SHAKING COVID SHAKESPEARE STYLE

– *Rejoining, Recovering & Rethinking*

OkMRF Trustee Retreat
Oklahoma Municipal Retirement Fund
1001 NW 63rd Street, Suite 260, Oklahoma City, OK 73116

Thursday, June 23, 2022

Call to Order	**Trustee Discussion and Continuing Education**
9:00 a.m.	**OkMRF Portfolio Analysis and Liquidity Simulation – 'Be-all, end-all.** *Jonathan Cogan/Connor Ortolf, BlackRock*
9:45 a.m.	**Impact of Covid – 'To be or not to be.** *Sean Sullivan, Dean Actuaries*
10:15 a.m.	**New Requirements: ASOP-4 – 'Brave new world.** *Chuck Dean, Dean Actuaries*
10:45 a.m.	**Break – 'Break the ice.**
11:00 a.m.	**Keynote Speaker** **Exploring Emerging Trends to Serve the Needs of Government Employees – 'We know what we are, but know not what we may be.** *Speaker: Karen Eisenbach, Voya Financial*
11:45 a.m.	**Update on Call Center – 'It's not enough to speak, but to speak true** Deltra Hayes, *Voya Financial*
12:00 p.m.	**Lunch Break** **LUNCH sponsored by BlackRock – 'He hath eaten me out of house and home.**

THANK-YOU BLACKROCK!!!

1:00 p.m.	**Global Economic/Geopolitical Update – 'Uneasy lies the head that wears a crown.** Haley Rives, *ACG*
1:45 p.m.	**Break – 'Break the ice.**
2:00 p.m.	**Global Equity DB Portfolio Review – 'Be not afraid of Greatness.** Kevin Moore, *ACG*
3:00 p.m.	**ACG Extensive Fee Review – 'To thine own self be true.** Haley Rives & Kevin Moore, *ACG*
3:45 p.m.	**Wrap Up & Adjourn**

ATTIRE IS CASUAL

SPEAKER BIOS ATTACHED

EDUCATIONAL SPEAKER BIOS

JONATHAN COGAN, BlackRock

Jonathan Cogan, CFA, CAIA, Director, is a member of the Client Insight Unit (CIU) within BlackRock's Institutional Client Business, where he focuses on delivering customized portfolio consulting services to institutional clients. Prior to assuming his current responsibilities, Mr. Cogan was a member of BlackRock's Market Intelligence Unit within the Financial Institutions Group where he was responsible for providing advisory services to insurance and other taxable clients. Mr. Cogan's service with the firm dates back to 2011 where he began his career in BlackRock's finance department.

Mr. Cogan earned a BA degree from Binghamton University where he double majored in Economics & Philosophy, Politics, and Law, and graduated Phi Beta Kappa and summa cum laude in 2010.

Mr. Cogan is the co-founder and treasurer of The Ellie Ruby Foundation, a charity organization dedicated to raising awareness and securing research funding for pediatric cancer.

CONNER ORTOLF, BlackRock

Connor Ortolf, CAIA, is a member of the Pensions team within BlackRock's Institutional Client Business. He is responsible for developing and maintaining relationships with institutional investors, including public and corporate pensions plans.

Connor was an Emerging Wealth Market Leader within BlackRock's US Wealth Advisory Business supporting Wirehouse and Registered Investment Advisor (RIA) Financial Professionals in the greater NYC area.

In 2018, Connor was accepted into the Keystone Program. The Keystone Program is comprised of a select group of high-potential sales professionals who are preparing for senior client-facing positions.

Connor earned his BA in Economics from Lafayette College and holds the Chartered Alternative Investment Analyst (CAIA) designation. At Lafayette he was a member and Captain of the Division I Baseball Team. Connor lives with his wife, Kristin, and son, PJ, in Hoboken, NJ. They both enjoy their time at the beach and spend their summers in Bay Head, NJ and Ocean City, NJ with their families.

SEAN SULLIVAN, Dean Actuaries

Sean has 35 years of experience as an actuary and employee benefits consultant; he has provided pension consulting services to public plans for 25 of those years. He has worked for various national firms, including Foster Higgins, Coopers & Lybrand, Arthur Andersen, and Dun & Bradstreet. He has also served as trustee for the $200M+ retirement plan for the City of Plano, Texas for the past 10 years.

BIOs Continued, next page

Sean's professional experience includes the design, implementation and administration of retirement programs in both the public and private sector. Representative projects include:

- Long term forecast to evaluate the financial soundness of a police and firefighters pension fund
- Design and redesign of retirement programs in response changing employer objectives, workforce, and federal regulations
- Ongoing valuation and administration of numerous public plans on the municipality level
- Annual status report and key issues presented to executive committees, Boards of Trustees and Directors, and county commissioners
- Conducted employee meetings to explain major changes in retirement programs
- Consolidation of multiple retirement programs
- Served on Board-appointed work committee to recommend major plan re-design
- Long term forecasts using asset/liability modeling techniques to determine revised funding and investment policies
- Served on national actuarial policy committee of a major benefits consulting firm
- Conducted training sessions for benefits staff of a Fortune-50 client

Sean received his Bachelor of Arts in Mathematics from the University of Chicago. He is a Fellow of the Society of Actuaries, Member of the American Academy of Actuaries, and an Enrolled Actuary. He has spoken frequently on topics of interest to the benefits community.

CHUCK DEAN, Dean Actuaries

Charles Dean has 40 years of experience as an actuary and employee benefit consultant. He has been a principal of A. S. Hansen and Foster Higgins and founded the consulting firm of Dean Actuaries. His professional experience includes designing, implementing and monitoring retirement and other employee benefit plans. Representative projects include:

- Developed long-term pension funding and expense policies for larger employers using pension plan asset/liability models
- Performed GASB 43/45/74/75 actuarial valuations of post-retirement medical (OPEB) plans for municipalities and non-profit organizations. Helped municipalities develop their implementation strategy for new GASB 74/75 requirements.
- Conducted audit and review of all statewide retirement systems in Oklahoma
- Analyzed the cost of proposed plan design changes for public employee retirement systems while legislature was in session
- Served as the consultant to joint legislative committee on public retirement systems
- Consulted on the merger of municipal police and fire fighter retirement programs into statewide consolidated system
- Set reserve limits and premiums for self-insured municipal group life plan
- Drafted bill for retirement system changes

BIOs Continued, next page

- Designed a low cost Social Security alternative plan for part-time, temporary, and seasonal employees of the City of Arlington.
- Analyzed the impact of FASB Statements 106 and 112 on retiree medical and other postemployment benefits for several large employers. This work included measurements of cost, funding requirements, and balance sheet impact for a 20-year time horizon under multiple economic and plan design scenarios.
- Designed cash balance retirement plans for a manufacturing company, a retailer, and three financial institutions.

A graduate of Caltech, Mr. Dean is a Fellow of the Society of Actuaries, Fellow of the Conference of Consulting Actuaries and an enrolled pension actuary. He is a frequent speaker and author on employee benefit issues.

KEYNOTE SPEAKER

KAREN EISENBACH, Voya Financial

Karen is Senior Vice President and Chief Marketing Officer since 2015.

Education
Bachelor of Science, Business Administration, The Ohio State University

Current Responsibilities
Karen and her team focus on the strategy, development, and execution of marketing initiatives for Voya's Workplace Benefits and Savings business – which includes Employee Benefits, Health Savings Accounts, and Retirement Solutions. She is passionate about providing workplace benefit and saving solutions to help all Americans make a secure financial future possible.

Experience
Karen brings more than 30 years of marketing, sales, product management, and strategic planning experience to the role. Before joining Voya, she was executive director of Retirement Marketing at J.P. Morgan Asset Management, where she helped develop and launch a retirement offering for small and mid-sized corporate plan sponsors. She also managed her own consulting business, and held prior leadership positions with Nationwide Financial and National City Bank.

Karen is also a member of Voya's Enterprise Leadership Team.

Personal
Karen is a member of the boards of directors for the Greater Hartford Arts Council and Creative Spirit, a non-profit devoted to creating integrated employment opportunities for individuals with intellectual and developmental disabilities.

BIOs Continued, next page

DELTRA HAYES, Voya Financial

Experience
Deltra has 30 years of experience in retirement service plan administration, strategic relationship management, employee benefits, and human resources. Prior to her employment at Voya, Deltra worked for seven years as an Assistant Vice President responsible for large client relationships and retention at Bankers Trust Company. This was followed by 13 years as a relationship manager and Vice President of new business development for defined contribution plans at AIG Retirement. Earlier in her career, Deltra held several managerial positions in human resources and employee benefits.

Professional Designations
- Financial Industry Regulatory Authority (FINRA) Series 6, 7, 63, 65 and 26
- Accredited Investment Fiduciary® (AIF)
- Chartered Retirement Plans Specialist(SM) CRPS®

Education
- Bachelor of Science in Finance, University of Houston-Downtown
- Master of Business Administration, Jesse H. Jones School of Business at Texas Southern University

Current Responsibility
Oversee daily operations and performance of Voya's New York City branch office, along with managing activity of over 90 on-site employees responsible for recordkeeping, retirement readiness call center, operations for money in/money out, human resources, compliance, education, communications, and information technology. Play key role as National Segment Retention leader with responsibility of strategic relationship management. Deliver support to clients by leveraging segment-centric approaches and best practices. Present effective solutions on strengthening company's strategy and tactical activity to achieve retention, revenue, and operational improvement goals. Enable growth and leadership development opportunities within Tax-Exempt Market team.

Affiliations
- National Association of Government Defined Contribution Administrators (NAGDCA)
- College and University Professional Association for Human Resources (CUPA-HR)
- Texas Higher Education Human Resource Association (THEHRA)
- University of Houston – Downtown (UH-D) Alumni Association

Registered Representative of and securities offered through Voya Financial Advisors, Inc. (member SIPC).

Registered Representative of and securities offered through Voya Financial Partners, LLC (member SIPC).

BIOs Continued, next page

HALEY RIVES, ACG

Haley is a Senior Consultant with significant experience working with both institutional entities and private clients. She collaborates with our clients to develop investment policy, design and construct portfolios, conduct investment manager searches and due diligence, and provide evaluation of investment performance. Haley is the current Chair of ACG's Investment Committee, which establishes the framework for the firm's investment philosophy and oversees the internal processes used to ultimately make investment recommendations to clients. Prior to joining ACG, Haley was an investment analyst at Moneta Group. There she was responsible for due diligence and ongoing monitoring of actively managed equity and fixed income investment alternatives for high-net-worth and institutional clients. Haley holds a Bachelor of Science in Finance from the University of Illinois, and an MBA from Washington University in St. Louis. She is a holder of the Chartered Financial Analyst designation and a member of the CFA Society of St. Louis and the CFA Institute. She is also a member of the St. Louis Women in Investments Network.

KEVIN MOORE (aka Shifty), ACG

Kevin is a Consultant who works closely with both institutional and private investor clients. His primary responsibilities include asset allocation analysis, portfolio construction, investment policy development and review, investment manager searches and due diligence, portfolio analysis, implementation and rebalancing, and performance evaluation. Prior to this role, he was part of the ACG's Research Team. Kevin worked as a summer intern at ACG before joining the firm full-time. He graduated from the University of Dayton with a Bachelor of Science degree in Finance. Kevin is a holder of the Chartered Financial Analyst designation and is a member of the CFA Society of St. Louis and the CFA Institute.

HOST HOTEL: The Ellison, 6201 North Western Avenue Oklahoma City

ENTERTAINMENT: Shakespeare in the Park, Featuring: *EMMA*

A very special thank-you to each of our speakers and to our keynote speaker! OkMRF is a true believer that Education is an important ingredient to the Fund's success. Plus, much appreciation to Asset Consulting Group for helping us coordinate the Retreat and ensuring top-notch sessions.

In spirit of our theme, please join us for a fun-filled Shakespearean evening:

5:00 p.m. **Meet in the Ellison Lobby, we will carpool from there**
5:30 p.m. **Dinner at Paseo Grill, 2909 Paseo**
7:15 p.m. **Walk over to the Shakespeare in the Park, 2920 Paseo, chairs will be provided**
8:00 to 10:30 **Sit back and enjoy the show: *Emma***

June 2022 | Client Insight Unit

BlackRock

OKMRF SUMMER RETREAT

PORTFOLIO ANALYSIS & LIQUIDITY SIMULATION

ICBH0622U/S-2225025-1/23

EXECUTIVE SUMMARY

Following last year's conversations, we were asked to prepare education materials on private market investing and refresh the liquidity simulation we reviewed with OkMRF's investment team. This analysis provides an overview of our most recent capital market assumptions for select public and private asset classes and outlines the potential return and diversification benefits private market exposure can add to a traditional portfolio. We highlight OkMRF's target allocation and reallocations to private equity and infrastructure equity to better understand your current risk/return profile and the potential risk/return impact from exposure changes. We share the results of the customized liquidity simulation to assist you in building a framework around the likelihood of a potential liquidity event given OkMRF's underlying plan concentration – and how introducing illiquid exposure can impact the portfolio allocation in different liquidity scenarios.

Overview & Asset Class Mappings

Client
Insight
Unit

Portfolio Allocations

Asset Class	Client Description	Shortname	Benchmark / Proxy	Expected Return	Expected Risk	Target Allocation	PE +5%	Infra +5%
Fixed Income	Fixed Income	FI	BBG Barc US Aggregate	2.99%	5.02%	20.00%	20.00%	20.00%
Equity	US Large Cap	US LC	MSCI USA	7.06%	17.10%	25.00%	**22.92%**	**22.92%**
Equity	US SMID	US SC	MSCI USA Small Cap	7.30%	21.64%	10.00%	**9.17%**	**9.17%**
Equity	Intl Dev	Intl Dev	MSCI World Ex US	8.11%	16.39%	20.00%	**18.33%**	**18.33%**
Equity	EM	EM	MSCI Emerging Markets	9.03%	21.11%	5.00%	**4.58%**	**4.58%**
Alternatives	Global L/S	HF	BlackRock Proxy HF (Global Fund Weighted, hedged)	8.21%	7.30%	10.00%	10.00%	10.00%
Alternatives	Real Asset	RE	BlackRock Proxy US Core Real Estate	4.79%	12.17%	10.00%	10.00%	10.00%
Alternatives	PE	PE	BlackRock Proxy Global PE Buyout	13.65%	30.58%	0.00%	**5.00%**	0.00%
Alternatives	Infra	Infra	BlackRock Proxy Global Infrastructure Equity	10.78%	18.75%	0.00%	0.00%	**5.00%**
Alternatives	Private Credit	Prv Credit	BlackRock Proxy Direct Lending	8.91%	11.99%	0.00%	0.00%	0.00%

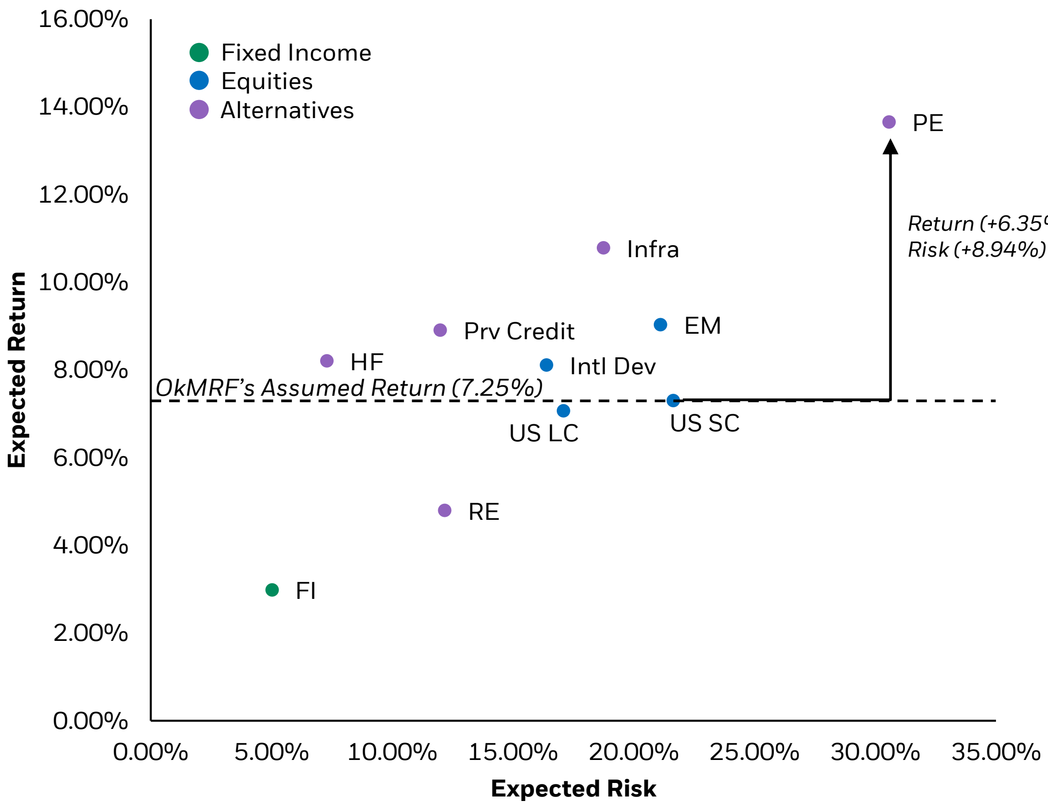
Existing portfolio data provided to BlackRock by OkMRF in May2022. BlackRock does not verify the accuracy of the data provided by OkMRF. The analysis is as of May2022.
Source: BlackRock as of May 2022, based on BlackRock's capital market assumptions. Expected risk is calculated using the expected volatility assumptions. See slide titled "Capital Market and Modeling Assumptions" at the end of this presentation for additional details, including the indexes used to represent each asset class. This asset class mapping is also used for the ex-ante risk contribution and scenario analysis, as applicable. There is no guarantee that the capital market assumptions will be achieved, and actual risk and returns could be significantly higher or lower than shown. Risk: Monthly Constant Weighted (MTC model) with 258 monthly observations; 1 standard deviation.

THE ILLIQUIDITY PREMIUM

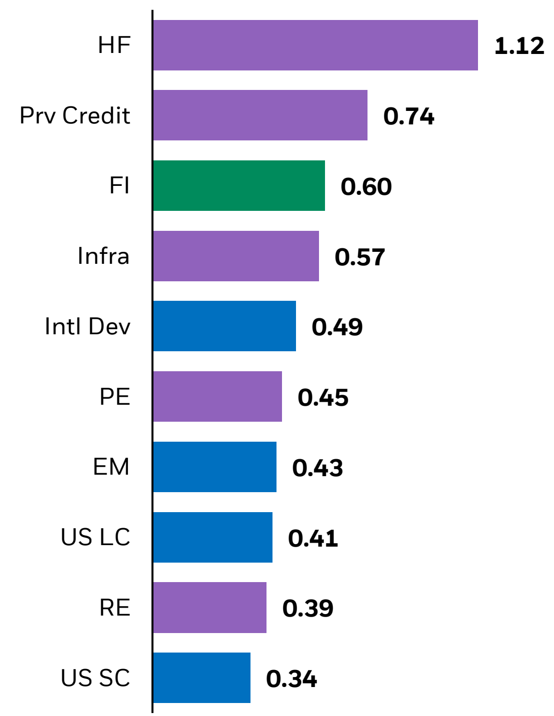
BlackRock Capital Market Assumptions

Client
Insight
Unit

Expected Asset Class Risk and Return (10yr)



Return per unit of Risk



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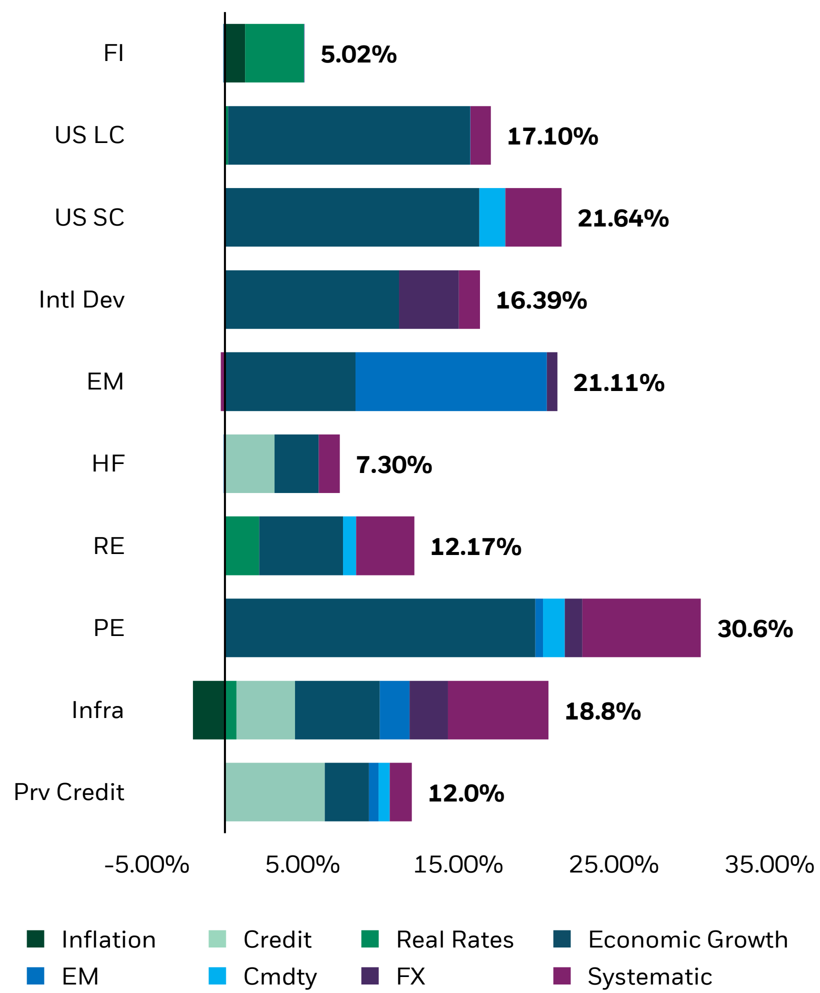
Asset Class Risk & Correlations

Client **Insight** Unit

Risk Factor Decomposition



Correlation Matrix

	FI	US LC	US SC	Intl Dev	EM	HF	RE	PE	Infra	PC
FI	1.00									
US LC	-0.11	1.00								
US SC	-0.12	0.94	1.00							
Intl Dev	-0.03	0.85	0.87	1.00						
EM	-0.04	0.76	0.79	0.83	1.00					
HF	-0.13	0.82	0.85	0.81	0.74	1.00				
RE	0.18	0.68	0.69	0.65	0.55	0.63	1.00			
PE	-0.10	0.86	0.91	0.84	0.72	0.80	0.64	1.00		
Infra	0.11	0.62	0.64	0.75	0.65	0.64	0.60	0.62	1.00	
Prv Credit	-0.12	0.75	0.82	0.74	0.68	0.85	0.64	0.74	0.64	1.00

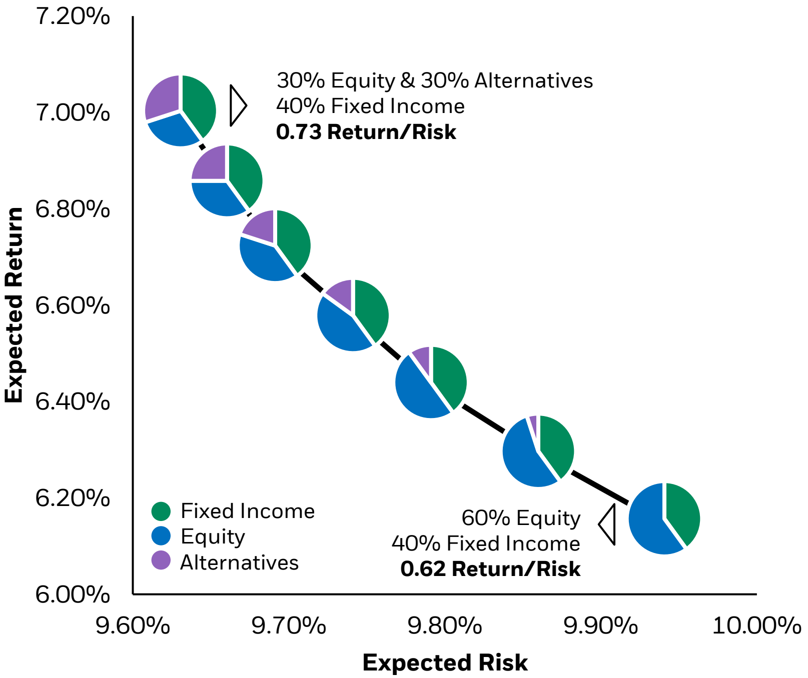
Negative relationship   Positive relationship

Ex-ante risk is defined as annual expected volatility and is calculated using data derived from portfolio asset class mappings, using the Aladdin portfolio risk model. This proprietary multi-factor model can be applied across multiple asset classes to analyze the impact of different characteristics of securities on their behaviors in the market place. In analyzing risk factors, the Aladdin portfolio risk model attempts to capture and monitor these attributes that can influence the risk/return behavior of a particular security/asset. For additional details see the Macro Factor Glossary at the end of this presentation. For details regarding the indexes used to represent each asset class, see the "Capital Market and Modeling Assumptions" slide at the end of this presentation.
Source: BlackRock, as of May2022.

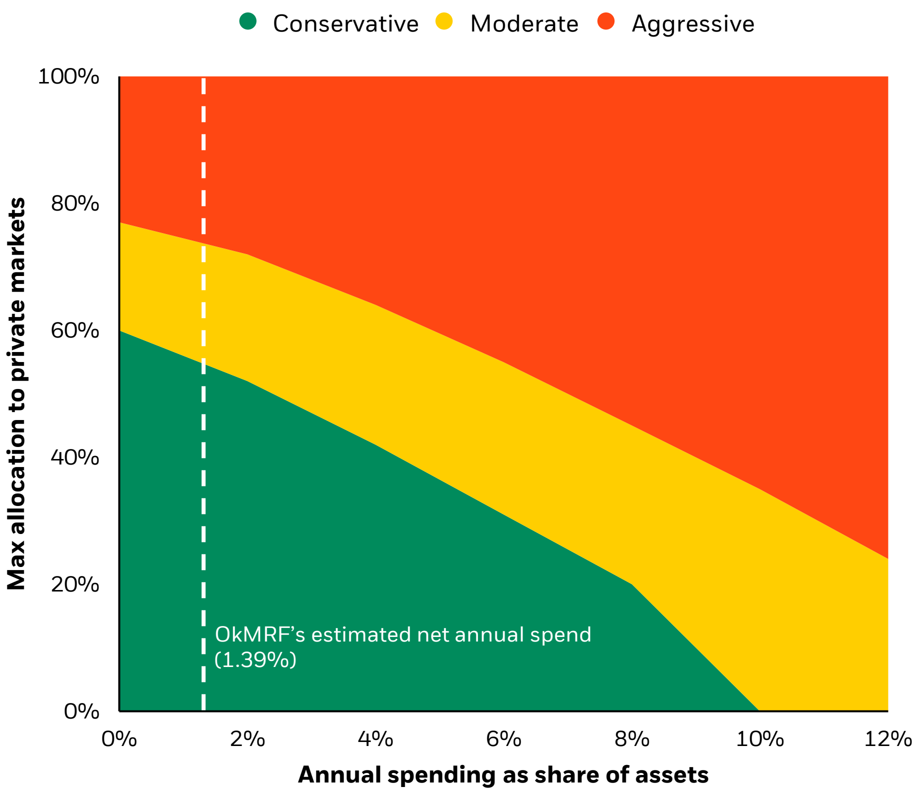
Balancing Exposures

Allocating to Private Markets

Allocating to a diversified Alternatives portfolio can potentially increase return while decreasing risk



Calibrating Liquidity Constraints



Source: BlackRock as of May 2022, based on BlackRock's capital market assumptions. Expected risk is calculated using the expected volatility assumptions. See slide titled "Capital Market and Modeling Assumptions" at the end of this presentation for additional details, including the indexes used to represent each asset class. This asset class mapping is also used for the ex-ante risk contribution and scenario analysis, as applicable. There is no guarantee that the capital market assumptions will be achieved, and actual risk and returns could be significantly higher or lower than shown. Risk: Monthly Constant Weighted (MTC model) with 258 monthly observations; 1 standard deviation.
Fixed Income,: US Aggregate, Equity: 58.5% US Large Cap, 6.5% US Small Cap, 35% Intl Dev. Alternatives portfolio is equally weighted to Direct Lending, Private Equity, Real Estate, and Infrastructure Equity .
Calibrating Liquidity Constraints: **This information is not intended as a recommendation to invest in any particular asset class or strategy or as a promise – or even as an estimate – of future performance.**
Source: BlackRock Investment Institute, March 2019.

LIQUIDITY SIMULATION

Plan Information and Simulation Overview

Client Insight Unit

Plan Details

134	0.75%	0.25%	25%	70%
Total Plans	Average plan coverage	Median plan coverage	Coverage of largest 5 plans	Coverage of largest 25 plans

Simulation Information

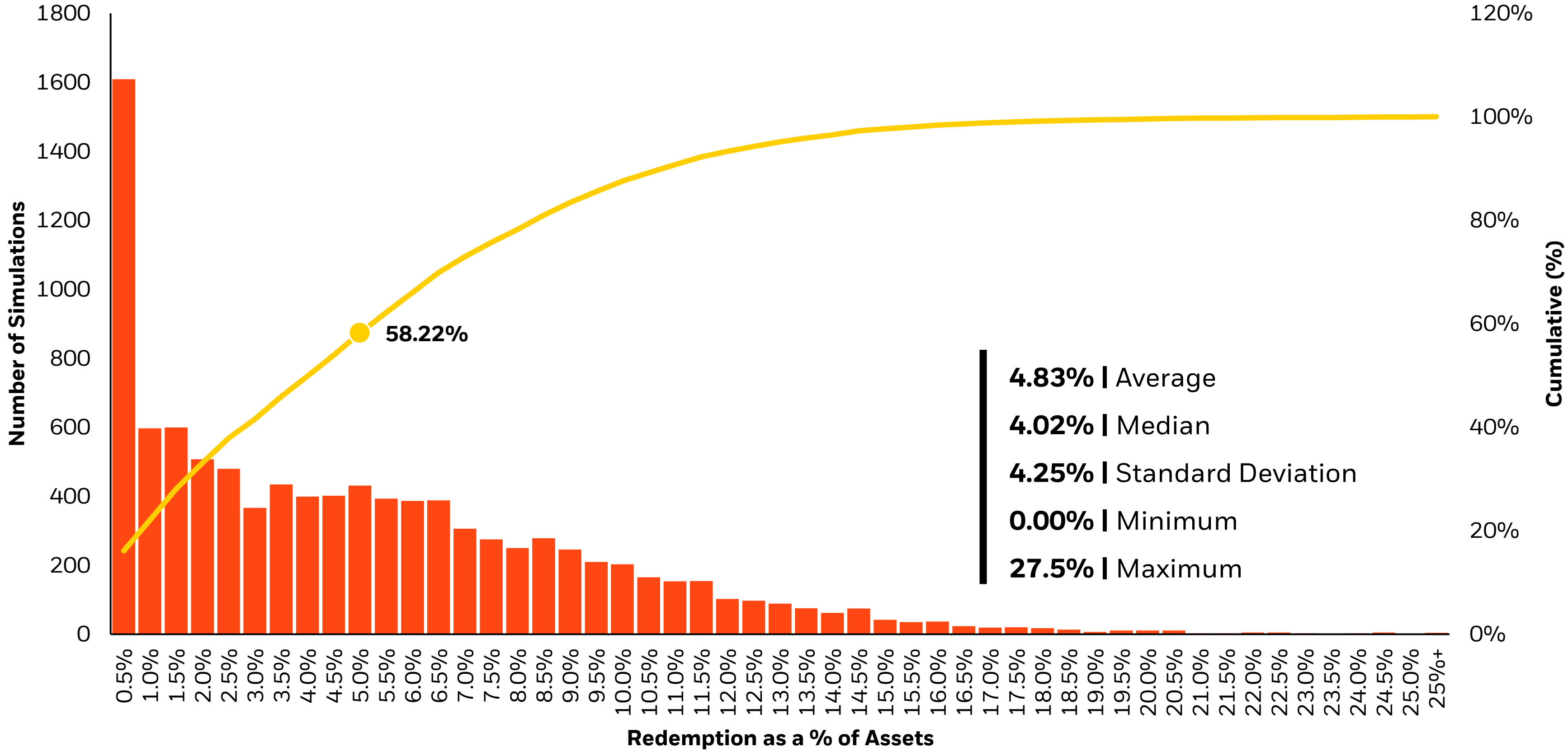
- Randomly select number (0-13) to determine the number of plans withdrawing assets
- Randomly select which plans are withdrawing assets
- Calculate total redemption value based on both variable selection
- Run simulation with 10,000 observations

Existing plan data provided to BlackRock by OkMRF in May 2022. BlackRock does not verify the accuracy of the data provided by OkMRF. The analysis is as of May 2022.

Simulation Results

Client
Insight
Unit

Distribution



For illustrative purposes only. The results shown are hypothetical estimates generated using Monte Carlo simulation, which is a statistical modeling technique that forecasts a set of potential future outcomes based on the variability or randomness associated with historical occurrences. No representation is made as to the accuracy or completeness of the simulation results shown or the validity of the underlying methodology. Actual results could vary significantly based upon a number of factors and circumstances not addressed herein.

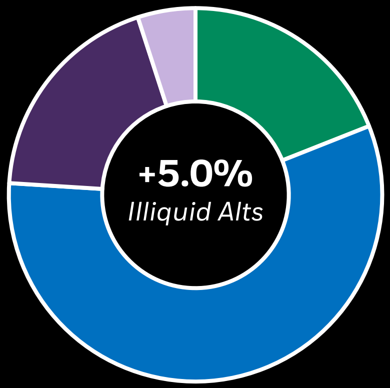
Liquidity Impacts of Liquidations

Average Liquidation: -4.83%

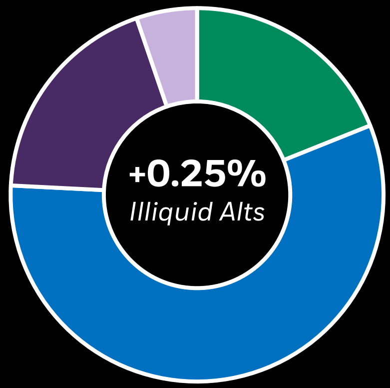
Client **Insight** Unit

Current Allocation

5% Pro-rata Illiquid Allocation



Post-redemption Allocation



- Fixed Income, **20.00%**
- Equity, **60.00%**
- Liquid Alts, **20.00%**
- Illiquid Alts, **0.00%**

- Fixed Income, **19.00%** (-1.00%)
- Equity, **57.00%** (-3.00%)
- Liquid Alts, **19.00%** (-1.00%)
- Illiquid Alts, **5.00%** (+5.00%)

- Fixed Income, **18.95%** (-0.05%)
- Equity, **56.85%** (-0.15%)
- Liquid Alts, **18.95%** (-0.05%)
- Illiquid Alts, **5.25%** (+0.25%)

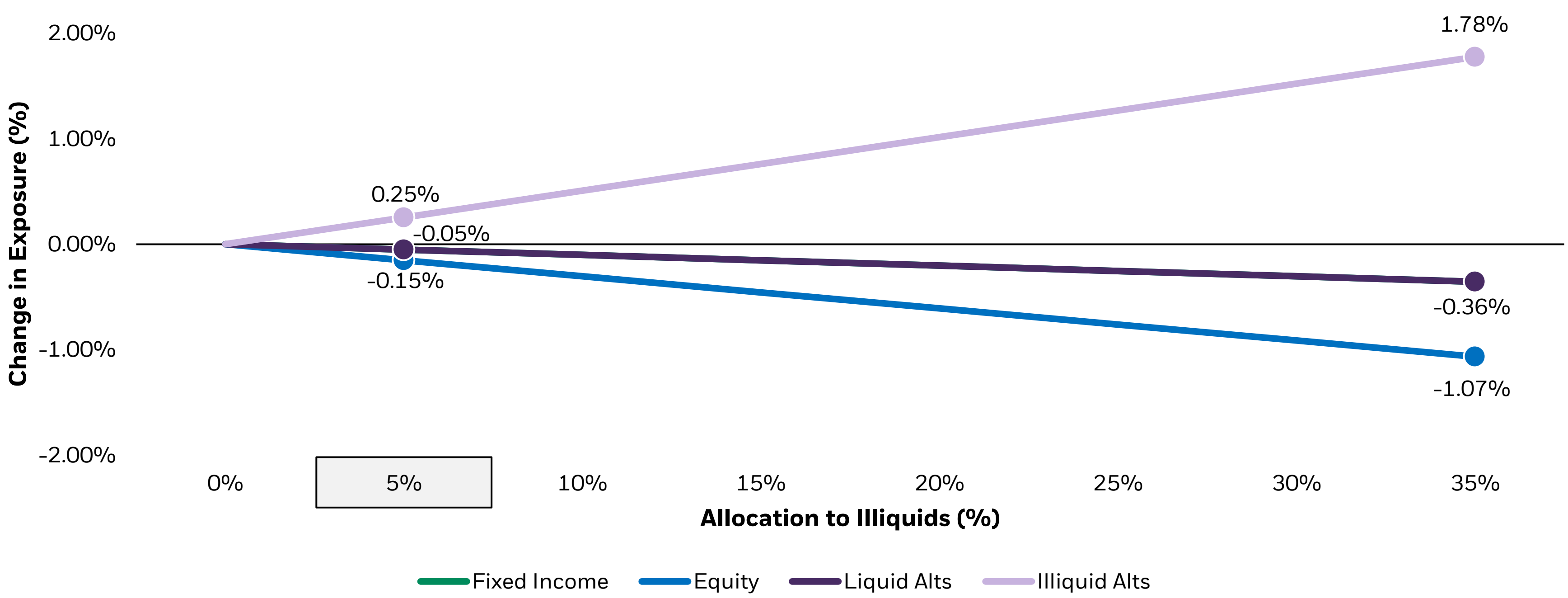
For illustrative purposes only. Actual results could vary significantly based upon a number of factors and circumstances not addressed herein. **This information is not intended as a recommendation to invest in any particular asset class or strategy or as a promise – or even as an estimate – of future performance.**

Liquidity Impacts of Liquidations

Average Liquidation: -4.85%

Client
Insight
Unit

Allocation Changes



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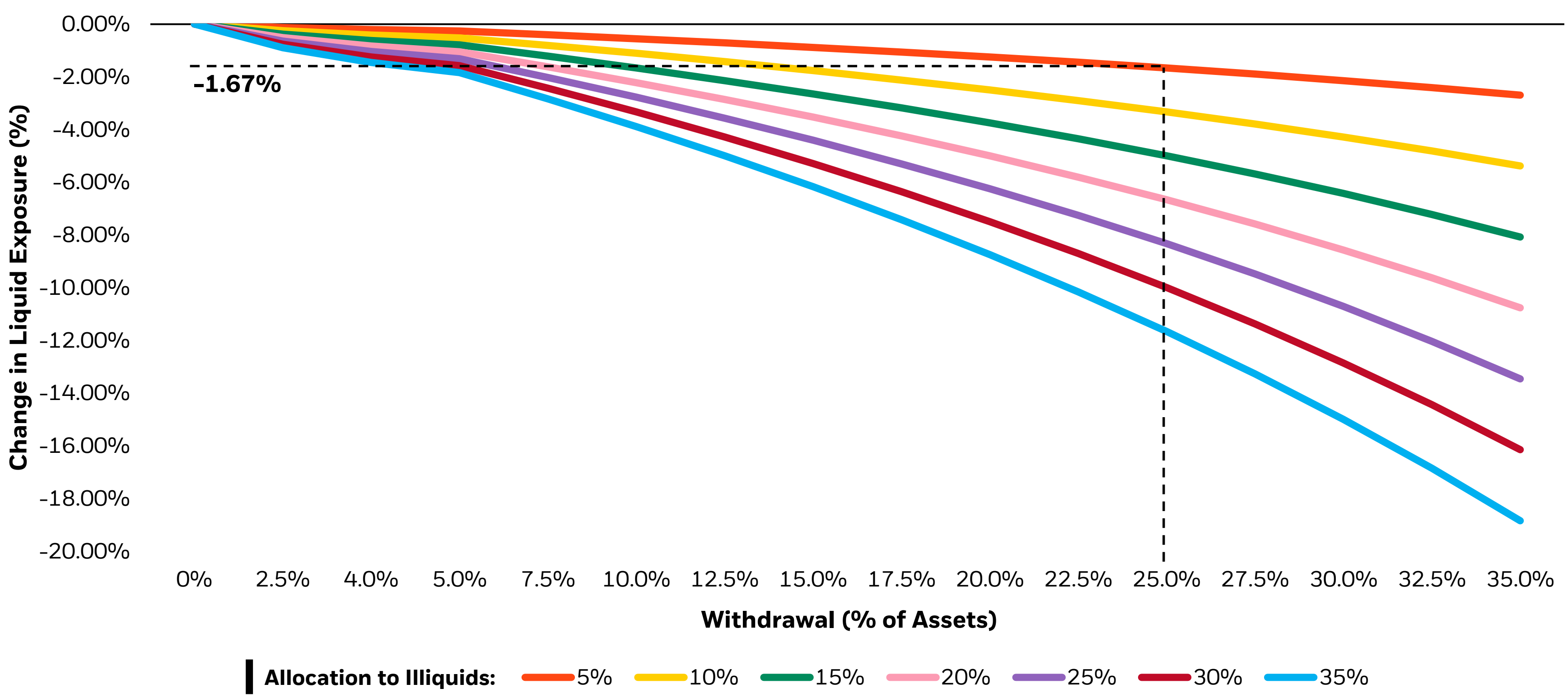
Liquidity Impacts of Liquidations
Variable Liquidation and Allocation to Illiquids

Client **Insight** Unit

Allocation Changes



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PORTFOLIO REALLOCATIONS

PUBLIC FOR PRIVATE

Rotate 5% of public equity exposure into private equity

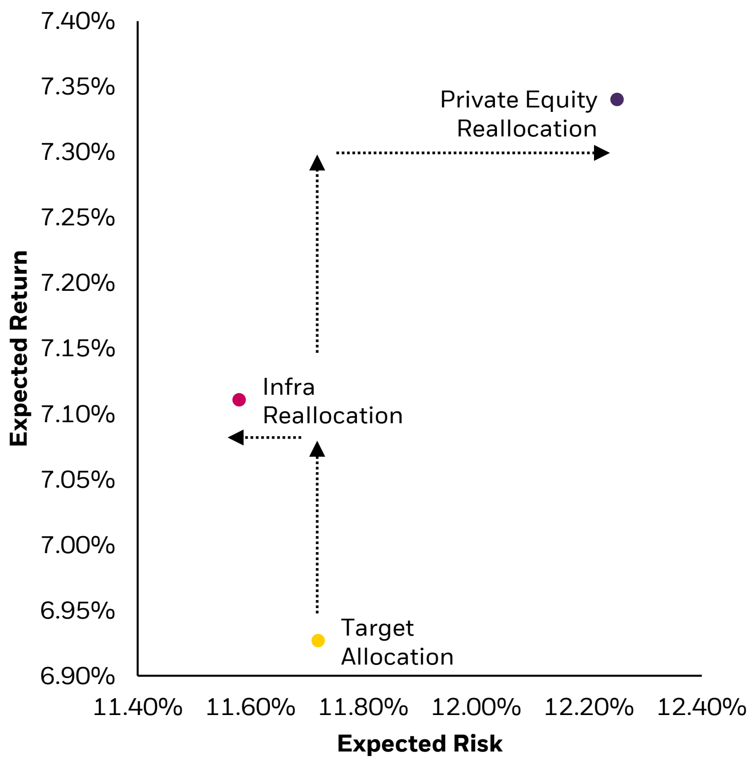
EYEING INFLATION

Rotate 5% of public equity exposure into infrastructure

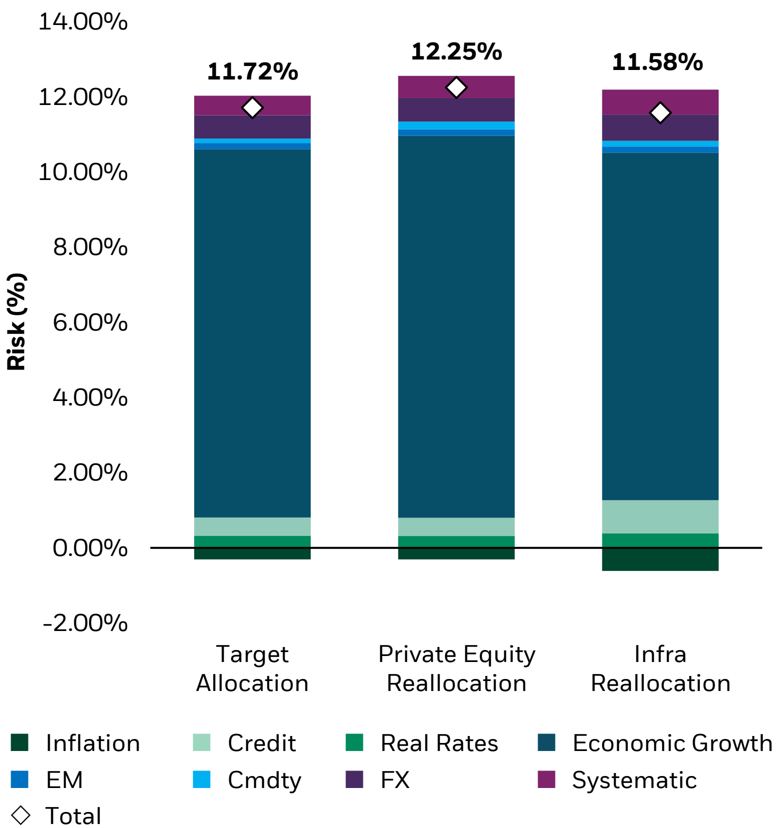
Reallocation Summary

Client Insight Unit

Expected Risk and Return (10yr)



Risk Factor Decomposition

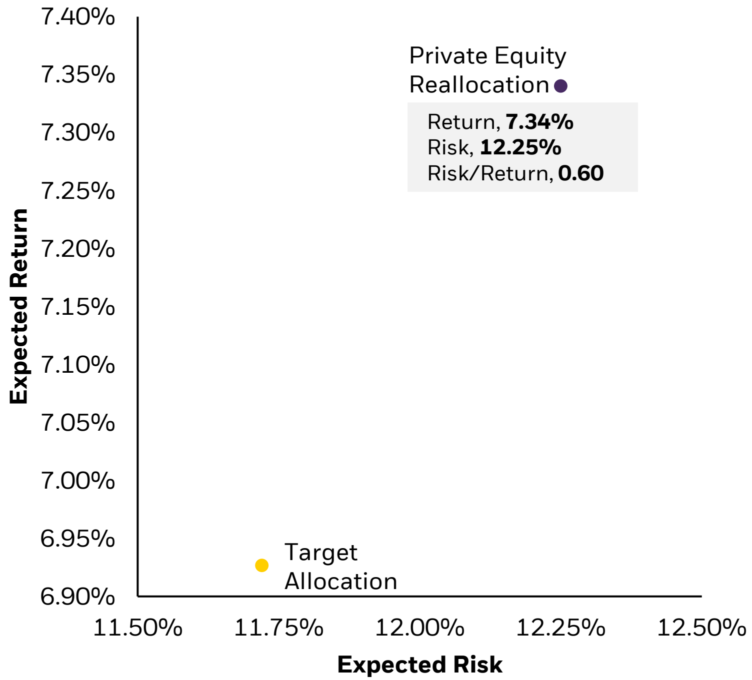


Source: BlackRock as of May 2022, based on BlackRock's capital market assumptions. Risk: Monthly Constant Weighted (MTC model) with 258 monthly observations; 1 standard deviation. Expected risk is calculated using the expected volatility assumptions. Ex-ante risk is defined as annual expected volatility and is calculated using data derived from portfolio asset class mappings, using the Aladdin portfolio risk model. This proprietary multi-factor model can be applied across multiple asset classes to analyze the impact of different characteristics of securities on their behaviors in the market place. In analyzing risk factors, the Aladdin portfolio risk model attempts to capture and monitor these attributes that can influence the risk/return behavior of a particular security/asset. For additional details see the Macro Factor Glossary at the end of this presentation. See slide titled "Capital Market and Modeling Assumptions" at the end of this presentation for additional details, including the indexes used to represent each asset class. This asset class mapping is also used for the ex-ante risk contribution and scenario analysis, as applicable. There is no guarantee that the capital market assumptions will be achieved, and actual risk and returns could be significantly higher or lower than shown.

Public for Private

Rotate 5% of public equity into private equity

Expected Risk and Return (10yr)



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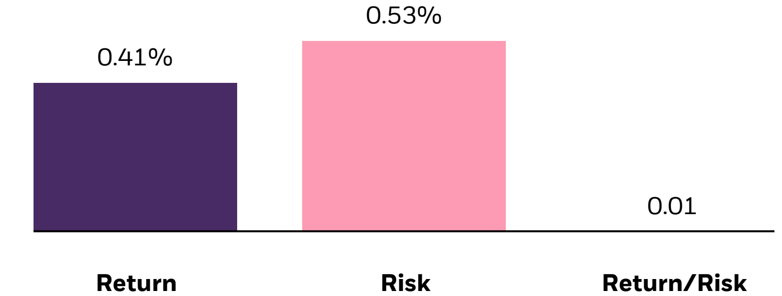
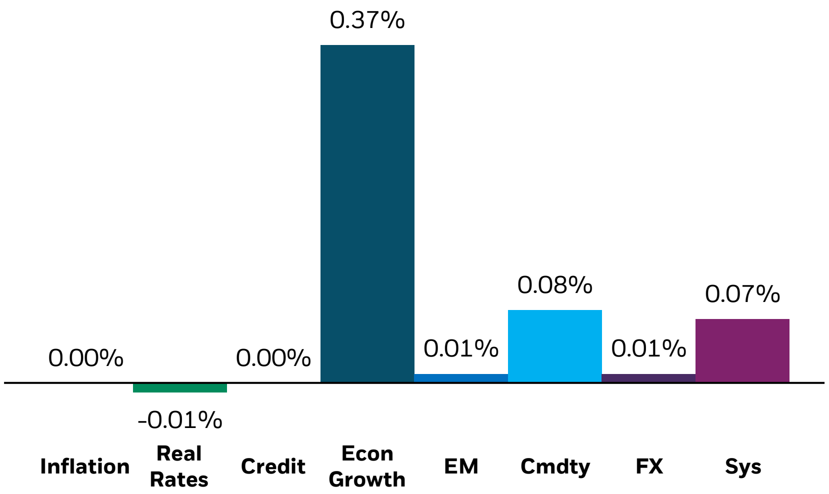
Portfolio Impact – Measuring the Change

Changes in Risk & Return Profile



Changes in Risk Factor Decomposition

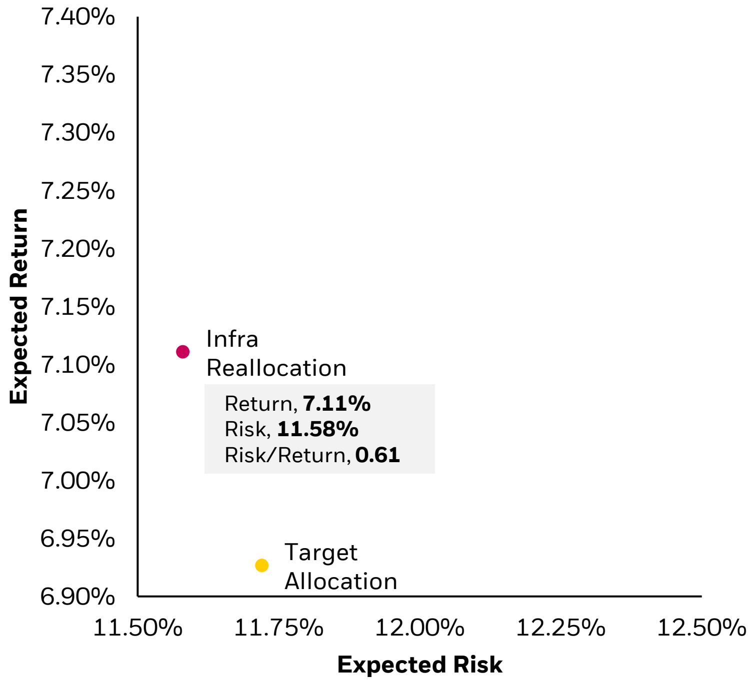


Eyeing Inflation

Client **Insight** Unit

Reallocate 5% of public equity exposure with infrastructure equity

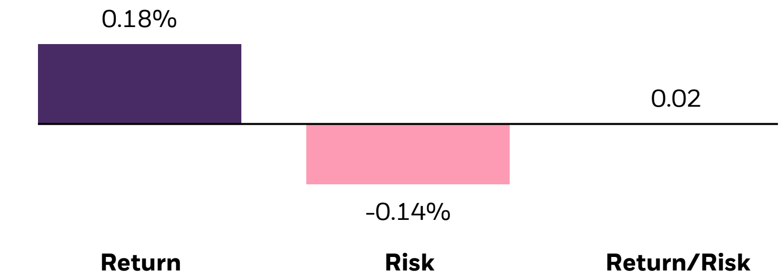
Expected Risk and Return (10yr)



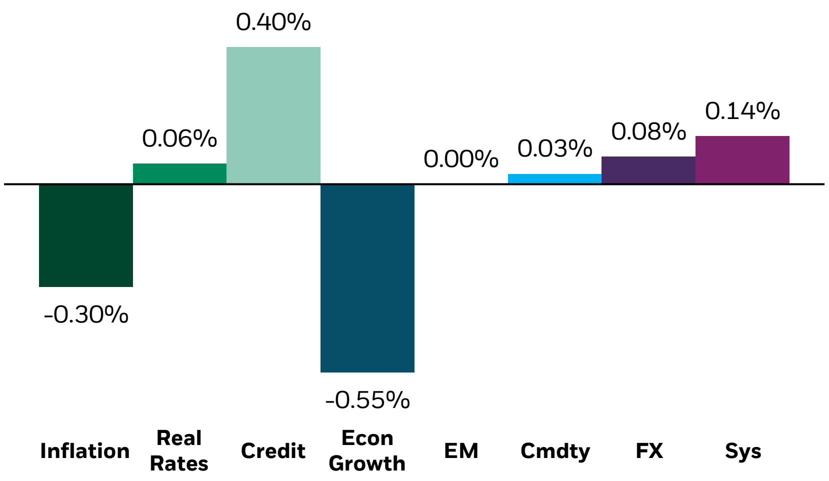
Source: BlackRock as of May 2022, based on BlackRock's capital market assumptions. Risk: Monthly Constant Weighted (MTC model) with 258 monthly observations; 1 standard deviation. Expected risk is calculated using the expected volatility assumptions. Ex-ante risk is defined as annual expected volatility and is calculated using data derived from portfolio asset class mappings, using the Aladdin portfolio risk model. This proprietary multi-factor model can be applied across multiple asset classes to analyze the impact of different characteristics of securities on their behaviors in the market place. In analyzing risk factors, the Aladdin portfolio risk model attempts to capture and monitor these attributes that can influence the risk/return behavior of a particular security/asset. For additional details see the Macro Factor Glossary at the end of this presentation. See slide titled "Capital Market and Modeling Assumptions" at the end of this presentation for additional details, including the indexes used to represent each asset class. This asset class mapping is also used for the ex-ante risk contribution and scenario analysis, as applicable. There is no guarantee that the capital market assumptions will be achieved, and actual risk and returns could be significantly higher or lower than shown.

Portfolio Impact – Measuring the Change

Changes in Risk & Return Profile



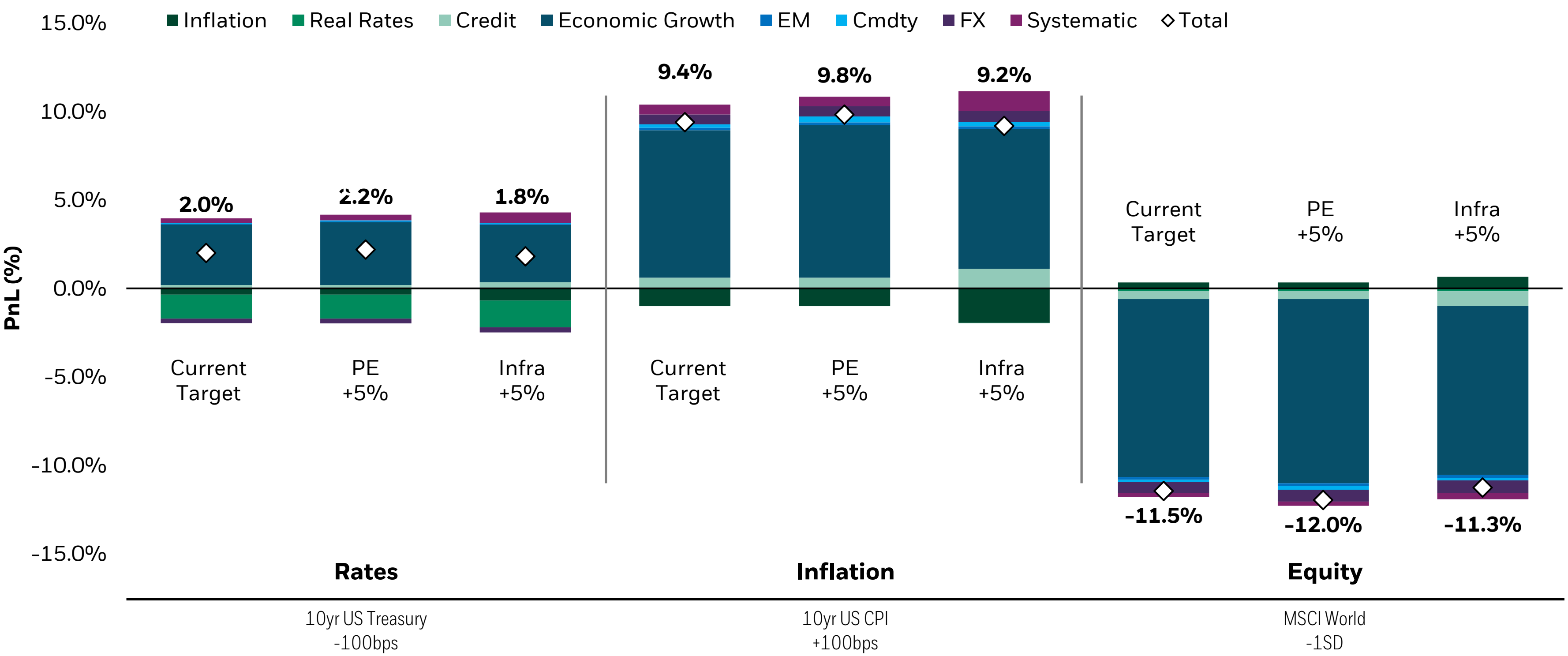
Changes in Risk Factor Decomposition



Risk Factor Sensitivities

Client **Insight** Unit

Risk Factor Decomposition



Source: BlackRock, as of May 2022. For illustrative purposes only. Risk Factor sensitivities represent estimated portfolio sensitivity to a one standard deviation change in a market risk factor or index. Risk Factor sensitivities for these portfolios are estimated based on underlying fund holdings and risk factor exposures. They are intended to convey expected longer-term relationships and offer relative comparisons. A positive sensitivity indicates a tendency for co-movement with the benchmark, while a negative sensitivity indicates that the portfolio and the benchmark tend to move in opposite directions. These charts are not being shown to suggest that additional risk exposure will necessarily have a beneficial impact on a portfolio's returns, nor that an increase in sensitivity to these risk factors will translate into portfolio returns. Using risk factor sensitivity as the basis for portfolio metrics is subject to certain limitations. Risk factor sensitivities are not necessarily stable over time, due to the dynamic nature of fund strategies and of the risk factor data itself. In the absence of holdings-level data, market proxies may be used. A portfolio's total return is influenced by a variety of elements, such as changes in the composition of its holdings, which may not be included in this analysis. Any changes to the underlying holdings of the portfolio could affect the risk, return and other aspects of the profile of the portfolio and are outside of the scope of this analysis. This analysis was conducted using BlackRock's proprietary risk models, and the results may differ from those produced by other risk models. Risk factor sensitivities use a fundamental holdings-based risk model (258 MTC). Risk factor sensitivity analysis measures the portfolio's sensitivity to changes in the 10 Year U.S. Treasury Interest Rate (Rates), the portfolio's sensitivity to changes in the 10 Year CPI (Inflation), and the portfolio's sensitivity to changes in the MSCI World Index (Equity).

APPENDIX

Risk Factor Glossary

Client
Insight
Unit

Risk Factors	Description
Alternatives	Contribution to portfolio risk arising from a portfolio's exposure to alternative assets and strategies.
Commodities	Contribution to portfolio risk arising from a portfolios exposure to commodity prices.
Emerging Market Spread	Contribution to portfolio risk arising from a portfolio's exposure to emerging market bond credit spreads over benchmark interest rates.
Equity – Country	Contribution to portfolio risk arising from a portfolio's exposure to returns of country specific equities adjusting for market, sector and style effects.
Equity – Dividend Yield	Contribution to portfolio risk arising from a portfolio's exposure to companies with different dividend yield levels.
Equity – Growth	Contribution to portfolio risk arising from a portfolio's exposure to companies with different historical growth.
Equity – Idiosyncratic	Contribution to portfolio risk arising from a portfolio's exposure to stock specific idiosyncratic risk not captured by the common risk factors.
Equity -- Market	Contribution to portfolio risk arising from a portfolio's exposure to returns across the equity market. This factor captures the risk associate with general equity market movements.
Equity – Momentum	Contribution to portfolio risk arising from a portfolio's exposure to companies with recent price momentum.
Equity – Sector	Contribution to portfolio risk arising from a portfolio's exposure to the returns of sector specific equities adjusting for market, country, and style effects.
Equity – Size	Contribution to portfolio risk arising from a portfolio's exposure to companies of different market capitalization.
Equity – Style	Contribution to portfolio risk arising from a portfolio's exposure to the returns of factors such as value, growth, size and momentum. Style factors are constructed from company fundamentals, analyst estimate data and historical market data.
Equity – Value	Contribution to Portfolio Risk arising from a portfolio's exposure to companies of different valuations.
Equity -- Volatility	Contribution to portfolio risk arising from a portfolio's exposure to companies with different historical volatility.
Foreign Currency (FX)	Contribution to portfolio risk arising from a portfolio's exposure to risk associated with changes in foreign exchange rates.
Interest Rates	Contribution to portfolio risk arising from a portfolio's exposure to risk associated with changes in yield curves.
Inflation	Contribution to portfolio risk arising from a portfolio's exposure to risk associated with changes in inflation.
Other	Contribution to portfolio risk arising from a portfolio's exposure to remaining risk factors not shown.
Spreads – Credit	Contribution to portfolio risk arising from a portfolio's exposure to credit spreads. Credit spreads capture risk associated with investment grade, high yield, and distressed debt credit spreads over benchmark interest rates.
Spread -- High Yield	Contribution to portfolio risk arising from a portfolio's exposure to high yield credit spreads over benchmark interest rates.
Spread -- Investment Grade	Contribution to portfolio risk arising from a portfolio's exposure to investment grade credit spreads over benchmark interest rates.
Spreads -- Muni	Contribution to portfolio risk arising from a portfolio's exposure to municipal bond credit spreads over benchmark interest rates.
Spreads -- Securitized	Contribution to portfolio risk arising from a portfolio's exposure to securitized credit spreads over benchmark interest rates.

Capital Market and Modeling Assumptions

Client **Insight** Unit

Asset Class	Client Description	Shortname	Benchmark / Proxy	Expected Return	Expected Risk
Fixed Income	Fixed Income	FI	BBG Barc US Aggregate	2.99%	5.02%
Equity	US Large Cap	US LC	MSCI USA	7.06%	17.10%
Equity	US SMID	US SC	MSCI USA Small Cap	7.30%	21.64%
Equity	Intl Dev	Intl Dev	MSCI World Ex US	8.11%	16.39%
Equity	EM	EM	MSCI Emerging Markets	9.03%	21.11%
Alternatives	Global L/S	HF	BlackRock Proxy HF (Global Fund Weighted, hedged)	8.21%	7.30%
Alternatives	Real Asset	RE	BlackRock Proxy US Core Real Estate	4.79%	12.17%
Alternatives	PE	PE	BlackRock Proxy Global PE Buyout	13.65%	30.58%
Alternatives	Infra	Infra	BlackRock Proxy Global Infrastructure Equity	10.78%	18.75%
Alternatives	Private Credit	Prv Credit	BlackRock Proxy Direct Lending	8.91%	11.99%

The representative indices listed above may differ from those that are publicly available, but the underlying methodology and assumptions are consistent. BlackRock expected market return information is based on BlackRock's long-term capital market assumptions as of May 2022 which are subject to change. Capital market assumptions contain forward-looking information that is not purely historical in nature. They should not be construed as guarantees of future returns. The projections in the chart above are based on BlackRock's proprietary long-term capital markets assumptions (10+ years) for risk and geometric return (above) and correlations between major asset classes. These asset class assumptions are passive only and do not consider the impact of active management. The assumptions are presented for illustrative purposes only and should not be used, or relied upon, to make investment decisions. The assumptions are not meant to be a representation of, nor should they be interpreted as BlackRock's investment recommendations. Allocations, assumptions, and expected returns are not meant to represent BlackRock performance. Long-term capital markets assumptions are subject to high levels of uncertainty regarding future economic and market factors that may affect actual future performance. Ultimately, the value of these assumptions is not in their accuracy as estimates of future returns, but in their ability to capture relevant relationships and changes in those relationships as a function of economic and market influences. Please note all information shown is based on assumptions, therefore, exclusive reliance on these assumptions is incomplete and not advised. The individual asset class assumptions are not a promise of future performance. Indexes are unmanaged and used for illustrative purposes only and are not intended to be indicative of any fund's performance. It is not possible to invest directly in an index.

BlackRock Capital Market Assumptions Methodology and Limitations

BlackRock Capital Market Assumptions

This information is not intended as a recommendation to invest in any particular asset class or strategy or as a promise of future performance. Note that these asset class assumptions are passive, and do not consider the impact of active management. All estimates in this document are in U.S. dollar terms unless noted otherwise. Given the complex risk-reward trade-offs involved, we advise clients to rely on judgment as well as quantitative optimization approaches in setting strategic allocations to all the asset classes and strategies.

References to future returns are not promises or even estimates of actual returns a client portfolio may achieve. Assumptions, opinions and estimates are provided for illustrative purposes only. They should not be relied upon as recommendations to buy or sell securities. Forecasts of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. We believe the information provided here is reliable, but do not warrant its accuracy or completeness. This material has been prepared for information purposes only and is not intended to provide, and should not be relied on for, accounting, legal, or tax advice.

The outputs of the assumptions are provided for illustration purposes only and are subject to significant limitations. “Expected” return estimates are subject to uncertainty and error. Expected returns for each asset class can be conditional on economic scenarios; in the event a particular scenario comes to pass, actual returns could be significantly higher or lower than forecasted. Because of the inherent limitations of all models, potential investors should not rely exclusively on the model when making an investment decision. The model cannot account for the impact that economic, market, and other factors may have on the implementation and ongoing management of an actual investment portfolio. Unlike actual portfolio outcomes, the model outcomes do not reflect actual trading, liquidity constraints, fees, expenses, taxes and other factors that could impact future returns.

BlackRock 5-year asset return and long-term volatility assumptions

Five-year and long-term equilibrium annualized return assumptions are in geometric terms. Return assumptions are total nominal returns. Return assumptions for all asset classes are shown in unhedged terms, with the exception of global ex-US treasuries. We use long-term volatility assumptions. We break down each asset class into factor exposures and analyze those factors' historical volatilities and correlations over the past 15 years. We combine the historical volatilities with the current factor makeup of each asset class to arrive at our forward-looking assumptions. This approach takes into account how asset classes evolve over time. Example: Some fixed income indices are of shorter or longer duration than they were in the past. Our forward-looking assumptions reflect these changes, whereas a volatility calculation based only on historical monthly index returns would fail to capture the shifts. We have created BlackRock proxies to represent asset classes where historical data is either lacking or of poor quality. Expected return estimates are subject to uncertainty and error. Expected returns for each asset class can be conditional on economic scenarios; in the event a particular scenario comes to pass, actual returns could be significantly higher or lower than forecasted. The geometric return, sometimes called the time-weighted rate of return, takes into account the effects of compounding over the investment period. The arithmetic return can be thought of as a simple average calculated by taking the individual annual returns divided by the number of years in the investment period.

Index returns are for illustrative purposes only and do not represent any actual fund performance. Index performance returns do not reflect any management fees, transaction costs or expenses. Indexes are unmanaged and one cannot invest directly in an index. Past performance does not guarantee future results.

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FOR MORE INFORMATION: www.BlackRock.com

Important Information

Client
Insight
Unit

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Impact of COVID-19 on Retirement

June 23, 2022

DEAN ACTUARIES, LLC

Impact of COVID-19 on Retirement

- Mortality
- Inflation
- Investment Return
- Other Repercussions

Mortality

- 2020 Experience
- Future Expectations

Mortality

- Mortality 21.1% higher than expected
- 80% of excess deaths attributable to COVID
  - COVID was main cause of excess deaths over age 45
  - other factors were predominantly the cause of excess deaths at younger ages

Mortality

EXCESS MORTALITY RATES FOR THE 40 WEEKS MARCH 22, 2020 THROUGH DEC. 26, 2020

	Females			Males		
Age	**Excess Deaths**	**COVID**	**Exc COVID**	**Excess Deaths**	**COVID**	**Exc COVID**
15–24	19.00%	3.60%	15.40%	25.30%	2.10%	23.20%
25–34	18.70%	6.30%	12.40%	22.50%	4.70%	17.90%
35–44	24.00%	9.40%	14.60%	28.90%	10.10%	18.80%
45–54	22.80%	12.70%	10.20%	28.70%	15.80%	12.90%
55–64	16.40%	13.70%	2.60%	21.20%	15.90%	5.30%
65–74	20.40%	16.60%	3.90%	22.80%	19.20%	3.70%
75–84	21.20%	17.70%	3.50%	23.50%	20.80%	2.70%
>84	19.50%	17.00%	2.50%	19.40%	18.90%	0.40%
All ages	**19.70%**	**16.00%**	**3.70%**	**22.30%**	**17.50%**	**4.80%**

Mortality

- Life expectancy at birth declined from 2019 to 2020 in 27 of 29 western countries
  - Denmark and Norway were the only exceptions
  - Largest decline was in USA
- In many countries, the decline offset previous 4 years gains

Mortality

- Random occurrence with one-time effect that has little effect on future mortality?
- Leave a healthier population with stronger immune systems and lower future mortality?
- Residual long-term effects on survivors that increases future mortality?

Mortality

2022 OASDI Trustees Report adjusted mortality for the impact of COVID-19

- 16.1% higher (ages 15-64) and 16.1% higher (age 65+) in 2020
- 19.5% and 17.5% higher in 2021
- 5.9% and 4.7% higher in 2022
- 1.2% and 0.9% higher in 2023
- Offsetting impact beyond 2023

Mortality

- Retirees
  - COVID deaths heavily concentrated at older ages
  - Most fatalities occurred among people with other serious health risks
- Actives
  - Longer time horizon for long-term effects to emerge?

Inflation

- Supply chain disruption
  - temporary effect?
- Increase in federal debt
  - long-term impact?

Inflation

Impact on Plan Funding

- Plans with COLA most impacted
  - impact tempered by annual 3% cap
- Final-pay plans
  - pay increases keep pace with inflation
  - increased liability for long-service actives

Inflation

Impact on Plan Participants

- Active participants
  - Final-pay formula offers good protection against inflation during working career
- Retirees
  - Purchasing power of benefit decreases – even in plans with COLA

Investment Return

- It was really good
- Then it wasn't

Investment Return

- Active plans in aggregate as of 7-1-2021
  - AAV 88.9% of MV
  - $81.96M in unrecognized investment gains
- To achieve 7.25% AAV return for FY2022, return on market value must be at least -9.81%

Other Repercussions

- Municipal revenue
- Many people retired earlier than planned
- Many employees plan on working longer than they had planned
- Demand for flexibility in hours and location

Other Repercussions

- Retirees and employees generally reduced spending
- Retiree concerns
  - Inflation
  - Housing
  - Long-term care

Other Repercussions

- Lump sum distributions
- Women more affected by family responsibilities
- Recurrence of familiar viruses
- Future pandemics?

Oklahoma Municipal Retirement Fund

Social Security and ASOP 4

6/23/2022

DEAN ACTUARIES

Actuarial Topics of Importance

- *The Future of Social Security*

- *Managing pension plan financial risk*
  - *Plan design*
  - *Asset and liability immunization*

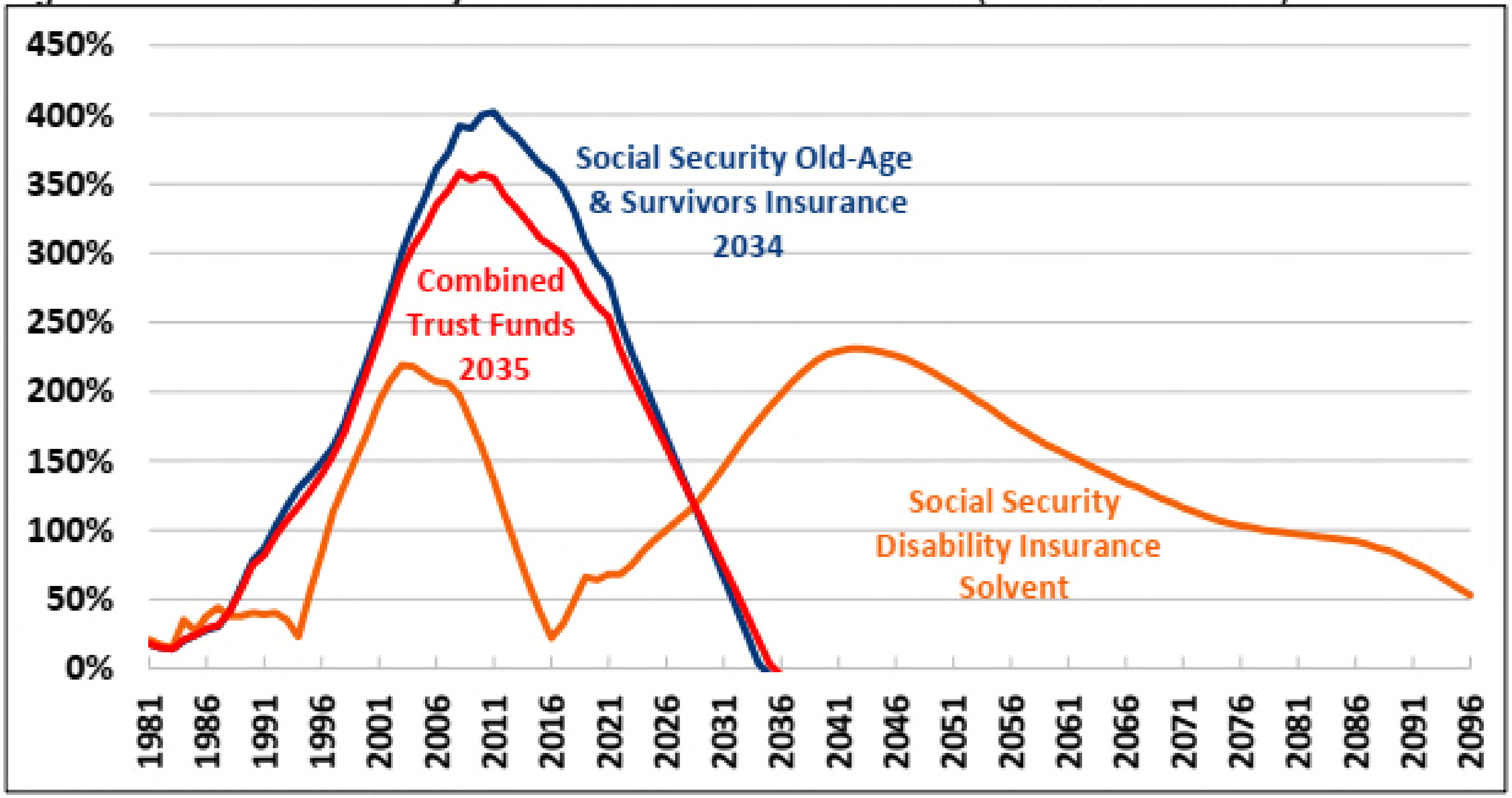
- *Retirement planning*
  - *Before retirement*
  - *After retirement*
  - *Draw down strategy for DC plans*

- *Hybrid plans and Cash Balance Plans*

- *ASOP 4*
  - *Important new disclosure - what , why, when*
  - *Not without danger*

Social Security Status

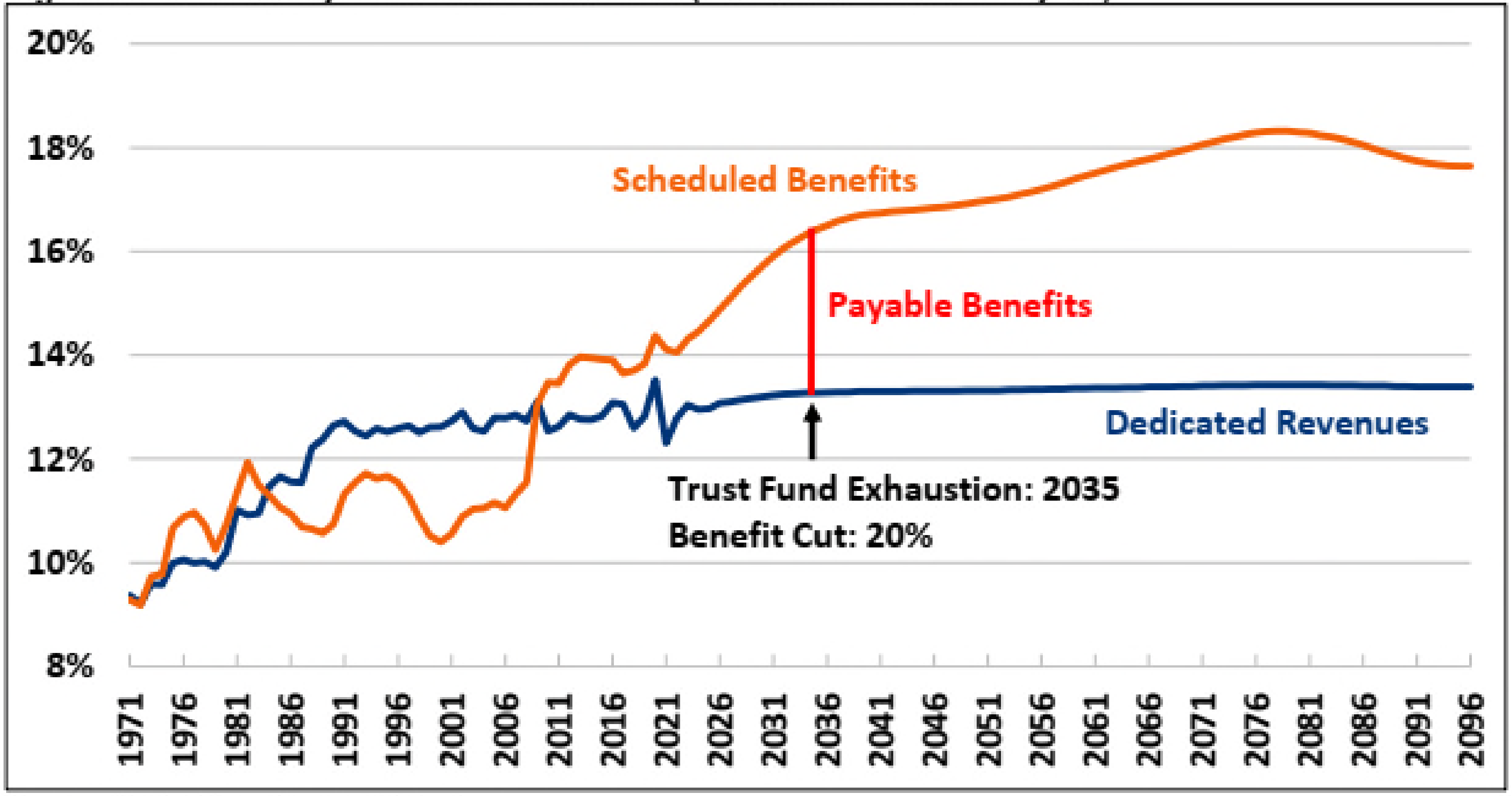
Fig. 1: Ratio of Social Security Trust Fund Reserves to Benefits (Percent of Benefits)



Source: Social Security Administration.

Social Security – Cut backs Coming

Fig. 2: Social Security Revenue and Benefits (Percent of Taxable Payroll)



Source: Social Security Administration.

2022 Trustees Report vs 2021 Report

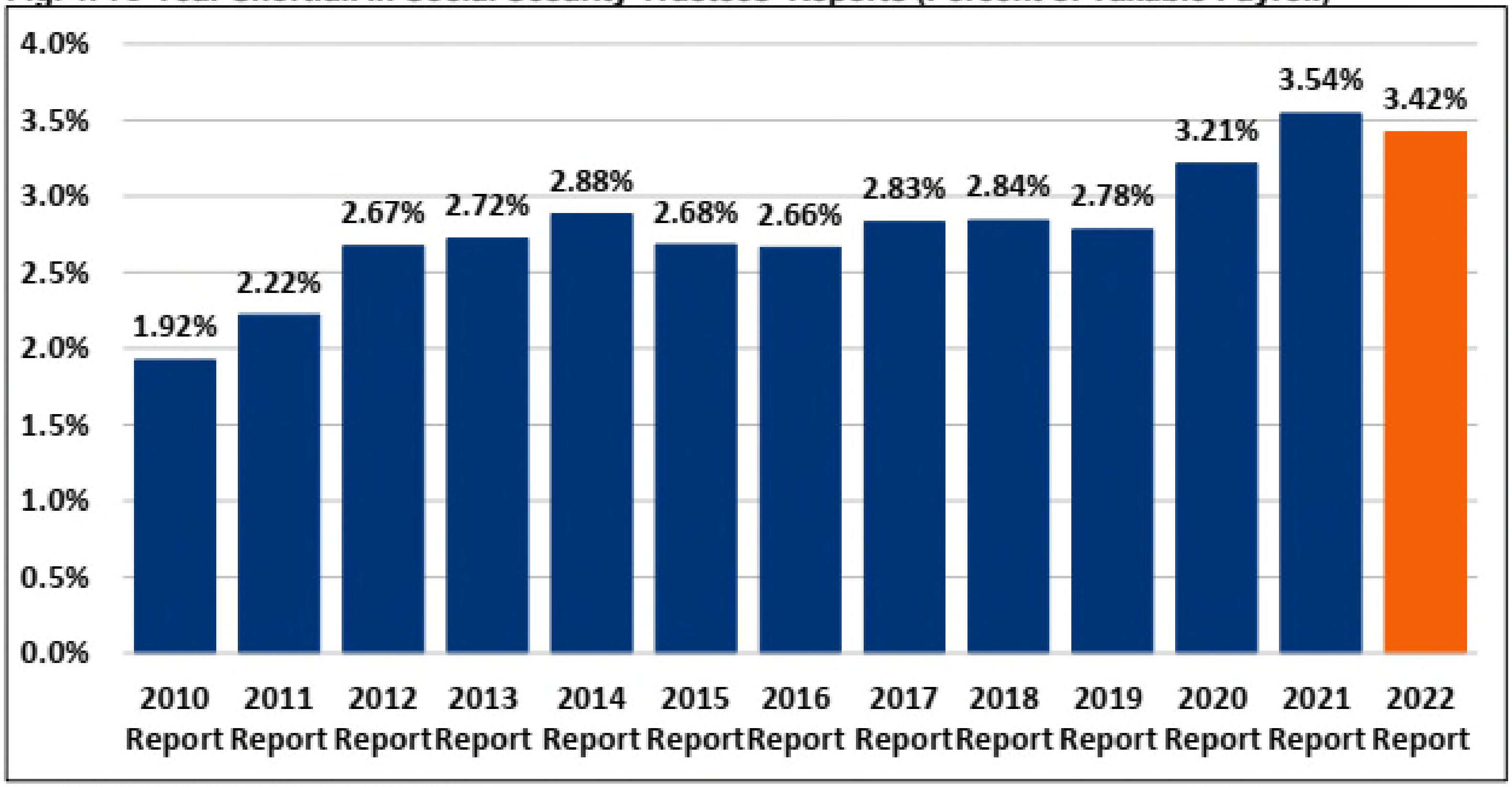
Fig. 3: Reasons for Change in 75-Year Actuarial Shortfall (Percent of Taxable Payroll)

	Effect on 75-Year OASI Shortfall	Effect on 75-Year SSDI Shortfall	Effect on 75-Year OASDI Shortfall
75-Year Actuarial Imbalance in 2021 Report	**-3.46%**	**-0.08%**	**-3.54%**
Change in Demographic Assumptions	-0.04%	0.00%	-0.04%
Change in Economic Assumptions	0.13%	0.00%	0.13%
Change in Disability Assumptions	0.00%	0.08%	0.07%
Methods and Programmatic Data	0.01%	0.00%	0.01%
Shifting of 75-Year Window	-0.05%	-0.01%	-0.06%
75-Year Actuarial Imbalance in 2022 Report	**-3.41%**	**-0.01%**	**-3.42%**

Source: Social Security Administration. Numbers may not sum due to rounding.

2022 Trustees Report vs 2021 Report

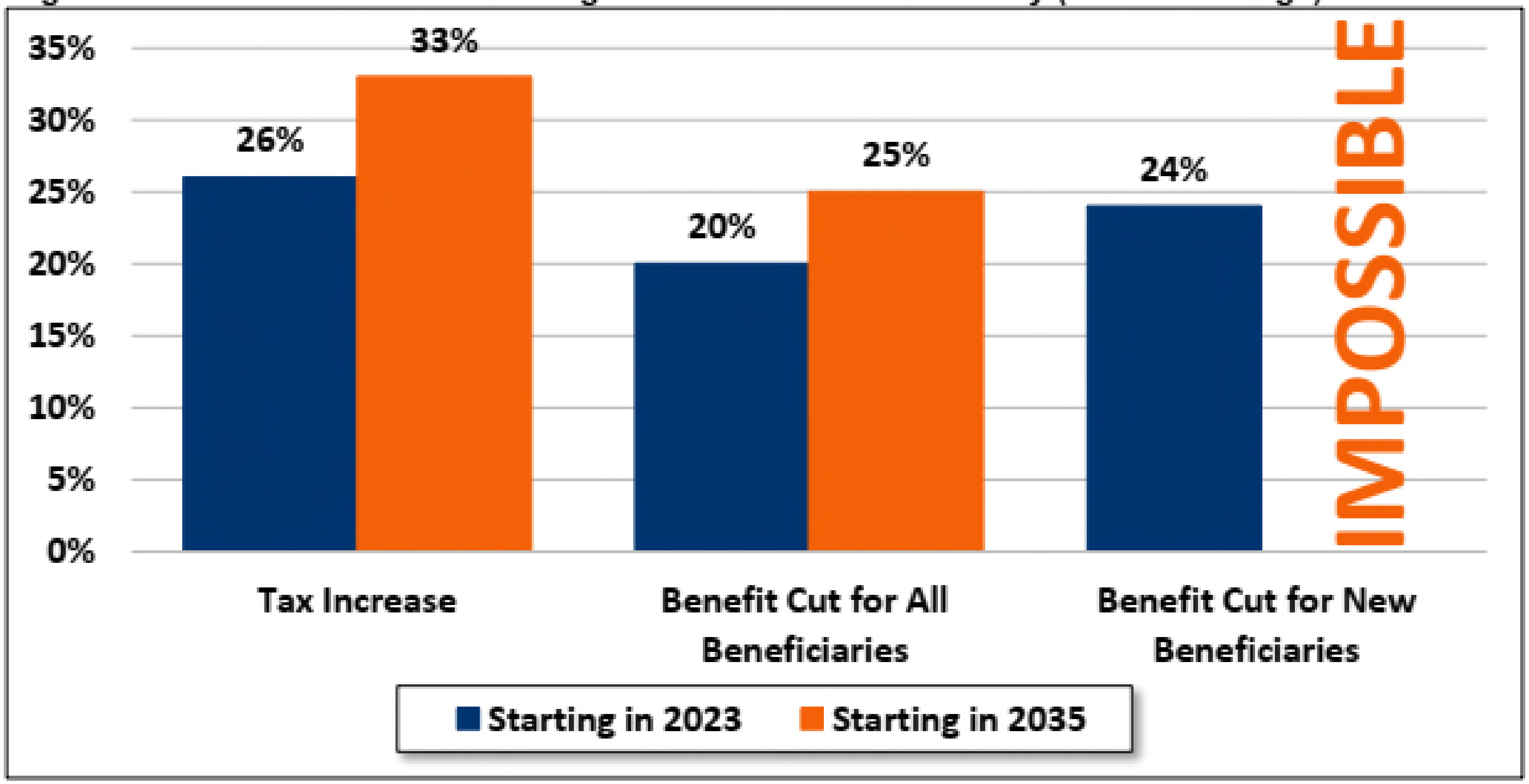
Fig. 4: 75-Year Shortfall in Social Security Trustees' Reports (Percent of Taxable Payroll)



Source: Social Security Administration.

Social Security – How Painful is the Fix?

Fig. 5: Tax Increases or Benefit Changes Need to Achieve Solvency (Percent Change)



Source: Social Security Administration.

Social Security – Possible Solutions?

- **Change eligibility age**
  - **Age 69 in RSC plan Rep Jim Banks**

- **Change COLA index definition**

- **Fix 35 year issue for employees with less than 35 years**

- **Change basic formula**
  - **Average Indexed Monthly Earnings (AIME) 35 years**
  - **PIA = 90% AIME up to $1,024 plus**
    32% AIME from $1,024 to $6,172 plus
    15% AIME above $6,172
- **Tax changes**
  - **Eliminate the Taxable Wage Base ceiling**
  - **Higher taxes above 400,000**
  - **Higher tax rates**

ASOP 4

Actuarial Standards Board

Opinions are a professional requirement not a choice

Comparisons to FASB GASB

ASOP 4

1. ***ASOP No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions;***
2. ***ASOP No. 27, Selection of Economic Assumptions for Measuring Pension Obligations;***
3. ***ASOP No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations;***
4. ***ASOP No. 44, Selection and Use of Asset Valuation Methods for Pension Valuations; and***
5. ***ASOP No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions.***

ASOP 4

Exposure draft March 2018

Exposure draft December 2019

Third version in 2021

Final version in 2022

Effective for Measurement Dates After February 15, 2023

ASOP 4 – Where did it come from

- **Financial economics**
    - ***Risk free rate of return***
    - ***Defeasance concept***
- **Pension Protection Act of 2006 for ERISA plans**
- **Related to asset - liability matching and immunization**

ASOP 4 – two key topics

Reasonable Actuarially Determined Contribution in actuarial reports

- *Cost method*
- *Asset smoothing*
- *Amortization pattern and period*

Disclosure of Market-Based Liability

Low-Default Risk Obligation Measure LDROM

An actuarial calculation with new discount rates

ASOP 4 – Market based liability

Benefits accrued as of the valuation date;

The unit credit cost method;

Discount rates that are either

> ***U.S. Treasury yields; or***
>
> ***rates at which pension obligations can be effectively settled. (e.g., yields on fixed-income debt securities that receive one of the two highest ratings given by a recognized ratings agency); and***

Assumptions, other than discount rates, used in the valuation or other reasonable assumptions based on estimates in market data.

ASOP 4 – Market based liability

Means:

- ***Low discount rate(s) perhaps even an entire bond yield curve***
- ***No benefits to be earned in the future***
- ***No salary scale***
- ***Other valuation assumptions: turnover, retirement rates, mortality***

ASOP 4 – Market based liability

Discount rate is derived from

> ***"low-default-risk income securities whose cash flows are consistent with the pattern of benefits expected to be paid in the future."***

Best practice would seem to be using a full bond yield curve based on high credit quality bonds.

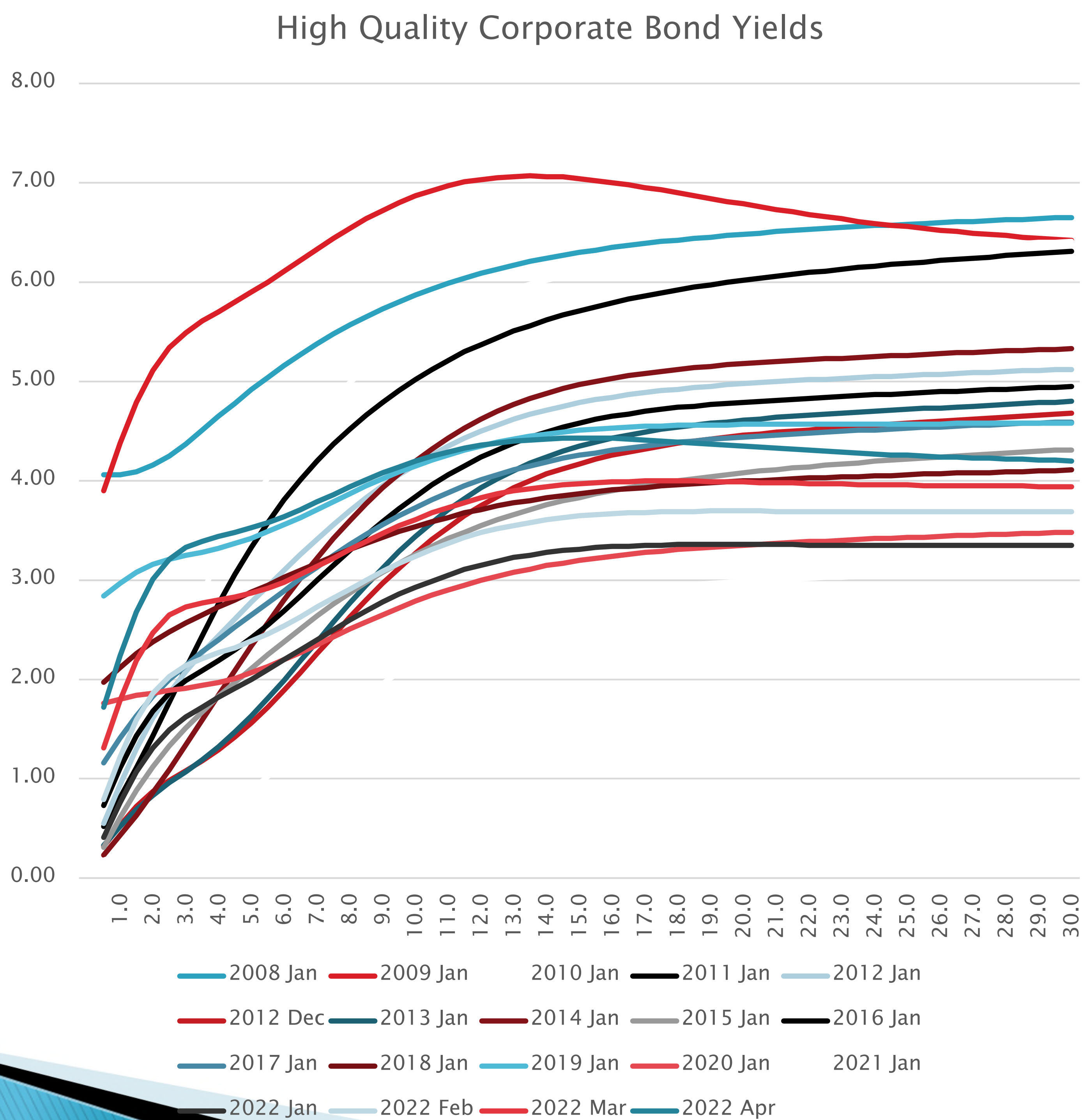
ASOP 4 – Market based liability

What Is Investment Grade?

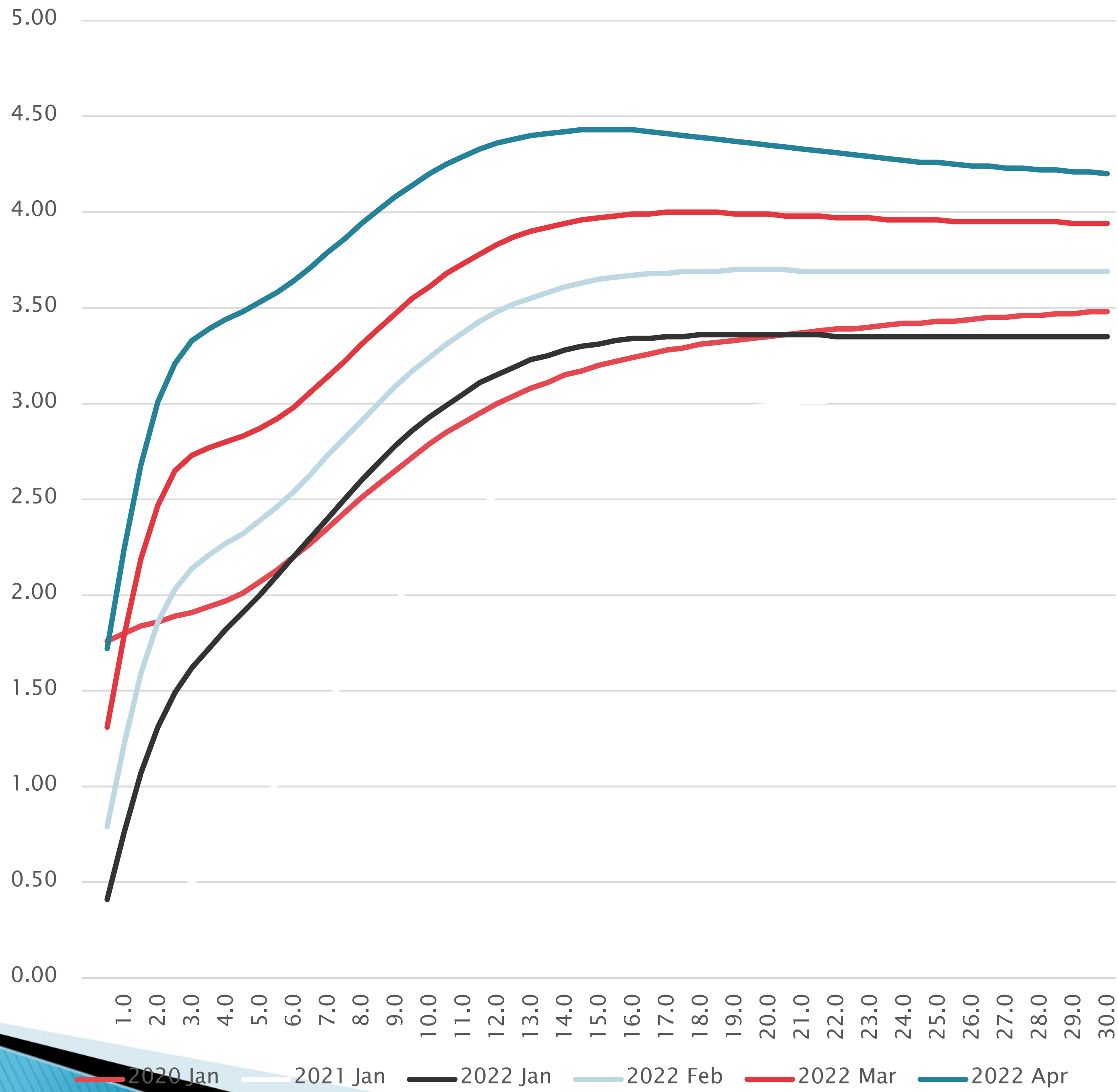
An investment grade is a rating that signifies a municipal or corporate bond presents a relatively low risk of default. Bond rating firms like Standard & Poor's and Moody's use different designations, consisting of the upper- and lower-case letters "A" and "B," to identify a bond's credit quality rating.

"AAA" and "AA" (high credit quality) and "A" and "BBB" (medium credit quality) are considered investment grade.

High Quality Corporate Bond Yields



High Quality Corporate Bond Yields



ASOP 4 – As applied to ERISA plans

Pension Protection Act incorporated Financial Economics ideas

with major alterations.

***Funding Target** is the Present Value of Accrued Benefits discounted*

- ***Using a full bond yield curve***
- ***Or a 3 segment rate approximation to full yield curve.***

Modifications:

- ***Use +/- 10% corridor of 25 year average yield curve for minimum funding***
- ***Use 24 month average without yield curve for maximum contribution***
- ***Use one month segment rates for paying lump sums to participants.***

ASOP 4 – Issues for OkMRF

A blessing or a curse?

Communication issue

- **LDROM is *not* used for funding – what should it be used for**
- **Can be used to argue that plan is underfunded even is funding schedule is appropriate and is being systematically followed**
- **Education for the reader of the actuarial report**
- **Should 7/1/2022 valuation include an explanation of what ASOP 4 will require and how to view it? ASOP 4 disclosures will be needed for 7/1/2023 valuation in any case.**

Thank you!

Chuck Dean, FSA

Oklahoma Municipal Retirement Fund

Social Security and ASOP 4

6/23/2022

Dean Actuaries

Actuarial Topics of Importance

- *The Future of Social Security*

- *Managing pension plan financial risk*
  - *Plan design*
  - *Asset and liability immunization*

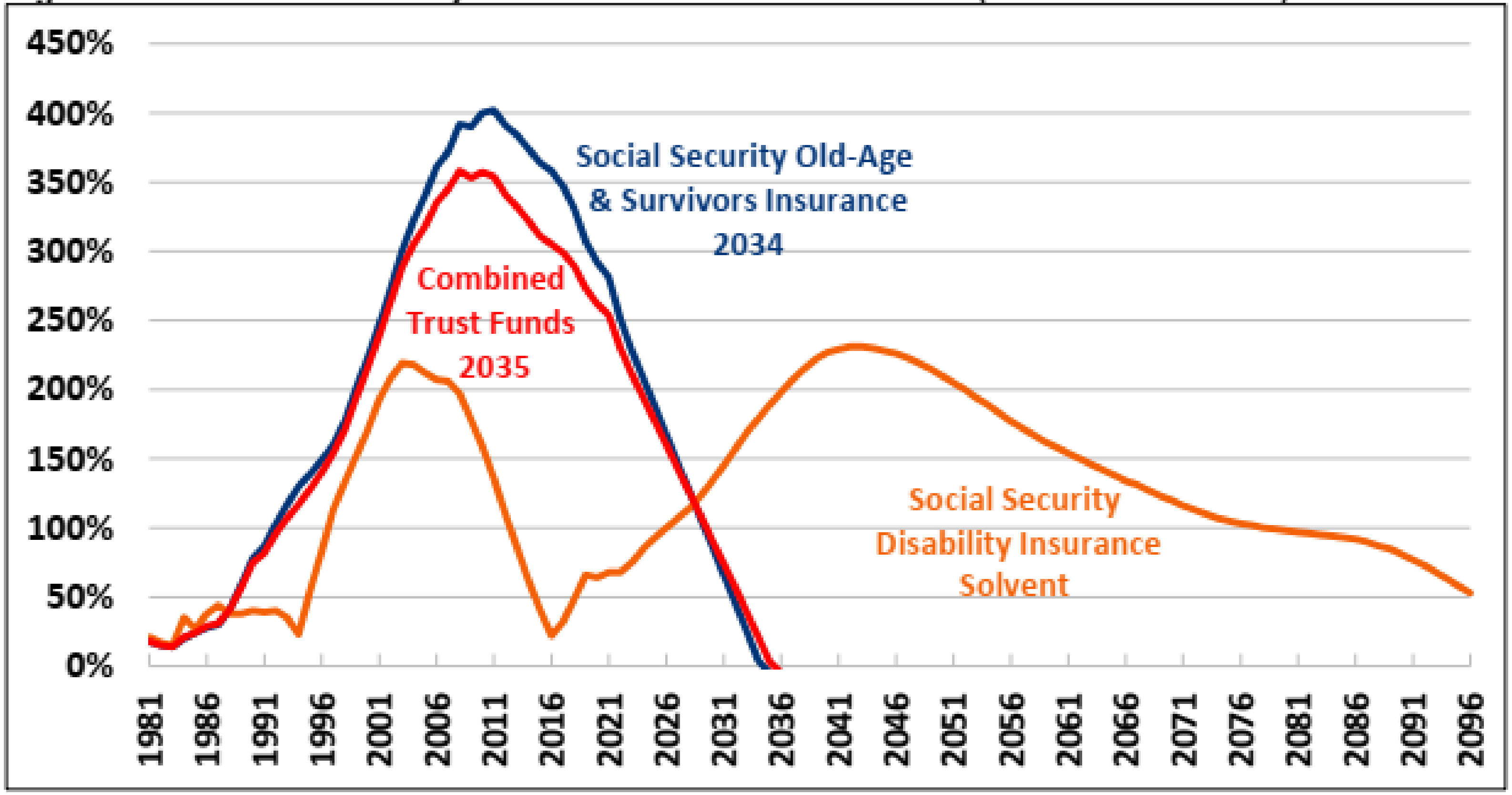
- *Retirement planning*
  - *Before retirement*
  - *After retirement*
  - *Draw down strategy for DC plans*

- *Hybrid plans and Cash Balance Plans*

- *ASOP 4*
  - *Important new disclosure - what , why, when*
  - *Not without danger*

Social Security Status

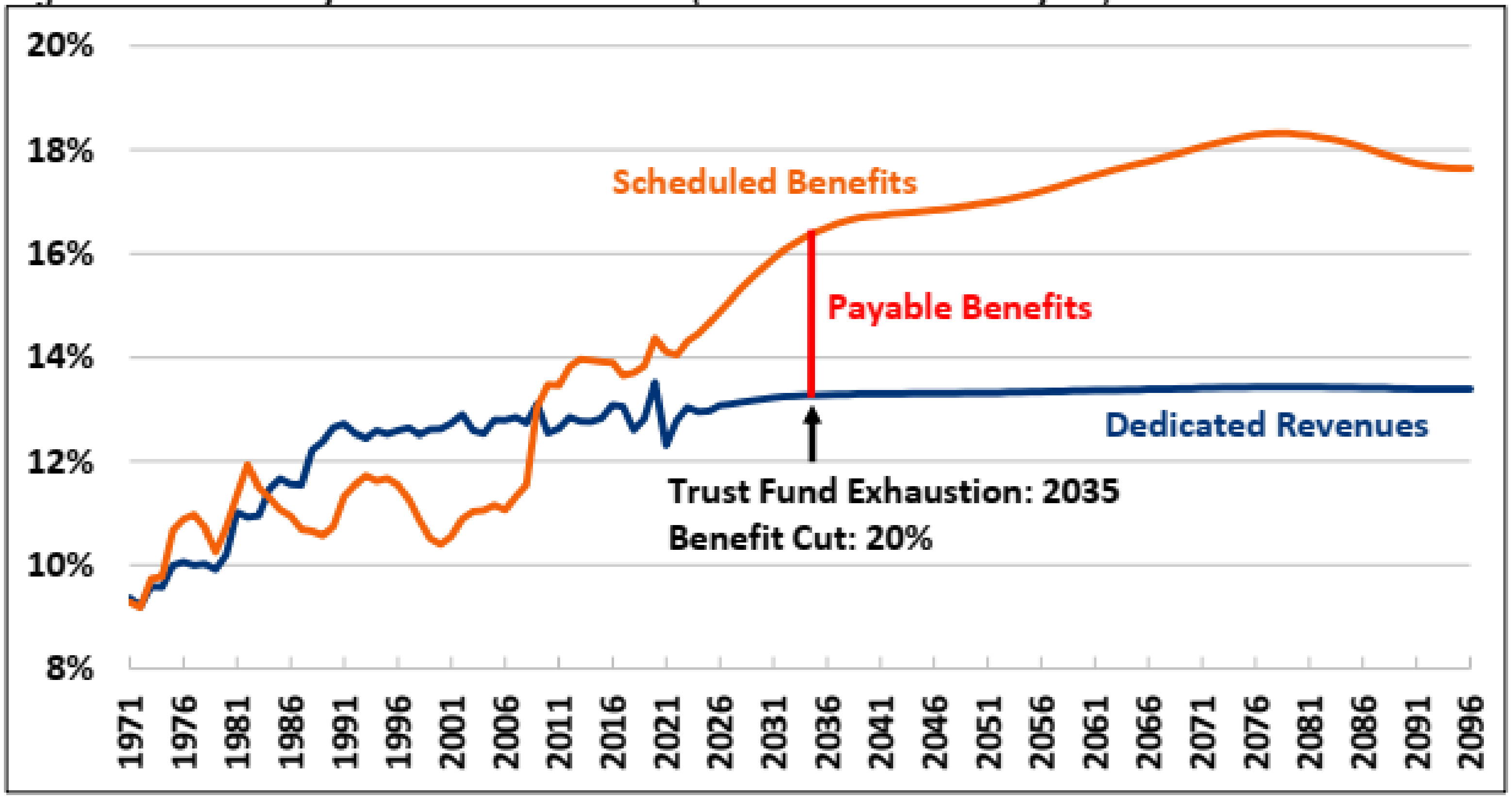
Fig. 1: Ratio of Social Security Trust Fund Reserves to Benefits (Percent of Benefits)



Source: Social Security Administration.

Social Security – Cut backs Coming

Fig. 2: Social Security Revenue and Benefits (Percent of Taxable Payroll)



Source: Social Security Administration.

2022 Trustees Report vs 2021 Report

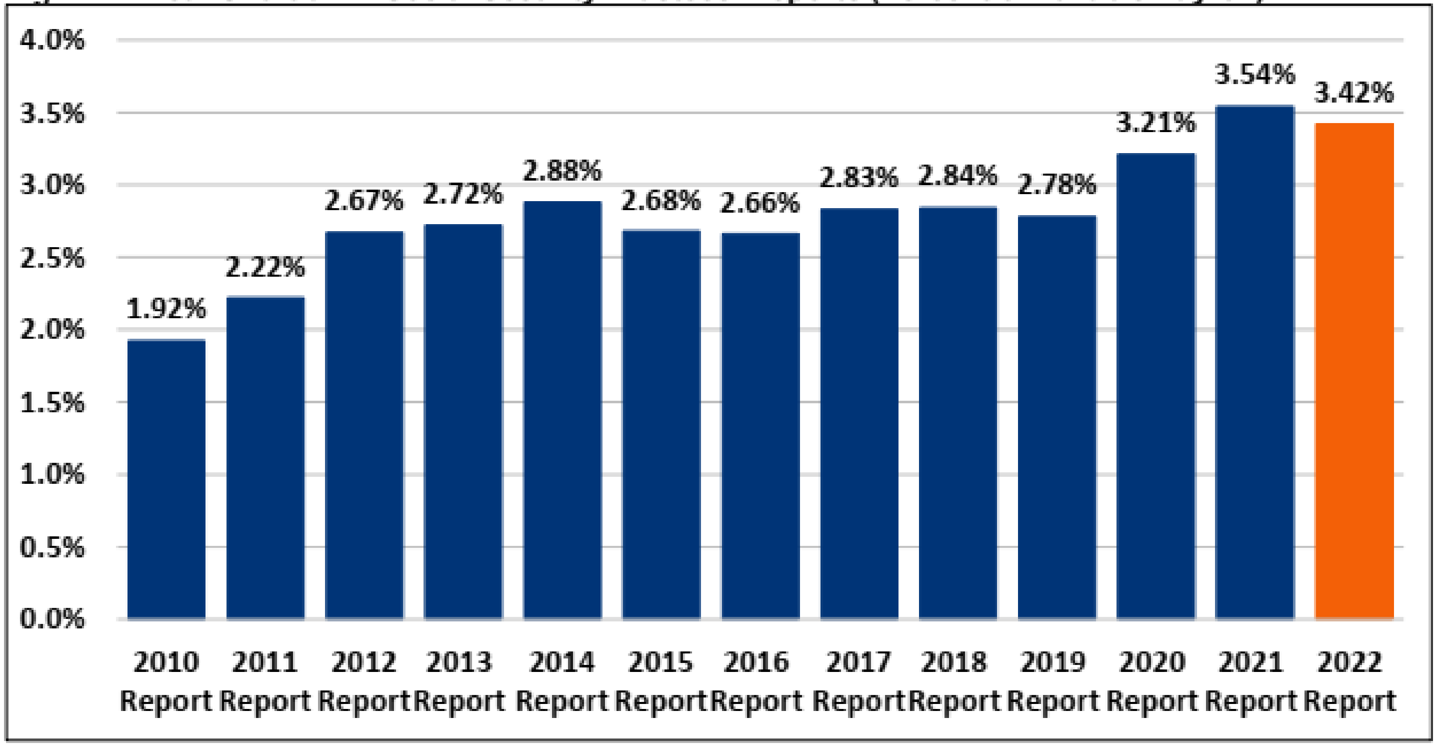
Fig. 3: Reasons for Change in 75-Year Actuarial Shortfall (Percent of Taxable Payroll)

	Effect on 75-Year OASI Shortfall	Effect on 75-Year SSDI Shortfall	Effect on 75-Year OASDI Shortfall
75-Year Actuarial Imbalance in 2021 Report	**-3.46%**	**-0.08%**	**-3.54%**
Change in Demographic Assumptions	-0.04%	0.00%	-0.04%
Change in Economic Assumptions	0.13%	0.00%	0.13%
Change in Disability Assumptions	0.00%	0.08%	0.07%
Methods and Programmatic Data	0.01%	0.00%	0.01%
Shifting of 75-Year Window	-0.05%	-0.01%	-0.06%
75-Year Actuarial Imbalance in 2022 Report	**-3.41%**	**-0.01%**	**-3.42%**

Source: Social Security Administration. Numbers may not sum due to rounding.

2022 Trustees Report vs 2021 Report

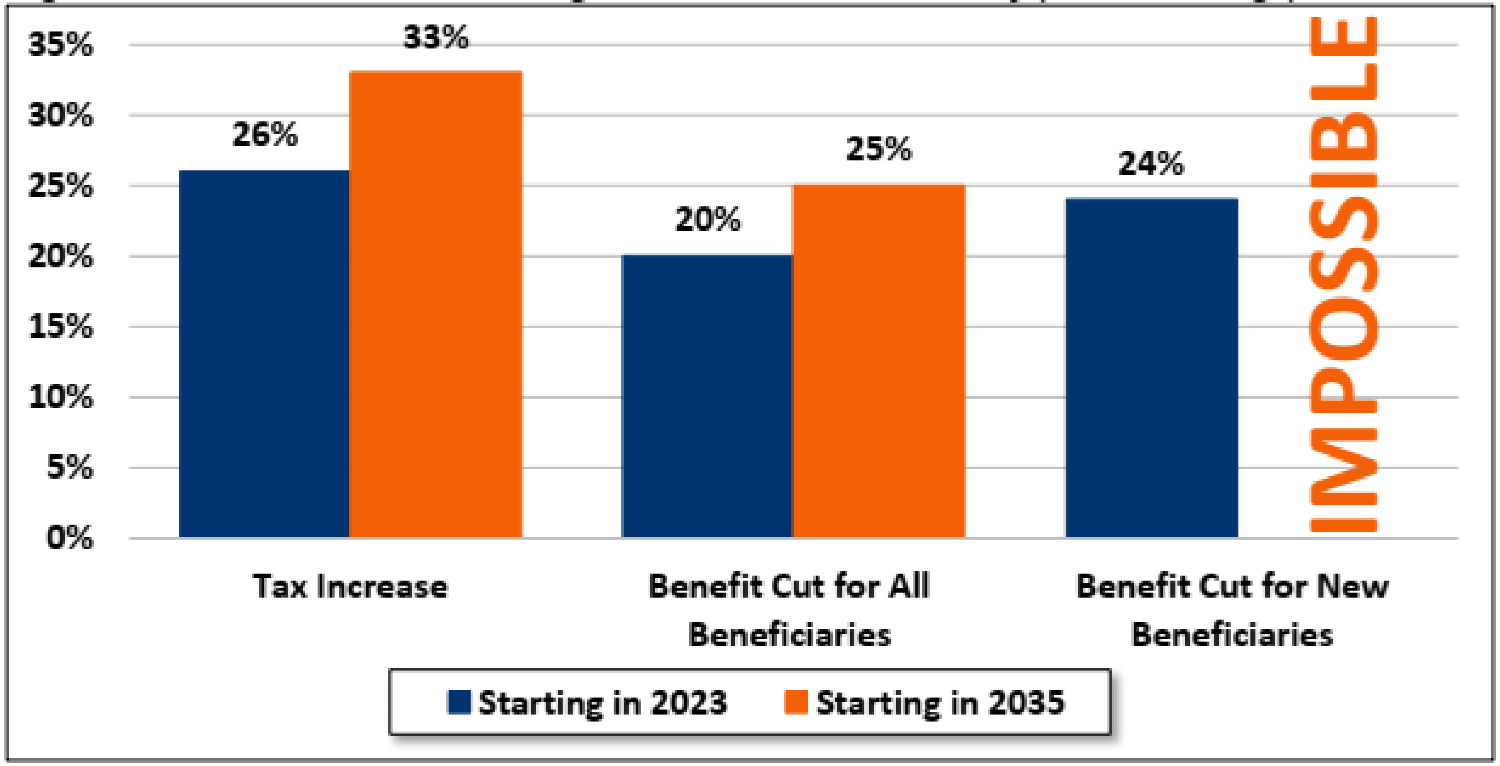
Fig. 4: 75-Year Shortfall in Social Security Trustees' Reports (Percent of Taxable Payroll)



Source: Social Security Administration.

Social Security – How Painful is the Fix?

Fig. 5: Tax Increases or Benefit Changes Need to Achieve Solvency (Percent Change)



Source: Social Security Administration.

Social Security – Possible Solutions?

- Change eligibility age
  - Age 69 in RSC plan Rep Jim Banks

- Change COLA index definition

- Fix 35 year issue for employees with less than 35 years

- Change basic formula
  - Average Indexed Monthly Earnings (AIME) 35 years
  - PIA = 90% AIME up to $1,024 plus
    32% AIME from $1,024 to $6,172 plus
    15% AIME above $6,172
- Tax changes
  - Eliminate the Taxable Wage Base ceiling
  - Higher taxes above 400,000
  - Higher tax rates

ASOP 4

Actuarial Standards Board

Opinions are a professional requirement not a choice

Comparisons to FASB GASB

ASOP 4

1. *ASOP No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions;*
2. *ASOP No. 27, Selection of Economic Assumptions for Measuring Pension Obligations;*
3. *ASOP No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations;*
4. *ASOP No. 44, Selection and Use of Asset Valuation Methods for Pension Valuations; and*
5. *ASOP No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions.*

ASOP 4

Exposure draft March 2018

Exposure draft December 2019

Third version in 2021

Final version in 2022

Effective for Measurement Dates After February 15, 2023

ASOP 4 – Where did it come from

- **Financial economics**
  - ***Risk free rate of return***
  - ***Defeasance concept***
- **Pension Protection Act of 2006 for ERISA plans**
- **Related to asset - liability matching and immunization**

ASOP 4 – two key topics

Reasonable Actuarially Determined Contribution in actuarial reports

- ***Cost method***
- ***Asset smoothing***
- ***Amortization pattern and period***

Disclosure of Market-Based Liability

Low-Default Risk Obligation Measure LDROM

An actuarial calculation with new discount rates

ASOP 4 – Market based liability

Benefits accrued as of the valuation date;

The unit credit cost method;

Discount rates that are either

> ***U.S. Treasury yields; or***
>
> ***rates at which pension obligations can be effectively settled. (e.g., yields on fixed-income debt securities that receive one of the two highest ratings given by a recognized ratings agency); and***

Assumptions, other than discount rates, used in the valuation or other reasonable assumptions based on estimates in market data.

ASOP 4 – Market based liability

Means:

- *Low discount rate(s) perhaps even an entire bond yield curve*
- *No benefits to be earned in the future*
- *No salary scale*
- *Other valuation assumptions: turnover, retirement rates, mortality*

ASOP 4 – Market based liability

Discount rate is derived from

"low-default-risk income securities whose cash flows are consistent with the pattern of benefits expected to be paid in the future."

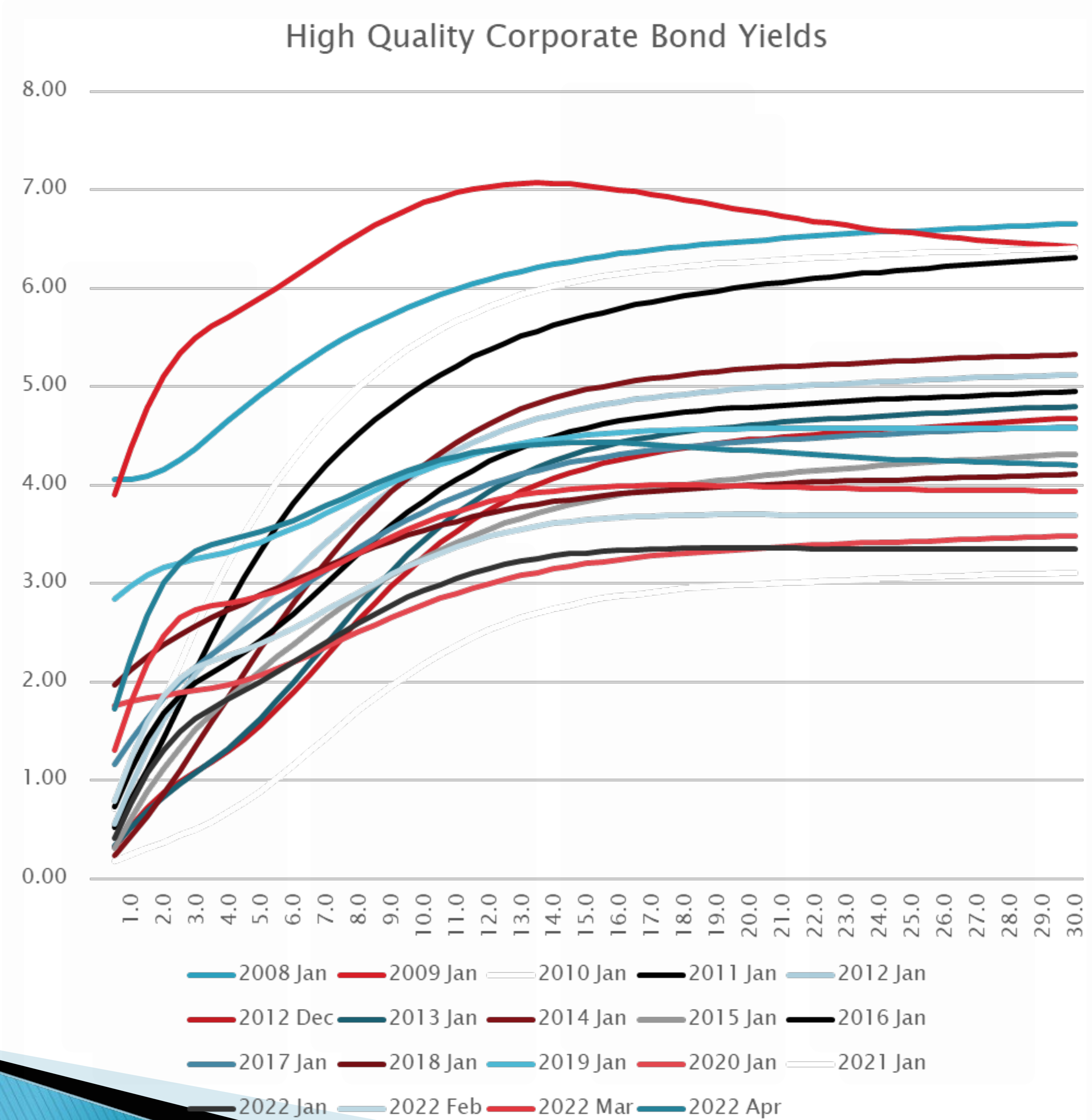
Best practice would seem to be using a full bond yield curve based on high credit quality bonds.

ASOP 4 – Market based liability

What Is Investment Grade?

An investment grade is a rating that signifies a municipal or corporate bond presents a relatively low risk of default. Bond rating firms like Standard & Poor's and Moody's use different designations, consisting of the upper- and lower-case letters "A" and "B," to identify a bond's credit quality rating.

"AAA" and "AA" (high credit quality) and "A" and "BBB" (medium credit quality) are considered investment grade.


High Quality Corporate Bond Yields
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
1.0
2.0
3.0
4.0
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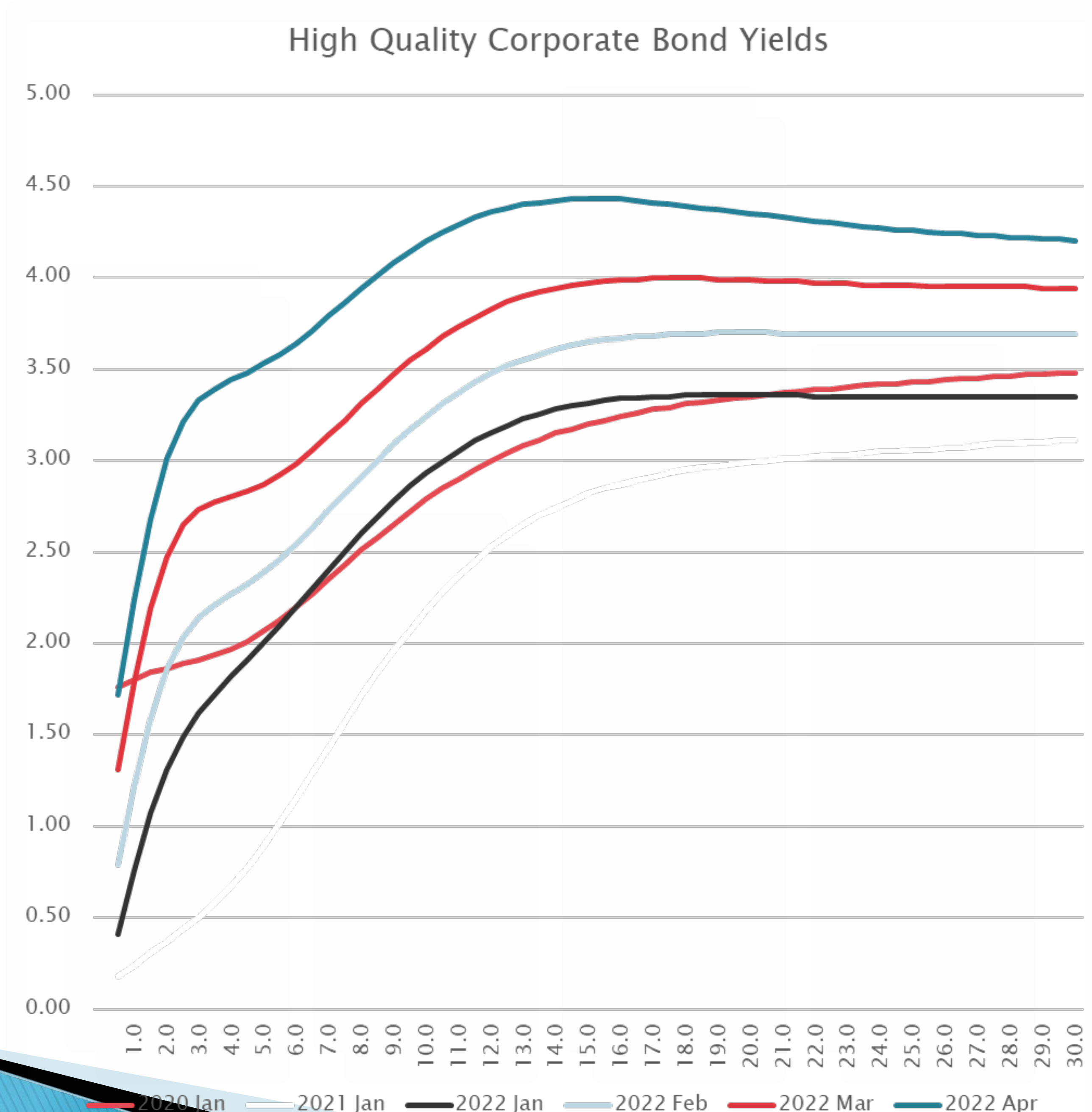

High Quality Corporate Bond Yields
5.00
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2020 Jan
2021 Jan
2022 Jan
2022 Feb
2022 Mar
2022 Apr

ASOP 4 – As applied to ERISA plans

Pension Protection Act incorporated Financial Economics ideas

with major alterations.

Funding Target is the Present Value of Accrued Benefits discounted

- ***Using a full bond yield curve***
- ***Or a 3 segment rate approximation to full yield curve.***

Modifications:

- ***Use +/- 10% corridor of 25 year average yield curve for minimum funding***
- ***Use 24 month average without yield curve for maximum contribution***
- ***Use one month segment rates for paying lump sums to participants.***

ASOP 4 – Issues for OkMRF

A blessing or a curse?

Communication issue

- **LDROM is *not* used for funding – what should it be used for**
- **Can be used to argue that plan is underfunded even is funding schedule is appropriate and is being systematically followed**
- **Education for the reader of the actuarial report**
- **Should 7/1/2022 valuation include an explanation of what ASOP 4 will require and how to view it? ASOP 4 disclosures will be needed for 7/1/2023 valuation in any case.**

Thank you!

Chuck Dean, FSA

Exploring emerging trends to serve the needs of government employees

Presented by:
Karen Eisenbach

Introduction

Karen Eisenbach

*Senior Vice President,
Chief Marketing Officer, Workplace,
Voya's Marketing Group*

Joined Voya in 2015

Education
Bachelor of Science, Business Administration, The Ohio State University

Current Responsibilities
Karen and her team focus on the strategy, development, and execution of marketing initiatives for Voya's Workplace Benefits and Savings business – which includes Employee Benefits, Health Savings Accounts, and Retirement Solutions. She is passionate about providing workplace benefit and saving solutions to help all Americans make a secure financial future possible.

Experience
Karen brings more than 30 years of marketing, sales, product management, and strategic planning experience to the role. Before joining Voya, she was executive director of Retirement Marketing at J.P. Morgan Asset Management, where she helped develop and launch a retirement offering for small and mid-sized corporate plan sponsors. She also managed her own consulting business, and held prior leadership positions with Nationwide Financial and National City Bank.

Karen is also a member of Voya's Enterprise Leadership Team, collaborating on the execution of strategy.

Personal
Karen is a member of the boards of directors for the Greater Hartford Arts Council and Creative Spirit, a non-profit devoted to creating integrated employment opportunities at the best companies in the world for individuals with intellectual and developmental disabilities.

America’s new financial reality

Let me tell you a story

Meet Sofia

- Early career
- Has student loan debt
- Lives paycheck to paycheck

Meet Sarah

- Mid-career
- New role as a sandwich caregiver
- Worried that a major health event would bankrupt her

Meet Alex

- Pre-retiree
- Must work longer to recoup lost retirement savings
- Concerned about the future cost of healthcare and professional caregiving

Financial unwellness today leads to an off-track retirement

Mounting student loan debt

96% of employees with student loan debt say they're likely to save more for retirement if they had their debt under control[1]

New role as a caregiver

83% of caregivers have taken time off work to provide care[2]

Mental health and inclusion

88% of employees feel mental health and inclusion are important building blocks to developing a strong workforce[3]

1 Voya Consumer Insights and Research, June 2020
2 "For the Benefit of All: How Organizations Win When They Recognize and Support Caregivers and Employees with Disabilities", Voya Financial, May 2019, voyacares.com/forthebenefitofall.
3 Based on the results of a Voya Financial survey conducted through Ipsos on the Ipsos eNation omnibus online platform among 1,004 adults aged 18+ in the U.S., representative of the general adult U.S. population. Research was conducted in November, 2021

Health and wealth are closely connected

$293,157
potential retirement healthcare savings gap[5]

40% indicate their health
has been impacted by financial worries[1]

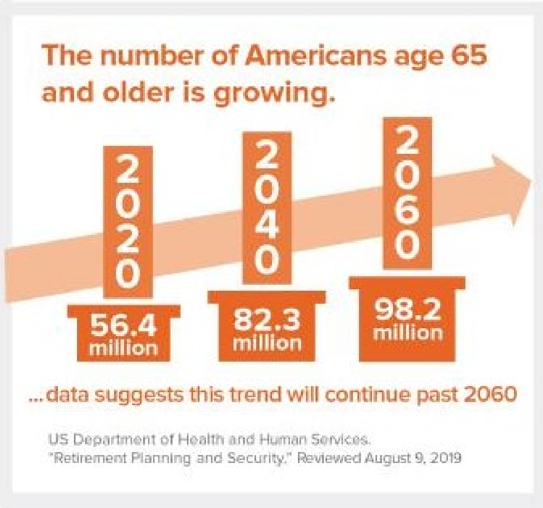
Health care costs are rising
2X as fast
as incomes[2]

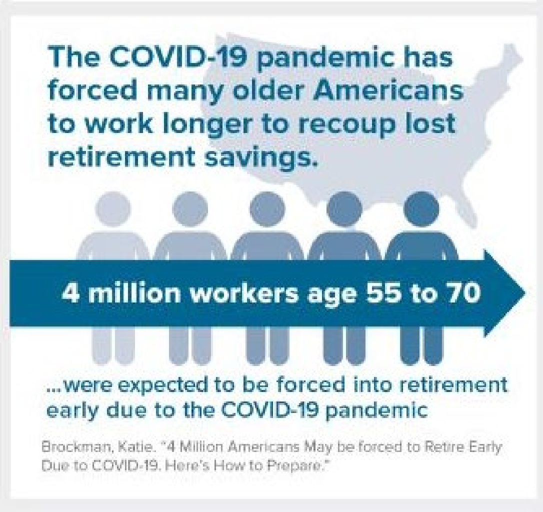
67% of bankruptcies
are caused by medical expenses[4]

#1 reason for hardship withdrawals from retirement plans are **Unexpected medical expenses[3]**

1 PWC Employee Financial Wellness Survey, 2018.
2 Based on 2018 data from the U.S. Agency for Healthcare Research and Quality's Medical Expenditure Survey.
3 Based on Voya internal data, 1/1/2021-7/31/2021.
4 American Journal of Public Health, Medical Bankruptcy: Still Common Despite the Affordable Care Act, 2019.
5 Improving HSA engagement, Voya white paper, Oct. 2019.

The average age of the workforce is increasing





The evolving benefits landscape

The evolving benefits landscape

More choice, responsibility and complexity than ever before

35%

of employed Americans

didn't fully understand any of the benefits they enrolled in during their most recent enrollment season[1]

More financial stress that impacts wellbeing

Stressors in the workplace:[2]

59% - financial stress

15% - my job

12% - relationships

10% - health concerns

4% - other stress

More look to the employer for help

78% of employees

rate their employer as a trusted source of information when it comes to making employee benefit decisions.[3]

79% of employees

trust the retirement plan services offered to them by their employer.[3]

1 Voya Consumer Insights & Research Team, Survey conducted through Ipsos, Dec. 2020.
2 PWC Employee Financial Wellness Survey, 2018.
3 Voya Consumer Insights Team, Plan Participant Survey, Jan. 2020.

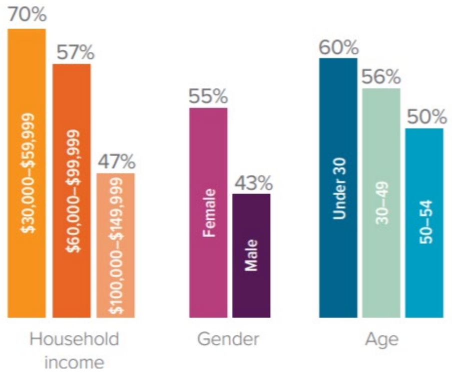
myHealth&Wealth

Building an emergency fund

Employees are vulnerable to financial emergencies

Little to no emergency savings – across all demographics

The prevalence of inadequate emergency savings[1] by:

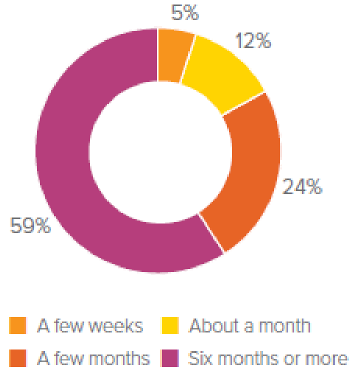


30%

of individuals have no emergency savings[1]

Financial shock from unplanned expenses is surprisingly common

How long it takes to recover from financial shock[2]



60%

of households experienced a financial shock in the previous 12 months[2]

1 Voya internal data, October 2020.
2 The Pew Charitable Trusts, Financial Security and Financial Shocks, May 2015.

VOYA FINANCIAL

Saving for unexpected expenses can help improve retirement outcomes

Protection

Spending & Saving

Emergency Fund

Retirement

Debt

Other Goals

Out-of-plan SOLUTION

Not tied to retirement plan, easy to implement

SOLUTION INCORPORATES

best practices for helping employees build emergency savings

- **Automated savings**
- **Option for employer contributions**
- **Employee engagement support & reporting**

An out-of-plan emergency savings solution can help employees build financial resiliency.

The costs of student loan debt

Student loan debt solutions can help employees and employers

44.7 million

Americans owe student loans worth more than **$1.56 trillion**[1]

$32,731

is the average student loan debt per person[1]

$393

is the average monthly student loan payment for graduates[2]

[1]Forbes, "Student Loan Debt Statistics In 2020: A Record $1.6 Trillion," February 2020.
[2]Credit.com, "U.S. Average Student Loan Debt Statistics," June 2019.

Planning for healthcare costs in retirement

Providing savings opportunities to help stay on track for retirement

Unplanned health event

when you're under saved for healthcare expenses

Hardship withdrawal from retirement plan

Unexpected expense

when you're under saved for emergencies

Borrow from retirement account

Under or over insured

when you're under saved for retirement

Lower retirement contribution rate

Helping active employees and retirees address healthcare expenses

$122k Out of pocket medical expenses From age 70 until death[1]

36% Of employees know how much they'll need for healthcare expenses in retirement[2]

#1 Healthcare availability and affordability Tops the list of Americans' worries for the 5th straight year.[3]

1. John Bailey Jones & Aaron Steelman, 2019. "**Lifetime Medical Spending of Retirees**," Richmond Fed Economic Brief, Federal Reserve Bank of Richmond, issue May.
2. Employee Benefit Research Institute and Greenwald & Associates, 2020 Retirement Confidence Survey.
3. Gallup, 2019. https://news.gallup.com/poll/248159/healthcare-once-again-tops-list-americans-worries.aspx

VOYA FINANCIAL

Helping active employees and retirees address healthcare expenses

2%

of HSA accountholders understand the full features and benefits of the account[1]

$2,803

Average assets in an HSA[2]

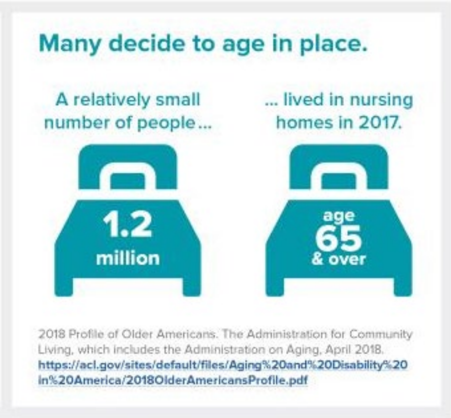
96%

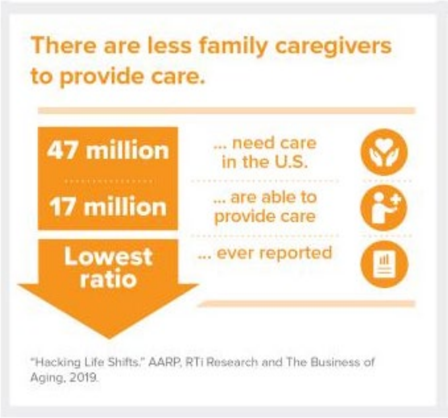
of annual HSA contributions are spent on qualified expenses during the plan year[3]

1. Voya Consumer Insights and Research Team, Health Plan Research, Understanding the selection and decision making process, October 9, 2020. Base: n=315
2. Employee Benefit Research Institute, 2020, https://www.ebri.org/docs/default-source/ebri-issue-brief/ebri_ib_497_hsalong-9jan20.pdf?sfvrsn=a30f3d2f_10
3. CNBC, 2020, https://www.cnbc.com/2020/01/23/americans-are-draining-hsa-and-spending-most-to-see-doctors.html

Providing support for caregivers

The cost of professional caregiving is increasing the need for family caregivers





https://www.voya.com/article/americas-new-retirement-reality-infographics

The impact of caregiving in the workplace

Employee replacement cost

31%

of caregivers have left one job for another due to caregiving duties[1]

22%

caregivers have quit work entirely[1]

Productivity loss

83%

of caregivers have taken time off work to provide care[1]

Time spent on caregiving

Family caregivers spend up to

32 hours

per week coordinating care.[2]

1. "For the Benefit of All: How Organizations Win When They Recognize and Support Caregivers and Employees with Disabilities", Voya Financial, May 2019, voyacares.com/forthebenefitofall.
2. *The Journey of Caregiving: Honor, Responsibility and Financial Complexity*, Age Wave/Merrill Lynch, 2017.

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Navigating the world of planning for caregivers

1. **Family assets and planning**
2. **Employee benefits**
3. **Government benefits**
4. **Legal planning***

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Bringing the story to life

Supporting employees with needs outside their retirement plan

MILLENNIUM TRUST COMPANY®
Emergency savings solution

Vault
Student loan debt solution

savvi financial
simply smart advice
Interactive guidance solution

Health Savings and Spending Account
Health account solution

Wellthy
Concierge caregiver support

Milliman
Defined Benefits solution

INTEGRATION
with pre-existing
benefits solutions
that are serving you well

MORNINGSTAR®
Voya Employee Benefits

Voya Nonqualified Benefits

VOYA INVESTMENT MANAGEMENT

Financial Engines®

Supporting employees with needs outside their retirement plan

Health Account Solutions, including Health Savings Accounts, Flexible Spending Accounts, Commuter Benefits, Health Reimbursement Arrangements, and COBRA Administration offered by Voya Benefits Company, LLC (in New York, doing business as Voya BC, LLC). HSA custodial services provided by WEX Inc. For all other products, administration services provided in part by WEX Health, Inc.

Wellthy is a separate entity and not a corporate affiliate of Voya Financial. All caregiver solutions provided by Wellthy.

Vault is a separate entity and not a corporate affiliate of Voya Financial. Voya clients receive preferred pricing on any Vault product. Vault pays Voya Retirement Insurance and Annuity
Company an ongoing quarterly fee for referring plan sponsors that elect Vault’s student loan debt services.

Insurance products are issued by ReliaStar Life Insurance Company (Minneapolis, MN) and ReliaStar Life Insurance Company of New York (Woodbury, NY). Within the State of New York, only ReliaStar Life Insurance Company of New York is admitted, and its products issued. Both are members of the Voya® family of companies. Voya Employee Benefits is a division of both companies. Product availability and specific provisions may vary by state.

Voya Financial and its affiliated companies (collectively, “Voya”) is making available to you the myHealth&Wealth tool offered by SAVVI Financial LLC. (“SAVVI”). Voya has a financial ownership interest in and business relationships with SAVVI that create an incentive for Voya to promote SAVVI's products and services and for SAVVI to promote Voya's products and services. Please access and read SAVVI's Firm Brochure which is available at this link: https://www.savvifi.com/legal/form-adv. It contains general information about SAVVI's business, including conflicts of interest.

How do our stories end?

Meet Sofia

- Early career
- Has student loan debt
- Lives paycheck to paycheck

Meet Sarah

- Mid-career
- New role as a sandwich caregiver
- Worried that a major health event would bankrupt her

Meet Alex

- Pre-retiree
- Must work longer to recoup lost retirement savings
- Concerned about the future cost of healthcare and professional caregiving

Thank you

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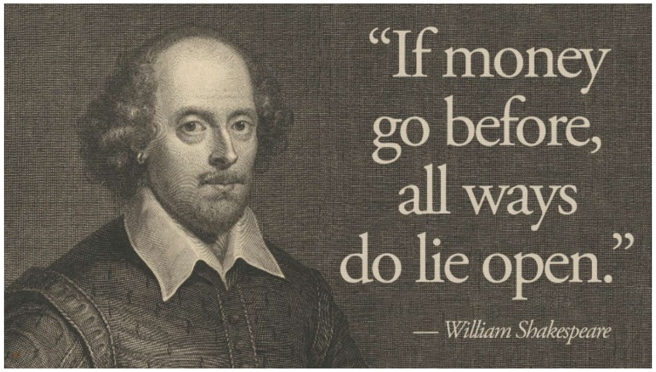
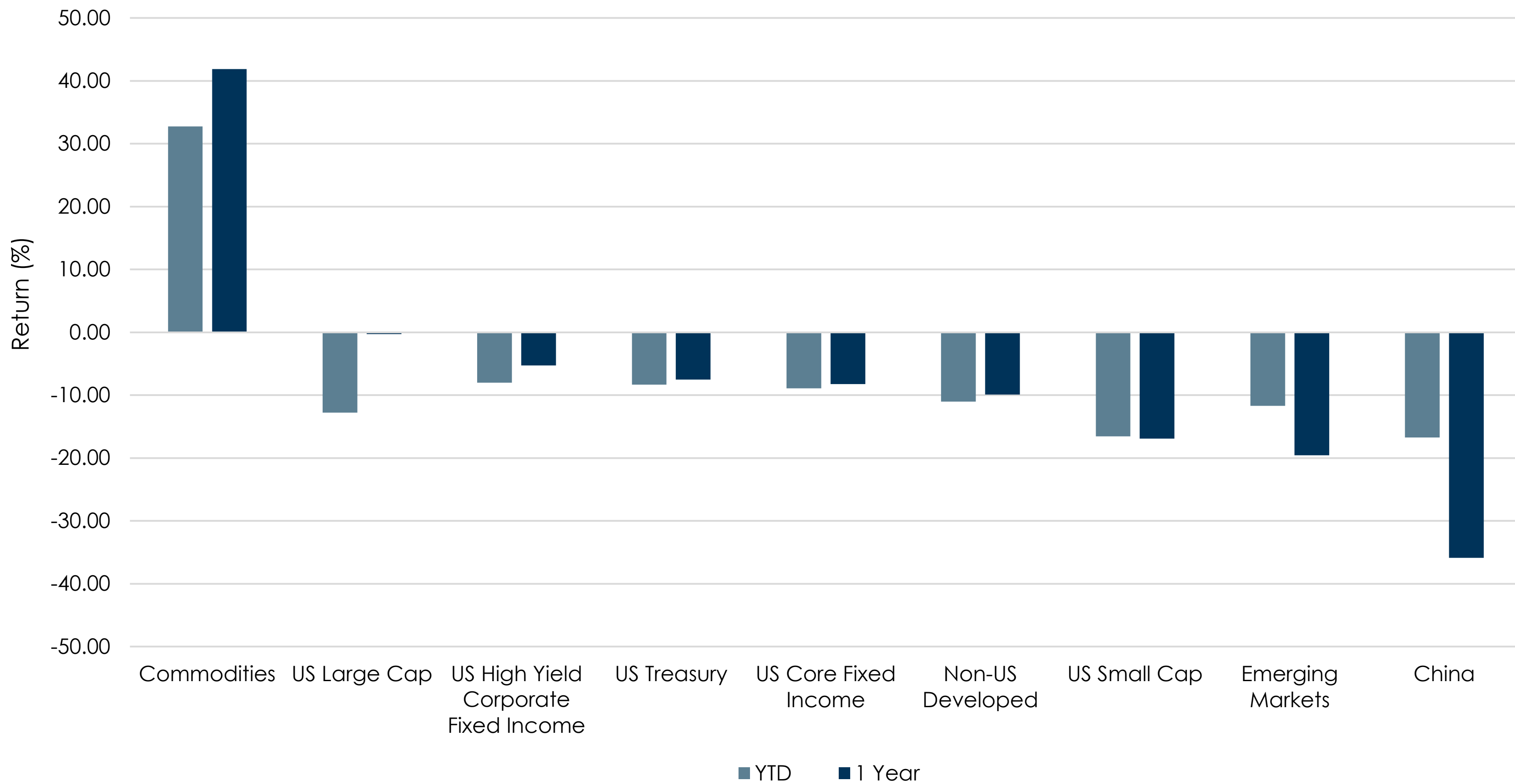


Oklahoma Municipal Retirement Fund – Trustee Retreat
Global Economic & Geopolitical Review

June 23, 2022

"Though it be honest, it is never good to bring bad news."

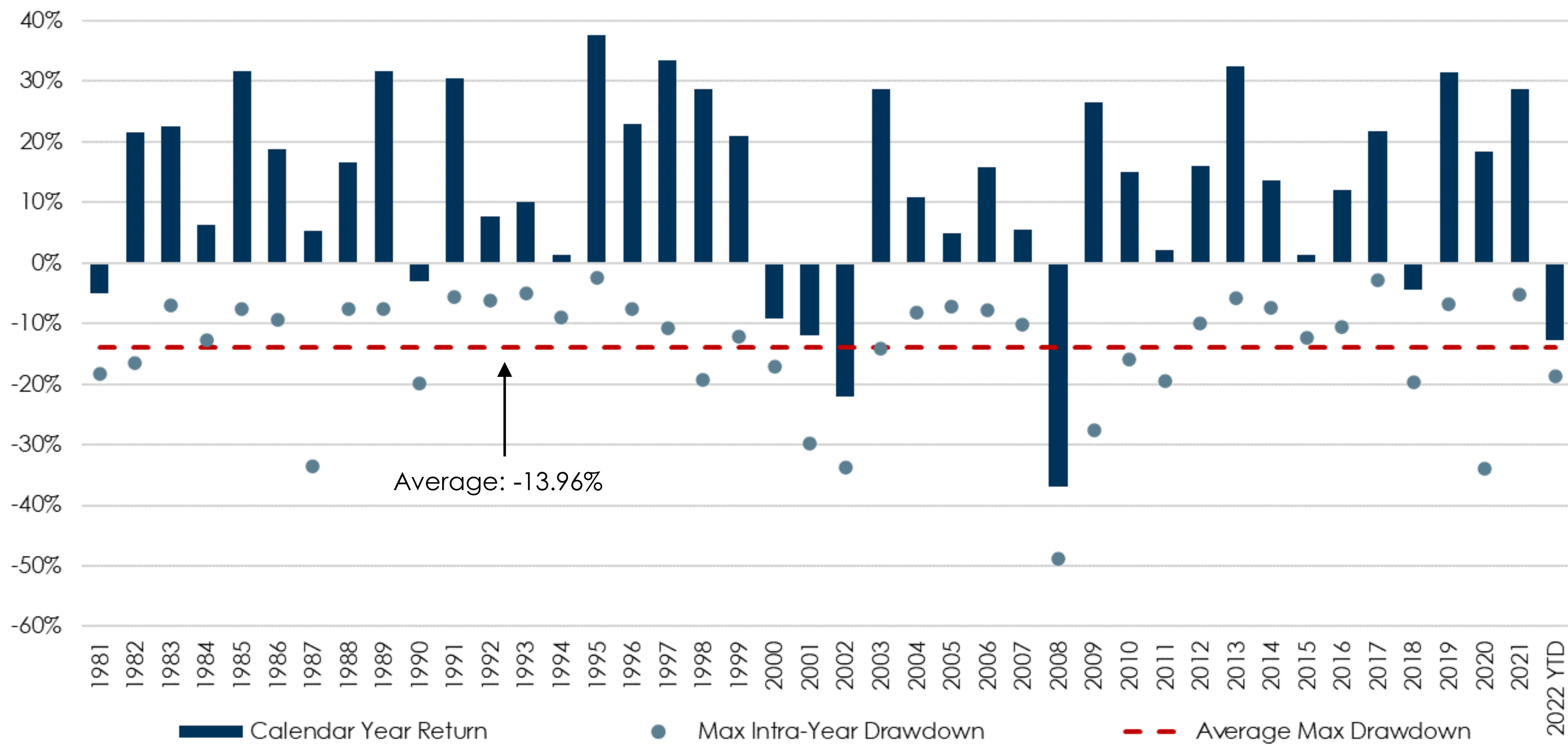
Most Asset Classes Struggle YTD



Source: ACG Research, Morningstar (as of May 31, 2022). The following indices used as proxy for asset classes: Russell 2000, Bloomberg Commodity, S&P 500, MSCI EAFE, MSCI Emerging Markets, MSCI China, Bloomberg US Corporate High Yield, Bloomberg US Aggregate, Bloomberg US Treasury

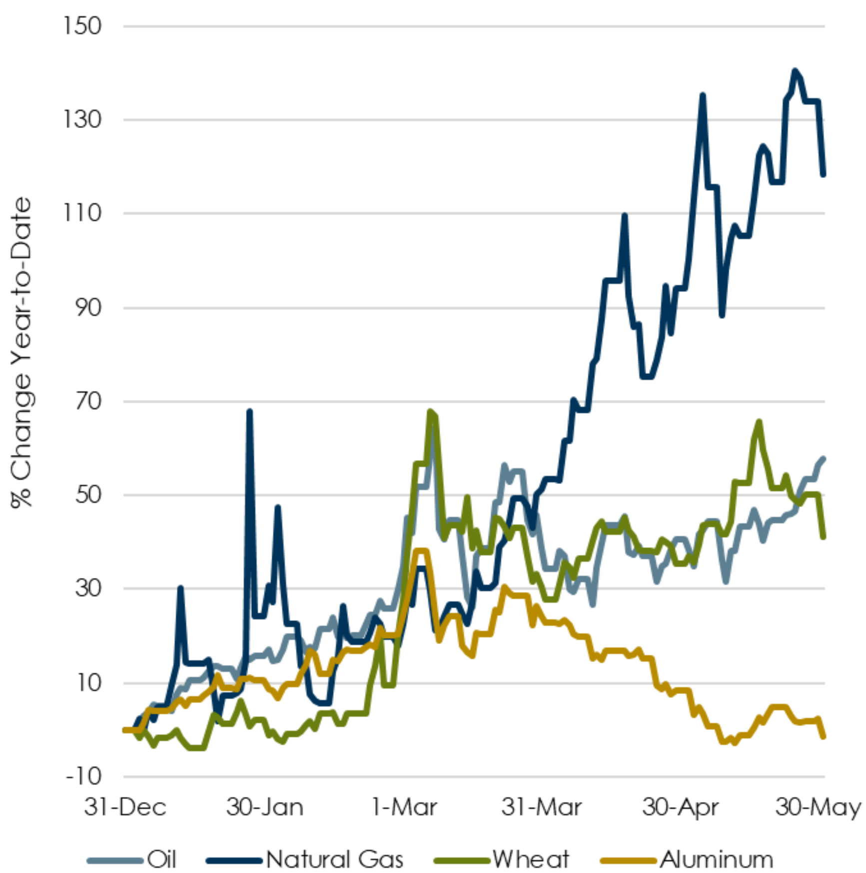
"There is nothing either good or bad, but thinking makes it so."

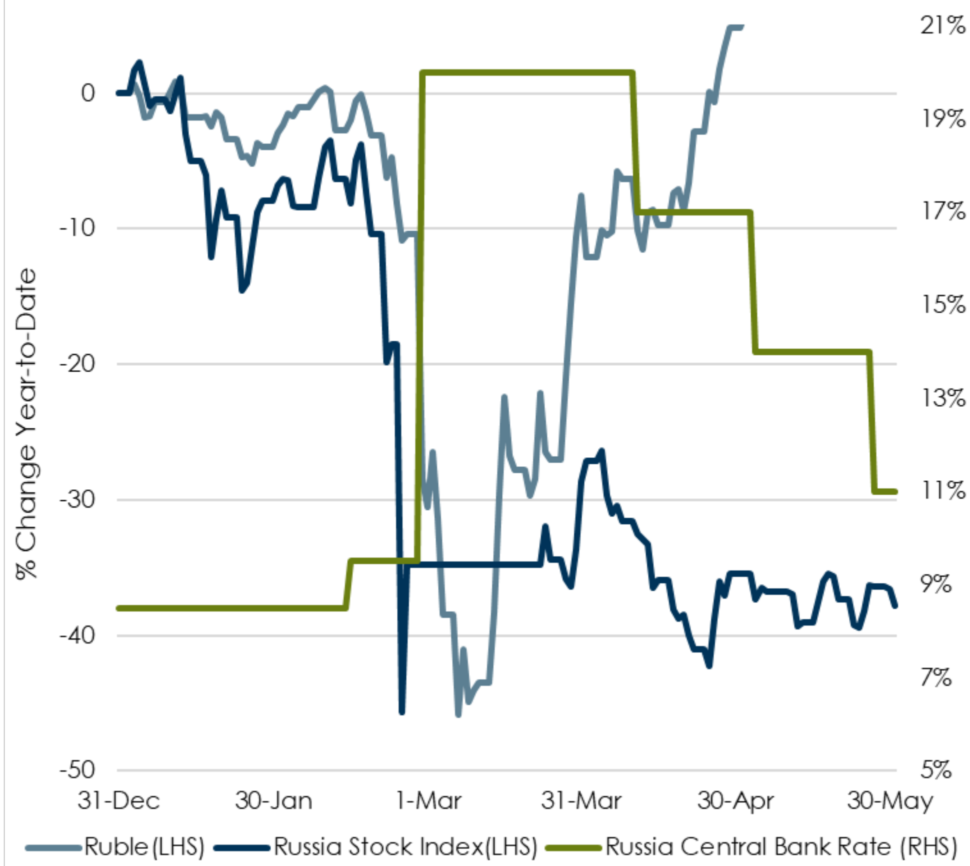
Market Drawdowns are Common



Source: ACG Research, Bloomberg

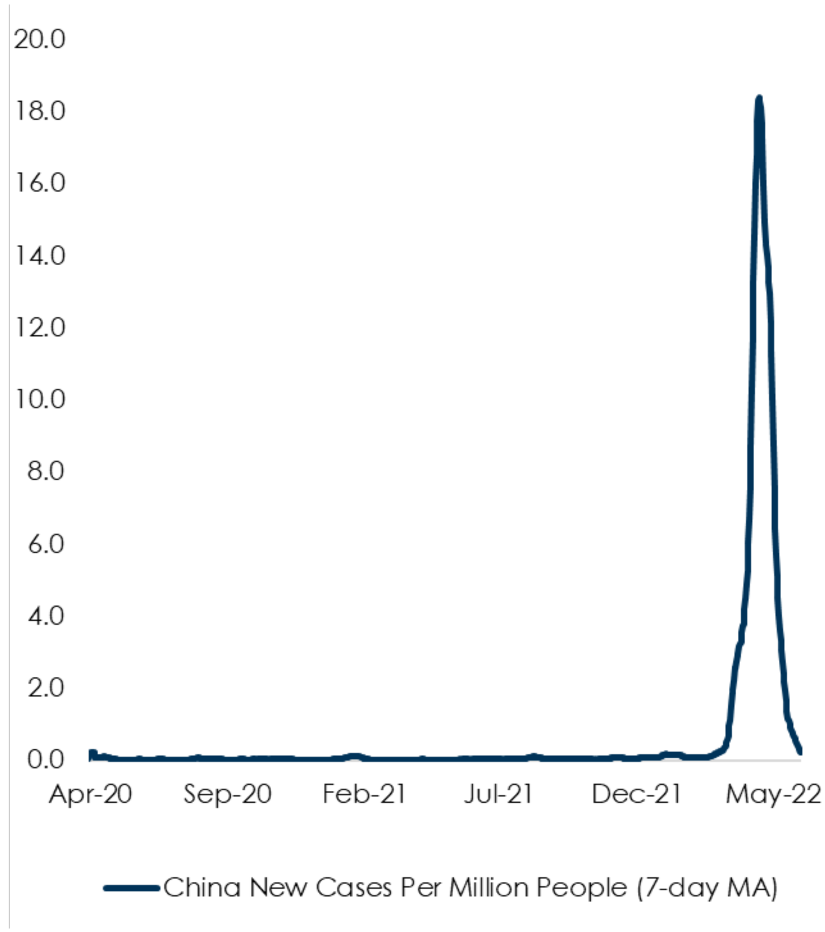
Commodity Prices Remain Volatile; Sanctions Prove Highly Disruptive to Russian Markets

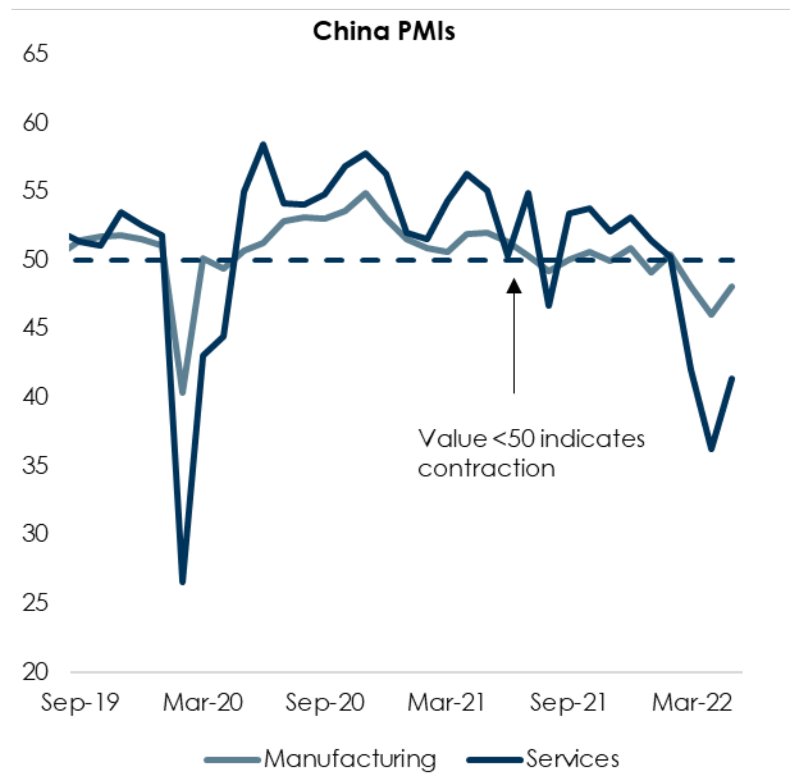




Source: ACG Research, Bloomberg (as of May 31, 2022)

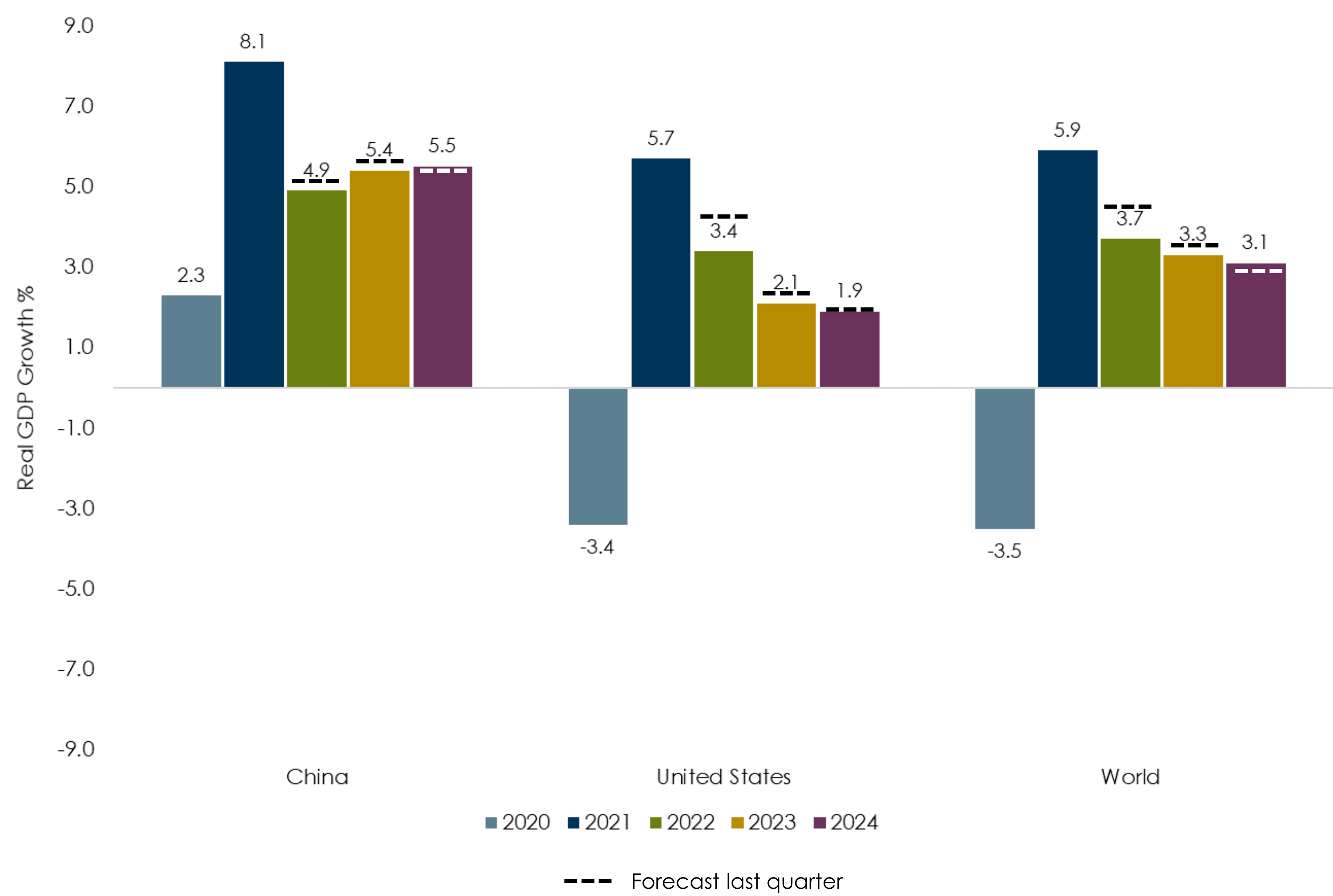
China's Covid Surge Eases, Economic Contraction Slows





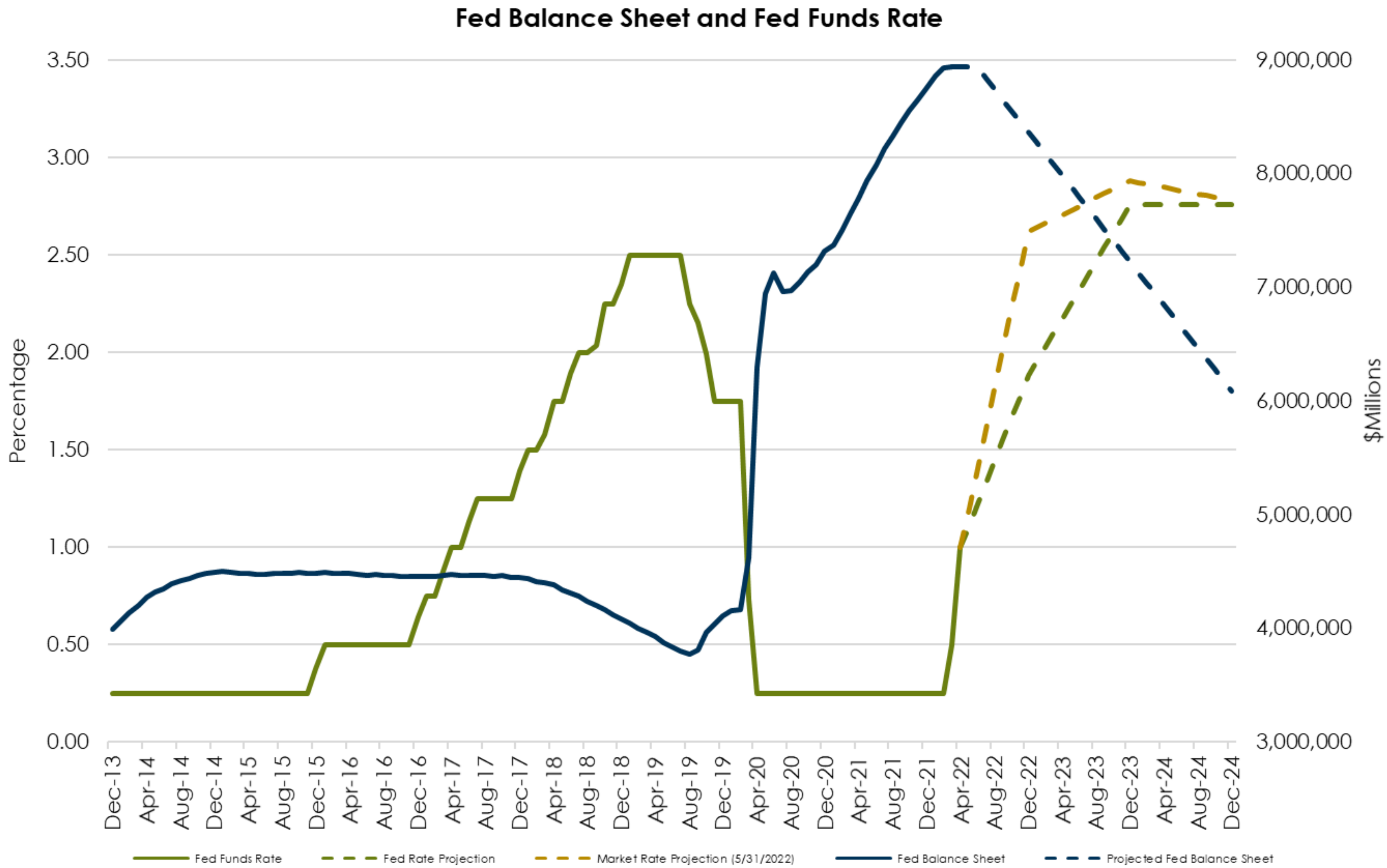
Source: ACG Research, Our World in Data, Bloomberg (as of May 31, 2022)

Forecasts for 2022 Remain Solid but are Expected to Slow in 2023/4



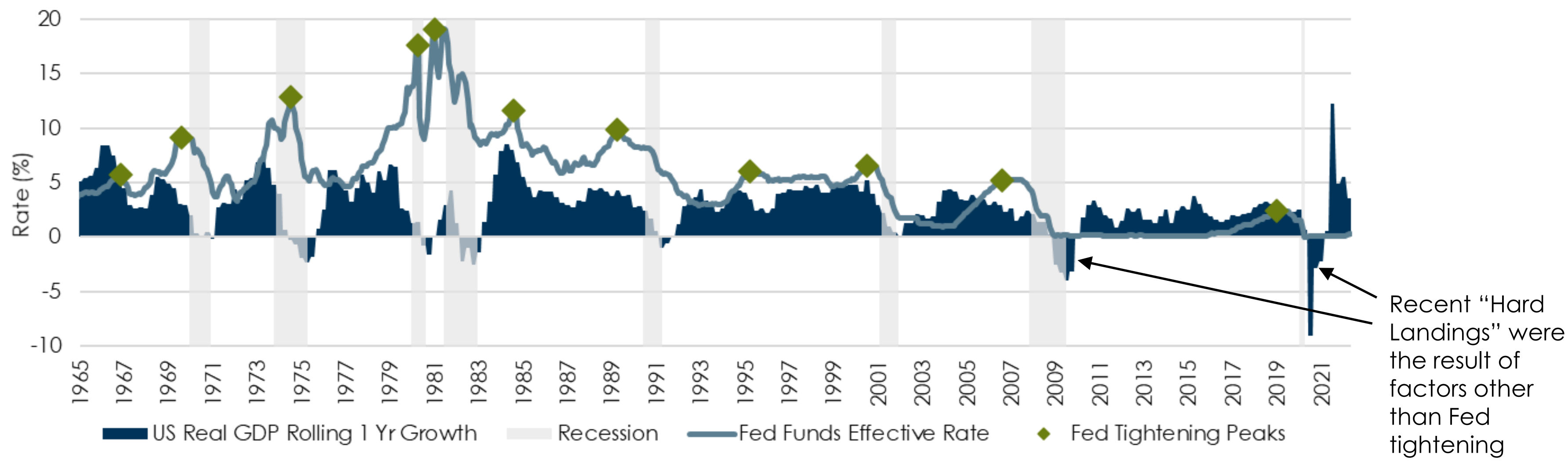
Source: ACG Research, Oxford Economics (as of March 31, 2022)

Policy Still Supportive but Direction is Hawkish

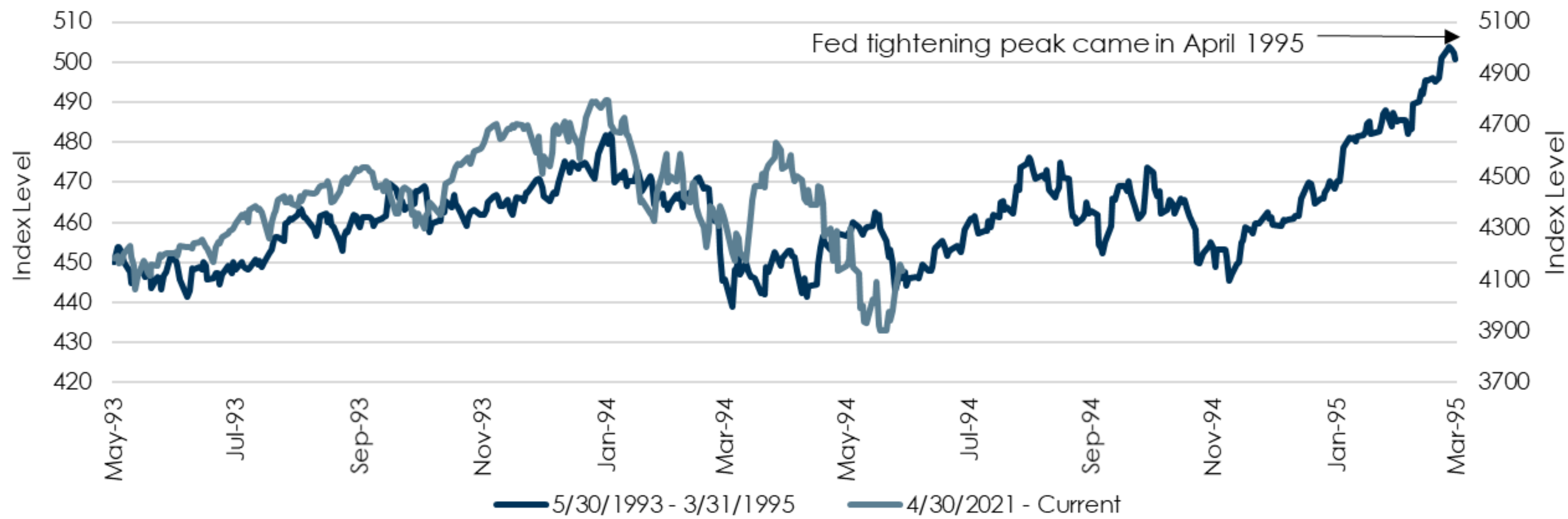


Source: ACG Research, Bloomberg, St. Louis Federal Reserve (as of May 31, 2022). Balance Sheet Projection based on guidance from Fed meeting minutes.

The Fed Last Executed a "Soft Landing" in 1994, but Soft and Soft-ish Landings are Not Uncommon

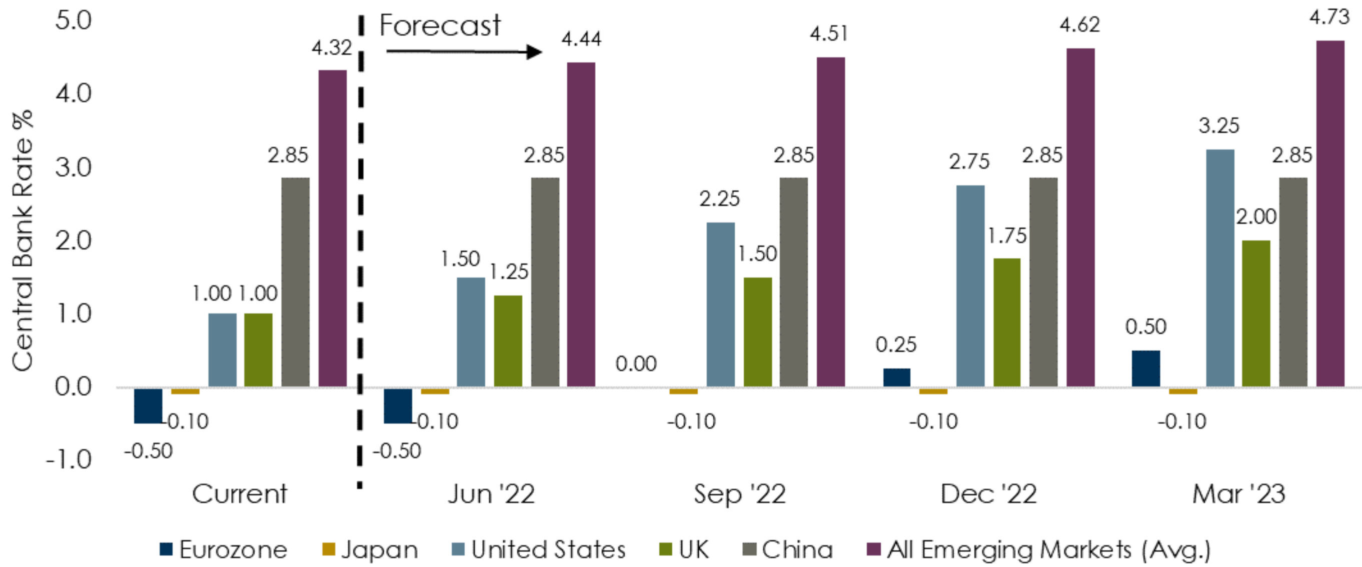


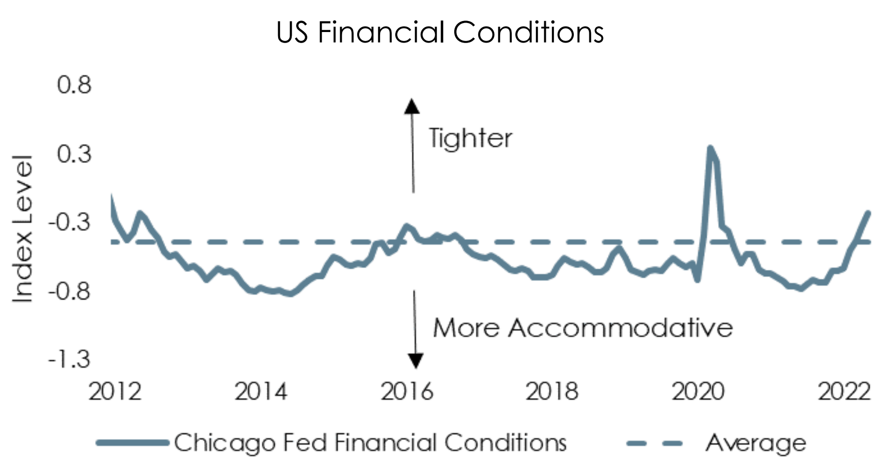
S&P 500 Price During 1994 Fed Soft Landing Compared to Current Market

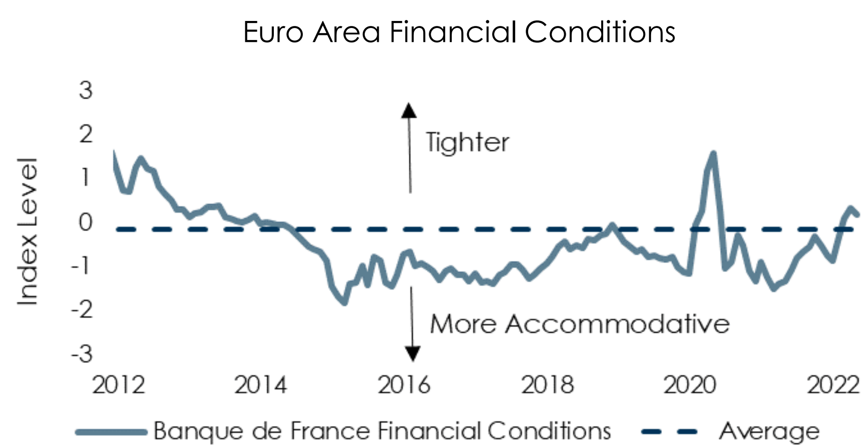


Source: ACG Research, Bloomberg (as of May 31, 2022)

Financial Conditions Tightening for Most Markets

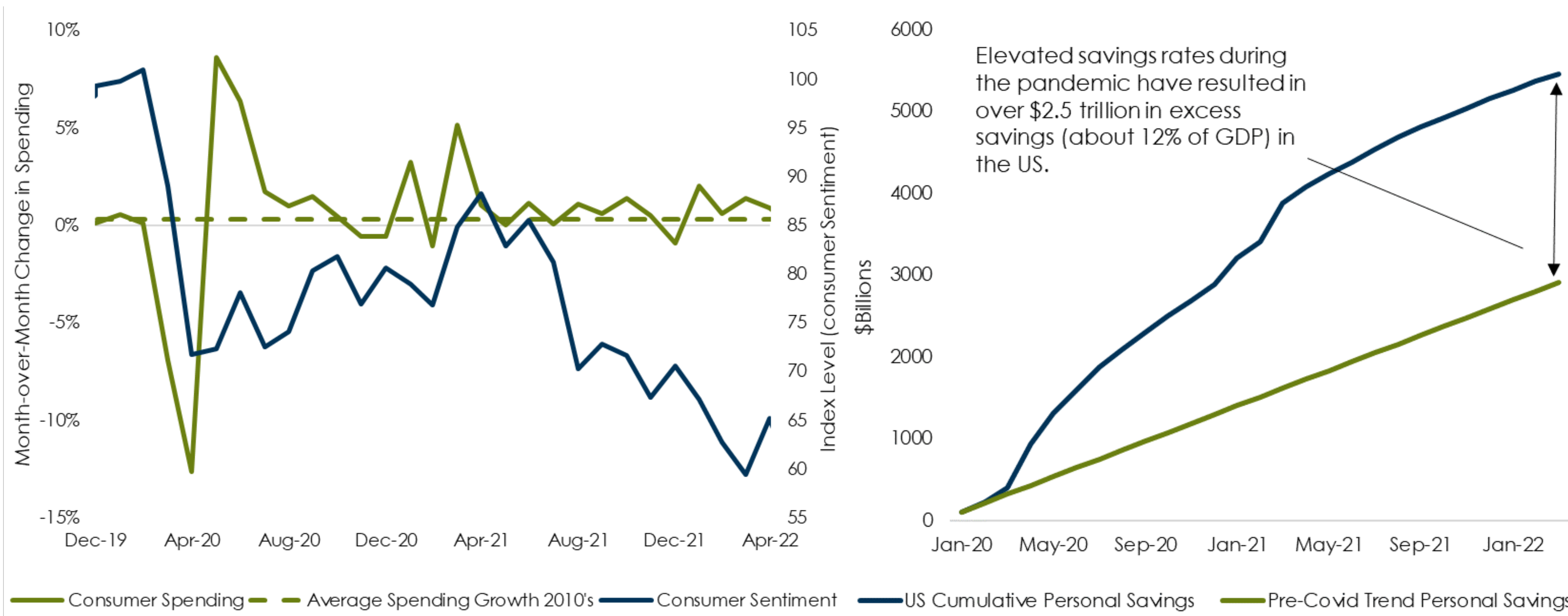






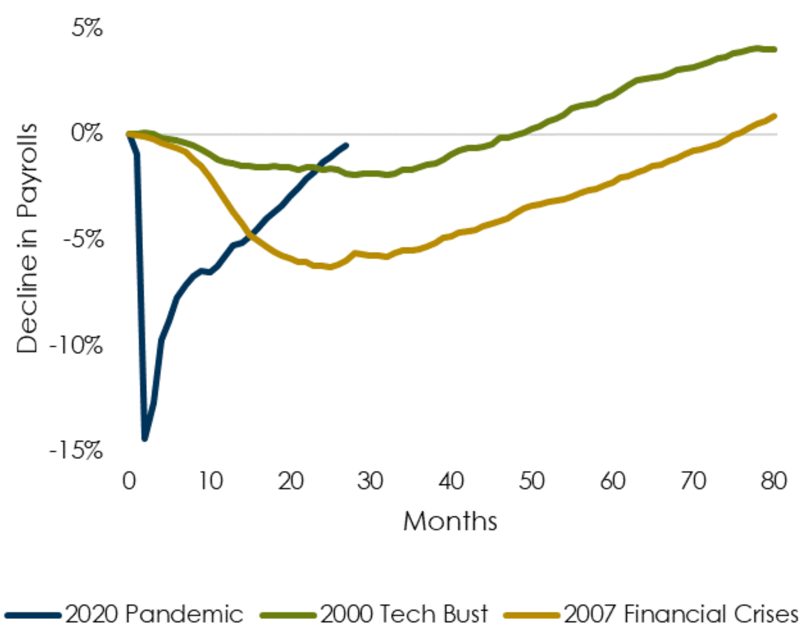
Source: ACG Research, Bloomberg, Federal Reserve, Banque de France, Forecasts from JP Morgan (as of May 31, 2022)

Consumer Spending Growth Slowing but Supported by High Personal Savings



Source: ACG Research, Bloomberg, University of Michigan (as of April 30, 2022)

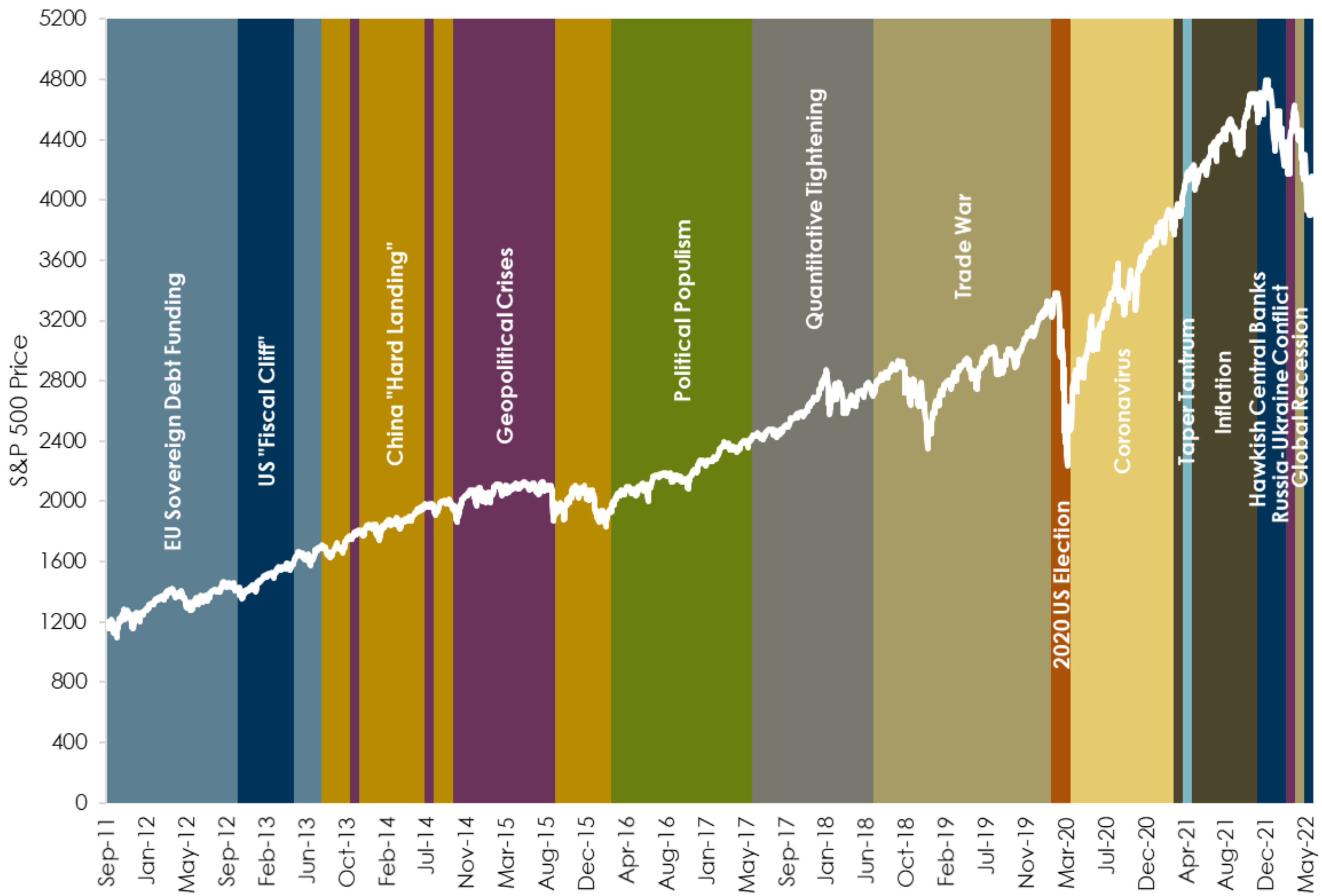
Overall Jobs Recovery Continues, but Labor Shortages Persist



Source: ACG Research, Bloomberg, Bureau of Labor Statistics (as of May 31, 2022)

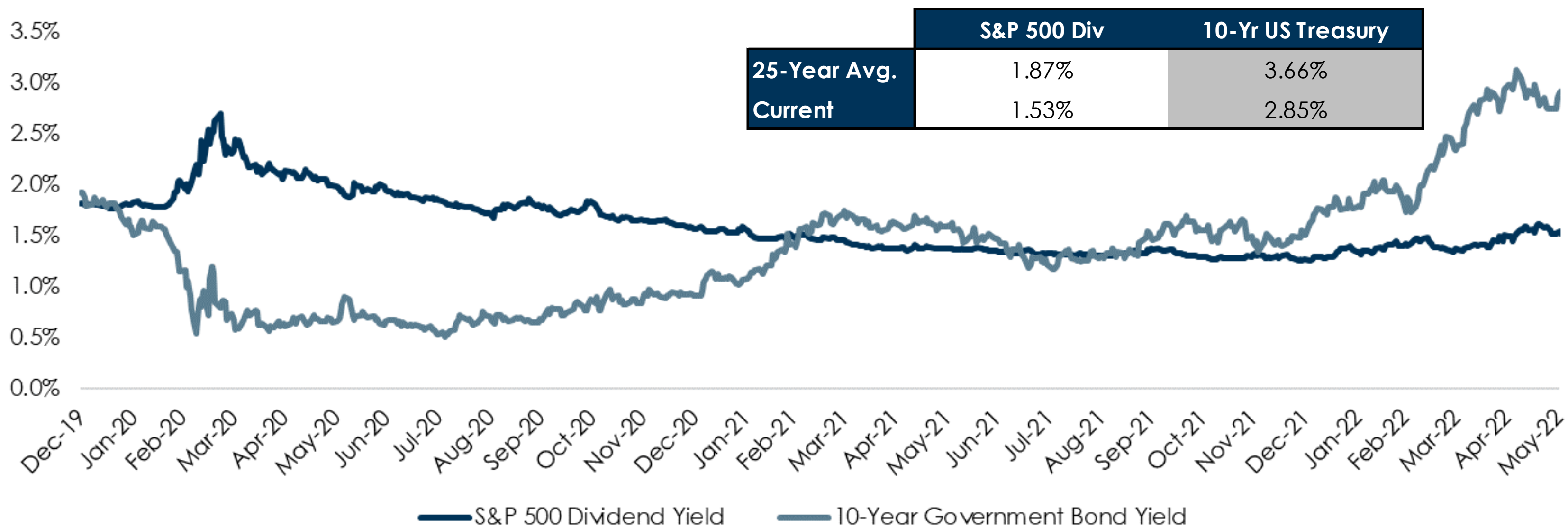
‘Hawkish Central Banks’ Returns to the Top of Fund Managers’ List of Concerns

History of top answers for “biggest tail risk” in Global Fund Manager Survey

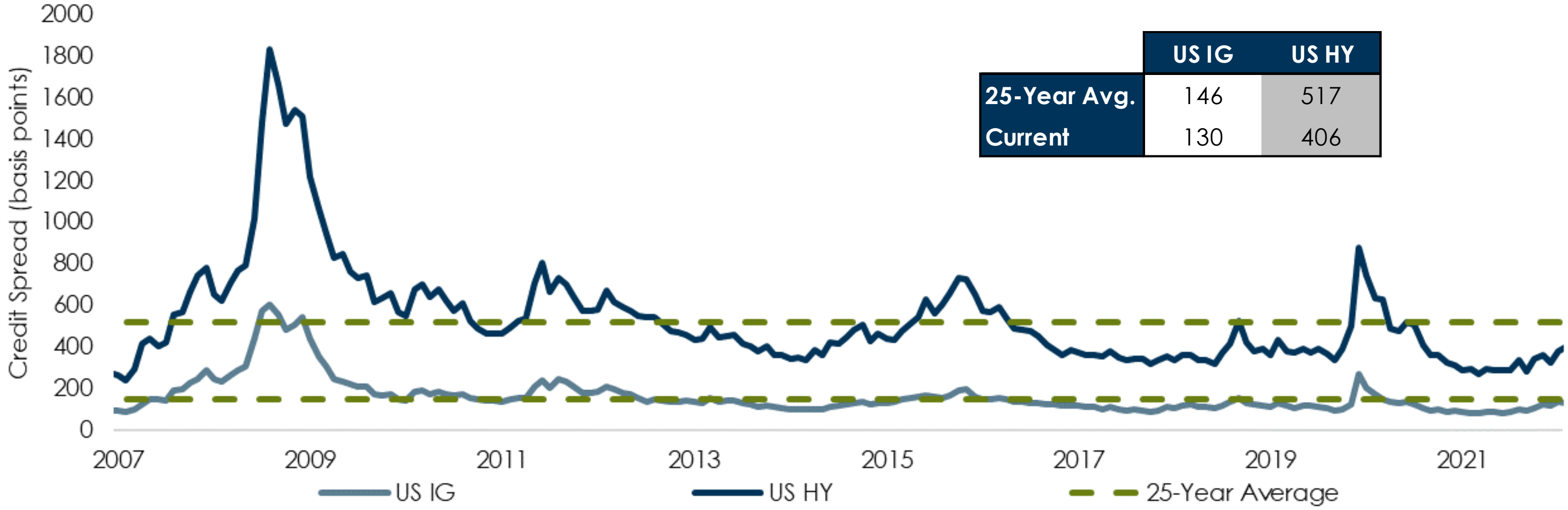


Source: ACG Research, BofA Global Fund Manager Survey (as of May 31, 2022)

Govt Bond Yields Exceed Equity Dividend Yield; Credit Spreads Remain Tight



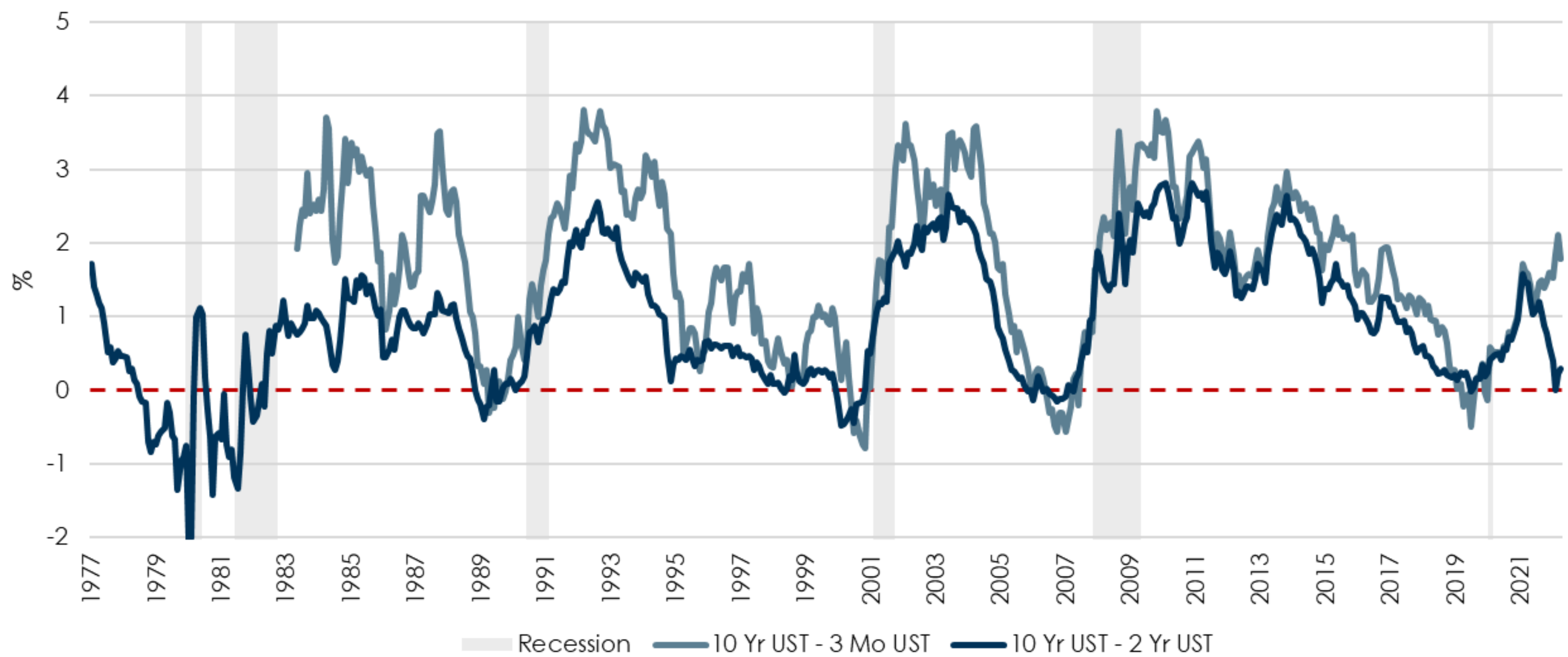
	S&P 500 Div	10-Yr US Treasury
25-Year Avg.	1.87%	3.66%
Current	1.53%	2.85%



	US IG	US HY
25-Year Avg.	146	517
Current	130	406

Source: ACG Research, Bloomberg (as of May 31, 2022)

But Still Too Early to Call Recession

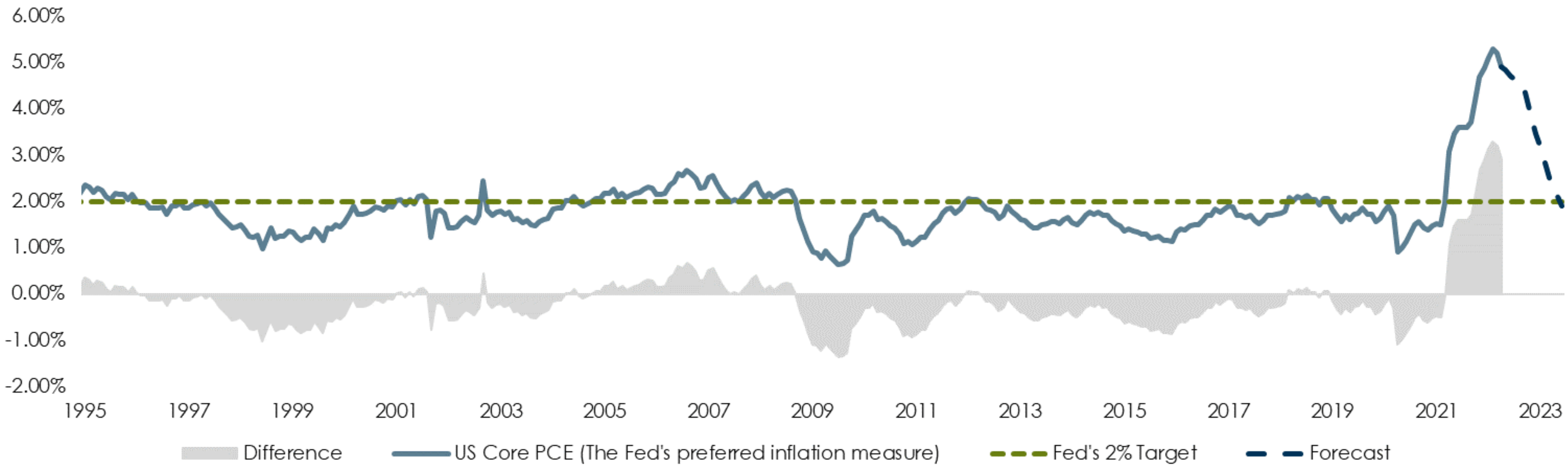


Long and variable lead times between the 10-year/2-year inversion and recessions

Initial Inversion	Recession Start	Months Between
August-78	January-80	16.5
September-80	July-81	9.5
December-88	July-90	18.5
March-98	March-01	35
December-05	December-07	23
August-19	February-20	6
Average		**18**

Source: ACG Research, Bloomberg, Oxford Economics (as of May 31, 2022)

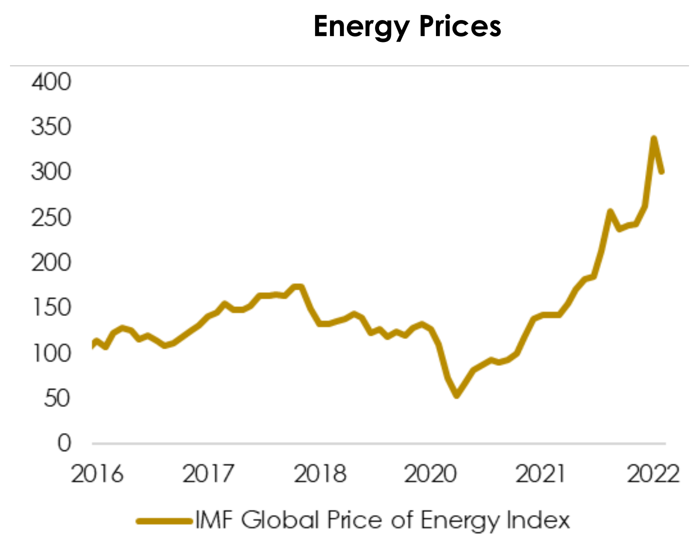
After Recent Surge, Forecasts Point to Normalization by 2023/4

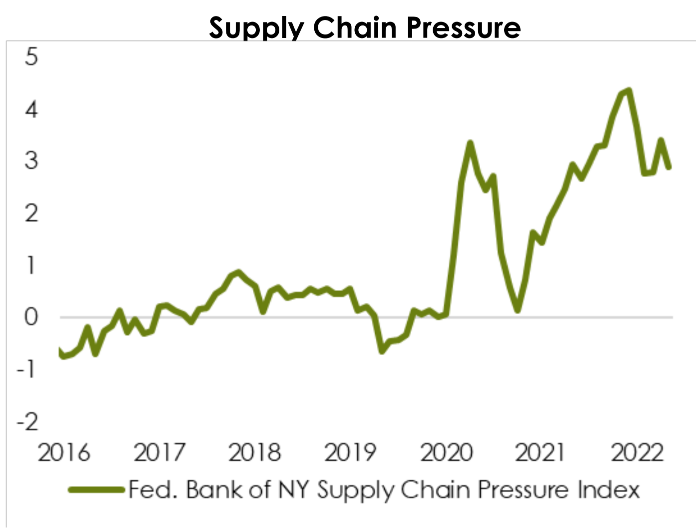


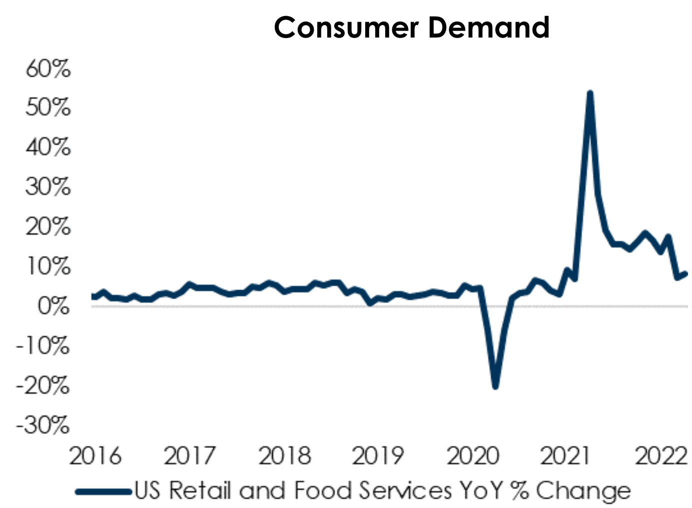
Deflationary Signals	Inflationary Signals
-Demographic trends (lower birth rate, aging population)	-Fed accommodation
-Technological innovations	-Consumer demand induced by economic recovery
-Stagnant wage growth	-Fiscal policy support
-Unemployment	-Weaker USD
-High savings rate	-Supply chain disruption
-Reduced velocity of money	-Deglobalization
-Inequality	-Reduced competition

Source: ACG Research, Oxford Economics, Bloomberg (as of May 31, 2022)

Key Inflation Drivers Still Elevated



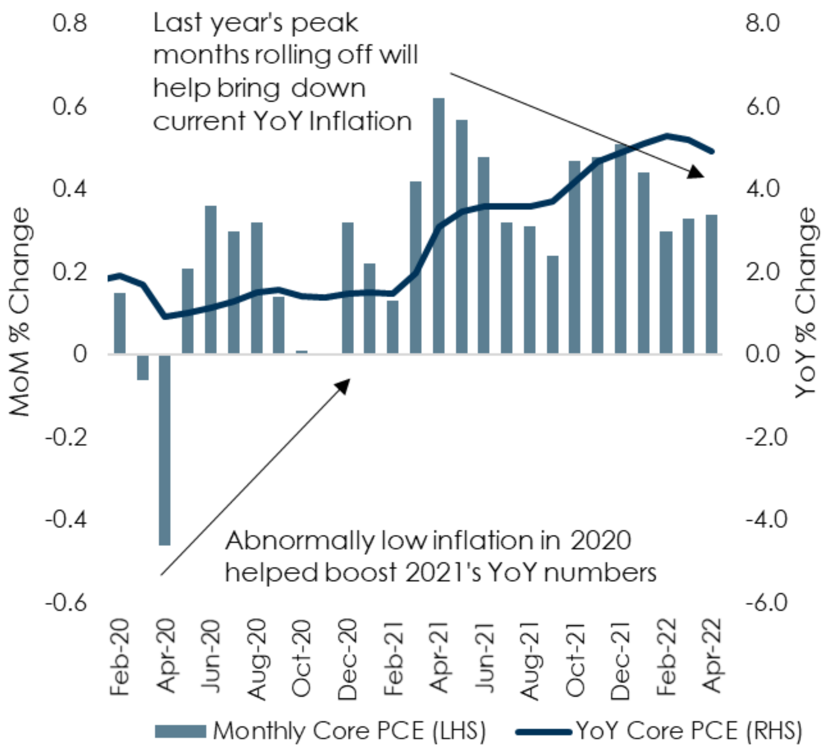




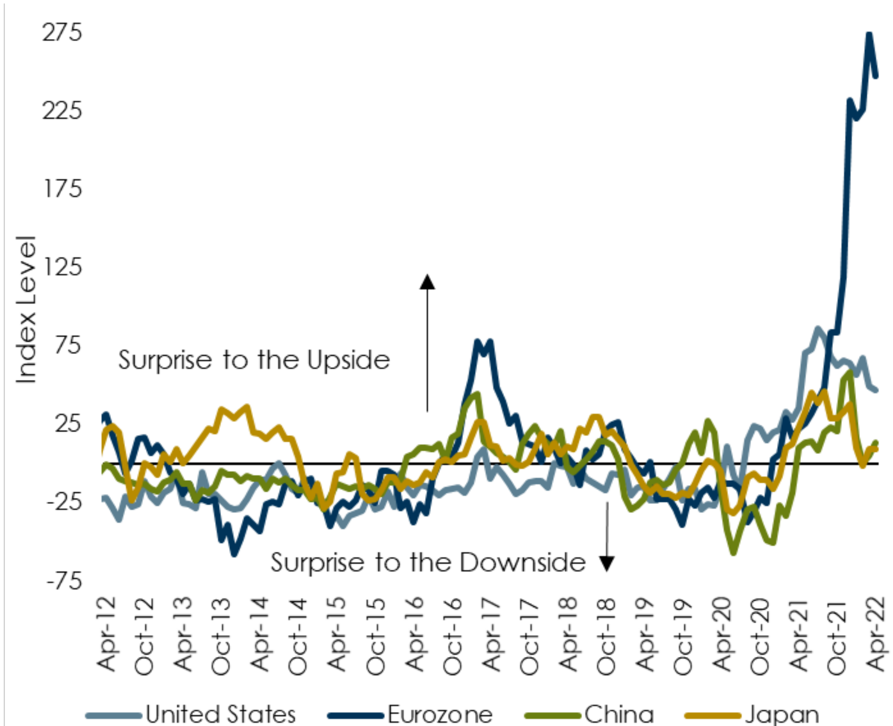
Source: ACG Research, Bloomberg, FRED, IMF (as of May 31, 2022)

Base Effects Should Help This Time; Inflation Surprises Becoming More Subdued

Monthly and Yearly Core PCE



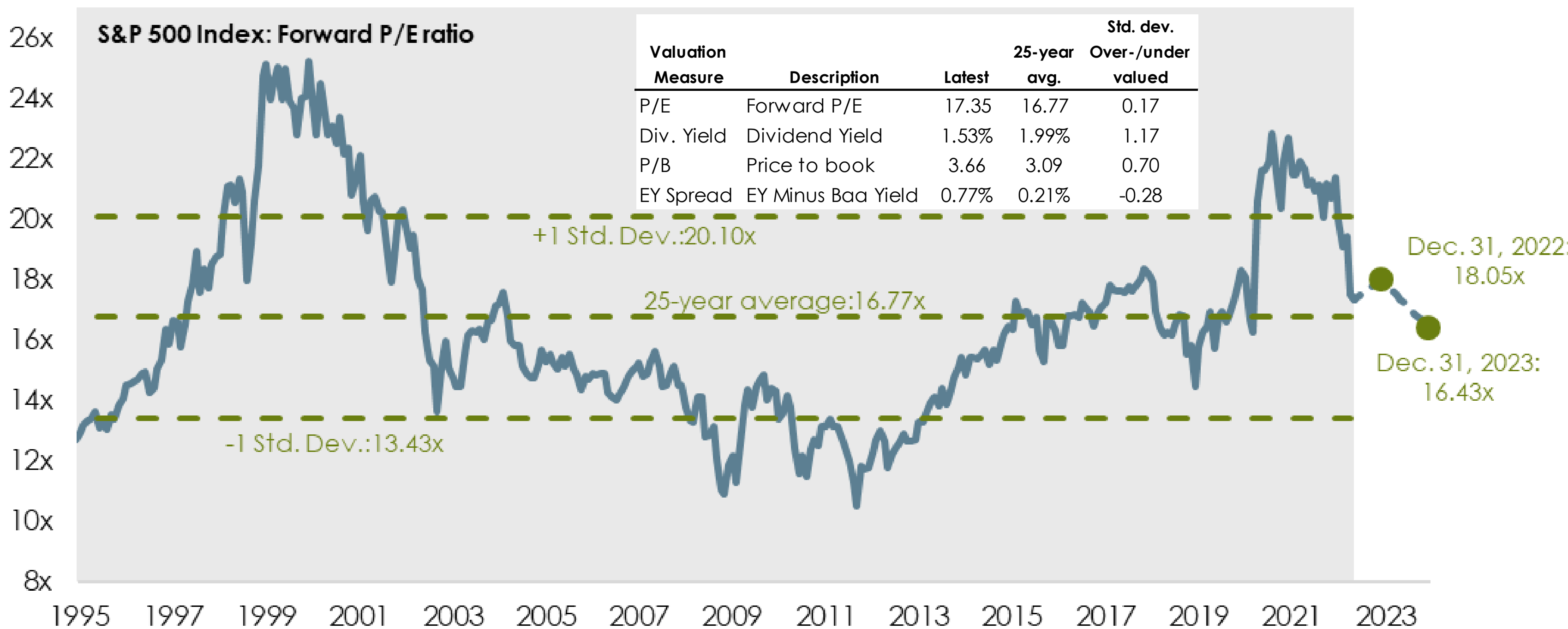
Citi Inflation Surprise Index



Source: ACG Research, Bloomberg, FRED, IMF (as of May 31, 2022)

P/E Multiples Have Moderated but are Not Cheap

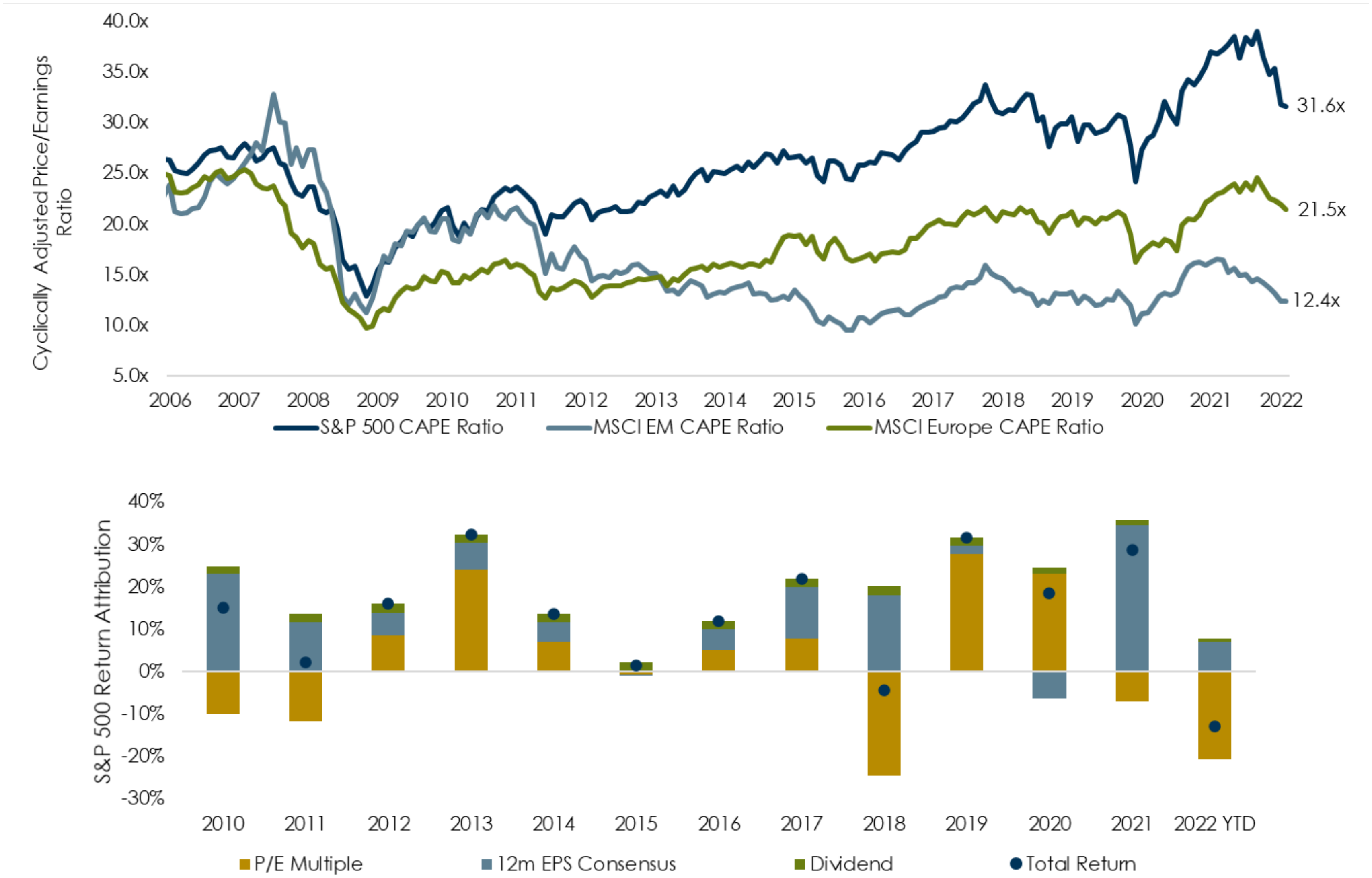
- **Based on several metrics, the S&P 500 Index still appears slightly expensive (5/31/22 closing price of $4132)**
- Consensus earnings estimates for 2022 ($229) suggest a forward p/e of 18.05x (vs. 25-year average of 16.8x)
- Consensus estimates are higher for 2023 ($252) yet the forward p/e for ‘23 is still 16.43x (vs. 25-year average of 16.8x)



Valuation Measure	Description	Latest	25-year avg.	Std. dev. Over-/under valued
P/E	Forward P/E	17.35	16.77	0.17
Div. Yield	Dividend Yield	1.53%	1.99%	1.17
P/B	Price to book	3.66	3.09	0.70
EY Spread	EY Minus Baa Yield	0.77%	0.21%	-0.28

Source: FactSet, FRB, Robert Shiller, Standard & Poor’s, J.P. Morgan Asset Management

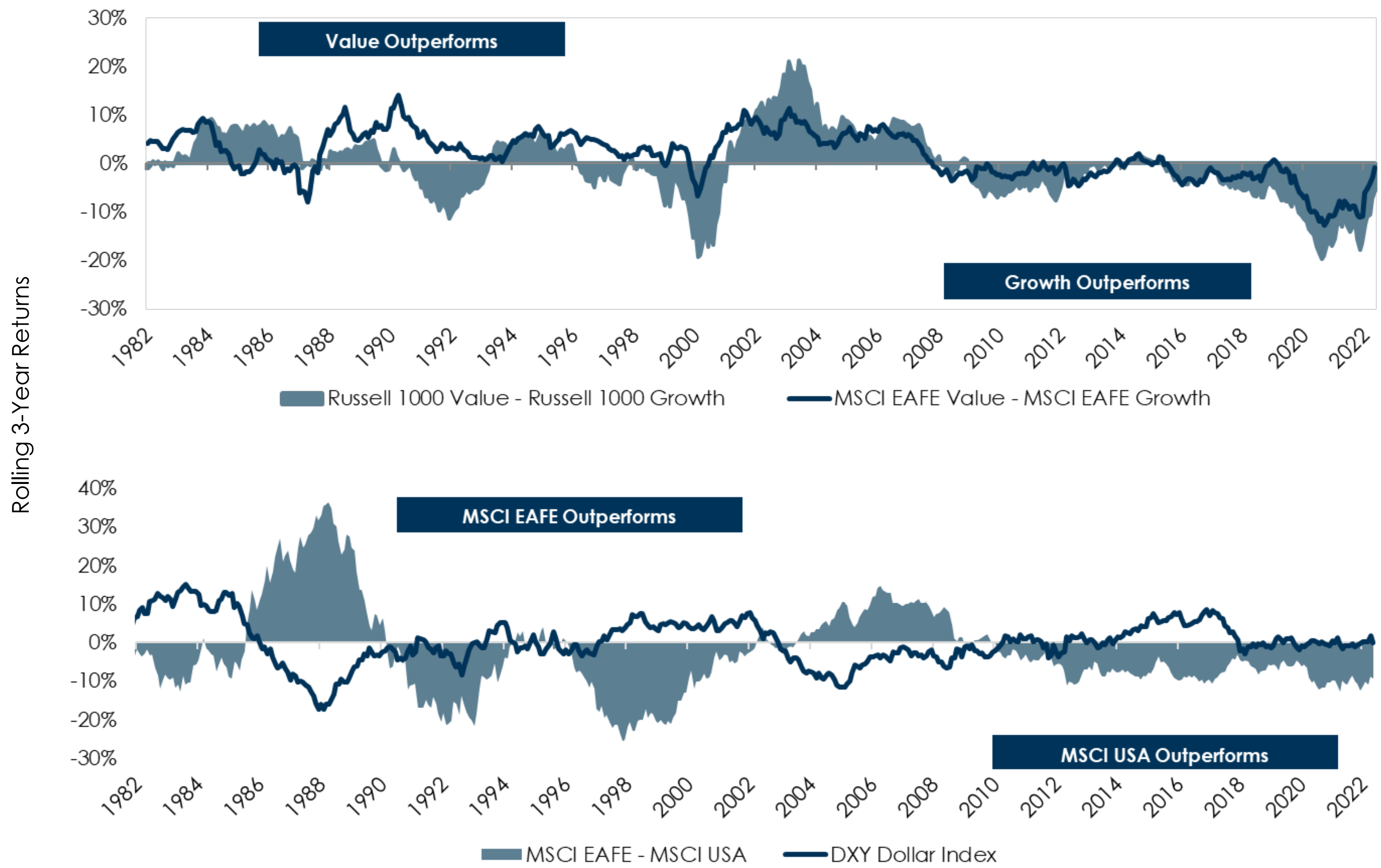
Non-US Equities Remain at a Wide Discount to US



Source: ACG Research, Bloomberg, Robert Shiller (as of May 31, 2022)

Valuation Discounts/Premiums Can Take Time to Unwind

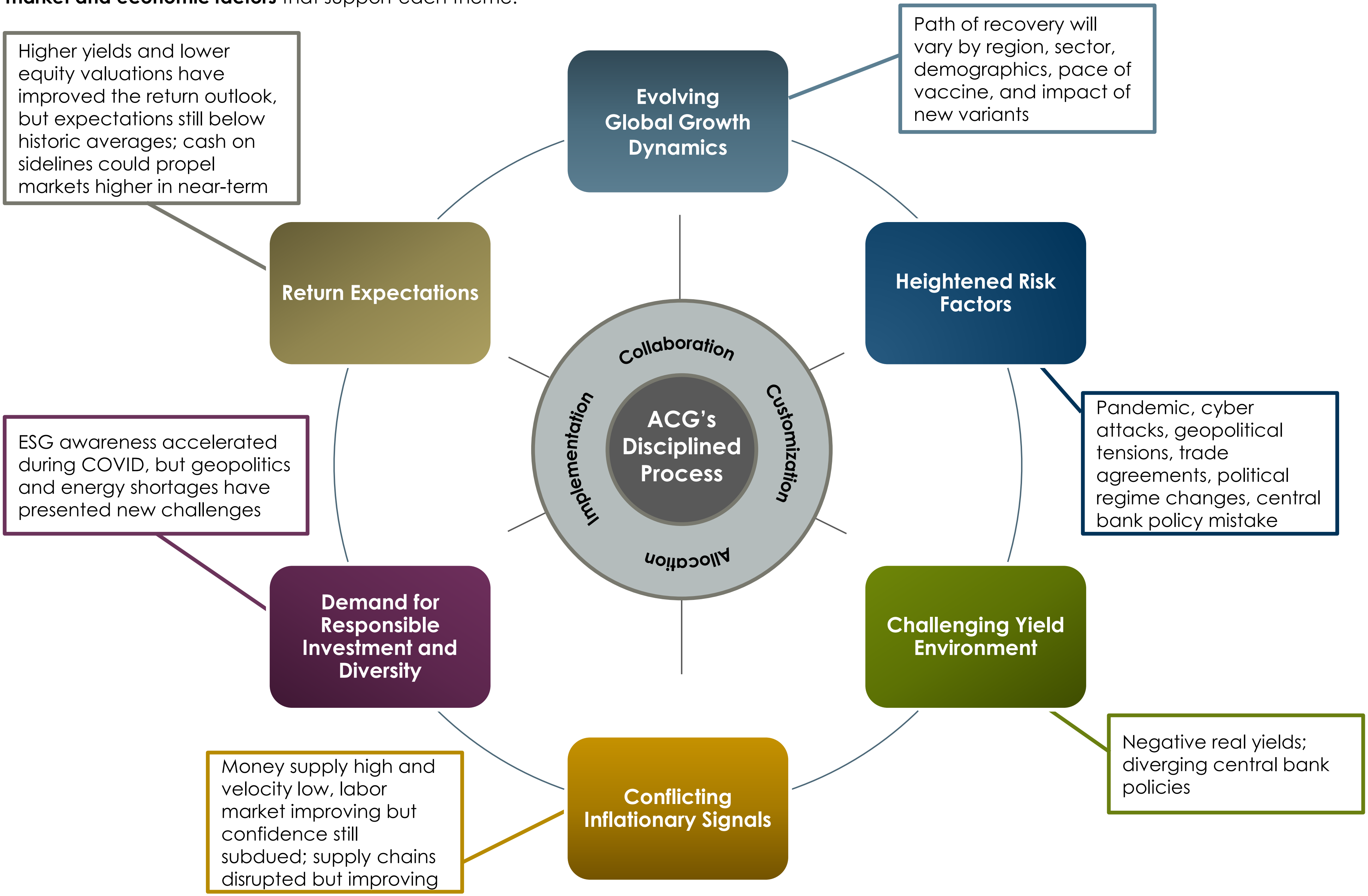
Potential Rotations: Cyclical Recoveries Favor Non-US and Value



Source: ACG Research, Bloomberg, MSCI, Morningstar (as of May 31, 2022)

Key Themes

ACG's Investment Committee outlines key themes that will drive investment returns **over the intermediate term.** In this quarterly update, we highlight **market and economic factors** that support each theme.



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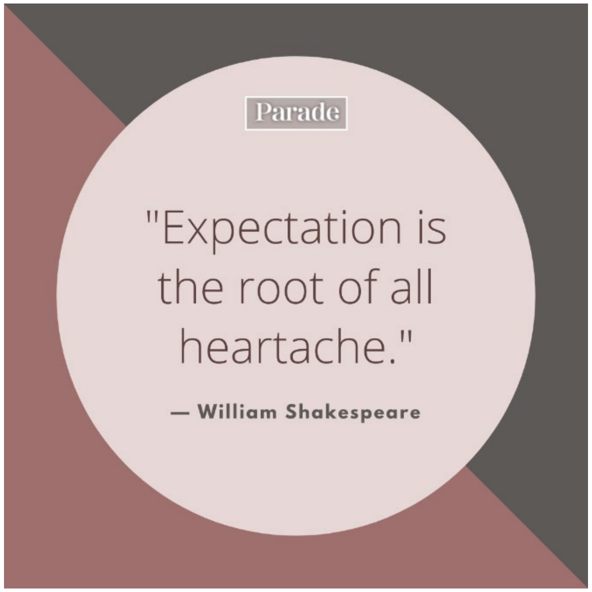
Past performance is not indicative of future results. Given the inherent volatility of the securities markets, you should not assume that your investments will experience returns comparable to those shown in the analysis contained in this report. For example, market and economic conditions may change in the future producing materially different results than those shown included in the analysis contained in this report. Any comparison to an index is for comparative purposes only. An investment cannot be made directly into an index. Indices are unmanaged and do not reflect the deduction of advisory fees.

This report is distributed with the understanding that it is not rendering accounting, legal or tax advice. Please consult your legal or tax advisor concerning such matters. No assurance can be given that the investment objectives described herein will be achieved and investment results may vary substantially on a quarterly, annual or other periodic basis. There is no representation or warranty as to the current accuracy of, nor liability for, decisions based on such information.



Oklahoma Municipal Retirement Fund – Trustee Retreat
Global Equity Portfolio Review & Opportunity Set

June 23, 2022

Greenwich

Quality Leader

2018 2019 2020 **2021**

We are proud to announce that ACG has again been named a Greenwich Associates Quality Leader – recognized as one of the top consultants in the industry.

Methodology and Disclosure: *Between July and October 2021, Coalition Greenwich (previously known as Greenwich Associates), conducted in-person and phone interviews and online surveys with 811 professionals at 661 of the largest tax-exempt funds in the United States, including corporate and union funds, public funds, endowments and foundations, insurance general accounts, and healthcare organizations, with either pension or investment pool assets greater than $150 million. Study participants were asked to provide quantitative and qualitative evaluations of their asset managers and investment consultants, including qualitative assessments of those firms soliciting their business and detailed information on important market trends. ACG is one of four firms recognized in the mid-size investment consultant category. The ratings may not be representative of any one client's experience with ACG; rather they are representative of those clients that chose to participate in the survey. The results are not indicative of ACG's future performance. ACG does not pay to have its clients participate in the study.*

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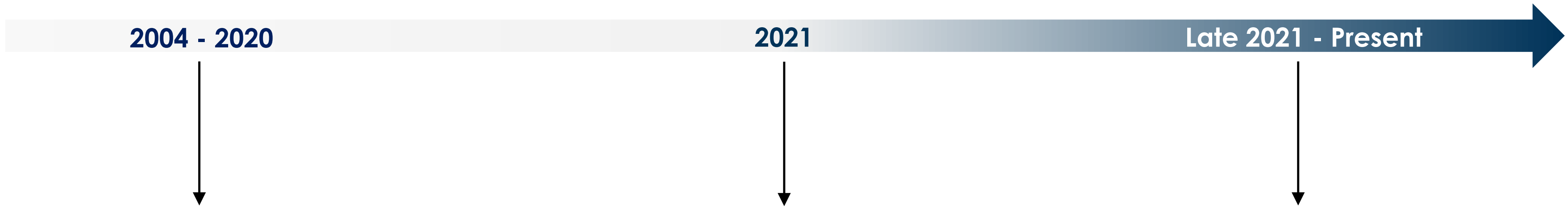
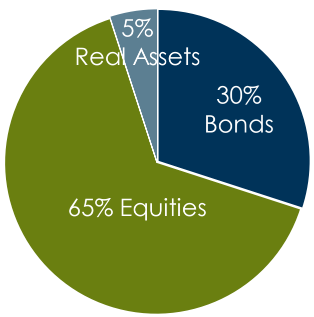
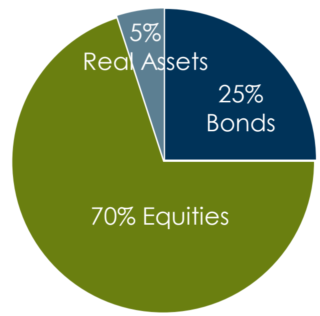
Background & Current Equity Exposure



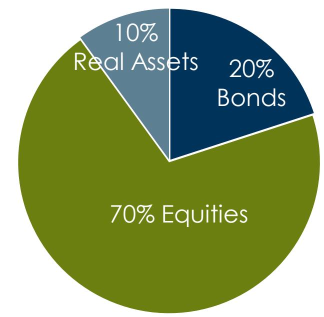
Broad Asset Allocation Targets



Broad Asset Allocation Targets



Broad Asset Allocation Targets



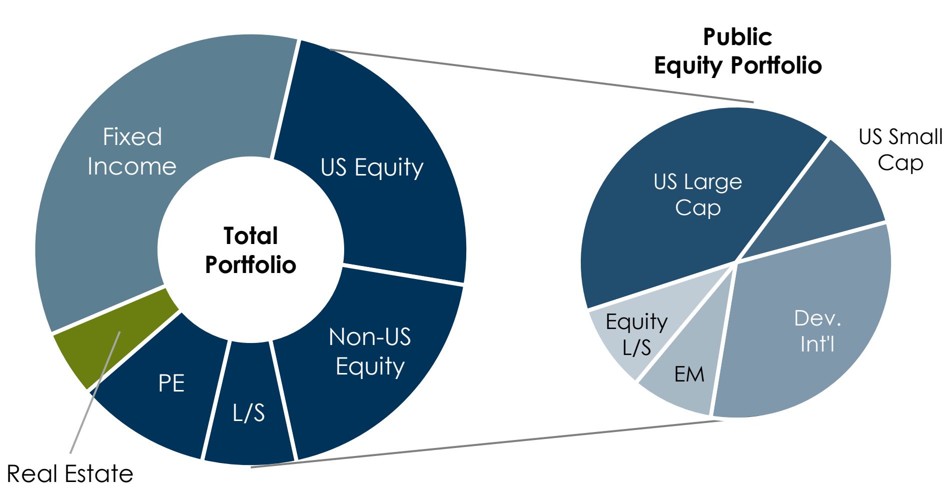
- **ACG reviews the DB Plan's asset allocation with the Board at least annually** to ensure the current implementation remains aligned with the long-term objectives.
- Since ACG's inception in 2004, **numerous tweaks have been made to the DB Plan's asset allocation**, as market dynamics have changed and the DB Plan has grown in size and complexity.

Public Equity: Traditional asset class providing liquid exposure to stocks across the global opportunity set

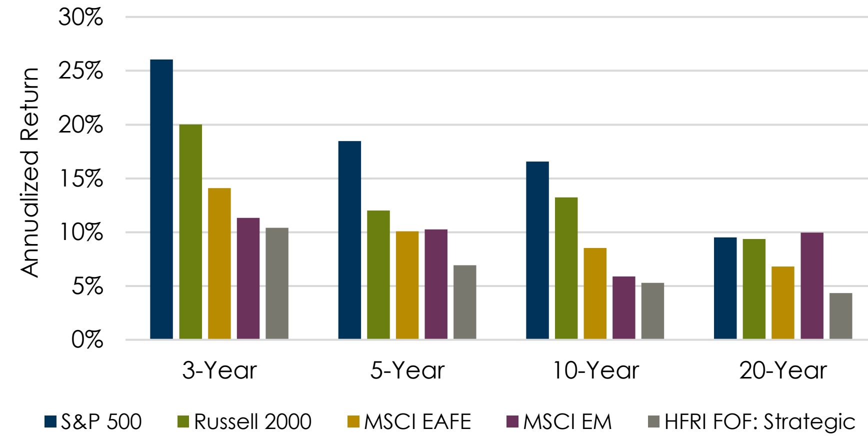
Case for Public Equity

- Primary driver of risk/return in a diversified portfolio.
- Long-term capital appreciation via exposure to the global economy.
- Source of liquid diversification to fixed income and alternatives.
- Blend active/passive implementations based upon opportunity set.

Asset Allocation



Asset Class Returns (Dec. 31, 2021)

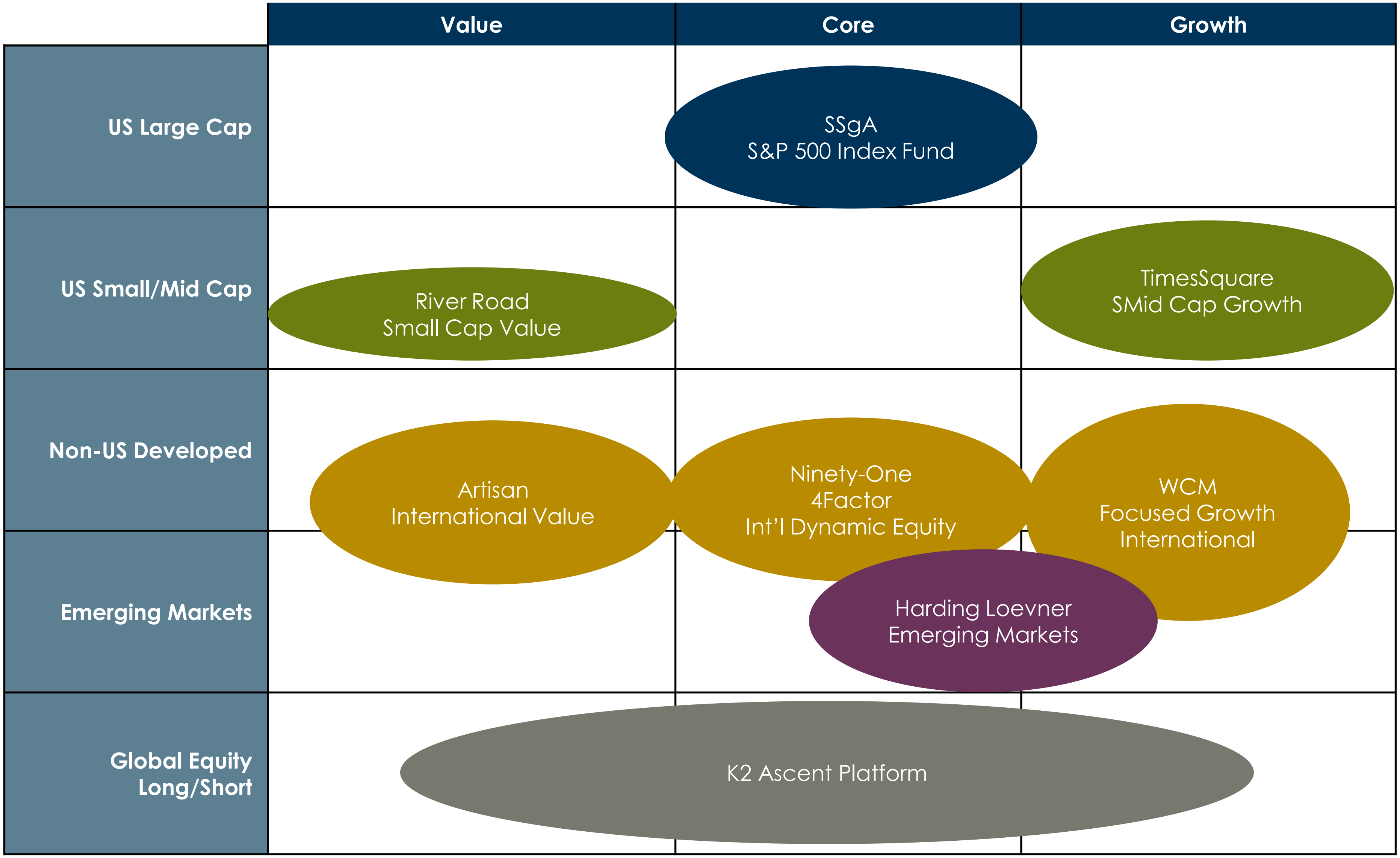


10 Yr. Correlations to Fixed Income and Real Estate

	Bloomberg US Agg	NFI ODCE
S&P 500	-0.02	-0.11
Russell 2000	-0.11	-0.05
MSCI EAFE	0.02	-0.06
MSCI EM	0.13	-0.08
HFRI FOF: Strategic	0.04	-0.12

Opportunity Set	US Large Cap	US Small Cap	Developed International	Emerging Markets	Equity Long/Short
Implementation	Passive	Active Growth & Value	Active Growth, Core & Value	Active	Active Fund-of-Funds Manager Approach
Liquidity Profile	Daily	Daily	Daily, Monthly	Daily, Monthly	Monthly, Quarterly
DB Plan Target Allocation	25%	10%	20%	5%	10%

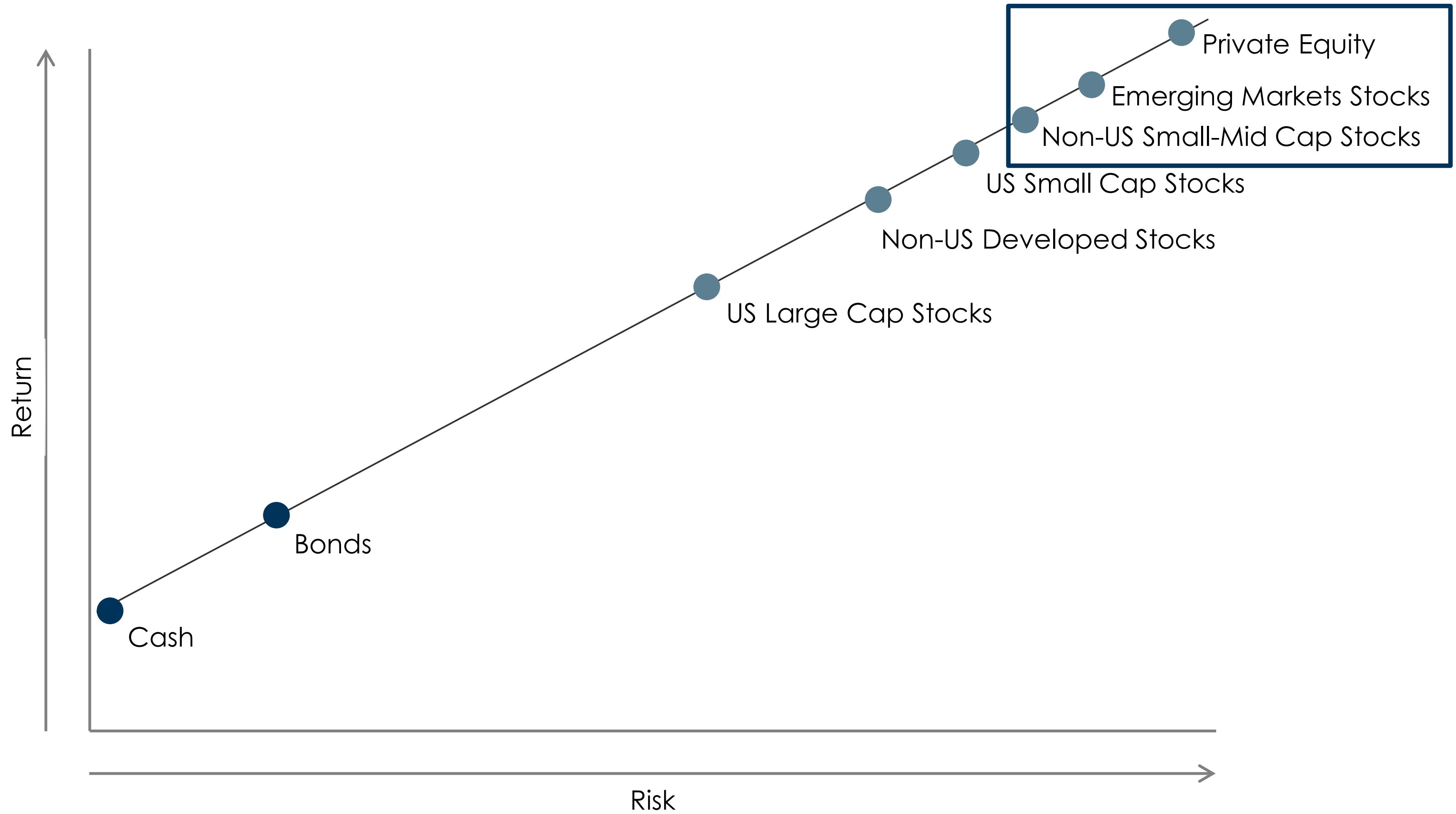
Public Equity Portfolio Construction



– William Shakespeare

Potential Return-Enhancing Asset Classes

Investing Categories – Risk & Return



Non-US Small-Mid Cap Equity

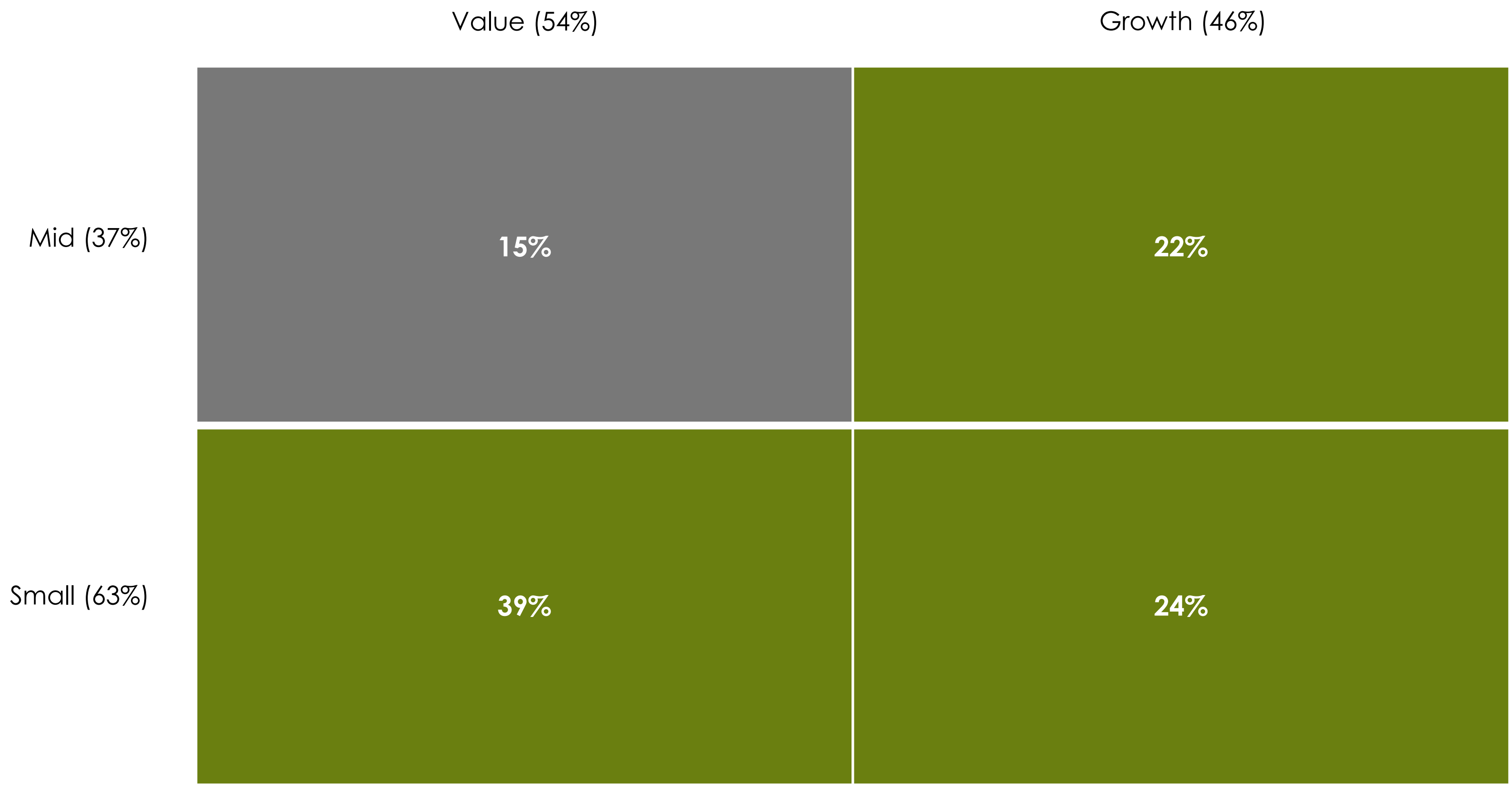
Thesis: Breadth of universe and lack of coverage presents a meaningful active management opportunity

Key Considerations

- **Breadth** – 6,100+ stocks in index
- **Multiple Levers** – region, country, market cap
- **Diversification** – underrepresented in benchmark
- **Underfollowed –** discovery premium
- **Mergers & Acquisitions** – takeout premium
- **Capacity** – opportunity declines as AUM rises

Thesis: Breadth of universe and lack of coverage presents a meaningful active management opportunity

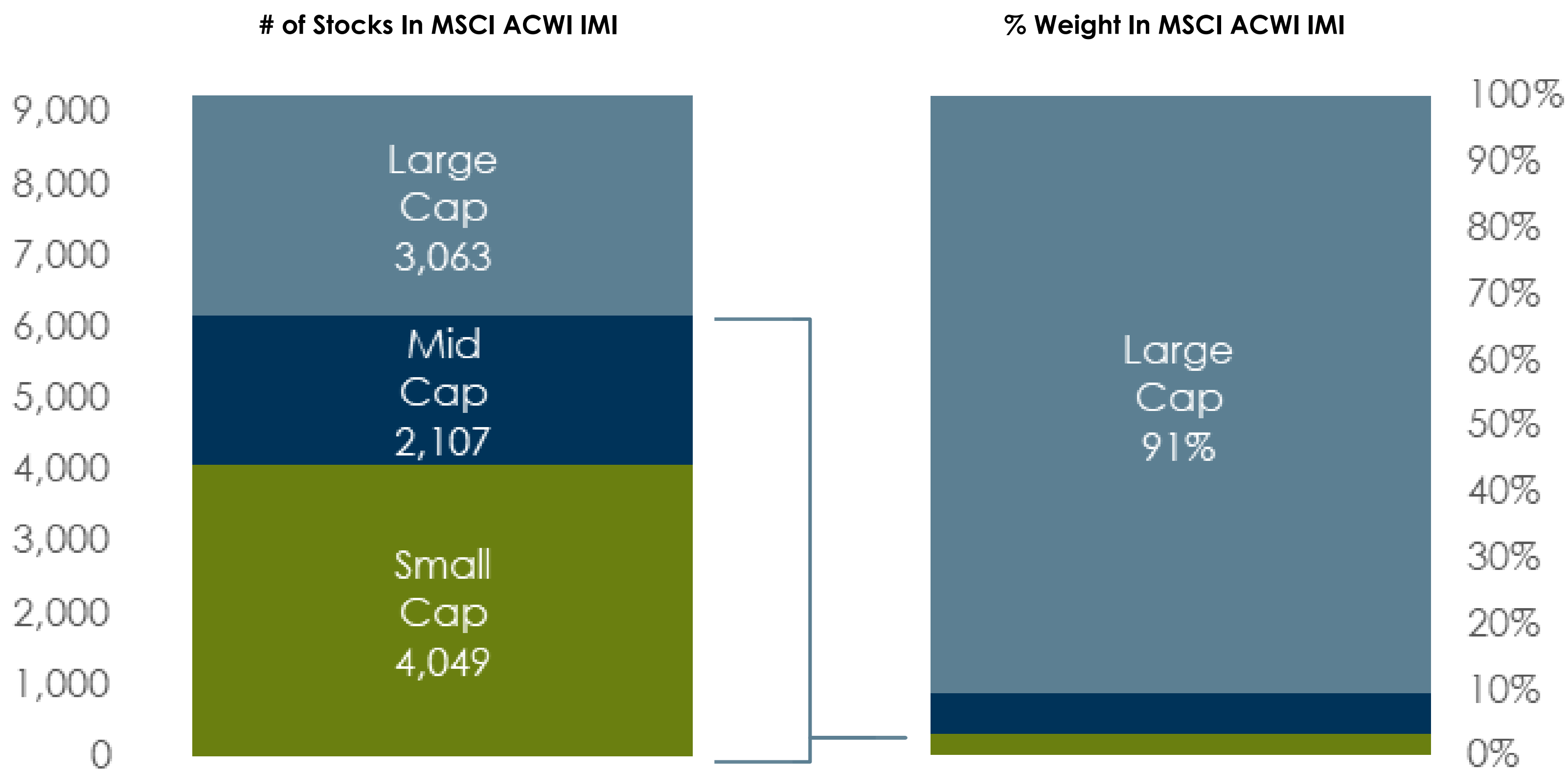
Foundation of Consistency – % of Index Leadership*



Rolling 3-yr beta returns, % of observations (97) top performer Jul-94 to Jun 21
**MSCI ACWI ex US Mid Cap Value, MSCI ACWI ex US Mid Cap Growth*
MSCI ACWI ex US Small Cap Value, MSCI ACWI ex US Mid Cap Value

Thesis: Breadth of universe and lack of coverage presents a meaningful active management opportunity

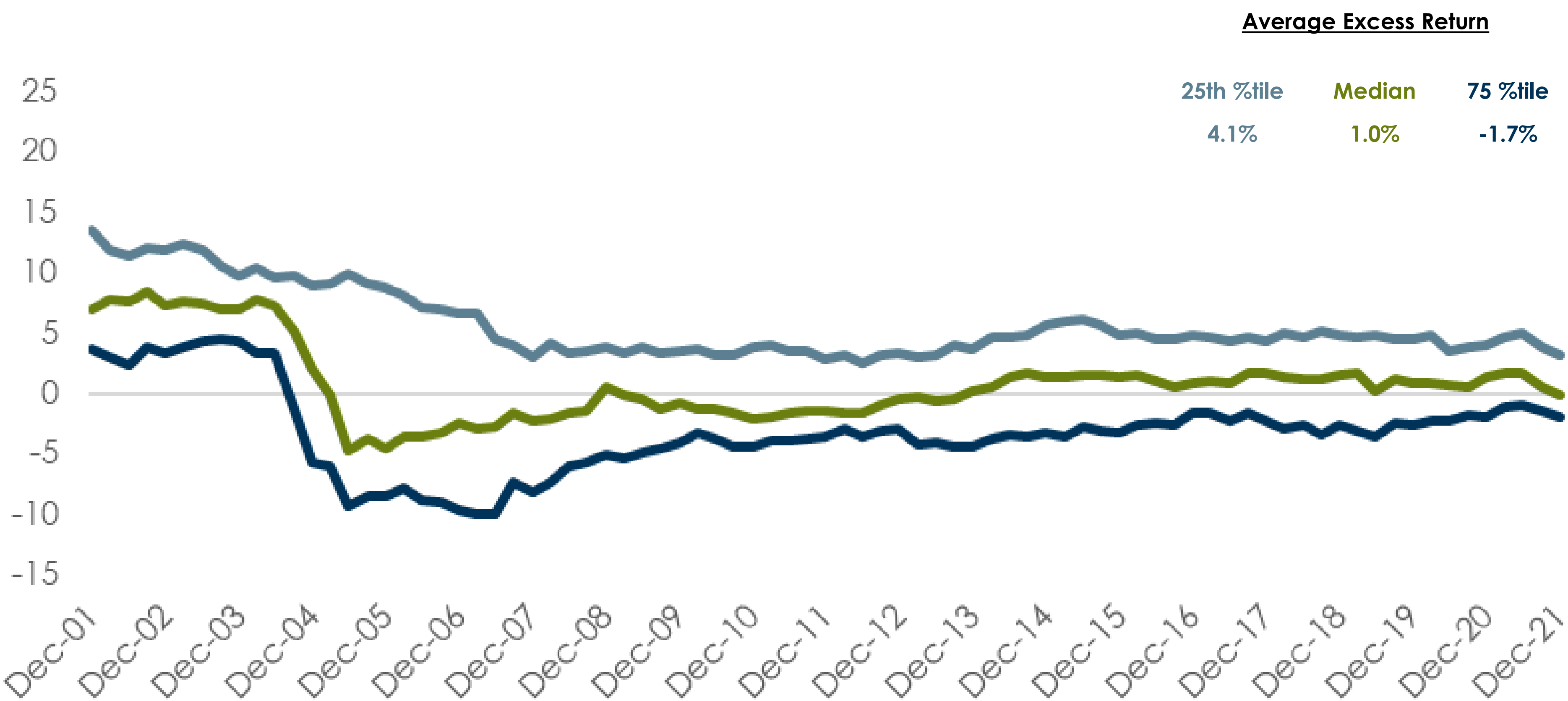
Diversification – 67% of Stocks, Represent a 9% Weight



Thesis: Breadth of universe and lack of coverage presents a meaningful active management opportunity

Active Opportunity – High

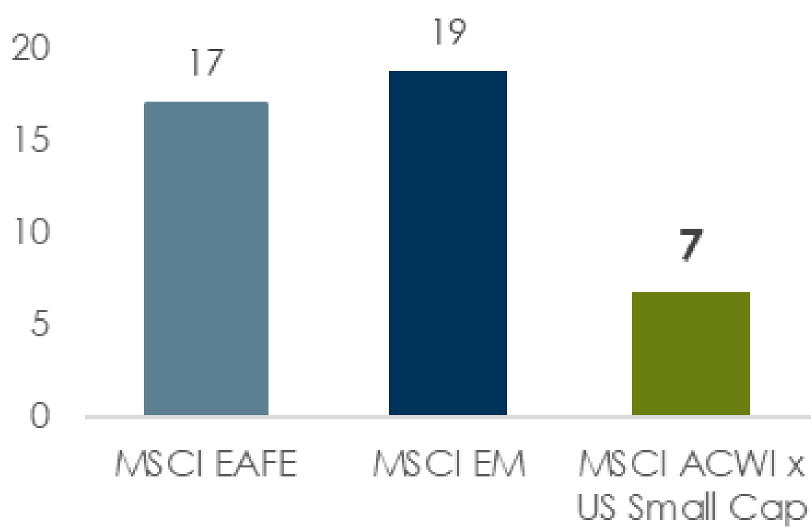
eVestment Int'l SMID/Small vs. MSCI ACWI ex US Small Rolling Excess Return 3-Years (Net of Fees)



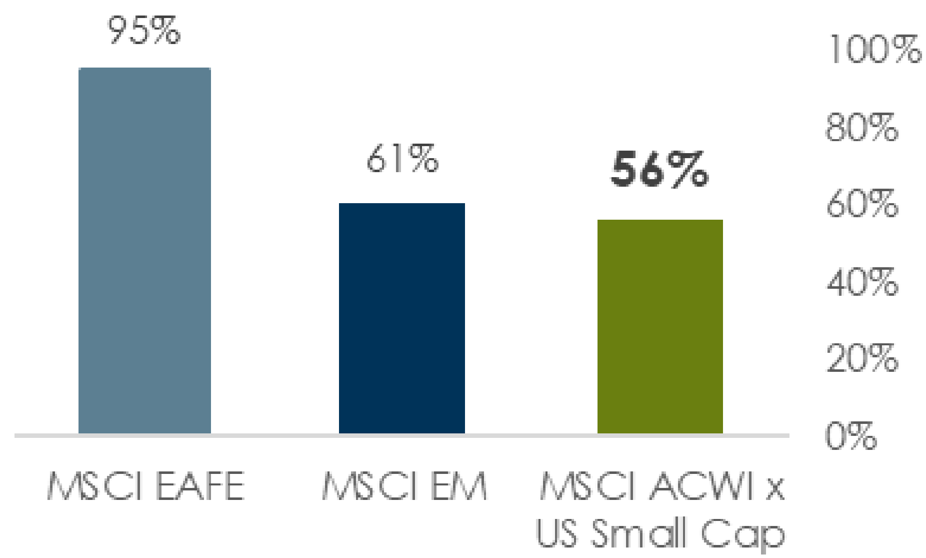
Thesis: Breadth of universe and lack of coverage presents a meaningful active management opportunity

Information Opportunity** – Lack of Coverage Enables Differentiated View

Avg. # of Analyst Coverage



% of Stocks Covered by at Least 5 Analysts



***Source: Bloomberg*

Thesis: Breadth of universe and lack of coverage presents a meaningful active management opportunity

Implementation Profile

- **Active management** – attractive market with alpha potential
- **Diversification –** capture full opportunity set of international markets
- **Information Advantage** – seek managers who exploit this opportunity
- **Opportunistic** – emphasize small cap stock-picking over style

Emerging Markets Small-Mid Cap Equity

Thesis: Emphasize diversified active managers that have the ability to invest in the full opportunity set of emerging markets

Key Considerations

- **Breadth** – 3,200+ stocks in index, of which 2,500 are mid-small cap
- **Multiple Levers** – region, country (34), market cap
- **Disruption** – economic, demographics, technological
- **Enhanced Risks –** currency, political, regulatory changes
- **ESG** – concentrated ownership, state-owned – progress
- **Capacity** – opportunity declines as AUM rises

Thesis: Emphasize diversified active managers that have the ability to invest in the full opportunity set of emerging markets

Foundation of Consistency – % of Index Leadership*

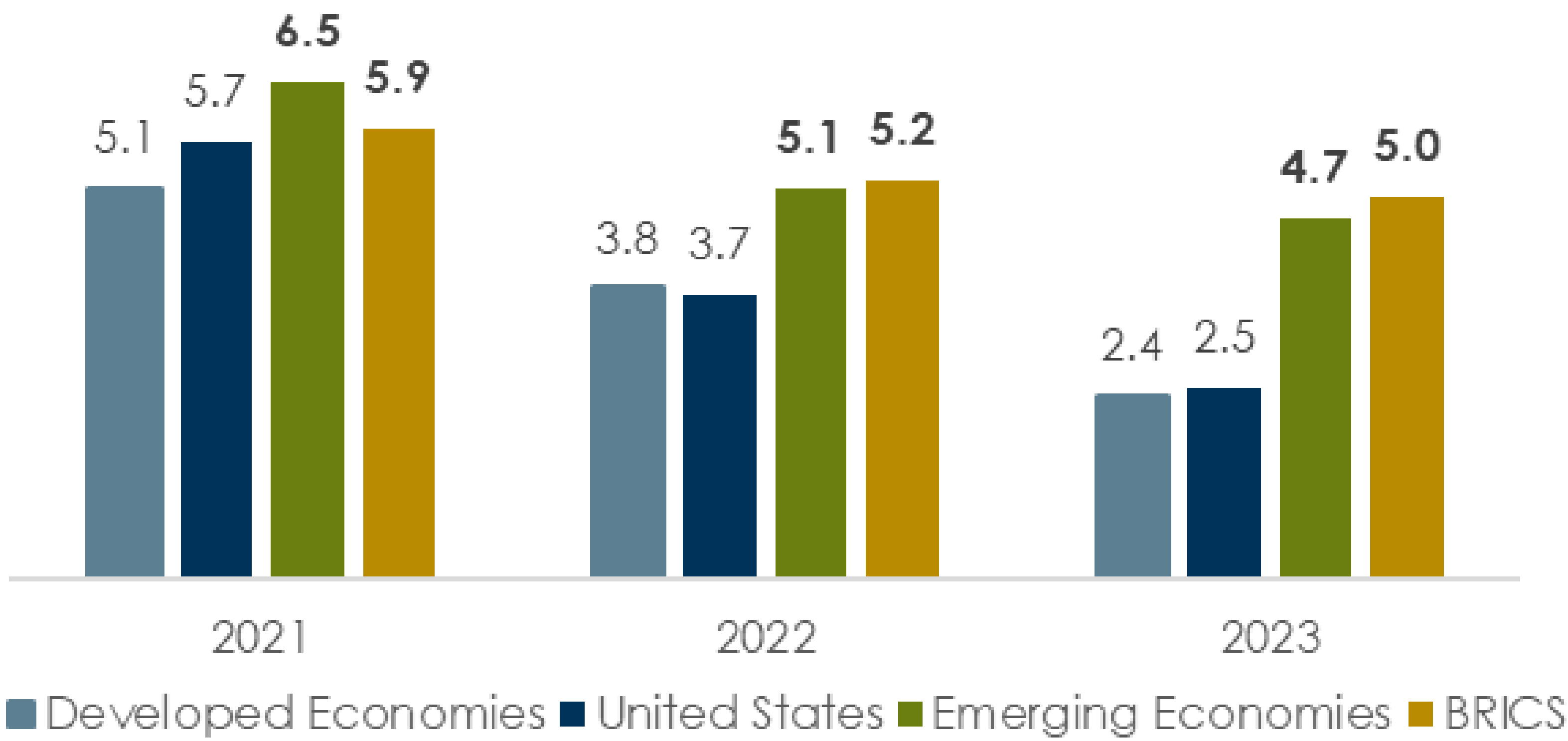
	Value	Growth
Large (30%)	**6%**	**24%**
Mid (27%)	**24%**	**3%**
Small (21%)	**18%**	**3%**
Frontier (22%)	**22%**	

Rolling 3-yr beta returns, % of observations (67) top performer Jul-02 to Dec-21
*Since common inception: MSCI EM Large Cap Value, MSCI EM Large Cap Growth, MSCI EM Mid Cap Value, MSCI EM Mid Cap Growth, MSCI EM Small Cap Value, MSCI EM Small Cap Growth, and EM Frontier

Thesis: Emphasize diversified active managers that have the ability to invest in the full opportunity set of emerging managers

Growth Tailwind – Embrace the Inherent Growth in the Space

Real GDP Consensus Forecast (Bloomberg)



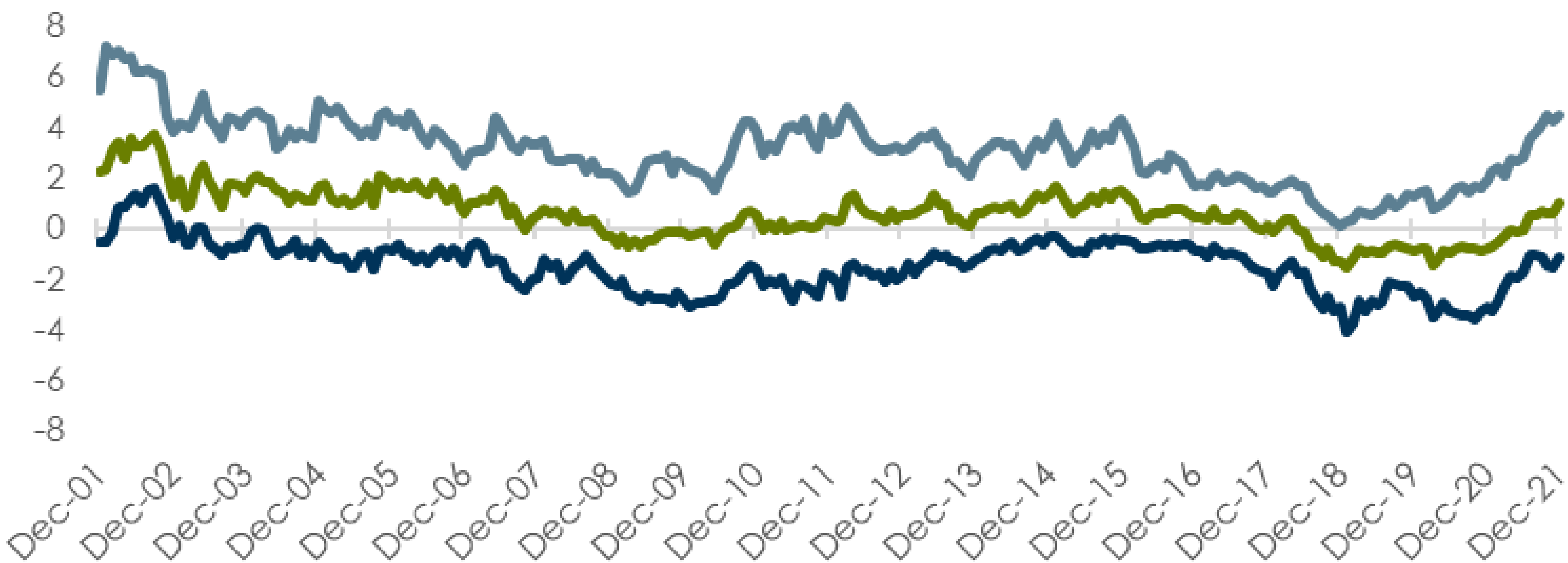
Thesis: Emphasize diversified active managers that have the ability to invest in the full opportunity set of merging markets

Active Opportunity – High

eVestment Global Emerging Markets vs. MSCI EM Rolling Excess Return 3-Years (Net of Fees)

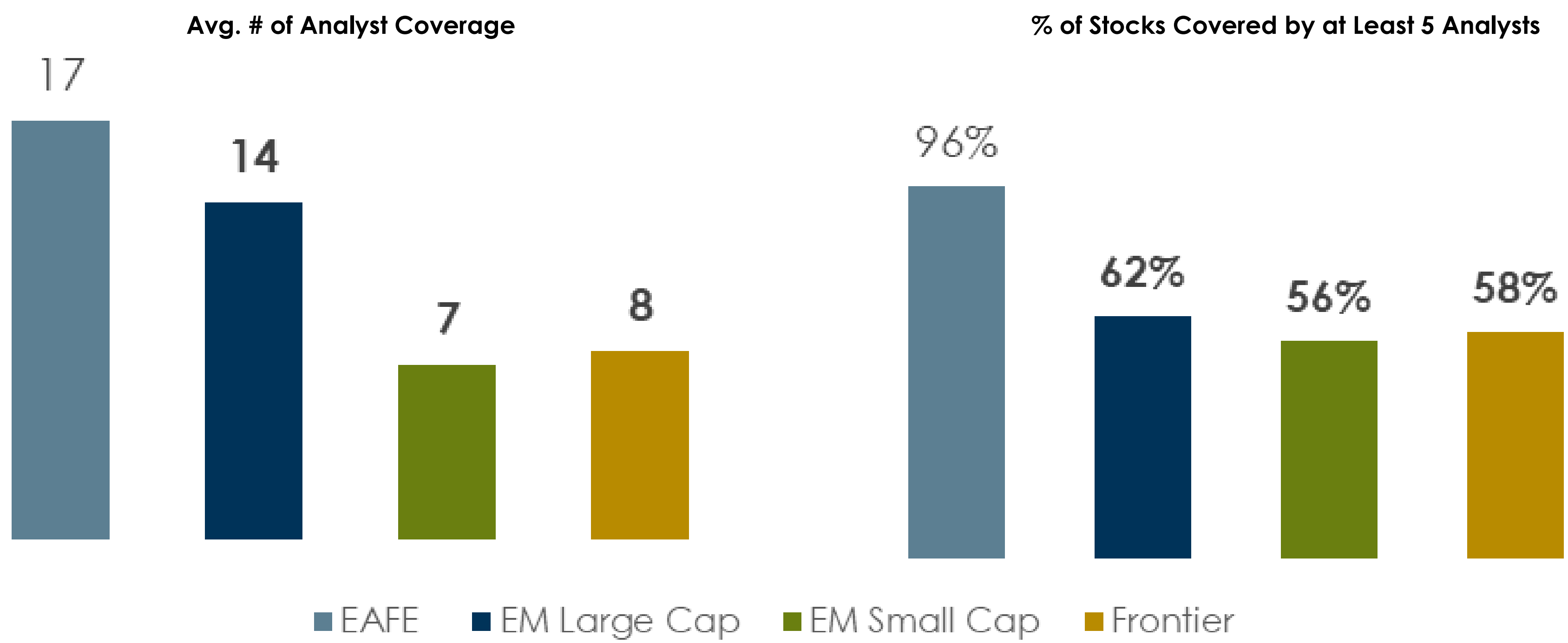
Average Excess Return

25th %tile	Median	75 %tile
3.1%	0.6%	-1.5%



Thesis: Emphasize diversified active managers that have the ability to invest in the full opportunity set of emerging markets

Information Opportunity** - Lack of Coverage Enables Differentiated View



**Source: Bloomberg

Thesis: Emphasize diversified active managers that have the ability to invest in the full opportunity set of emerging markets

Implementation Profile

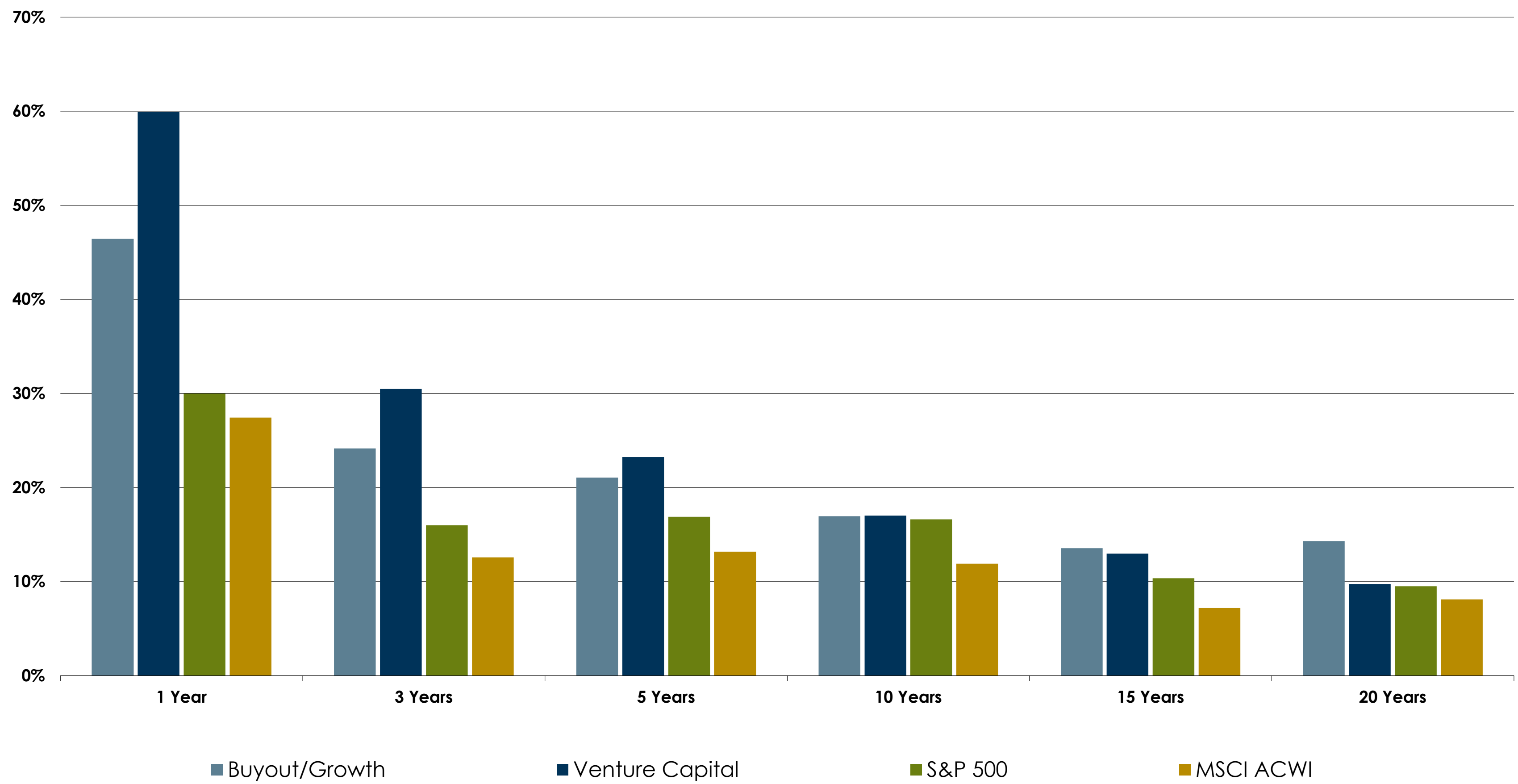
- **Active Management –** emphasize active management
- **All Cap –** seek managers that have the ability to invest down cap
- **Growth Opportunities –** demographic, corporate governance, industry, competition
- **Diversified** – emphasize managers who provide all-cap and style diversification

Private Equity

Why Invest in Private Equity

Private Market Investments Have Delivered Strong Relative and Absolute Performance

Investment Horizon Returns – As of September 30, 2021



Source: Bloomberg, PitchBook, ACG Research

What is Private Equity?

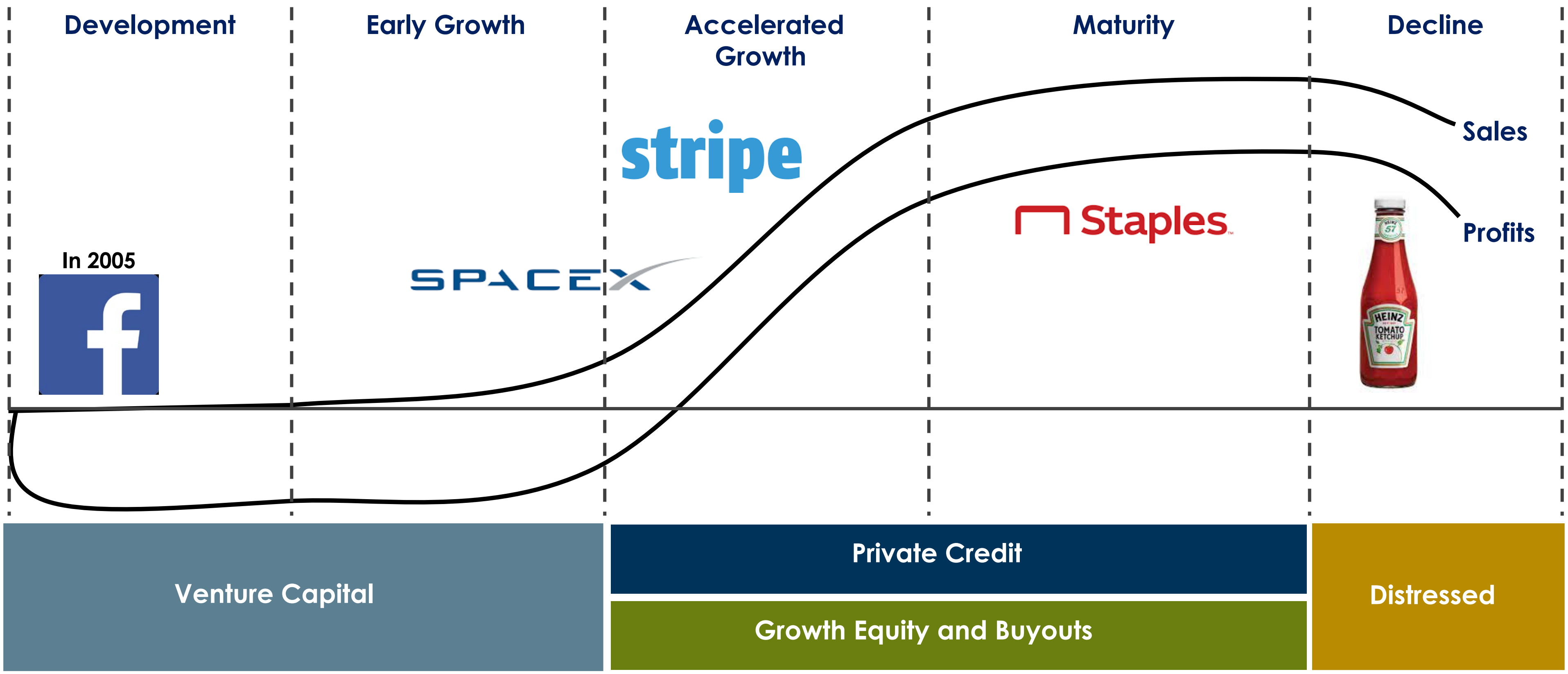
- The term "private equity" refers to **any investment of capital that is executed outside of the public capital markets**.
- In many cases, **other sources of financing, such as public equity or public debt, are not available** due to the perceived risk profile of the company or the long time horizon associated with implementing a business strategy.

Public versus Private Markets

Public Markets:		**Private Markets:**
Investments in **publicly traded stocks.**	→	Investments in **private companies**.
Information is freely available on almost all companies.	→	**Information is confidential**.
Available to all individuals & institutions.	→	Typically **available only to Qualified Purchasers**.
Accessed through a **broker, money manager, or a mutual fund**.	→	Accessed through a **Fund or FoF manager**,
Long-term or short-term strategies.	→	**Long-term** strategies
Investments are **marketable and liquid**.	→	Investments are **non–marketable / illiquid**.
Companies are valued instantaneously and there is a mechanism to bring buyers and sellers together efficiently.	→	Company **valuations are difficult and inefficient.**

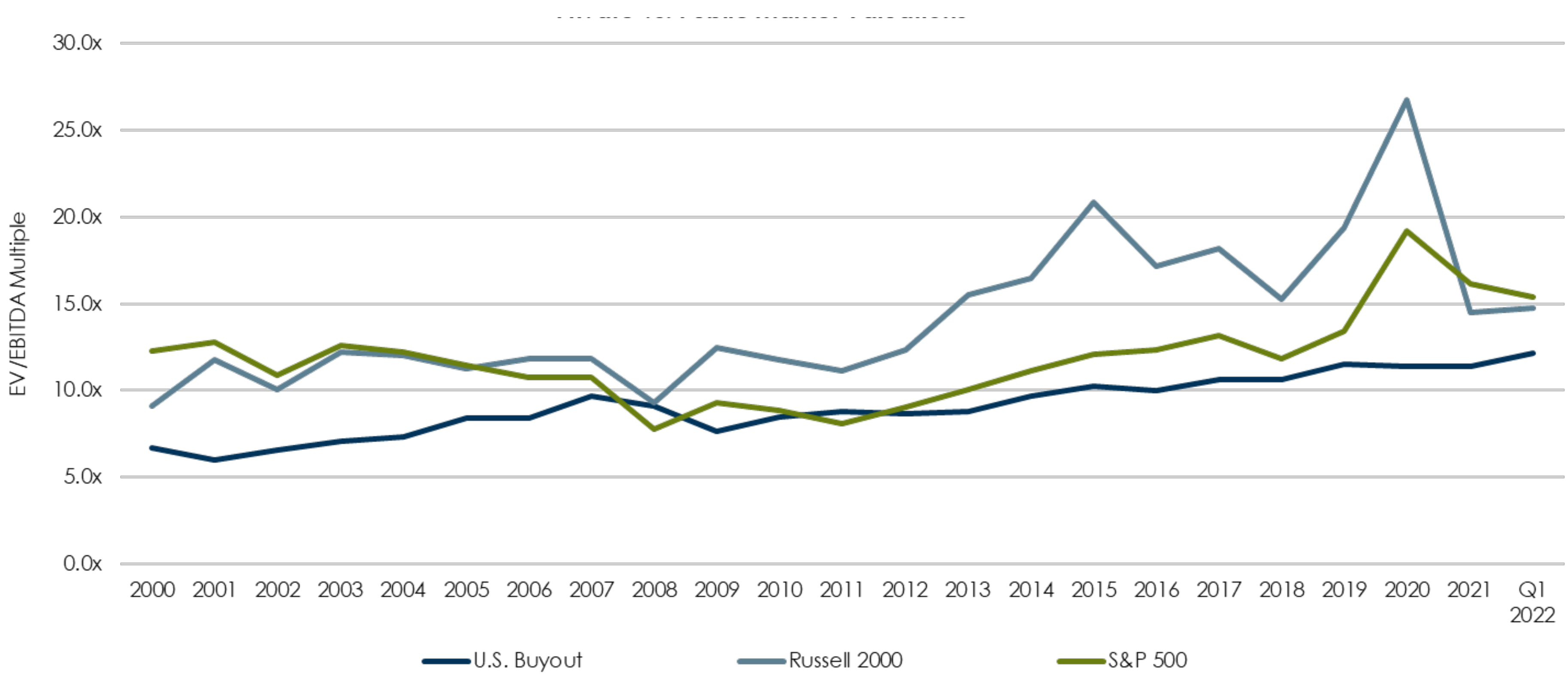
Stages of Private Equity

- The business life cycle provides a logical framework for discussing private equity
- Each stage of the business life cycle requires a specialized skill set
- Most private equity strategies focus on a particular stage of the business life cycle



Private vs. Public Market Valuations

Persistent high pricing in private markets could weigh on future return prospects, but **valuations remain reasonable versus public markets.**



Source: PitchBook, Bloomberg, ACG Research; data as of 12/31/2020

Stable Drivers of Return Premium

Capital Inefficiency	Less capital pursuing a larger, more diversified set of companies
Valuation Discount	Private businesses can be purchased for valuation multiples that are less than those observed in public markets
Alignment	Long-term investment horizon with shared economic incentives for LPs, GPs and management teams
Hands-On Value Creation	Control orientation allows GPs to guide decision making and invest for growth

Private Equity – Portfolio Construction

Venture Capital

Seed Stage

Growth Equity

Buyout

Small Cap

Large Cap

Credit

Origination

Credit Origination strategies will typically not be included as part of the Private Equity allocation due to their lower return targets and fixed income characteristics.

Distress

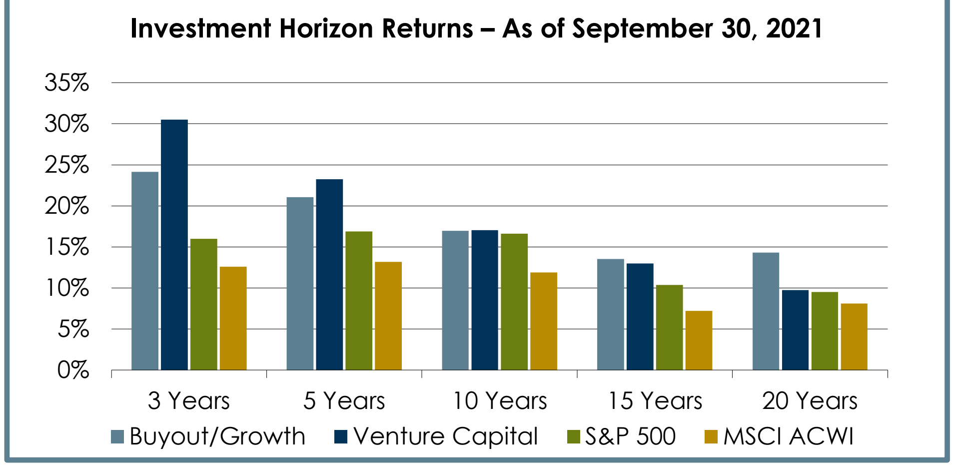
Private Equity Strategies

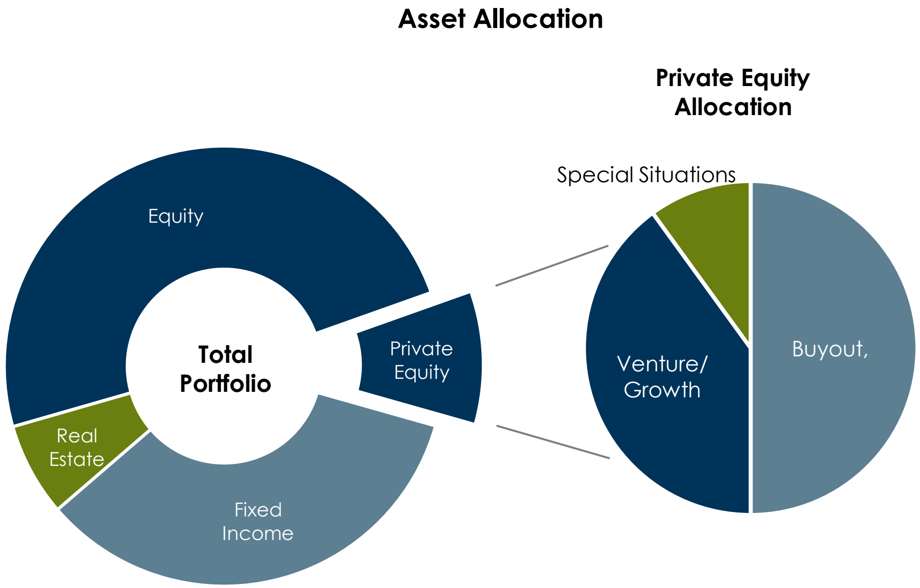
- The private equity universe includes thousands of funds across hundreds of sub-strategies. The universe can be categorized into three broad sectors: Venture Capital, Leveraged Buyout, and Private Credit.
- The relative attractiveness of these three sectors fluctuates through different business and credit cycles. A risk-controlled private equity portfolio should be balanced to include exposure to most or all of these sectors.
- The goal is to build out a diversified portfolio of 6 – 8 private equity managers over three to five years that address each of these sectors.

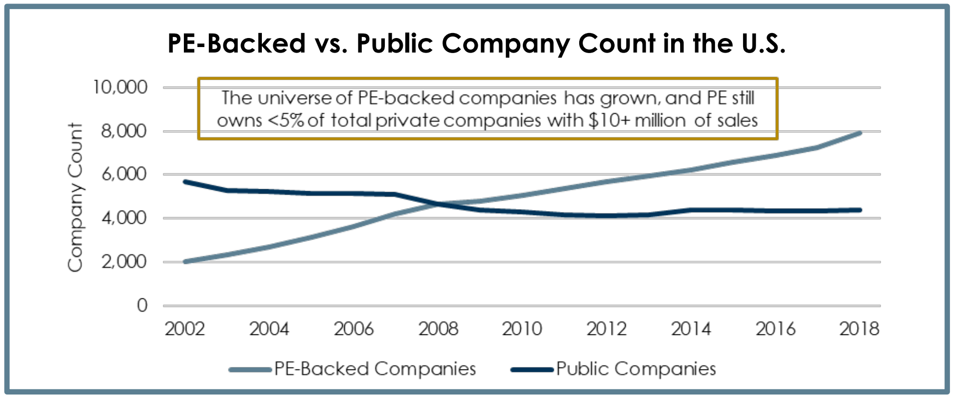
Private Equity: Return-enhancing alternative to public equity

Case for Private Equity

- Consistent outperformance vs. public equity
- Broad company diversification; low penetration vs. opportunity set
- Return dispersion creates alpha opportunity via manager selection







Opportunity Set	Buyout	Venture/Growth	Special Situations
Target Company Profile	Mature with steady cash flow	Earlier stage with rapid growth	Distressed
Target Net Return	12% to 15%	15%+	10% to 15%
Average Holding Period	4 to 6 years	5 to 8 years	<4 years
Portfolio Allocation (of PE Target)	40% - 60%	30% - 50%	0% - 10%

Sources: PitchBook, World Bank, NAICS Association, ACG Research. Notes: Target Net Returns are based on PitchBook historical median returns and ACG experience.

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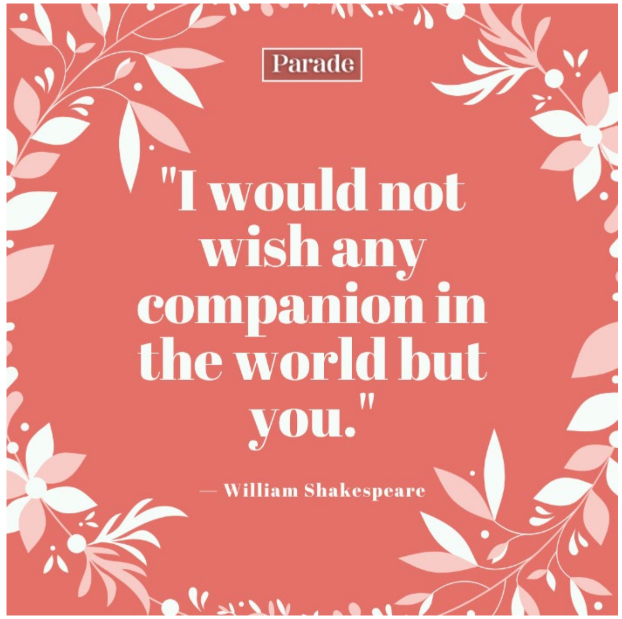

Oklahoma Municipal Retirement Fund – Trustee Retreat
Investment Manager Fee Review

June 23, 2022

ACG | ASSET CONSULTING GROUP
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Greenwich
Quality Leader

2018 2019 2020 2021

We are proud to announce that ACG has again been named a Greenwich Associates Quality Leader – recognized as one of the top consultants in the industry.

Methodology and Disclosure: *Between July and October 2021, Coalition Greenwich (previously known as Greenwich Associates), conducted in-person and phone interviews and online surveys with 811 professionals at 661 of the largest tax-exempt funds in the United States, including corporate and union funds, public funds, endowments and foundations, insurance general accounts, and healthcare organizations, with either pension or investment pool assets greater than $150 million. Study participants were asked to provide quantitative and qualitative evaluations of their asset managers and investment consultants, including qualitative assessments of those firms soliciting their business and detailed information on important market trends. ACG is one of four firms recognized in the mid-size investment consultant category. The ratings may not be representative of any one client's experience with ACG; rather they are representative of those clients that chose to participate in the survey. The results are not indicative of ACG's future performance. ACG does not pay to have its clients participate in the study.*

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Tab 1 Defined Benefit Investment Manager Fee Review

Tab 2 Defined Contribution Investment Manager Fee Review

Defined Contribution Asset Class Options

Defined Contribution Target Retirement Options

Defined Benefit Investment Manager Fee Review

Defined Benefit – Executive Summary

- Oklahoma Municipal Retirement Fund Defined Benefit Plan is well diversified, having exposure to all major asset classes, including fixed income, equity and real assets.

- The Fund's performance over the trailing 10 years is beating the Policy Index while also exceeding the actuarial rate of return. This performance ranks in the top 25th percentile when compared to other funds with a similar equity allocation.

- The current asset allocation posture of the fund is expected to generate long-term returns that exceed the actuarial assumed rate of return (7.25%) although this could be more challenging over the short-to-intermediate-term horizon.

- OkMRF Defined Benefit Plan's investment manager fee structure falls below the least expensive quartile when compared to similarly-sized plans.

- In addition, the fee structure comes in under the **54 bps average investment management expense of other public pension plans** as reported in the NCPERS 2021 Public Retirement Systems study.

Defined Benefit – Current Portfolio Structure as of March 31, 2022

Global Equity Funds

	Value	Core	Growth
U.S. Large Cap		SSgA S&P 500 (30.5%)	
U.S. Small/Mid Cap	River Road (5.5%)		TimesSquare (4.2%)
International Developed Equity	Artisan (7.1%)	Ninety One (6.6%)	WCM (6.4%)
Emerging Markets Equity		Harding Loevner (3.6%)	
Long/Short Equity		K2 Ascent (8.9%)	

Global Fixed Income Funds

Core Fixed Income	JP Morgan (6.3%)
Core Plus Fixed Income	Amundi Pioneer (6.7%)
Absolute Return Fixed Income	BlackRock Strategic Income (7.1%)

Real Assets

Core Real Estate	JP Morgan Special Situations (2.4%) JP Morgan Strategic Property (4.8%)

Excludes cash and short-term investments.
Percentages are based upon 3/31/2022 market values.

Performance vs. Objectives

For the Periods Ending March 31, 2022

	5 Years Benchmark (%)	5 Years Rank	5 Years Total Portfolio (%)	5 Years Rank	5 Years Objective Met?	10 Years Benchmark (%)	10 Years Rank	10 Years Total Portfolio (%)	10 Years Rank	10 Years Objective Met?
▪ The Pension Plan gross annualized total return should equal or exceed the Plan's actuarial interest rate assumption.	7.25		9.61		Yes	7.25		8.98		Yes
▪ The Pension Plan gross annualized total return should equal or exceed the annualized total return of the policy index.	9.61		9.61		Yes	8.93		8.98		Yes
▪ The Pension Plan gross annualized total return should rank at median or above when compared to a universe of total fund portfolios with a similar allocation to equities (55%-70%).	9.04	50th	9.61	26th	Yes	8.38	50th	8.98	25th	Yes
▪ Gross volatility or standard deviation should be in line with that of the Policy Index.	10.57		10.38		Yes	9.10		8.63		Yes

Performance and Statistics are calculated using monthly return data. * Indicates net of fee data.

Policy Index: Effective October 2021, the index consists of 70.0% MSCI ACWI, 20.0% Bloomberg US Aggregate, 10.0% NCREIF Property.

Defined Benefit – Investment Manager Fee Structure

Manager	Asset Class	Fee Schedule	Blended Fee (bps) [1]
SSgA	Large Cap Equity	1 bp on all assets	1.0
River Road	Small Cap Value Equity	First $10M at 95 bps; next $15M at 90 bps; next $25M at 85 bps	89.5
TimesSquare	Small Cap Growth Equity	90 bps on the first $50 million; 80 bps on the next $50 million; 70 bps on the balance	90.0
Artisan	International Equity	95 bps on all assets	95.0
Ninety One	International Equity	35 bps on all assets	35.0
WCM	International Equity	70 bps on all assets	70.0
Harding Loevner	Emerging Markets Equity	100 bps on all assets	100.0
K2 Ascent [2]	Long/Short Equity	31 bps on all assets	31.0
JP Morgan - Core Fixed Income	Core Fixed Income	30 bps on all assets	30.0
Amundi Pioneer	Core Plus Fixed Income	25 bps on all assets	25.0
BlackRock	Absolute Return	67 bps on all assets	67.0
JP Morgan - Special Situation [3]	Core Real Estate	125 bps of account's pro-rata share of NAV plus 62.5 bps on outstanding debt balance; fee is capped at 187.5 bps	125.0
JP Morgan - Strategic	Core Real Estate	99 bps per annum on account's net asset value	99.0

[1] Blended Fees Based on Current Market Value and Sliding Scale; Figures are in Basis Points and exclude performance based fees.
[2] Due to market declines in 2022, the expense ratio for K2 Ascent has increased slightly and does not match the 0.29% fee used in OkMRF's Annual Budget.
[3] The blended fee for JP Morgan Special Situation Property excludes fees on outstanding debt balance.

Manager	Asset Class	Market Value ($000s) [1]	Blended Fee (bps) [2]
SSgA	Large Cap Equity	$215,527	1
River Road	Small Cap Value Equity	$38,961	89
TimesSquare	Small Cap Growth Equity	$29,896	90
Artisan	International Equity	$49,964	95
Ninety One	International Equity	$46,919	35
WCM	International Equity	$44,964	70
Harding Loevner	Emerging Markets Equity	$25,790	100
K2 Ascent [3]	Long/Short Equity	$62,704	31
JP Morgan - Core Fixed Income	Core Fixed Income	$44,878	30
Amundi Pioneer	Core Plus Fixed Income	$47,226	25
BlackRock	Absolute Return	$50,077	67
JP Morgan - Special Situation [4]	Core Real Estate	$17,284	125
JP Morgan - Strategic	Core Real Estate	$33,674	99
Total Fund Weighted Average Fee		**$707,864**	**45**

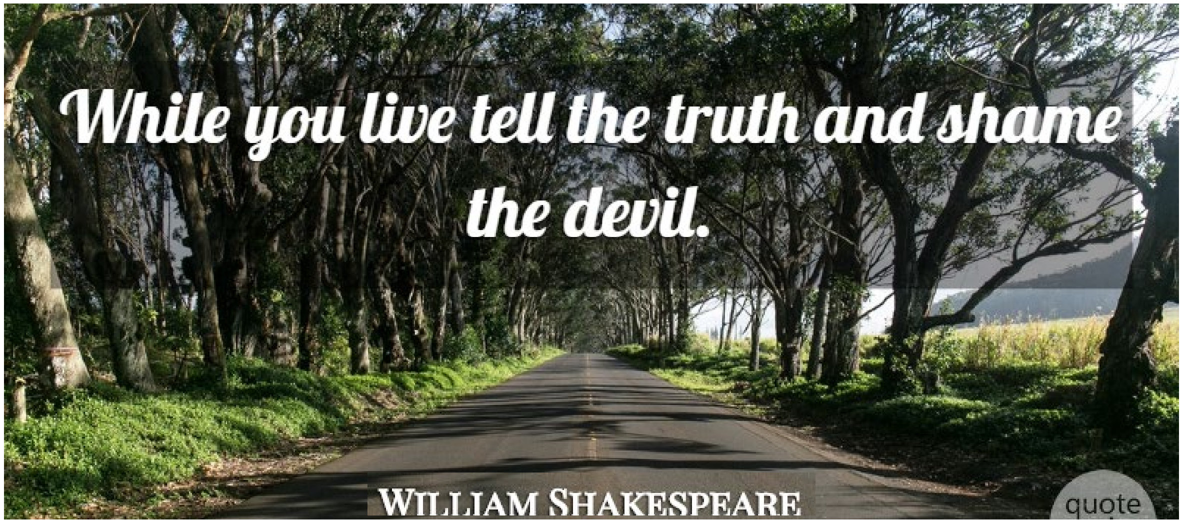
Fees May Vary Based on Changes in Market Values or Investment Results.

[1] Market Values as of March 31, 2022. Excludes cash.
[2] Blended Fees Based on Current Market Value and Sliding Scale; Figures are in Basis Points and exclude performance based fees.
[3] Due to market declines in 2022, the expense ratio for K2 Ascent has increased slightly and does not match the 0.29% fee used in OkMRF's Annual Budget.
[4] The blended fee for JP Morgan Special Situation Property excludes fees on outstanding debt balance.

Manager	Current Allocation [1]	Blended Fee [2]	Least Expensive Quartile	Median	Most Expensive Quartile
SSgA	30%	1.0	32.0	42.0	52.0
River Road	6%	89.5	80.0	88.0	96.0
TimesSquare	4%	90.0	78.0	85.0	90.0
Artisan	7%	95.0	66.0	82.0	90.0
Ninety One	7%	35.0	60.0	71.0	85.0
WCM	6%	70.0	69.0	78.0	90.0
Harding Loevner	4%	100.0	80.0	99.0	115.0
K2 Ascent [3]	9%	31.0	100.0	115.0	150.0
JP Morgan - Core Fixed Income	6%	30.0	24.0	28.0	31.0
Amundi Pioneer	7%	25.0	28.0	31.0	35.0
BlackRock	7%	67.0	50.0	65.0	74.0
JP Morgan - Special Situation [4]	2%	125.0	97.0	100.0	110.0
JP Morgan - Strategic	5%	99.0	97.0	100.0	110.0
	100%	**45.0**	**56.1** [5]	**66.1** [5]	**77.6** [5]

Fees May Vary Based on Changes in Market Values or Investment Results.

[1] Allocation based on market values as of March 31, 2022. Excludes cash.
[2] Blended fees based on current market value and sliding scale; Figures are in basis points.
[3] Due to market declines in 2022, the expense ratio for K2 Ascent has increased slightly and does not match the 0.29% fee used in OkMRF's Annual Budget.
[4] The blended fee for JP Morgan Special Situation Property excludes fees on outstanding debt balance.
[5] Weighted average fee rate using the current allocation and asset class quartile fee rates per eVestment; figures are in basis points.



Defined Contribution Investment Manager Fee Review

- Oklahoma Municipal Retirement Fund Defined Contribution Plan offers participants well diversified investment options, having exposure to all major asset classes, including fixed income, equity and real assets.

- Of the nine asset class options, six options have blended fees falling below the least expensive quartile of their peer universe. Two managers have blended fees falling below the median when compared to their peer universe.

- OkMRF's Defined Contribution Plan offers eleven target retirement funds. All eleven options fall below the least expensive quartile of their respective peer universe.

Defined Contribution Asset Class Options

Defined Contribution Asset Class Options – Investment Manager Fee Structure

Manager	Asset Class	Fee Schedule	Blended Fee (bps) [1]
Growth and Value Option	Large Cap Core Equity	Blended fee resulting from manager allocation [2]	22.0
S&P 500 Option	US Large Cap Equity	2.3 bps on all assets	2.3
Aggressive Equity Option	Small to Mid Cap Equity	Blended fee resulting from manager allocation [2]	46.6
International Investment Equity Option	International Equity	Blended fee resulting from manager allocation [2]	68.8
Global Equity Option	Global Equity	10 bps on all assets	10.0
ESG US Stock Fund Option	ESG US Large and Mid Cap Equity	63 bps on all assets	63.0
Total Yield Option	Total Yield Option	Blended fee resulting from manager allocation [2]	42.5
Bond Index Option	Bond Index	6 bps on all assets	6.0
Real Assets Option	Real Assets	41 bps on all assets	41.0

[1] Blended Fees Based on Current Market Value. Figures are in Basis Points.

[2] Fee details available on the following pages.

Analysis excludes Fixed Fund Option.

Defined Contribution Asset Class Options – Investment Manager Fee Structure

Manager	Asset Class	Fee Schedule	Blended Fee (bps) [1]
Growth and Value Option	**Large Cap Core Equity**	**Blended fee resulting from manager allocation**	**22.0**
Vanguard Total Stock	US All Cap Core	3 bps on all assets	3.0
Vanguard Windsor II	US Large Cap Value	26 bps on all assets	26.0
T. Rowe Price	US Large Cap Equity	56 bps on all assets	56.0
Aggressive Equity Option	**Small to Mid Cap Equity**	**Blended fee resulting from manager allocation**	**46.6**
SSgA Russell Small Cap Completeness	US Small Cap Core	5.2 on all assets	5.2
Integrity Small Cap Value	US Small Cap Value	96 bps on all assets	96.0
TimesSquare Small Cap Growth	US Small Cap Growth	80 bps on all assets	80.0
International Investment Equity Option	**International Equity**	**Blended fee resulting from manager allocation**	**68.8**
Artisan	International Developed Markets Equity	95 bps on all assets	95.0
SSgA Global Equity ex US	International Developed Markets Equity	9 bps on all assets	9.0
Harding Loevner International Equity	International Developed Markets Equity	72 bps on all assets	72.0
Harding Loevner Emerging Markets	Emerging Markets Equity	99 bps on all assets	99.0
Total Yield Option	**Total Yield Option**	**Blended fee resulting from manager allocation**	**42.5**
JP Morgan Fixed Income	Core Bonds	30 bps on all assets	30.0
BlackRock Strategic Income Opportunities	Absolute Return	67 bps on all assets	67.0
Amundi Pioneer Core Plus	Multi-Sector Fixed Income	43 bps on all assets	43.0

[1] Blended Fees Based on Current Market Value and Sliding Scale; Figures are in Basis Points and exclude performance based fees.

Defined Contribution Asset Class Options – Investment Management Fee Comparison

Manager	Blended Fee [1]	Least Expensive Quartile	Median	Most Expensive Quartile
Growth and Value Option	22.0	56.0	69.0	85.0
S&P 500 Option	2.3	35.0	50.0	60.0
Aggressive Equity Option	46.6	60.0	65.0	75.0
International Investment Equity Option	68.8	60.0	75.0	85.0
Global Equity Option	10.0	63.0	75.0	80.0
ESG US Stock Fund Option	63.0	56.0	69.0	85.0
Total Yield Option	42.5	30.0	32.0	35.0
Bond Index Option	6.0	24.0	28.0	34.0
Real Assets Option	41.0	97.0	100.0	110.0

Fees may vary based on changes in market values or investment results.

[1] Blended fees based on current market value and sliding scale; Figures are in basis points.
Analysis excludes Fixed Fund Option.

Defined Contribution Target Retirement Options

Defined Contribution Target Retirement Options – Current Fee Schedule

Manager	Asset Class	Fee Schedule	Blended Fee (bps) [1]
SSgA Target Retirement 2020	Target Date Fund	12 bps on all assets	12.0
SSgA Target Retirement 2025	Target Date Fund	12 bps on all assets	12.0
SSgA Target Retirement 2030	Target Date Fund	12 bps on all assets	12.0
SSgA Target Retirement 2035	Target Date Fund	12 bps on all assets	12.0
SSgA Target Retirement 2040	Target Date Fund	12 bps on all assets	12.0
SSgA Target Retirement 2045	Target Date Fund	12 bps on all assets	12.0
SSgA Target Retirement 2050	Target Date Fund	12 bps on all assets	12.0
SSgA Target Retirement 2055	Target Date Fund	12 bps on all assets	12.0
SSgA Target Retirement 2060	Target Date Fund	12 bps on all assets	12.0
SSgA Target Retirement 2065	Target Date Fund	12 bps on all assets	12.0
SSgA Target Retirement Income	Target Date Fund	12 bps on all assets	12.0

[1] Blended Fees Based on Current Market Value. Figures are in Basis Points.

Defined Contribution Target Retirement Options – Investment Management Fee Comparison

Manager	Blended Fee [1]	Least Expensive Quartile	Median	Most Expensive Quartile
SSgA Target Retirement 2020	12.0	16.0	35.0	49.0
SSgA Target Retirement 2025	12.0	16.0	36.0	49.0
SSgA Target Retirement 2030	12.0	16.0	35.0	49.0
SSgA Target Retirement 2035	12.0	16.0	36.0	49.0
SSgA Target Retirement 2040	12.0	16.0	36.0	49.0
SSgA Target Retirement 2045	12.0	16.0	36.0	49.0
SSgA Target Retirement 2050	12.0	16.0	36.0	49.0
SSgA Target Retirement 2055	12.0	16.0	36.0	49.0
SSgA Target Retirement 2060	12.0	16.0	36.0	45.0
SSgA Target Retirement 2065	12.0	28.0	36.0	36.0
SSgA Target Retirement Income	12.0	18.0	38.0	43.0

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[1] Blended fees based on current market value and sliding scale; Figures are in basis points.

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OkMRF Trustee Retreat
Oklahoma Municipal Retirement Fund
1001 NW 63rd Street, Suite 260, Oklahoma City, OK 73116

Thursday, June 23, 2022

Addendum

2022 Retirement Confidence Survey: Americans Remain Optimistic About Comfortable Retirement
Employee Benefit Research Institute [EBRI] and Greenwald Research
May 17, 2022
53 pages. "Americans remain optimistic about living a comfortable retirement.... [A]lmost 4 in 10 workers and 2 in 10 retirees say they don't know who to go to for financial and retirement planning advice ... More than 4 in 5 workers who are offered a workplace retirement savings plan are satisfied with the benefit ... [W]orkers envision (or hope for) a gradual retirement transition to retirement and work for pay in retirement, which doesn't match the experience of most retirees."

State and Local Government Spending on Public Employee Retirement Systems
National Association of State Retirement Administrators [NASRA]
Feb. 22, 2022
Updated Feb. 2022. "Pension costs paid by state and local government employers vary widely and reflect multiple factors, including differing levels of public services, benefits, pension funding levels, employer effort to pay required contributions, and the fiscal condition of states and their political subdivisions, among others. Employers in FY 20 contributed nearly $180 billion to pension benefits for employees, an amount that, in total, is a relatively small -- but growing -- part of state and local government spending."

2021 NCPERS Public Retirement Systems Study
National Conference on Public Employee Retirement Systems [NCPERS]
Feb. 2, 2022
40 pages. "NCPERS has collected and analyzed the most current data available on funds' fiscal condition and steps they are taking to ensure fiscal and operational integrity. [This study] includes responses from 156 state and local government pension funds with more than 17.7 million active and retired members and assets exceeding $2.6 trillion."

Survey of Existing Public Sector Hybrid Retirement Plans
National Association of State Retirement Administrators [NASRA]
June 29, 2021
13 pages, rev. Jun. 2021. "Despite variability in the design of cash balance and DB-DC combination plans, well-designed plans generally contain the core features of retirement plan design known to best meet the human resources and retirement policy objectives of state and local governments: mandatory participation, shared financing between employers and employees, pooled assets invested by professionals, targeted income replacement with survivor and disability protection, and a benefit that cannot be outlived. This brief discusses the degree to which these core design features have been retained in public sector hybrid plans."

Retirement Asset Decumulation Patterns Among Public Sector Workers
Mission Square Research Institute
May 12, 2022
20 pages. "[N]early half of public sector employees are taking no action with their defined contribution plan funds once retired. Looking out ten years from general employees' last contributions, 48% of plan participants had not taken any partial disbursements, and 72% had not taken any full disbursements.... 27% of plan participants took their first partial disbursement within the same year of retirement, while 11% took a full disbursement that first year."

Why Converting Public Employee Retirement Plans to Defined Contribution Is Wrong for Your State
National Public Pension Coalition [NPPC]
Jan. 18, 2022
29 pages. "This report explores the potential impact states will face should lawmakers decide to convert new public employees from a defined-benefit pension plan [DB plan] to a defined-contribution 401(k) retirement plan [DC plan][as a budget-saving measure.... [1] Has the emergence of [DC plans] contributed to the retirement savings crisis in the country? [2] Does converting a [DB plan] to a [DC plan] impact the overall cost to the state? [3] What are the consequences of converting a [DB plan] to a [DC plan]? [4] Does conversion to a [DC plan] impact recruitment and retention of public employees?"

Colorado Supreme Court: Public Employees Cannot Jettison Ex-Spouses from Retirement Benefits Without Court Approval
Colorado Politics
Apr. 19, 2022
"Robert J. Mack of Colorado Springs, who retired from government work in 2012 and designated his then-wife as the beneficiary of his retirement benefits, argued to the Supreme Court that the trial judge overseeing his divorce was essentially compelled to honor his request to alter his retirement plan and allow the benefits to flow directly to Mack. But in an April 11 opinion, Chief Justice Brian D. Boatright indicated that while a retiree may make the request, Colorado law 'does not obligate the court to carry out the retiree's wishes.' " [In re marriage of Mack, No. 21SC62 (Colo. Apr. 11, 2022)]

Where Is Information About Social Security Retirement Benefits Provided to the Public?
Lois A. Vitt and Barbara A. Smith, via SSRN
Feb. 16, 2022
"This article explores the presence and extent of Social Security information provided to employees in workplaces, to service members in military facilities, to students in secondary and postsecondary schools, and to participants in religious and community organization settings."

Public Pension Plan Investment Return Assumptions
National Association of State Retirement Administrators [NASRA]
Mar. 29, 2022
"As with other actuarial assumptions, projecting public pension fund investment returns requires a focus on the long-term. This brief discusses how investment return assumptions are established and evaluated, compares these assumptions with public funds' actual investment experience, and the challenging investment environment public retirement systems currently face." [Updated Mar. 2022]

Overview of Public Pension Plan Amortization Policies
National Association of State Retirement Administrators [NASRA]
Apr. 26, 2022
"Nearly every public pension plan has an unfunded liability; some plans have an actuarial surplus, which also is referred to as a negative unfunded liability. As financial obligations, public pension unfunded liabilities sometimes are likened to debt. As with other government obligations, unfunded liabilities typically are amortized, or paid, in a systematic manner over a period of time. Amortization policies are characterized by several factors described in this brief."

ESG Investment Options in Public DC Plans
Public Retirement Research Lab [PRRL]
Mar. 15, 2022
"[T]his Issue Brief studies the adoption of ... environmental, social, or governance (ESG)-themed investment options ... among public defined contribution (DC) plan participants.... [U]sing plan-level aggregate values to assess individual participants' ESG investment decisions gives an incomplete picture in assessing participant preferences. While dollar allocations to ESG funds at a plan level may be small ... [the authors] find an overall ESG adoption rate of 31 percent and an average ESG allocation for ESG-investing participants of 14 percent."

Enhancing the Sustainability of Public Pensions
National Conference on Public Employee Retirement Systems [NCPERS]
Jan. 3, 2022
92 pages. "Based on the latest data (2018), ... unfunded liabilities of the state and local pension plans in the United States can be stabilized and made fiscally sustainable by paying them down by about $141 billion or 0.8 percent of the economy. The $141 billion was about 3 percent of unfunded liabilities in 2018.... [S]tate and local governments may not have the needed amounts readily available to pay down unfunded liabilities right away. However, they can use stabilization funds to stabilize unfunded liabilities in, say, the next five years and then use the sustainability valuation approach to keep them stable and fiscally sustainable going forward."

Employee Contributions to Public Pension Plans
National Association of State Retirement Administrators [NASRA]
Sept. 21, 2021
13 pages. "[By] providing a consistent and predictable stream of revenue to public pension funds, contributions from employees fill a vital role in financing pension benefits. Reforms made in the wake of the 2008-09 market decline included higher employee contribution rates for many public pension plans. This issue brief examines employee contribution plan designs, policies and recent trends."

Forensic Analysis of Public Employee Pension Funding: A Tool for Policymakers
Center for Retirement Research at Boston College
Apr. 26, 2022
"State and local policymakers face a growing pension cost burden, but often lack understanding of the root causes. One underappreciated cause is 'legacy debt' -- unfunded liabilities accumulated long ago, before plans adopted modern funding practices.... In a sample of plans with particularly low funded ratios, legacy debt averaged more than 40 percent of unfunded liabilities. A failure to recognize the legacy debt has provided misleading information about benefit generosity, hindering progress toward effective solutions."

2021 Update: Public Plan Funding Improves as Workforce Declines
Center for Retirement Research at Boston College
June 8, 2021
"While initial expectations for public pensions were low due to COVID, financial markets rebounded and municipal tax revenues were quite resilient. Yet one other COVID-related factor -- cuts to the state and local workforce -- impacted public pension finances in FY 2021. These cuts had little impact on funded status and required contribution amounts, but they do explain the rise in contribution rates, which are expressed as a share of lower payrolls."

Vermont Highlights DB/DC Split in Public Plans
Pensions & Investments
June 6, 2022

"As states look to solve long-term funding shortfalls in their defined benefit plans, some are either offering new employees a DC plan as an alternative to a traditional pension or closing the plan to new hires altogether and giving them a defined contribution plan instead. To date, nine states offer a defined contribution plan as an alternative to a defined benefit plan, and three -- Alaska, Michigan and Oklahoma -- have taken the broader measure of offering a DC plan as the only option for new workers[.]"

Public Pensions Take on Private Equity's Opaque Fees?
Pension Pulse
Mar. 30, 2022
"Private equity titans are raking in record assets and getting rewarded record windfall gains, which is fine as long as they're delivering the long-term performance.... So [the question for] US public pensions is this: if you're not doing enough co-investments to reduce fee drag and maintain a healthy allocation to PE, then why are you investing in private equity? To make billionaires a lot wealthier?"

A Chance to Enter a New Era of Financial Transparency and Awareness for Public Pension Plans
Reason Foundation
Mar. 28, 2022
"Actuaries will soon have to calculate and disclose a liability measure much closer to a decision-useful market liability than anything currently required or commonly shown. This liability could, and should, raise awareness of the extent to which reported liabilities for both funding and [GASB] financial statements understate what economists and finance professionals would consider economically meaningful measurements ... The new requirement applies to all pension plans, but it was targeted at public plans."

How Some States Are Addressing Recruitment and Retention of Public Employees with Pensions
National Public Pension Coalition [NPPC]
Mar. 9, 2022
"[Some states], including Kentucky, Oklahoma, Kansas, and Alaska, are attempting to make positive changes to pension benefits for firefighters, correctional officers, state employees, and teachers. In Oklahoma and Alaska, lawmakers are examining whether to re-open pension systems for public employees who have been denied a defined-benefit pension for years.... Several state and local governments have ... gone back to offering a defined-benefit pension again."

Public Pension Funded Status at End of 2021 Is Highest in More Than Five Years
Milliman
Jan. 26, 2022
"Public pensions closed out 2021 with a funded status of 85.5%, up from 83.9% in Q3 and the highest recorded funded status since ... 2016. In aggregate, these plans experienced an investment return of 3.21% for the quarter, though individual plans' estimated returns ranged from 0.57% to 6.80%. Nearly half of the plans in [this study] are now funded over 90%[.]"

Tiering Up: The Unfinished Business of Public Pension Reform in New York
Empire Center for Public Policy
Dec. 17, 2021
"The Tier 5 and Tier 6 changes combined are saving New York state and local governments outside New York City more than $1 billion this year. After record-busting investment returns in 2021, most of the state's public pension plans report they are fully funded -- but adjusting for financial risk, their combined unfunded liabilities still total nearly $400 billion."

Do Public Pensions Need a Shift in Investment Strategies?
PLANSPONSOR; free registration may be required
Dec. 9, 2021
"A composite of 46 large public funds underperformed a passively investable benchmark by 155 basis points (bps) per year for the 12 years ended June 30, 2020. The composite underperformed the benchmark in 11 years out of 12 ... [T]hat underperformance of 155 bps per year costs stakeholders nearly $70 billion a year."

California Public Employees' Pension Bill Will Increase After CalPERS Lowers Market Expectations
The Center Square
Nov. 18, 2021
"The CalPERS board voted Monday to select a portfolio with a return of 6.8% and an expected volatility rate of 12.1%. This expected rate of return is two-tenths of a percentage point lower than last year's target of 7%.... [CalPERS estimates that] employees hired after the implementation of the Public Employees' Pension Reform Act (PEPRA) in January 2013 ... will contribute an average of 1.2% to 1.5% more toward their pensions."

Putting 2021 Fiscal Year Public DB Returns in Perspective
Callan
Oct. 31, 2021
"One needs to go back to 1985 to find a single year with a return higher than what the median public plan achieved during 2021 ... [T]he loss experienced during fiscal 2009 due to the Global Financial Crisis was greater than all the other fiscal year losses combined.... The average fiscal year return between 1976 and 2021 was 9.7% and the median was 9.6%."

Understanding Return Forecasts for Public DB Plans: Comparing Actuarial vs. Consultant Rates of Return
Callan
Oct. 20, 2021
"Public defined benefit plans face intensifying pressure as modest expectations for future investment returns continue to fall short of actuarial discount rates.... [D]ecision makers ... face a critical dilemma affecting the plan's future financial health: How to distinguish between the actuarial discount rates used to measure plan benefit obligations and the return expectations used to inform decisions on long-term strategic asset allocation."

Summary of the Quarterly Survey of Public Pensions for First Quarter of 2021
U.S. Census Bureau
July 28, 2021
"For the 100 largest public-employee pension systems in the country, assets (cash and investments) totaled $4,635.0 billion in the first quarter of 2021, increasing by 2.1 percent from the fourth quarter of 2020 level of $4,539.7 billion."

Public Pension Funding Tops 80% for First Time in Over Five Years
Milliman
July 21, 2021
"For the first time since ... 2016, the funded ratio for [the nation's 100 largest public defined benefit pension plans] has climbed above 80%.... Q2 2021 marked the fifth consecutive quarter of high-water marks for both public pension assets and liabilities, with the estimated funded status of the [these] plans growing from 79.0% at the end of March 2021 to 82.6% at the end of June."

Addressing and Avoiding Severe Fiscal Stress in Public Pension Plans
Urban Institute
Jan. 26, 2022
"This report provides actionable recommendations to help policymakers address pension funding issues and avoid worst-case scenarios. [The authors] provide a simple rating system to help stakeholders better understand the financial risks their plans face, discuss the policy options and mechanisms available to governments whose plans face a solvency crisis, and outline policy options that can help prevent plans from falling into a crisis."

ESG Investment Options in Public DC Plans
Employee Benefit Research Institute [EBRI]
Feb. 24, 2022
"[U]sing plan-level aggregate values to assess individual participants' ESG investment decisions gives an incomplete picture in assessing participant preferences. While dollar allocations to ESG funds at a plan level may be small (on average, 2.7 percent in [this] sample), [this study finds] an overall ESG adoption rate of 31 percent and an average ESG allocation for ESG-investing participants of 14 percent."

The Number of Older Workers Retiring in the Pandemic Soared
National Public Radio [NPR]
Aug. 23, 2021
"Roughly 2 million more people than expected have joined the ranks of the retired in the pandemic, according to The New School's Schwartz Center for Economic Policy Analysis. While some ... happily chose to retire early, others were forced into retirement after losing their jobs or quitting out of fears of exposure to COVID. This doesn't mean that they're permanently out of the workforce."

GAO Report on Retirement Savings: Federal Workers' Portfolios Should Be Evaluated for Possible Financial Risks Related to Climate Change
U.S. Government Accountability Office [GAO]
June 24, 2021
"This report examines [1] what is known about retirement plans' exposure to climate change-related investment risks, [2] what comparable retirement plans in other countries have done to address risks from climate change and how they communicate this information to the public, and [3] what steps FRTIB has taken to address investment risks from climate change." [GAO-21-327, published May 25, 2021, released Jun. 24, 2021]

Teacher Pension Bills During 2021: What They Were, What Became of Them
Still River
Feb. 2, 2022
"This issue examines enacted and proposed legislation intended to affect public school teacher retirement plans across the country. Each of the 50 states (and District of Columbia) has at least one plan that covers public school K-12 teachers, whether designed specifically for teachers or covering public employees including teachers. Several city teacher retirement plans are included for purposes of this review."

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Development of Projected Benefit Obligation under FASB rules for a private sector pension plan

Development of Discount Rate for the ABC Pension Plan

	Cashflow		Yield curve				Single rate		
Plan Year	BOYtotal	EOYtotal	BOY	EOY	DiscBOY	DiscEOY	2.54%	DiscBOY	DiscEOY
2021	1,725,549	1,425,688							
2022	1,718,629	1,421,866	0.35%	0.63%	100.00%	99.37%	2.54%	100.00%	97.52%
2023	1,717,837	1,420,530	0.80%	0.95%	99.21%	98.14%	2.54%	97.52%	95.11%
2024	1,716,000	1,426,225	1.08%	1.21%	97.87%	96.45%	2.54%	95.11%	92.75%
2025	1,745,654	1,439,028	1.34%	1.44%	96.10%	94.43%	2.54%	92.75%	90.45%
2026	1,742,290	1,432,898	1.52%	1.57%	94.16%	92.52%	2.54%	90.45%	88.21%
2027	1,716,074	1,406,900	1.65%	1.76%	92.12%	90.09%	2.54%	88.21%	86.02%
2028	1,691,069	1,393,148	1.84%	1.89%	89.65%	87.73%	2.54%	86.02%	83.89%
2029	1,689,172	1,389,214	1.93%	1.97%	87.48%	85.52%	2.54%	83.89%	81.81%
2030	1,668,433	1,364,045	2.02%	2.07%	85.19%	83.13%	2.54%	81.81%	79.79%
2031	1,622,951	1,322,519	2.12%	2.17%	82.76%	80.64%	2.54%	79.79%	77.81%
2032	1,575,704	1,279,732	2.20%	2.23%	80.43%	78.46%	2.54%	77.81%	75.88%
2033	1,517,700	1,232,843	2.26%	2.29%	78.23%	76.25%	2.54%	75.88%	74.00%
2034	1,462,269	1,181,886	2.31%	2.35%	75.99%	73.96%	2.54%	74.00%	72.17%
2035	1,397,738	1,126,827	2.38%	2.43%	73.61%	71.49%	2.54%	72.17%	70.38%
2036	1,339,534	1,076,983	2.47%	2.52%	71.04%	68.82%	2.54%	70.38%	68.63%
2037	1,276,253	1,025,158	2.58%	2.63%	68.28%	65.98%	2.54%	68.63%	66.93%
2038	1,214,909	971,322	2.69%	2.75%	65.38%	63.02%	2.54%	66.93%	65.27%
2039	1,149,730	916,379	2.82%	2.88%	62.37%	60.02%	2.54%	65.27%	63.66%
2040	1,084,521	862,046	2.93%	2.98%	59.45%	57.29%	2.54%	63.66%	62.08%
2041	1,020,404	807,838	3.01%	3.04%	56.92%	54.96%	2.54%	62.08%	60.54%
2042	955,229	753,186	3.04%	3.05%	54.91%	53.26%	2.54%	60.54%	59.04%
2043	890,557	699,226	3.05%	3.05%	53.22%	51.62%	2.54%	59.04%	57.58%
2044	826,460	645,965	3.05%	3.05%	51.61%	50.10%	2.54%	57.58%	56.15%
2045	763,413	593,816	3.05%	3.04%	50.14%	48.74%	2.54%	56.15%	54.76%
2046	701,783	543,100	3.03%	3.02%	48.84%	47.54%	2.54%	54.76%	53.40%
2047	641,846	494,099	3.01%	2.99%	47.69%	46.47%	2.54%	53.40%	52.08%
2048	583,936	447,053	2.98%	2.96%	46.64%	45.44%	2.54%	52.08%	50.79%
2049	528,336	402,166	2.95%	2.95%	45.57%	44.37%	2.54%	50.79%	49.53%
2050	475,288	359,619	2.94%	2.93%	44.45%	43.25%	2.54%	49.53%	48.30%
2051	425,005	319,577	2.93%	2.93%	43.30%	42.08%	2.54%	48.30%	47.11%

Only 30 years of the projection are shown. The full projection extends beyond year 2100.

Development of Projected Benefit Obligation under FASB rules for a private sector pension plan

The present value of the benefit payments determined using the full yield curve and then using the equivalent single rate are shown below.

Yield curve liability:	**52,298,908**
Single rate liability:	**52,298,908**
Equality check	-
Disc Rate	2.54%
Yield curve date:	**12/31/2021**

Single equivalent rate as of 12-31-2014	3.80%
Single equivalent rate as of 12-31-2015	4.02%
Single equivalent rate as of 12-31-2016	3.86%
Single equivalent rate as of 12-31-2017	3.39%
Single equivalent rate as of 12-31-2018	4.03%
Single equivalent rate as of 12-31-2019	2.95%
Single equivalent rate as of 12-31-2020	2.11%
Single equivalent rate as of 12-31-2021	2.54%

Development of Funding Target with Corridor PPA funding rules for a private sector pension plan

FUNDING TARGET WITH CORRIDOR

as of January 1, 2021

	Active Employees Allocated to		Nonactive Participants Allocated to		Discount	Discount Factors		Present Value		
Year	**Beg of Yr**	**End of Yr**	**Beg of Yr**	**End of Yr**	**Rate**	**Beg of Yr**	**End of Yr**	**Active**	**Nonactive**	**Total**
2021	$ 32,403	$ 26,097	$ 1,692,945	$ 1,398,487	4.75%	1.00000	0.95465	$ 57,316	$ 3,028,016	$ 3,085,332
2022	46,048	37,123	1,671,177	1,382,565	4.75%	0.95465	0.91136	77,793	2,855,417	2,933,209
2023	59,547	48,683	1,656,508	1,368,951	4.75%	0.91136	0.87004	96,625	2,700,720	2,797,345
2024	76,820	63,139	1,637,530	1,359,969	4.75%	0.87004	0.83058	119,279	2,554,281	2,673,560
2025	98,519	81,806	1,646,157	1,354,540	4.75%	0.83058	0.79292	146,694	2,441,315	2,588,009
2026	118,792	99,037	1,623,462	1,331,748	5.36%	0.77023	0.73105	163,897	2,224,012	2,387,909
2027	133,499	111,534	1,582,847	1,293,261	5.36%	0.73105	0.69386	174,983	2,054,473	2,229,456
2028	145,232	121,304	1,545,972	1,269,337	5.36%	0.69386	0.65856	180,656	1,908,614	2,089,270
2029	157,955	132,458	1,531,333	1,254,336	5.36%	0.65856	0.62505	186,816	1,792,500	1,979,316
2030	166,117	139,148	1,501,770	1,221,607	5.36%	0.62505	0.59326	186,383	1,663,415	1,849,797
2031	173,775	144,549	1,448,181	1,173,429	5.36%	0.59326	0.56308	184,485	1,519,871	1,704,356
2032	179,446	148,882	1,394,044	1,124,814	5.36%	0.56308	0.53443	180,608	1,386,087	1,566,695
2033	179,273	147,737	1,333,608	1,076,135	5.36%	0.53443	0.50724	170,747	1,258,581	1,429,328
2034	177,446	146,904	1,276,046	1,023,041	5.36%	0.50724	0.48144	160,733	1,139,794	1,300,527
2035	175,497	145,594	1,209,345	966,093	5.36%	0.48144	0.45694	151,019	1,023,674	1,174,693
2036	175,356	145,565	1,147,933	913,565	5.36%	0.45694	0.43370	143,259	920,754	1,064,013
2037	176,373	145,391	1,081,224	859,146	5.36%	0.43370	0.41163	136,340	822,580	958,920
2038	176,205	144,965	1,016,701	802,802	5.36%	0.41163	0.39069	129,169	732,159	861,328
2039	175,012	143,948	949,091	746,021	5.36%	0.39069	0.37082	121,755	647,441	769,196
2040	173,635	142,237	881,992	690,481	5.36%	0.37082	0.35195	114,448	570,075	684,523
2041	170,103	139,571	816,984	635,875	6.11%	0.30540	0.28782	92,121	432,525	524,646
2042	166,239	136,394	751,509	581,494	6.11%	0.28782	0.27124	84,843	374,025	458,867
2043	162,376	132,756	687,222	528,550	6.11%	0.27124	0.25563	77,979	321,516	399,496
2044	156,894	127,985	624,752	477,430	6.11%	0.25563	0.24091	70,939	274,719	345,657
2045	151,256	122,842	564,235	428,305	6.11%	0.24091	0.22703	64,328	233,168	297,496
2046	145,177	117,329	506,179	381,562	6.11%	0.22703	0.21396	58,064	196,560	254,624
2047	138,662	111,461	450,937	337,492	6.11%	0.21396	0.20164	52,144	164,535	216,679
2048	131,728	105,267	398,854	296,305	6.11%	0.20164	0.19003	46,566	136,732	183,298
2049	124,407	98,783	350,179	258,156	6.11%	0.19003	0.17909	41,332	112,777	154,109
2050	116,744	92,056	305,093	223,136	6.11%	0.17909	0.16878	36,444	92,299	128,743
2051 -	914,067	681,371	1,516,707	1,060,232	6.11%			195,794	343,689	539,483
Funding Target as defined under the Pension Protection Act								**$ 3,703,559**	**$ 35,926,325**	**$ 39,629,883**

Actuarial Assumptions

Interest rates:	Segment rates for 2021 (25 year average with corridor)
Mortality:	2021 Static Mortality
Payment form:	Retirement and deferred vested benefits with a present value less than $5,000 are assumed to be paid as a lump sum (based on segment rate lump sum factors). Other benefits are assumed to be paid as annuities (life only, J50S or J100S).
Other:	Turnover, retirement rates and other assumptions are specified in the Actuarial Report.

Development of Funding Target without Corridor under PPA funding rules for a private sector plan

FUNDING TARGET UNDER PPA 2006 - 24 Month Segment Rates

as of January 1, 2021

	Active Employees		Nonactive Participants							
	Allocated to		Allocated to		Discount	Discount Factors		Present Value		
Year	Beg of Yr	End of Yr	Beg of Yr	End of Yr	Rate	Beg of Yr	End of Yr	Active	Nonactive	Total
2021	$ 32,403	$ 26,097	$ 1,692,945	$ 1,398,487	1.75%	1.00000	0.98280	$ 58,051	$ 3,067,379	$ 3,125,430
2022	46,048	37,123	1,671,177	1,382,565	1.75%	0.98280	0.96590	81,113	2,977,852	3,058,965
2023	59,547	48,683	1,656,508	1,368,951	1.75%	0.96590	0.94929	103,730	2,899,542	3,003,273
2024	76,820	63,139	1,637,530	1,359,969	1.75%	0.94929	0.93296	131,831	2,823,277	2,955,108
2025	98,519	81,806	1,646,157	1,354,540	1.75%	0.93296	0.91691	166,923	2,777,791	2,944,713
2026	118,792	99,037	1,623,462	1,331,748	3.04%	0.86094	0.83554	185,021	2,510,419	2,695,440
2027	133,499	111,534	1,582,847	1,293,261	3.04%	0.83554	0.81088	201,984	2,371,210	2,573,194
2028	145,232	121,304	1,545,972	1,269,337	3.04%	0.81088	0.78696	213,228	2,252,523	2,465,751
2029	157,955	132,458	1,531,333	1,254,336	3.04%	0.78696	0.76374	225,468	2,163,090	2,388,558
2030	166,117	139,148	1,501,770	1,221,607	3.04%	0.76374	0.74121	230,009	2,052,434	2,282,443
2031	173,775	144,549	1,448,181	1,173,429	3.04%	0.74121	0.71934	232,784	1,917,504	2,150,288
2032	179,446	148,882	1,394,044	1,124,814	3.04%	0.71934	0.69812	233,020	1,788,050	2,021,070
2033	179,273	147,737	1,333,608	1,076,135	3.04%	0.69812	0.67752	225,249	1,660,124	1,885,373
2034	177,446	146,904	1,276,046	1,023,041	3.04%	0.67752	0.65753	216,818	1,537,234	1,754,053
2035	175,497	145,594	1,209,345	966,093	3.04%	0.65753	0.63813	208,304	1,411,683	1,619,986
2036	175,356	145,565	1,147,933	913,565	3.04%	0.63813	0.61931	202,050	1,298,313	1,500,364
2037	176,373	145,391	1,081,224	859,146	3.04%	0.61931	0.60104	196,614	1,185,988	1,382,602
2038	176,205	144,965	1,016,701	802,802	3.04%	0.60104	0.58330	190,464	1,079,352	1,269,816
2039	175,012	143,948	949,091	746,021	3.04%	0.58330	0.56609	183,574	975,926	1,159,500
2040	173,635	142,237	881,992	690,481	3.04%	0.56609	0.54939	176,438	878,636	1,055,074
2041	170,103	139,571	816,984	635,875	3.65%	0.48822	0.47103	148,789	698,380	847,168
2042	166,239	136,394	751,509	581,494	3.65%	0.47103	0.45444	140,285	618,233	758,519
2043	162,376	132,756	687,222	528,550	3.65%	0.45444	0.43844	131,995	544,035	676,030
2044	156,894	127,985	624,752	477,430	3.65%	0.43844	0.42300	122,925	475,865	598,790
2045	151,256	122,842	564,235	428,305	3.65%	0.42300	0.40810	114,113	413,461	527,574
2046	145,177	117,329	506,179	381,562	3.65%	0.40810	0.39373	105,443	356,804	462,247
2047	138,662	111,461	450,937	337,492	3.65%	0.39373	0.37986	96,936	305,748	402,684
2048	131,728	105,267	398,854	296,305	3.65%	0.37986	0.36649	88,618	260,103	348,720
2049	124,407	98,783	350,179	258,156	3.65%	0.36649	0.35358	80,522	219,615	300,137
2050	116,744	92,056	305,093	223,136	3.65%	0.35358	0.34113	72,682	183,994	256,676
2051 -	914,067	681,371	1,516,707	1,060,232	3.65%			444,878	758,324	1,203,202
Funding Target as defined under the Pension Protection Act								**$ 5,209,857**	**$ 44,462,890**	**$ 49,672,748**

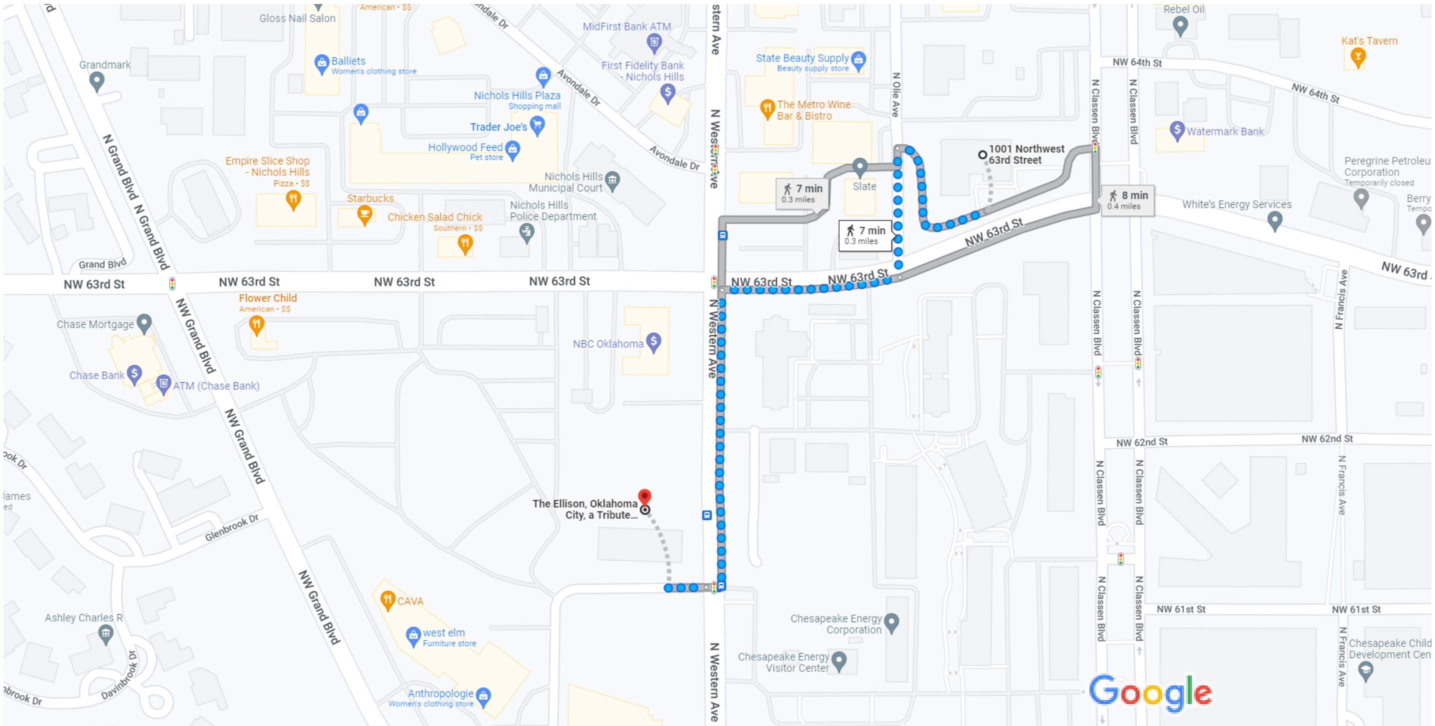
Actuarial Assumptions

Interest rates:	Segment rates for January 2021 (24 month average, no corridor)
Mortality:	2021 Static Mortality
Payment form:	Retirement and deferred vested benefits with a present value less than $5,000 are assumed to be paid as a lump sum (based on segment rate lump sum factors). Other benefits are assumed to be paid as annuities (life only, J50S or J100S).
Other:	Turnover, retirement rates and other assumptions are specified in the Actuarial Report.

Google Maps

1001 NW 63rd St, Oklahoma City, OK 73116 to The Ellison, Oklahoma City, a Tribute Portfolio Hotel, 6201 N Western Ave, Oklahoma City, OK 73118

Walk 0.3 mile, 7 min



Map data ©2022 Google 100 ft

🚶	via N Western Ave	7 min 0.3 mile
🚶	via NW 63rd St and N Western Ave	7 min 0.3 mile
🚶	via N Classen Blvd, NW 63rd St and N Western Ave	8 min 0.4 mile

All routes are mostly flat