MEKETA | 45 YEARS
CELEBRATING A MILESTONE

Maryland State Retirement and Pension System

Performance Report
March 31, 2023

Fund Evaluation Report

Agenda

1. Executive Summary
2. Performance Summary
3. Risk Dashboard
4. Activity Update
5. Economic and Market Update
6. Appendices
   - Corporate Update
   - Disclaimer, Glossary, and Notes

Executive Summary

Market Value & Performance

→ At the end of the first quarter, the System was valued at $64,365 million, an increase of $1,448 million from the end of the fourth quarter.

- The increase was the result of positive investment performance despite net cash outflows that totaled $350.9 million for the quarter.

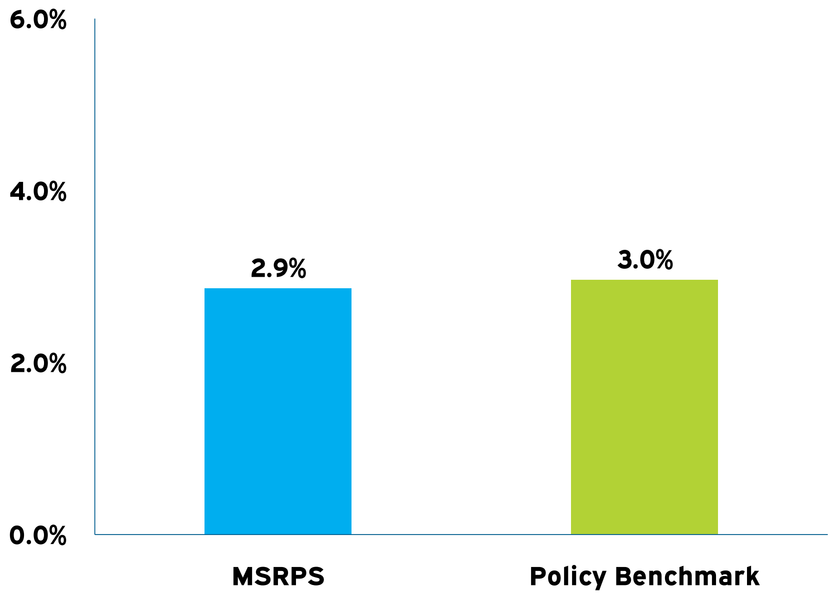
→ The System returned 2.9%, net of fees, during the first quarter of 2023, underperforming the policy benchmark by 0.1%.

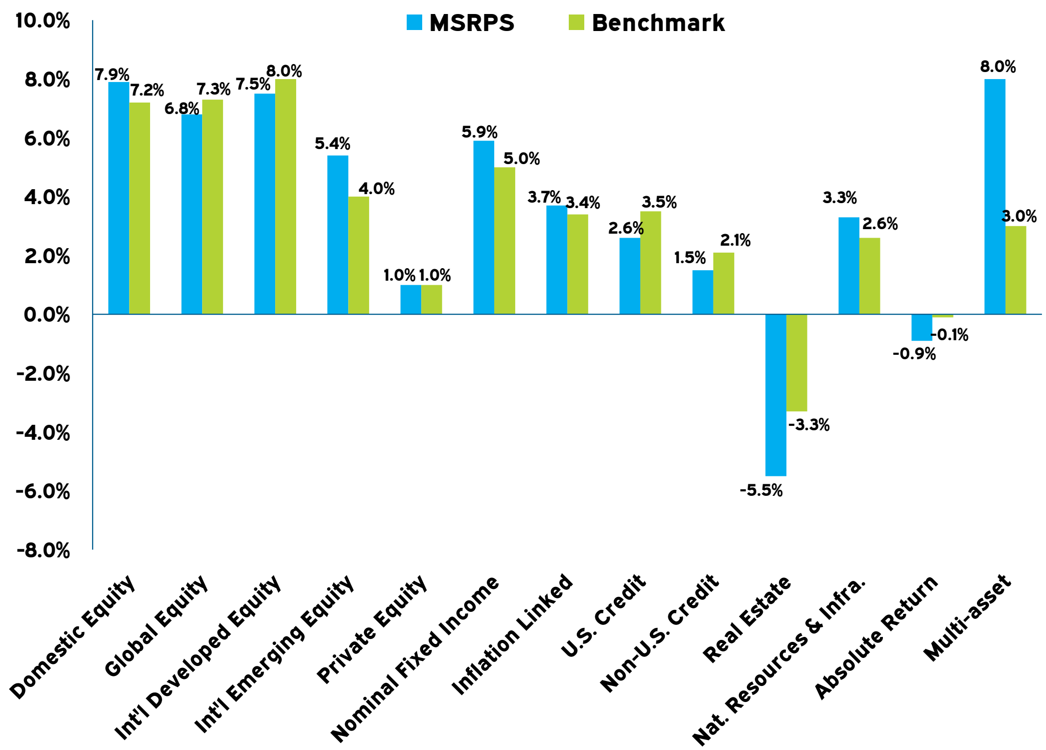
- All asset class returns were positive for the quarter except for absolute return and real estate.
- Multi-asset had the strongest absolute return, up 8.0% for the quarter, while real estate was the weakest performer in absolute terms, down 5.5%.

→ At quarter end, all asset classes were within their respective target allocation ranges.

Q1 System and Asset Class Performance

→ The System underperformed the Policy Benchmark during the first quarter, returning 2.9%, net of fees.





→ During the quarter, multi-asset delivered the best absolute performance returning 8.0%.

→ On a relative basis, multi-asset was the best performing asset class, outpacing its benchmark by 5.0%.

Note: For some asset classes, there is a lack of publicly available index data which at times can introduce greater tracking error in the short-term (e.g. natural resources & infrastructure) when a market proxy is used.

Total System Q1 Attribution[1]

	Total System			Policy Benchmark			Attribution Analysis			
	Average Weight	Total Return[2]	Contribution to Return	Average Weight[3]	Total Return[2]	Contribution to Return	Allocation Effect	Active Management Effect[4]	Interaction Effect	Total Effect
Public Equity	29.7	6.8	2.0	28.7	6.5	1.9	0.02	0.13	-0.05	0.10
Domestic Equity	11.3	7.5	0.8	12.7	7.2	0.9	-0.06	0.04	-0.01	-0.03
International Developed	7.0	8.2	0.6	7.6	8.0	0.6	-0.04	0.02	0.00	-0.02
International Emerging	8.0	4.9	0.4	8.4	4.0	0.3	-0.02	0.08	0.00	0.06
Global Equity	3.4	6.1	0.2	0.0	7.3	0.0	0.14	0.00	-0.04	0.10
Private Equity	21.3	1.0	0.2	21.3	1.0	0.2	0.00	0.00	0.00	0.00
Nominal Fixed Income	13.3	5.2	0.7	15.0	5.0	0.7	-0.04	0.03	0.00	-0.01
Inflation Linked	4.2	3.6	0.2	4.7	3.4	0.2	0.00	0.01	0.00	0.00
US Credit	7.2	2.6	0.2	7.0	3.5	0.2	0.00	-0.07	0.00	-0.07
Non- US Credit	1.0	1.5	0.0	1.0	2.1	0.0	0.00	-0.01	0.00	-0.01
Real Estate	11.4	-5.5	-0.6	11.4	-3.3	-0.4	0.00	-0.27	0.00	-0.27
Natural Resources & Infrastructure	5.0	3.3	0.2	5.0	2.6	0.1	0.00	0.03	0.00	0.02
Absolute Return	6.2	-0.9	-0.1	6.0	-0.1	0.0	-0.02	-0.05	0.00	-0.06
Multi-Asset	0.4	8.0	0.0	0.0	3.0	0.0	0.00	0.00	0.02	0.02
Cash	0.4	0.9	0.0	0.0	1.1	0.0	0.00	0.00	0.00	0.00
Total (excl. overlay)	-	-	2.67	-	-	2.96	-0.04	-0.19	-0.04	-0.27
Currency Overlay							-0.02			
Structural/Tactical Overlay							0.22			
Total (incl. overlay)	100.0	-	2.86	100.0	-	2.96	0.16	-0.19	-0.04	-0.07

[1] Numbers may not sum due to rounding. Attribution calculated on a monthly basis, using average month end market values and targets. As a result, there can be discrepancies from custodian data due to intra-month transfers.
[2] "Total Return" and "Contribution to Return" reflects asset class and System performance excluding the currency hedging and structural/tactical overlay programs.
[3] Based on the transitional target allocations.
[4] In cases where the policy weight is zero, the active management effect will in turn be zero. The interaction effect will capture any contributions made by active management where the policy weight is zero as it factors in the portfolio weight.

Total System 1-Year Attribution[1]

	Total System			Policy Benchmark			Attribution Analysis			
	Average Weight	Total Return[2]	Contribution to Return	Average Weight[3]	Total Return[2]	Contribution to Return	Allocation Effect	Active Management Effect[4]	Interaction Effect	Total Effect
Public Equity	29.4	-7.8	-2.3	28.9	-7.6	-2.2	-0.19	-0.06	-0.03	-0.27
Domestic Equity	11.3	-8.9	-1.0	12.7	-8.6	-1.1	-0.06	-0.05	0.00	-0.11
International Developed	6.7	-3.2	-0.2	7.6	-2.7	-0.2	-0.07	-0.04	0.01	-0.10
International Emerging	7.9	-10.1	-0.8	8.5	-10.7	-0.9	-0.05	0.03	0.00	-0.02
Global Equity	3.5	-7.9	-0.3	0.0	-7.4	0.0	-0.01	0.00	-0.04	-0.05
Private Equity	21.1	-2.2	-0.5	21.1	-5.7	-1.2	0.00	0.74	0.00	0.74
Nominal Fixed Income	13.3	-9.8	-1.3	15.2	-12.0	-1.8	0.14	0.35	-0.05	0.44
Inflation Linked	4.3	-6.4	-0.3	4.7	-6.5	-0.3	-0.01	0.01	0.00	0.00
US Credit	7.2	-0.5	0.0	7.0	-2.1	-0.1	-0.01	0.09	0.01	0.09
Non- US Credit	0.9	-6.5	-0.1	1.0	-5.6	-0.1	0.00	-0.01	0.00	-0.01
Real Estate	11.0	6.9	0.8	11.0	-3.6	-0.4	0.00	1.10	0.00	1.10
Natural Resources & Infrastructure	4.9	7.3	0.4	4.8	-9.4	-0.4	-0.05	0.66	0.04	0.66
Absolute Return	6.8	-2.8	-0.2	6.3	-1.3	-0.1	-0.08	-0.07	-0.04	-0.19
Multi-Asset	0.5	-17.0	-0.1	0.0	-6.7	0.0	0.00	0.00	-0.10	-0.10
Cash	0.7	3.0	0.0	0.0	2.6	0.0	0.05	0.00	0.00	0.06
Total (excl. overlay)	-	-	-3.89	-	-	-6.66	-0.14	2.81	-0.16	2.51
Currency Overlay							0.12			
Structural/Tactical Overlay							-0.29			
Total (incl. overlay)	**100.0**	**-**	**-4.09**	**100.0**	**-**	**-6.66**	**-0.31**	**2.81**	**-0.16**	**2.34**

[1] Numbers may not sum due to rounding. Attribution calculated on a monthly basis, using average month end market values and targets. As a result, there can be discrepancies from custodian data due to intra-month transfers.
[2] "Total Return" reflects asset class performance excluding the currency hedging and structural/tactical overlay programs.
[3] Based on the transitional target allocations.
[4] In cases where the policy weight is zero, the active management effect will in turn be zero. The interaction effect will capture any contributions made by active management where the policy weight is zero as it factors in the portfolio weight.

Attribution Commentary

First Quarter

→ In the first quarter, the System underperformed the policy benchmark by 0.10%.

→ Inclusive of the overlay programs, asset allocation had a positive effect on the relative performance.

→ Active management detracted from performance and the interaction effect detracted to relative performance due to the underperformance of global equity.

- Selection within real estate, US credit, absolute return, and global equities detracted from relative performance, while manager performance within international emerging, domestic equity, and nominal fixed income were additive to the active management effect.

Trailing 1-Year

→ Over the trailing one-year period, the System outperformed the Policy Benchmark by 2.57%.

→ Inclusive of the overlay programs, the asset allocation effect detracted from relative performance.

→ While interaction effects detracted from performance, manager selection (e.g., active management) contributed positively over the trailing year.

- Manager selection within real estate, natural resources and infrastructure, private equity, and nominal fixed income were the most additive while selection within public equities and absolute return detracted.

Attribution Details

Returns Based Attribution Definition:

→ Attribution is an analytical evaluation of a portfolio's performance relative to its benchmark. Attribution can portray where portfolio decisions were additive or detracted from relative performance. The three main attribution effects are the following:

- *Allocation Effect:* how the overweight or underweight of an asset class relative to the benchmark contributes to or detracts from performance.
- *Active Management Effect:* attributes relative performance to managers' stock selection decisions, relative to the benchmark.
- *Interaction Effect:* captures the portion of active management that is responsible for the cross interaction between the allocation and active management effects.
  - For example, if the System is overweight an underperforming asset class, it will have a negative interaction effect.

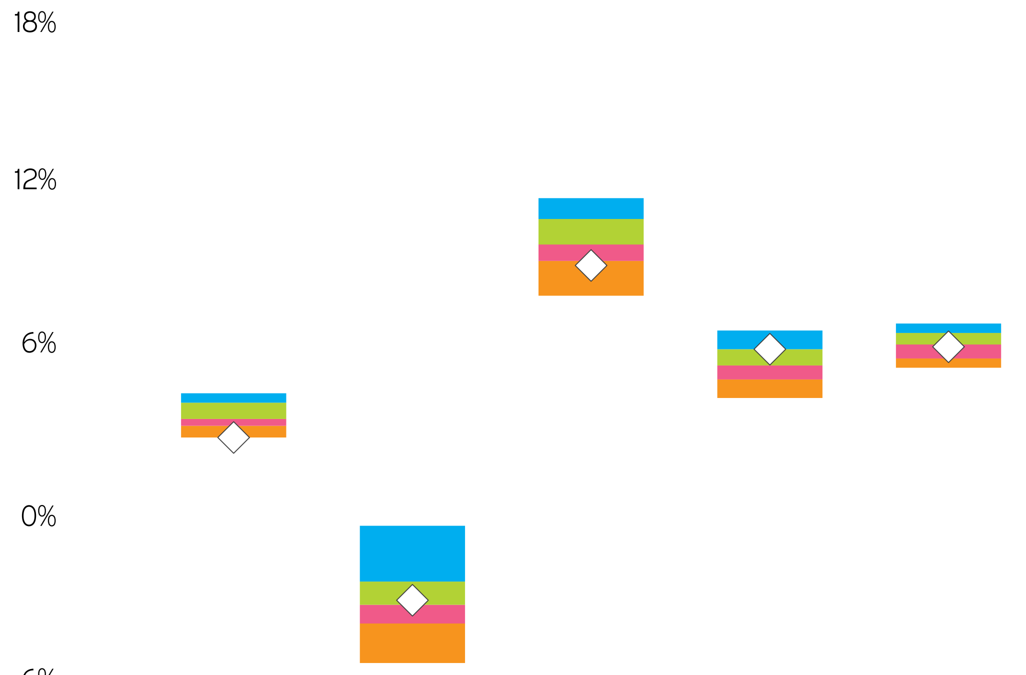
Calculations[1]:

→ The Brinson Fachler attribution methodology is widely accepted within the industry. Using this methodology, the components are calculated as follows:

- *Allocation Effect:* $(\mathrm{Rab} - \mathrm{Rpb}) \times (\mathrm{Wp} - \mathrm{Wb})$
- *Active Management Effect[2]:* $\mathrm{Wb} \times (\mathrm{Rp} - \mathrm{Rab})$
- *Interaction Effect:* $(\mathrm{Wp} - \mathrm{Wb}) \times (\mathrm{Rp} - \mathrm{Rab})$

[1]Rpb= Policy Benchmark
Rab = Asset Class Benchmark
Wp = Portfolio Weight
Wb = Policy Weight
Rp = Asset Class Return
Rb = Policy Benchmark Return
[2] In cases where the policy weight is zero, the active management effect will in turn be zero. The interaction effect will capture any contributions made by active management where the policy weight is zero as it factors in the portfolio weight.

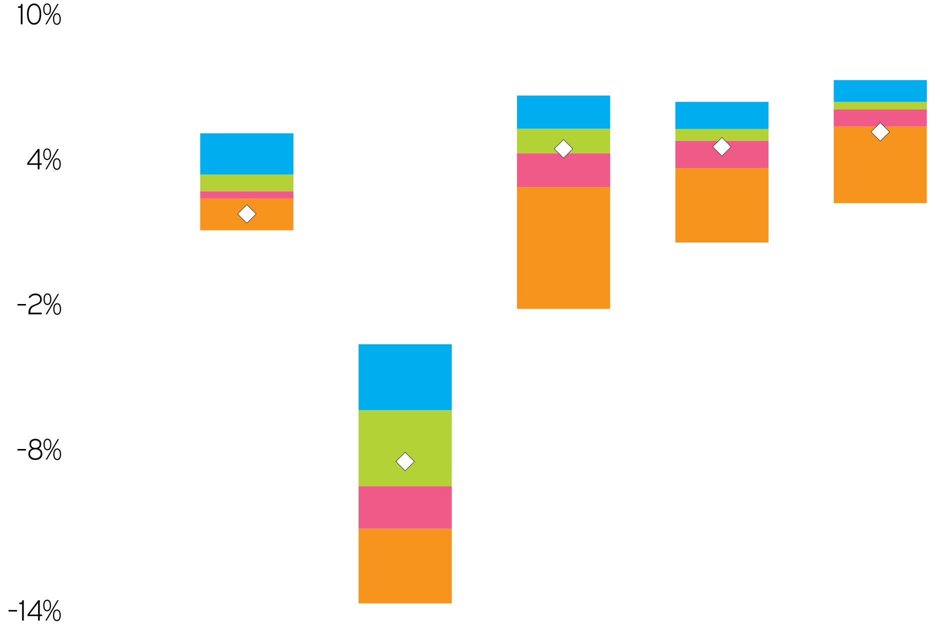
Total System vs. Public Plans >$1 Billion Universe[1]
As of March 31, 2023



	1Q23 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
Total System	2.9	-4.1	10.3	6.7	6.8
25th Percentile	4.4	-3.3	12.3	6.7	7.4
Median	3.7	-4.3	11.2	6.0	6.9
75th Percentile	3.4	-5.1	10.5	5.4	6.3
Rank (%)	*94*	*45*	*82*	*25*	*55*

[1] Represents the second release of the InvMetrics Public DB >$1 bn peer group as of March 31, 2023. Total System performance is net of fees. Includes 50 plans.

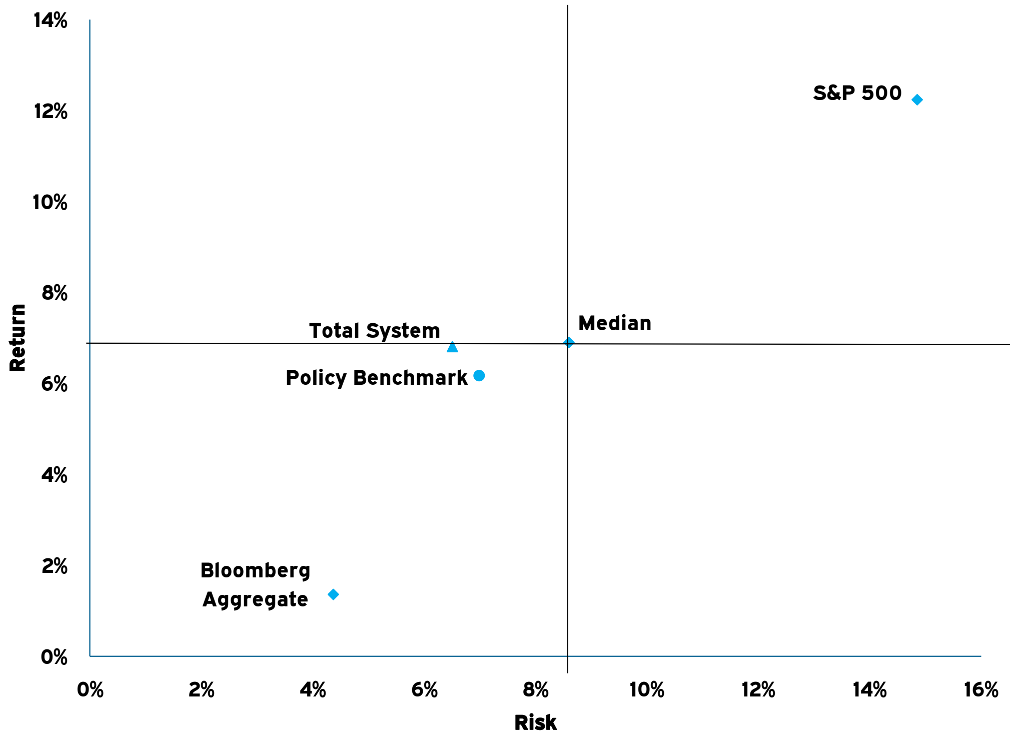
Total System vs. Public Plans >$25 Billion Universe[1]
As of December 31, 2022



	4Q22 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
Total System	3.2	-8.8	6.3	6.4	7.1
25th Percentile	5.1	-6.3	7.3	7.3	8.6
Median	4.3	-10.0	6.1	6.7	8.2
75th Percentile	3.9	-12.1	4.5	5.4	7.4
Rank (%)	89	41	41	60	84
Policy Benchmark	*3.1*	*-10.8*	*4.8*	*5.4*	*6.3*
Rank (%)	*91*	*50*	*65*	*70*	*84*

[1] Represents the TUCS Public >$25 bn peer group as of December 31, 2022. Total System performance is gross of fees. Includes 23 plans.

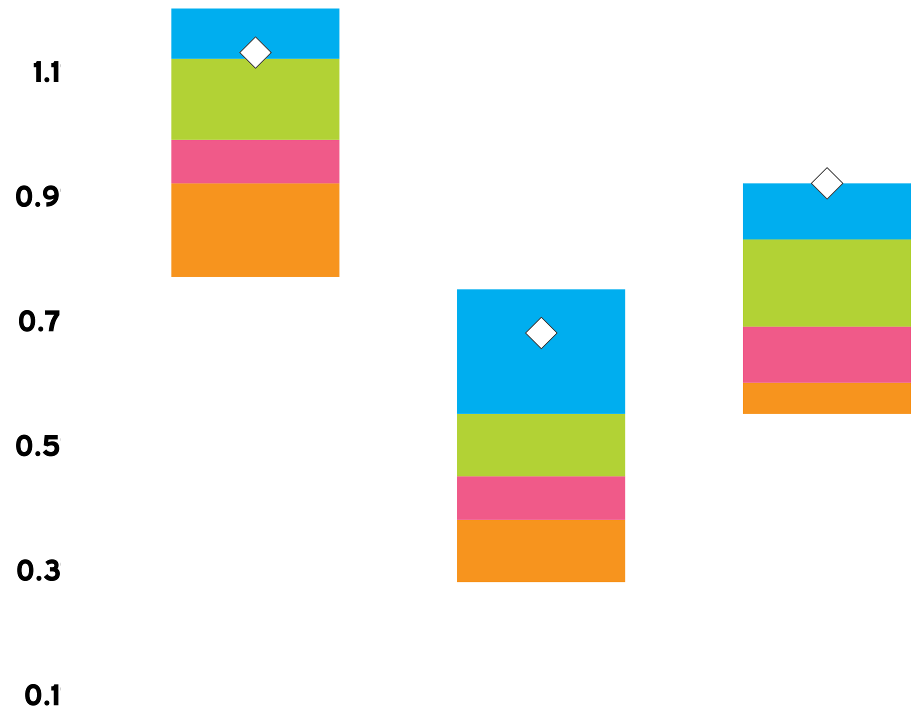
Total System Trailing 10-Year Risk vs Return[1]
As of March 31, 2023



	Risk (%)	Return (%)
Total System	6.5	6.8
Policy Benchmark	7.0	6.2
Median	8.6	6.9

[1] Represents a final cut of InvMetrics Public DB >$1 bn Net peer group as of March 31, 2022. Includes 26 plans.

Total System vs. Public Plans >$1 Billion Universe Sharpe Ratio Comparison[1]
As of March 31, 2023

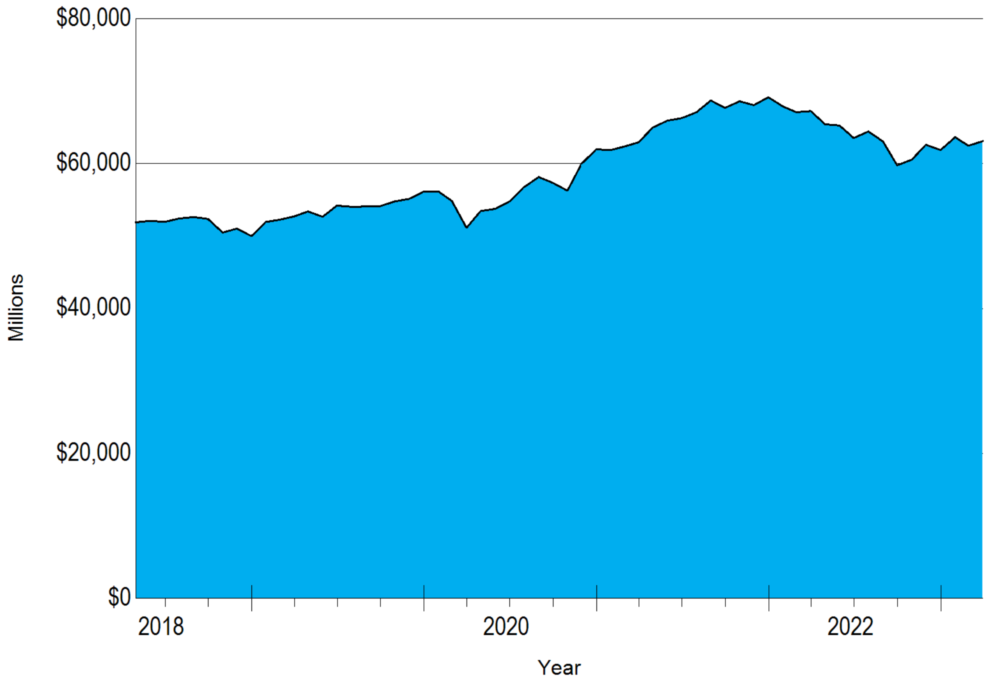


	3 YR	5 YR	10 YR
Total System	1.1	0.7	0.9
S&P 500	0.9	0.6	0.8
25th Percentile	1.1	0.6	0.8
Median	1.0	0.5	0.7
75th Percentile	0.9	0.4	0.6
Rank (%)	*24*	*9*	*5*

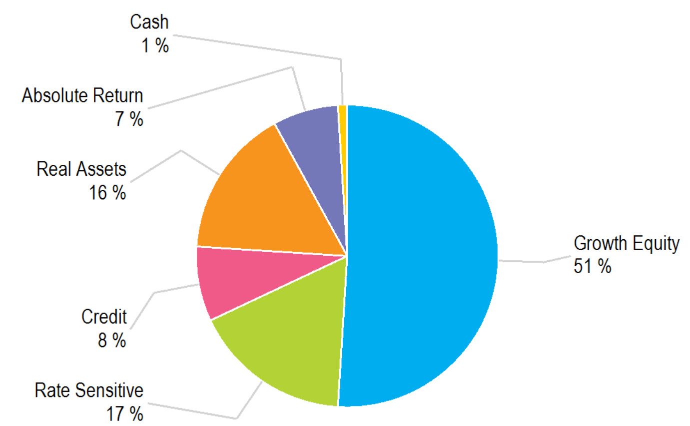
[1] Represents a final cut of Investor Force Public DB >$1 bn Net peer group as of March 31, 2023. Includes 50 plans. The risk-free rate is the 91-day T-bill.

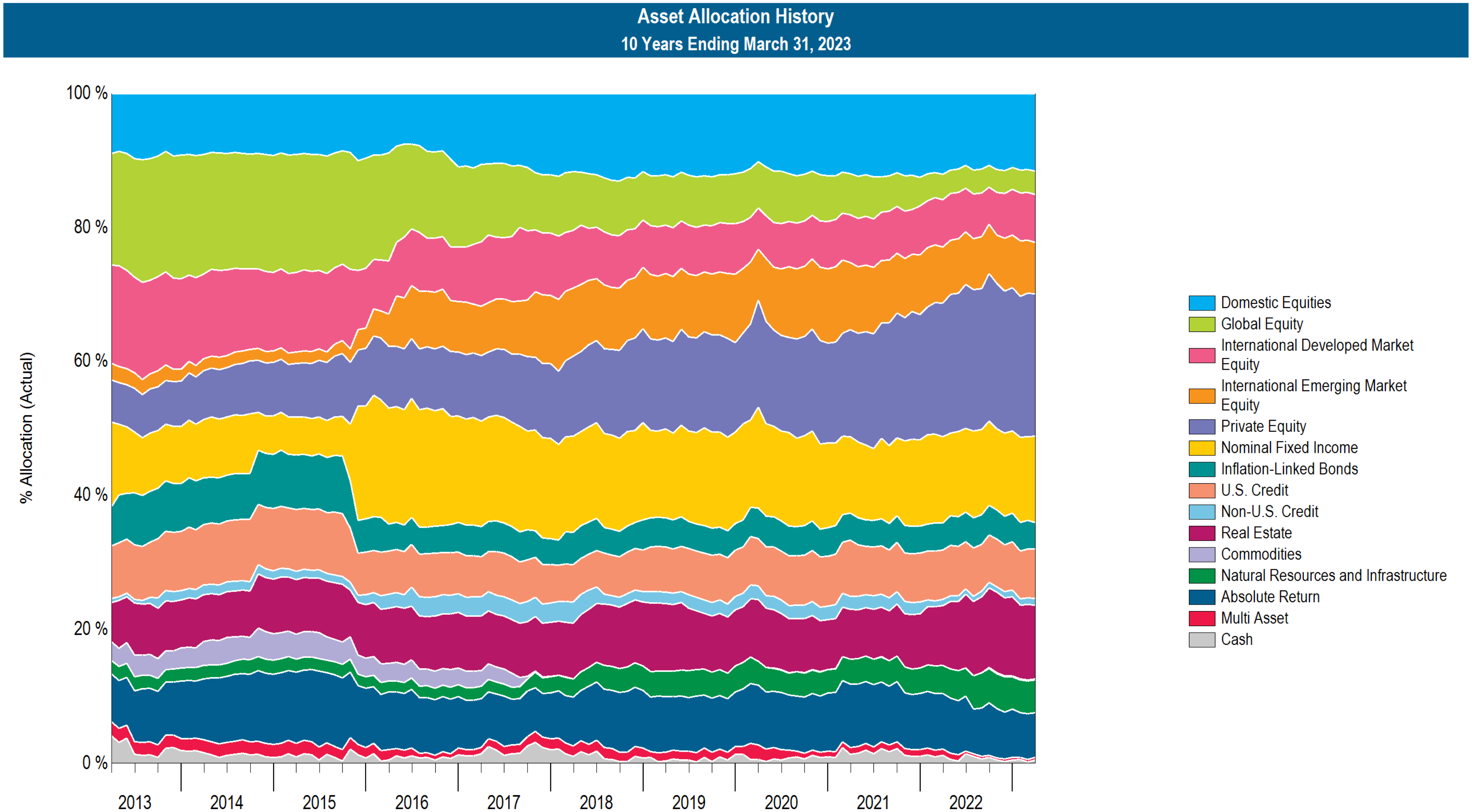
Performance Summary

Market Value History
5 Years Ending March 31, 2023



Actual Allocation




Asset Allocation History
10 Years Ending March 31, 2023
100 %
80 %
60 %
40 %
20 %
0 %
% Allocation (Actual)
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
Domestic Equities
Global Equity
International Developed Market Equity
International Emerging Market Equity
Private Equity
Nominal Fixed Income
Inflation-Linked Bonds
U.S. Credit
Non-U.S. Credit
Real Estate
Commodities
Natural Resources and Infrastructure
Absolute Return
Multi Asset
Cash

Allocation vs. Targets and Policy

	Current Balance	Current Allocation	Transitional Targets	Policy	Policy Range
Growth Equity	**$32,939,977,485**	**51%**	**50%**	**50%**	**43% - 57%**
Domestic Equities	$7,481,492,364	12%	13%	16%	--
Global Equity	$2,217,849,444	3%	0%	0%	--
International Developed Market Equity	$4,613,317,450	7%	8%	9%	--
International Emerging Market Equity	$4,928,537,493	8%	8%	9%	--
Private Equity	$13,682,462,832	21%	21%	16%	--
Stock Distributions	$16,317,901	0%	0%	0%	--
Rate Sensitive	**$11,358,834,066**	**18%**	**20%**	**21%**	**16% - 26%**
Nominal Fixed Income	$8,803,340,624	14%	15%	16%	--
Inflation-Linked Bonds	$2,555,493,442	4%	5%	5%	--
Credit	**$5,383,886,364**	**8%**	**8%**	**8%**	**4% - 12%**
U.S. Credit	$4,733,109,781	7%	7%	7%	--
Non-U.S. Credit	$650,776,583	1%	1%	1%	--
Real Assets	**$10,314,858,679**	**16%**	**16%**	**15%**	**11% - 18%**
Real Estate	$7,091,183,451	11%	11%	10%	--
Commodities	$91,975,167	0%	0%	0%	--
Natural Resources and Infrastructure	$3,131,700,061	5%	5%	5%	--
Absolute Return	**$4,291,698,632**	**6%**	**6%**	**6%**	**2% - 10%**
Absolute Return	$4,291,698,632	6%	6%	6%	--
Multi Asset	**$244,155,536**	**0%**	**0%**	**0%**	**0% - 2%**
Multi Asset	$244,155,536	0%	0%	0%	--
Cash	**$298,010,302**	**1%**	**0%**	**0%**	**0% - 2%**
Cash	$298,010,302	1%	0%	0%	--
Total	**$64,364,613,606**	**100%**	**100%**	**100%**	

Asset Class Performance Summary

	Market Value ($)	% of Portfolio	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Total System	**64,364,613,606**	**100.0**	**2.9**	**1.6**	**-4.1**	**10.3**	**6.7**	**6.8**	**7.9**	**Jul-86**
System Policy Benchmark			*3.0*	*0.7*	*-6.7*	*9.0*	*6.1*	*6.2*	--	*Jul-86*
Over/Under			-0.1	0.9	2.6	1.3	0.6	0.6		
System Strategic Policy Benchmark			*3.1*	*0.8*	*-6.6*	*9.4*	*6.2*	*6.4*	--	*Jul-86*
Growth Equity	**32,939,977,485**	**51.2**	**4.5**	**3.5**	**-5.0**	**17.4**	**9.5**	**10.3**	**6.8**	**Jan-98**
Public Equity	**19,241,196,753**	**29.9**	**7.0**	**8.4**	**-6.6**	**15.4**	**5.8**	**7.9**	**--**	**Apr-94**
Public Equity Custom Benchmark			*6.5*	*8.5*	*-7.4*	*14.2*	*5.4*	*7.5*	--	*Apr-94*
Over/Under			0.5	-0.1	0.8	1.2	0.4	0.4		
Domestic Equity	**7,481,492,365**	**11.6**	**7.9**	**10.2**	**-6.8**	**19.1**	**10.1**	**11.4**	**9.1**	**Apr-94**
U.S. Equity Custom Benchmark			*7.2*	*9.7*	*-8.6*	*18.5*	*10.5*	*11.7*	--	*Apr-94*
Over/Under			0.7	0.5	1.8	0.6	-0.4	-0.3		
Global Equity	**2,217,849,445**	**3.4**	**6.8**	**8.7**	**-8.9**	**13.9**	**6.6**	**8.1**	**6.9**	**Oct-05**
Global Equity Custom Benchmark			*7.3*	*9.7*	*-7.4*	*15.4*	*6.9*	*8.1*	*6.6*	*Oct-05*
Over/Under			-0.5	-1.0	-1.5	-1.5	-0.3	0.0	0.3	
International Developed Market Equity	**4,613,317,450**	**7.2**	**7.5**	**12.9**	**-1.7**	**14.7**	**4.2**	**5.1**	**6.1**	**Jan-95**
MSRA Custom International Index			*8.0*	*14.0*	*-2.7*	*13.5*	*3.8*	*4.4*	*5.2*	*Jan-95*
Over/Under			-0.5	-1.1	1.0	1.2	0.4	0.7	0.9	
International Emerging Markets Equity	**4,928,537,493**	**7.7**	**5.4**	**2.1**	**-9.3**	**10.8**	**0.2**	**--**	**5.5**	**Nov-15**
MSCI Emerging Markets			*4.0*	*0.8*	*-10.7*	*7.8*	*-0.9*	*2.0*	*4.5*	*Nov-15*
Over/Under			1.4	1.3	1.4	3.0	1.1		1.0	
Private Equity	**13,682,462,832**	**21.3**	**1.0**	**-2.7**	**-2.2**	**19.6**	**17.2**	**16.5**	**9.5**	**Mar-94**
State Street Private Equity Index			*1.0*	*-5.1*	*-5.7*	*17.5*	*15.0*	*13.5*	--	*Mar-94*
Over/Under			0.0	2.4	3.5	2.1	2.2	3.0		

Performance Summary | As of March 31, 2023

	Market Value ($)	% of Portfolio	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Rate Sensitive	**11,358,834,066**	**17.6**	**5.3**	**-1.9**	**-11.7**	**-5.5**	**0.9**	**1.6**	**6.1**	**Jul-86**
Custom Rate Sensitive Benchmark			*4.6*	*-2.0*	*-10.6*	*-5.9*	*0.9*	*1.5*	--	*Jul-86*
Over/Under			0.7	0.1	-1.1	0.4	0.0	0.1		
Nominal Fixed Income	**8,803,340,624**	**13.7**	**5.9**	**-2.7**	**-13.4**	**-7.7**	**0.2**	**1.3**	**6.0**	**Jul-86**
Custom Nominal Fixed Income Benchmark			*5.0*	*-2.7*	*-12.0*	*-7.9*	*0.3*	*1.2*	--	*Jul-86*
Over/Under			0.9	0.0	-1.4	0.2	-0.1	0.1		
Inflation-Linked Bonds	**2,555,493,442**	**4.0**	**3.7**	**0.4**	**-6.3**	**1.8**	**3.1**	**1.8**	**3.5**	**Jul-08**
Custom Inflation Sensitive Benchmark			*3.4*	*0.1*	*-6.5*	*1.6*	*2.9*	*1.9*	*3.3*	*Jul-08*
Over/Under			0.3	0.3	0.2	0.2	0.2	-0.1	0.2	
Credit	**5,383,886,364**	**8.4**	**2.5**	**4.6**	**-1.1**	**6.4**	**3.4**	**4.5**	**7.5**	**Mar-09**
U.S. Credit	**4,733,109,781**	**7.4**	**2.6**	**4.5**	**-0.4**	**7.6**	**4.9**	**5.6**	**7.9**	**Mar-09**
U.S. Credit Custom Benchmark			*3.5*	*7.3*	*-2.1*	*6.5*	*3.3*	*4.0*	*6.8*	*Mar-09*
Over/Under			-0.9	-2.8	1.7	1.1	1.6	1.6	1.1	
Non-U.S. Credit	**650,776,583**	**1.0**	**1.5**	**5.4**	**-6.5**	**0.3**	**-1.4**	**-1.8**	**-0.4**	**Oct-10**
Non-U.S. Credit Custom Benchmark			*2.1*	*4.7*	*-5.6*	*-1.7*	*-1.7*	*-1.6*	*-0.2*	*Oct-10*
Over/Under			-0.6	0.7	-0.9	2.0	0.3	-0.2	-0.2	
Real Assets	**10,314,858,679**	**16.0**	**-2.9**	**-0.6**	**7.1**	**12.4**	**8.2**	**4.3**	**5.2**	**Feb-06**
Custom Real Assets Benchmark			*-1.6*	*-4.6*	*-5.4*	*11.5*	*7.3*	*4.0*	*4.4*	*Feb-06*
Over/Under			-1.3	4.0	12.5	0.9	0.9	0.3	0.8	
Real Estate	**7,091,183,348**	**11.0**	**-5.5**	**-4.7**	**6.9**	**9.8**	**8.5**	**9.4**	**7.1**	**Jul-87**
Real Estate Custom Benchmark			*-3.3*	*-7.8*	*-3.6*	*8.2*	*7.8*	*8.9*	*8.2*	*Jul-87*
Over/Under			-2.2	3.1	10.5	1.6	0.7	0.5	-1.1	
Commodities	**91,975,167**	**0.1**								

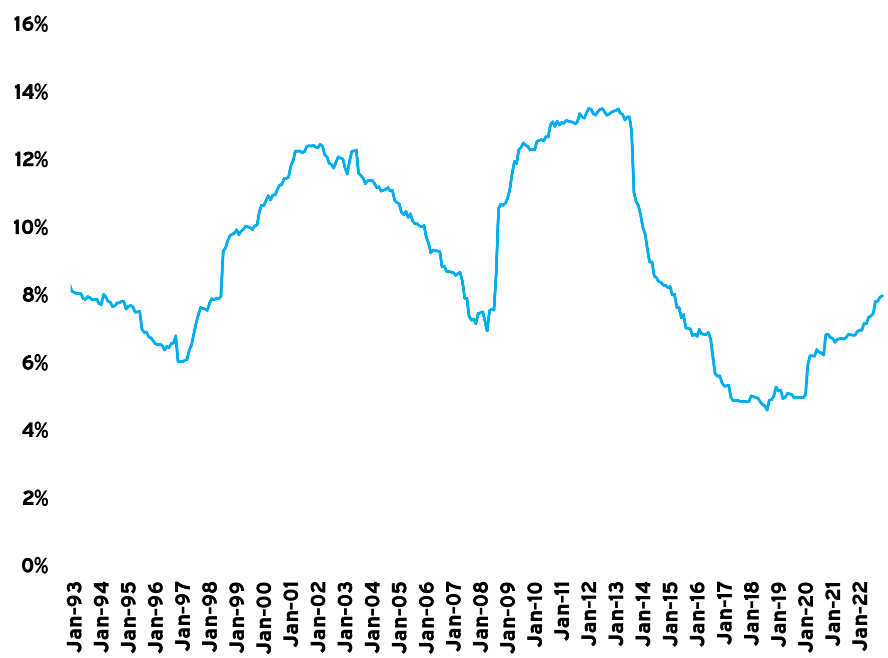
	Market Value ($)	% of Portfolio	QTD (%)	Fiscal YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Natural Resources and Infrastructure	**3,131,700,061**	**4.9**	**3.3**	**9.8**	**7.3**	**17.5**	**6.9**	**5.0**	**8.8**	**Aug-09**
Natural Resources and Infrastructure Benchmark			*2.6*	*3.4*	*-9.4*	*19.4*	*5.9*	*7.2*	*7.2*	*Aug-09*
Over/Under			0.7	6.4	16.7	-1.9	1.0	-2.2	1.6	
Absolute Return	**3,802,428,405**	**5.9**	**-0.9**	**-2.6**	**-2.8**	**5.5**	**3.1**	**2.2**	**3.1**	**Apr-08**
Absolute Return Custom Benchmark			*-0.1*	*0.1*	*-1.3*	*8.2*	*4.7*	*4.1*	*2.6*	*Apr-08*
Over/Under			-0.8	-2.7	-1.5	-2.7	-1.6	-1.9	0.5	
Multi Asset	**244,155,536**	**0.4**	**8.0**	**1.7**	**-17.0**	**4.9**	**--**	**--**	**2.0**	**Jul-18**
System Policy Benchmark			*3.0*	*0.7*	*-6.7*	*9.0*	*6.1*	*6.2*	*6.3*	*Jul-18*
Over/Under			5.0	1.0	-10.3	-4.1			-4.3	
Cash	**320,473,071**	**0.5**	**0.9**	**3.5**	**3.0**	**1.9**	**3.6**	**3.5**	**3.5**	**Jul-08**
FTSE T-Bill 3 Months TR			*1.1*	*2.5*	*2.6*	*1.0*	*1.4*	*0.9*	*0.7*	*Jul-08*
Over/Under			-0.2	1.0	0.4	0.9	2.2	2.6	2.8	

Risk Dashboard

Total System Risk

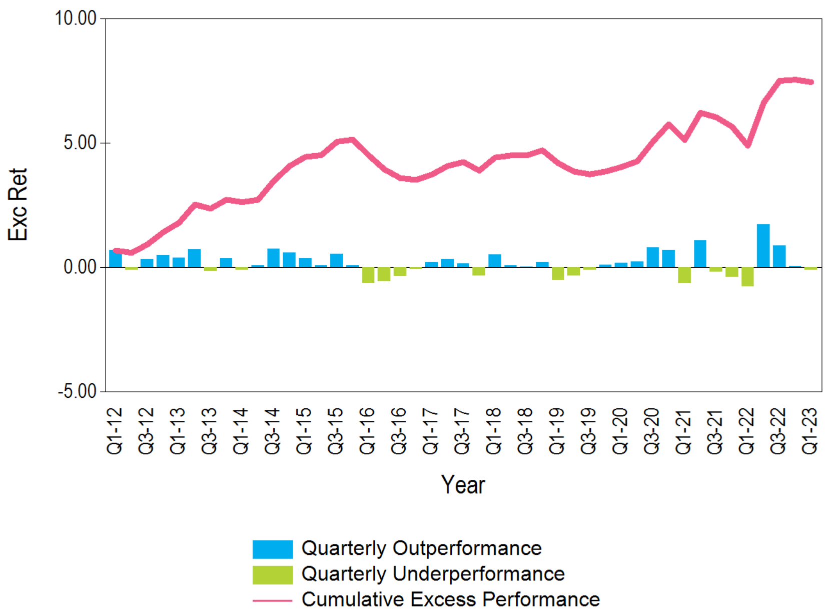
Risk: (sixty months)	Total System 3/31/2023	Policy Benchmark 3/31/2023
Annualized Return (%)	6.7	6.1
Standard Deviation (%)	8.0	8.5
Best Monthly Return (%)	6.9	6.9
Worst Monthly Return (%)	-6.4	-6.4
Beta	0.93	1.00
Correlation (R^2) to Index	0.98	NA
Sharpe Measure	0.68	0.56
Information Ratio	0.51	NA
Excess Return (%)	0.66	NA
Tracking Error (%)	1.28	NA

Rolling 5-Year Standard Deviation

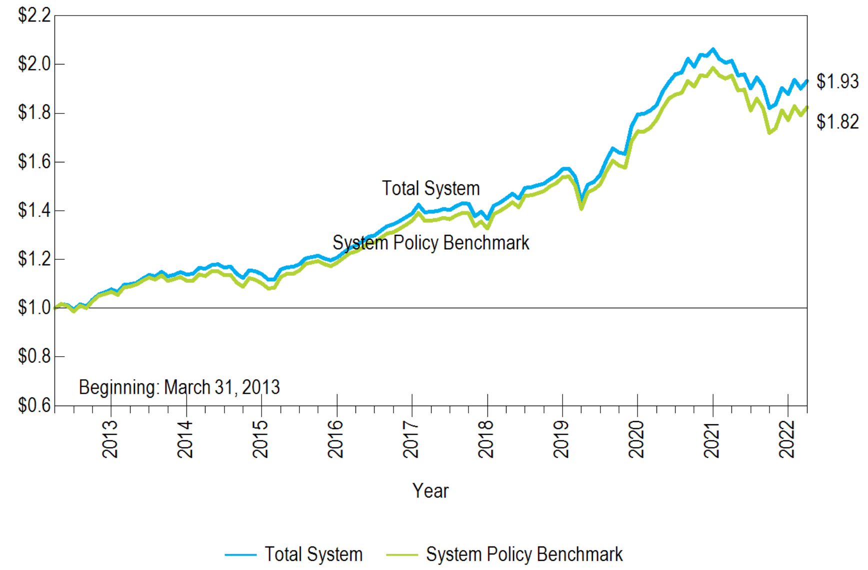


→ Over the trailing 5-years, the System has exhibited lower risk, as measured by standard deviation, than its Policy Benchmark while achieving slightly higher annualized returns.

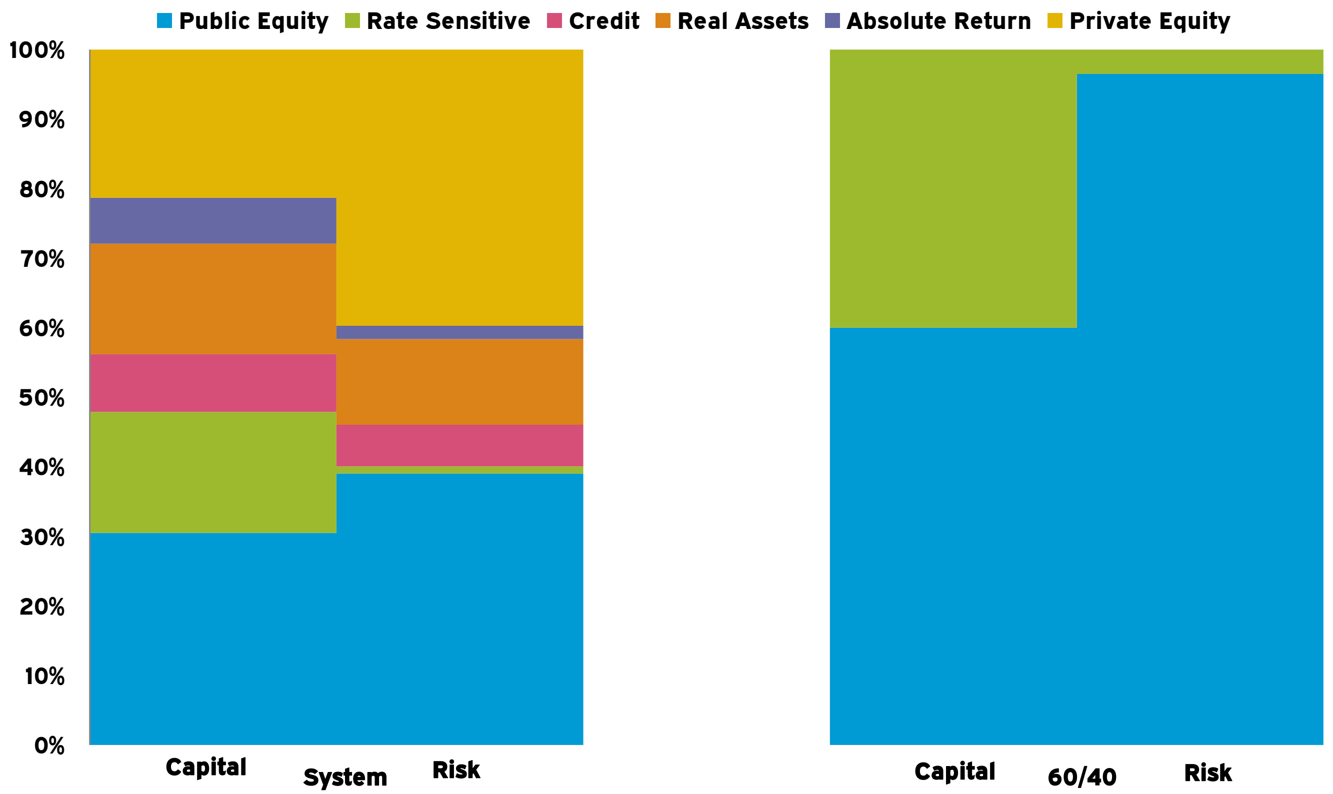
Quarterly and Cumulative Excess Performance



Growth of a Dollar
10 Years Ending March 31, 2023



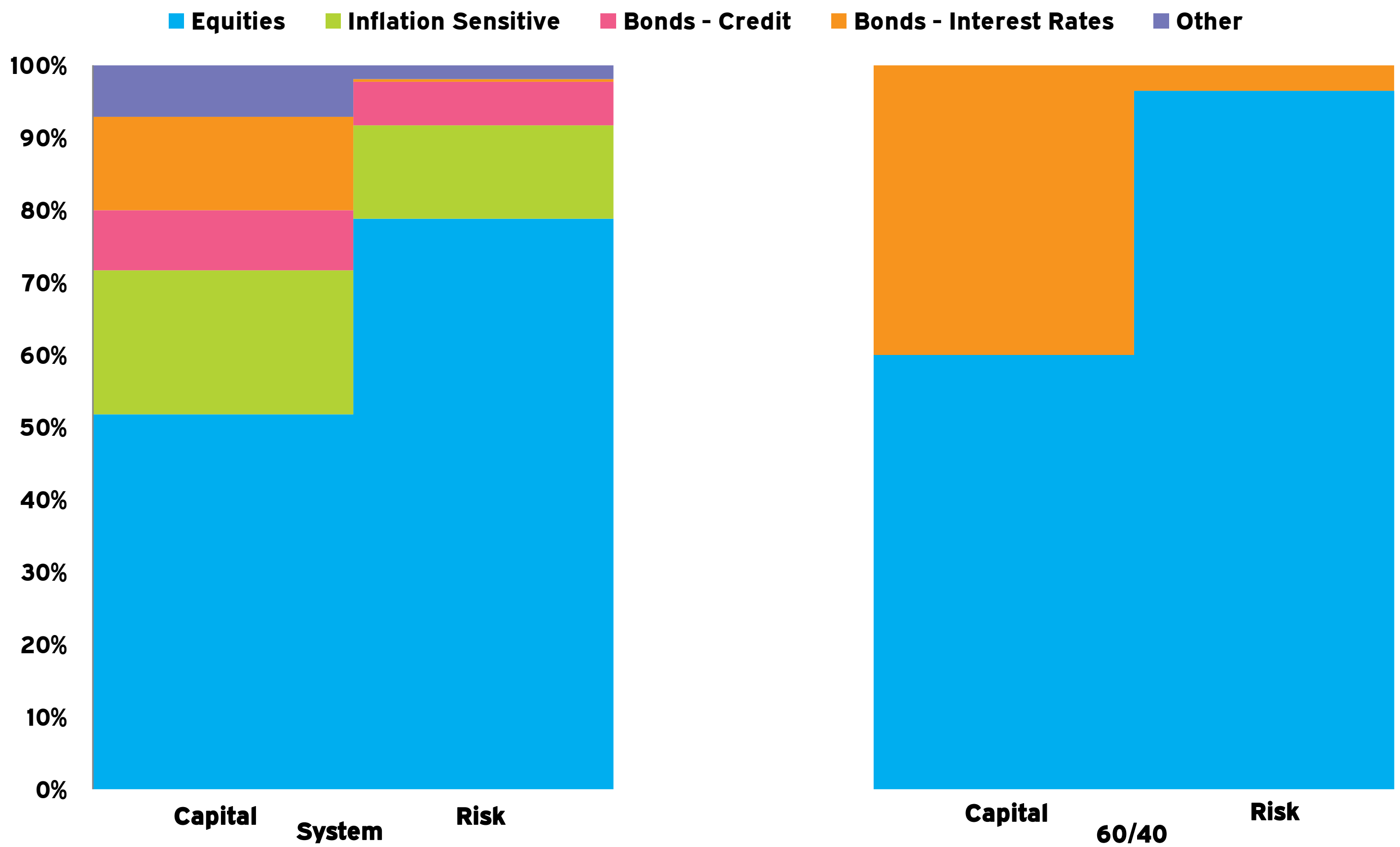
Capital Allocation vs. Risk Allocation
By Asset Class



→ Public equity makes up close to 30% of the current asset allocation; however, it comprises about 39% of the risk allocation.

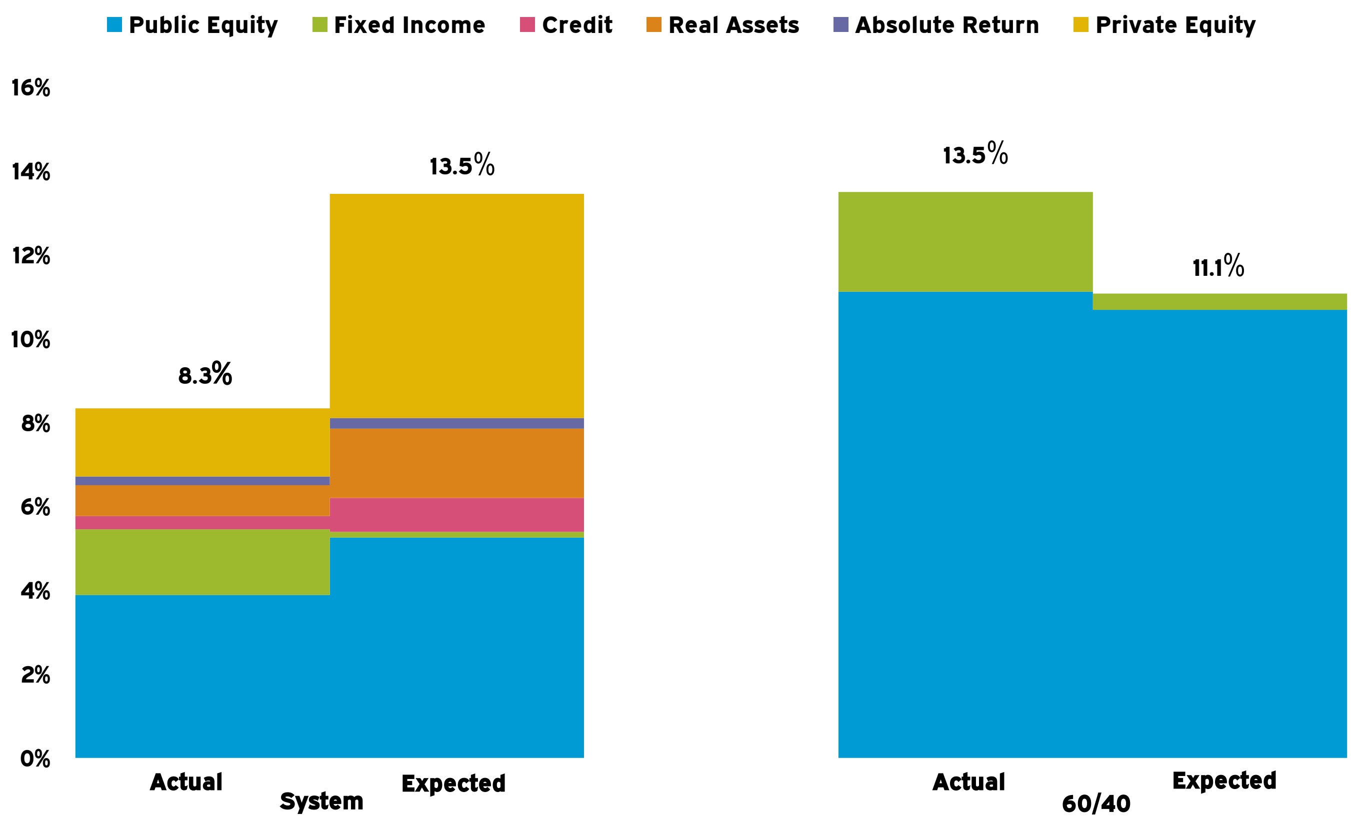
→ By contrast, in a 60/40 portfolio equity comprises 60% of the capital allocation but nearly 97% of the risk.

Capital Allocation vs. Risk Allocation
By Factor Exposure



→ Based on five broad risk exposures, equity (i.e. growth) risk dominates the risk composition of the System.

Risk Decomposition
Actual vs. Expected



→ The System's trailing 3-year standard deviation, as a measure of risk, has been lower than expected.

- Public equities, which make up over 39% of the expected risk composition, have made up over 46% of the actual risk over the last three years.

Portfolio Sensitivity Comparison

→ The chart above shows the resulting change in portfolio return given a one standard deviation event in the respective risk factor.

→ There is more concentration in Growth and Systematic Risk because these sources of risk tend to pay better (have higher expected returns) than the other risk factors.

Look Through Analysis Matrix[1,2]

	Manager Allocation	Public Equity	Fixed Income	Credit	Cash	Hedge Funds	Risk Parity/Multi -Asset	Closed-End Private Markets	Real Estate (Private)
Growth Equity	51%	30%				<1%		21%	
Rate Sensitive	18%		17%			<1%			
Credit	8%			5%				3%	
Real Assets	16%	3%						2%	11%
Absolute Return	6%					6%			
Multi Asset	0%						<1%		
Cash	1%				<1%				
Look Through Allocation	100%	33%	17%	5%	<1%	8%	<1%	26%	11%

[1] Numbers may not sum to 100% due to rounding.
[2] Numbers do not reflect the impact of overlay investing.

Asset Allocation Target Range Compliance

Asset Class	Target Range (%)	In Compliance?
Growth Equity	+/- 7	Yes
Rate Sensitive	+/- 5	Yes
Credit	+/- 4	Yes
Real Assets	+/- 4	Yes
Absolute Return	+/- 4	Yes

Sub-Asset Class Allocation Target Range Compliance

Asset Class	Sub-Asset Class	Target Range (%)	In Compliance?
Public Equity	Hedge Funds	0-20	Yes
Private Equity	Buyout	60-90	Yes
	Venture/Growth	10-25	Yes
	Special Situations	10-30	Yes
Rate Sensitive	L-T Government	30-70	Yes
	Securitized Corp	10-50	Yes
	Inflation Linked	0-40	Yes
Credit	Hedge Funds	0-30	Yes
	Private Credit	0-80	Yes
Real Assets	Real Estate- Core	50-100	Yes
	Real Estate – Value Added	0-25	Yes
	Real Estate- Opportunistic	0-25	Yes
	REITS	0-30	Yes
	Commodities	0-25	Yes

Activity Update

Summary of Work to Date

Ongoing Work on Current Roster

→ Completed and submitted comprehensive quarterly reporting for the System.

- Collect and reconcile data from State Street Bank and investment managers, run holdings analysis and performance calculations.
  - Completed quarterly since second quarter 2014.

→ Completed numerous System-related reporting requirements.

- Iran/Sudan divestment analysis (semi-annually in January and July).
  - Attribution and cost analysis of identified companies and potential impact on performance resulting from divestment.

→ Annually, meet and review all public market managers (video conference calls) and make recommendations to staff on potential changes. Initial review of all managers have been completed.

- Annually, over 40 meetings completed via conference call or in person.
- Comprehensive manager analyses written on all public market managers.

Summary of Work to Date

Investment Topics

→ Discussed general investment topics with Staff, and in some instances the Board.

→ The topics listed are covered through sharing white papers, holding conference calls, or in person meetings:

- Role of leverage in the System
- Public manager peer ranking
- Total fund fee analysis
- Survey & presentation of asset allocation best practices
- Emerging market sensitivity
- Inflation risk
- Benchmarking for private markets and hedge funds
- Fund Governance survey of best practices
- Annual risk reporting
- TUCS peer analysis
- Real estate and emerging market debt benchmarking
- Asset allocation and the impact of the inability to rebalance private markets on long-term returns
- Investing in a Low Interest Rate Environment
- Chinese Restricted List Divestment Impact Analysis
- Researching and drafting a responsible contractor policy
- Involvement with the ad hoc committee in the assumed rate of return
- Asset allocation including more detailed liability analysis and climate scenario analysis
- Implementation of Asset Allocation Changes and Benchmark Changes
- Absolute Return Program Overview
- System Exposure to China

Current Agenda Topics

→ Performance Review

→ Alternative Approaches to Absolute Return for the Retirement System

Appendix

MEKETA

RESEARCH INSIGHTS

Functional Allocation Framework | Technology, Media & Telecommunications | Market Buyouts | CMEs
Emerging Market Debt | China | 2023 Themes | RMS | Real Estate | GP Led Secondaries | Global Wages

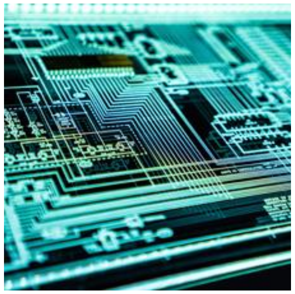
APRIL 2023

Meketa Investment Group is excited to share its latest edition of Research Insights. In this publication, we provide some of our most recent thinking and research on topical and timely subjects.

Functional Allocation Framework

Institutional investors of all types and sizes make use of numerous classes, or buckets, when allocating investment assets within portfolios. A functional allocation framework, where assets are aligned based on their functional role within a portfolio, represents a departure from the classic asset class allocation paradigm that has dominated the industry for decades. This paper seeks to describe what functional allocation frameworks are, why they may be useful, and what their major challenges tend to be.

https://meketa.com/leadership/functional-allocation-framework/



Technology, Media & Telecommunications

This paper examines the technology, media and telecommunications (TMT) sector, particularly whether it offers diversification benefits and greater alpha opportunities than other equity sectors. There is a high level of dispersion and a low level of correlation across the sector, giving investment managers a more robust opportunity set for generating alpha than exists in most other sectors. Active equity returns may be enhanced by finding skillful investment managers who invest in the TMT sector.

https://meketa.com/leadership/exploring-the-technology-media-and-telecommunications-sector/

Small and Middle Market Buyouts

Over the last 20 years, buyout managers targeting the lower end of the market – private companies with enterprise values of $500 million or less – have consistently outperformed public equities while performing in-line with other buyout strategies. This lower end of the buyout market has also historically generated a wider performance spread relative to that of other buyout strategies. The objective of this paper is to examine the sources of those returns and expectations for their persistence in the future.

https://meketa.com/leadership/small-and-middle-market-buyouts-2/

Capital Markets Expectations

We update our capital markets expectations each year in January. Changes are driven by many factors, including interest rates, credit spreads, cap rates, and equity prices. 2022 was a difficult year, with losses experienced for most asset classes, as interest rates increased, spreads widened, and most risk assets declined in value. However, there is a notable silver lining to this story – increased return assumptions.

https://meketa.com/leadership/2023-capital-markets-expectations/

Emerging Market Debt

In this document we provide a brief history of emerging market debt, types of emerging market debt within the investible universe, and some of the most widely used benchmarks. We examine the rationale behind investment in the asset class and potential risks associated with it. We also review historical performance, the implementation options available to institutional investors, and provide recommendations.

https://meketa.com/leadership/emerging-market-debt/

Understanding China Series Update | February 2023

This update is the first issue in our new Connectives series. Providing a timely update on US/China relations, it reminds us of the importance of context in looking at current events. See our "Understanding China" series of white papers for history and trends.

https://mcusercontent.com/65e055d92efdbd28568c748e1/files/ba18dd33-6480-5f14-2c34-984fcb0fad2b/MEKETA_Understanding_China_Series_Update.pdf

https://meketa.com/leadership/understanding-china-an-economic-and-investment-perspective-part-i/

https://meketa.com/leadership/understanding-china-an-economic-and-investment-perspective-part-ii/

https://meketa.com/leadership/understanding-china-an-economic-and-investment-perspective-part-iii/

https://meketa.com/leadership/understanding-china-webinar/

Four Themes We Are Watching in 2023

Meketa is focused on four interconnected themes for 2023 that we believe will shape the markets' performance as it recovers from the economic and inflationary shocks of the past two years in order to return to pre-pandemic trends. We anticipate that some of the key themes that drove markets in 2022, such as inflation, monetary policy, a strong US labor market, and China, will continue to have a meaningful role in 2023.

https://meketa.com/leadership/four-themes-for-2023/

Risk Mitigating Strategies

In this paper we use the title Risk Mitigating Strategies (RMS) to describe an investment framework that can be used to consider allocations to strategies that are expected to be diversifying and most notably complimentary to equity growth risk. An RMS allocation may seek to provide positive long-term returns while producing low to negative correlations to traditional sources of risk (interest rates, credit spreads, equities, etc.) on average. More specifically, an RMS allocation may seek to profit from turbulent markets or equity drawdowns by having low to negative conditional correlations to equities during these times.

https://meketa.com/leadership/risk-mitigating-strategies/

Core Real Estate

Real estate, which combines elements of stocks, bonds, and hard assets, is widely recognized as an institutional-class investment with distinct risk and return factors. As a result, real estate can help diversify an institutional portfolio. This paper provides a background and overview of core real estate, reviews the case for including it in a portfolio, and also discusses its characteristics.

https://meketa.com/leadership/core-real-estate/

GP Led Secondaries

GP-led Secondaries offer the option for Limited Partners to achieve full or partial liquidity on their fund interests, while a General Partner often gets the opportunity to secure additional time and capital to maximize the value of a fund's remaining asset(s). In recent years, as the secondaries market flourished, such transactions have become increasingly common in the private equity industry.

https://meketa.com/leadership/gp-led-secondaries/

Global Wages Rise and May Keep Inflation Higher for Longer

The 2nd issue in our Connectives series discusses the increase in employee wages and educational programs, certificates, and benefits from employers around the world to attract employees. It combines our 4 Themes newsletter, Stagflation white paper, and our 2023 Capital Market Expectations piece.

https://mcusercontent.com/65e055d92efdbd28568c748e1/files/72e9cb4d-8b79-f2a4-d55e-e20d9090d786/MEKETA_Global_Wages_3.21.2023.pdf

https://meketa.com/leadership/four-themes-for-2023/

https://meketa.com/leadership/stagflation/

https://meketa.com/leadership/2023-capital-markets-expectations/

Economic and Market Update

Data as of March 31, 2023

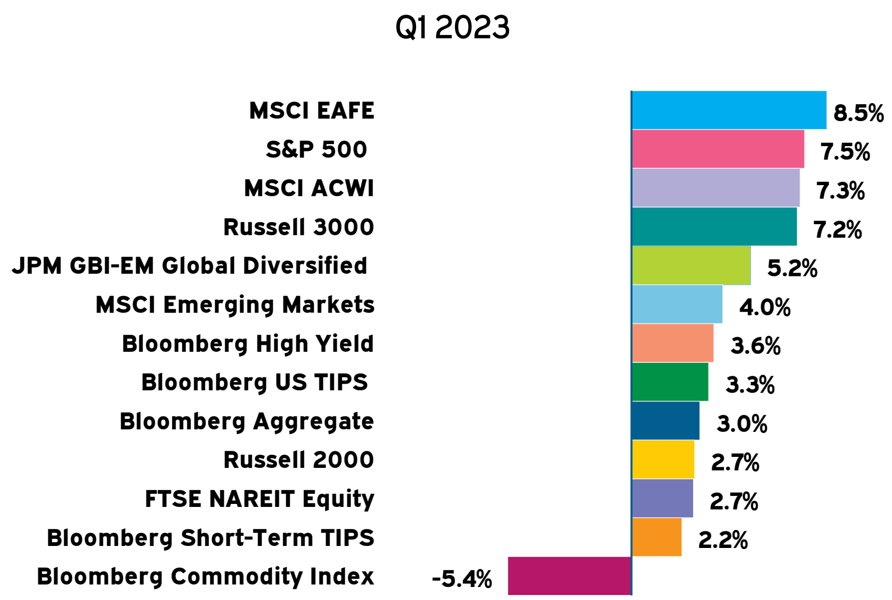
Commentary

→ It was a volatile quarter for most asset classes driven by evolving monetary policy expectations and high-profile bank failures. Ultimately, investors remained focused on slowing inflation and potentially peaking rate hikes leading to positive results across most asset classes for the quarter.

- The Fed's, and others', quick responses to pressures in the banking sector brought confidence back to the markets in March with the crisis driving the terminal policy rate expectations lower.
- US equity markets (Russell 3000) rallied in March (+2.7%) finishing the first quarter in strongly positive territory (+7.2%). Growth significantly outperformed value for the quarter, driven by the technology sector.
- Non-US developed equity markets (MSCI EAFE +2.5%) also posted positive returns in March. They returned 8.5% for the quarter, finishing ahead of US equities.
- Emerging market equities had positive returns for the month (+3.0%) supported by Chinese equities (+4.5%) and a weaker US dollar. They trailed developed market equities for the quarter partly due to higher US-China tensions.
- On expectations for lower inflation and concerns over the banking sector, bonds rallied in March, with the broad US bond market (Bloomberg Aggregate) rising 2.5%. For the quarter, the broad US bond market was up 3.0%.

→ This year, the path of inflation and monetary policy, slowing global growth, and the war in Ukraine, as well as recent pressures in small- and medium-sized regional banks in the US, will all be key.

Index Returns[1]



→ Despite volatility during the quarter, public markets, except commodities, finished the first quarter of 2023 in positive territory adding to the strong gains from the fourth quarter of last year.

[1] Source: Bloomberg and FactSet. Data is as of March 31, 2023.

Domestic Equity Returns[1]

Domestic Equity	March (%)	Q1 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
S&P 500	3.7	7.5	-7.7	18.6	11.2	12.2
Russell 3000	2.7	7.2	-8.6	18.5	10.4	11.7
Russell 1000	3.2	7.5	-8.4	18.6	10.9	12.0
Russell 1000 Growth	6.8	14.4	-10.9	18.6	13.6	14.6
Russell 1000 Value	-0.5	1.0	-5.9	17.9	7.5	9.1
Russell MidCap	-1.5	4.1	-8.8	19.2	8.0	10.0
Russell MidCap Growth	1.4	9.1	-8.5	15.2	9.1	11.2
Russell MidCap Value	-3.1	1.3	-9.2	20.7	6.5	8.8
Russell 2000	-4.8	2.7	-11.6	17.5	4.7	8.0
Russell 2000 Growth	-2.5	6.1	-10.6	13.4	4.3	8.5
Russell 2000 Value	-7.2	-0.7	-13.0	21.0	4.5	7.2

US Equities: Russell 3000 Index rose 2.7% in March and 7.2% in Q1.

→ US stocks rose in aggregate for the month and quarter as investors were optimistic that the Federal Reserve may end its policy tightening earlier than expected. However, turmoil in the regional banking industry weighed on segments of the market.

→ The small cap and value indices were more exposed to the banking turmoil and underperformed their broad market indices by significant margins.

→ Large cap stocks were driven higher by the continued strength of the technology and communication services sectors. This same dynamic contributed to the continued outperformance of growth stocks against their value counterparts across the capitalization spectrum.

[1] Source: Bloomberg. Data is as of March 31, 2023.

Foreign Equity Returns[1]

Foreign Equity	March (%)	Q1 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
MSCI ACWI ex. US	2.4	6.9	-5.1	11.8	2.5	4.2
MSCI EAFE	2.5	8.5	-1.4	13.0	3.6	5.0
MSCI EAFE (Local Currency)	0.5	7.5	3.8	14.6	6.3	7.3
MSCI EAFE Small Cap	-0.2	4.9	-9.8	12.1	0.9	5.8
MSCI Emerging Markets	3.0	4.0	-10.7	7.8	-0.9	2.0
MSCI Emerging Markets (Local Currency)	2.2	3.8	-6.6	8.8	1.9	5.0
MSCI China	4.5	4.7	-4.7	-2.6	-4.0	3.4

Foreign Equity: Developed international equities (MSCI EAFE) rose 2.5% in March and 8.5% for the quarter. Emerging market equities (MSCI EM) rose 3.0%. for the month and 4.0% in the first quarter.

- → Non-US equities also recovered in March with developed markets (MSCI EAFE) outpacing US equities (8.5% versus 7.2%) for the quarter and emerging markets (MSCI Emerging Markets) trailing (4.0% versus 7.2%).
- → Developed market equities also benefited from expectations that monetary policy may be peaking on declining inflation. The continued weakness in the US dollar also added to the quarterly results (+1%) for US investors.
- → Emerging market equities started the year with optimism over the reopening of China's economy, but the escalation of US-China tensions and the broader banking crisis led to weaker relative results compared to developed markets.

[1] Source: Bloomberg. Data is as of March 31, 2023.

Fixed Income Returns[1]

Fixed Income	March (%)	Q1 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)	Current Yield (%)	Duration (Years)
Bloomberg Barclays Universal	2.3	2.9	-4.6	-2.0	1.0	1.6	4.8	6.3
Bloomberg Barclays Aggregate	2.5	3.0	-4.8	-2.8	0.9	1.4	4.4	6.5
Bloomberg Barclays US TIPS	2.9	3.3	-6.1	1.8	2.9	1.5	4.1	7.0
Bloomberg Short-term TIPS	1.9	2.2	-0.3	3.5	3.0	1.5	4.6	2.5
Bloomberg Barclays High Yield	1.1	3.6	-3.3	5.9	3.2	4.1	8.5	4.2
JPM GBI-EM Global Diversified (USD)	4.1	5.2	-0.7	0.9	-2.4	-1.5	7.1	5.1

Fixed Income: The Bloomberg Universal rose 2.3% in March and 2.9% in Q1 as global sovereign debt yields fell on monetary policy expectations.

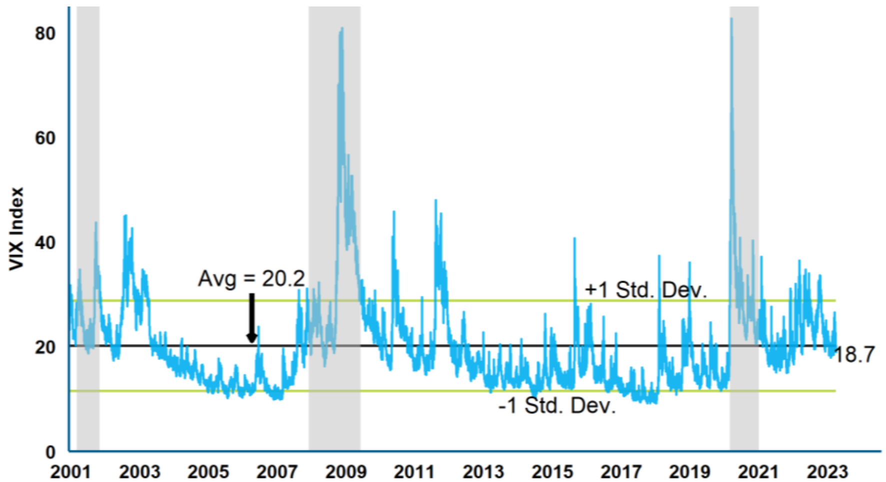
→ Anecdotal reports suggest bouts of flight-to-quality flows during the peak of interest rate volatility connected to the banking sector pushed sovereign debt yields lower. These concerns largely outweighed continued inflation concerns and caused investors to adjust their policy expectations.

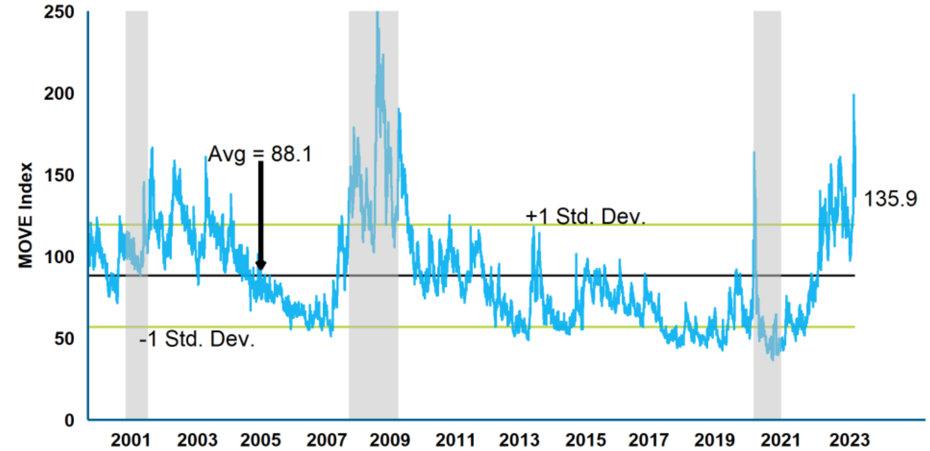
→ The broad TIPS index outperformed the broad US bond market (Bloomberg Aggregate) in March and for the quarter.

→ High yield bonds had the weakest results in March driven by banking sector weakness but outperformed the broad US bond market for the quarter.

[1] Source: Bloomberg. JPM GBI-EM data is from InvestorForce. Data is as of March 31, 2023. The yield and duration data from Bloomberg is defined as the index's yield to worst and modified duration respectively.

Equity and Fixed Income Volatility[1]



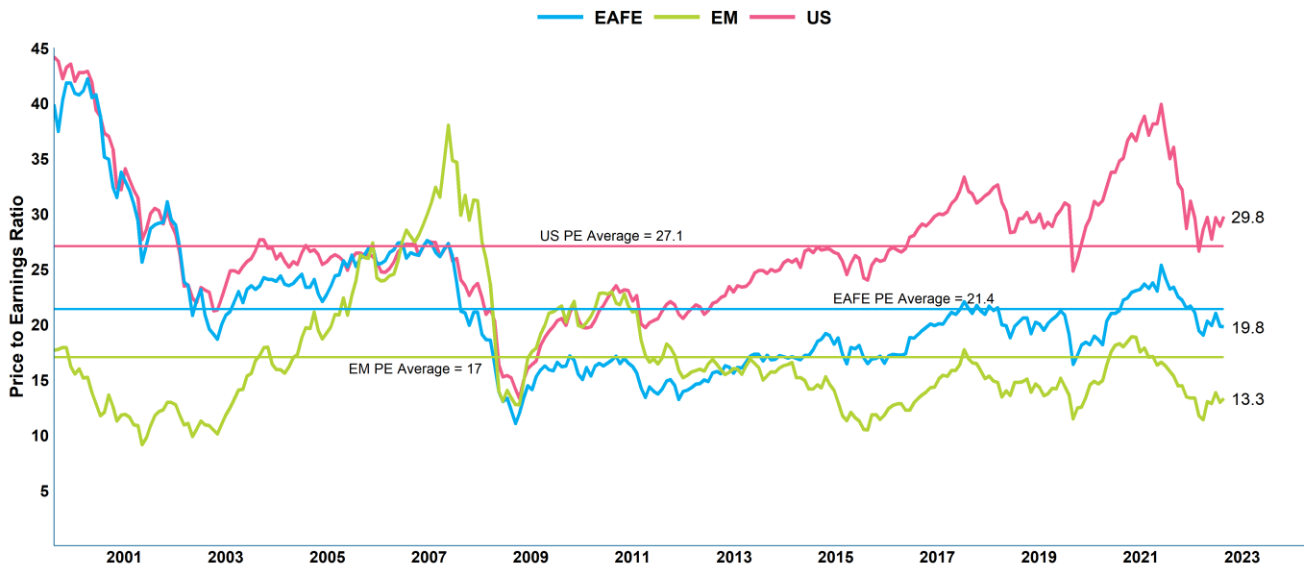


→ Volatility in equities (VIX) remained subdued through the end of March as investors continued to anticipate the end of the Fed's policy tightening.

→ In comparison, the bond market remains on edge with the more policy sensitive MOVE (fixed income volatility) remaining well above its long-run average. During the quarter it hit the highest level since the Global Financial Crisis as the banking sector issues created uncertainty over how the Fed would balance fighting inflation and maintaining financial stability.

[1] Equity and Fixed Income Volatility – Source: Bloomberg. Implied volatility as measured using VIX Index for equity markets and the MOVE Index to measure interest rate volatility for fixed income markets. Data is as of March 2023. The average line indicated is the average of the VIX and MOVE values between January 2000 and March 2023.

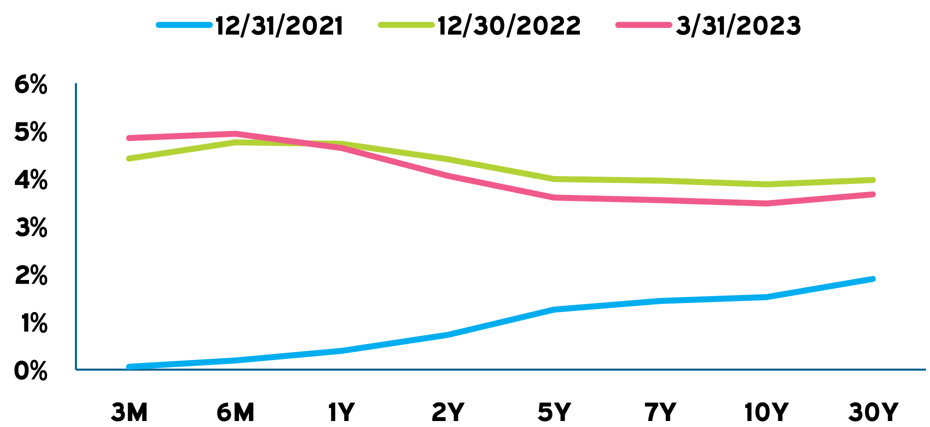
Equity Cyclically Adjusted P/E Ratios[1]



- → After its dramatic decline last year the US equity price-to-earnings ratio remains above its long-run (21st century) average.
- → International developed market valuations are slightly below their own long-term average, with those for emerging markets the lowest and well under the long-term average.

[1] US Equity Cyclically Adjusted P/E on S&P 500 Index. Source: Robert Shiller, Yale University, and Meketa Investment Group. Developed and Emerging Market Equity (MSCI EAFE and EM Index) Cyclically Adjusted P/E – Source: MSCI and Bloomberg. Earnings figures represent the average of monthly "as reported" earnings over the previous ten years. Data is as of March 2023. The average line is the long-term average of the US, EM, and EAFE PE values from December 1999 to the recent month-end respectively.

US Yield Curve[1]



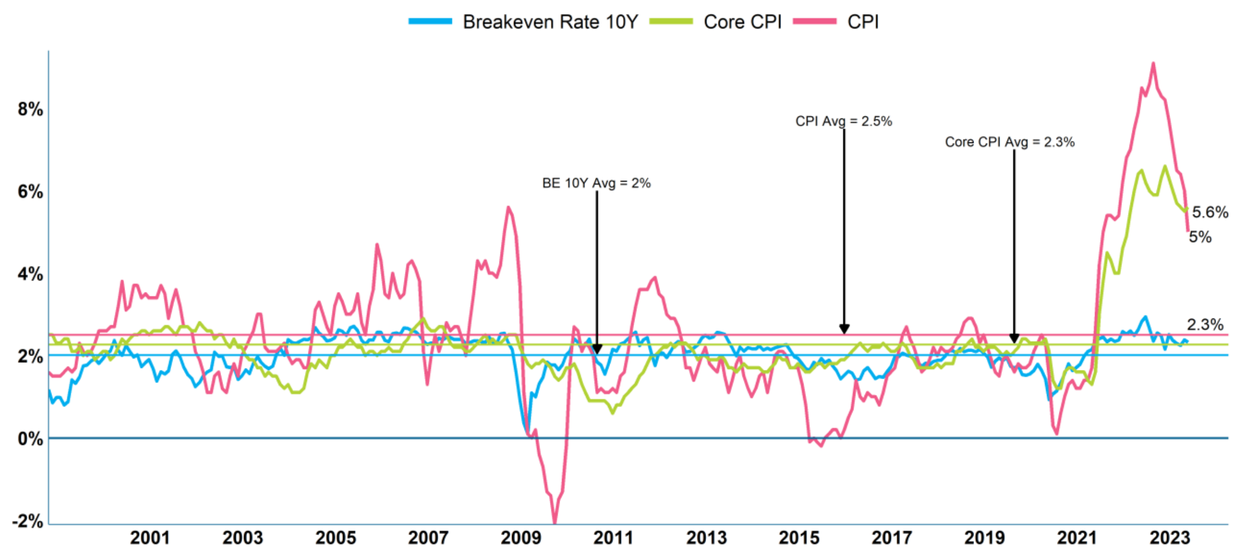
→ It was a volatile quarter for interest rates, particularly shorter-dated maturities. Except for the shortest maturities, rates largely declined across the yield curve in the first quarter on expectations of peaking policy.

→ After hitting -1.07% in early March, the yield spread between two-year and ten-year Treasuries finished the quarter at -0.55% as policy-sensitive rates at the front-end of the curve declined faster than longer maturities. The more closely watched measure by the Fed of three-month and ten-year Treasuries also remained inverted. Inversions in the yield curve have often preceded recessions.

→ The Fed remained committed to fighting inflation, despite pressures in the banking sector, raising rates another 25 basis points to a range of 4.75% to 5.0% at its March meeting.

[1] Source: Bloomberg. Data is as of March 31, 2023.

Ten-Year Breakeven Inflation and CPI[1]



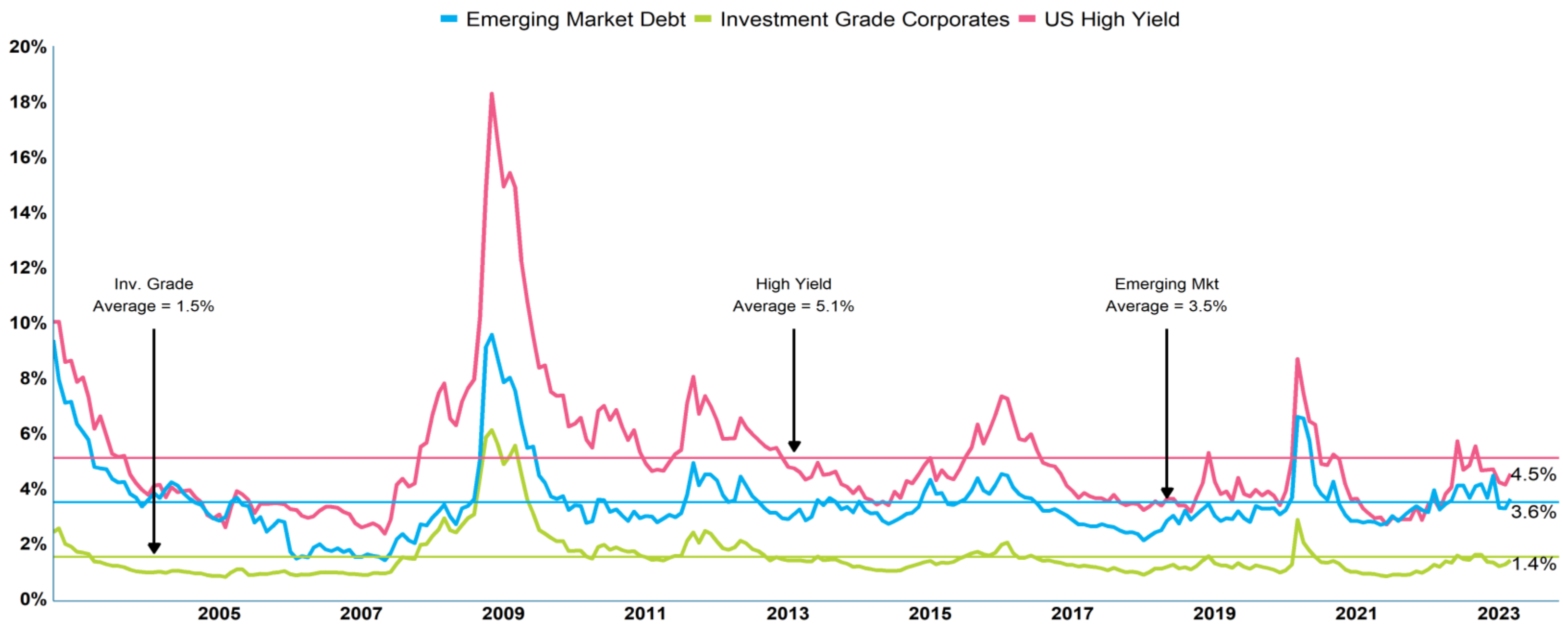
→ Inflation continued to decline in March with the year-over-year reading falling from 6.0% to 5.0% and coming in slightly below the 5.1% expectations. The rate of price increases also slowed on a month-over-month basis (0.1% versus 0.4%), with food prices only slightly higher and energy prices declining.

→ Core inflation – excluding food and energy - rose (5.6% versus 5.5%) mostly driven by transportation and housing.

→ Inflation expectations (breakevens) were volatile over the month and declined on net, but nonetheless ended the month at 2.3% (roughly where it started the quarter).

[1] Source: Bloomberg. Data is as of March 31, 2023. The CPI and 10 Year Breakeven average lines denote the average values from August 1998 to the present month-end, respectively. Breakeven values represent month-end values for comparative purposes.

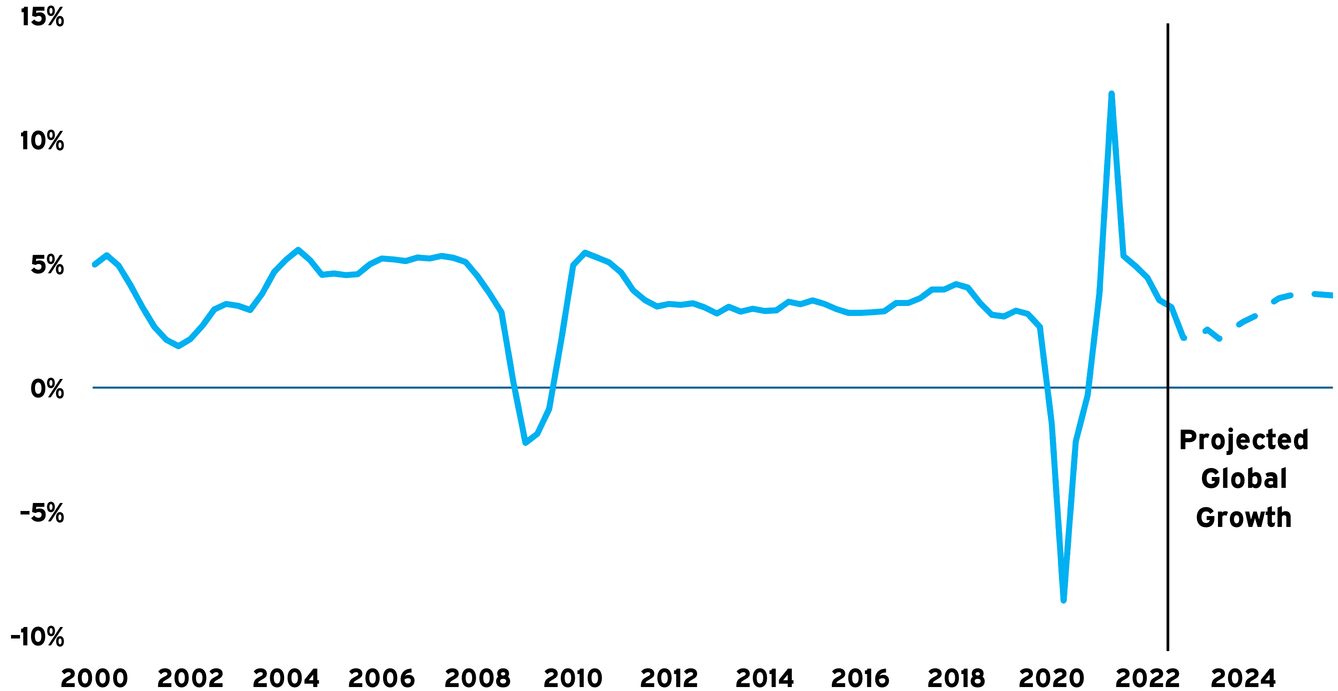
Credit Spreads vs. US Treasury Bonds[1]



- → Spreads (the added yield above a comparable maturity Treasury) experienced a significant spike in March during the banking crisis but subsequently declined as the Fed and others stepped in to provide support.
- → High yield spreads rose from 4.1% to a peak of 5.2% in March before finishing the quarter at 4.5% (lower than the start of the quarter by 0.2%). Investment grade spreads also spiked in March (1.2% to 1.6%) but also fell from their peak to 1.4%. Emerging market spreads finished the quarter at 3.6% experiencing the largest decline (-0.9%).

[1] Sources: Bloomberg. Data is as of March 31, 2023. Average lines denote the average of the investment grade, high yield, and emerging market spread values from August 2000 to the recent month-end, respectively.

Global Real Gross Domestic Product (GDP) Growth[1]



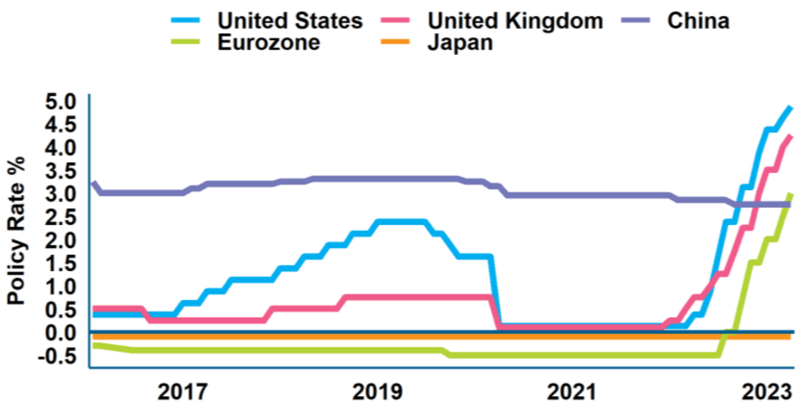
→ Global economies are expected to slow in 2023 compared to 2022, with risks of recession increasing given persistently high inflation and related tighter monetary policy.

→ The delicate balancing act of central banks trying to reduce inflation without dramatically impacting growth will remain key.

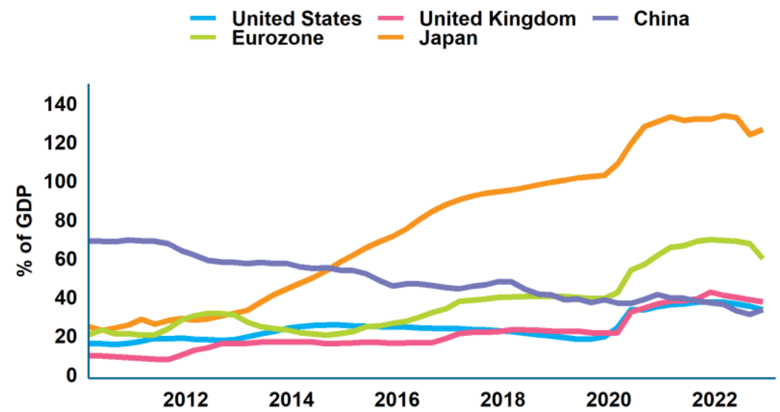
[1] Source: Oxford Economics (World GDP, US$ prices & PPP exchange rate, real, % change YoY). Updated March 2023.

Central Bank Response[1]

Policy Rates



Balance Sheet as % of GDP



→ In 2022, many central banks aggressively reduced pandemic-era policy support in the face of high inflation with the US taking the most aggressive approach. Slowing inflation and recent signs of instability in the banking sector have led to expectations for the slowing of policy tightening going forward.

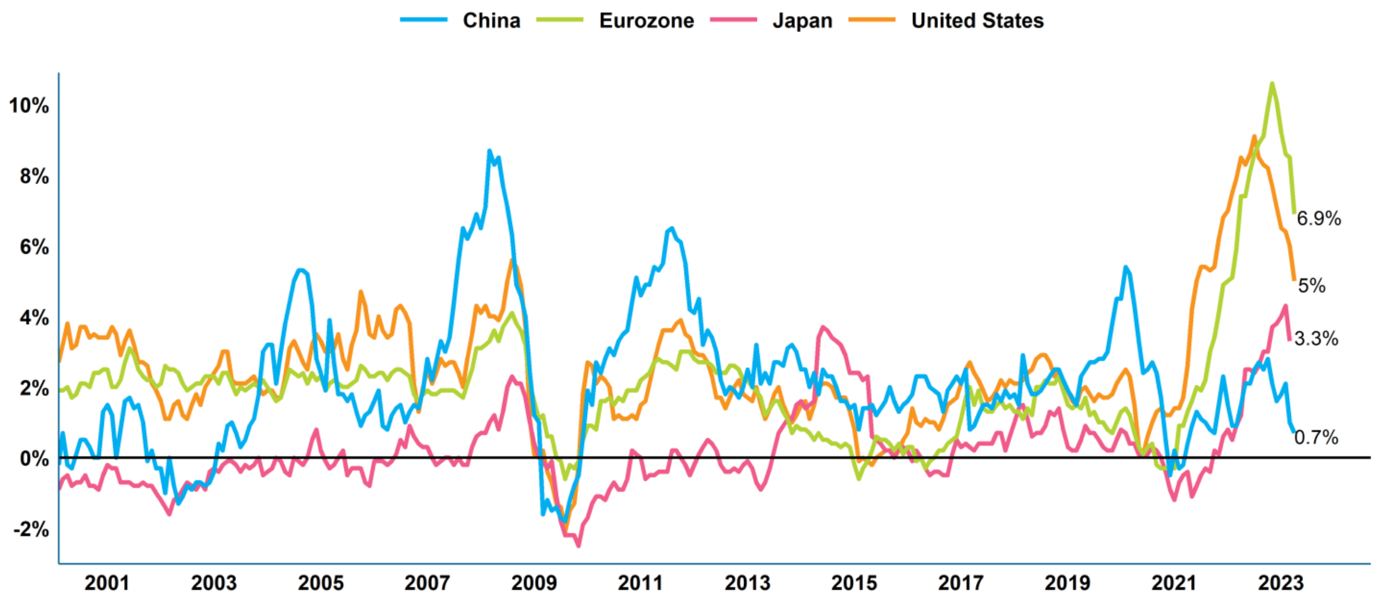
→ In March, the Fed, FDIC, and Treasury provided deposit guarantees after high profile bank failures revealed bank capital losses on US Treasurys related to higher interest rates and lax risk management.

→ China's central bank is one notable exception. They are expected to maintain an accommodative monetary stance to support the economy. They cut bank reserves requirements to improve bank liquidity and banks have also securitized over $390 billion in non-performing loans to improve loan quality ratios.

→ Looking ahead the risk remains for a policy error as central banks attempt to balance bringing down inflation, maintaining financial stability, and growth.

[1] Source: Bloomberg. Policy rate data is as of March 31, 2023. China policy rate is defined as the medium-term lending facility 1 year interest rate. Balance sheet as % of GDP is based on quarterly data and is as of December 31, 2022.

Inflation (CPI Trailing Twelve Months)[1]



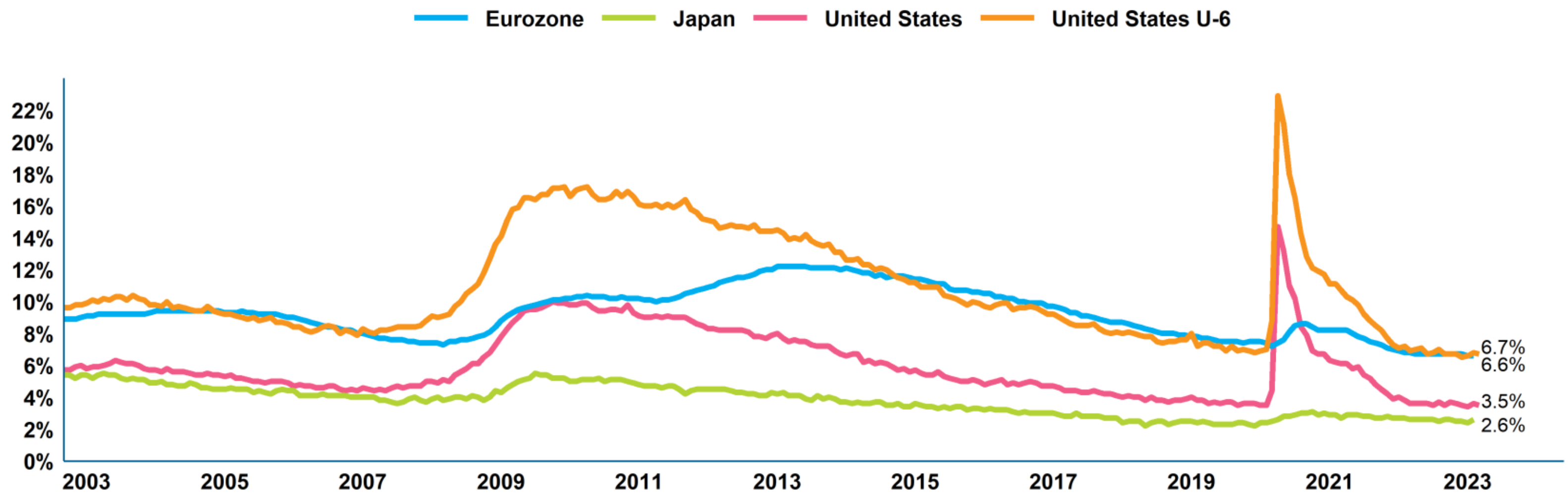
→ Inflation increased dramatically from the lows of the pandemic, particularly in the US and Eurozone where it reached levels not seen in many decades.

→ Inflation pressures are slowly declining in the US as supply issues ease, but they remain elevated, while in Europe they have also started to fall as energy prices have eased.

→ Lingering supply issues related to the pandemic, record monetary and fiscal stimulus, strict COVID-19 restrictions in China, and higher commodity prices driven by the war in Ukraine have been key global drivers of inflation.

[1] Source: Bloomberg. Data is as March 31, 2023. The most recent Japanese inflation data is as of February 2023.

Unemployment[1]



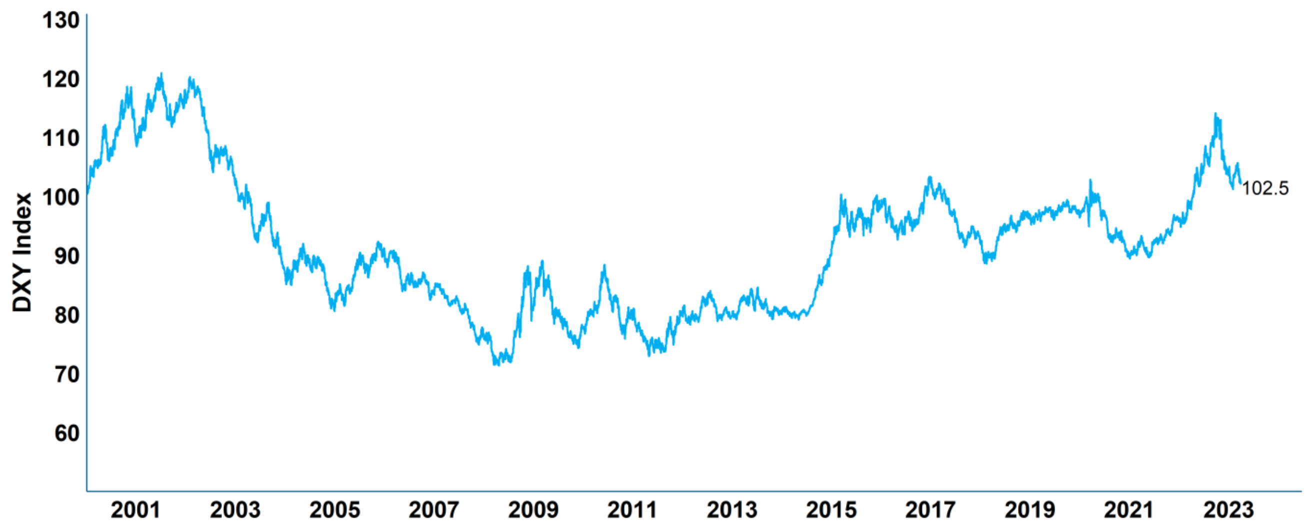
→ Labor markets have significantly improved from the pandemic as economies have largely reopened.

→ Despite slowing growth and high inflation, the US labor market remains a particular bright spot. Unemployment in the US, which experienced the steepest rise, recently has returned to pre-pandemic levels. Broader measures of unemployment (U-6) remain higher at 6.7% but have also declined dramatically from their peak.

→ The strong labor market and higher wages, although beneficial for workers, motivates the Fed's efforts to fight inflation, likely leading to higher unemployment.

[1] Source: Bloomberg. Data is as March 31, 2023, for the US. The most recent data for Eurozone and Japanese unemployment is as of February 2023.

US Dollar versus Broad Currencies[1]



→ The dollar finished 2022 much higher than it started, due to the increased pace of policy tightening, stronger relative growth, and safe-haven flows. Late last year and into early this year, the dollar experienced some weakness though as investors anticipated the end of Fed tightening.

→ Overall, the US dollar depreciated in March and finished the quarter slightly lower than where it started as weaker economic data and bank turmoil drove interest rates lower in the US.

→ This year, the track of inflation across economies and the corresponding monetary policies will likely be key drivers of currency moves.

[1] Source: Bloomberg. Data as of March 31, 2023.

Summary

Key Trends:

→ The impacts of record high inflation will remain key, with market volatility likely to stay high.

→ Recent issues related to the banking sector have created a delicate balance for central banks to continue to fight inflation but also try to maintain financial stability.

→ Global monetary policies could diverge in 2023 with the Fed pausing and others continuing to tighten. The risk of policy errors remains elevated given persistent inflation pressures and a strong US labor market.

→ Growth is expected to slow globally this year, with many economies forecast to tip into recession. Inflation, monetary policy, and the war will all be key.

→ In the US, the end of many fiscal programs is expected to put the burden of continued growth on consumers. Costs for shelter, medical care, and education could continue to rise, keeping 'sticky price' inflation at elevated levels.

→ The key for US equities going forward will be whether earnings can remain resilient if growth continues to slow.

→ Outside the US, equity valuations remain lower in both emerging and developed markets, but risks remain, including potential continued strength in the US dollar, higher inflation particularly weighing on Europe, and China's rushed exit from COVID-19 restrictions and on-going weakness in the real estate sector.

Appendices

Corporate Update

7
Offices

245+
Employees

240+
Clients

1.7T
Assets Under Advisement

150B
Assets in Alternative Investments

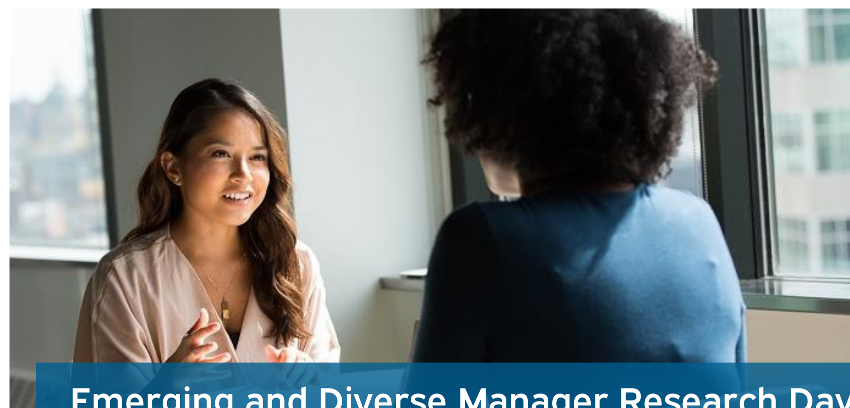
99%
Client Retention Rate

4:1
Client | Consultant Ratio

Meketa Investment Group is proud to work for over 5 million American families everyday!

Upcoming Events

Q2 Investment Perspectives Webcast
July 2023



Emerging and Diverse Manager Research Day
October 2023

Client and employee counts as of March 31, 2023; assets as of December 31, 2022.
Client retention rate is one minus the number of clients lost divided by the number of clients at prior year-end.

Meketa in the News

fin|news

Nonprofit News Special Report:
2023 Alternative Investments Outlook
TRENDS 01.19.23 By JUSTIN SLAUGHTER

"A restrictive policy from the Fed always comes with the risk of a hard landing. In a recession, the highest risk markets such as venture may be most vulnerable," said **John Haggerty**, managing principal and director of private market investments at **Meketa Investment Group**.

In this environment, Meketa "advocates for identifying partners in venture that have shown skill protecting capital in market conditions and trusting them to navigate more challenging economic conditions," Haggerty said.

Meketa is also focused on building diversified infrastructure portfolios for clients, including high-growth asset like communications or logistics that will benefit from the 2021 Infrastructure Investment and Jobs Act, according to **Lisa Bacon**, managing principal, private markets consultant and infrastructure program lead at the consulting firm.

"The shear breadth and variety of sector and geographic exposures accessible via infrastructure also is a draw. The asset class's overall performance during COVID demonstrated these attributes, performance resiliency, and spotlighted important growth sectors e.g., communications, logistics," Bacon said.

Mary Bates, managing principal and private markets consultant at Meketa, found that "the benefits of private credit – attractive absolute and risk-adjusted returns, diversification and low volatility – were evident this year as private credit investors benefitted from the structural benefits of floating rate instruments and the ability to be liquidity providers to dislocated markets."

The increases in rates and a "frozen broadly syndicated [loan] market" provided new opportunities for return to investors, with some "top of the capital structure" private credit strategies now offering the "potential for returns historically associated with mezzanine risk" and other strategies even offering "returns previously offered by private equity," Bates added.

The unpredictability of hedge fund performance is not necessarily a reason to not include the strategies in a diversified portfolio as there are many strategies that can benefit from an inflationary environment, Meketa Senior V.P. and Research Consultant **Jason Josephiac** said.

"There are some strategies that may have a higher probability of positive outcomes when the market's expectations for inflation are materially different than realized inflation. The magnitude of this difference is what drives dispersion and the ability for some hedge fund strategies, and perhaps specific sub-strategies, to perform well in such an environment. The degree of protection from hedge funds depends on inflation surprises, inflation persistence relative to expectations and how quickly market participants are able to adjust to a different future macro environment," Josephiac said. Accordingly, the Westwood, Mass.-based consultant is recommending "multi-asset long volatility and trend following strategies as well as a disperse set of relative value/market neutral oriented strategies," he noted.

chief investment officer

These Days, Institutional Investors Eye China Warily US and Canadian allocators no longer pile into Chinese assets. By Larry Light | January 24, 2022

The Last Word

All right, is China a worthwhile destination for investments?

True, it remains an economic powerhouse. "The world still needs China's goods," says Alison Adams, executive vice president at Meketa Investment Group.

Yet those other worrisome factors intrude. Investors in its securities, she goes on, can be "optimistic over the short term, but there are questions over the long term."

The upshot is that many institutional investors are well aware of these realities as they plan for the future. They may not be bailing out, but the thrill is gone.

WSJ PRO PRIVATE EQUITY

By JENNIFER ROSSA | 01/11/23

"Both Covid-19 and the GFC were trying periods for companies of all types," said Steven Hartt, managing principal with Meketa Investment Group. "Those are different muscles than dealing with inflation. But at least being quick to respond, trying to make timely decisions and being able to make strategic shifts in a well-thought through and rapid fashion are exercises that a number of GPs have been through recently."

Celebrating this Quarter


Alison Adams, Phd


William Duryea


Colin Hill


Hayley Tran, CFA, CAIA

Meketa has expanded its employee ownership to include four new shareholders.

Principals Alison Adams, William Duryea, Colin Hill, and Hayley Tran have joined the firm's ownership group, bringing the total number of Meketa shareholders to 75.

"It is a pleasure to further expand our ownership team and to welcome these accomplished professionals as Meketa shareholders," said Stephen McCourt, Managing Principal and Co-Chief Executive Officer, Meketa. "Each has proven to be a valuable contributor, serving our clients with the integrity, excellence and personal attention that have been the hallmarks of Meketa for 45 years."

"Our sincere congratulations to Alison, Will, Colin and Hayley for their well-deserved appointment as shareholders," said Peter Woolley, Managing Principal and Co-Chief Executive Officer, Meketa. "As a 100 percent employee-owned firm, adding to our ownership group on an annual basis demonstrates our commitment to fully invest in our employees, recognize their contributions, and create a thriving workforce that provides the highest level of service to our clients."

Read the full article here:
https://meketa.com/news/meketa-investment-group-expands-employee-ownership-team/

MEKETA | 45
CELEBRATING A MILESTONE | YEARS

Meketa announces they are celebrating 45 years as an investment consulting firm.

Since its founding in Boston in 1978, Meketa has continually evolved to meet the ever-changing needs of the marketplace and its institutional investor clients. In most respects, from the size of its client roster, to the number of employees and employee shareholders, number of offices, and assets under advisement, Meketa has seen continuous and meaningful growth. Among the notable milestones was the firm's 2019 merger with Pension Consulting Alliance (PCA), which combined two of the industry's most experienced and highly-regarded investment consulting firms.

In founding Meketa 45 years ago, we sought to fill a clear market need for a consulting firm dedicated to providing a broad range of customized, strategic investment advisory services to institutional clients," said Jim Meketa, Managing Principal and Chairman, Meketa Investment Group. "Our considerable growth since then, in breadth and depth, is due in no small part to our dedicated staff and to remaining true to our client-first business model. I am immensely proud of our accomplishments and extend a sincere thank you to all those who helped us realize that success."

Read the full article here:
https://meketa.com/news/meketa-investment-group-marks-45th-year/

Thought Leadership

Watch our recent webinar on Risk Mitigating Strategies: Diversifiers

Risk Mitigating Strategies (RMS) is a strategic investment framework designed to provide investors diversification relative to the single largest risk factor in most portfolios: equity risk. Jason Josephiac, a member of Meketa's Marketable Alternatives research team, provides an overview of "Diversifiers", one of the three main building blocks of RMS. Diversifiers are meant to provide uncorrelated returns to stabilize 1st and 2nd responders (or lines of protection in an equity drawdown and/or market shocks across or within multiple asset classes). Given the headwinds facing investors in this current market environment, as well as the potential of future outcomes to be more variable, exposure to RMS may be an attractive allocation for investors' portfolios.

Watch the webinar here:

https://meketa.com/leadership/risk-mitigating-strategies-rms-diversifiers/

Read our 2023 Diversity, Equity, and Inclusion (DEI) Questionnaire Results Summary

In 2020 as a next step in our commitment to DEI, Meketa launched a formal initiative to gather data from public and private market asset management firms within our proprietary database, which focused on evaluating their efforts towards DEI within their own organizations. 2022 marked the third year in a row we have asked firms to complete our questionnaire to report on their work in this area. As the asset management industry continues its focus on improving DEI, we believe an increase in transparency and reporting, more clarity on DEI policies and internal initiatives, and a deeper understanding of employee conduct provide the industry with better information to monitor, improve, and create enduring changes.

Read the report here:

https://meketa.com/leadership/2023-diversity-equity-and-inclusion-annual-questionnaire-results-summary/

Read our 2023 Annual Newsletter Dedicated to Endowment and Foundation Investing

In this issue, we take a look at the challenges and opportunities presented during the course of 2022, share return data over the past year, examine the results of the NACUBO-TIAA Study of Endowments, dive into a few initiatives of Meketa and one of its clients, and highlight some of our recent research, including the latest iteration of our Annual E&F Survey.

Read the report here:

https://meketa.com/leadership/endowment-and-foundation-2022-annual-newsletter/

Disclaimer, Glossary, and Notes

WE HAVE PREPARED THIS REPORT (THIS “REPORT”) FOR THE SOLE BENEFIT OF THE INTENDED RECIPIENT (THE “RECIPIENT”).

SIGNIFICANT EVENTS MAY OCCUR (OR HAVE OCCURRED) AFTER THE DATE OF THIS REPORT AND THAT IT IS NOT OUR FUNCTION OR RESPONSIBILITY TO UPDATE THIS REPORT. ANY OPINIONS OR RECOMMENDATIONS PRESENTED HEREIN REPRESENT OUR GOOD FAITH VIEWS AS OF THE DATE OF THIS REPORT AND ARE SUBJECT TO CHANGE AT ANY TIME. ALL INVESTMENTS INVOLVE RISK. THERE CAN BE NO GUARANTEE THAT THE STRATEGIES, TACTICS, AND METHODS DISCUSSED HERE WILL BE SUCCESSFUL.

INFORMATION USED TO PREPARE THIS REPORT WAS OBTAINED FROM INVESTMENT MANAGERS, CUSTODIANS, AND OTHER EXTERNAL SOURCES. WHILE WE HAVE EXERCISED REASONABLE CARE IN PREPARING THIS REPORT, WE CANNOT GUARANTEE THE ACCURACY OF ALL SOURCE INFORMATION CONTAINED HEREIN.

CERTAIN INFORMATION CONTAINED IN THIS REPORT MAY CONSTITUTE “FORWARD - LOOKING STATEMENTS,” WHICH CAN BE IDENTIFIED BY THE USE OF TERMINOLOGY SUCH AS “MAY,” “WILL,” “SHOULD,” “EXPECT,” “AIM”, “ANTICIPATE,” “TARGET,” “PROJECT,” “ESTIMATE,” “INTEND,” “CONTINUE” OR “BELIEVE,” OR THE NEGATIVES THEREOF OR OTHER VARIATIONS THEREON OR COMPARABLE TERMINOLOGY. ANY FORWARD-LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION ARE BASED UPON CURRENT ASSUMPTIONS. CHANGES TO ANY ASSUMPTIONS MAY HAVE A MATERIAL IMPACT ON FORWARD - LOOKING STATEMENTS, FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS. ACTUAL RESULTS MAY THEREFORE BE MATERIALLY DIFFERENT FROM ANY FORECASTS, PROJECTIONS, VALUATIONS, OR RESULTS IN THIS PRESENTATION.

PERFORMANCE DATA CONTAINED HEREIN REPRESENT PAST PERFORMANCE. PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS.

Credit Risk: Refers to the risk that the issuer of a fixed income security may default (i.e., the issuer will be unable to make timely principal and/or interest payments on the security.)

Duration: Measure of the sensitivity of the price of a bond to a change in its yield to maturity. Duration summarizes, in a single number, the characteristics that cause bond prices to change in response to a change in interest rates. For example, the price of a bond with a duration of three years will rise by approximately 3% for each 1% decrease in its yield to maturity. Conversely, the price will decrease 3% for each 1% increase in the bond's yield. Price changes for two different bonds can be compared using duration. A bond with a duration of six years will exhibit twice the percentage price change of a bond with a three-year duration. The actual calculation of a bond's duration is somewhat complicated, but the idea behind the calculation is straightforward. The first step is to measure the time interval until receipt for each cash flow (coupon and principal payments) from a bond. The second step is to compute a weighted average of these time intervals. Each time interval is measured by the present value of that cash flow. This weighted average is the duration of the bond measured in years.

Information Ratio: This statistic is a measure of the consistency of a portfolio's performance relative to a benchmark. It is calculated by subtracting the benchmark return from the portfolio return (excess return), and dividing the resulting excess return by the standard deviation (volatility) of this excess return. A positive information ratio indicates outperformance versus the benchmark, and the higher the information ratio, the more consistent the outperformance.

Jensen's Alpha: A measure of the average return of a portfolio or investment in excess of what is predicted by its beta or "market" risk. Portfolio Return- [Risk Free Rate+Beta*(market return-Risk Free Rate)].

Market Capitalization: For a firm, market capitalization is the total market value of outstanding common stock. For a portfolio, market capitalization is the sum of the capitalization of each company weighted by the ratio of holdings in that company to total portfolio holdings; thus it is a weighted-average capitalization. Meketa Investment Group considers the largest 65% of the broad domestic equity market as large capitalization, the next 25% of the market as medium capitalization, and the smallest 10% of stocks as small capitalization.

Market Weighted: Stocks in many indices are weighted based on the total market capitalization of the issue. Thus, the individual returns of higher market-capitalization issues will more heavily influence an index's return than the returns of the smaller market-capitalization issues in the index.

Maturity: The date on which a loan, bond, mortgage, or other debt/security becomes due and is to be paid off.

Prepayment Risk: The risk that prepayments will increase (homeowners will prepay all or part of their mortgage) when mortgage interest rates decline; hence, investors' monies will be returned to them in a lower interest rate environment. Also, the risk that prepayments will slow down when mortgage interest rates rise; hence, investors will not have as much money as previously anticipated in a higher interest rate environment. A prepayment is any payment in excess of the scheduled mortgage payment.

Price-Book Value (P/B) Ratio: The current market price of a stock divided by its book value per share. Meketa Investment Group calculates P/B as the current price divided by Compustat's quarterly common equity. Common equity includes common stock, capital surplus, retained earnings, and treasury stock adjusted for both common and nonredeemable preferred stock. Similar to high P/E stocks, stocks with high P/B's tend to be riskier investments.

Price-Earnings (P/E) Ratio: A stock's market price divided by its current or estimated future earnings. Lower P/E ratios often characterize stocks in low growth or mature industries, stocks in groups that have fallen out of favor, or stocks of established blue chip companies with long records of stable earnings and regular dividends. Sometimes a company that has good fundamentals may be viewed unfavorably by the market if it is an industry that is temporarily out of favor. Or a business may have experienced financial problems causing investors to be skeptical about is future. Either of these situations would result in lower relative P/E ratios. Some stocks exhibit above-average sales and earnings growth or expectations for above average growth. Consequently, investors are willing to pay more for these companies' earnings, which results in elevated P/E ratios. In other words, investors will pay more for shares of companies whose profits, in their opinion, are expected to increase faster than average. Because future events are in no way assured, high P/E stocks tend to be riskier and more volatile investments. Meketa Investment Group calculates P/E as the current price divided by the I/B/E/S consensus of twelve-month forecast earnings per share.

Quality Rating: The rank assigned a security by such rating services as Fitch, Moody's, and Standard & Poor's. The rating may be determined by such factors as (1) the likelihood of fulfillment of dividend, income, and principal payment of obligations; (2) the nature and provisions of the issue; and (3) the security's relative position in the event of liquidation of the company. Bonds assigned the top four grades (AAA, AA, A, BBB) are considered investment grade because they are eligible bank investments as determined by the controller of the currency.

Sharpe Ratio: A commonly used measure of risk-adjusted return. It is calculated by subtracting the risk free return (usually three-month Treasury bill) from the portfolio return and dividing the resulting excess return by the portfolio's total risk level (standard deviation). The result is a measure of return per unit of total risk taken. The higher the Sharpe ratio, the better the fund's historical risk adjusted performance.

STIF Account: Short-term investment fund at a custodian bank that invests in cash-equivalent instruments. It is generally used to safely invest the excess cash held by portfolio managers.

Standard Deviation: A measure of the total risk of an asset or a portfolio. Standard deviation measures the dispersion of a set of numbers around a central point (e.g., the average return). If the standard deviation is small, the distribution is concentrated within a narrow range of values. For a normal distribution, about two thirds of the observations will fall within one standard deviation of the mean, and 95% of the observations will fall within two standard deviations of the mean.

Style: The description of the type of approach and strategy utilized by an investment manager to manage funds. For example, the style for equities is determined by portfolio characteristics such as price-to-book value, price-to-earnings ratio, and dividend yield. Equity styles include growth, value, and core.

Tracking Error: A divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark, as defined by the difference in standard deviation.

Yield to Maturity: The yield, or return, provided by a bond to its maturity date; determined by a mathematical process, usually requiring the use of a "basis book." For example, a 5% bond pays $5 a year interest on each $100 par value. To figure its current yield, divide $5 by $95—the market price of the bond—and you get 5.26%. Assume that the same bond is due to mature in five years. On the maturity date, the issuer is pledged to pay $100 for the bond that can be bought now for $95. In other words, the bond is selling at a discount of 5% below par value. To figure yield to maturity, a simple and approximate method is to divide 5% by the five years to maturity, which equals 1% pro rata yearly. Add that 1% to the 5.26% current yield, and the yield to maturity is roughly 6.26%.

$$\frac{5\%\ \text{(discount)}}{5\ \text{(yrs. to maturity)}} = \begin{array}{l}1\%\ \text{pro rata, plus}\\ 5.26\%\ \text{(current yield)}\end{array} = 6.26\%\ \text{(yield to maturity)}$$

Yield to Worst: The lowest potential yield that can be received on a bond without the issuer actually defaulting. The yield to worst is calculated by making worst-case scenario assumptions on the issue by calculating the returns that would be received if provisions, including prepayment, call, or sinking fund, are used by the issuer.

NCREIF Property Index (NPI): Measures unleveraged investment performance of a very large pool of individual commercial real estate properties acquired in the private market by tax-exempt institutional investors for investment purposes only. The NPI index is capitalization-weighted for a quarterly time series composite total rate of return.

NCREIF Fund Index - Open End Diversified Core Equity (NFI-ODCE): Measures the investment performance of 28 open-end commingled funds pursuing a core investment strategy that reflects funds' leverage and cash positions. The NFI-ODCE index is equal-weighted and is reported gross and net of fees for a quarterly time series composite total rate of return.

Sources: Investment Terminology, International Foundation of Employee Benefit Plans, 1999.
The Handbook of Fixed Income Securities, Fabozzi, Frank J., 1991

Throughout this report, numbers may not sum due to rounding.

Returns for periods greater than one year are annualized throughout this report.

Values shown are in millions of dollars, unless noted otherwise.