MARYLAND
STATE RETIREMENT
and PENSION SYSTEM

Maryland State Retirement and Pension System Overview MGFOA

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1/27/23

Agenda

- Plan stats/history
- Governance
- Asset Allocation with topics
- Performance
- Market outlook
- ESG and climate

History

12 Systems

- Teachers' Retirement System (1927)
- Employees' Retirement System (1941)
- State Police Retirement System (1949)
- Judges' Retirement System (1969)
- Legislative Pension Plan (1971)
- Correctional Officers' Retirement System (1975)
- Employees' Pension System (1980)
- Teachers' Pension System (1980)
- Law Enforcement Officers' Pension System (1990)

Status

MARYLAND STATE RETIREMENT *and* PENSION SYSTEM

Membership

- 244,753 participants: active and deferred vested (June 30, 2020)
- 167,644 pension annuitants (June 30, 2020)
- Nearly $4.2 billion in payments in FY 2020

Funding – State plan example

- Employees – 7%
- Sponsor
  - Normal cost – 5%
  - Unfunded Liability amortization – 14%
  - Total Percentage of payroll – 19%

- Investment Returns
  - Assume 6.8% over 20 years
  - 2.5% inflation
  - 3% payroll growth

Governance

- 15 MEMBER BOARD
  - 3 EX-OFFICIO, TREASURER, COMPTROLLER, DIRECTOR OF BUDGET
  - 5 ELECTED, TROOPER, RETIRED AND ACTIVE STATE EMPLOYEES AND TEACHERS
  - 7 APPOINTED BY GOVERNOR, 2 OF WHOM REPRESENT THE INTEREST OF PGU'S/COUNTY
  - SETS POLICY, REVIEWS AND APPROVES BUDGETS, PROVIDES OVERSIGHT
- EXECUTIVE DIRECTOR – OVERSIGHT AND MANAGEMENT OF PENSION SYSTEM
- CHIEF INVESTMENT OFFICER – OVERSIGHT AND IMPLEMENTATION OF INVESTMENT PROGRAM INCLUDING APPROVAL OF MANAGER SELECTION

Pension Math

- UNLIKE AN INDIVIDUAL, DB PLAN IS NOT TARGETING LONG TERM WEALTH CREATION BUT IN FUNDING A GROWING AND NOT FULLY FUNDED LIABILITY

- WHY IT MATTERS
  - PATH OF RETURNS IMPACTS OUTCOMES

Diversification Lowers Volatility: Good for Pensions

MEKETA

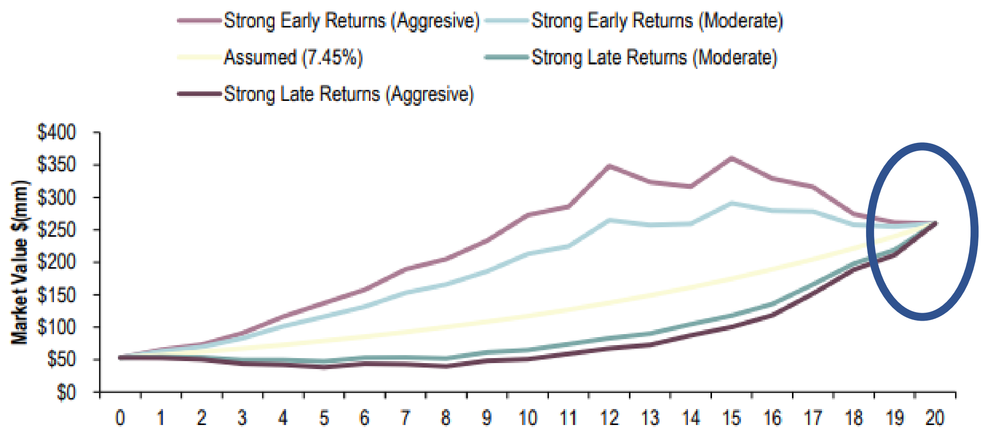
Maryland State Retirement and Pension System

Volatility Drag

MARYLAND STATE RETIREMENT and PENSION SYSTEM

Sequence of Returns – Does Not Matter with No Cash Flows.

- This analysis reviews three scenarios that achieve the same twenty-year annualized return of 7.45% but that take very different paths to arrive at this destination.
- The "Strong Early Returns" and "Strong Late Returns" scenarios produce the same returns but the order in which the returns are generated is reversed. The third scenario assumes 7.45% is earned every year.



- The market values all end up at the exact value at the end of twenty years if there are no cash flows into or out of the System.

Note: Assumes $0 cash flow over the 20-year period. Modeled for Maryland State Retirement and Pension System only. The path of returns is based on the System's expected volatility.

Diversification Lowers Volatility: Good for Pensions

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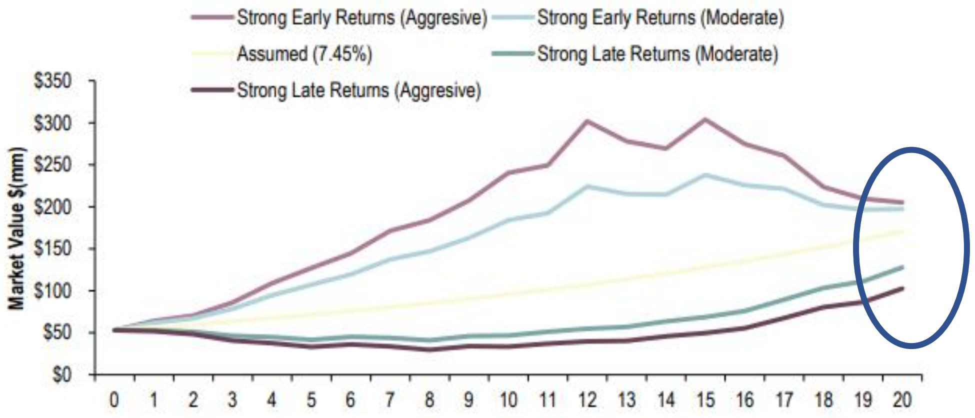
Maryland State Retirement and Pension System

Volatility Drag

Sequence of Returns - Significant Impact with Negative Cash Flows.

- Negative cash flows make it much harder for a System to recover after a market downturn.
  - The larger the cash outflows are, the more severe the impact.
  - The *greater the volatility*, the more severe the impact.



- Using the Systems' projected cash flows[1], the ending market value (year 20) would be $43 billion lower than what is projected based on the assumed rate if weaker returns are experienced in the first ten years.
- Greater volatility (the "aggressive" scenario) amplifies this difference by another $25 billion.

[1] Contributions and benefit payments were provided by the actuary, GRS.

Asset Allocation

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Asset Allocation

What is Asset Allocation?

- Asset allocation refers to the distribution of assets across a number of asset classes that exhibit different correlations with each other. Each asset class exhibits a unique combination of risk and reward. The expected and realized long-term returns vary by asset class, as does the interim volatility of those returns. Some asset classes, like equities, exhibit high degrees of volatility, but also offer high returns over time. Other asset classes, like cash, experience very little volatility, but offer limited return potential.

Why is Asset Allocation important?

- The distribution of assets across various asset classes exerts a major influence on the return behavior of the aggregate pool over short and long time periods.

How does Asset Allocation affect aggregate performance?

- In addition to exhibiting unique characteristics, each asset class interacts differently with other asset classes. Because of low correlations, the likelihood that any two asset classes will move together in the same direction is limited, with the movement of one asset class often offsetting another's. Combining asset classes allows investors to control more fully the aggregate risk and return of their portfolios, and to benefit from the reduction in volatility that stems from diversification.

Developing Investment Objectives

What is the Fund's long-term return objective?

- Meet or exceed the Policy Benchmark.
- Meet or exceed actuarial assumed rate of return of 6.8%.
- Maintain purchasing power, exceeding inflation by at least 3% in real terms.

What are the Fund's risk objectives?

- Achieve and maintain a fully funded pension plan.
- Minimize contribution volatility from year to year.

Developing Investment Constraints

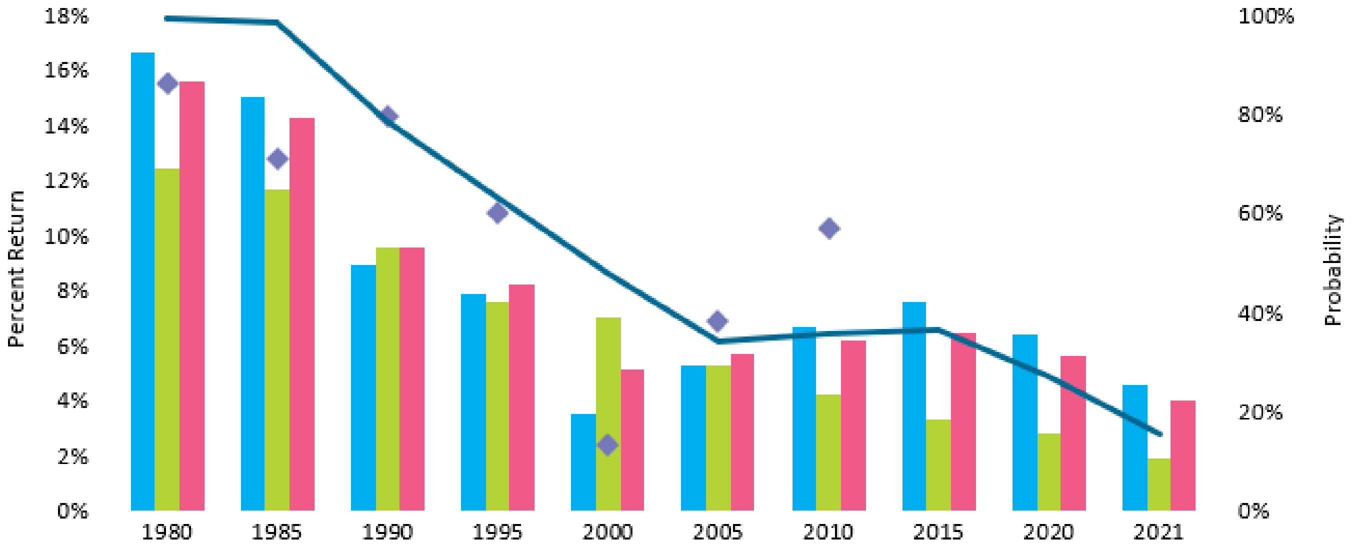
What is the overall time horizon for the Fund?

- On-going concern, with long-term time horizon for majority of assets.

What are the liquidity needs of the Fund?

- Net cash outflows of approximately $1.5 billion to $1.7 billion per year over the next five years.
- Net cash outflows are projected to range between 3% and 3.5% of System assets until it becomes fully funded (approximately in 2040).

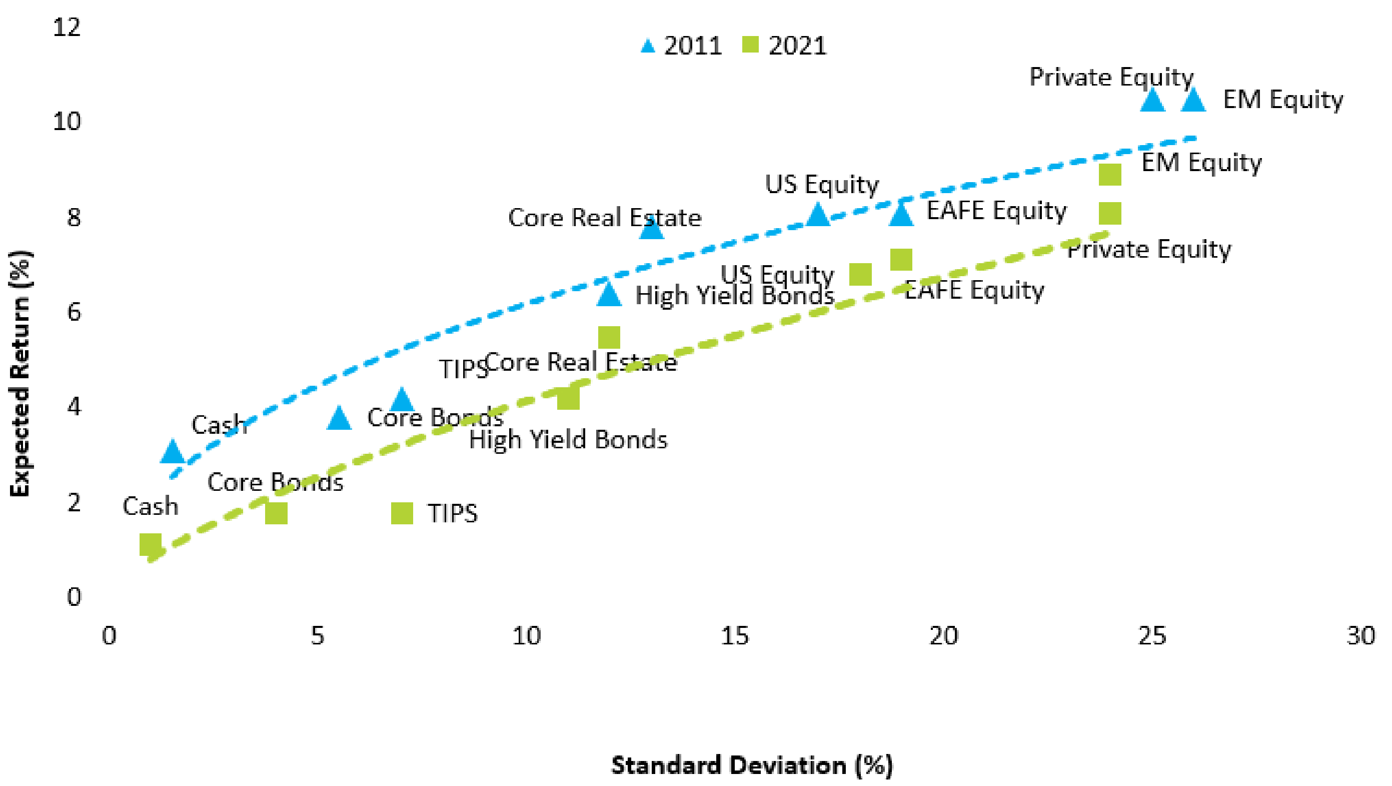
The Secular Decline in Investment Returns[1]



	1980	1985	1990	1995	2000	2005	2010	2015	2020	2021
Equity Expected Return	16.6%	15.0%	8.9%	7.9%	3.5%	5.3%	6.7%	7.6%	6.4%	4.6%
Bond Expected Return	12.4%	11.6%	9.6%	7.6%	7.0%	5.3%	4.2%	3.3%	2.9%	1.9%
65/35 Eq/Bond Exp. Ret.	15.6%	14.2%	9.5%	8.2%	5.1%	5.7%	6.2%	6.5%	5.6%	4.0%
Actual 10-year Return	15.5%	12.8%	14.3%	10.8%	2.4%	6.9%	10.3%			
Probability of Earning 7.0%	99%	98%	79%	63%	48%	34%	36%	36%	27%	16%

- The chart above illustrates that a portfolio comprising of 65% domestic stocks and 35% investment grade bonds has produced diminishing expected returns as well as actual returns over the past 30 years.

Investable Universe over Time: Less Return for the Same or More Risk[1]



- A positive relationship exists between long-term return expectations and the level of risk accepted.
- However, this relationship is not static.

[1] Expected return and standard deviation are based upon Meketa Investment Group's Annual Asset Study.

Asset Allocation Review September 2021

Asset Allocation Policy Options[1]

	Current Policy (%)	Recommended (%)	Liability Efficient (%)	Leverage (%)	Climate Sensitive (%)	Peer Average (%)
Growth/Equity	**50**	**50**	**46**	**48**	**46**	**55.5**
US Equity	16	15	15	15	12	26
Developed non-US Equity	10	9	8	9	9	12.5
Emerging Market Equity	11	10	9	9	8	6.5
Private Equity	13	16	14	15	17	10.5
Credit	**9**	**8**	**7**	**7**	**8**	**7.5**
High Yield, Bank Loans & EM Debt	5	4	3	3	8	4.5
Private Debt	4	4	4	4	0	3
Rate Sensitive	**19**	**21**	**18**	**23**	**18**	**17.5**
Cash & US Investment Grade Bonds	5	6	4	7	6	14
Long-term Government Bonds	10	10	10	10	8	2.5
TIPS	4	5	4	6	4	1
Real Assets	**14**	**15**	**21**	**20**	**20**	**14**
Real Estate	10	10	10	10	14	9
Natural Resources and Infrastructure	4	5	7	5	4	3
Commodities and Gold	0	0	4	5	0	1
Absolute Return	**8**	**6**	**8**	**8**	**8**	**5.5**
Expected Return (20 years)	*7.03*	*7.11*	*7.09*	*7.17*	*7.07*	*6.80*
Standard Deviation	*12.9*	*13.0*	*12.6*	*12.9*	*12.7*	*13.3*
Probability of 6.8% over 20 Years	*52.7*	*53.8*	*53.6*	*54.6*	*53.3*	*49.5*

Asset Allocation Review September 2021

MVO-Based Risk Analysis

Scenario	Current Policy (%)	Recommended (%)	Liability Efficient (%)	Leverage (%)	Climate Sensitive (%)	Peer Average (%)
Worst Case Returns[1]						
One Year	-18.9	-19.0	-18.3	-18.9	-18.6	-19.8
Three Years (annualized)	-8.8	-8.9	-8.4	-8.8	-8.6	-9.5
Five Years (annualized)	-5.5	-5.5	-5.1	-5.4	-5.3	-6.1
Ten Years (annualized)	-2.0	-2.0	-1.7	-1.9	-1.9	-2.5
Twenty Years (annualized)	0.6	0.6	0.8	0.7	0.7	0.1
Probability of Experiencing Negative Returns						
One Year	28.6	28.5	27.9	28.2	28.2	29.8
Three Years	16.3	16.2	15.5	15.9	15.9	17.9
Five Years	10.3	10.2	9.5	9.9	9.8	11.7
Ten Years	3.7	3.6	3.2	3.4	3.4	4.6
Twenty Years	0.6	0.5	0.4	0.5	0.5	0.9
Probability of Achieving at least a 6.8% Return						
Ten Years	51.9	52.7	52.6	53.2	52.3	49.6
Twenty Years	52.7	53.8	53.6	54.6	53.3	49.5

- The Current Policy is perhaps the most defensive portfolio from a volatility standpoint. However, it is the least likely of the options to reach the target return over the long term.

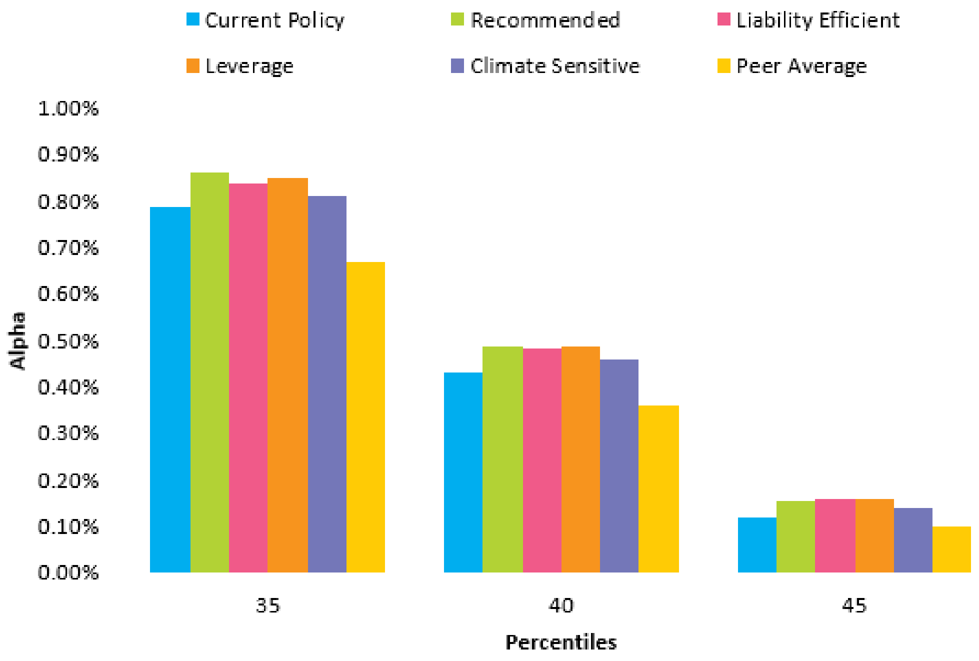
Asset Allocation Topics

- Active/Passive
  - System believes in active management in asset classes and sectors where it is likely to be successful.
    - Approximately 20% of assets are passively managed
- Private/Public
  - The System invests in private partnerships
    - Private equity
    - Private real estate
    - Private Credit
    - Private Infrastructure

Manager Alpha Potential

- The Recommended Portfolio has the greatest potential for value add (i.e., alpha) via active management
  - This is increasingly the case if the System is more successful at identifying alpha relative to its peers.

Expected Manager Alpha by Percentile



Active/Passive, Public/Private

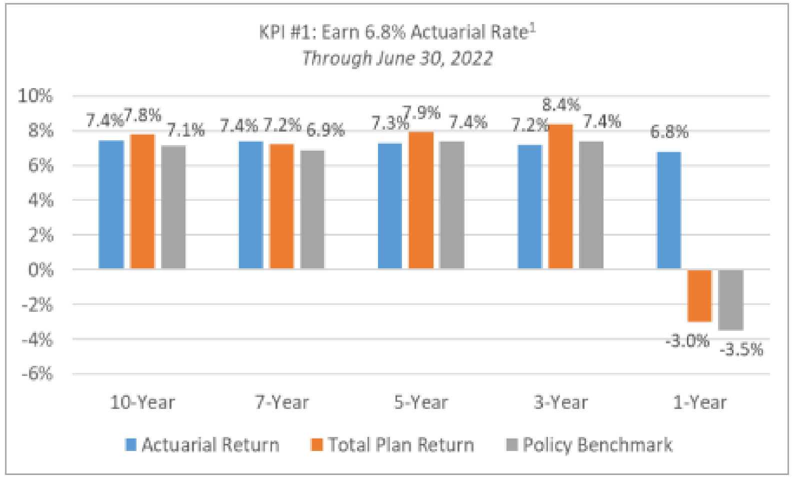
- Active Management has been additive for the System in public and private markets, increasing returns and lowering risk
- Private Market investments increase returns and lower risk through
  - Ability to impact the outcome
  - Broader set of investments than available in public markets – more diversification
  - Appraisal based pricing
- Costs of active and private investing are higher than passive but results are reported on a net of fee basis and maintain their attractive attributes.

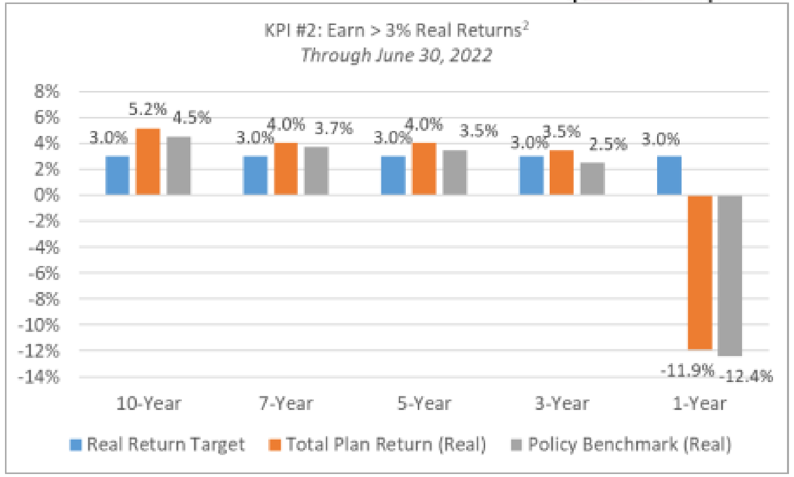
Performance

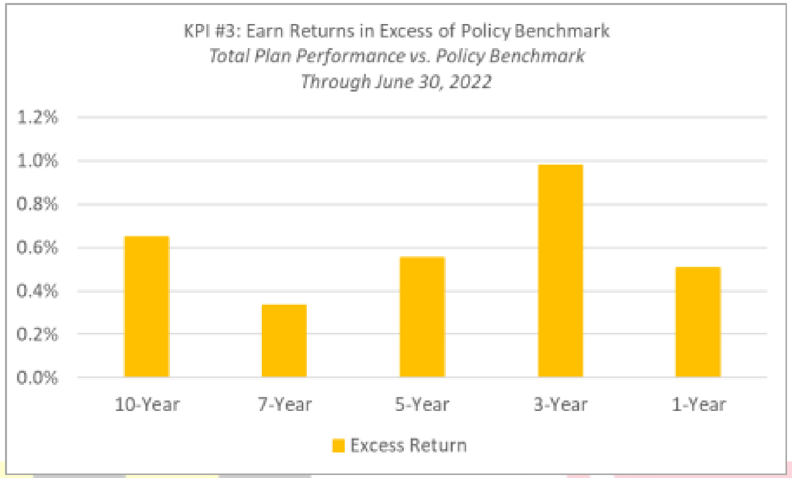
MARYLAND STATE RETIREMENT *and* PENSION SYSTEM

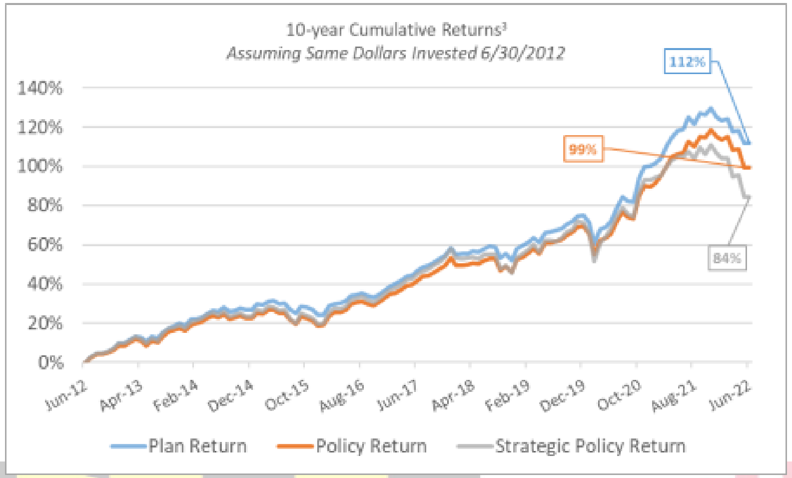
- The System evaluates performance along three dimensions
  - Performance vs. the actuarial rate over long time frames
  - Performance vs. the Policy Benchmark
  - Performance vs Peers

Key Performance Indicators – June 30, 2022



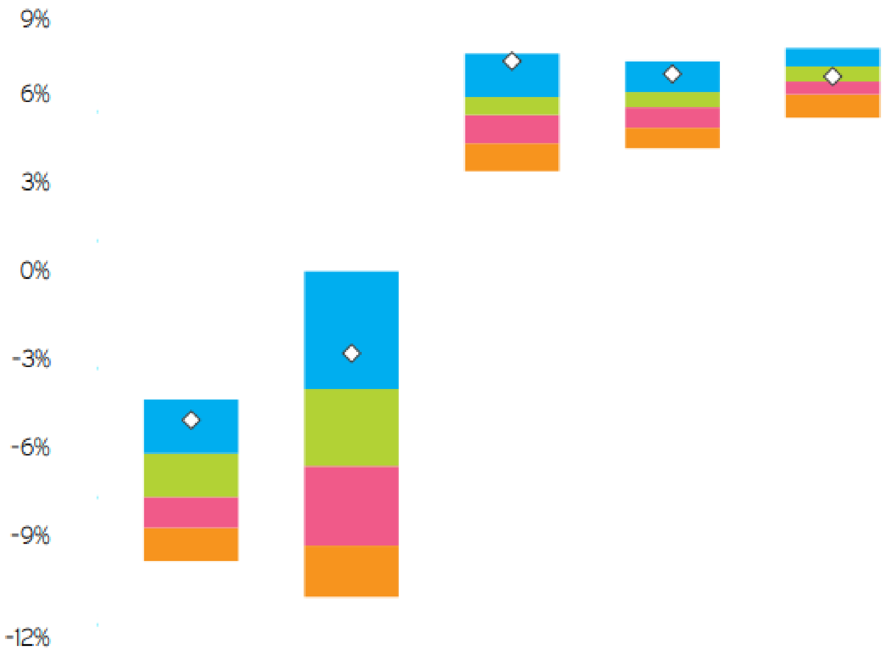






Notes: 1) The Actuarial Return is 6.8% for FY 2022; 2) Inflation as measured by BLS: all items in U.S. city average, all urban consumers, seasonally adjusted; 3) Assumes no distributions

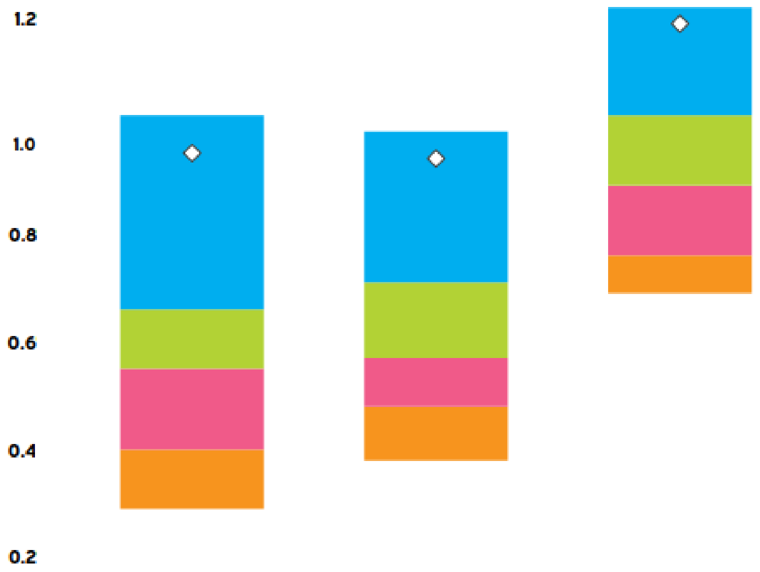
Total System vs. Public Plans >$1 Billion Universe[1]
As of June 30, 2022



	2Q22 (%)	1 YR (%)	3 YR (%)	5 YR (%)	10 YR (%)
Total System	**-5.6**	**-3.0**	**8.4**	**7.9**	**7.8**
25th Percentile	-6.9	-4.4	7.0	7.2	8.2
Median	-8.6	-7.4	6.3	6.6	7.6
75th Percentile	-9.8	-10.5	5.2	5.8	7.1
Rank (%)	*9*	*14*	*8*	*13*	*47*

[1] Represents a final cut of the InvMetrics Public DB >$1 bn peer group as of June 30, 2022. Total System performance is net of fees. Includes 64 plans.

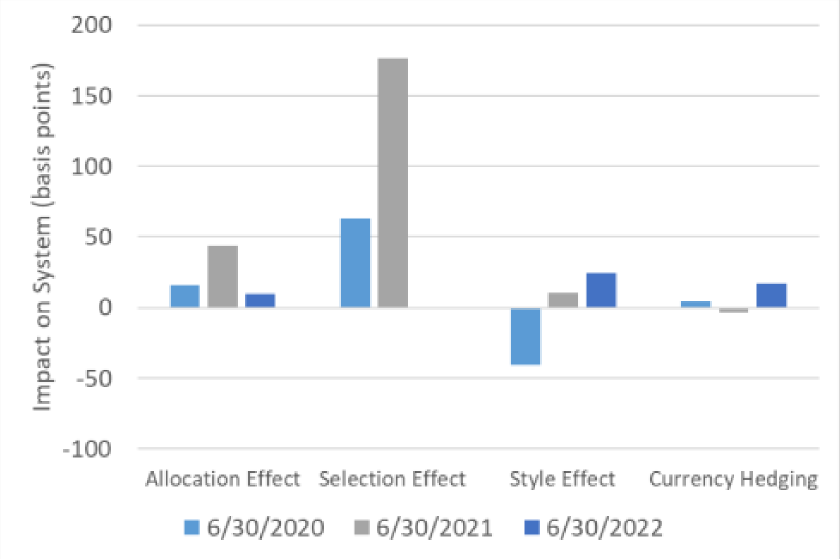
Total System vs. Public Plans >$1 Billion Universe Sharpe Ratio Comparison[1]
As of June 30, 2022

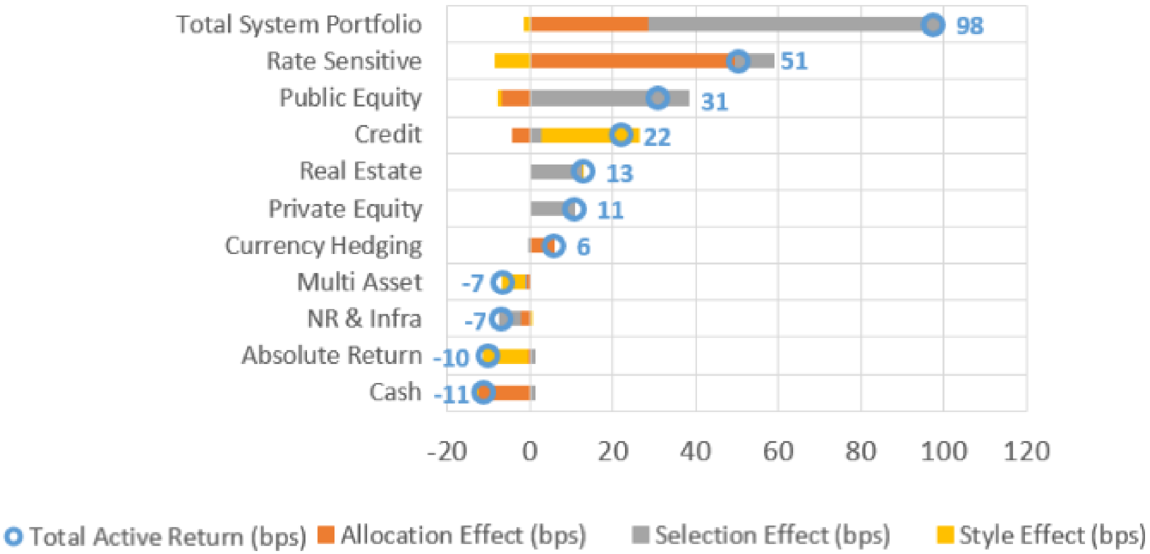


	3 YR	5 YR	10 YR
Total System	**1.0**	**0.9**	**1.2**
S&P 500	0.5	0.6	0.9
25th Percentile	0.6	0.7	1.0
Median	0.6	0.6	0.9
75th Percentile	0.4	0.5	0.8
Rank (%)	*7*	*7*	*6*

[1] Represents a final cut of Investor Force Public DB >$1 bn Net peer group as of June 30, 2022. Includes 64 plans. The risk free rate is the 91 day T-bill.

Portfolio Review – June 30, 2022
Performance Attribution – Last Three Years



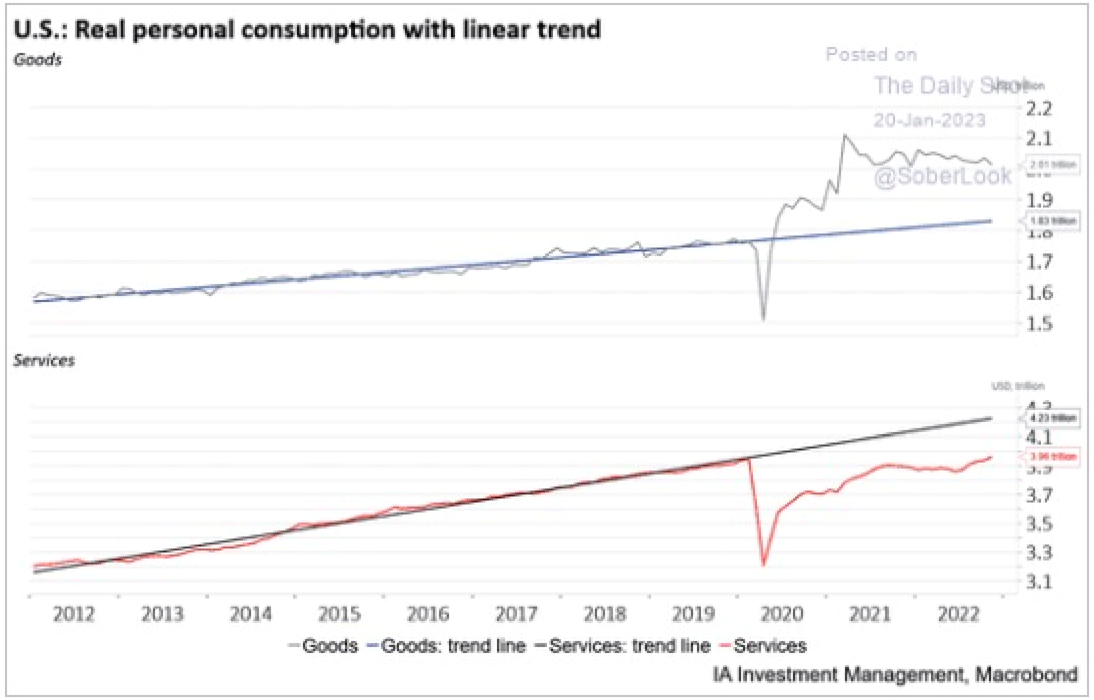


Total outperformance	≈	Allocation effect	+	Selection effect	+	Style effect
+98 bps*	≈	+28 bps	+	+71 bps	+	-2 bps
• The System has outperformed over the last three years		• Rate Sensitive (+50 bps) had the largest positive impact • Cash drag (-12 bps) and Public Equity (-7 bps) were the largest detractors		• Public Equity (+39 bps), Real Estate (+13 bps), Private Equity (+11 bps), and Rate Sensitive (+10 bps) were the largest sources of value add		• Private Credit (+24 bps) added value, but was offset by negative effects in Absolute Return (-11 bps), Rate Sensitive (-9 bps), and Multi Asset (-5 bps)

Source: *State Street, *The components may not add up to the total due to cash flow/timing differences at State Street*

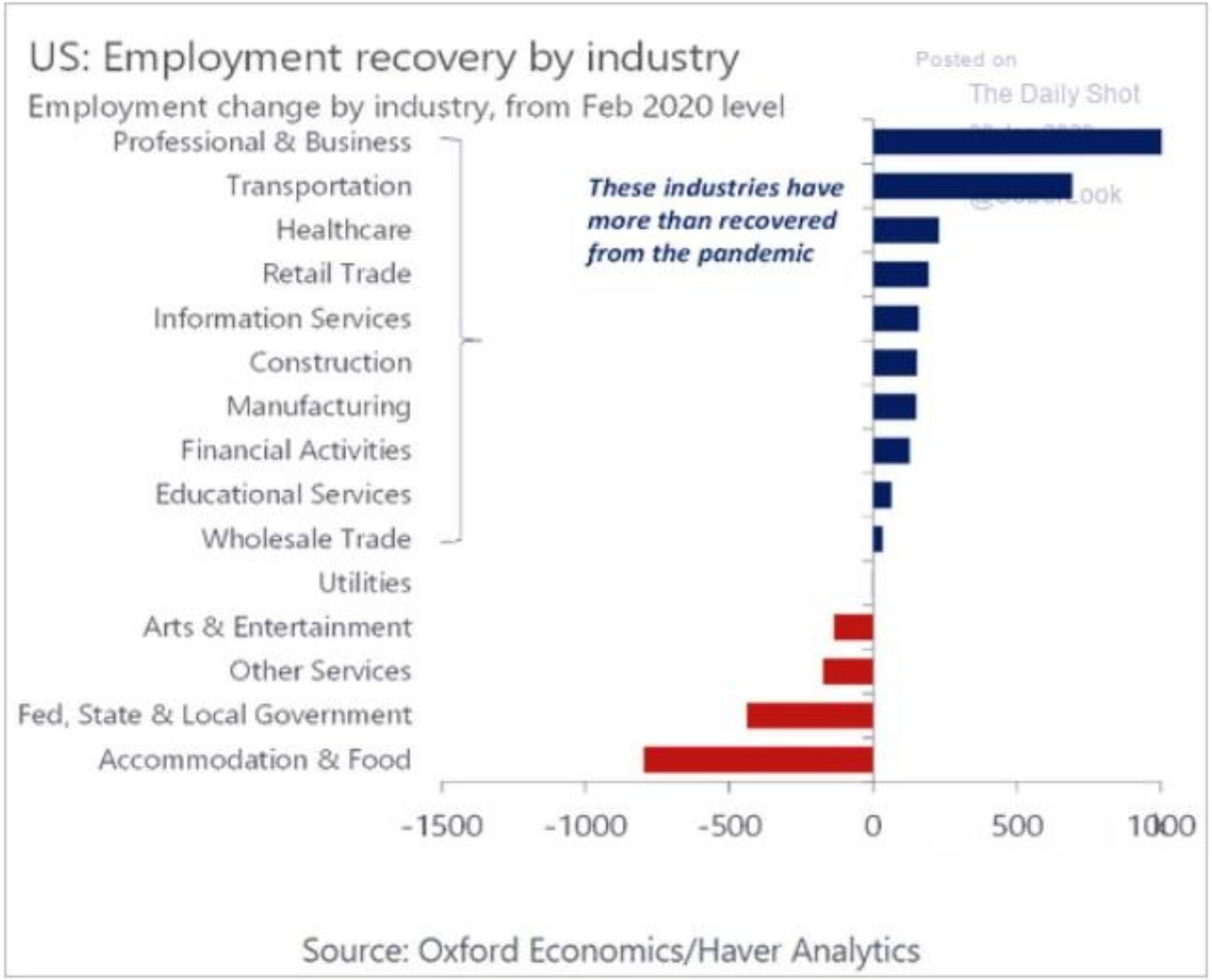
Market Outlook

- Inflation
  - Goods inflation likely to continue to moderate
  - Service inflation will soften but may be sticky high



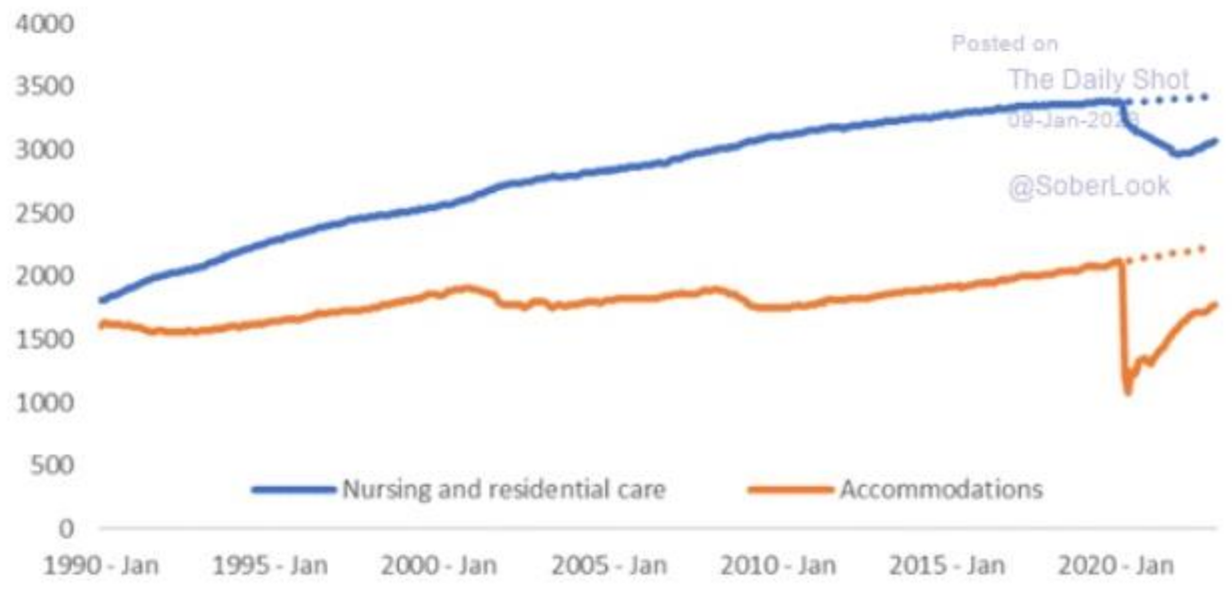
Market Outlook

- Employment
  - Manufacturing, housing, housing finance to weaken
  - Will services take up the slack as spending patterns revert to historical pattern?



Market Outlook

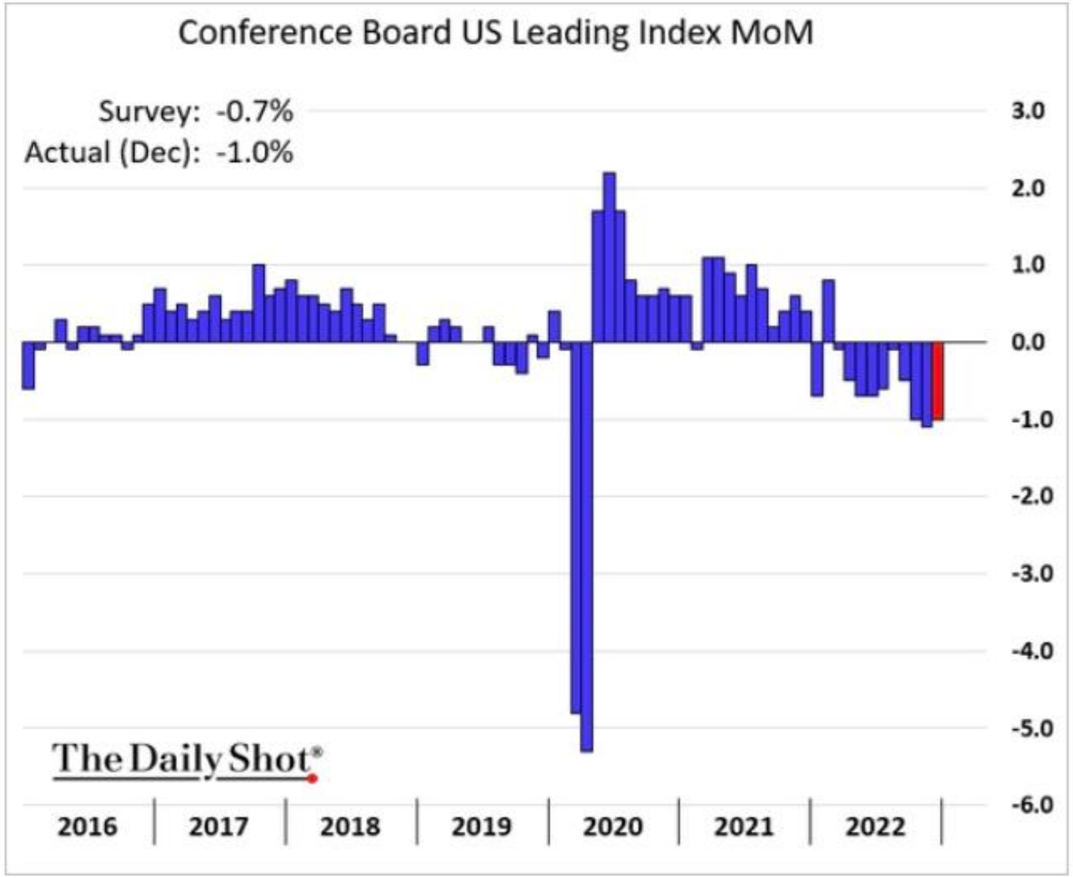
Tough Jobs are still missing a lot of workers



Source: Bureau of Labor Statistics; data as of January 6, 2023

Market Outlook – Slowdown Is Coming

Leading indicators are pointing to recession



Market Outlook – Interest Rates are Restrictive

Market Outlook

- US Stocks are moderately over-valued and underbought but earnings are likely to disappoint, and the Fed is not likely to respond with lower rates to prop up profitability or falling stocks
- Bonds are now reasonably attractive for long term investors, have enough yield to be a source of protection in systemic risk and the Fed is close to ending its tightening period.
- Non-U.S. Stocks are poised to benefit if the dollar weakens and have the tailwind of China reopening. Both developed and emerging markets have return potentials skewed to the upside – more ways to win.

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DOGBERT'S ESG RATING SERVICE
I WAS PLANNING TO RESEARCH EACH COMPANY BEFORE RATING IT.
DILBERT.COM @SCOTTADAMSSAYS
THEN I FOUND OUT HOW MANY COMPANIES THERE ARE. WOW! I'M GLAD I DIDN'T GO THAT ROUTE.
SO INSTEAD OF RESEARCHING THE COMPANIES THAT YOU ARE RATING, YOU. . .
TELL PEOPLE I DID.

ESG and Climate and DEI

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- MSRA approach
  - As fiduciaries to the beneficiaries of the plan we do not have scope to use plan assets for anything other than generating returns to pay benefits
  - However
    - Nonfinancial factors can impact returns at the company, sector and asset class levels
    - The Board and staff have a responsibility to evaluate these factors from both a risk and benefit perspective.
  - What happens in the world will impact the returns the System can receive,
  - The System can advocate to help reduce risk to the System

  - Bottom line, ESG is a framework to help make better investment decisions