ALAMEDA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

RESPONSES TO WRITTEN QUESTIONS RELATED TO GENERAL INVESTMENT CONSULTANT SEARCH

ACERA's responses to the written questions submitted by firms are on the following pages.

Several attachments are included as well.

CONTENTS

QUESTIONS AND ANSWERS

1. *We understand the incumbent is both General Investment Consultant and Alternatives Consultants with a separate Real Estate Consultant. Is this RFP for the GIC mandate only or is ACERA considering both mandates and/or full service consultant?*

   ACERA will consider proposals for:
   a) one consultant to provide both the "general" and alternatives advisory services as well as services related to the real estate portfolio; and
   b) two consultants: a GIC/alternatives consultant and an unrelated real estate consultant.

   The fee proposal should reflect the scope of services (i.e., a or b above).

2. *Given the Real Estate questions in the RFP, is Real Estate being considered if the GIC can offer Real Estate?*

   Yes.

3. *Is the scope outlined in the RFP consistent with the current consultant's contract? If not, what items are different?*

   Yes. The scope of work outlined in the RFP is consistent with the current general investment consultant's contract.

   Note, however, that ACERA currently uses the services of both a general investment consultant and an unrelated specialized real estate consultant.

   As noted in the RFP, proponents may propose to offer their services to ACERA related to either:
   a) General Investment Consulting only (i.e., excluding Specialized Real Estate Consulting); or
   b) General Investment Consulting and Specialized Real Estate Consulting.

4. *To clarify the fee page, which asset classes are being considered within the General Investment Consulting fee?*

The GIC fee would cover all asset classes (including alternatives), but not real estate, noting that the research and recommendations related to the target asset allocation to real estate would be covered under the GIC fee.

The fee related to Specialized Real Estate Consulting on page 21 of the RFP would cover services related to the development, implementation, and management of the real estate portfolio (e.g., regional and sector exposures).

5. *Do your board or investment committee periodically hold investment-related offsites?*

Yes.

As noted in the RFP (page 9, Client Service and Education), the GIC is expected to attend additional meetings which include semi-annual planning sessions with Staff and an annual Board offsite session.

6. *We understand the hired consultant is expected to attend up to 12 Investment Committee meetings and Board meetings (as needed). Will the hired consultant be expected to attend Committee and Board meetings in person, virtually, or a combination of the two?*

The GIC will generally be expected to attend Investment Committee and Board meetings in person, unless ACERA's Board has indicated otherwise. For example, currently, the Board has adopted a virtual meeting policy (COVID-related in-person meeting restrictions).

7. *Please describe the anticipated frequency of in-person meeting attendance required from research professionals (as opposed to client-facing consultants) for your general investment consulting mandate, and for your specialized real estate consulting mandate.*

Research professionals are expected to attend investment committee meetings as needed. For the GIC mandate, ACERA expects that research professionals would attend meetings that support:
- asset allocation decisions;
- manager selection decisions; and
- Semiannual Investment Committee Planning Meetings.

For the real estate mandate, ACERA expects attendance at:
- manager selection decisions; and
- Semiannual Investment Committee Planning Meetings.

8. *Is the Pension Plan expecting to have an Asset Liability study done in 2023?*

Yes.

The last study was completed in May 2019, or almost four years ago, and capital market assumptions may need to be updated (e.g., higher inflation assumption).

ACERA would expect any new GIC to complete such a study early in the new engagement.

9. *Could you please provide your latest asset-liability study?*

Attachment 1 has the latest Asset Liability Study (May 2019).

Attachment 2 has the latest Asset Allocation Study (June 2021).

The 2022 Capital Market Assumptions Review is available at the link below, from the February 9, 2022 Board meeting.

https://www.acera.org/sites/main/files/file-attachments/02092022_investment_committee_meetiing_public_packet_0.pdf?1646894978

10. *Are there any anticipated changes to the target portfolio for 2023?*

There are no changes currently being considered to the asset allocation targets on page 4 of the RFP. However, as stated in the RFP (page 7), the GIC is expected to conduct an annual and/or periodic comprehensive review and analysis of investment policies, objectives, asset allocation, and portfolio structure, and recommend changes, if appropriate.

11. *Could you provide any more details on the Emerging Investment Manager Program and the services related to that for the GIC?*

Please see the Emerging Investment Manager Policy at the link below.

https://www.acera.org/sites/main/files/file-attachments/3_2022_acera_eim_policy_review_blackline_final.pdf?1666933866

This policy was developed by both ACERA Staff and the Consultant.

12. Does Verus handle this program now or is there a separate consultant that assists?

Verus helped with the development of the Emerging Investment Manager Policy.

Verus assists in program oversight.

13. Approximately how many new private market fund commitments (for private equity, private credit, real estate, and real assets) do you anticipate making per year?

    a. Private equity: 8 to 10
    b. Private credit: 2 to 3
    c. Real estate: 1 to 2
    d. Real assets: 2 to 3

14. What has the commitment volume been over the past five years?

    a. Private equity: Average of $160 million and 5 deals per year.
    b. Private credit: Average of $150 million and 2 deals per year.
    c. Real estate: Average of $35 million and 1 to 2 deals per year.
    d. Real assets: Average of $70 million and 2 deals per year.

15. Were any of those commitments instigated by ACERA's request, of managers or strategies that your consultants were not already planning to underwrite?

    a. Private equity: No.
    b. Private credit: Yes. Some were instigated by ACERA's request.
    c. Real estate: Approximately 40% were instigated by ACERA or managers and not strategies the consultant was not already planning to underwrite.
    d. Real assets: No.

16. How many manager searches have been conducted each year, over the last 3 years?

The <u>total</u> number of searches over the last three years is below.

Asset Class	**Total Searches (Over 3 Years)**
US Equity	1
International Equity	1
Fixed Income	0
Real Estate	0
Private Equity	0
Absolute Return	1
Real Assets	0
Private Credit	0
Cash	1

17. How many public market searches do you typically conduct in a year?

Public market searches are conducted when needed; this is typically one or no searches in a year.

Please see Question 16 for the searches conducted over the last 3 years.

Also, ACERA has a process for introductory meetings with investment product/service vendors (Investment Products and Services Introductions or IPSI). The purpose of these introductions is to provide an opportunity for prospective vendors to understand ACERA's needs better and for Staff to learn about the vendors' investment products / services. The IPSI process is described at the link below.

https://www.acera.org/post/investment-products-and-services-introductions

18. *How many private searches do you typically conduct in a year?*

Private market searches are conducted when needed; this is typically one or no searches in a year.

19. *For private markets, do you take consultant manager recommendations or is the consultant asked to due diligence one-off managers that staff identifies?*

Both approaches are used.

20. *How are investment manager searches conducted; does internal staff have hire/fire authority?*

In general, investment manager searches are approved by the Board and executed by Staff and Consultant. Staff makes recommendations to the Investment Committee. The Board, not Staff, have hire/fire authority.

However, Staff has some limited delegated authority to recommend, subject to the Board's final approval, private deals for managers that are in good standing.

21. *Is the Board or Staff considering ESG?*

Please see ACERA's ESG policy for our current approach to ESG, which is available at the link below.

https://www.acera.org/download/environmental-social-and-governance-esg-investment-policy

22. *Could you elaborate on the extent to which ESG education, analysis or reporting is part of the scope?*

ESG will have a weighting (5% of total points) in terms of scoring proposals.

Because ESG is a constantly evolving topic, ACERA values ongoing ESG education. For example, education could include a review of the principles and beliefs that could be used by ACERA to inform its ESG policies and practices over time.

ACERA would also value any research or other analyses that quantifies the impact that ESG practices have on overall portfolio risk and performance.

23. *Do you anticipate any near-term direct property acquisitions or sales?*

No.

24. *What level of oversight and/or active management is required for the separately managed real estate property?*

One property (475 14th Street, Oakland) is an office building. We have a separate account manager, and they hire a property manager. The level of oversight is similar to the open-end funds, which is quarterly oversight and review.

25. *It is noted that ACERA currently invests in fund of funds. Are they considering direct investments?*

In the Absolute Return asset class (8% target in the Total Fund), there are two custom fund of hedge funds (at 40% weightings each) representing a combined 80% of the asset class. The remaining 20% can invest in direct hedge fund investments. Thus, given the current structure, direct investments are considered for 20% of the asset class.

26.Is there a pacing plan or any information on commitment size and number of investments they annual commit to each year?

Attachment 3 has the **Private Equity Investment Plan**, which was presented at the October 13, 2021 Board meeting and is available at the link below as well.

> https://www.acera.org/sites/main/files/file-attachments/101321_icm_publicl_packet.pdf?1633644140

Attachment 4 has the **Real Estate Investment Plan**, which was presented at the November 3, 2021 Board meeting and is available at the link below as well.

> https://www.acera.org/sites/main/files/file-attachments/110321_icm_publicl_packet.pdf?1635485365

Attachment 5 has the **Real Asset Structure and Investment Plan**, which was presented at the December 9, 2020 Board meeting and is available at the link below as well.

> https://www.acera.org/sites/main/files/file-attachments/120920_icm_packet_public.pdf?1606954257

ATTACHMENTS

1. Asset Liability Study (May 2019)

2. Asset Allocation Study (June 2021)

3. Private Equity Investment Plan (October 2021)

4. Real Estate Investment Plan (November 2021)

5. Real Asset Structure and Investment Plan (December 2020)

Verus

PERSPECTIVES THAT DRIVE ENTERPRISE SUCCESS

MAY 15, 2019

Asset-Liability Integration – Part 2

ACERA

Table of contents

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I. Introduction and asset mixes

Session objectives

— Review risk and return characteristics of ACERA's current policy and refined asset mixes

— Review asset-liability integration results

— Discuss and prioritize risk and liquidity considerations

— Determine asset allocation mix to recommend to Board

Key considerations

— Asset allocation drives the bulk of the variation in portfolio returns over time.

— This relationship must hold over the long-term:

| Contributions | ✚ | Investment Returns | ＝ | Benefit Payments | ✚ | Expenses |

— A more aggressive asset allocation will increase the likelihood that future contributions may be lower.

— A more aggressive allocation also increases the likelihood of future volatility in contributions.

Modern portfolio theory

First introduced in 1952 by nobel prize winner Harry Markowitz

Basic Assumptions (It's all about risk and return)
— Investors are rational
— A rational investor will choose the highest rate of return for taking on a given amount of risk
— Risk and return can be reasonably estimated
— Diversification of investments provides the investor with a so-called "free lunch"

Basic Principles
— Return
— Risk
— Correlation ("the magic in the mix")

Functional labels

Range of likely 10 year outcomes

10 YEAR RETURN 90% CONFIDENCE INTERVAL

High Volatility → Low Volatility

Legend: ■ 5th to 25th ■ 25th to 50th ■ 50th to 75th ■ 75th to 95th ○ Expected Return
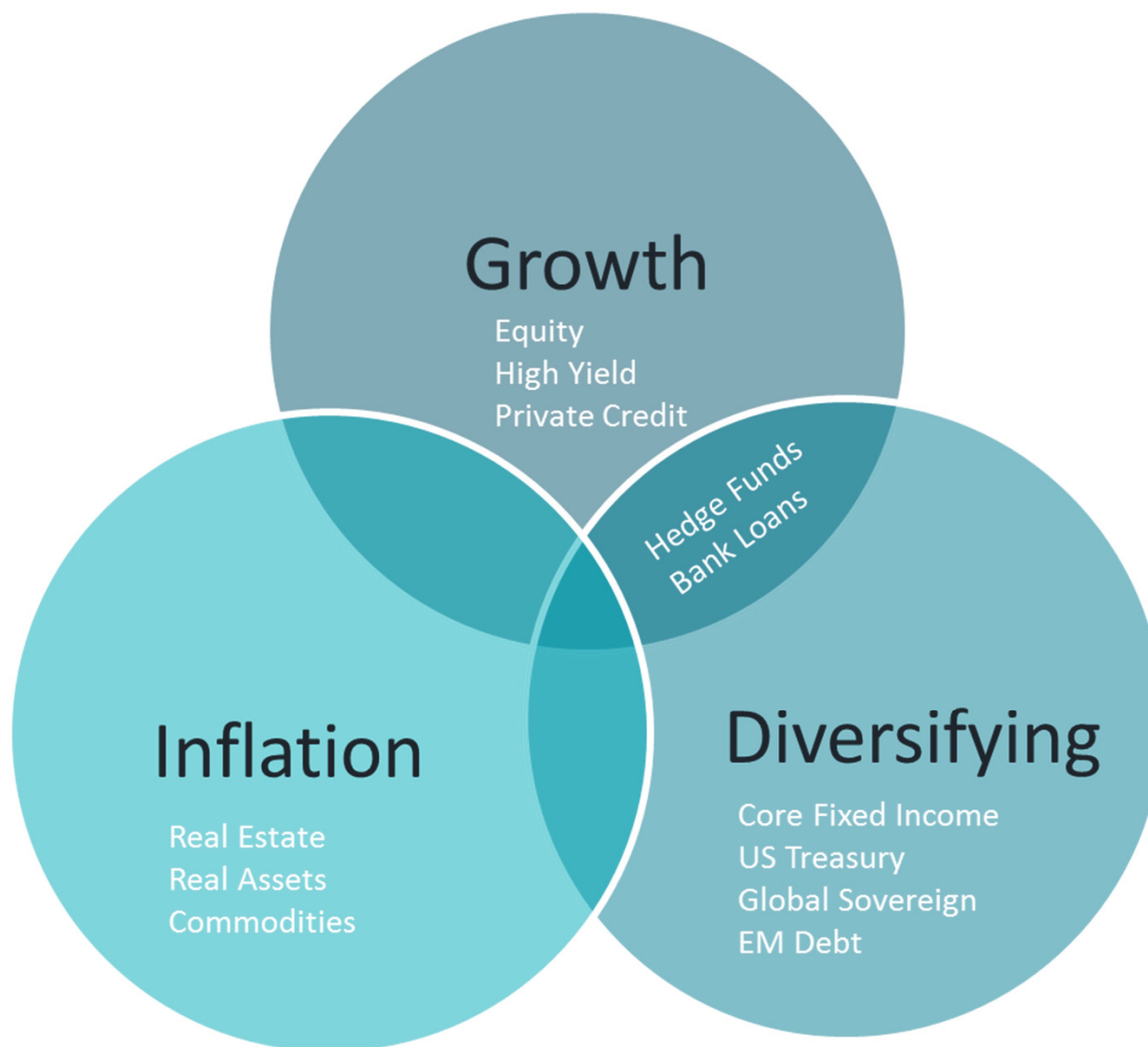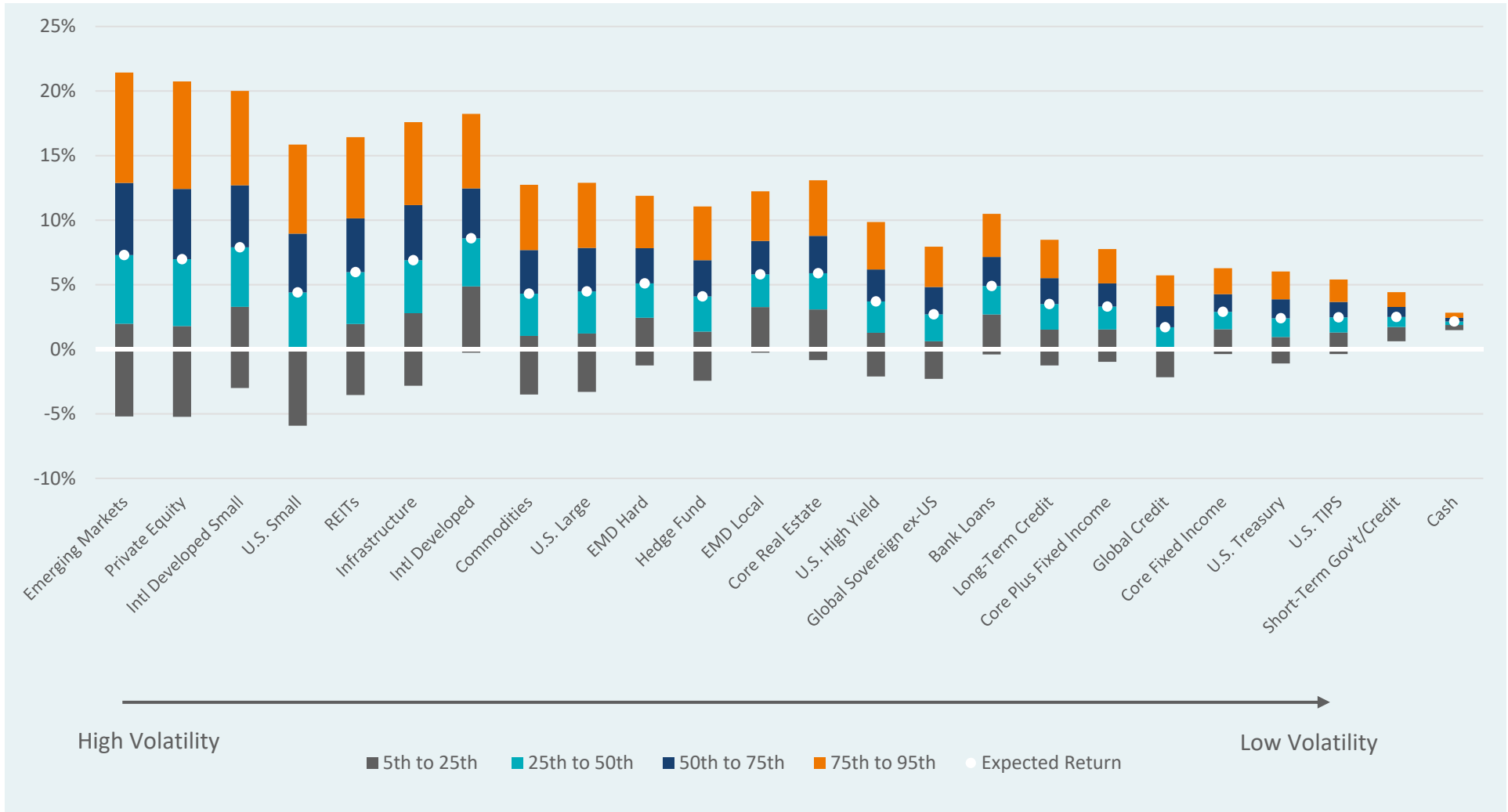
Investment models

Asset Class	Port.	Policy	Alt 1	Alt 2	Peer	Return (g)	Standard Deviation	Sharpe Ratio
US Large	29.6%	25.0%	26.0%	22.4%	26.0%	5.8	15.6	0.31
US Small	3.1%	3.0%	2.9%	2.5%	0.0%	5.4	21.3	0.25
Intl. Developed	18.8%	18.0%	20.2%	17.0%	23.2%	7.7	17.8	0.39
Intl. Small	2.50%	3.0%	3.0%	3.0%	0.0%	6.5	22.4	0.30
EM	4.7%	5.0%	5.8%	5.0%	3.5%	8.6	26.1	0.36
High Yield	2.0%	1.5%	0.8%	1.6%	0.0%	5.7	11.5	0.37
Private Equity	8.0%	11.3%	12.5%	10.5%	8.3%	8.8	25.6	0.37
Private Credit	0.0%	0.0%	2.0%	4.0%	0.0%	7.7	10.2	0.60
Growth	**68.7%**	**66.8%**	**73.2%**	**66.0%**	**61.0%**			
Core Fixed Income	10.0%	11.3%	5.7%	11.4%	21.9%	3.3	6.4	0.22
Global Sovereign Ex US	3.9%	2.3%	1.5%	3.0%	0.0%	0.8	9.8	-0.08
Hedge Fund	8.6%	9.0%	9.0%	9.0%	7.6%	4.4	7.8	0.33
Cash	0.2%	0.0%	0.0%	0.0%	1.3%	2.1	1.2	-
Diversifying	**22.7%**	**22.6%**	**16.2%**	**23.4%**	**30.8%**			
Commodities	0.6%	0.8%	0.8%	0.8%	2.0%	4.2	15.7	0.20
Core Real Estate	6.7%	8.0%	8.0%	8.0%	6.2%	6.1	12.9	0.37
Infrastructure	1.3%	1.8%	1.8%	1.8%	0.0%	7.9	18.2	0.40
Real Return	**8.6%**	**10.6%**	**10.6%**	**10.6%**	**8.2%**			
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**			

	Port	Policy	Alt 1	Alt 2	Peer
Mean Variance Analysis					
Forecast 10 Year Return	*6.5*	*6.7*	*7.0*	*6.7*	*6.4*
Standard Deviation	12.8	12.9	13.8	12.3	11.3
Return/Std. Deviation	*0.5*	*0.5*	*0.5*	*0.5*	*0.6*
1st percentile ret. 1 year	-18.4	-17.2	-18.7	-15.4	-15.1
Sharpe Ratio	0.39	0.41	0.41	0.42	0.42

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Investment model forecasts

Compound Nominal Return

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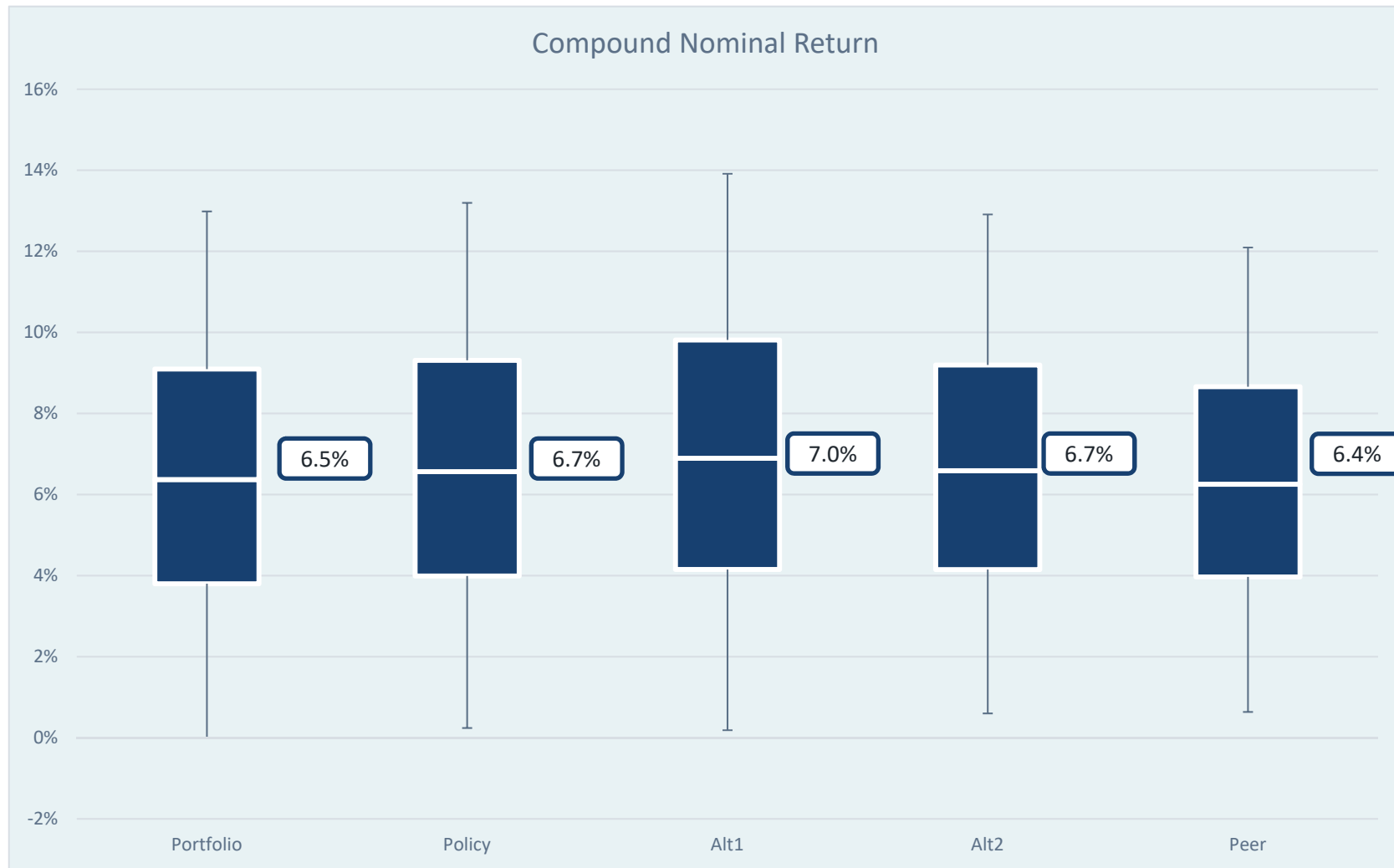
Risk decomposition
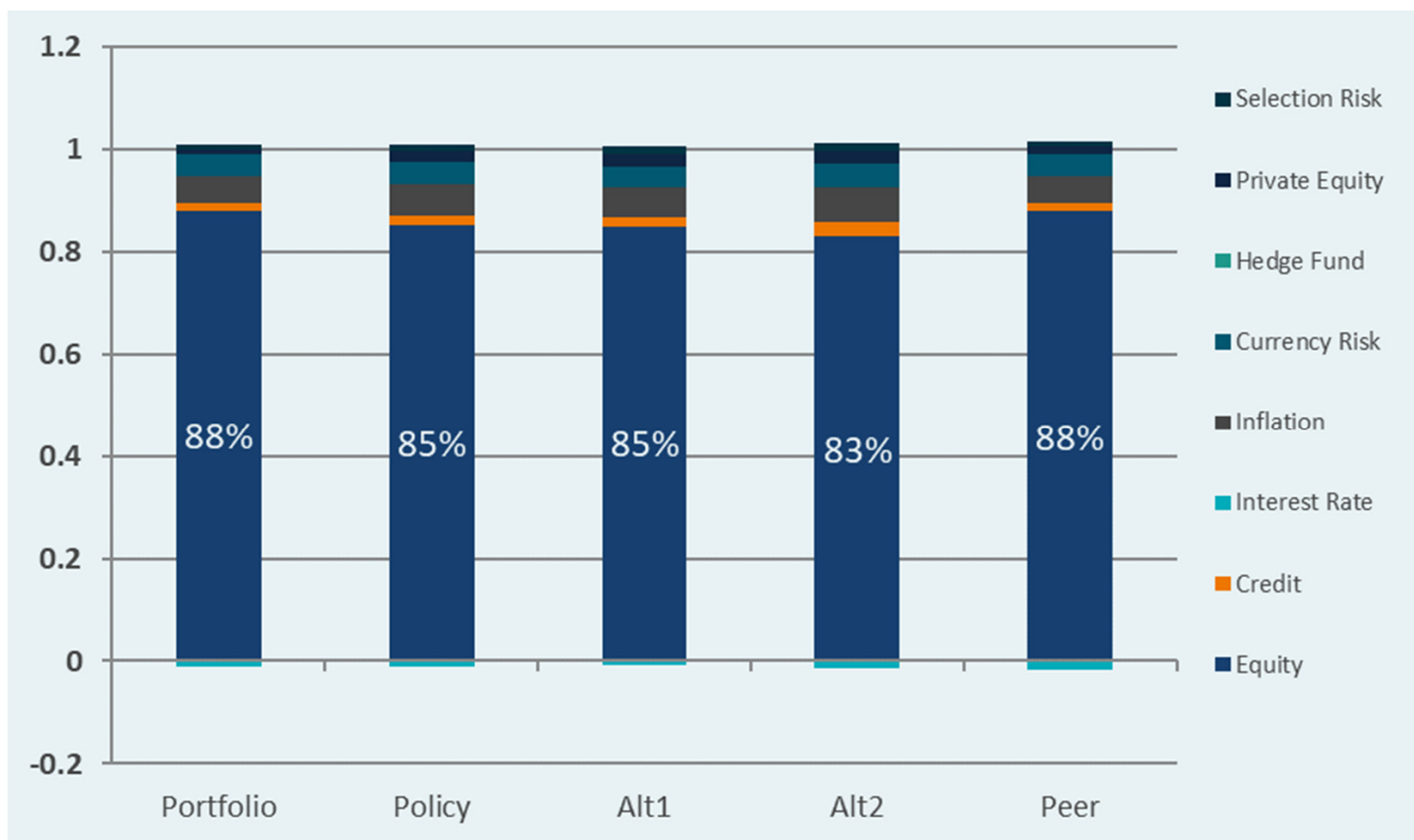
Source: MSCI BARRA

Note: Selection Risk is the risk attributable to unassigned factors

Sources of risk

Equity Beta

Portfolio	Policy	Alt1	Alt2	Peer
0.73	0.72	0.78	0.68	0.65
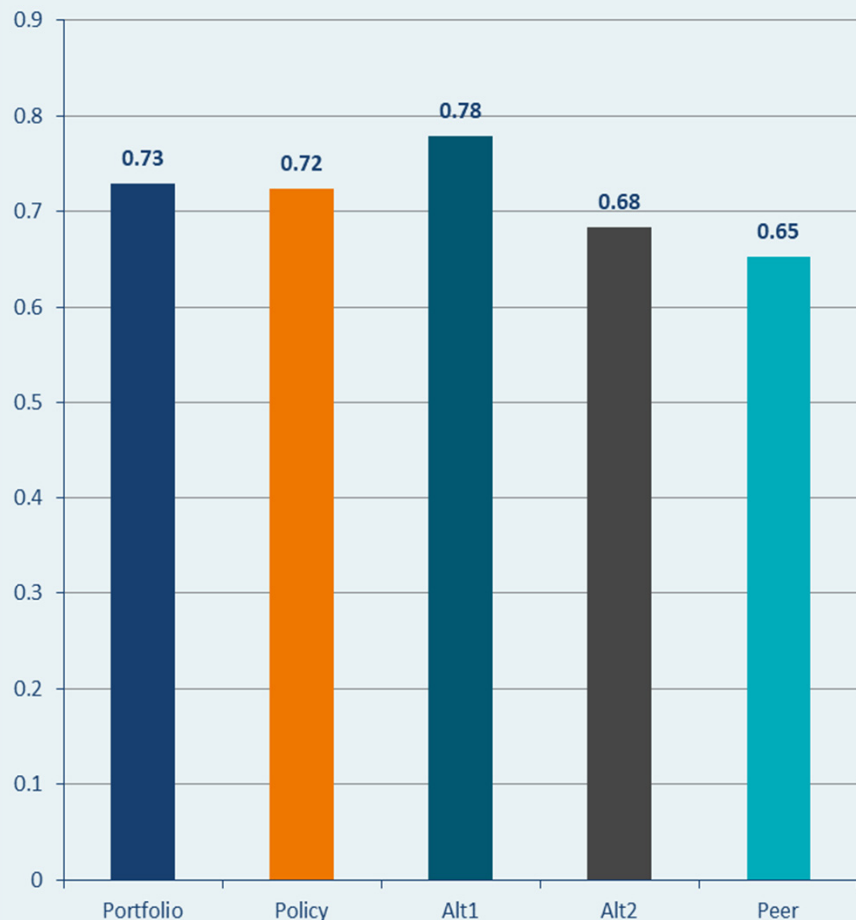
Portfolio Effective Duration

Portfolio	Policy	Alt1	Alt2	Peer
1.0	0.9	0.5	1.0	1.3
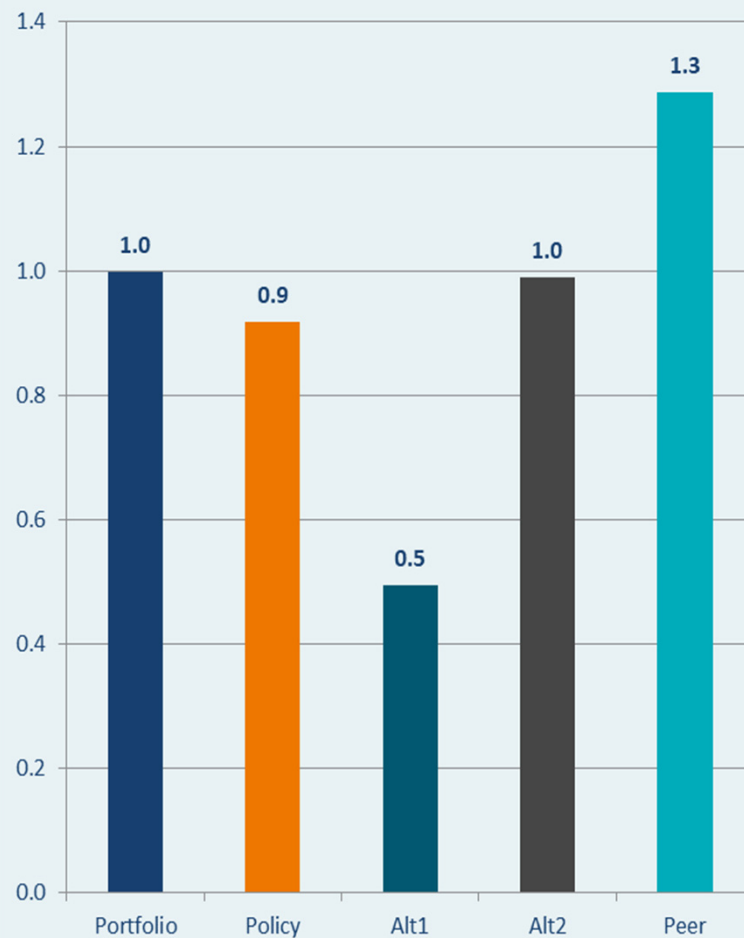
Equity beta measures the sensitivity to the risks of the broad equity market.

Duration measures the sensitivity of the portfolio to a change in interest rates.

Source: MSCI BARRA

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Scenario analysis
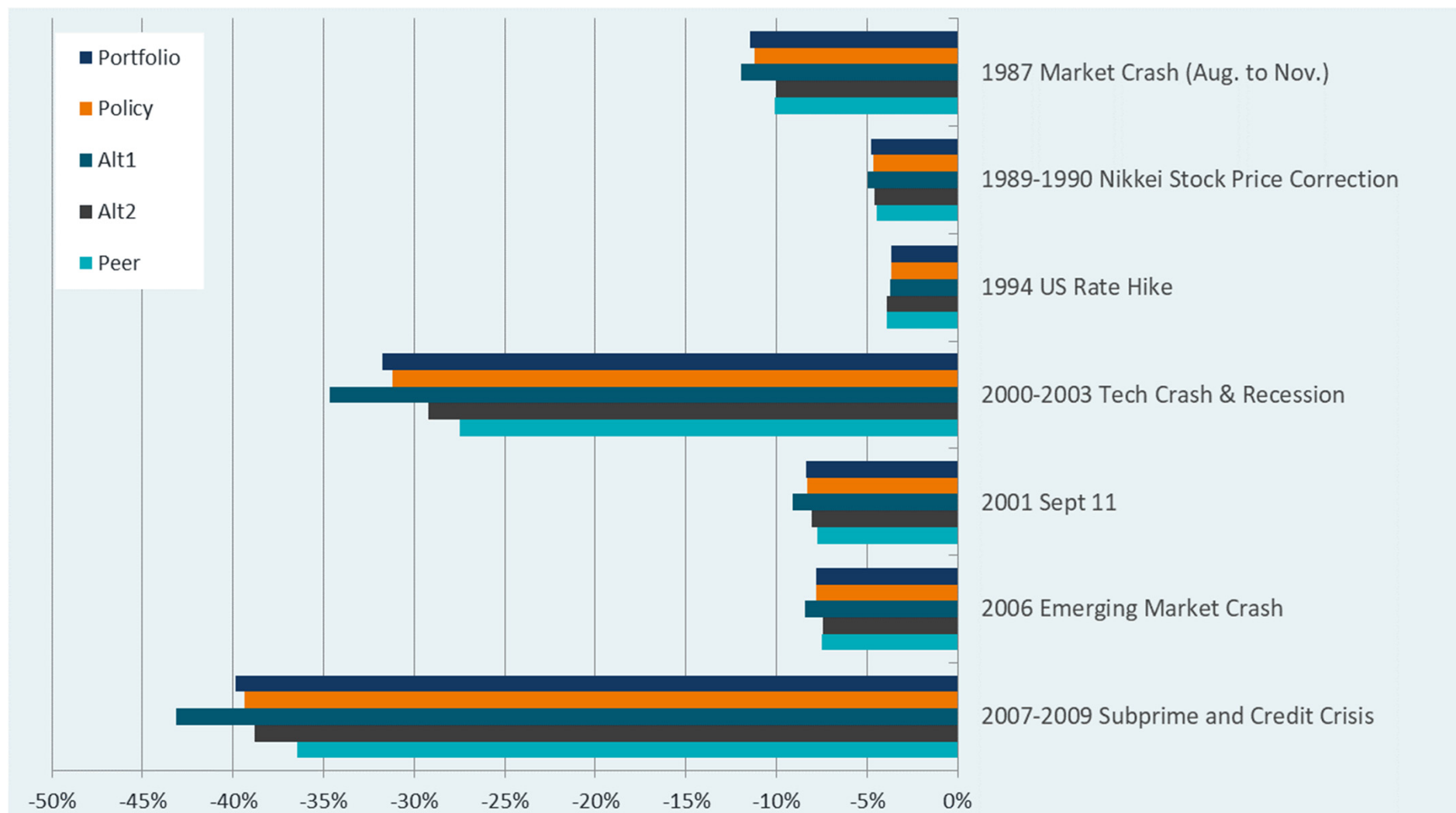
Source: MSCI BARRA

Stress tests

Source: MSCI BARRA

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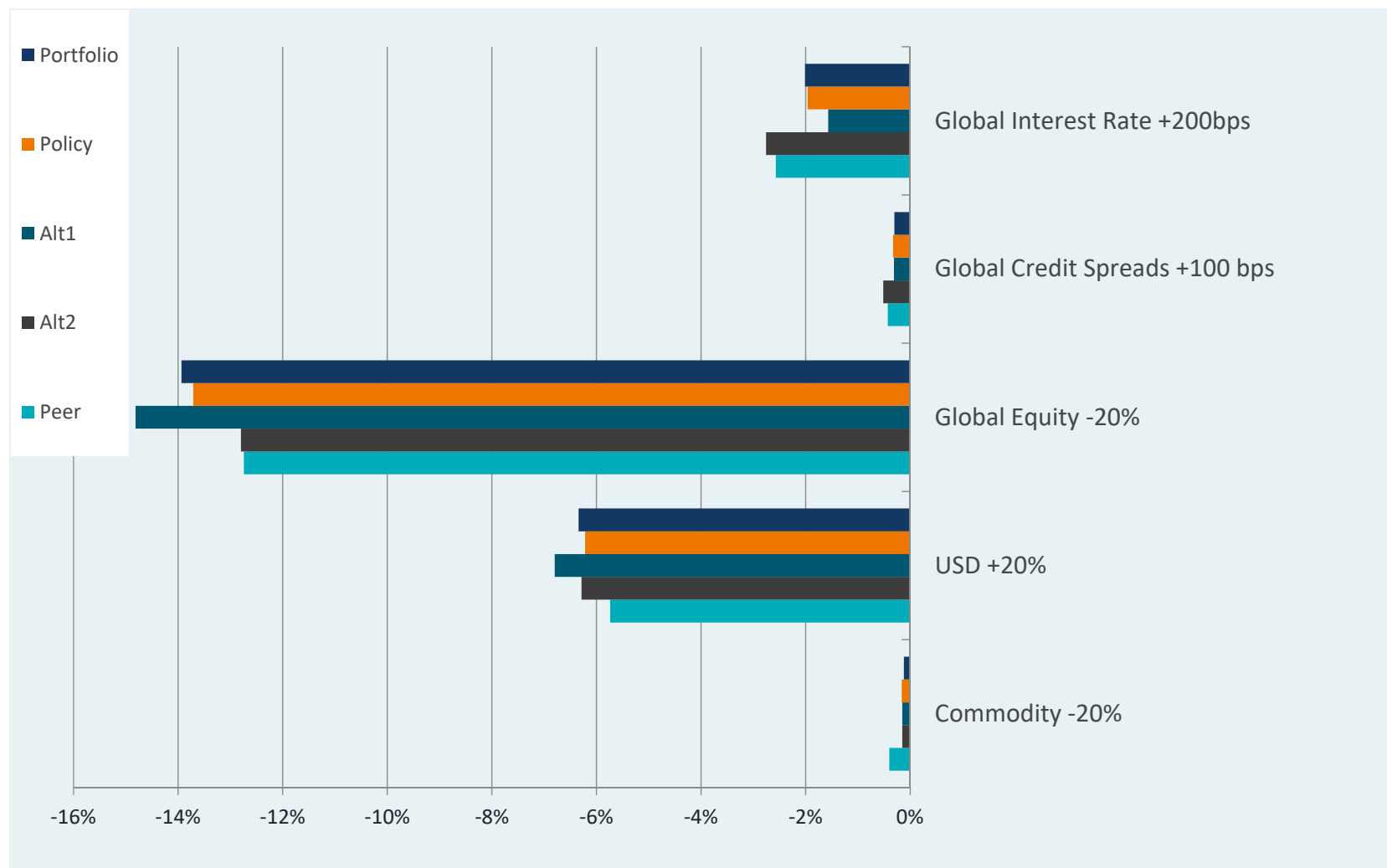
Summary findings

— Based on capital market assumptions:

  ▪ Expected Returns range from 6.4%-7.0%

  ▪ Equity Risk exposure ranges from 83% to 88%

— From a mean/variance standpoint, the risk and return metrics are comparable across portfolios

  ▪ More aggressive mix (Alt 1) has slightly higher expected return with slightly greater standard deviation and downside risk; has lowest duration risk

  ▪ More conservative mix (Alt 2) has slightly lower expected return with slightly lower risk; has greater duration risk although lower than peer average

  ▪ Alt 2 has same expected return as current ACERA policy

II. ACERA historical experience

Historical funding status

Historical Assets and Funding Status

Historical contributions
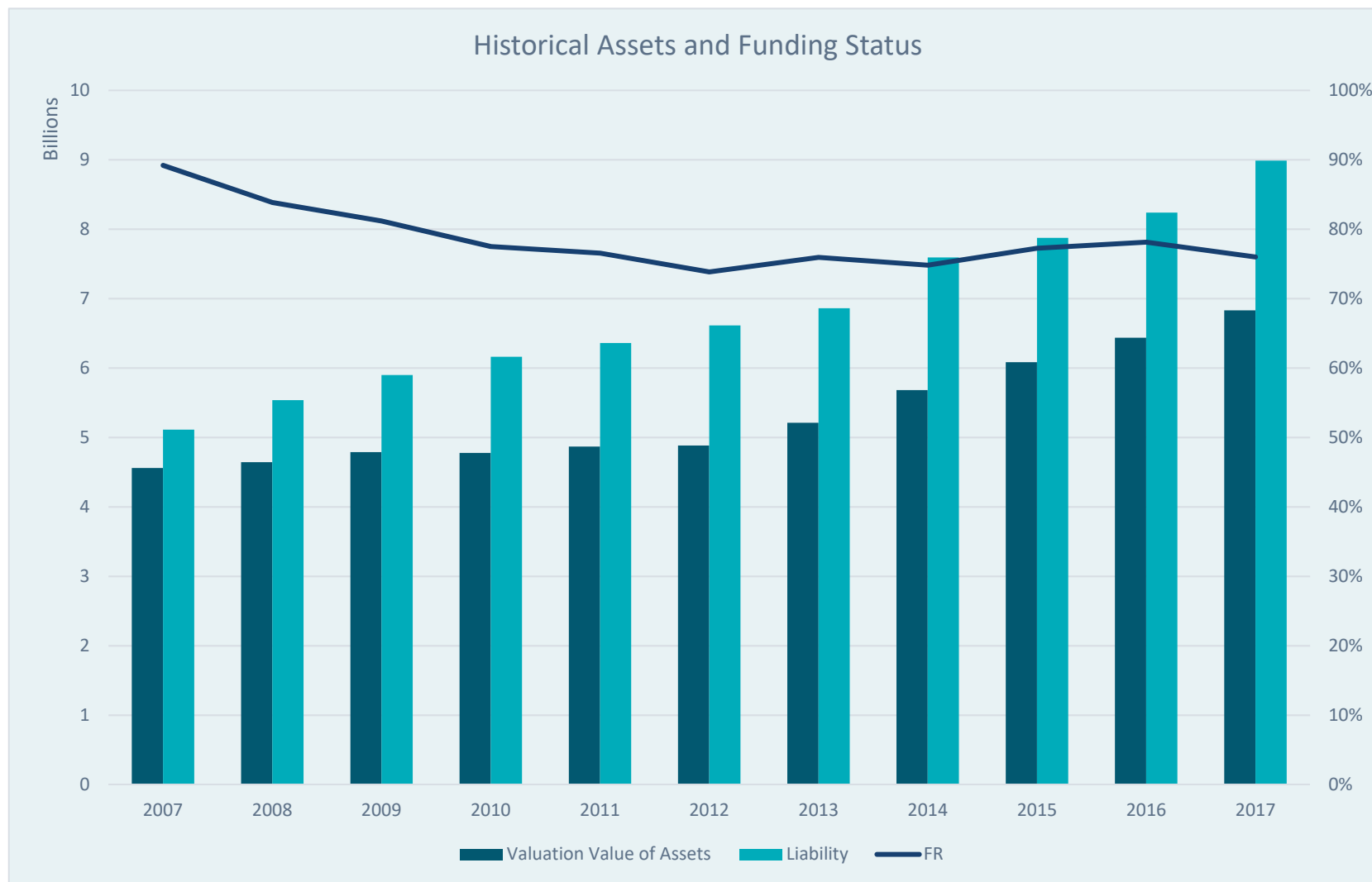
ACERA Historical Contributions

III. Asset-liability integration

Expected contributions

Baseline Deterministic Forecast (7.25% Return)

Legend:
- Employer Contribution
- Employee Contribution
- Act. Funded Ratio

*Not including SRBR

Expected contributions

Deterministic Forecast (6.60% Return)

Employer Contribution — Employee Contribution — Act. FR
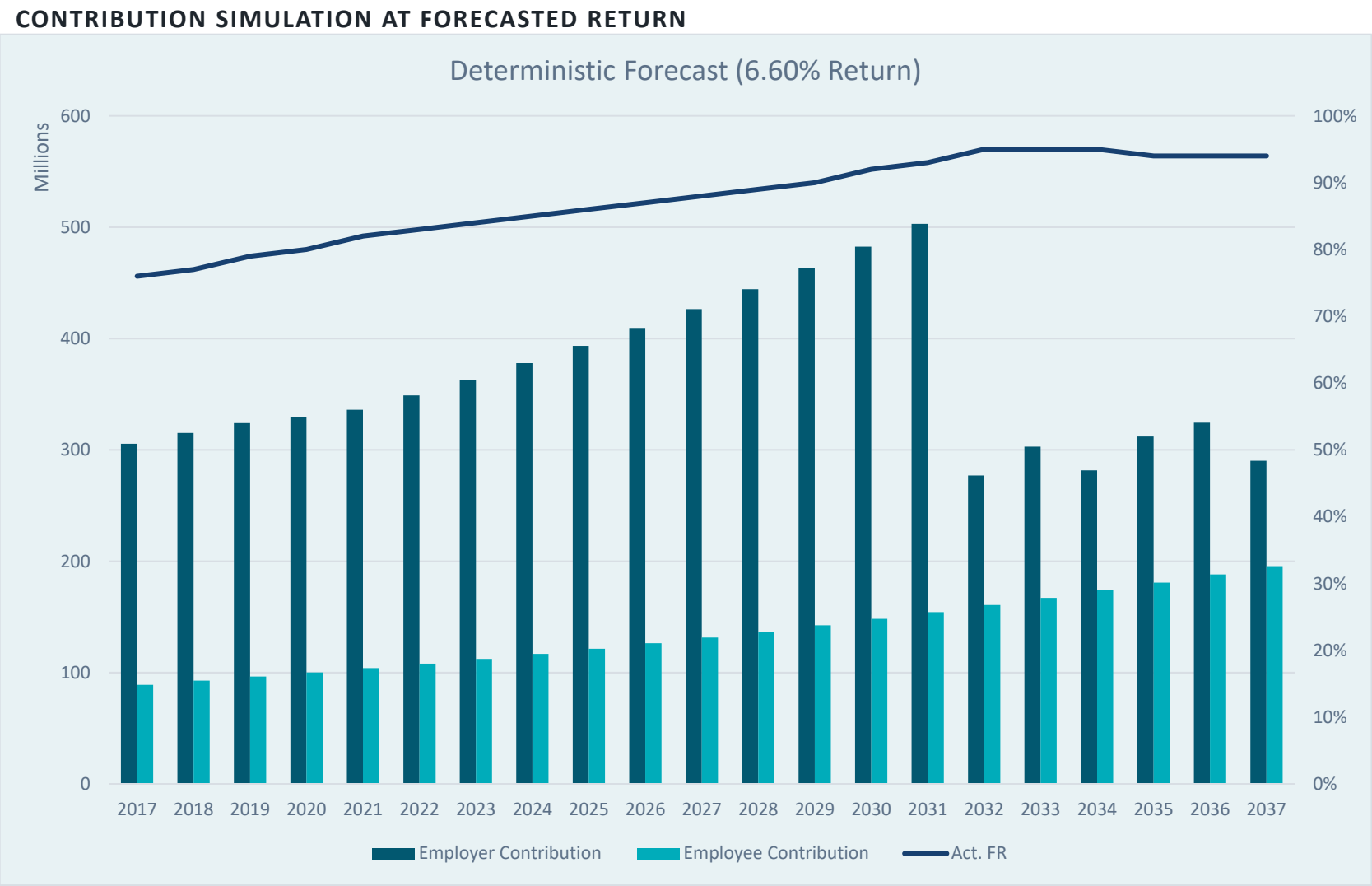
Not including SRBR

Expected contributions with 10% drawdown

CONTRIBUTION SIMULATION

Deterministic Forecast (-10% Yr1, 7.25% Thereafter)

Legend: Employer Contribution, Employee Contribution, Act. FR

Not including SRBR

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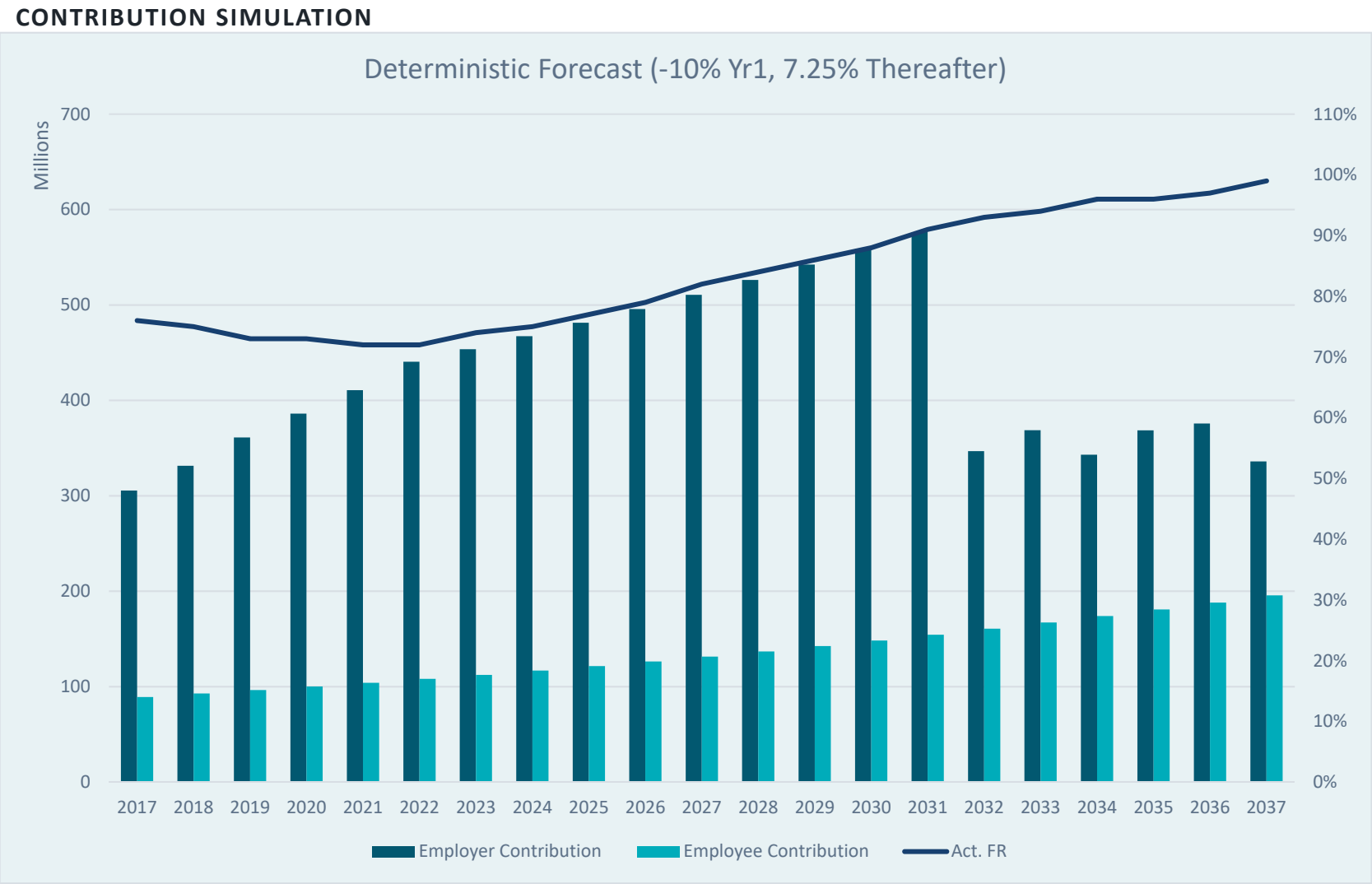
Funded ratio projections

Median Projections:
Actuarial Funded Ratio (EOY 2028)

Legend: Portfolio — Policy — Alt1 — Alt2 — Peer

Actuarial Funded Ratio (EOY 2028)

*Not Including SRBR

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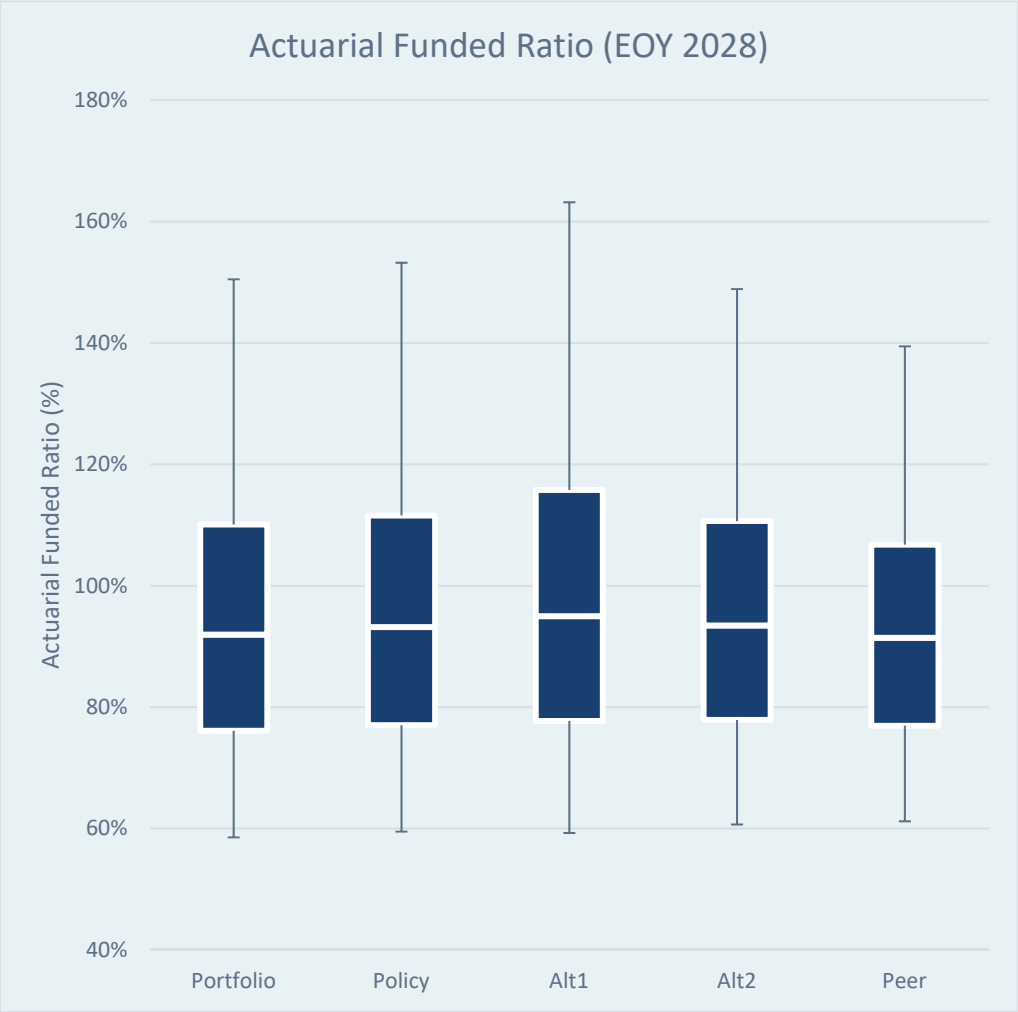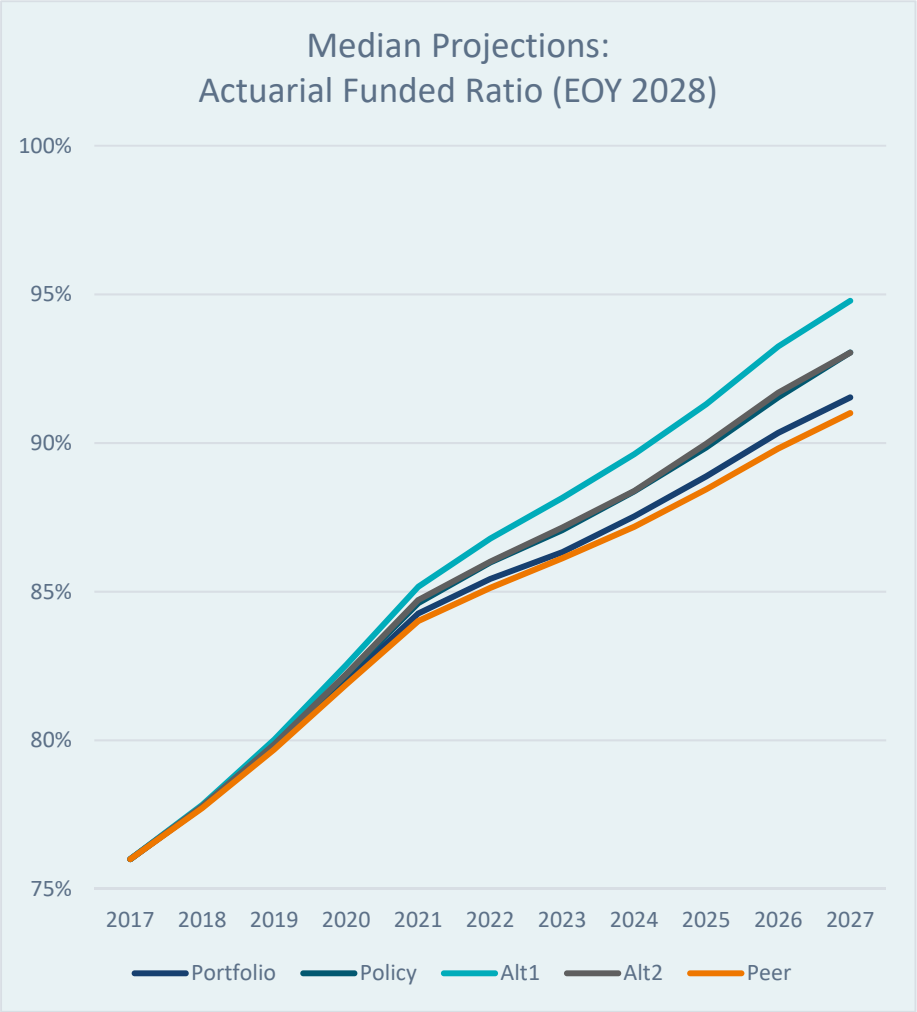
Employer contribution projections (10 years)

*Not Including SRBR

SRBR effect on ACERA

Valuation Funded Ratio (EOY 2028) — box plot showing Portfolio, Policy, Alt1, Alt2, Peer

SRBR Assets (EOY 2028) — box plot showing Portfolio, Policy, Alt1, Alt2, Peer
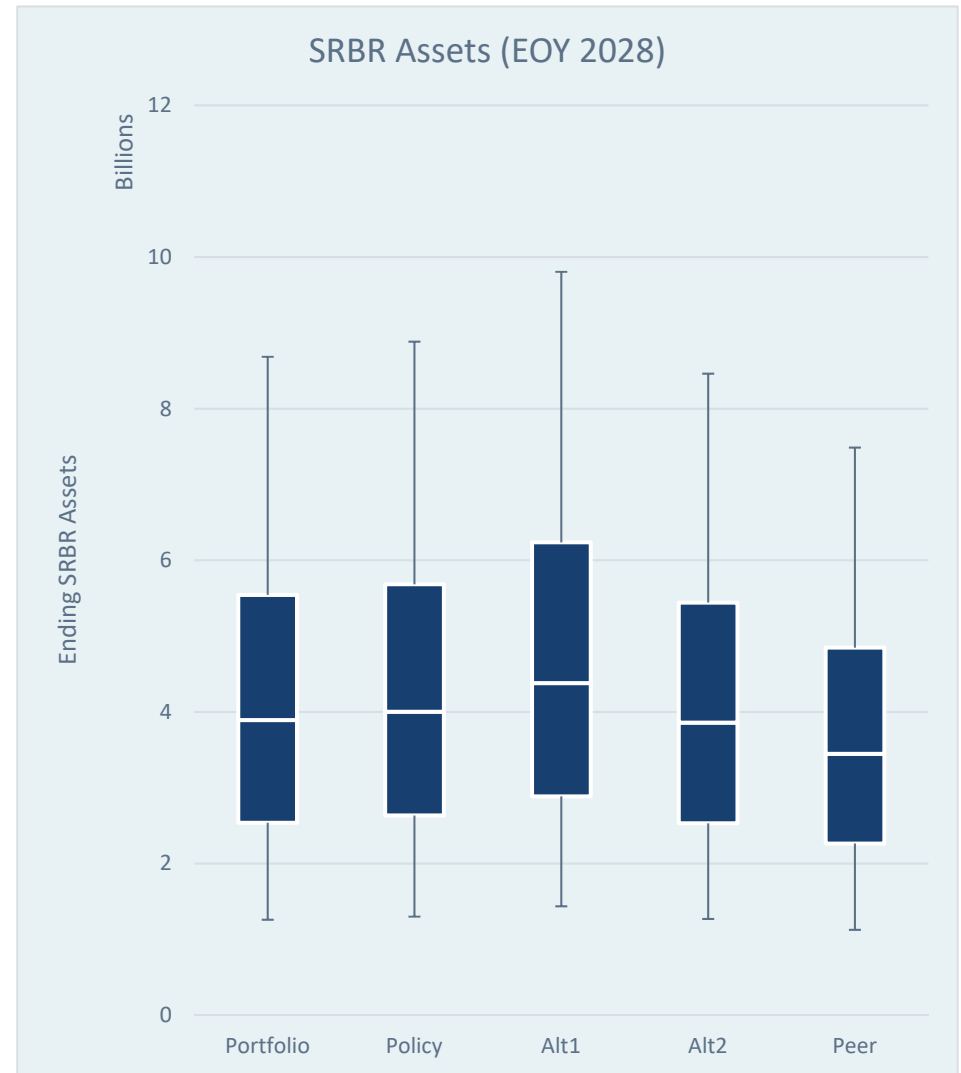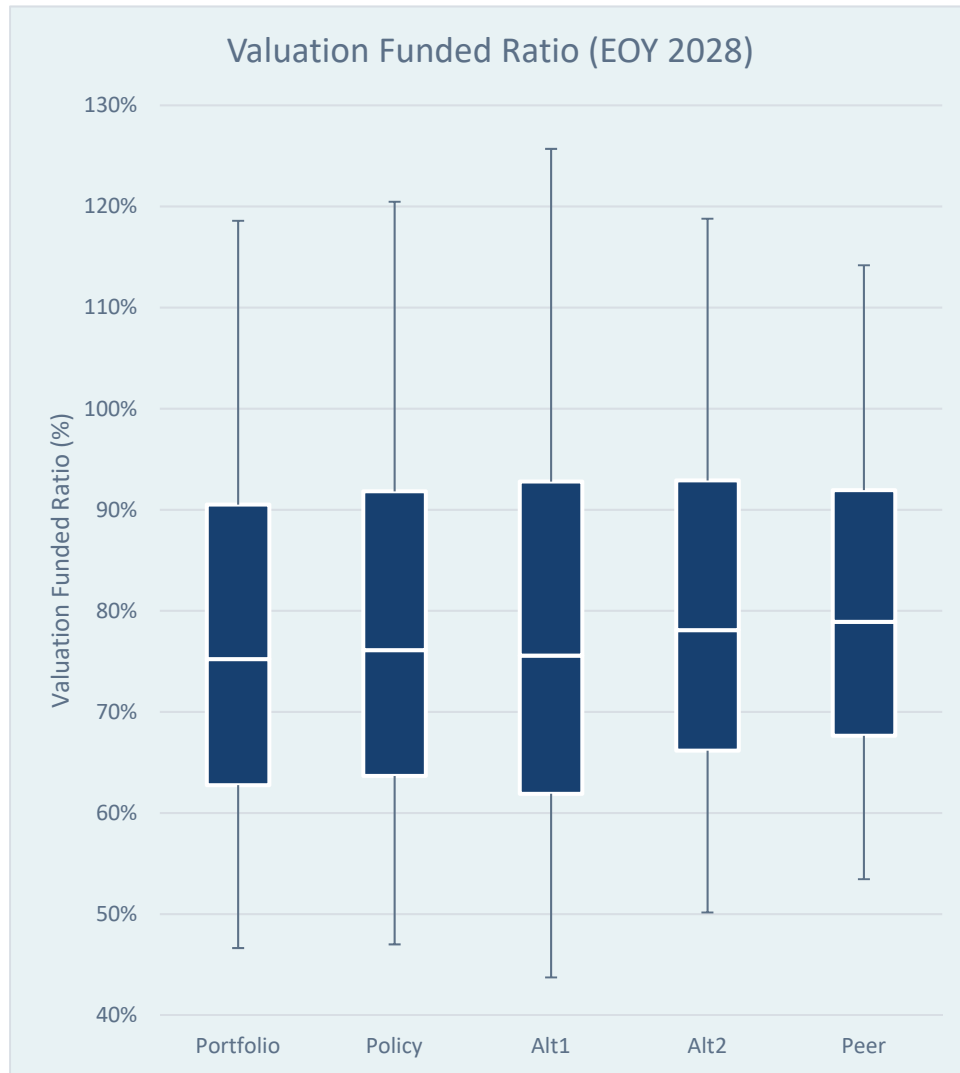
Summary findings of asset-liability integration

— Alternative 1

- Increases the equity risk of the portfolio

- Lowers the portfolio's effective duration

- Has highest return expectation and increases volatility

— Alternative 2

- Lowers equity risk relative to current policy

- Performs better than policy and alternative 1 in stress tests and scenario analysis

- Same expected return as current policy

— Funded ratio estimated to be 90-95% in 10 years given our assumptions

— Funded Ratio including SRBR estimated to be 75-80% in 10 years

IV. ERT survey results

Long-term objectives – ERT results

LONG TERM OBJECTIVES
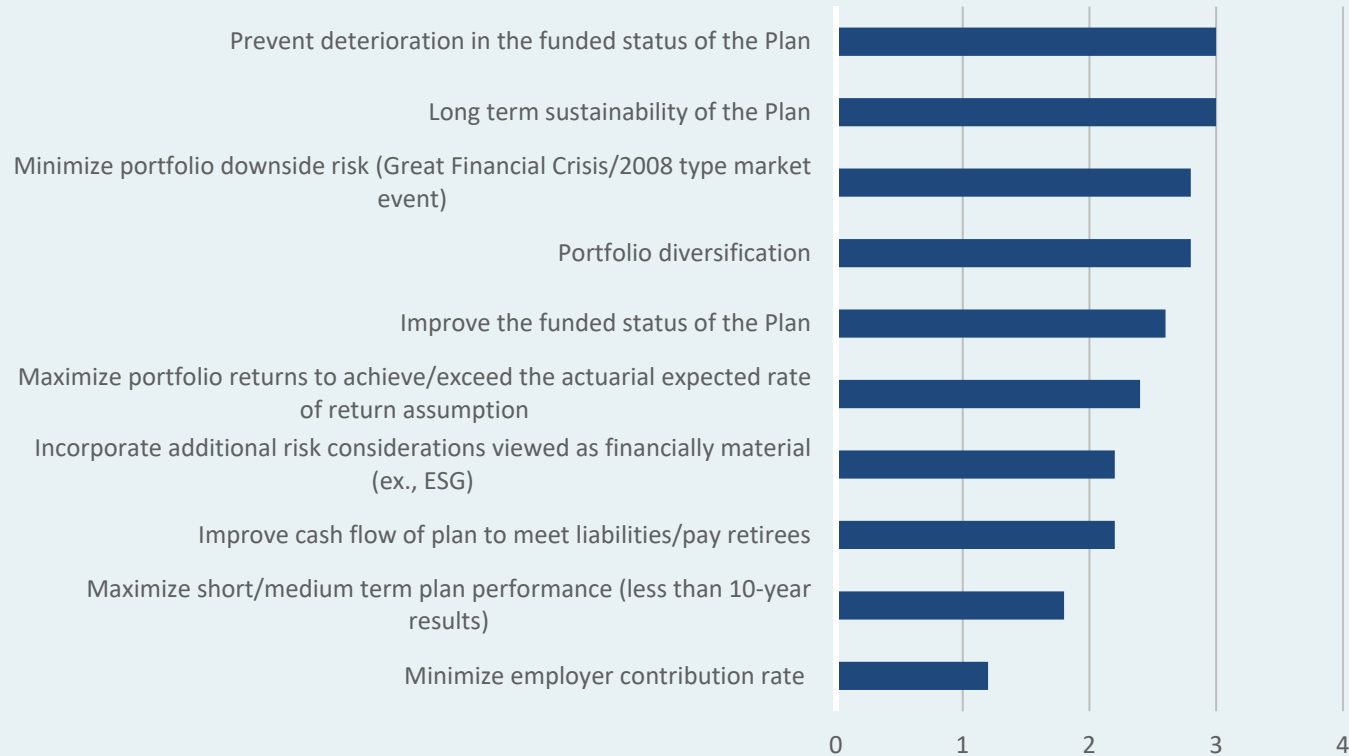
Conclusions – Relative to objectives

— Alternative 1

- Prevent deterioration of funded status
- Improve funded ratio
- Maximize return to increase probability to achieve/outperform actuarial rate

Objective Rank

- 1
- 5
- 6

— Alternative 2

- Long Term sustainability of plan
- Minimize downside risk
- Improved Diversification

Objective Rank

- 2
- 3
- 4

— *Verus believes that Alternative 2 is the most appropriate Policy target based on survey objectives*

V. Appendix

The role of asset classes

GROWTH

**Rising growth
Falling inflation**

Equities, corporate bonds, emerging market debt, infrastructure, mortgages, government bonds, real estate, commodities

Commodities, infrastructure, real estate, equities, corporate bonds, emerging market debt

**Rising growth
Rising inflation**

INFLATION

**Falling growth
Falling inflation**

Government bonds, corporate bonds, emerging market debt, inflation linked bonds

Inflation linked bonds, commodities, infrastructure, real estate

**Falling growth
Rising inflation**

CMA methodology

Asset	Return Methodology	Volatility Methodology*
Inflation	25% weight to the University of Michigan Survey 5-10 year ahead inflation expectation and the Survey of Professional Forecasters (Fed Survey), and the remaining 50% to the market's expectation for inflation as observed through the 10-year TIPS breakeven rate	-
Cash	Real yield estimate + inflation forecast	Long-term volatility
Bonds	Nominal bonds: current yield; Real bonds: real yield + inflation forecast	Long-term volatility
International Bonds	Current yield	Long-term volatility
Credit	Current option-adjusted spread + U.S. 10-year Treasury – effective default rate	Long-term volatility
International Credit	Current option-adjusted spread + foreign 10-year Treasury – effective default rate	Long-term volatility
Private Credit	Bank loan forecast + 1.75% private credit premium**	Long-term volatility
Equity	Current yield + real earnings growth (historical average) + inflation on earnings (inflation forecast) + expected P/E change	Long-term volatility
Intl Developed Equity	Current yield + real earnings growth (historical average) + inflation on earnings (intl. inflation forecast) + expected P/E change	Long-term volatility
Private Equity	US large cap domestic equity forecast * 1.85 beta adjustment	1.2 * Long-term volatility of U.S. small cap
Commodities	Collateral return (cash) + spot return (inflation forecast) + roll return (assumed to be zero)	Long-term volatility
Hedge Funds	Return coming from traditional betas + 15-year historical idiosyncratic return	Long-term volatility
Core Real Estate	Cap rate + real income growth – capex + inflation forecast	65% of REIT volatility
REITs	Core real estate	Long-term volatility
Value-Add Real Estate	Core real estate + 2%	Volatility to produce Sharpe Ratio (g) equal to core real estate
Opportunistic Real Estate	Core real estate + 4%	Volatility to produce Sharpe Ratio (g) equal to core real estate
Infrastructure	Current yield + real income growth + inflation on earnings (inflation forecast)	Long-term volatility
Risk Parity	Expected Sharpe Ratio * target volatility + cash rate	Target volatility

10 year return & risk assumptions

Asset Class	Index Proxy	Ten Year Return Forecast		Standard Deviation Forecast	Sharpe Ratio Forecast (g)	Sharpe Ratio Forecast (a)	10-Year Historical Sharpe Ratio (g)	10-Year Historical Sharpe Ratio (a)
		Geometric	Arithmetic					
Equities								
U.S. Large	S&P 500	5.8%	6.9%	15.6%	0.24	0.31	0.94	0.95
U.S. Small	Russell 2000	5.4%	7.5%	21.3%	0.15	0.25	0.63	0.69
International Developed	MSCI EAFE	7.7%	9.1%	17.8%	0.31	0.39	0.37	0.43
International Small	MSCI EAFE Small Cap	6.5%	8.8%	22.4%	0.20	0.30	0.61	0.66
Emerging Markets	MSCI EM	8.6%	11.6%	26.1%	0.25	0.36	0.40	0.48
Global Equity	MSCI ACWI	6.8%	8.2%	17.1%	0.27	0.36	0.62	0.67
Private Equity*	Cambridge Private Equity	8.8%	11.7%	25.6%	0.26	0.37	-	-
Fixed Income								
Cash	30 Day T-Bills	2.1%	2.1%	1.2%	-	-	-	-
U.S. TIPS	BBgBarc U.S. TIPS 5-10	3.0%	3.1%	5.5%	0.16	0.18	0.67	0.68
U.S. Treasury	BBgBarc Treasury 7-10 Year	2.7%	2.9%	6.7%	0.09	0.12	0.46	0.48
Global Sovereign ex U.S.	BBgBarc Global Treasury ex U.S.	0.8%	1.3%	9.8%	-0.13	-0.08	0.14	0.18
Core Fixed Income	BBgBarc U.S. Aggregate Bond	3.3%	3.5%	6.4%	0.19	0.22	1.09	1.08
Core Plus Fixed Income	BBgBarc U.S. Corporate IG	4.1%	4.4%	8.4%	0.24	0.27	1.23	1.22
Short-Term Gov't/Credit	BBgBarc U.S. Gov't/Credit 1-3 Year	2.8%	2.9%	3.6%	0.19	0.22	1.38	1.37
Short-Term Credit	BBgBarc Credit 1-3 Year	3.2%	3.2%	3.7%	0.30	0.30	1.66	1.64
Long-Term Credit	BBgBarc Long U.S. Corporate	4.3%	4.7%	9.4%	0.23	0.28	0.88	0.89
High Yield Corp. Credit	BBgBarc U.S. Corporate High Yield	5.7%	6.3%	11.5%	0.31	0.37	1.39	1.36
Bank Loans	S&P/LSTA Leveraged Loan	5.9%	6.4%	10.2%	0.37	0.42	1.50	1.47
Global Credit	BBgBarc Global Credit	2.1%	2.4%	7.5%	0.00	0.04	0.88	0.89
Emerging Markets Debt (Hard)	JPM EMBI Global Diversified	6.7%	7.4%	12.6%	0.37	0.42	1.19	1.18
Emerging Markets Debt (Local)	JPM GBI-EM Global Diversified	6.9%	7.6%	12.1%	0.40	0.45	0.26	0.31
Private Credit	Bank Loans + 175bps	7.7%	8.2%	10.2%	0.55	0.60	-	-
Other								
Commodities	Bloomberg Commodity	4.2%	5.3%	15.7%	0.13	0.20	-0.29	-0.22
Hedge Funds*	HFRI Fund Weighted Composite	4.4%	4.7%	7.8%	0.29	0.33	0.76	0.76
Core Real Estate	NCREIF Property	6.1%	6.9%	12.9%	0.31	0.37	1.28	1.26
Value-Add Real Estate	NCREIF Property + 200bps	8.1%	9.8%	19.4%	0.31	0.40	-	-
Opportunistic Real Estate	NCREIF Property + 400bps	10.1%	13.0%	25.9%	0.31	0.42	-	-
REITs	Wilshire REIT	6.1%	7.8%	19.3%	0.21	0.30	0.55	0.63
Global Infrastructure	S&P Global Infrastructure	7.9%	9.3%	18.2%	0.32	0.40	0.52	0.57
Risk Parity	Risk Parity	7.1%	7.6%	10.0%	0.50	0.55	-	-
Currency Beta	Russell Conscious Currency	2.1%	2.2%	4.1%	0.02	0.02	0.25	0.26
Inflation		2.0%	-	-	-	-	-	-

Investors wishing to produce expected geometric return forecasts for their portfolios should use the arithmetic return forecasts provided here as inputs into that calculation, rather than the single-asset-class geometric return forecasts. This is the industry standard approach, but requires a complex explanation only a heavy quant could love, so we have chosen not to provide further details in this document – we will happily provide those details to any readers of this who are interested.

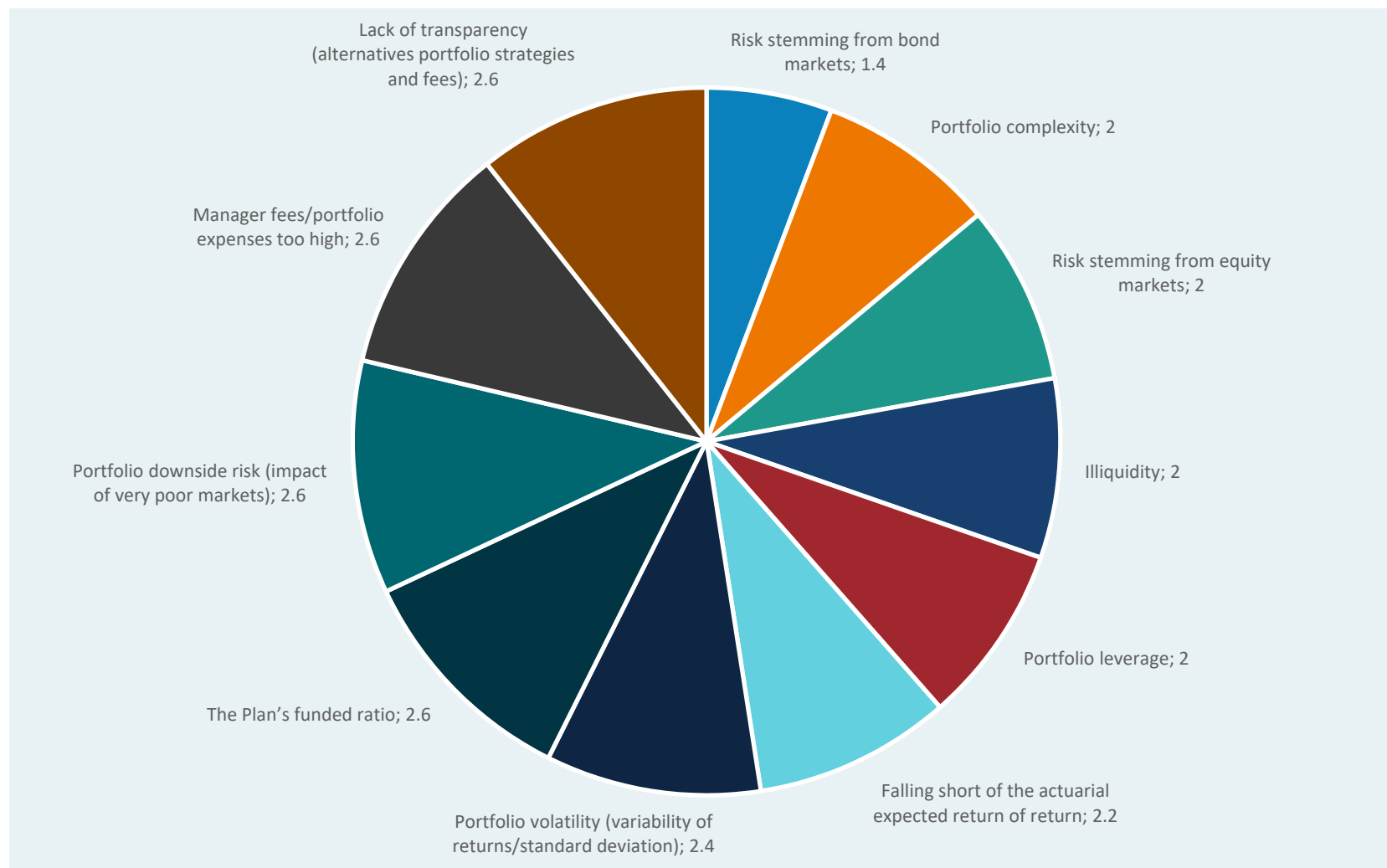**Return expectations differ depending on method of implementation*

Correlation assumptions

	Cash	US Large	US Small	Intl Large	Intl Large Hdg	Intl Small	Intl Small Hdg	EM	Global Equity	PE	US TIPS	US Treasury	Global Sovereign ex US	Global Sovereign ex US Hdg	US Core	US Core Plus	ST Govt/Credit	Short-Term Credit	Long-Term Credit	US HY	Bank Loans	Global Credit	Global Credit Hdg	EMD USD	EMD Local	Commodities	Hedge Funds	Real Estate	REITs	Infrastructure	Risk Parity	Currency Beta	Inflation
Cash	1.0																																
US Large	-0.3	1.0																															
US Small	-0.2	0.9	1.0																														
Intl Large	-0.3	0.9	0.8	1.0																													
Intl Large Hdg	-0.4	0.9	0.8	0.9	1.0																												
Intl Small	-0.3	0.9	0.8	1.0	0.9	1.0																											
Intl Small Hdg	-0.4	0.8	0.8	0.9	1.0	0.9	1.0																										
EM	-0.3	0.8	0.7	0.9	0.8	0.9	0.8	1.0																									
Global Equity	-0.3	1.0	0.9	1.0	0.9	0.9	0.9	0.9	1.0																								
PE	-0.2	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.7	1.0																							
US TIPS	0.0	0.2	0.1	0.3	0.1	0.3	0.2	0.4	0.3	0.1	1.0																						
US Treasury	0.1	-0.3	-0.3	-0.2	-0.3	-0.2	-0.3	-0.2	-0.2	-0.2	0.6	1.0																					
Global Sovereign ex US	0.1	0.3	0.1	0.4	0.1	0.4	0.1	0.4	0.4	0.0	0.6	0.5	1.0																				
Global Sovereign ex US Hdg	0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	-0.2	-0.1	0.4	0.8	0.4	1.0																			
US Core	0.0	0.0	-0.1	0.2	0.0	0.2	0.0	0.2	0.1	-0.1	0.8	0.9	0.6	0.7	1.0																		
US Core Plus	-0.2	0.4	0.3	0.5	0.4	0.5	0.4	0.5	0.5	0.1	0.7	0.5	0.5	0.4	0.8	1.0																	
ST Govt/Credit	0.3	-0.1	-0.1	0.1	-0.1	0.1	-0.1	0.1	0.0	-0.1	0.6	0.6	0.6	0.5	0.7	0.6	1.0																
Short-Term Credit	-0.1	0.3	0.3	0.5	0.4	0.5	0.4	0.5	0.4	0.3	0.6	0.2	0.4	0.2	0.5	0.8	0.7	1.0															
Long-Term Credit	-0.2	0.3	0.2	0.4	0.3	0.4	0.4	0.4	0.4	0.0	0.6	0.5	0.5	0.5	0.8	1.0	0.5	0.6	1.0														
US HY	-0.3	0.7	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.4	0.5	-0.2	0.3	-0.2	0.2	0.6	0.2	0.6	0.5	1.0													
Bank Loans	-0.4	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.4	0.3	-0.4	0.0	-0.3	0.0	0.4	-0.1	0.5	0.3	0.9	1.0												
Global Credit	-0.2	0.6	0.5	0.8	0.6	0.8	0.6	0.7	0.7	0.2	0.7	0.2	0.7	0.2	0.6	0.8	0.5	0.7	0.8	0.8	0.5	1.0											
Global Credit Hdg	-0.2	0.5	0.4	0.6	0.6	0.6	0.6	0.7	0.6	0.2	0.7	0.3	0.5	0.4	0.7	1.0	0.5	0.8	0.9	0.8	0.6	0.9	1.0										
EMD USD	-0.2	0.6	0.5	0.7	0.6	0.7	0.6	0.8	0.7	0.3	0.7	0.3	0.5	0.2	0.6	0.8	0.4	0.7	0.7	0.8	0.6	0.9	0.9	1.0									
EMD Local	0.0	0.6	0.6	0.7	0.6	0.7	0.6	0.8	0.7	0.3	0.6	0.2	0.7	0.1	0.5	0.6	0.4	0.5	0.6	0.7	0.4	0.8	0.7	0.8	1.0								
Commodities	-0.1	0.5	0.4	0.6	0.4	0.6	0.4	0.7	0.6	0.3	0.4	-0.2	0.4	-0.3	0.1	0.3	0.2	0.4	0.2	0.5	0.5	0.6	0.4	0.5	0.6	1.0							
Hedge Funds	-0.4	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.5	0.3	-0.3	0.1	-0.2	0.0	0.4	-0.1	0.5	0.3	0.7	0.7	0.6	0.5	0.5	0.5	0.6	1.0						
Real Estate	-0.1	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.1	-0.1	0.1	0.0	0.0	0.2	0.0	0.1	0.1	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.4	1.0					
REITs	-0.1	0.7	0.7	0.7	0.6	0.7	0.6	0.6	0.7	0.4	0.3	0.0	0.4	0.1	0.3	0.5	0.1	0.3	0.4	0.7	0.5	0.6	0.6	0.6	0.6	0.3	0.4	0.6	1.0				
Infrastructure	-0.3	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.2	0.4	-0.1	0.5	-0.1	0.2	0.5	0.1	0.5	0.5	0.7	0.6	0.7	0.7	0.7	0.7	0.6	0.6	0.1	0.6	1.0			
Risk Parity	-0.1	0.5	0.4	0.6	0.4	0.6	0.5	0.6	0.6	0.3	0.7	0.3	0.6	0.3	0.6	0.7	0.5	0.6	0.6	0.6	0.3	0.8	0.7	0.7	0.7	0.6	0.5	-0.1	0.5	0.7	1.0		
Currency Beta	-0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.1	0.1	0.2	-0.2	-0.2	-0.1	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	0.1	-0.1	0.0	0.1	0.0	1.0	
Inflation	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	-0.3	0.0	-0.3	-0.2	-0.1	-0.2	0.0	-0.2	0.3	0.4	0.1	0.0	0.1	0.1	0.3	0.2	0.1	0.1	0.1	0.1	-0.1	1.0

Note: Correlation assumptions are based on the last ten years. Private Equity and Real Estate correlations are especially difficult to model – we have therefore used BarraOne correlation data to strengthen these correlation estimates.

SRBR modeling assumptions

— Impacts from the contingency reserve are excluded from the analysis for simplicity.

— 50% of a given years actuarial gain on the total pension assets are attributed to the SRBR fund. The remaining 50% is realized by the pension.

— In addition, the SRBR fund is attributed between 0% and 7.25% return in a given year depending on portfolio performance. The fund is never attributed a negative return. If a negative return event occurs, those losses are covered by the pension's assets and a 0% return is attributed to the SRBR for the year.

— Expected withdrawals from the SRBR fund are taken to be those projected from the actuary found in the 12/31/2017 OPEB and non-OPEB valuation, section 2 page 9.

— Calculations for the SRBR fund are created as broad approximations with a focus on its impact on the pension's funds assets. Differences in smoothing methodology and return attribution may materially alter SRBR projected asset results.

Long-term risks – ERT results

Lack of transparency (alternatives portfolio strategies and fees); 2.6

Risk stemming from bond markets; 1.4

Portfolio complexity; 2

Manager fees/portfolio expenses too high; 2.6

Risk stemming from equity markets; 2

Illiquidity; 2

Portfolio downside risk (impact of very poor markets); 2.6

Portfolio leverage; 2

The Plan's funded ratio; 2.6

Falling short of the actuarial expected return of return; 2.2

Portfolio volatility (variability of returns/standard deviation); 2.4

Private credit – investor's perspective

Key benefits:

— Illiquidity premium

— Contractual yield

— Higher in the capital stack

  ▪ lenders have priority over equity holders on cash flows

Key considerations:

— Borrowers may be of lower credit quality or may be unrated

  ▪ However, there are funds across the credit quality spectrum including investment grade private credit

— Limited liquidity

  ▪ as a result of capital lock-ups or lack of secondary buyers

— Tough to benchmark

— High fees (often private equity-like fees)

Risk and return characteristics

	Direct Lending	Mezzanine Financing	Stressed and Distressed
Relative risk	Moderate	Higher	Highest
Expected returns*	5 – 8% (10 – 16% after fund level leverage)	8 – 12%	12% and up
Return characteristics	Most of the return comes from contractual yield (coupon payments)	Typically more equity like in terms of return characteristics with less return coming from contractual yield	Varies depending on the situation

— Direct lending and mezzanine financing expected returns are similar so the investor must decide on where to take risk

— The tradeoff to achieve the expected low-double-digit returns involves either leverage to a senior part of the capital structure (direct lending) or investing in a lower part of the capital structure (mezzanine financing)

Expected returns are estimates based on manager survey

Glossary

Active management The process of constructing a portfolio with the goal of generating a return on investment that is greater than the general market would otherwise provide. Asset-liability studies exclude the potential gains/losses from active management.

Actuarial expected return - A pension fund portfolio's actuarial expected return is the rate used to discount future benefits to determine plan liabilities and is designed to be a reasonable expectation of the future rate of return on the pension plan's assets. Also known as the actuarial assumed rate and the discount rate.

Actuarial liability The present value of benefits earned to date plus the present value of benefits that will result from future increases in salary and service already earned.

Asset allocation – Asset allocation is the process by which an investor aims to balance risk and reward according to the plan's goals, risk tolerance and investment horizon. Assets are allocated between asset classes that have different levels of risk and return and behave differently from one another to provide diversification.

Asset/liability analysis A study that analyzes the future relationships between assets, liabilities, benefits and funding. A projection model previews how liabilities and required contributions react in various capital market environments, relying on assumptions regarding markets, plan membership, inflation, and various assumptions made by the plan's actuary.

Contributions – Employer and employee contributions into the system are determined by the plan's annual actuarial valuation and are updated regularly to ensure that contribution rates are sufficient to fund the plan. Actuarial valuations are based on the benefit formulas for the employee groups covered.

Glossary (continued)

Correlation – A measure of the relative movement of returns of one security or asset class relative to another over time. A correlation of 1 means the returns of two securities move in lock step, a correlation of -1 means the returns of two securities move in the exact opposite direction over time. Correlation is used as a measure to help optimize the benefits of diversification when constructing an investment portfolio.

Diversification – Diversification is a form of risk management whereby a variety of investments that are uncorrelated are combined in a portfolio with the goal of providing the highest return for a given level of risk. Diversification also mitigates unsystematic (company specific) risk.

Downside risk (drawdown risk) - A measure of volatility, or risk, focusing on downside or negative performance time periods. Drawdown risk is a subset of downside risk that measures peak to trough declines and is defined as the negative half of standard deviation.

Enterprise risk tolerance (ERT) - A holistic assessment of risk for a plan that incorporates and extends beyond portfolio risk. In addition to investment risk, the ERT assessment includes regulatory risk, headline risk, peer risk and organizational risk to the system. A plan's ERT is incorporated into strategic decision-making.

Funded ratio (funded status) – A measurement of the funded status of the system. The funded ratio is calculated by dividing the valuation assets by the actuarial accrued liability. For example, a funded ratio of 90% indicates that assets are 10% less than liabilities.

Glossary (continued)

Normal cost – Represents the portion of the cost of projected benefits allocated to the current plan year.

Peer risk - Peer risk refers to having a plan portfolio that looks different from the average pension plan. Peer risk is most often highlighted during periods of underperformance versus average plans.

Standard deviation A measure of volatility, or risk. Measures risk by indicating how far from the average, or mean, return one is likely to fall in any given time period. The rules of statistics dictate that you will fall within 1 standard deviation of the mean 2/3 of the time and within 2 standard deviations 95% of the time. For example, if a security has an average annual rate of return of 10% and a standard deviation of 5%, then two-thirds of the time, one would expect to receive an annual rate of return between 5% and 15%.

Volatility - A statistical measure of the dispersion of returns for a security, index or portfolio. Generally speaking, the higher the volatility, the riskier the investment. Volatility is most commonly measured using standard deviation (defined above).

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Verus

PERSPECTIVES
THAT DRIVE ENTERPRISE SUCCESS

JUNE 2021

Asset Allocation Review

ACERA

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Verus⁷⁷⁷

Overview

Introduction

— As fiduciaries we need to periodically review the asset allocation relative to the market environment and the enterprise objectives.

  - 2020 was an unprecedented year with a constantly evolving market environment driven by the global pandemic and its ramifications.

— The goal of this presentation is to review the current asset allocation targets relative to potential alternatives while considering:

  - Risk tolerance/liquidity

  - The market environment

— This review considers modest changes to existing asset classes in the ACERA portfolio.

  - Asset allocation of current policy reflects target asset allocation adopted during ACERA's 2019 asset-liability study.

  - The turbulence of 2020 has resulted in a meaningful reduction in 10-year expected returns compared to last year.

Many plans are reviewing their asset allocation since updated expected returns deviate from actuarial assumed rates.

Asset allocation analysis

Determine strategic asset mix ← Asset allocation

Implementation of AA. Manager/asset class structure decisions include active/passive, style, market cap, tracking error ← Manager structure

Implementation of manager structure; manager selection ← Manager selection
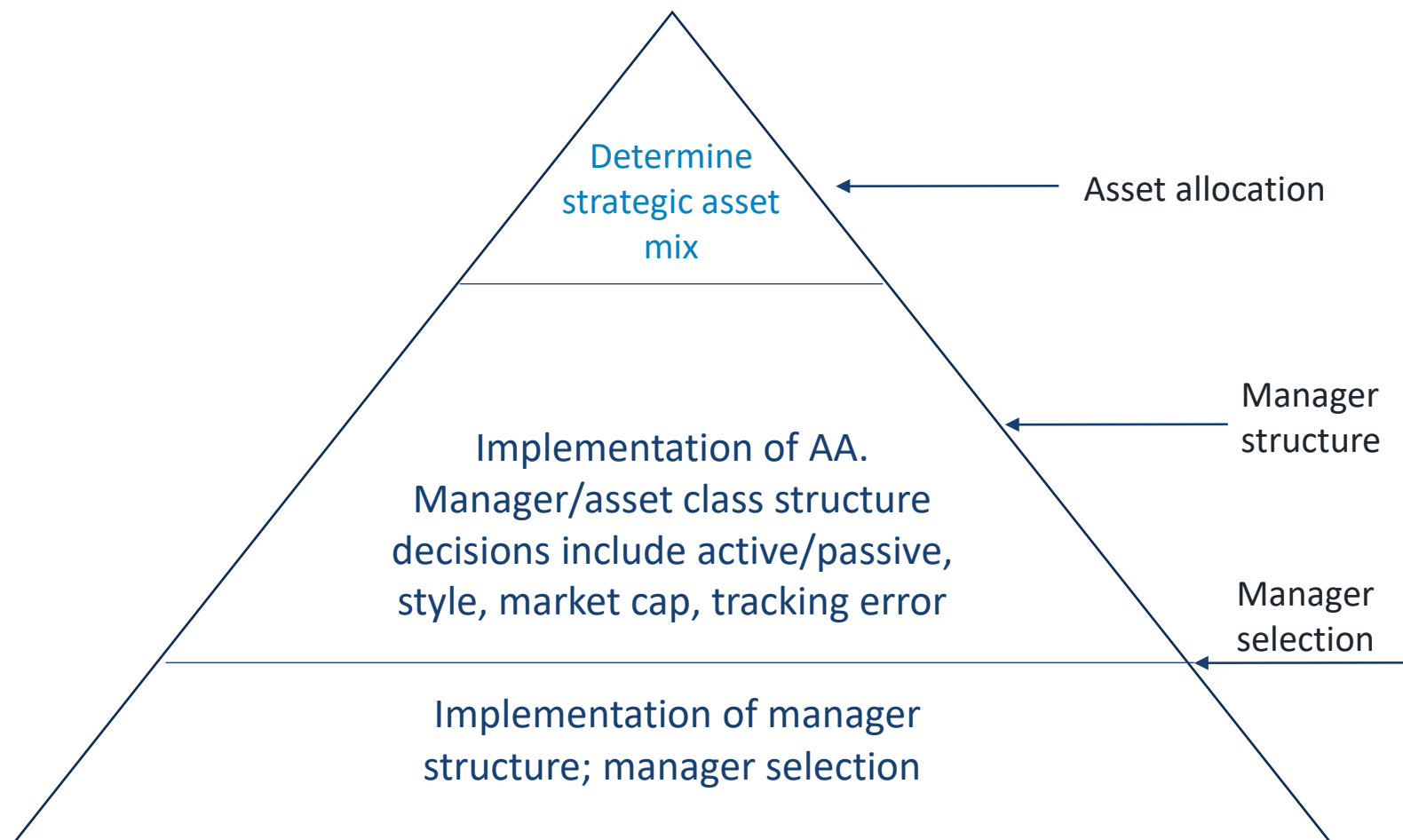
Asset allocation is the biggest determinant of portfolio risk and return. Asset allocation analysis assumes only market beta (no alpha or manager skill).

Identifying economic drivers of return

— For each asset class, investors can usually identify the economic environments which are likely to lead to strong, or poor, performance.

— Based on these relationships, investors can work to understand how their overall portfolio is likely to perform if faced with different economic environments.

— Investors may choose to adjust asset allocation so that their portfolio is not overly exposed to one type of future environment.

— Verus recommends diversified portfolios that are designed to weather all economic environments.

GROWTH

Rising growth
Falling inflation

Equities, corporate bonds, emerging market debt, infrastructure, mortgages, government bonds, real estate, commodities

Commodities, infrastructure, real estate, equities, corporate bonds, emerging market debt

Rising growth
Rising inflation

INFLATION

Falling growth
Falling inflation

Government bonds, corporate bonds, emerging market debt, inflation linked bonds

Inflation linked bonds, commodities, infrastructure, real estate

Falling growth
Rising inflation

The roles of asset classes

— Why do we invest in various asset classes?

— What is it we practically expect them to contribute to the portfolio over time?

— What will determine whether or not they serve the desired role?

	RETURN ROLES				DIVERSIFICATION & VOLATILITY ROLES			HOW MACRO OUTLOOK/GDP AFFECTS ROLE	
	Benefit from GDP Growth	Earn Risk Premium	Produce Stable Income	Hedge Against Inflation	Low Absolute Volatility	Low Corr. To Other Assets	Reduce Portfolio Volatility	Elements of Return for Asset Class	Sensitivity of Role to GDP
Public Equities	High	Med-High	Low	Medium	None	Low	Low	PEs, Dividends, Earnings Growth	High
Private Equities	High	High	None	None	Low	Medium	Medium	PEs (exits), Financing, Opportunity Set	Med-High
Fixed (Treasury)	None	None	High	Low	High	Medium	High	Direct Link to Yields	Medium
Fixed (Credit)	Medium	Low	High	Low	Med-High	Medium	Med-High	Direct Link to Yields, Credit Spreads	Med-High
Hedge Funds (Intended role)	None	Low	None	None	High	High	High	Pes, Credit Spreads, Fat Tails	Medium
Real Estate	Low	Medium	Med-High	High	Medium	High	Medium	Unemployment, Vacancies, Cap Rates	High

MAGNITUDE

High	Med-High	Medium	Low	None

Investors are typically looking for a combination of return enhancement and lower correlation.

Complexity is not an advantage unless there are clear reasons why you're taking on additional risks and costs.

Methodology

CORE INPUTS

— We use a fundamental building block approach based on several inputs, including historical data and academic research to create asset class return forecasts.
— For most asset classes, we use the long-term historical volatility after adjusting for autocorrelation.
— Correlations between asset classes are calculated based on the last 10 years. For illiquid assets, such as private equity and private real estate, we use BarraOne correlation estimates.

Asset	Return Methodology	Volatility Methodology*
Inflation	25% weight to the University of Michigan Survey 5-10 year ahead inflation expectation and the Survey of Professional Forecasters (Fed Survey), and the remaining 50% to the market's expectation for inflation as observed through the 10-year TIPS breakeven rate	-
Cash	75% * current federal funds rate + 25% * U.S. 10-year Treasury yield	Long-term volatility
Bonds	Nominal bonds: current yield; Real bonds: real yield + inflation forecast	Long-term volatility
International Bonds	Current yield	Long-term volatility
Credit	Current option-adjusted spread + U.S. 10-year Treasury – effective default rate	Long-term volatility
International Credit	Current option-adjusted spread + foreign 10-year Treasury – effective default rate	Long-term volatility
Private Credit	Bank loan forecast + 1.75% private credit premium**	Long-term volatility
Equity	Current yield + real earnings growth (historical average) + inflation on earnings (inflation forecast) + expected P/E change	Long-term volatility
Intl Developed Equity	Current yield + real earnings growth (historical average) + inflation on earnings (intl. inflation forecast) + expected P/E change	Long-term volatility
Private Equity	US large cap domestic equity forecast * 1.85 beta adjustment	1.2 * Long-term volatility of U.S. small cap
Commodities	Collateral return (cash) + spot return (inflation forecast) + roll return (assumed to be zero)	Long-term volatility
Hedge Funds	Return coming from traditional betas + 15-year historical idiosyncratic return	Long-term volatility
Core Real Estate	Cap rate + real income growth – capex + inflation forecast	65% of REIT volatility
REITs	Core real estate	Long-term volatility
Value-Add Real Estate	Core real estate + 2%	Volatility to produce Sharpe Ratio (g) equal to core real estate
Opportunistic Real Estate	Core real estate + 4%	Volatility to produce Sharpe Ratio (g) equal to core real estate
Infrastructure	Current yield + real income growth + inflation on earnings (inflation forecast)	Long-term volatility
Risk Parity	Expected Sharpe Ratio * target volatility + cash rate	Target volatility

*Long-term historical volatility data is adjusted for autocorrelation (see Appendix)

**The private credit premium is generated by illiquidity, issuer size, and lack of credit rating
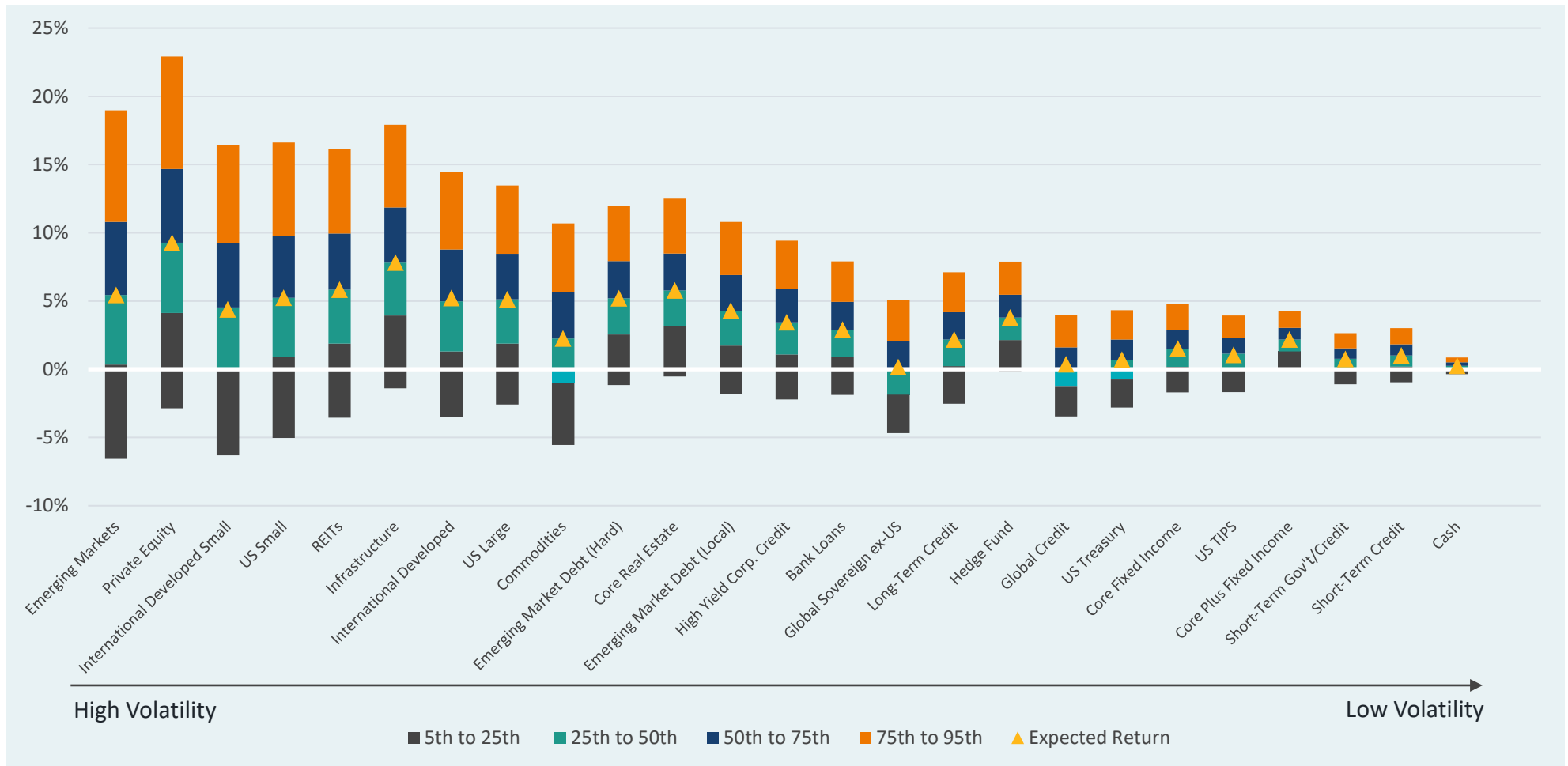
10-year return & risk assumptions

Asset Class	Index Proxy	Ten Year Return Forecast		Standard Deviation Forecast	Sharpe Ratio Forecast (g)	Sharpe Ratio Forecast (a)	10-Year Historical Sharpe Ratio (g)	10-Year Historical Sharpe Ratio (a)
		Geometric	Arithmetic					
Equities								
U.S. Large	S&P 500	5.1%	6.3%	15.7%	0.31	0.38	0.99	0.99
U.S. Small	Russell 2000	5.2%	7.3%	21.4%	0.23	0.33	0.51	0.58
International Developed	MSCI EAFE	5.2%	6.7%	17.9%	0.28	0.36	0.27	0.34
International Small	MSCI EAFE Small Cap	4.4%	6.7%	22.4%	0.19	0.29	0.43	0.49
Emerging Markets	MSCI EM	5.4%	8.3%	25.5%	0.20	0.32	0.11	0.19
Global Equity	MSCI ACWI	5.2%	6.6%	17.3%	0.29	0.37	0.58	0.62
Private Equity*	Cambridge Private Equity	9.3%	12.1%	28.1%	0.35	0.46	-	-
Fixed Income								
Cash	30 Day T-Bills	0.2%	0.2%	1.2%	-	-	-	-
U.S. TIPS	BBgBarc U.S. TIPS 5-10	1.1%	1.2%	5.3%	0.15	0.18	0.66	0.67
U.S. Treasury	BBgBarc Treasury 7-10 Year	0.7%	0.9%	6.7%	0.07	0.10	0.67	0.68
Global Sovereign ex U.S.	BBgBarc Global Treasury ex U.S.	0.2%	0.6%	9.6%	-0.01	0.04	0.09	0.12
Global Aggregate	BBgBarc Global Aggregate	1.1%	1.3%	6.1%	0.14	0.17	0.38	0.39
Core Fixed Income	BBgBarc U.S. Aggregate Bond	1.5%	1.6%	4.0%	0.31	0.36	1.02	1.01
Core Plus Fixed Income	BBgBarc U.S. Universal	2.2%	2.3%	4.0%	0.49	0.50	1.13	1.12
Short-Term Gov't/Credit	BBgBarc U.S. Gov't/Credit 1-3 Year	0.7%	0.8%	3.6%	0.14	0.16	1.23	1.22
Short-Term Credit	BBgBarc Credit 1-3 Year	1.0%	1.1%	3.6%	0.21	0.23	1.23	1.22
Long-Term Credit	BBgBarc Long U.S. Corporate	2.2%	2.6%	9.3%	0.21	0.25	0.76	0.77
High Yield Corp. Credit	BBgBarc U.S. Corporate High Yield	3.4%	4.0%	11.3%	0.28	0.34	0.82	0.83
Bank Loans	S&P/LSTA Leveraged Loan	2.9%	3.2%	9.5%	0.28	0.32	0.66	0.67
Global Credit	BBgBarc Global Credit	0.3%	0.6%	7.4%	0.01	0.05	0.63	0.64
Emerging Markets Debt (Hard)	JPM EMBI Global Diversified	5.2%	6.0%	12.7%	0.39	0.45	0.60	0.63
Emerging Markets Debt (Local)	JPM GBI-EM Global Diversified	4.3%	5.0%	12.2%	0.33	0.39	-0.01	0.05
Private Credit	Bank Loans + 175bps	4.6%	5.2%	11.2%	0.39	0.45	-	-
Other								
Commodities	Bloomberg Commodity	2.2%	3.4%	15.9%	0.13	0.20	-0.47	-0.41
Hedge Funds*	HFRI Fund Weighted Composite	3.8%	4.1%	7.8%	0.46	0.49	0.47	0.49
Real Estate Debt	BBgBarc CMBS IG	2.2%	2.5%	7.5%	0.26	0.30	1.18	1.17
Core Real Estate	NCREIF Property	5.8%	6.5%	12.6%	0.44	0.50	2.06	1.99
Value-Add Real Estate	NCREIF Property + 200bps	7.8%	9.1%	17.1%	0.44	0.52	-	-
Opportunistic Real Estate	NCREIF Property + 400bps	9.8%	11.8%	21.6%	0.44	0.54	-	-
REITs	Wilshire REIT	5.8%	7.5%	19.3%	0.29	0.38	0.46	0.52
Global Infrastructure	S&P Global Infrastructure	7.8%	9.4%	18.8%	0.40	0.49	0.28	0.35
Risk Parity	Risk Parity	5.2%	5.9%	10.0%	0.50	0.56	-	-
Currency Beta	MSCI Currency Factor Index	1.2%	1.3%	3.5%	0.28	0.30	0.15	0.16
Inflation		2.0%	-	-	-	-	-	-

Investors wishing to produce expected geometric return forecasts for their portfolios should use the arithmetic return forecasts provided here as inputs into that calculation, rather than the single-asset-class geometric return forecasts. This is the industry standard approach, but requires a complex explanation only a heavy quant could love, so we have chosen not to provide further details in this document – we will happily provide those details to any readers of this who are interested.

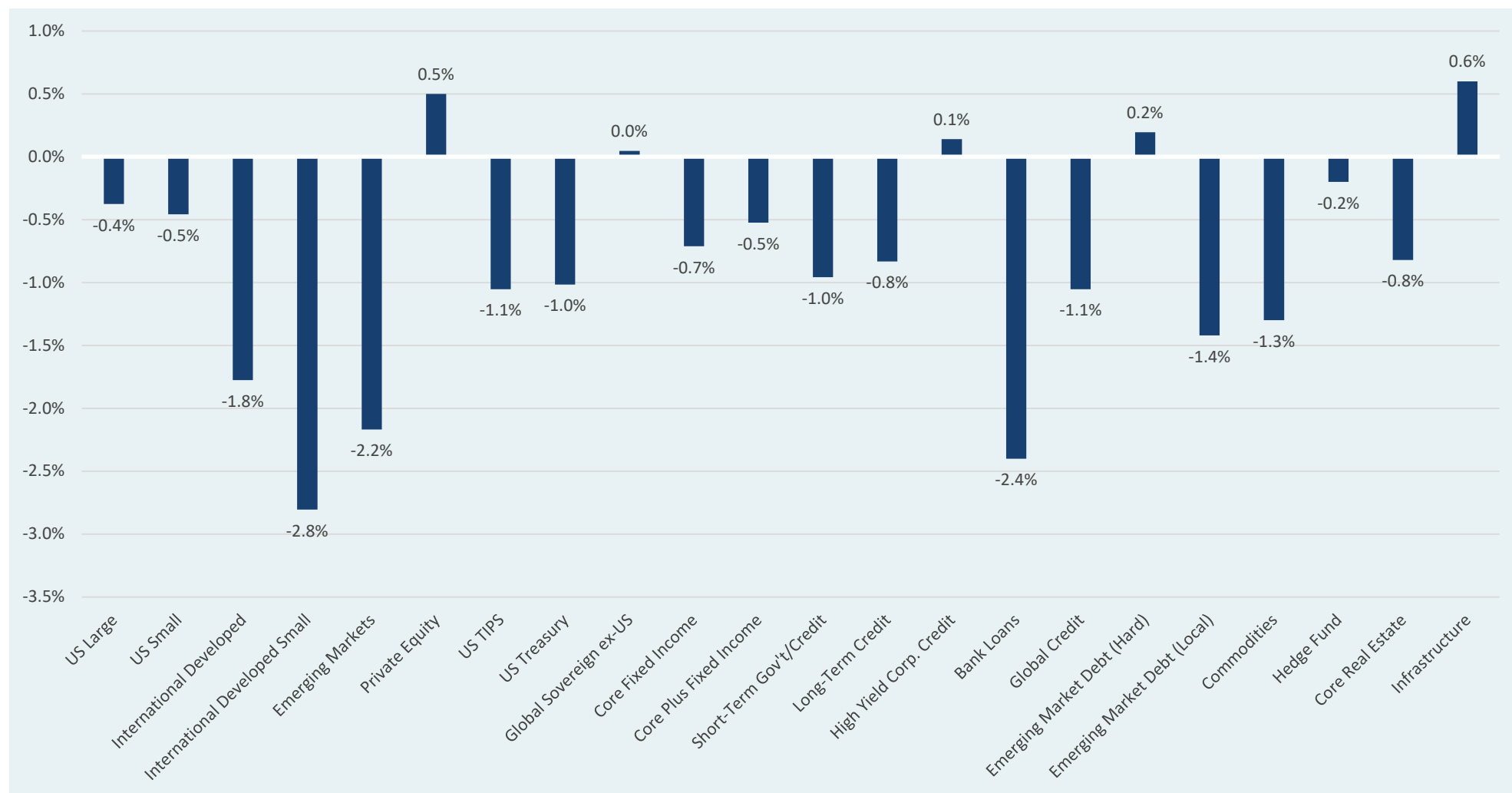**Return expectations differ depending on method of implementation*

Range of likely 10-year outcomes

10-YEAR RETURN 90% CONFIDENCE INTERVAL

Legend: ■ 5th to 25th ■ 25th to 50th ■ 50th to 75th ■ 75th to 95th ▲ Expected Return

High Volatility → Low Volatility

Source: Verus, MPI

Verus

2021 vs. 2020 return forecasts

Note: year-over-year change of the select group of asset classes above is based on the 2020 CMA methodology

Which <u>overall</u> risks should an investor accept?

|		
Accept greater volatility	Be truly different from peers	Add portfolio leverage, which can change risk profile
Maintain same risk, but with weaker expected return	Take on illiquidity risk, which may lead to forced selling in stressed markets	Tilt into assets with higher expected return, but forecasts may be wrong
Make portfolio "bets" which might fail to pay off	Rely on active managers who may fail to produce alpha	Over-diversify which might reduce return

Source: Bridgewater, Verus

Market environment

- Stocks broadly are relatively expensive, bolstered by high valuations

- Interest rates are low but with potential for longer term reflation trade

- Credit spreads are relatively tight

- Fiscal stimulus likely under new administration

- Assumption of full reopening of the global economy after COVID vaccinations are widely distributed

YIELD CURVE PRE- AND POST-COVID
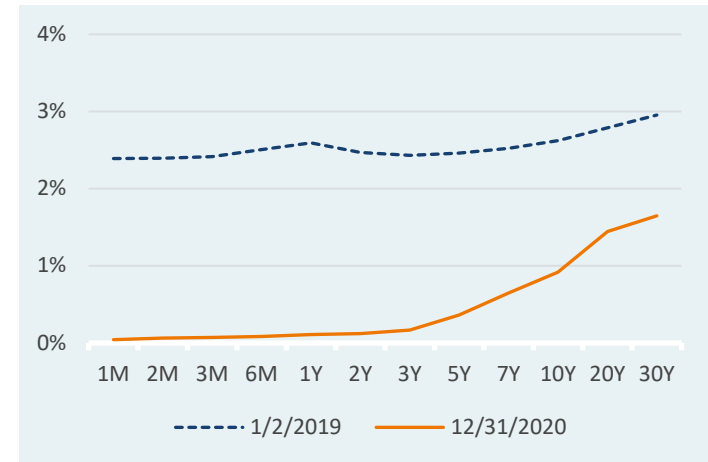
MSCI STOCK VALUATIONS(3-MONTH AVG)
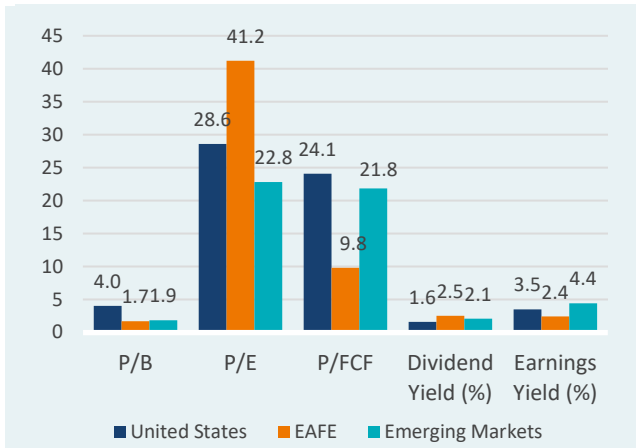
NOMINAL YIELDS
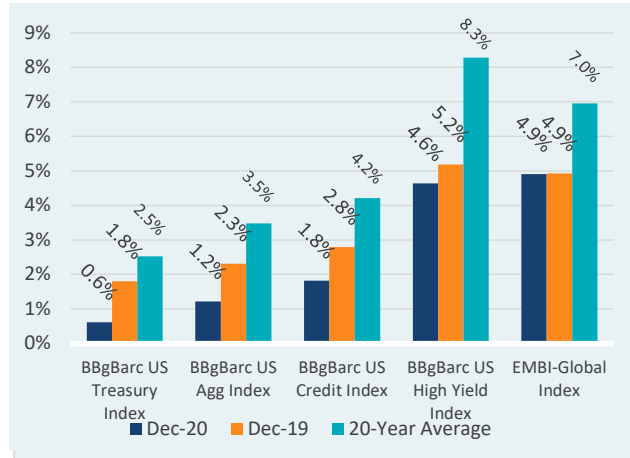
GDP GROWTH EXPECTATIONS (%)

Data as of 12/31/20

Long-term objectives – ERT results

LONG TERM OBJECTIVES

Enterprise Risk Tolerance survey results from 2019 asset-liability study

Assesses the Trustees' ability, willingness and comfort in taking different types of risks to achieve the objectives of ACERA

Objectives can be at odds with one another at times

Verus

ACERA's Portfolio

Historical performance

InvMetrics Public DB > $1B Gross Return Comparison
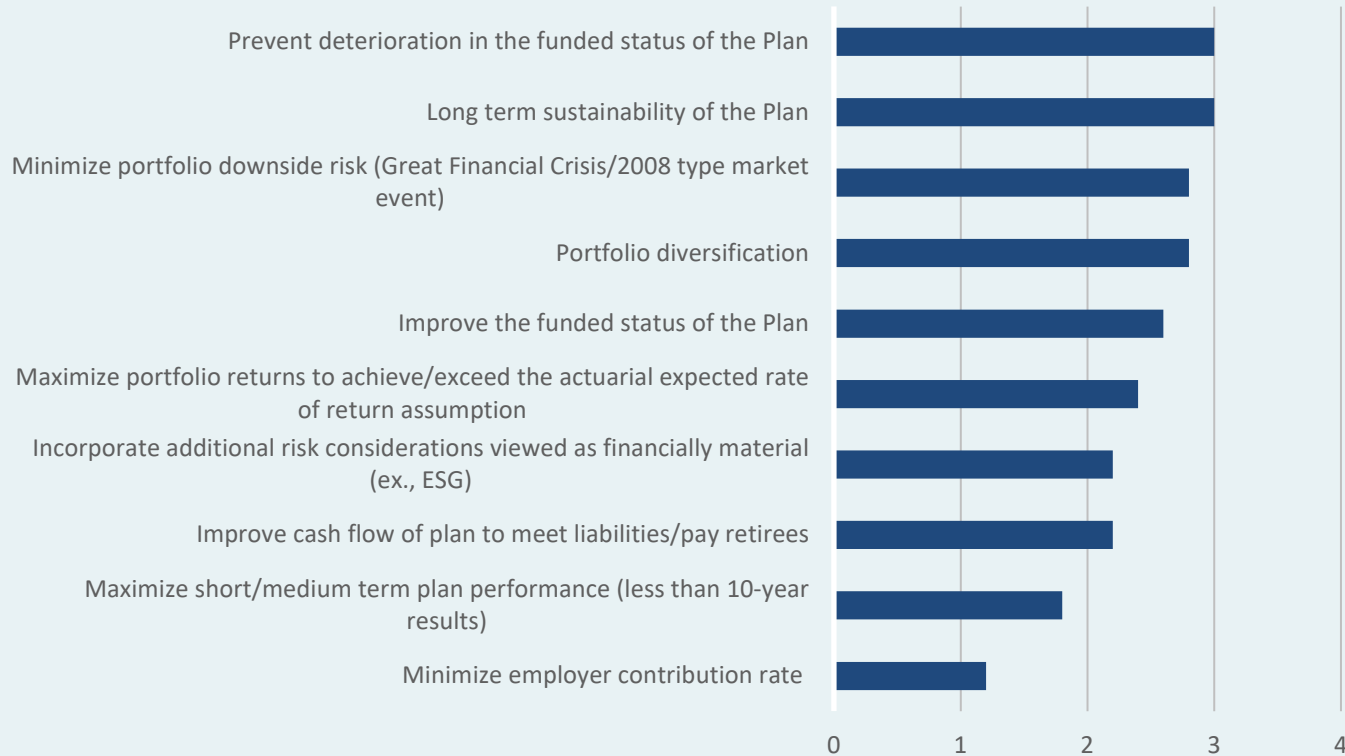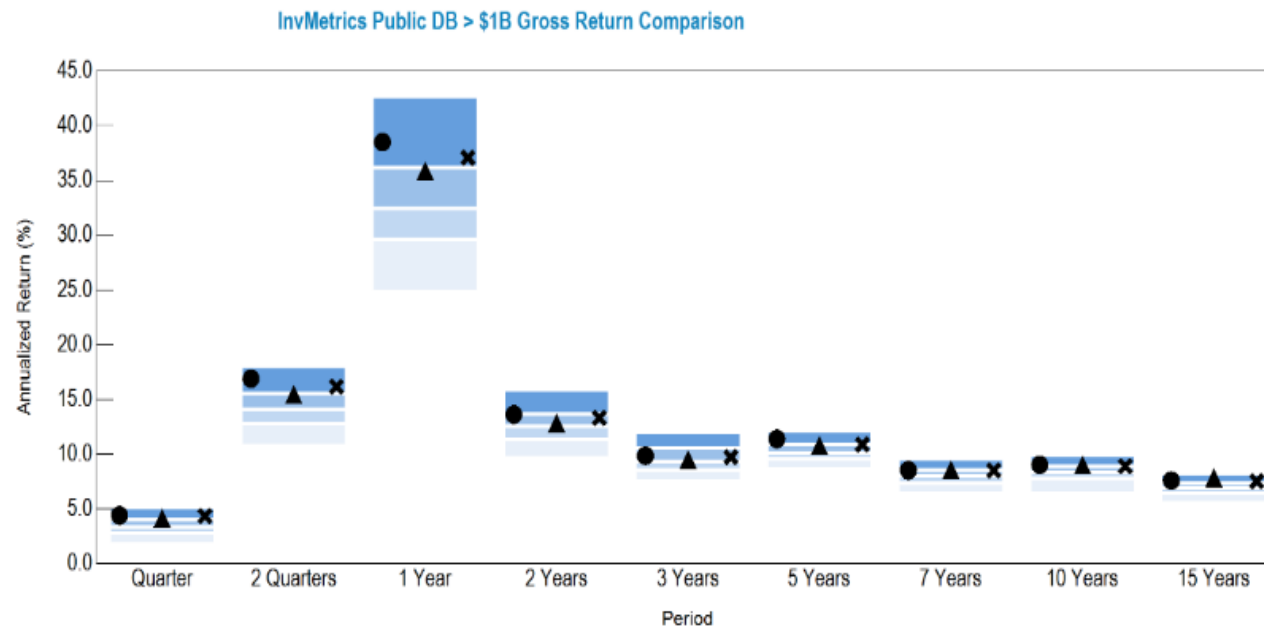
Return (Rank)																		
5th Percentile	5.07		18.01		42.64		15.84		11.93		12.10		9.57		9.89		8.20	
25th Percentile	4.08		15.53		36.18		13.71		10.56		10.93		8.54		8.93		7.40	
Median	3.43		14.11		32.47		12.54		9.33		10.17		8.00		8.37		6.97	
75th Percentile	2.86		12.83		29.65		11.41		8.56		9.57		7.42		7.79		6.46	
95th Percentile	1.80		10.82		24.88		9.68		7.59		8.68		6.52		6.48		5.60	
# of Portfolios	96		96		96		96		96		96		95		91		84	
● Total Fund	4.41	(15)	16.90	(13)	38.50	(18)	13.62	(28)	9.87	(38)	11.39	(13)	8.53	(27)	9.03	(17)	7.60	(16)
▲ Policy Index	4.19	(21)	15.47	(26)	35.88	(28)	12.82	(45)	9.50	(47)	10.82	(33)	8.58	(23)	9.05	(16)	7.86	(10)
✕ Allocation Index	4.36	(16)	16.16	(18)	37.07	(23)	13.30	(36)	9.73	(42)	10.88	(29)	8.52	(28)	8.90	(27)	7.53	(19)

ACERA's returns have exceeded the actuarial assumed rate by a large margin in recent years.

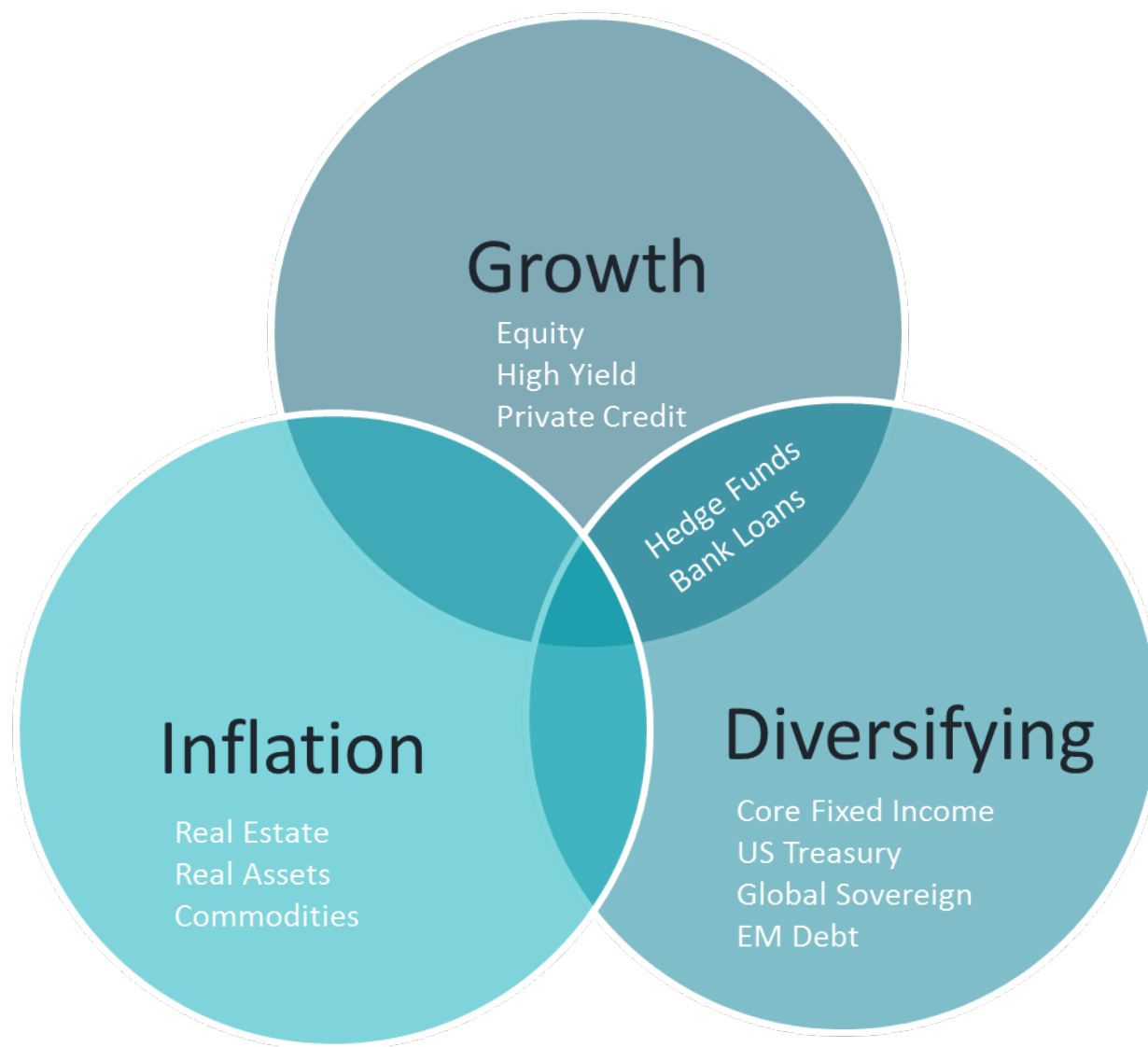Over the past 30 years, a 60/40 US portfolio returned 8.9% and a 60/40 global portfolio returned 6.9%.

High equity valuations and lower bond yields reduce future expected returns.

Historical performance by asset class

	6 Mo(%)	Index(%)	1 Yr(%)	Index(%)	3 Yrs(%)	Index(%)	5 Yrs(%)	Index(%)	10 Yrs(%)	Index(%)
Total Fund	16.8	15.5	38.2	35.9	9.7	9.5	11.2	10.8	8.7	9.1
US Equity	22.8	22.0	64.0	62.5	16.6	17.1	17.3	16.6	13.4	13.8
Large Cap Active	18.1	20.4	58.5	60.6	12.0	17.3	14.7	16.7	12.3	14.0
Small Cap Equity	48.1	48.1	98.6	94.9	17.7	14.8	18.7	16.4	11.9	11.7
International Equity	21.8	21.8	57.3	52.6	8.6	7.0	11.7	10.4	6.7	5.6
Total Fixed Income	1.2	-1.6	11.6	3.8	5.3	4.3	5.1	3.5	5.1	3.4
US Fixed Income	-0.8	-2.7	7.7	0.7	6.0	4.7	5.2	3.1	5.3	3.4
Global Fixed	7.1	-3.1	23.1	1.8	3.0	2.1	4.8	2.1	4.5	1.7
Absolute Return	11.3	10.1	14.3	23.8	0.4	5.4	2.8	5.6	--	3.4
Private Equity	30.4	27.7	26.6	25.2	17.7	12.8	16.3	12.9	15.1	10.4
Real Assets	20.7	24.8	37.7	49.6	0.1	5.3	1.6	6.7	--	--
Private Credit	4.8	6.6	20.7	22.8	--	5.9	--	7.1	--	6.1
Real Estate	4.0	3.4	3.5	2.3	5.5	4.9	6.6	6.2	9.8	9.7
Cash	0.2	0.0	0.3	0.1	1.3	1.4	1.1	1.1	0.6	0.6

Functional labels

Growth
Equity
High Yield
Private Credit

Inflation
Real Estate
Real Assets
Commodities

Diversifying
Core Fixed Income
US Treasury
Global Sovereign
EM Debt

Hedge Funds
Bank Loans

Asset allocation

- ACERA "Current Target" Mix – Approved strategic asset allocation as of 6/1/19

  - Public equity lowered by 4% from prior asset-liability study

  - Addition of Private Credit +4%

- "ACERA Revised" Mix – Incorporates feedback and modest suggested changes by ACERA

  - Private Real Assets -1%; Real Estate +2%

  - Absolute Return -2%; Global Fixed Income +1%

  - US Fixed -2%; Private Credit +2%

  - EM Equity increased (from 20% to 30% of Intl Equity)

- "More Equities" Mix – Moderately increases public equities with the aim of increasing portfolio expected returns

  - Public Equity +4%

  - Fixed Income -3%

  - Absolute Return -1%

- "More Privates" Mix – Moderately increases private investments with the aim of increasing portfolio expected returns

  - Private Equity +3%; Public Equity -2%

  - Diversifying -3%

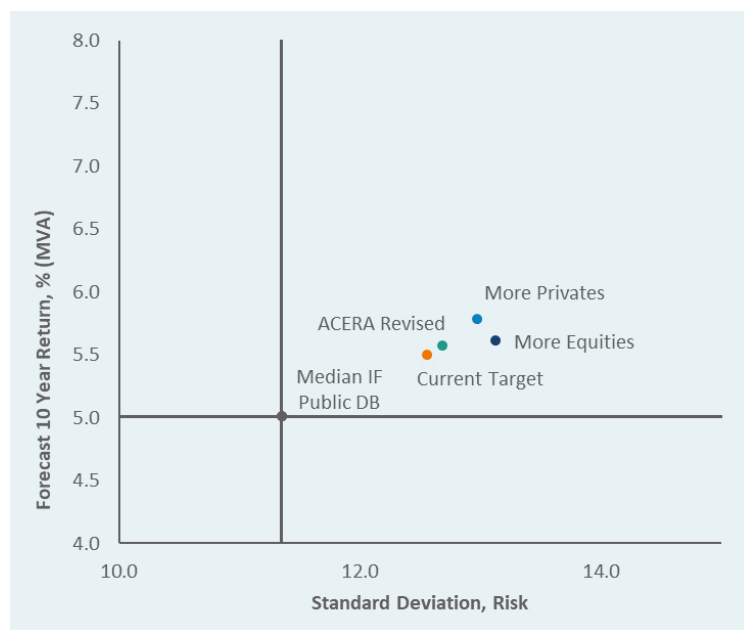 - Inflation Hedge +2%: Real Estate +1%; Private Real Assets +1%

Asset allocation

	Current Target	ACERA Revised	More Equities	More Privates	Median IF Public DB	CMA's (10 Yr) Return (g)	Standard Deviation	Sharpe Ratio (a)
Total Domestic Equity	*25*	*25*	*27*	*24*	*27*	*5.2*	*16.1*	*0.38*
International Developed	17.0	14.9	18.4	16.3	17.2	5.2	17.9	0.36
International Developed Small	3.0	2.6	3.2	2.9		4.4	22.4	0.29
Emerging Markets	5.0	7.5	5.4	4.8	5.2	5.4	25.5	0.32
Total Int'l Equity	*25*	*25*	*27*	*24*	*22*			
Total Equity	*50*	*50*	*54*	*48*	*50*			
Private Equity	8.0	8.0	8.0	11.0	7.0	9.3	28.1	0.46
Private Credit	4.0	6.0	4.0	4.0		4.6	11.2	0.45
Total Growth	*62*	*64*	*66*	*63*	*57*			
Core Fixed Income	11.4	9.6	9.6	10.5	18.2	1.5	4.0	0.36
High Yield Corp. Credit	1.6	1.4	1.4	1.5		3.4	11.3	0.34
Total US Fixed	*13*	*11*	*11*	*12*	*18*			
Global Sovereign	3.0	4.0	2.0	2.0	3.8	0.5	7.3	0.07
Emerging Market Debt					3.8	5.2	12.7	0.45
Total Global Fixed	*3*	*4*	*2*	*2*	*8*			
Absolute Return	9.0	7.0	8.0	8.0	5.4	3.8	7.8	0.49
Total Diversifying	*25*	*22*	*21*	*22*	*31*			
Core Real Estate	5.6	7.0	5.6	6.3	9.1	5.8	12.6	0.50
Value Add Real Estate	1.6	2.0	1.6	1.8		7.8	17.1	0.52
Opportunistic Real Estate	0.8	1.0	0.8	0.9		9.8	21.6	0.54
Total Real Estate	*8*	*10*	*8*	*9*	*9*			
Private Real Assets	5.0	4.0	5.0	6.0		7.8	18.8	0.49
Commodities					3.2	2.2	15.9	0.20
Total Real Assets	*5*	*4*	*5*	*6*	*3*			
Total Infl Hedge	*13*	*14*	*13*	*15*	*12*			
Cash						0.2	1.2	-
Total Allocation	**100**	**100**	**100**	**100**	**100**			

	Current Target	ACERA Revised	More Equities	More Privates	Median IF Public DB
Mean Variance Analysis					
Forecast 10 Year Return	*5.5*	*5.6*	*5.6*	*5.8*	*5.0*
Standard Deviation	12.6	12.7	13.1	13.0	11.4
1st percentile ret. 1 year	*-19.8*	*-20.0*	*-20.7*	*-20.2*	*-18.2*
Sharpe Ratio	0.47	0.47	0.46	0.48	0.46
Probability 1 year return > 7%	45.2	45.5	45.8	46.3	43.0
Probability 10 year return > 7%	35.2	36.1	36.9	38.3	29.0
Verus Scenario Analysis					
10 Year Return Forecast					
Stagflation	2.3	2.2	2.3	2.3	2.9
Weak	-0.7	-0.8	-0.9	-0.9	-0.3
Feb 2021	*5.6*	*5.7*	*5.7*	*5.9*	*5.2*
Strong	12.7	13.0	13.2	13.5	11.6
Shock (1 year)	*-30.0*	*-29.7*	*-31.6*	*-31.5*	*-25.1*

Expected 10-year forecasts

- "ACERA Revised" expected to provide 10 bps more return with same risk-efficiency (Sharpe Ratio)

- "More Equities" expected to provide 10 bps more return with slightly less risk-efficiency

- "More Privates" expected to provide 30 bps more return with slightly better risk-efficiency

	Current Target	ACERA Revised	More Equities	More Privates	Median IF Public DB
Mean Variance Analysis					
Forecast 10 Year Return	*5.5*	*5.6*	*5.6*	*5.8*	*5.0*
Standard Deviation	12.6	12.7	13.1	13.0	11.4
1st percentile ret. 1 year	*-19.8*	*-20.0*	*-20.7*	*-20.2*	*-18.2*
Sharpe Ratio	0.47	0.47	0.46	0.48	0.46
Probability 1 year return > 7%	45.2	45.5	45.8	46.3	43.0
Probability 10 year return > 7%	35.2	36.1	36.9	38.3	29.0
Verus Scenario Analysis					
10 Year Return Forecast					
Stagflation	2.3	2.2	2.3	2.3	2.9
Weak	-0.7	-0.8	-0.9	-0.9	-0.3
Feb 2021	*5.6*	*5.7*	*5.7*	*5.9*	*5.2*
Strong	12.7	13.0	13.2	13.5	11.6
Shock (1 year)	*-30.0*	*-29.7*	*-31.6*	*-31.5*	*-25.1*

Risk Decomposition

- "ACERA Revised" provides slightly more hedging of Barra inflation risk factor and less exposure to equity risk factor than does current target

RISK BY FACTOR (%)

	Current Target	ACERA Revised	More Equities	More Privates	Median IF Public DB
■ Other	0.0	0.0	0.0	0.0	0.0
■ Currency	0.5%	0.5%	0.5%	0.5%	0.5%
■ Inflation	1.0%	1.3%	1.0%	1.2%	1.5%
■ Equity	13.0%	12.6%	13.7%	13.5%	11.2%
■ Credit	1.0%	1.1%	0.9%	1.0%	1.0%
■ Rates	-0.2%	-0.2%	-0.2%	-0.2%	-0.3%

RISK FACTOR CONTRIBUTION

	Current Target	ACERA Revised	More Equities	More Privates	Median IF Public DB
■ Other	1.0%	1.0%	0.9%	1.3%	0.7%
■ Currency	3.3%	3.5%	3.3%	3.0%	3.6%
■ Inflation	6.7%	8.5%	6.4%	7.2%	11.0%
■ Equity	84.0%	81.0%	84.8%	83.6%	79.6%
■ Credit	6.4%	7.3%	5.7%	6.1%	6.9%
■ Rates	-1.3%	-1.3%	-1.1%	-1.2%	-2.0%

Scenario Analysis

Tail Risk - Scenario Analysis

Categories (top to bottom):
- 2009 July - January
- 2007-2009 Subprime Meltdown
- 2001 Dot-com Slowdown
- 1997 - 1999 Oil Price Decline
- 1994 US Rate Hike
- 2000-2003 Tech Crash & Recession
- 2006 Emerging Market Crash
- 1987 Market Crash (Oct. 14 to Oct. 19)
- 1972 - 1974 Oil Crisis (Dec. to Sep.)

X-axis: -50%, -40%, -30%, -20%, -10%, 0%, 10%, 20%, 30%, 40%

Legend:
- ACERA Target
- ACERA Revised
- ACERA More Equities
- ACERA More Privates
- ACERA Median IF Public DB

Tail Risk - Stress Tests

Categories (top to bottom):
- USD -20%
- Global Eq +20%
- Global Eq -20%
- Global Credit Spreads +100 bps
- Global Rates +200 bps

X-axis: -20%, -10%, 0%, 10%, 20%

Legend:
- ACERA Target
- ACERA Revised
- ACERA More Equities
- ACERA More Privates
- ACERA Median IF Public DB

Verus

ACERA Liquidity Coverage Ratio (LCR)

Liquidity Available	Liquid Financial Assets	$	9,176,263,284.43
	Distributions from Illiquids	$	872,993,894.00
	Employer + Employee Contributions	$	2,296,554,990.00
	Investment Income		482,585,827.15
Liquidity Needs	Benefit Payments	$	3,259,088,106.00
	Capital Calls	$	732,119,750.00
	Plan Expenses	$	89,521,771.80
	UAAL Amortization	-	
LCR			**3.1**

LCR = 3.1

3.1x coverage in liquidity available relative to your spending needs over the next 5 years

DRAWDOWN SCENARIO AND CHANGE IN FUTURE RETURN

		Assumed Return (Subsequent 5-years)					
	3.14	2.50%	3.50%	4.50%	5.50%	6.50%	7.50%
Drawdown Scenario (Immediate)	-50%	1.59	1.63	1.68	1.73	1.79	1.84
	-40%	1.77	1.84	1.90	1.97	2.05	2.14
	-30%	1.99	2.07	2.16	2.26	2.37	2.49
	-20%	2.24	2.35	2.47	2.55	2.63	2.71
	-10%	2.51	2.59	2.67	2.76	2.85	2.94
	0%	2.69	2.78	2.87	2.97	3.07	3.17

Contribution Sensitivity Analysis

Contribution Reduction		3.14
	0%	3.14
	10%	3.09
	20%	3.03
	30%	2.97
	40%	2.92
	50%	2.86
	60%	2.81

Illiquid Asset Sensitivity Analysis

Illiquid Asset Allocation Increase		3.14
	0%	3.14
	2%	3.08
	4%	3.01
	6%	2.94
	8%	2.88
	10%	2.81
	12%	2.74

The Liquidity Coverage Ratio (LCR) seeks to quantify the amount of liquid assets available to cover anticipated cash spending needs of ACERA using its policy allocation. Any number over 1 indicates ample liquidity.

Verus

ACERA Increasing PE LCR

Liquidity Available	Liquid Financial Assets	$	8,765,385,823.93
	Distributions from Illiquids	$	927,081,000.00
	Employer + Employee Contributions	$	2,296,554,990.00
	Investment Income		482,585,827.15
Liquidity Needs	Benefit Payments	$	3,259,088,106.00
	Capital Calls	$	1,006,253,000.00
	Plan Expenses	$	89,521,771.80
	UAAL Amortization	-	
LCR			**2.9**

LCR = 2.9

2.9x coverage in liquidity available relative to your spending needs over the next 5 years

DRAWDOWN SCENARIO AND CHANGE IN FUTURE RETURN

		Assumed Return (Subsequent 5-years)					
2.86		2.50%	3.50%	4.50%	5.50%	6.50%	7.50%
Drawdown Scenario (Immediate)	-50%	1.49	1.53	1.57	1.62	1.67	1.72
	-40%	1.66	1.71	1.77	1.83	1.90	1.97
	-30%	1.84	1.92	1.99	2.08	2.18	2.28
	-20%	2.06	2.16	2.26	2.33	2.41	2.48
	-10%	2.30	2.37	2.44	2.52	2.60	2.68
	0%	2.46	2.54	2.62	2.70	2.79	2.89

Contribution Sensitivity Analysis

	2.86
Contribution Reduction 0%	2.86
10%	2.81
20%	2.76
30%	2.71
40%	2.65
50%	2.60
60%	2.55

Illiquid Asset Sensitivity Analysis

	2.86
Illiquid Asset Allocation Increase 0%	2.86
2%	2.80
4%	2.74
6%	2.68
8%	2.61
10%	2.55
12%	2.49

Conclusions

— Plan sponsors are expected to have difficulty meeting actuarial returns in the current low expected return environment without taking on additional risk.

  ▪ There are some key differences between investment and actuarial assumptions (shorter vs longer time periods, inflation differences) which must be considered in decision-making.

— Forecasting expected returns uses a precise methodology to estimate what is unknowable.

  ▪ Standard deviation around a mean estimate

  ▪ Changing market conditions impacting building block inputs for CMAs

  ▪ The exclusion of alpha (AA only considers market beta)

— Objectives and risks must be discussed and prioritized to determine the right asset allocation decision for the ACERA portfolio.

  ▪ Key plan objectives can be in conflict, and market risks are fluid and subject to change.

— It is important to revisit (and/or reaffirm) the Plan's asset allocation when market conditions change meaningfully and impact capital market assumptions and expected returns.

Comparison of mixes relative to ERT objectives

— Current
- Minimize downside risk
- Improved diversification

Objective Rank
- 3
- 4

— ACERA Revised
- Long term sustainability of plan
- Minimize downside risk
- Improved diversification

Objective Rank
- 2
- 3
- 4

— More Equities
- Long term sustainability of plan

Objective Rank
- 2

— More Privates
- Long term sustainability of plan
- Prevent deterioration of funded status
- Maximize return/meet or exceed actuarial return

Objective Rank
- 2
- 1
- 6

Recommendation

— Current Target may be appropriate to maintain depending on Trustees' time horizon for decision-making and objective/risk prioritization (>10 yrs; downside risk sensitivity).

— More equities reduces risk efficiency, and Verus believes that this asset mix should not be implemented.

— Updated asset allocation analysis points to a modest increase in risk efficiency with the ACERA Revised and More Privates mixes.

- ▪ More Privates increases expected return and supports several ERT objectives.

- ▪ ACERA Revised keeps similar risk profile as Current and supports several ERT objectives.

Appendix

Correlation assumptions

	Cash	US Large	US Small	Intl Large	Intl Small	EM	Global Equity	PE	US TIPS	US Treasury	Global Sovereign ex-US	US Core	Core Plus	Short-Term Gov't/Credit	Short-Term Credit	Long-Term Credit	US HY	Bank Loans	Global Credit	EMD USD	EMD Local	Commodities	Hedge Funds	Real Estate	REITs	Infrastructure	Risk Parity	Currency Beta
Cash	1.0																											
US Large	-0.2	1.0																										
US Small	-0.2	0.9	1.0																									
Intl Large	-0.1	0.9	0.8	1.0																								
Intl Small	-0.2	0.9	0.8	1.0	1.0																							
EM	-0.1	0.7	0.7	0.8	0.8	1.0																						
Global Equity	-0.2	1.0	0.9	1.0	0.9	0.9	1.0																					
PE	-0.2	0.6	0.6	0.6	0.6	0.5	0.7	1.0																				
US TIPS	0.0	0.1	0.1	0.2	0.2	0.3	0.2	0.1	1.0																			
US Treasury	0.2	-0.4	-0.5	-0.4	-0.4	-0.3	-0.4	-0.2	0.7	1.0																		
Global Sovereign ex-US	0.1	0.2	0.1	0.3	0.3	0.5	0.3	0.0	0.6	0.3	1.0																	
US Core	0.1	-0.1	-0.2	-0.1	-0.1	0.1	-0.1	0.0	0.8	0.9	0.5	1.0																
Core Plus	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.0	0.8	0.7	0.6	0.9	1.0															
Short-Term Gov't/Credit	0.4	-0.1	-0.2	0.0	-0.1	0.1	0.0	-0.2	0.6	0.7	0.5	0.8	0.8	1.0														
Short-Term Credit	0.0	0.4	0.4	0.4	0.4	0.5	0.4	0.0	0.5	0.2	0.5	0.5	0.8	0.7	1.0													
Long-Term Credit	0.0	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.7	0.5	0.5	0.8	0.9	0.5	0.6	1.0												
US HY	-0.2	0.8	0.7	0.8	0.8	0.8	0.8	0.5	0.4	-0.2	0.4	0.2	0.4	0.1	0.7	0.5	1.0											
Bank Loans	-0.3	0.7	0.7	0.6	0.7	0.6	0.7	0.4	0.2	-0.3	0.2	0.0	0.2	0.0	0.6	0.4	0.9	1.0										
Global Credit	-0.1	0.6	0.5	0.7	0.7	0.7	0.7	0.4	0.6	0.1	0.7	0.5	0.6	0.4	0.8	0.7	0.8	0.6	1.0									
EMD USD	-0.2	0.5	0.5	0.6	0.6	0.7	0.6	0.4	0.6	0.1	0.5	0.5	0.6	0.3	0.7	0.6	0.8	0.7	0.9	1.0								
EMD Local	0.0	0.5	0.4	0.7	0.7	0.8	0.7	0.4	0.4	0.0	0.6	0.3	0.4	0.3	0.5	0.4	0.7	0.5	0.8	0.8	1.0							
Commodities	-0.1	0.5	0.5	0.6	0.6	0.6	0.6	0.3	0.2	-0.3	0.4	-0.1	0.0	0.0	0.3	0.1	0.6	0.5	0.5	0.5	0.6	1.0						
Hedge Funds	-0.2	0.8	0.8	0.8	0.9	0.7	0.9	0.6	0.2	-0.4	0.2	-0.1	0.2	0.0	0.5	0.3	0.8	0.8	0.7	0.6	0.5	0.5	1.0					
Real Estate	-0.1	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.1	-0.1	0.1	0.0	-0.1	0.0	0.1	0.0	0.3	0.3	0.4	0.3	0.3	0.3	0.4	1.0				
REITs	-0.2	0.6	0.6	0.6	0.6	0.5	0.6	0.5	0.4	0.1	0.3	0.4	0.4	0.2	0.5	0.5	0.6	0.6	0.7	0.6	0.5	0.4	0.5	0.8	1.0			
Infrastructure	-0.2	0.8	0.7	0.8	0.8	0.7	0.8	0.7	0.4	-0.2	0.5	0.2	0.4	0.2	0.6	0.5	0.8	0.7	0.8	0.8	0.7	0.5	0.7	0.3	0.7	1.0		
Risk Parity	-0.1	0.6	0.6	0.7	0.6	0.6	0.7	0.3	0.4	0.0	0.4	0.2	0.5	0.3	0.6	0.5	0.8	0.6	0.7	0.7	0.6	0.6	0.7	0.0	0.5	0.7	1.0	
Currency Beta	0.0	0.2	0.2	0.1	0.1	0.1	0.2	0.0	0.0	-0.1	0.1	0.0	0.1	0.0	0.1	0.1	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	1.0

Note: Correlation assumptions are based on the last ten years. Private Equity and Real Estate correlations are especially difficult to model – we have therefore used BarraOne correlation data to strengthen these correlation estimates.

Relevant forecast changes

— Fixed income return expectations fell markedly across most asset classes as bond yields headed towards zero. Equity return expectations also fell due to a corporate earnings recession and quick recovery in prices, both of which pushed valuations significantly higher. Most of our fixed income forecasts are 0.5-1.5% lower, while our equity forecasts are 0.4-2.8% lower.

— Inflation expectations were mixed during the year. The U.S. TIPS breakeven inflation rate increased from 1.5% to 1.7%, and household inflation expectations (University of Michigan) rose from 2.4% to 2.7%. However, the Survey of Professional Forecasters moved in the opposite direction, indicating a decrease from 2.20% to 2.04%. Overall, our inflation forecast increased very slightly from 1.9% to 2.0%. Inflation is an important component of the performance of asset classes such as equities, real estate, and commodities. It is important to note that inflation expectations affect *nominal* returns, rather than *real* returns.

— Credit spreads spiked in March and April as the spread of COVID-19 contributed to extreme market volatility. Although spreads later moved back towards normal levels, they remain elevated and supportive of long-term return expectations. Core fixed income spreads increased from 62 bps to 90 bps, and high yield spreads rose from 396 bps to 551 bps.

— The yield curve fell as the Federal Reserve brought interest rates down to zero. The short end of the curve felt most of this move, though the longer end of the curve was also considerably impacted. As indicated by the Federal Reserve, interest rates will likely be kept at 0% for the foreseeable future. The three-month U.S. dollar LIBOR reference rate fell from 2.09% to 0.23%.

— Emerging market hard and local currency debt forecasts were mixed. Hard currency-denominated debt spreads to U.S. Treasury yields jumped from 351 bps to 471 bps, although the broader 1% fall in interest rates brought expectations down commensurately, leading to little overall change. The yield of local-denominated debt fell from 6.0% to 4.6% alongside the broader fixed income market.

All data cited above is as of 9/30/20

Inflation

We use a weighted average of market expectations (50%), consumer expectations (25%), and professional forecasts (25%) to create a 10-year inflation forecast. The market's expectations for 10-year inflation can be inferred by taking the difference between the U.S. 10-year Treasury yield and the 10-year Treasury Inflation-Protected (TIPS) yield (referred to as the breakeven inflation rate).

Inflation fell suddenly in the first half of 2020 as COVID-19 led to a global economic slowdown. In the third quarter inflation increased to a normal level as the broader economic recovered. Investors generally expect the low inflation environment to continue well into the future.

Consumer inflation expectations decoupled from investor inflation expectations during the year. While investors are pricing lower-for-longer inflation, American households are expecting 2.7% long-term inflation—the highest forecast since 2016. Inflation expectations from the Survey of Professional Forecasters fell from 2.20% to 2.04% over the year.

Our inflation forecast increased very slightly from 1.9% to 2.0%.

INFLATION EXPECTATIONS

— US Ten Year Breakeven Inflation Rate
— University of Michigan Survey 5-10 Inflation Expectation (mean)
— Survey of Profesional Forecasters
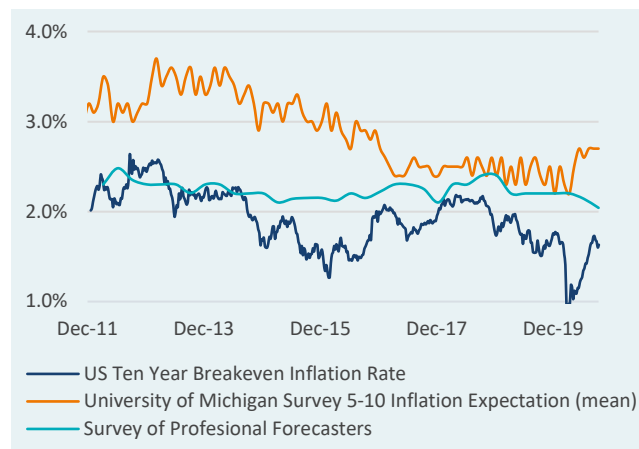
Source: U. of Michigan, Philly Fed, as of 9/30/20

U.S. 10-YR ROLLING AVERAGE INFLATION SINCE 1923
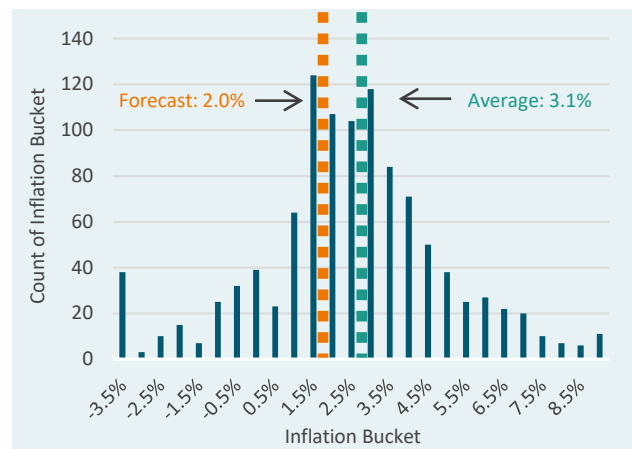
Source: Bloomberg, as of 9/30/20

FORECAST

	10-Year Forecast
University of Michigan Survey *(25% weight)*	+2.7%
Survey of Professional Forecasters *(25% weight)*	+2.0%
US 10-Year TIPS Breakeven Rate *(50% weight)*	+1.6%
Inflation Forecast	2.0%

Source: Verus, as of 9/30/20

Cash

The U.S. Treasury yield curve collapsed to nearly zero in the first half of 2020, but the curve retained steepness similar to that experienced in recent years. Unprecedented monetary policy and central bank involvement in the markets has led bond yields towards zero, or negative, in most developed countries. As indicated by the Federal Reserve, interest rates will likely be kept at 0% for the foreseeable future. This brings the real cash rate deeply negative.

The return of cash seems to have decoupled from the rate of inflation in the current environment, as zero or negative interest rates have become the new normal. We believe that the current federal funds rate, as well as the steepness of the U.S. Treasury yield curve, may provide guidance regarding the future longer-term cash return. We place a 75% forecasting weight on the current federal funds rate and a 25% weight to the 10-year U.S. Treasury.

Applying these relationships result in a 10-year cash forecast of 0.2%.

CASH YIELD (3-MONTH T-BILL)
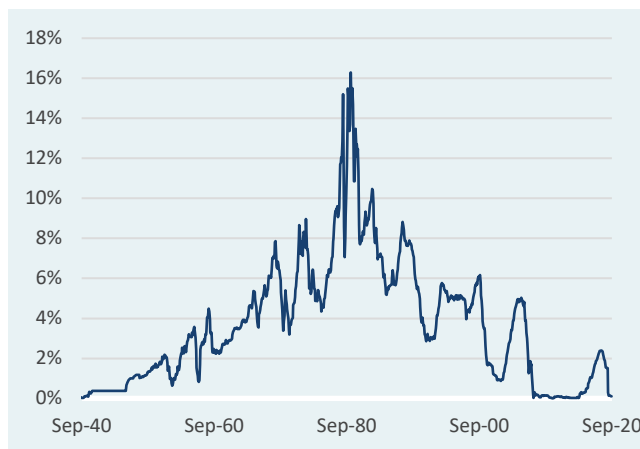
Source: FRED, as of 9/30/20

U.S. TREASURY YIELD CURVE

US Treasury Curve 9/30/20
US Treasury Curve 12/31/19
US Treasury Curve 12/31/18
US Treasury Curve 12/31/17
US Treasury Curve 12/31/10
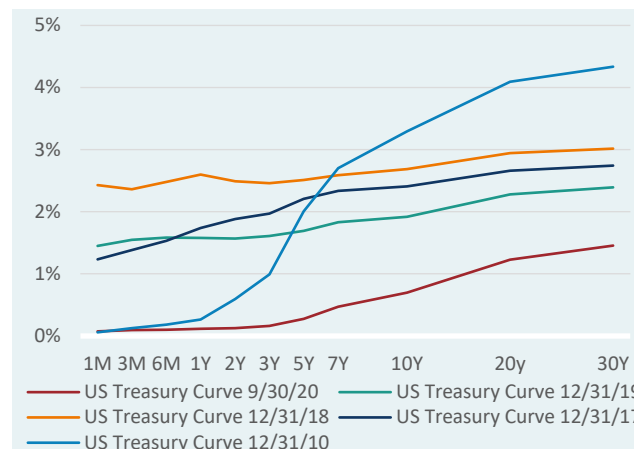
Source: Bloomberg, as of 9/30/20

FORECAST

	10-Year Forecast
Cash	+0.2%
Inflation Forecast	-2.0%
Real Return	-1.8%

Source: Verus, as of 9/30/20

Rates

We forecast the return from rates based upon the current 10-year Treasury yield, with all cash flows reinvested at the current yield. The 10-year yield fell from 1.7% to 0.7% through September.

U.S. Treasury yields remain high relative to other developed nations, specifically Japan and Germany, though less so since U.S. rates collapsed during the COVID-19 pandemic. Investors generally believe U.S. yields will stay lower-for-longer, though the Federal Reserve has expressed no interest in bringing rates into negative territory, which may limit significant downward movement from this point. The U.S.

yield curve remains surprisingly flat.

Developed world central banks have began to recognize the limitations of monetary policy in spurring economic growth, and many have commented on the need for greater fiscal policy support. It appears that interest rates in many countries have hit or are close to hitting a natural floor.

Our expectations are for a 0.7% return over the next ten years, in line with the current U.S. 10-year Treasury yield.

U.S. 10-YR TREASURY YIELD

Source: Bloomberg, as of 9/30/20

U.S. TREASURY YIELD CURVE

Legend:
- US Treasury Curve 9/30/20
- US Treasury Curve 12/31/18
- US Treasury Curve 12/31/10
- US Treasury Curve 12/31/19
- US Treasury Curve 12/31/17
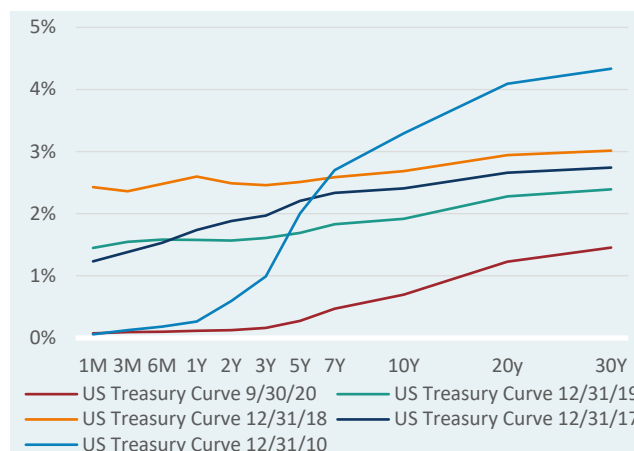
Source: Bloomberg, as of 9/30/20

FORECAST

	10-Year Forecast
U.S. 10-Year Treasury	+0.7%
Inflation Forecast	-2.0%
Real Return	-1.3%

Source: Verus, as of 9/30/20

Interest rates

JANUARY 2019 TO DECEMBER 2020

Chart legend: ---- 1/2/2019 —— 12/31/2020
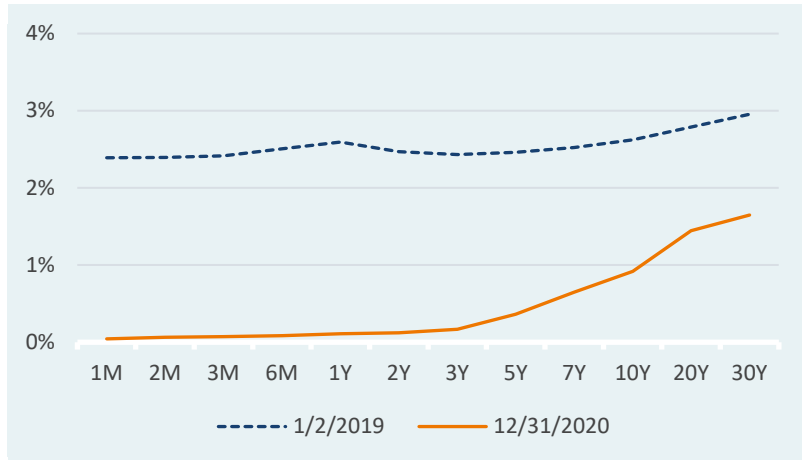
JANUARY 1993 TO JANUARY 1995

1994 INTEREST RATE HIKES

Chart legend: —— 1/3/1995 ---- 1/4/1993
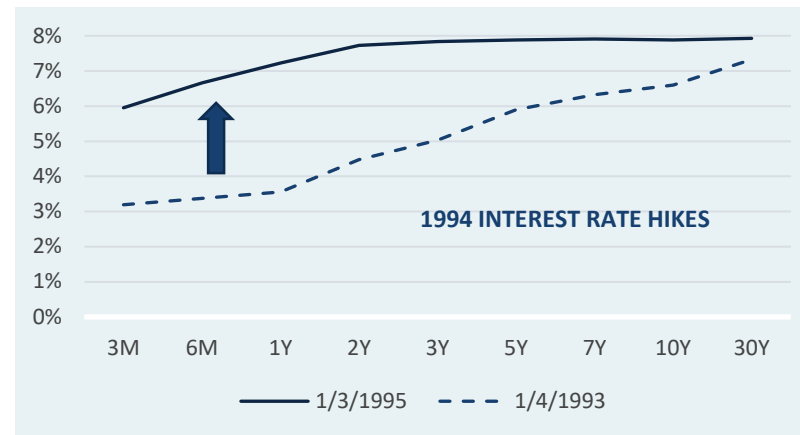
The anchor or ballast potential of fixed income has decreased due to low rates.

JANUARY 2007 – JANUARY 2009

GLOBAL FINANCIAL CRISIS

Chart legend: —— 1/2/2009 ---- 1/2/2007

JANUARY 2000 TO JANUARY 2004

DOT COM AND TECH SELLOFF

Chart legend: —— 1/2/2004 ---- 1/2/2000

Source: FRED

Verus
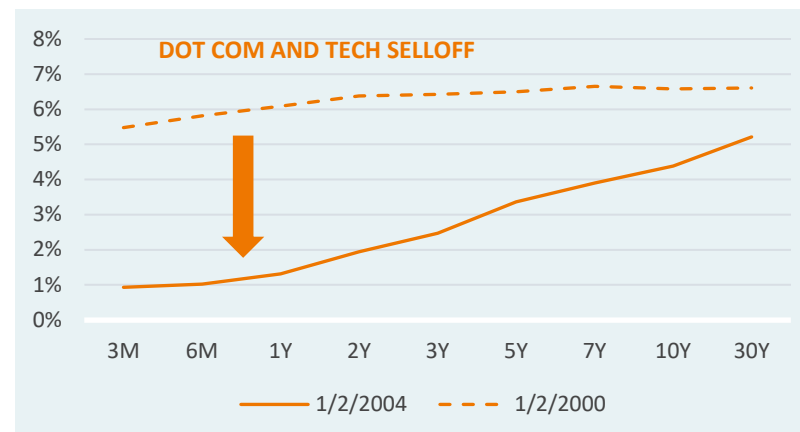
Real rates

TIPS provide high sensitivity to duration (interest rate risk) over short periods and track inflation (CPI) fairly well over longer periods. Changing inflation expectations, demand for inflation protection, and rate movements contribute to the price volatility of TIPS. Currently, future inflation is expected to be mild, there is low demand for inflation protection, and interest rates arguably cannot move much lower.

The U.S. 10-year real yield fell into deeply negative territory in 2020, along with falling interest rates. While inflation expectations bounced back in Q3 to prior levels, interest rates have stayed depressed. The breakeven inflation rate bottomed at 0.5% in March, but recovered to 1.64% in the third quarter.

To arrive at a nominal 10-year forecast, we add the current real TIPS yield to our 10-year inflation forecast. Our real rates forecast fell into deeply negative territory from 0.14% to -0.95% as nominal interest rate collapsed and inflation expectations are relatively unchanged from one year prior.

NOMINAL YIELD VS. REAL
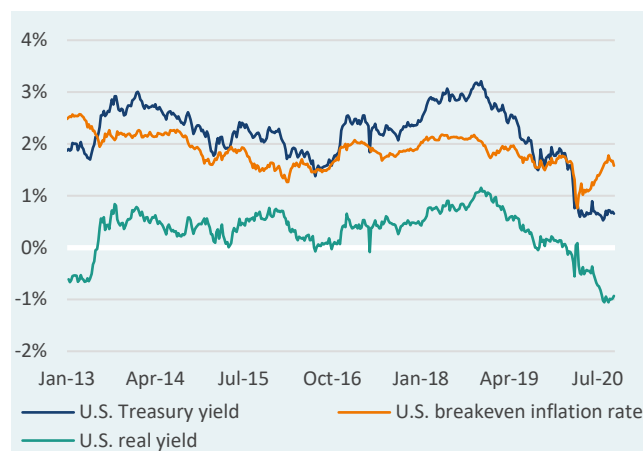
Source: Bloomberg, as of 9/30/20

INFLATION EXPECTATIONS
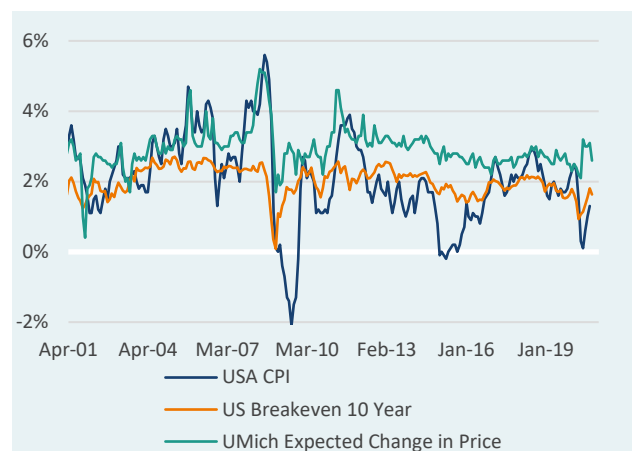
Source: Bloomberg, as of 9/30/20

FORECAST

	10-Year Forecast
U.S. 10-Year TIPS Real Yield	-0.95%
Inflation Forecast	+2.00%
Nominal Return	1.05%

Source: Verus, as of 9/30/20

Core fixed

Credit fixed income return is composed of a bond term premium (duration) and credit spread. The bond term premium is represented by the 10-year U.S. Treasury yield.

We use default rates and credit spreads for each respective fixed income category to provide our 10-year return forecast. Our default rate assumption is derived from a variety of sources, including historical data and academic research. The effective default that is subtracted from the return forecast is based on our assumed default and recovery rates.

Core fixed income spreads increased from 62 bps to 90 bps over the year, but remain below the 30-year average of 1.25%. Although higher credit spreads have bolstered core fixed income expectations slightly, materially lower interest rates had a greater impact, bringing our forecast from 2.2% to 1.5%.

U.S. CORE CREDIT SPREAD
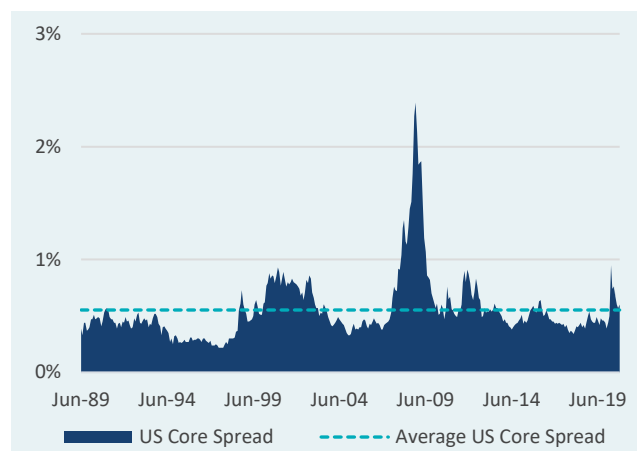
Source: Barclays, as of 9/30/20

ROLLING EXCESS RETURN (10-YR)
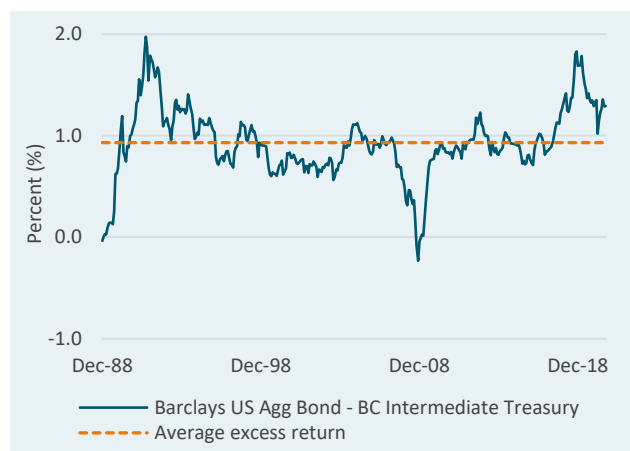
Source: Barclays, as of 9/30/20

FORECAST

	10-Year Forecast
Barclays U.S. Option-Adjusted Spread	+0.9%
Effective Default	-0.1%
U.S. 10-Year Treasury	+0.7%
Nominal Return	1.5%
Inflation Forecast	-2.0%
Real Return	-0.5%

Source: Verus, as of 9/30/20

Credit summary

	Core	Long-Term Credit	Global Credit	High Yield*	Bank Loans*	EM Debt (USD)	EM Debt (Local)	Private Credit	Real Estate Debt
Index	BBgBarc U.S. Aggregate	BBgBarc Long U.S. Corporate	BBgBarc Global Credit	BBgBarc U.S. High Yield	S&P LSTA	JPM EMBI	JPM GBI-EM	S&P LTSA + 1.75%	BBgBarc CMBS IG
Method	OAS + U.S. 10-Year	OAS + U.S. 10-Year	OAS + Global 10-Year Treasuries	OAS + U.S. 10-Year	LIBOR + Spread	OAS + U.S. 10-Year	Current Yield	Bank Loans+ 1.75% private premium	LIBOR + Spread
Spread to	Intermediate U.S. Treasury	Long-Term U.S. Treasury	Global Long-Term Treasuries	Intermediate U.S. Treasury	LIBOR	Intermediate U.S. Treasury	-	-	LIBOR
Default Assumption	-0.5%	-4.5%	-3.0%	-	-	-0.5%	-0.5%	-	-3.7%
Recovery Assumption	80%	95%	40%	-	-	60%	40%	-	47%
Spread	0.9%	1.7%	1.7%	5.5%	5.3%	4.7%	-	-	4.0%
Yield	-	-	-	-	-	-	4.6%	-	-
Risk Free Yield	0.7%	0.7%	0.4%	0.7%	0.2%	0.7%	-	-	0.2%
Effective Default	-0.1%	-0.2%	-1.8%	-2.8%	-2.6%	-0.2%	-0.3%	-	-2.0%
Nominal Return	1.5%	2.2%	0.3%	3.4%	2.9%	5.2%	4.3%	4.6%	2.2%
Inflation Forecast	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Real Return	-0.5%	0.2%	-1.6%	1.4%	0.9%	3.2%	2.3%	2.6%	0.2%

We assume half of the spread of higher risk credit will be lost to defaults, as this has roughly been the case throughout history.

Source: Verus

Equities

Investment returns in the equity space can be broken down into earnings growth, dividend yield, inflation, and repricing. Over the very long-term, repricing represents a small portion of return to equity investors, but over shorter time frames, the impacts on return can vary considerably.

If investors are willing to pay more for earnings, it could signal that investors are more confident in positive earnings growth going forward, while the opposite is true if investors pay less for earnings. It is somewhat surprising that investor confidence varies so much given that the long-term earnings growth is relatively stable.

Investor confidence in earnings growth can be measured using both the Shiller P/E ratio and the trailing 12-month P/E ratio. We take an average of these two valuations metrics when determining our repricing assumption. In short, if the P/E ratio is too high (low) relative to history, we expect future returns to be lower (higher) than the long-term average. Implicit in this analysis is the assumption that P/E's will exhibit mild mean reversion over 10 years.

We make a conservative repricing estimate given how widely repricing can vary over time. We then skew the repricing adjustment because the percentage change in index price is larger with each incremental rise in valuations when P/E's are low, compared to when they are high.

TRAILING 10-YR S&P 500 RETURN COMPOSITION
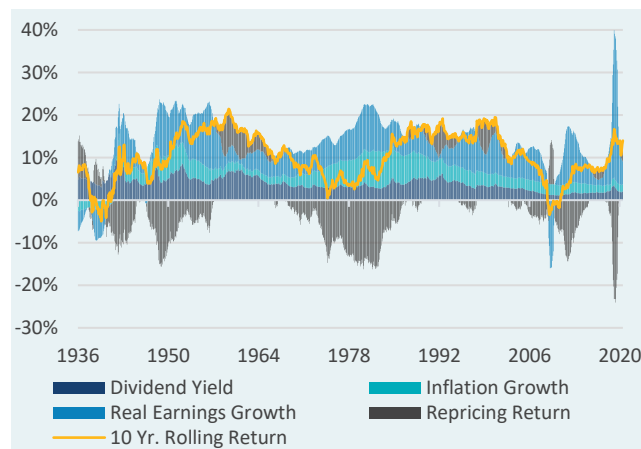
Source: Shiller, Standard & Poor's, as of 6/30/20

U.S. LARGE SHILLER P/E

Source: Shiller, S&P 500, as of 9/30/20

P/E REPRICING ASSUMPTION

Average P/E Percentile Bucket	Lower P/E	Upper P/E	Repricing Assumption
Lower 10%	-	10	2.00%
10% - 20%	10	13	1.50%
20% - 30%	13	15	0.75%
30% - 45%	15	18	0.50%
45% - 55%	18	19	0.0%
55% - 70%	19	21	-0.25%
70% - 80%	21	22	-0.50%
80% - 90%	22	24	-0.75%
Top 10%	24	-	-1.00%

Source: Verus

Equity summary

	U.S. Large	U.S. Small	EAFE	EAFE Small	EM
Index	S&P 500	Russell 2000	MSCI EAFE Large	MSCI EAFE Small	MSCI EM
Method	Building Block Approach: current dividend yield + historical average real earnings growth + inflation on earnings + repricing				
Current Shiller P/E Ratio	30.8	43.1	17.0	-	11.2
Regular P/E Ratio	26.0	13,764**	34.6	28.6	20.1
2020 Shiller P/E Change	+6.2%	-4.4%	-2.9%	-	+6.7%
2020 Regular P/E Change	+33.3%	+33,571%	+207.1%	+53%	+51.1%
Current Shiller P/E Percentile Rank	86%	91%	32%	-	34%
Current Regular P/E Percentile Rank	94%	100%	97%	63%*	93%
Average of P/E Methods' Percentile Rank	90%	95%	64%	63%*	63%
2020 YTD Return	5.6%	-8.7%	-7.1%	-4.2%	-1.2%
Shiller PE History	1982	1988	1982	Not Enough History	2005
Long-Term Average Shiller P/E	23.1	31.4	22.4	-	14.8
Current Dividend Yield	1.8%	1.3%	2.8%	2.3%	2.3%
Long-Term Average Real Earnings Growth	2.4%	2.9%	1.8%	1.6%	1.4%
Inflation on Earnings	2.0%	2.0%	0.8%	0.8%	2.0%
Repricing Effect (Estimate)	-1.0%	-1.0%	-0.3%	-0.3%	-0.3%
Nominal Return	5.1%	5.2%	5.2%	4.4%	5.4%
Inflation Forecast	2.0%	2.0%	0.8%	0.8%	2.0%
Real Return	3.1%	3.2%	4.4%	3.6%	3.4%

Data as of 9/30/20

*Average trailing P/E from previous 12 months is used

**Earnings have fallen to nearly zero, which is the cause of this extremely high figure (the denominator of the Price/Earnings equation is nearly zero)

NOTE: For all equities, we exclude data prior to 1972, which allows for a more appropriate comparison between data sets

Verus

Private equity

Private equity and public equity returns have been correlated historically because the underlying economic forces driving these asset class returns are quite similar. The return relationship between the two can vary in the short-term, but over the long-term investors have received a premium, driven by leverage, concentrated factor exposure (smaller and undervalued companies), skill, and possibly illiquidity.

Historically, the beta of private equity relative to public equities has been high. We use a beta assumption of 1.85 to U.S. large cap equities in our capital market forecast.

Private equity performance typically differs based on the implementation approach. We provide a 10-year forecast for the entire private equity universe of 9.3%. Direct private equity programs have historically outperformed the broader universe by approximately 1.0%, and we forecast direct private equity accordingly with a forecast of 10.3%. Private equity fund-of-fund (FoF) programs have historically lagged the universe by 1.0%, and we forecast private equity fund-of-funds at 8.3% to reflect this drag.

PRIVATE EQUITY EXCESS RETURN (PE – U.S. SMALL CAP EQUITY)

Cambridge Associates US PE Return - Russell 2000 Return
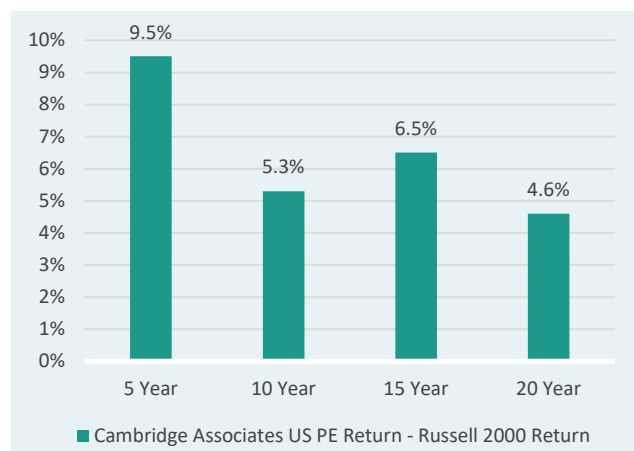
Source: Cambridge, Russell, as of 3/31/20

PRIVATE EQUITY IMPLEMENTATION FORECASTS

	10-Year Forecast
Private Equity Universe Forecast	9.3%
Private Equity FoF Forecast	8.3%
Private Equity Direct Forecast	10.3%

Source: Verus, as of 9/30/20

PRIVATE EQUITY UNIVERSE FORECAST

	10-Year Forecast
U.S. Large Cap Forecast	+5.1%
1.85 Beta Multiplier	+4.2%
Nominal Return	9.3%
Inflation Forecast	-2.0%
Real Return	7.3%

Source: Verus, as of 9/30/20

Hedge funds

Hedge fund performance variation through time can be partly explained by public market betas (ex: equity, rates, credit, etc.) and partly explained by non-public sources of return (ex: alternative betas, skill, luck). Certain hedge funds can be mostly explained by public market betas, while others are driven mostly by non-public sources of return. We do not believe hedge funds should be thought of as an asset class, and in most cases we recommend benchmarking and modeling individual hedge funds in line with the underlying asset class exposure set (equity hedge funds modeled as equity exposure, fixed income hedge funds modeled as fixed income exposure, etc.) Our forecast for "hedge funds" that we show here can be thought of as a forecast of the broad universe of hedge funds.

To forecast hedge fund returns, we identified the portion of historical hedge fund performance that can be attributed to public market betas, and the portion of hedge fund returns that cannot be attributed to public market beta. This means our forecast has two components: the public market return (explained return) and the non-public market return (unexplained return).

To forecast the public market beta portion of hedge funds, we take the historical sensitivity of hedge funds to equity, rates, credit, and commodities and pair these with our current 10-year public market forecasts for each asset class. To forecast the non-public market return portion of hedge funds (unexplained return) we simply assume the historical performance contribution of these sources will continue.

HEDGE FUND FORECAST
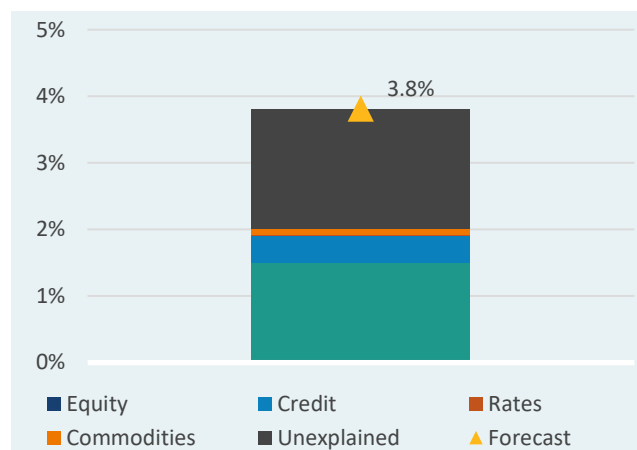
Source: Verus, as of 9/30/20

HEDGE FUND PUBLIC MARKET SOURCES OF RETURN (EXPLAINED RETURN)

Equity
Rates
Credit
Commodities

HEDGE FUND NON-PUBLIC SOURCES OF RETURN (UNEXPLAINED RETURN)

Alternative betas
Skill
Luck

Source: Verus

FORECAST

	10-Year Forecast
Public Market % of Return	+2.0%
Non-Public Market % of Return	+1.8%
Nominal Return	+3.8%
Inflation Forecast	-2.0%
Real Return	+1.8%

Source: Verus, as of 9/30/20

Private core real estate/REITS

Performance of the NCREIF property index can be decomposed into an income return (cap rate) and capital return. The return coming from income has historically been more stable than the return derived from capital changes.

The cap rate is the ratio of earnings less expenses to price and does not include extraordinary expenses. A more accurate measure of the yield investors receive should include non-recurring capital expenditures; we assume a 2.0% capex expenditure. We also assume income growth will roughly equal the rate of broad economic growth, and we use GDP forecasts as an estimate for future income growth.

Private real estate and REITs have provided very similar returns over the long-term. Investors should be careful when comparing risk-adjusted returns of publicly traded assets to returns of appraisal priced assets, due to data problems and smoothing effects. While private real estate appears to be less volatile than REITs, the true risks to investors are likely very similar.

We assume the effects of leverage and liquidity offset each other. Therefore, our return forecast is the same for private real estate and REITs.

TRAILING 10-YR NCREIF RETURN COMPOSITION

Legend:
- 10 Year NCREIF Property Capital Return
- 10 Year NCREIF Property Income Return
- 10 Year NCREIF Property Total Return
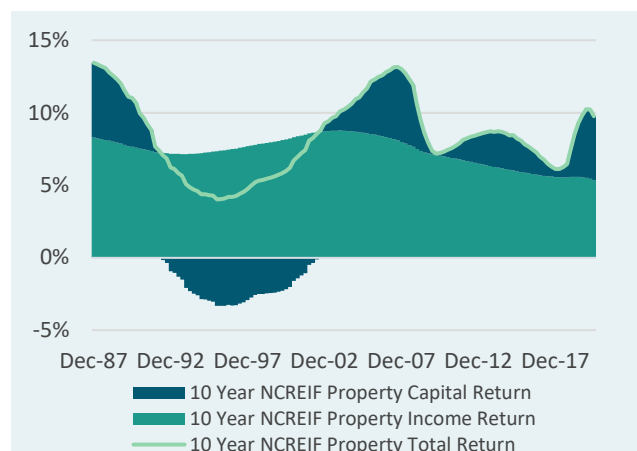
Source: NCREIF, as of 6/30/20

PRIVATE REAL ESTATE

	Private Real Estate 10-Year Forecast
Current Cap Rate	+4.1%
Real Income Growth	+1.7%
Capex Assumption	-2.0%
Inflation	+2.0%
Nominal Return	5.8%
Inflation Forecast	-2.0%
Real Return	3.8%

Source: Verus, as of 9/30/20

REITS

	10-Year Forecast
Nominal Return Forecast	5.8%
Inflation Forecast	-2.0%
Real Return	3.8%

Source: Verus, as of 9/30/20

Value-add & opportunistic real estate

Value-add real estate includes properties which are in need of renovation, repositioning, and/or lease-up. Properties may also be classified as value-add due to their lower quality and/or location. Opportunistic real estate can also include development and distressed or very complex transactions. Greater amounts of leverage are usually employed within these strategies. Leverage increases beta (risk) by expanding the purchasing power of property managers via a greater debt load, which magnifies gains or losses. Increased debt also results in greater interest rate sensitivity. An increase/decrease in interest rates may result in a write-up/write-down of fixed rate debt, since debt holdings are typically marked-to-market.

Performance of value-add real estate is composed of the underlying private

real estate market returns, plus a premium for additional associated risk, which is modeled here as 200 bps above our core real estate return forecast. Performance of opportunistic real estate strategies rests further out on the risk spectrum, and is modeled as 400 bps above the core real estate return forecast.

Additional expected returns above core real estate are justified by the higher inherent risk of properties which need improvement (operational or physical), price discounts built into properties located in non-core markets, illiquidity, and the ability of real estate managers to potentially source attractive deals in this less-than-efficient marketplace.

CAP RATE SPREADS
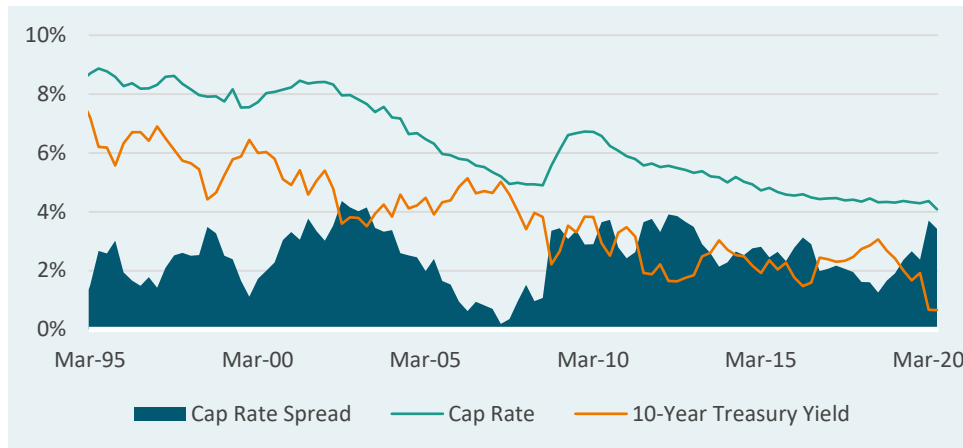
Source: NCREIF, Bloomberg, as of 6/30/20

FORECAST

	Value-Add 10-Year Forecast	Opportunistic 10-Year Forecast
Premium above core	+2.0%	+4.0%
Current Cap Rate	+4.1%	+4.1%
Real Income Growth	+1.7%	+1.7%
Capex Assumption	-2.0%	-2.0%
Inflation	+2.0%	+2.0%
Nominal Return	7.8%	9.8%
Inflation Forecast	-2.0%	-2.0%
Real Return	5.8%	7.8%

Source: Verus, as of 9/30/20

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Infrastructure

Infrastructure includes a variety of investment types across a subset of industries. There is not one definition for what can be included within infrastructure. The asset class has grown dramatically during the last decade as investors sought assets that might provide more attractive yield relative to fixed income along with the potential for inflation protection.

Similar to real estate investment, income plays a significant role in the returns which investors receive. Income yields are currently lower than average due to higher prices and competition in the space, which might reasonably be expected to translate into lower expected future returns.

Due to the discount rate effect, infrastructure asset valuations would generally be negatively affected by material increases in interest rates. Because leverage is used in this space, higher interest rates would also impact investors in the form of higher borrowing costs.

5-YR ROLLING RETURN COMPOSITION

Income Return | Price Return | Total Return
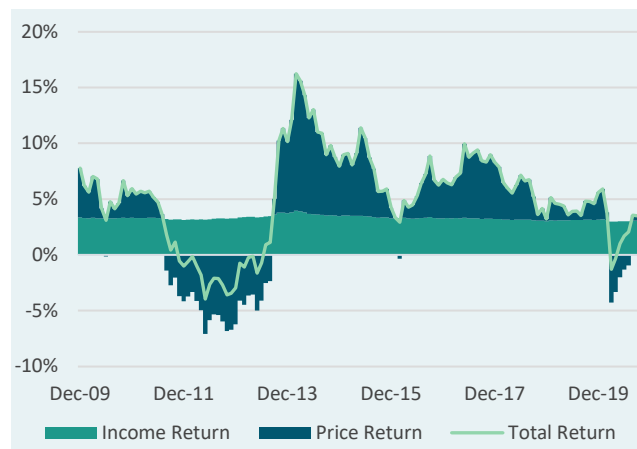
Source: S&P Global Infrastructure Index, as of 9/30/20

ADVANCED ECONOMY REAL GDP GROWTH

Advanced Economy Real GDP Growth
10-Year Average
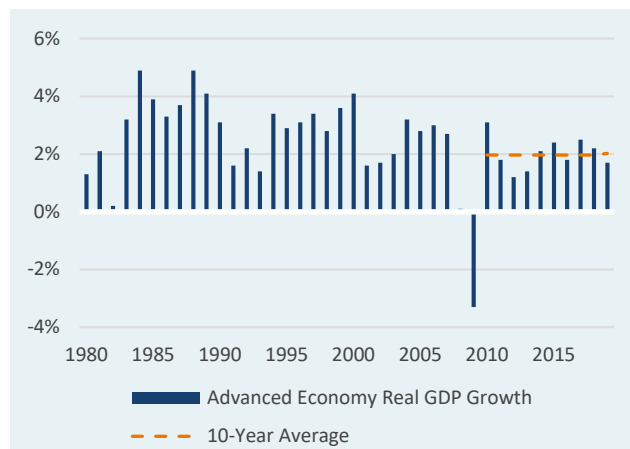
Source: IMF, as of 9/30/20

FORECAST

	10-Year Forecast
Inflation	1.7%
Yield	4.1%
Income Growth	2.0%
Nominal Return	7.8%
Global Inflation Forecast	-1.7%
Real Return	6.2%

Source: Verus, as of 9/30/20

Commodities

Commodity returns can be decomposed into three sources: collateral return (cash), spot changes (inflation), and roll yield.

Roll return is generated by either backwardation or contango present in futures markets. Backwardation occurs when the futures price is below the spot price, which results in positive yield. Contango occurs when the futures price is above the spot price, and this results in a loss to commodity investors. Historically, futures markets have fluctuated between backwardation and contango but with a net-zero effect over the very long-term (since 1877). Therefore, roll return is assumed to

be zero in our forecast. Over the most recent 10-year period, roll return has been negative, though this is likely the result of multiple commodity crises and a difficult market environment.

Our 10-year commodity forecast combines collateral (cash) return with spot return (inflation) to arrive at the nominal return, and subtracts out inflation to arrive at the real return.

TRAILING 10YR BLOOMBERG COMMODITY RETURN COMPOSITION (%)

Legend:
- 10 Year US Inflation
- 10 Year Spot Return
- 10 Year Annualized Return
- 10 Year Collateral Return
- 10 Year Roll Return
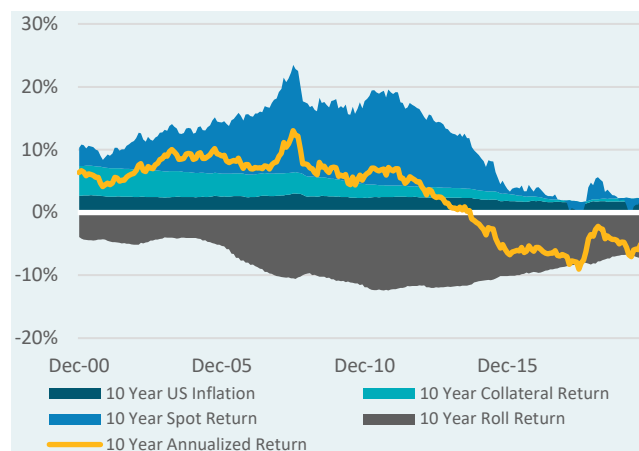
Source: MPI, Bloomberg, as of 9/30/20

BLOOMBERG COMMODITY RETURN COMPOSITION (%)

Values: -0.6% (Last 20 Years), -6.0% (Last 10 Years), -3.1% (Last 5 Years)

Legend:
- Roll Yield Return
- US Inflation Growth
- Bloomberg Commodity Return
- Cash Return
- Spot Return
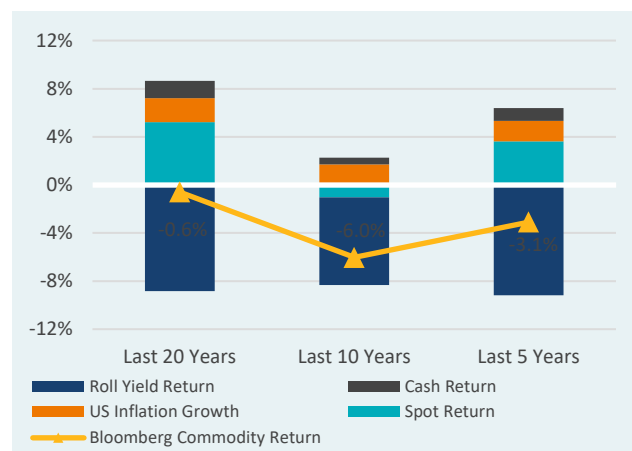
Source: MPI, Bloomberg, as of 9/30/20

FORECAST

	10-Year Forecast
Collateral Return (Cash)	+0.2%
Roll Return	+0.0%
Spot Return (Inflation)	+2.0%
Nominal Return	2.2%
Inflation Forecast	-2.0%
Real Return	0.2%

Source: Verus, as of 9/30/20

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Liquidity analysis – more privates

NORMAL MARKET LIQUIDITY

NORMAL MARKET LIQUIDITY

CAPITAL WEIGHT

	53.4%			
16.2%				4.9%
0.6%				0.6%
		7.0%	6.3%	11.0%

LIQUIDITY DURATION (DAYS)

	1-7	8-30	31-90	180+
■ Real Assets				4.9%
■ Equities	53.4%			
■ Fixed Income	16.2%			
■ Private Credit				0.6%
■ Real Estate			6.3%	
■ Cash	0.6%			
■ Private Equity				11.0%
■ Absolute Return		7.0%		
Total (%)	69.9%	7.0%	6.3%	16.5%
Total ($)	$7,113,315,090	$675,620,158	$608,058,142	$1,592,533,229
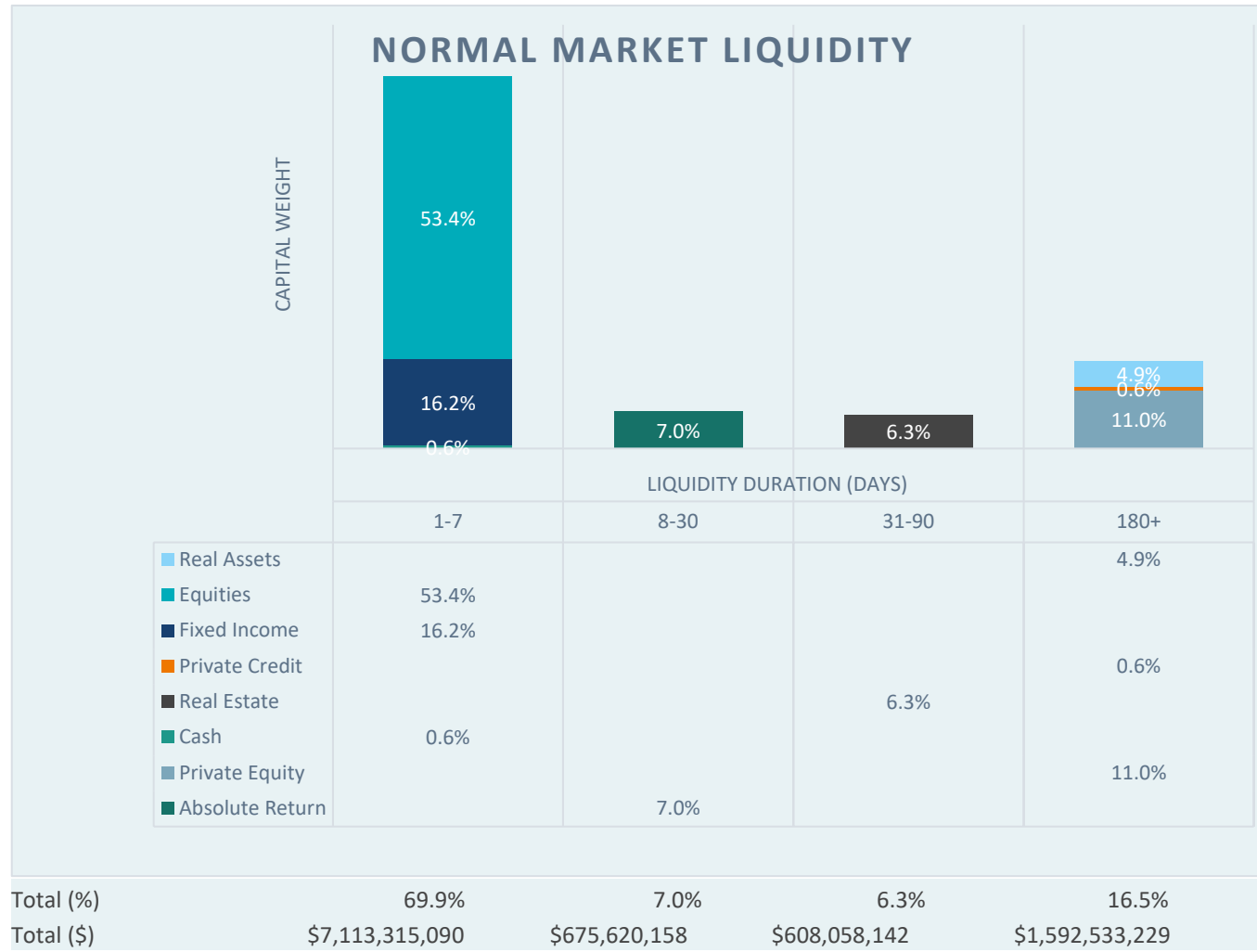
70% of ACERA' portfolio can be converted to cash within 1-7 days in a normal market environment

Around 16.5% of ACERA' assets would be considered mostly or completely illiquid

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Notices & disclosures

Verus

PERSPECTIVES
THAT DRIVE
ENTERPRISE
SUCCESS

OCTOBER 2021

Private Equity Investment Plan: 2021-2024

ACERA

Private Equity Investment Plan Overview

— Plan update per new asset allocation (approved 2021)

— Proposed Updates:

- Plan value: $11.44 billion (June 30, 2021)

- Long-term investment return assumption: 5.8% per year

- Plan Contributions / Distributions (source: Verus ALM study through 2029, 1.84% net outflow thereafter)

- Cash flows and valuations of existing funds

— Achieve target allocation:

- Private Equity: 11% by 2027

- Neutral weight to each sub-asset class:

  - Buyout: 60%
  - Venture Capital: 20%
  - Debt/Special Situations: 20%

Private Equity Investment Plan: 2021-2024

New Commitments Required to Achieve Target Allocations / Diversification*

Buyout:	9-12 new funds	$515 million
Venture Capital:	9-12 new funds	$202.5 million
Debt/Spec. Sits:	7 new funds	$252 million

*All projected commitments (number and size)
subject to bottom-up evaluation of GPs and market opportunities.

Manager selection is critical to results

Dispersion of Returns: Top-Bottom Quartile Funds
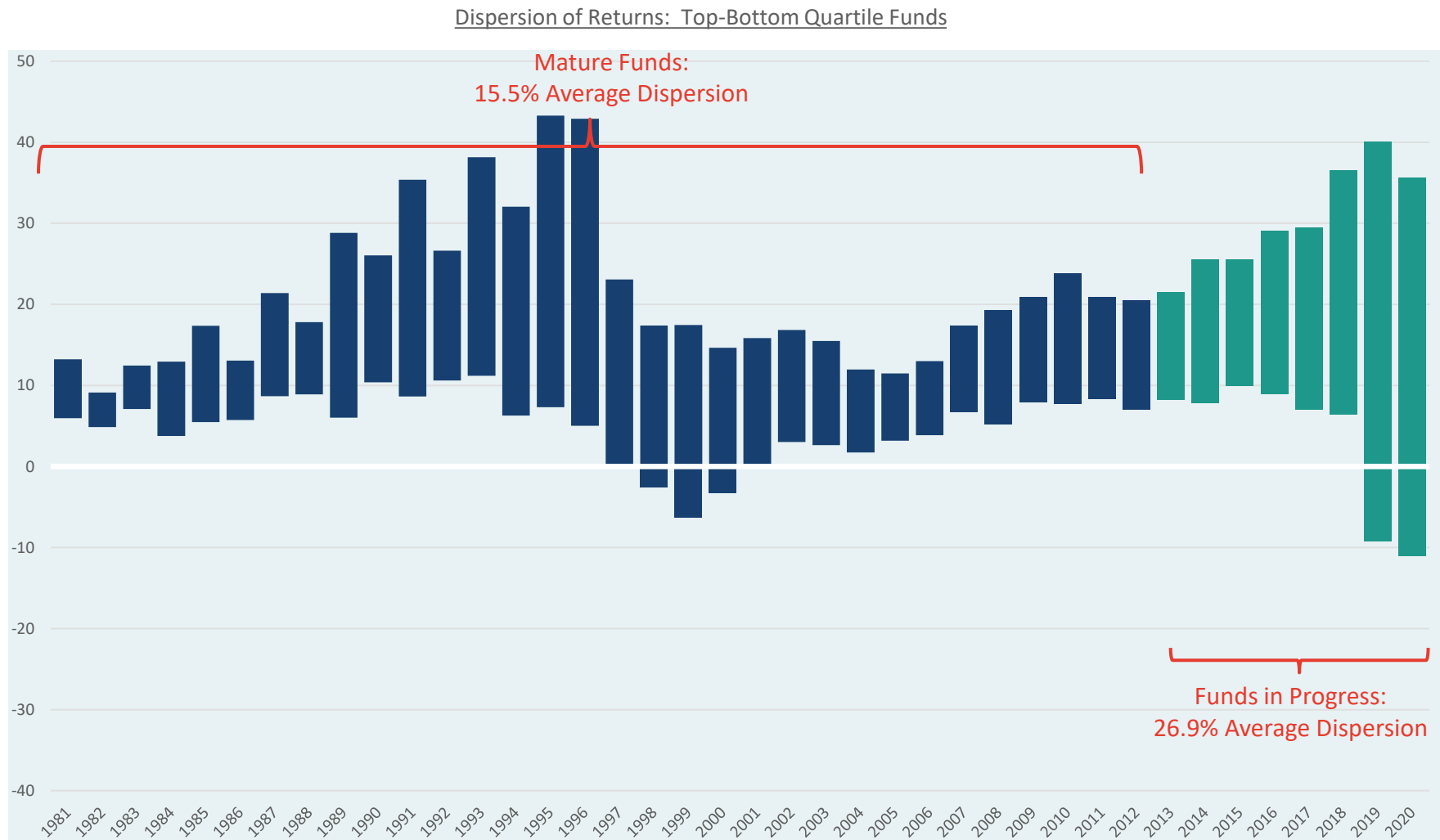
Source: Thomson Reuters C|A U.S. All Private Equity returns, as of December 31, 2020. For illustrative purposes only as dispersion of returns varies by sub-asset class.

Investment Plan – as of June 30, 2021

	2020 Actual	2021 Projected	2022 Projected	2023 Projected	2024 Projected	2025 Projected	2026 Projected	2027 Projected	2028 Projected	2029 Projected	2030 Projected	2031 Projected	2032 Projected
Annual Commitments ($M)													
Venture Capital	$ 25	$ 35	$ 67.5	$ 67.5	$ 67.5	$ 67.5	$ 67.5	$ 67.5	$ 70	$ 70	$ 78	$ 78	$ 78
Buyouts	$ 124	$ 85	$ 170	$ 170	$ 175	$ 175	$ 175	$ 184	$ 184	$ 196	$ 220	$ 220	$ 220
Debt-Related/Special Situations	$ 26	$ 90	$ 72	$ 72	$ 72	$ 85	$ 85	$ 95	$ 95	$ 95	$ 110	$ 110	$ 110
Total Private Equity	$ 175	$ 210	$ 309.5	$ 309.5	$ 314.5	$ 327.5	$ 327.5	$ 346.5	$ 349	$ 361	$ 408	$ 408	$ 408
Number of Commitments													
Venture Capital	1	2	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4
Buyouts	4	3	3-4	3-4	3-4	3-4	3-4	3-4	3-4	4	4	4	4
Debt-Related/Special Situations	1	3	2	2	2	2	2	2	2	2	2-3	2-3	2-3
Total Private Equity	6	8	8-10	8-10	8-10	8-10	8-10	8-10	8-10	9-10	9-11	9-11	9-11
Exposures													
Private Equity Exposure as a % of Plan (Target 11%; Range 8-13%)	8.8%	9.0%	9.0%	9.2%	9.6%	10.0%	10.5%	11.0%	11.2%	11.2%	11.3%	11.2%	11.0%
VC % of Total Private Equity (Target 20% / Range 0-40%)	32.9%	28.7%	26.3%	24.1%	20.9%	18.8%	18.9%	19.6%	19.7%	20.4%	20.7%	20.8%	20.7%
Buyouts % of Total Private Equity (Target 60% / Range 30-80%)	48.6%	53.3%	55.4%	56.3%	59.0%	60.6%	60.6%	60.6%	60.8%	60.5%	60.0%	59.7%	59.4%
Debt/Special Situations % of Total Private Equity (Target 20% / Range 0-30%)	18.5%	18.0%	18.3%	19.5%	20.1%	20.6%	20.5%	19.8%	19.5%	19.1%	19.2%	19.5%	19.9%

Verus

Callan

November 2021

**2021 – 2022
Real Estate Investment Plan**

Callan LLC

Avery Robinson, CAIA
Senior Vice President

Agenda

– Portfolio Overview

– Market Highlights

– Investment Plan Recommendations

– Policy Modification Recommendations

– Appendix

Portfolio Objectives Overview

Real Estate Investment Program

– The ACERA Real Estate portfolio dates back to 1988. The program has evolved from a heavily concentrated, predominately direct, separately-managed-account based portfolio, to a well-diversified, commingled fund-based program.

– The ACERA Real Estate portfolio is anticipated to provide the following benefits over the long term:
  - Lower the overall portfolio risk due to real estate's low correlation with other portfolio asset classes.
  - Generate a stable income stream to assist in meeting cash flow needs.
  - Provide growth through appreciation.
  - Serve as a hedge against inflation.
  - Provide an opportunity to enhance portfolio return through higher total return investments.

– The real estate program has a target allocation of 9%. As of June 30, 2021, the real estate exposure was 5.75%, 6.55% when including unfunded commitments.

ACERA Program Overview

ACERA COMPLIANCE MATRIX (as of June 30, 2021)		
Investment Style Allocations	**Strategic Constraint / Guideline**	**Compliance**
Core/Core-Plus	70% to 100%	In Compliance
Value-Added	0% to 30%	In Compliance
Opportunistic	0% to 15%	In Compliance
Return Targets **(Five Year Measurement; Net/Net)**	**Strategic Constraint / Guideline**	**Compliance**
Core	NCREIF Fund Index - Open End Diversified Core Equity ("ODCE")	In Compliance
Core-Plus	NCREIF Fund Index - Open End Diversified Core Equity ("ODCE")	In Compliance
Value-Added	NCREIF Fund Index - Open End Equity ("OE")	In Compliance
Opportunistic	NCREIF Fund Index - Open End Equity ("OE")	In Compliance
Total Portfolio	NCREIF Fund Index - Open End Diversified Core Equity ("ODCE)	In Compliance

ACERA Program Overview

ACERA COMPLIANCE MATRIX (as of June 30, 2021)		
Risk Policies	**Strategic Constraint / Guideline**	**Compliance**
Manager/Fund Diversification	No manager may represent more than 35% of ACERA's total real estate target allocation.	In Compliance
Property/Location Diversification	No property type or geographic location should represent more than 40% of program.	In Compliance
Leverage	A maximum of 40% leverage for the total portfolio.	In Compliance (29.3% LTV)
Watch List	A manager will automatically be placed on the Watch List if net of fee performance falls below the performance of the relevant manager account benchmark for three (3) consecutive quarters. Performance will be measured on a quarterly basis using the longest rolling time period possible (one, three or five year rolling returns).	In Compliance

Strategic Diversification (as of June 30, 2021)
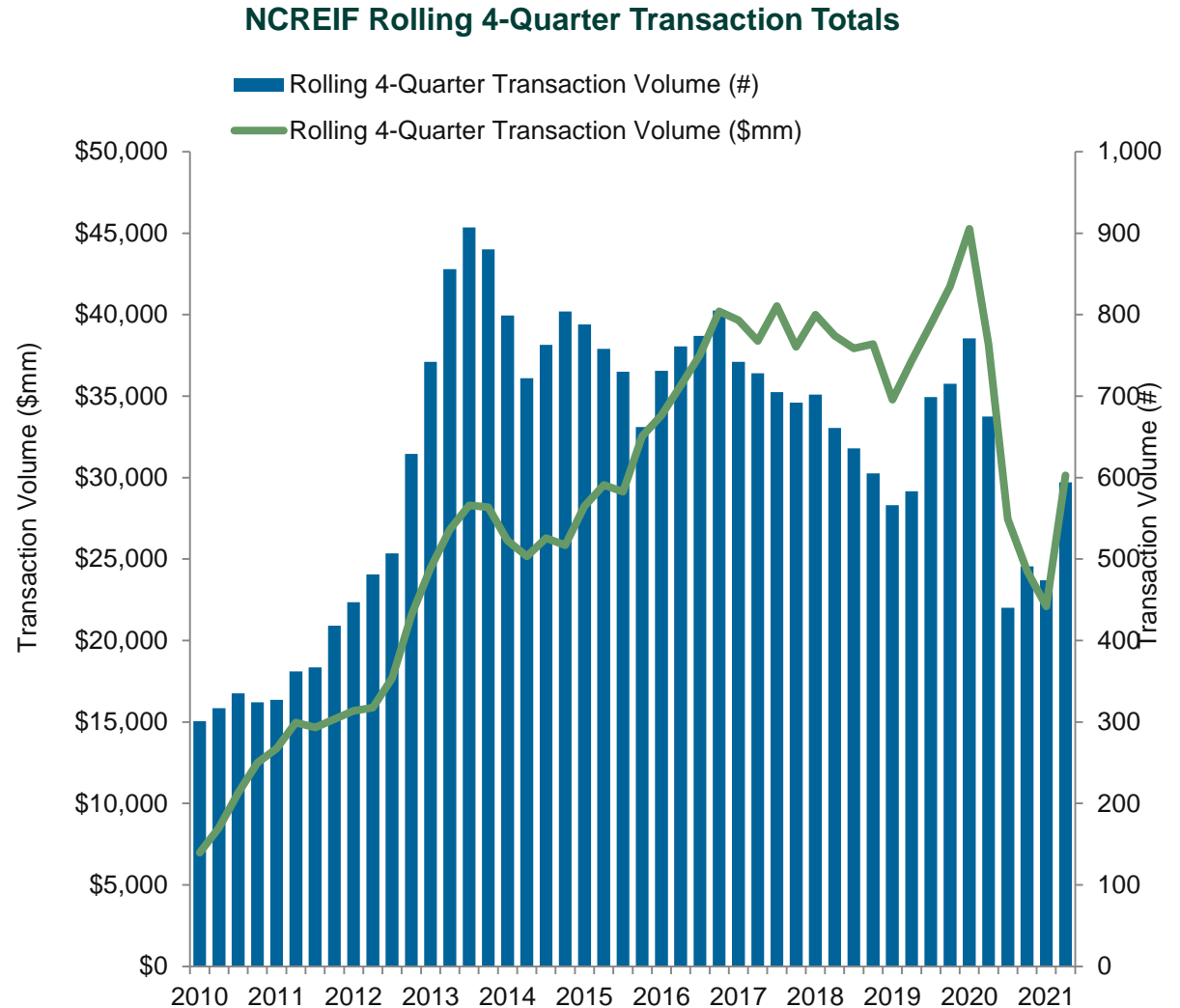
Portfolio Overview
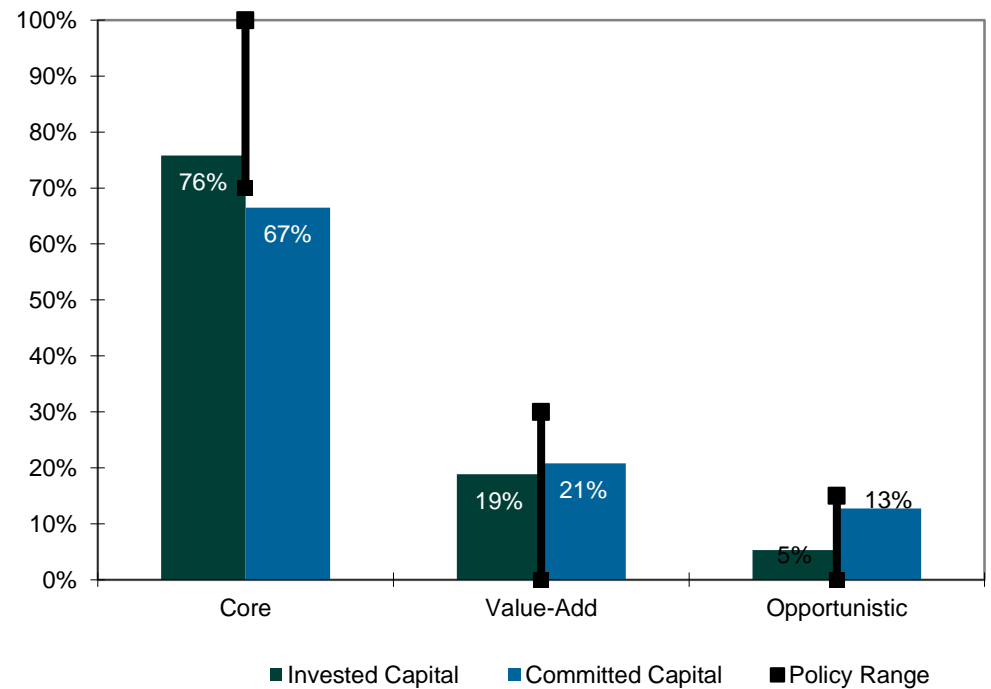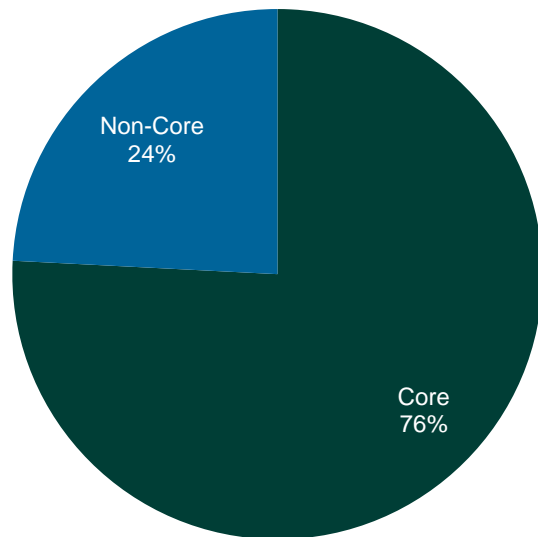
– ACERA has a predominantly core portfolio with some value-added and opportunistic exposure.

– All styles are within their strategic ranges.

Market Observations and Highlights

Investors committing to non-core; transactions market limited

– Recovery continues as ODCE posts strongest return single quarter return ever during 3Q2021 (6.6% Gross) Industrial remains the best performer.

– Appraisers pricing in recovery due to strong fundamentals within Industrial and Multifamily

– Return dispersion by manager within the ODCE Index due to composition of underlying portfolios

– Niche sectors self-storage and life sciences continue to be accretive.

NCREIF Rolling 4-Quarter Transaction Totals

Legend:
- Rolling 4-Quarter Transaction Volume (#)
- Rolling 4-Quarter Transaction Volume ($mm)

Expected Demand and Search Activity Drivers

Denominator could drive activity; niche properties in favor; pandemic halts new construction

– The gains in the equity market and accompanying denominator are leading lead to an influx of capital going toward the space.

– Some niche property sectors are garnering more interest, such as single-family rentals, medical office, and lab space.

– Net core activity has rebounded considerably during the past two quarters.

Core Fund Contribution/Redemption Queues ($mm)
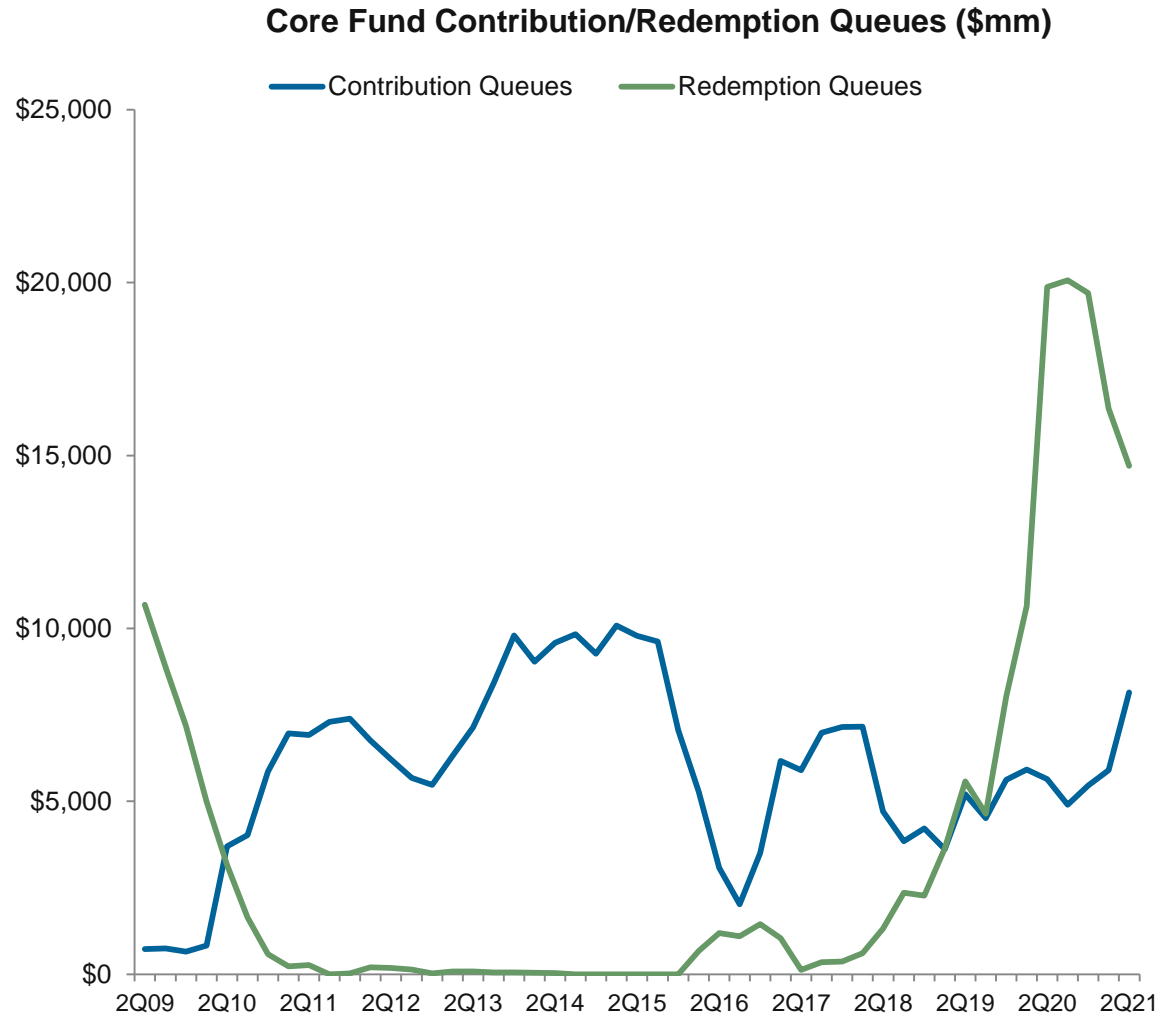
ACERA Prior Investment Activity (2019/2020/2021 YTD)

– There were six individual capital commitments made during 2019/2020 and YTD 2021 highlighted below. The strategies included value-add and opportunistic.

– There is approximately $185 million in capital that remains to be drawn from these commitments.

| Fund	Strategy	Commitment Amount ($mm)	Commitment Year
Artemis Income & Growth	Value Add	$35.0	2019
Angelo Gordon Fund X	Opportunistic	$35.0	2019
AEW Value Partners IX	Opportunistic	$35.0	2020
Artemis Healthcare Fund II	Value Add	$25.0	2021
CBRE Value Fund 9	Value Add	$40.0	2021
Starwood Fund XII	Opportunistic	$50.0	2021

Liquidations during 2019/2020.

– CIM IV (CMCT) completed its transition and liquidation.

– Heitman V II completed its transition and liquidation.

– JP Morgan Alternative Property Fund completed its transition and liquidation.

2022 / 2023 / 2024 Investment Plan Recommendations and Actions

1. Callan recommends that ACERA increase its core and core-plus real estate exposure. This can be achieved through a combination of new capital to existing, high performing managers, and select capital to new opportunities Net new commitments totaling approximately $200 million before the end of 2022 will help achieve and maintain the real estate allocation target based on the pacing study. (9%)

2. Callan recommends that ACERA continue to explore non-core investment opportunities in order to achieve and maintain vintage year diversification as the existing fund's return capital. This recommendation is dependent on the availability and quality of non-core funds in the market. Given the existing outstanding commitments, a new commitment of $50 million in 2022, with additional new commitments of $100 million in each subsequent year will help achieve and maintain the real estate allocation target based on the pacing study.

Pacing Based on Recommended Commitments

– Based on the recommendation of $200 million to core/core-plus and as well as continued commitments to non-core strategies, the real estate program is forecasted to reach its 9% target around year-end 2023.
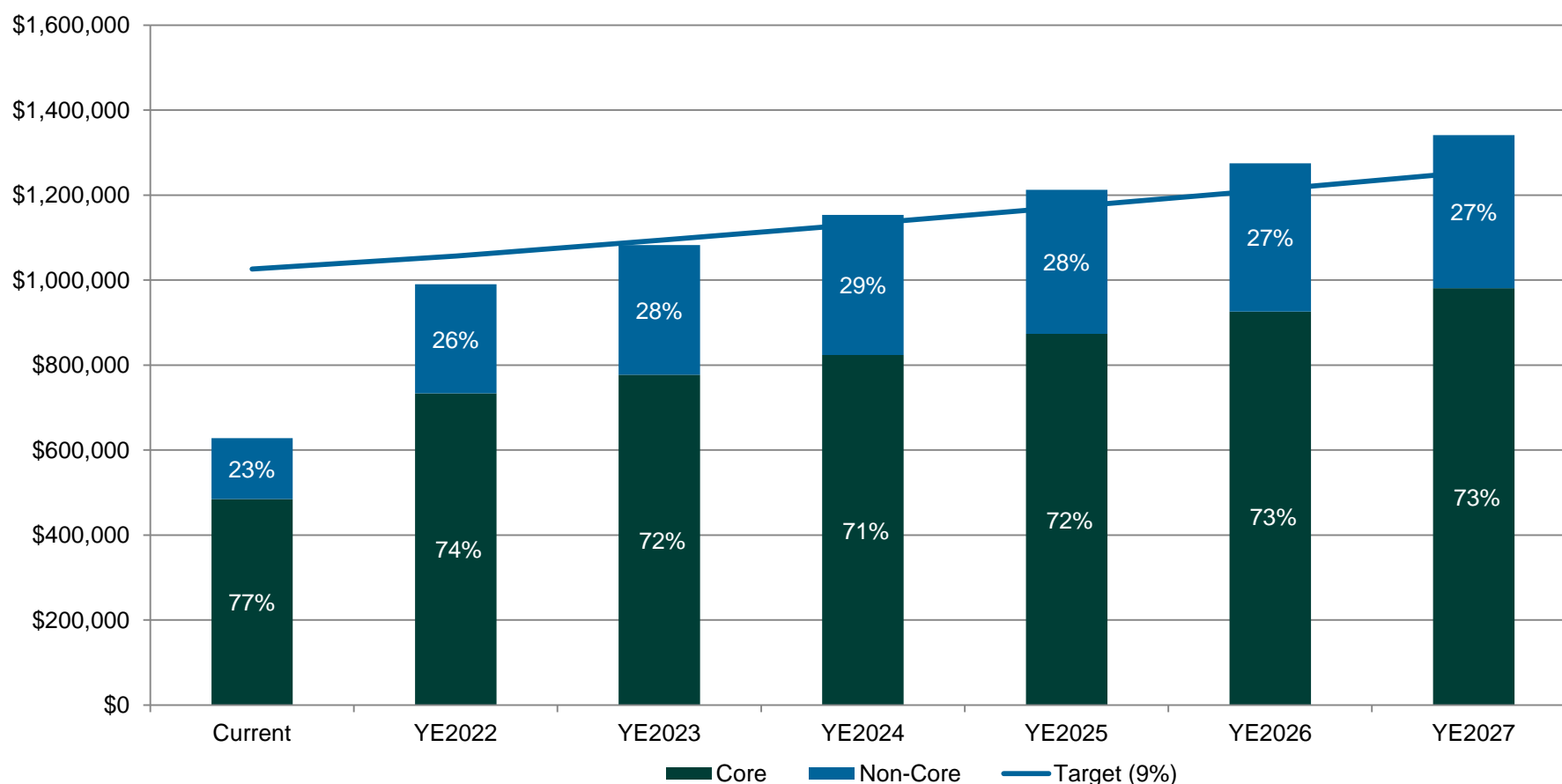
Policy Modifications

ACERA Policy Review and Recommendations

Recommendations

– Bifurcate Core and Core-Plus sub-assets classes

  – Currently Core and Core-Plus are included in the same allocation

  – Distinguishing between core and core-plus and setting appropriate limitations will help better account for the risk and return characteristics between the strategies. For example, currently the ACERA real estate portfolio has two core-plus funds representing approximately 19% of the total real estate allocation. In 2020, those two managers represented the strongest return and the weakest return, producing 23.2% and -9.3% respectively.

  – Establishing a core-plus range of 0-30%, and adjusting the core range to ≥ 60% is recommended.

– Add delegated authority up to 5% or 10%

  – Establishing limited staff discretion will allow the portfolio adjust more efficiently and invest with good managers that may be subject to some constraints. (i.e. Short Fund raising timeline –first or last closes, oversubscribed)

  – The proposed limit allows the staff to commit up to 5% of the real estate target to a new strategy or up to 10% to an existing manager via a "re-up".

Future considerations and thinking

– Revisit international and debt policy limitations

Appendix

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PERSPECTIVES THAT DRIVE ENTERPRISE SUCCESS

DECEMBER 2020

Real Asset Structure and Investment Plan

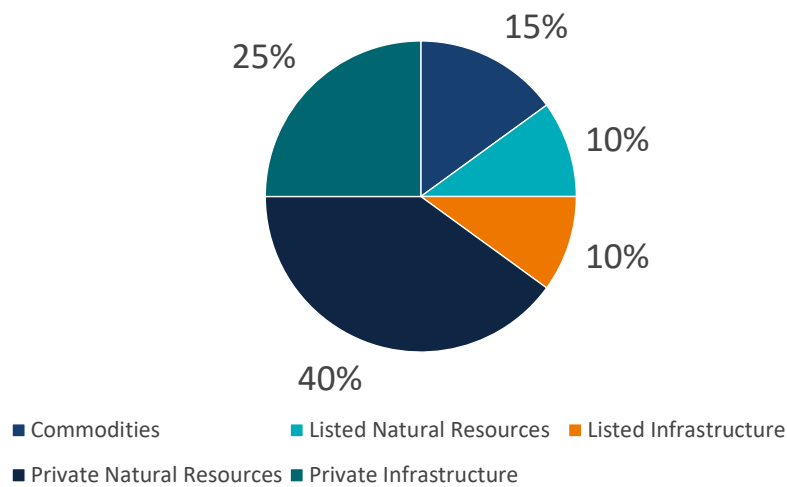## Alameda County Employees' Retirement Association

Introduction

— We are recommending an increase in allocation to infrastructure and a reduction to natural resources and commodities.

  ▪ The opportunity set in natural resources has been significantly reduced given the current distressed environment and reduced demand outlook in energy, along with the persistent low returns in timber and farmland.

  ▪ Low global growth since the GFC and the economic challenges caused by the COVID-19 pandemic have contributed to a low inflationary environment and slowing demand for commodities.

  ▪ We expect infrastructure to provide the most compelling investment opportunities within real assets for the foreseeable future.

— We are also recommending a reduction of the liquid portion of the portfolio by 10% with the liquid pool being used to fund private commitments until the targeted mix is achieved.

  ▪ While some liquidity in the portfolio is necessary, the public indices do not provide as much diversification to ACERA's total fund as pure real asset exposure.

Real Asset portfolio design

— The proposed changes would make infrastructure the majority allocation within the real asset portfolio at 60% (listed & private).

— The private infrastructure portfolio will be comprised of anchor positions in open-end core funds supplemented by investments in closed-end value add strategies and occasional opportunistic investments when there are attractive market dynamics in a specific sector.

— Private natural resource investments will be made when compelling opportunities arise in sectors such as mining, timberland, and agriculture.

— Listed real assets will be invested in a mix of passive index funds managed by SSGA.

Current Real Assets Target

15%
10%
10%
40%
25%

■ Commodities   ■ Listed Natural Resources   ■ Listed Infrastructure
■ Private Natural Resources   ■ Private Infrastructure

Proposed Real Assets Target

5%
10%
10%
25%
50%

■ Commodities   ■ Listed Natural Resources   ■ Listed Infrastructure
■ Private Natural Resources   ■ Private Infrastructure
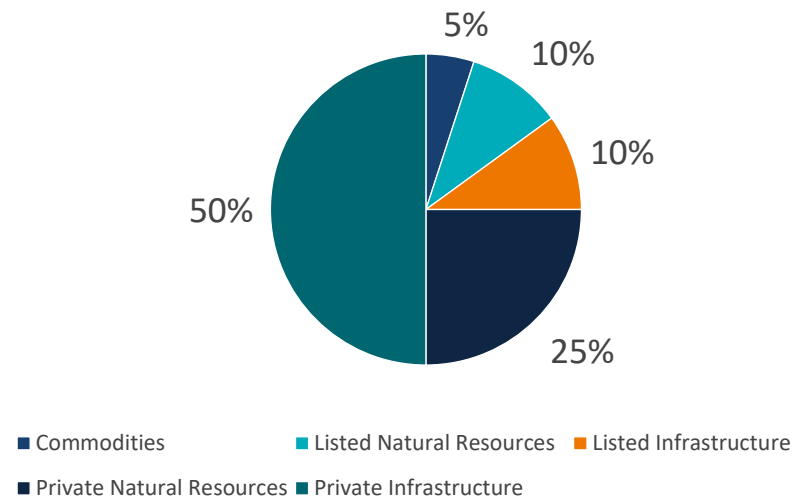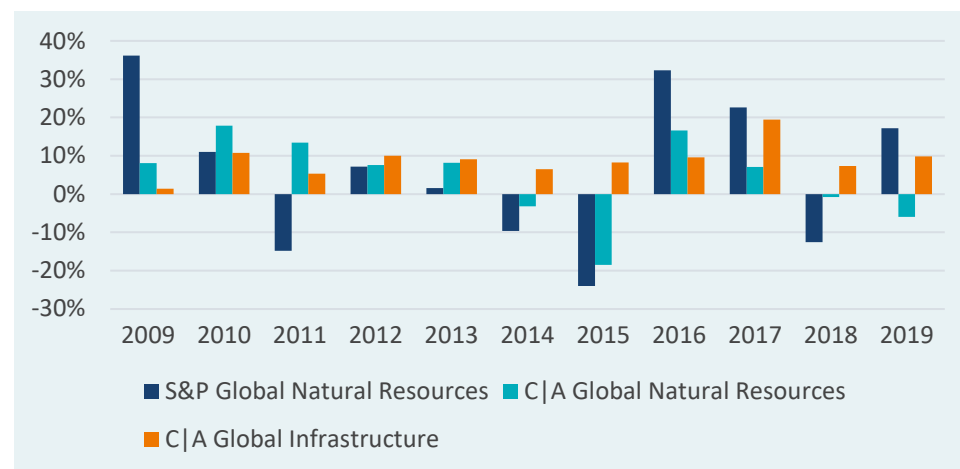
Challenges facing natural resources

— The low commodity price environment has put downward pressure on historical & expected returns in both public and private markets.

— Oil & gas, which has historically been the largest source of investment opportunities in the space, has been particularly out of favor with limited upside going forward.

— While the market dislocation in energy may provide some attractive buying opportunities, it remains challenging to operate assets profitably at current oil prices and demand and supply outlooks do not suggest an increase in price is likely.
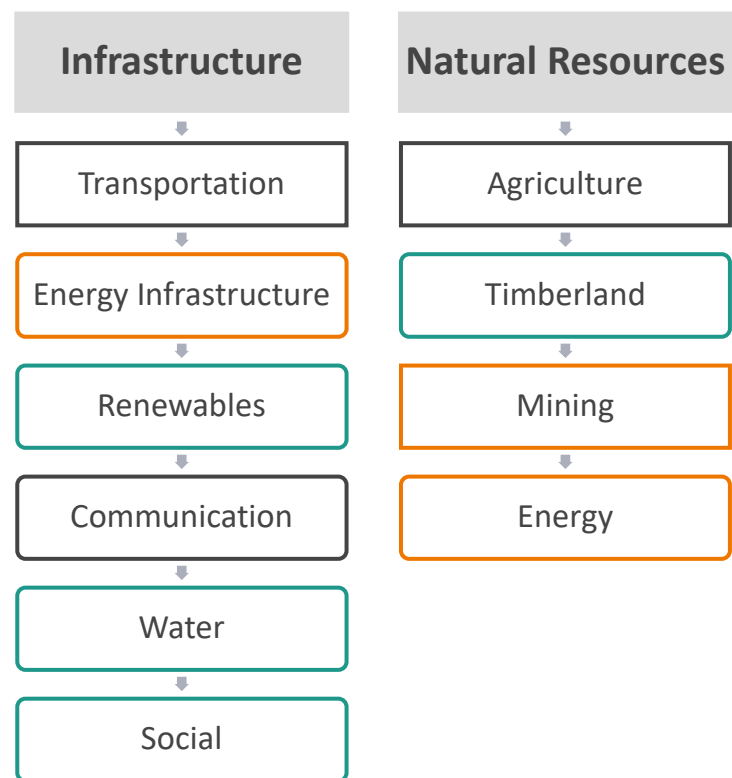
PRIVATE MARKET FUNDRAISING ($B)
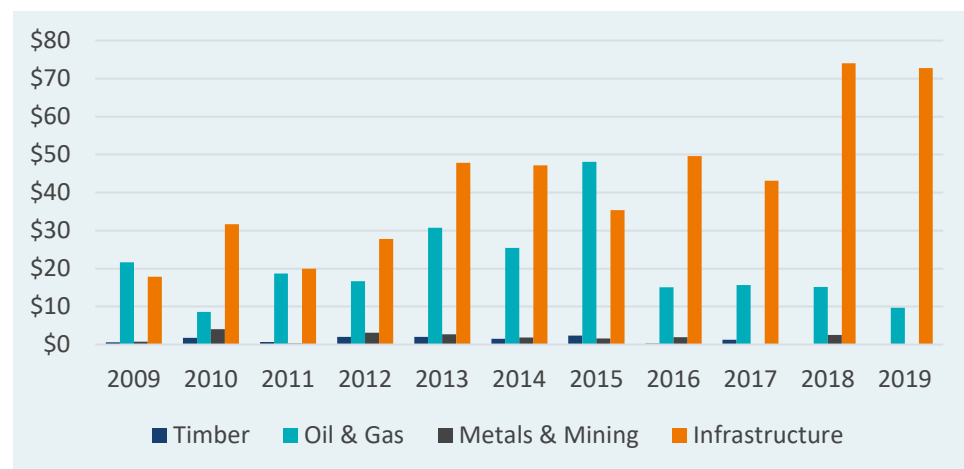
Source: PitchBook

PUBLIC & PRIVATE NATURAL RESOURCES RETURNS

Source: Thomson Reuters C|A, S&P

ESG considerations within real assets

Infrastructure	Natural Resources
Transportation	Agriculture
Energy Infrastructure	Timberland
Renewables	Mining
Communication	Energy
Water	
Social	

There are opportunities for both positive and negative ESG outcomes within real assets. In general, there are more positive and neutral options within infrastructure, while it can be difficult to avoid ESG issues in natural resources.

- Potential ESG concerns
- Potential impact opportunity
- No concerns or opportunities

Pacing model

RA Category	2020	2021	2022	2023	2024	2025	2026
	Actual Commit ($)	**Projected Commit ($)**	**Projected Commit ($)**	**Projected Commit ($)**	**Projected Commit ($)**	**Projected Commit ($)**	**Projected Commit ($)**
Infrastructure	$ 70,000,000	$ 40,000,000	$ 40,000,000	$ 40,000,000	$ 40,000,000	$ 40,000,000	$ 40,000,000
Natural Resources	$ -	$ 40,000,000	$ 40,000,000	$ 40,000,000	$ 40,000,000	$ 40,000,000	$ 40,000,000
Total RA Portfolio	**$ 70,000,000**	**$ 80,000,000**	**$ 80,000,000**	**$ 80,000,000**	**$ 80,000,000**	**$ 80,000,000**	**$ 80,000,000**
Listed Infrastructure		$ 19,512,333	$ (35,612,962)	$ (38,217,038)			
Listed Natural Resources		$ (76,923,251)	$ (20,774,228)	$ (22,293,272)			
Commodities		$ (34,585,367)	$ (2,967,747)	$ (3,184,753)			
Total Public		**$ (91,996,286)**	**$ (59,354,936)**	**$ (63,695,064)**			

	Projected Commit (#)	Projected Commit (#)	Projected Commit (#)	Projected Commit (#)	Projected Commit (#)	Projected Commit (#)	Projected Commit (#)
Infrastructure	2	1	1	1	1	1	1
Natural Resources	0	1	1	1	1	1	1
Total	**2**	**2**	**2**	**2**	**2**	**2**	**2**

- This pacing model assumes a 5.0% target allocation to real assets with a private to public ratio of 75:25.

- Deploying ~$80M/year should result in hitting the target allocation in 5-6 years.
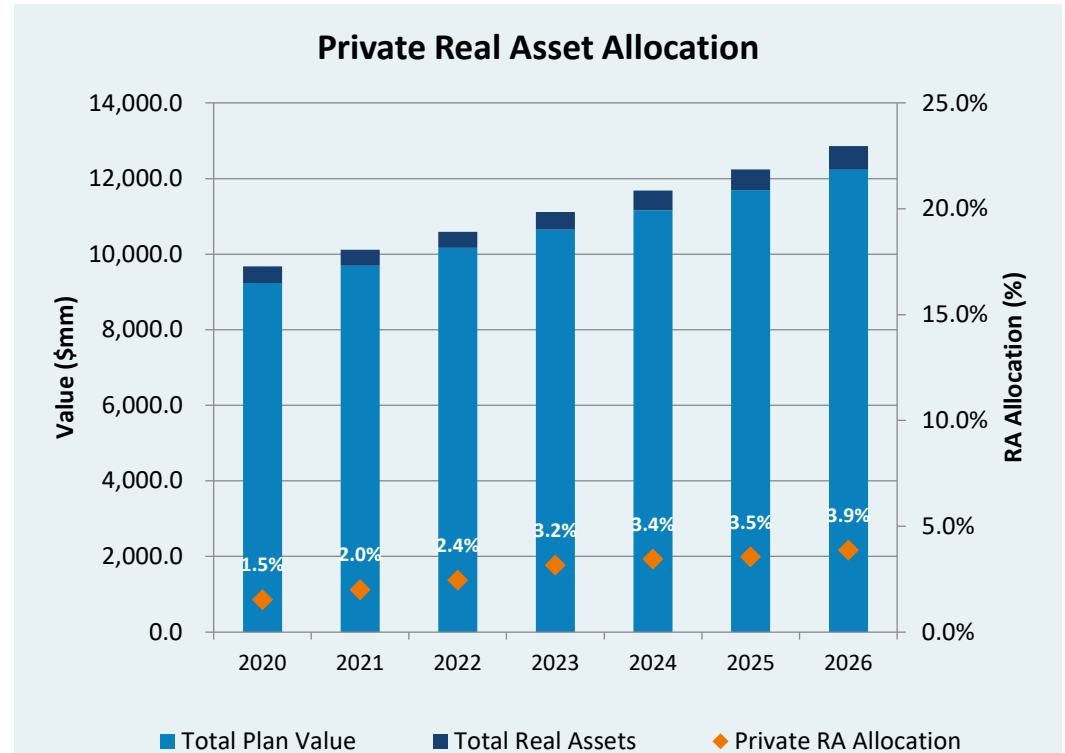
Next steps - timeline

— Phase 1 (1-2 quarters):

- Shift allocation within SSGA Real Asset Liquid Pool to:
  - 60% infrastructure
  - 35% natural resources
  - 5% commodities

— Phase 2 (5+ years)

- 2-3 private funds/year
- Projected to reach target in 2026

Private Real Asset Allocation

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