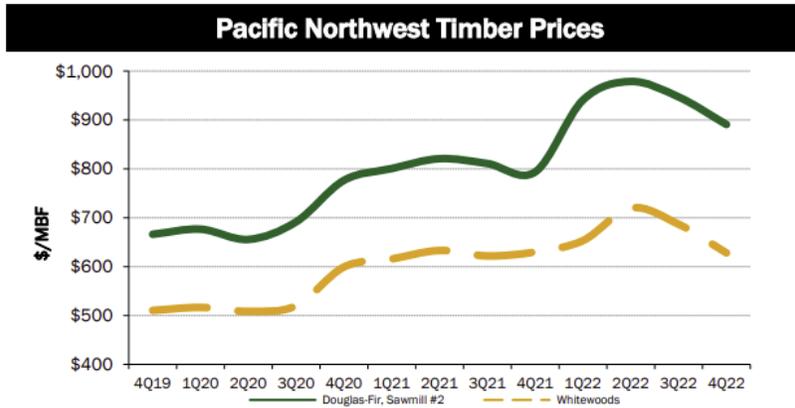
# Timber Investments



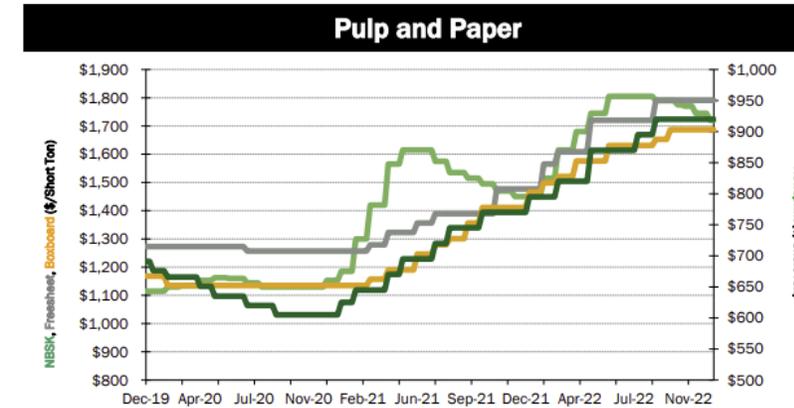
Source: Forest2Market®



Source: Pennsylvania Woodlands Timber Market Report - Northwest Region



Source: Fastmarkets RISI - Log Lines®



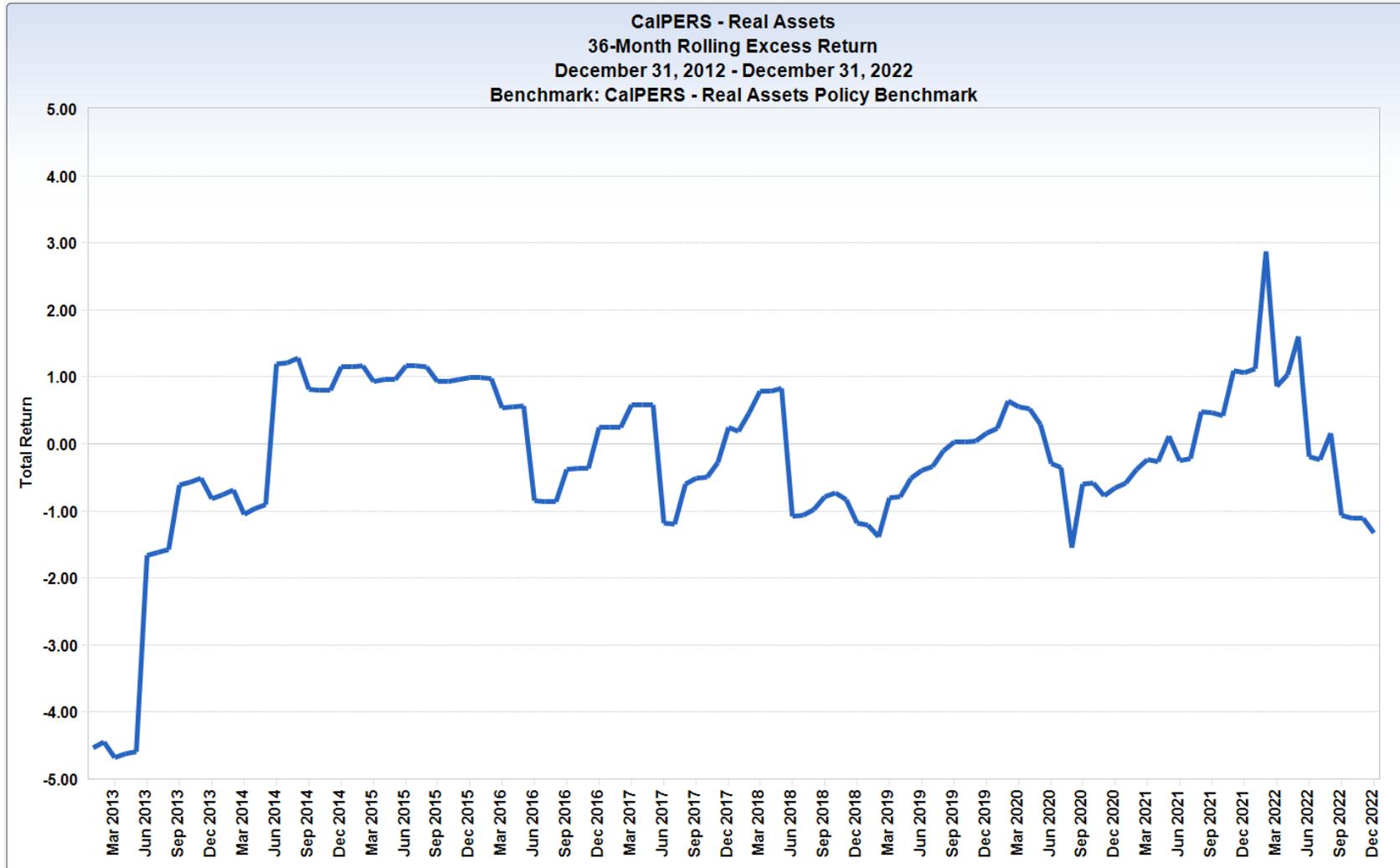
Source: Fastmarkets RISI

# CalPERS Real Assets – Performance

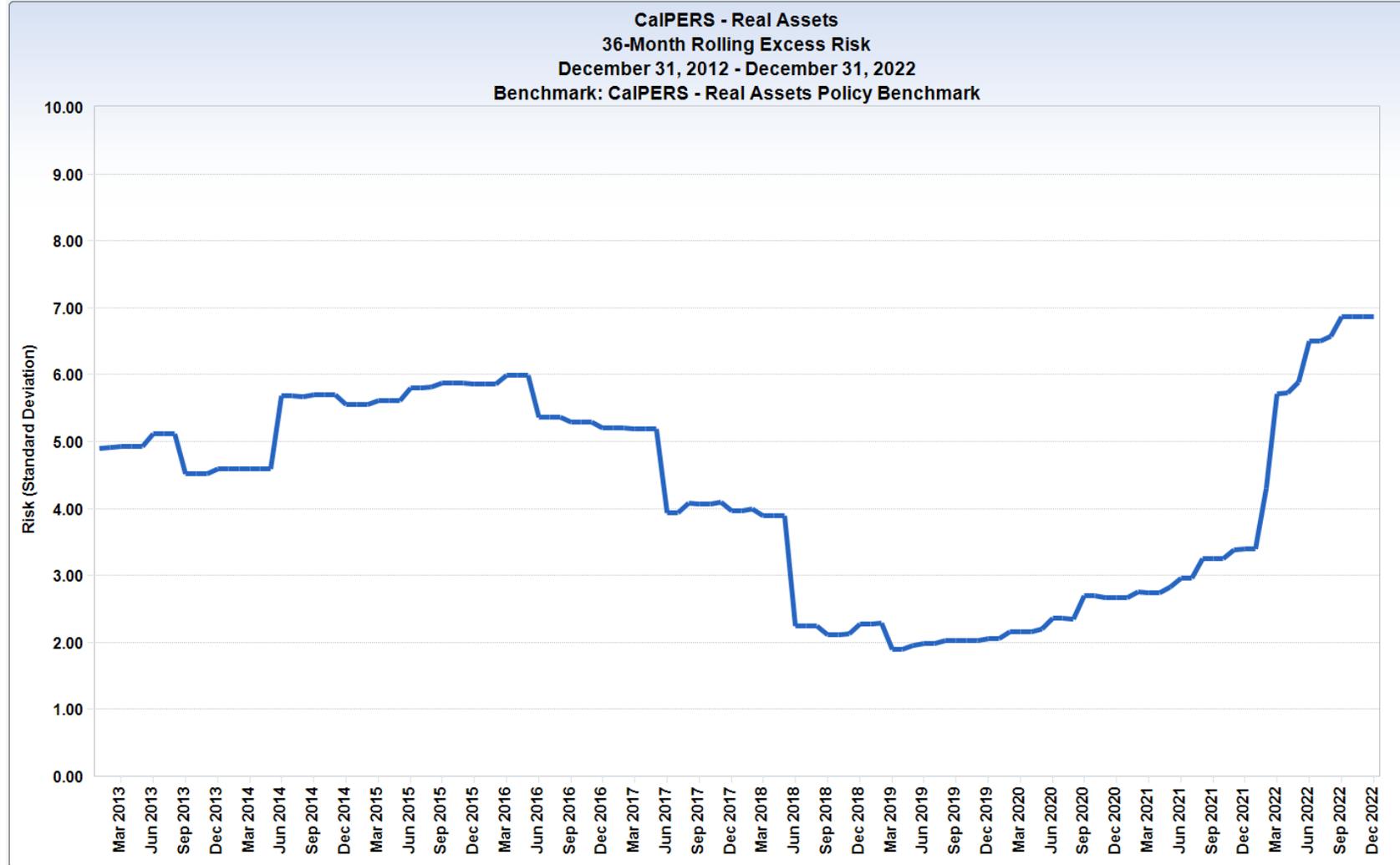
As of December 31, 2022

	Asset Value (\$Billion)	Quarter	1-Year	3-Year	5-Year	10-Year	VaR (\$Billion)	5-Year Ratios Sharpe	Info
<b>REAL ASSETS</b>	\$ 73.7	0.0%	14.3%	9.8%	7.9%	9.2%	\$ 10.9	1.7	-0.2
<i>Real Assets Policy Benchmark</i>		0.2%	20.9%	11.3%	9.1%	9.5%		1.3	0.0
<b>Real Estate</b>	\$ 60.0	0.1%	15.7%	10.5%	8.3%	9.6%	\$ 8.9	1.6	-0.1
<i>CalPERS Custom Real Estate Benchmark</i>		0.2%	20.9%	11.3%	9.2%	9.9%		1.3	0.0
<b>Infrastructure</b>	\$ 13.1	-1.1%	8.3%	7.4%	8.2%	11.2%	\$ 1.9	1.2	-0.1
<i>CalPERS Custom Infrastructure Benchmark</i>		0.2%	20.9%	11.3%	9.1%	7.2%		1.3	0.0
<b>Forestland</b>	\$ 0.7	2.4%	7.3%	2.2%	-0.3%	-0.2%	\$ 0.1	-0.2	-1.1
<i>CalPERS Custom Forestland Benchmark</i>		0.2%	20.9%	11.3%	8.9%	8.0%		1.3	0.0

# CalPERS Real Assets – Rolling Excess Return



# CalPERS Real Assets – Rolling Tracking Error



# CalPERS Other Trust Level, Leverage – Performance

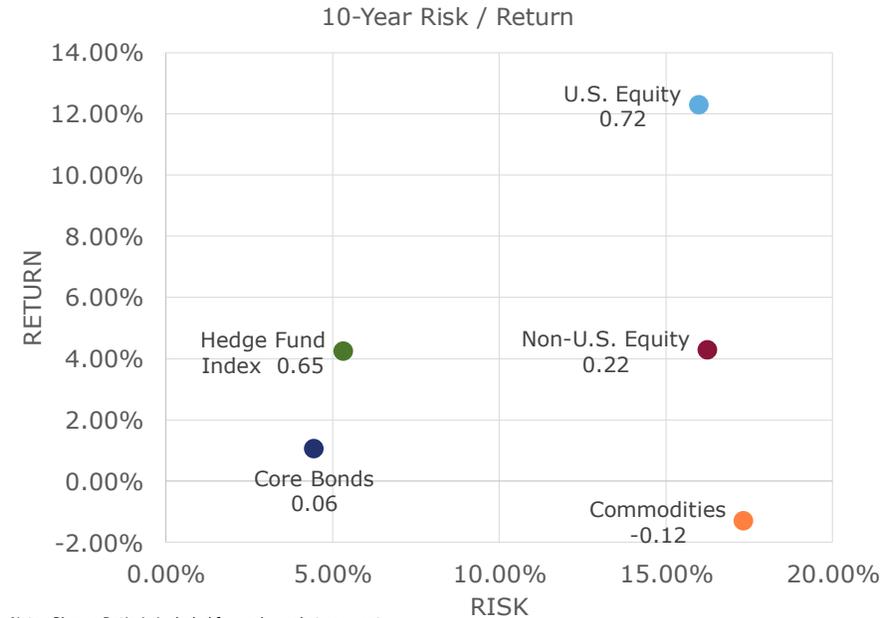
As of December 31, 2022

	Asset Value (\$Billion)	Quarter	1-Year	3-Year	5-Year	10-Year	VaR (\$Billion)	5-Year Ratios	
								Sharpe	Info
<b>OTHER TRUST LEVEL</b>	\$ 16.6								
<b>LLER</b>	\$ 14.2	2.0%	0.3%	1.4%	2.2%	--%	\$ 0.1	0.3	0.4
<i>LIBOR 1 Month Rate</i>		1.0%	2.0%	1.0%	1.2%	--%		-1.0	0.0
<b>Opportunistic Strategies</b>	\$ 0.2	1.5%	-2.8%	--%	--%	--%	\$ 0.0	N/A	N/A
<i>Custom Opportunistic Strategies Benchmark</i>		1.0%	2.0%	--%	--%	--%		N/A	N/A
<b>Trust Level Portfolio Management</b>	\$ 2.0	NM	NM	NM	NM	NM		N/A	N/A
<b>Other Perf</b>	\$ 0.1	NM	NM	NM	NM	NM		N/A	N/A

	Asset Value (\$Billion)	Quarter	1-Year	3-Year	5-Year	10-Year	VaR (\$Billion)	5-Year Ratios	
								Sharpe	Info
<b>LEVERAGE</b>	\$ (22.4)	--%	--%	--%	--%	--%		N/A	N/A
<b>Strategic</b>	\$ (5.8)	--%	--%	--%	--%	--%		N/A	N/A
<b>Active</b>	\$ (16.6)	--%	--%	--%	--%	--%		N/A	N/A

## Hedge Fund Performance

As of 12/31/2022	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
Credit Suisse Hedge Fund Index	0.9	1.1	1.1	5.2	4.2	4.2
Event Driven	1.7	-6.8	-6.8	4.0	3.2	3.4
Global Macro	-6.8	15.9	15.9	10.6	8.3	5.5
Long/Short Equity	5.6	-5.8	-5.8	3.3	3.3	5.2
Multi-Strategy	2.1	1.3	1.3	4.6	4.0	5.2
FT Wilshire 5000	7.1	-19.0	-19.0	7.4	9.0	12.3
MSCI ACWI ex-US (\$G)	14.4	-15.6	-15.6	0.5	1.4	4.3
Bloomberg Aggregate	1.9	-13.0	-13.0	-2.7	0.0	1.1
Bloomberg Commodity Index	2.2	16.1	16.1	12.7	6.4	-1.3



Note: Sharpe Ratio is included for each market segment

Data Source: Bloomberg

## Asset Class Performance

Asset Class Returns - Best to Worst						Annualized 5-Year as of 12/22
2017	2018	2019	2020	2021	2022 YTD	
Emrg Mrkts 37.7%	T-Bills 1.9%	U.S. Equity 31.0%	U.S. Equity 20.8%	REITs 46.2%	Commodities 16.1%	U.S. Equity 9.0%
Developed 25.6%	Core Bond 0.0%	REITs 25.8%	Emrg Mrkts 18.7%	Commodities 27.1%	T-Bills 1.3%	Commodities 6.4%
U.S. Equity 21.0%	U.S. TIPS -1.3%	Developed 22.7%	U.S. TIPS 11.0%	U.S. Equity 26.7%	High Yield -11.2%	REITs 3.4%
High Yield 7.5%	High Yield -2.1%	Emrg Mrkts 18.9%	Developed 8.3%	Developed 11.8%	U.S. TIPS -11.8%	High Yield 2.3%
REITs 4.2%	REITs -4.8%	High Yield 14.3%	Core Bond 7.5%	U.S. TIPS 6.0%	Core Bond -13.0%	U.S. TIPS 2.1%
Core Bond 3.6%	U.S. Equity -5.3%	Core Bond 8.7%	High Yield 7.1%	High Yield 5.3%	Developed -14.0%	Developed 2.0%
U.S. TIPS 3.0%	Commodities -11.2%	U.S. TIPS 8.4%	T-Bills 0.7%	T-Bills 0.0%	U.S. Equity -19.0%	T-Bills 1.2%
Commodities 1.7%	Developed -13.4%	Commodities 7.7%	Commodities -3.1%	Core Bond -1.5%	Emrg Mrkts -19.7%	Core Bond 0.0%
T-Bills 0.8%	Emrg Mrkts -14.2%	T-Bills 2.3%	REITs -7.9%	Emrg Mrkts -2.2%	REITs -26.8%	Emrg Mrkts -1.0%

Data Sources: Bloomberg    Note: Developed asset class is developed equity markets ex-U.S., ex-Canada

# Important Information

Wilshire is a global financial services firm providing diverse services to various types of investors and intermediaries. Wilshire's products, services, investment approach and advice may differ between clients and all of Wilshire's products and services may not be available to all clients. For more information regarding Wilshire's services, please see Wilshire's ADV Part 2 available at [www.wilshire.com/ADV](http://www.wilshire.com/ADV).

Wilshire believes that the information obtained from third party sources contained herein is reliable, but has not undertaken to verify such information. Wilshire gives no representations or warranties as to the accuracy of such information, and accepts no responsibility or liability (including for indirect, consequential or incidental damages) for any error, omission or inaccuracy in such information and for results obtained from its use.

This material may include estimates, projections, assumptions and other "forward-looking statements." Forward-looking statements represent Wilshire's current beliefs and opinions in respect of potential future events. These statements are not guarantees of future performance and undue reliance should not be placed on them. Such forward-looking statements necessarily involve known and unknown risks and uncertainties, which may cause actual events, performance and financial results to differ materially from any projections. Forward-looking statements speak only as of the date on which they are made and are subject to change without notice. Wilshire undertakes no obligation to update or revise any forward-looking statements.

Wilshire Advisors, LLC (Wilshire) is an investment advisor registered with the SEC. Wilshire® is a registered service mark.

Copyright © 2023 Wilshire. All rights reserved.