Agenda

Marin County Employees' Retirement Association (MCERA)
Retirement Board Strategic Workshop

One McInnis Parkway, First Floor
San Rafael, CA
April 27-28, 2021

This meeting will be held via video conference pursuant to Executive Order N-25-20, issued by Governor Newsom on March 12, 2020, Executive Order N-29-20, issued by Governor Newsom on March 17, 2020, and Executive Order N-35-20, issued by Governor Newsom on March 21, 2020.

Instructions for watching the meeting and/or providing public comment, as well as the links for access, are available on the How to Watch Meetings page of MCERA's website. Please visit https://www.mcera.org/retirementboard/agendas-minutes/watchmeetings for more information.

The Board of Retirement encourages a respectful presentation of public views to the Board. The Board, staff and public are expected to be polite and courteous, and refrain from questioning the character or motives of others. Please help create an atmosphere of respect during Board meetings.

Day 1
April 27, 2021

Meeting Chair Steven Block

9:00 a.m.
Call to Order/Roll Call

Open Time for Public Expression
Open time for public expression, from three to five minutes per speaker, on items not on the Board Agenda. While members of the public are welcome to address the Board during this time on matters within the Board's jurisdiction, except as otherwise permitted by the Ralph M. Brown Act (Government Code Sections 54950 et seq.), no deliberation or action may be taken by the Board concerning a non-agenda item. Members of the Board may (1) briefly respond to statements made or questions posed by persons addressing the Board, (2) ask a question for clarification, or (3) provide a reference to staff for factual information.

9:00 a.m. – 9:45 a.m.
Asset/Liability Study Process Overview
Jay Kloepfer, Callan, Capital Markets Research

9:45 a.m. – 10:30 a.m.
Measuring Pension Liabilities:

- **How Do Pension Liabilities Change Over Time**
- **How Do Assumptions About Risk Impact the Measurement of the Liability**
- **How are the Liability Measures Used in the Asset/Liability Study**

Graham Schmidt, ASA, FCA, MAAA, EA Consulting Actuary, Cheiron

10:30 a.m. – 10:45 a.m.
Break

10:45 a.m. – 11:15 a.m.
Modern Portfolio Theory: How do investment risk and diversification affect returns
Jay Kloepfer, Callan, Capital Markets Research

11:15 a.m. – 11:45 a.m.
The Case for Reversion to the Mean
Jim Callahan, President, Callan LLC
Jay Kloepfer, Callan, Capital Markets Research

11:45 a.m. – 1:00 p.m.
Lunch Break

1:00 p.m. – 2:00 p.m.
Domestic Equity Structure Review
Jim Callahan, President, Callan LLC

2:00 p.m. – 3:00 p.m.
Absolute Return/Multi-Asset Class Investments
Jim Callahan, President, Callan LLC

3:00 p.m. – 3:30 p.m.
Closing and Follow-up Items from Today's Agenda

Day 2
April 28, 2021

9:00 a.m.
Call to Order/Roll Call

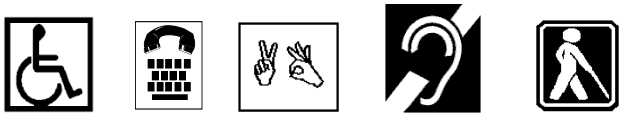
Open Time for Public Expression

9:00 a.m. – 10:00 a.m.
Review and Discussion of Operational Performance Measures
Jeff Wickman, Retirement Administrator
Michelle Hardesty, Assistant Retirement Administrator

Closing and Follow-up Items from Today's Agenda
10:00 a.m. – 10:30 a.m.

Note on Process: Items designated for information are appropriate for Board action if the Board wishes to take action. Any agenda item from a properly noticed Committee meeting held prior to this Board meeting may be considered by the Board.

Note on Voting: As provided by statute, the Alternate Safety Member votes in the absence of the Elected General or Safety Member, and in the absence of both the Retired and Alternate Retired Members. The Alternate Retired Member votes in the absence of the Elected Retired Member. If both Elected General Members, or the Safety Member and an Elected General Member, are absent, then the Elected Alternate Retired Member may vote in place of one absent Elected General Member.



Agenda material is provided upon request. Requests may be submitted by email to MCERABoard@marincounty.org, or by phone at (415) 473-6147.

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The agenda is available on the Internet at http://www.mcera.org

Callan

April 27, 2021

Asset Liability Study Process Overview

Jay Kloepfer
Capital Markets Research

Scope of the Project

Asset/Liability Study

Phase 1

- Review MCERA's current investment program
  - Strategic allocation to broad asset classes
  - Important to distinguish between "strategy" (i.e.—the target asset class/benchmark) and "implementation" (i.e.—the way the manager constructs the portfolio)
- Set asset class, portfolio expectations
  - Return, risk, correlation, and other considerations
  - Evaluate potential new asset classes/strategies

Phase 2

- Build integrated asset-liability model:
  - Reflect 6/30/2020 valuation results; confirm model assumptions, review with actuary. Roll valuation results forward to 6/30/21 to begin projections.
  - Deterministic projections – assume valuation assumptions are achieved
  - Simulation – apply Callan's capital market projections, insert capital market uncertainty, evaluate alternative investment strategies

Phase 3

- Develop preliminary asset-liability results
  - Confirm decision variables; ascertain risk tolerance and effective investment time horizon
  - Callan internal peer review of the study's results. Ongoing review and interaction with staff.
- Develop the final asset-liability study
  - Present finalized asset-liability results to MCERA Board of Trustees
  - MCERA Board selects an appropriate asset allocation

Proposed Timeline

July/August 2021

- Construct liability model in ProVal, starting with 2020 valuation results

September 2021

- Callan presentation: Overview of study process, review of current program, set capital market expectations, evaluate potential new strategies (Phase 1)
- Complete liability model, integrate asset mixes and develop projections and simulations (Phase 2)
- Review results with staff, actuary

October 2021

- Callan presentation: Deliver preliminary asset-liability study results for discussion with Board at October Workshop, focus on liability modeling (Phase 3). Consider alternative asset mixes

December 2021

- Callan presentation: Deliver refined asset-liability study results. Complete study, adoption by Board

Callan

Process Overview

Why Make Capital Markets Projections?

Guiding objectives and process

Cornerstone of a prudent process is a long-term strategic investment plan

- Capital markets projections are key elements — set reasonable return and risk expectations for the appropriate time horizon
- Projections represent our best thinking regarding the long-term (10-year) outlook, recognizing our median projections represent the midpoint of a range, rather than a specific number
- Develop results that are readily defensible both for individual asset classes and for total portfolios
- Be conscious of the level of change suggested in strategic allocations for long-term investors: DB plan sponsors, foundations, endowments, trusts, DC participants, families, and individuals
- Reflect common sense and recent market developments, within reason

Callan's forecasts are informed by current market conditions, but are not built directly from them

- Balance recent, immediate performance and valuation against long-term equilibrium expectations

Why Conduct an Asset and Liability Study?

The cornerstone of a prudent process for pension plan, endowment, and foundation trustees (and any individual investor) is a careful and thorough examination of their long-term strategic plan.

Explicitly acknowledge change and uncertainty in the capital markets.

Establish reasonable rate-of-return and risk expectations.

Incorporate material changes in strategic plan policies and demographics

- Funding policy, benefit formula, eligibility, early retirement, COLA, decrement tables

Reflect changes in regulations

- Public pension: GASB 67 and 68

Project and evaluate impact on assets, liabilities and funded status.

Confirm an investment policy to meet return and risk objectives in relation to funding, accounting and policy goals.

If no material changes have occurred, an asset allocation review should still be conducted every 3 – 5 years.

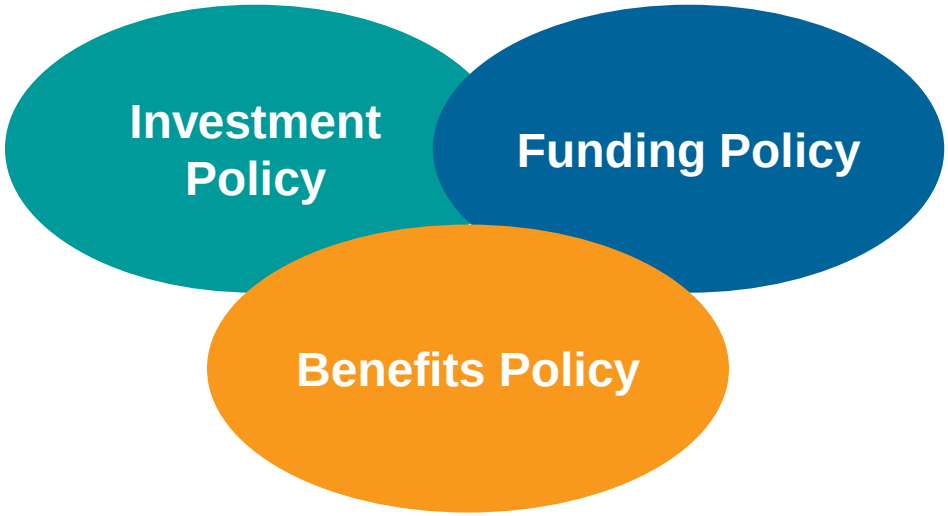
Where Does Asset Allocation Fit In Strategic Planning?

Integration of Key Operational Policies

We evaluate the interaction of the three key policies that govern a retirement plan with the goal of establishing the best investment policy

Investment Policy

- How will the assets supporting the benefits be invested?
- What risk and return objectives?
- How to manage cash flows?



Funding Policy

- How will the benefits/deficits be paid for (funded)?
- What are the actuarial assumptions to use?

Benefits Policy

- What type/kind of benefits?
- What level of benefit?
- When and to whom are they payable?

Defining MCERA's Risk Tolerance

Factors Critical to Decision-Making

Size of the Plan

Current funded status

Expected funding requirements

Plan status (open to new participants; existing members still accrue benefits)

Time horizon

Liquidity needs:

- Benefit payment less contributions
- Funding policy can impact liquidity needs

Liability growth rates

Willingness to take risk:

- Sensitivity to size of contribution or contribution volatility

Financial ability to take risk

Capital Markets Research

What makes our team great?

- Customized approach to decision-making
- Rigorous modeling and analysis
- Extensive experience with various investment pools

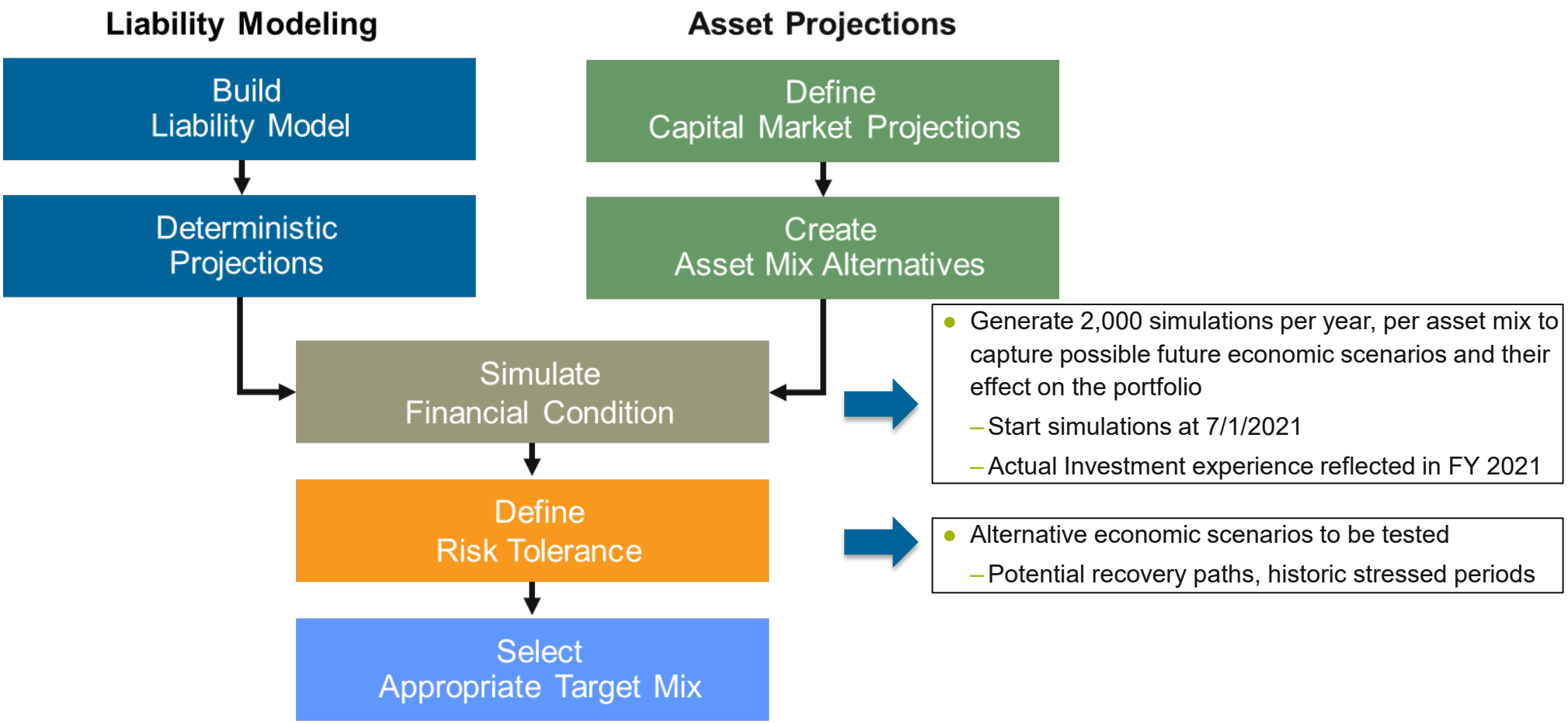
- Conducts all asset/liability, asset allocation, and asset spending studies for our clients
- Performs investment structure work to follow asset allocation decisions
- Provides capital market research and develops proprietary capital market assumptions for use in risk/reward modeling
- Provides custom client research and education

Gary Chang, CFA
Jason Ellement, FSA, CFA
Jay Kloepfer

Adam Lozinski
Kevin Machiz, CFA, FRM
Julia Moriarty, CFA

John Pirone, CFA, FRM, CAIA
Sweta Vaidya, FSA, CFA, EA
James Van Heuit

Callan Asset-Liability Process



Investment Policy Process

Broad Definitions are Most Appropriate for Asset Allocation Policy Analysis

Investment policy study is focused on capital market risk and return

- Asset allocation policy is based on acceptable asset classes and acceptable level of investment uncertainty

An asset class is a group of securities or investment strategies that have similar financial characteristics; behave similarly in response to market conditions; and behave differently from the securities (or strategies) contained in other asset classes.

Equity	Fixed Income	Real Assets	Absolute Return
US Equity	Bonds	Private	Private
Non-US Equity	Short Term Cash	Public	Public
Private Equity			
US Large Cap	US Investment Grade	Private Real Estate	Hedge Funds
US Mid/Small Cap	Global Fixed Income	Public Real Assets:	Multi-Asset Class Strategies
Non-US Developed		REITs	Liquid Alternatives
Non-US Emerging		Commodities	
Private Equity		TIPS	
		Natural Resource Equity	

Liability Model and Key Actuarial Assumptions – 2020 Actuarial Valuation

Variable	Value
As of 6/30/2020	
Total Actuarial Liability	$3,124.8mm
Market Value of Valuation Assets	$2,625.3mm
Unfunded Actuarial Liability	$499.5mm
Market Funded Status	84.0%
Employer Contribution for FYE 2019	29.68%
Employer Contribution for FYE 2020	30.53%

Key Actuarial Assumptions	Description
Investment Return	6.75%
Price Inflation	2.50%
Salary Scale	3.0%, plus longevity & promotion
COLA	2%-4% caps, vary by plan and tier

- Asset-liability projections will be based on the 6/30/2020 actuarial report for the MCERA Plan
- 2020-21 investment experience will be reflected in projections; return on Plan assets for FY 20 was 3.48%, expected to be substantially higher for FY 21

Employer contributions shown above are blended rates incorporating multiple plan groups and tiers, and reflect the employers' share of normal cost plus substantial contributions to pay down the unfunded actuarial liability.

Employee contributions are in addition to the rates shown above, and vary by plan group.

Callan

2021 Capital Markets Expectations & Impact on MCERA Policy Target

Setting Capital Markets Expectations in an Uncertain Environment

One challenge to creating long-term forecasts is a shifting market environment.

- Where do you start?
  - Time horizon?
  - Does valuation matter?
  - What interest rate?
  - A downturn in the economy and cycles in the capital markets are fully expected over a 10-year cycle
  - Discipline in the face of uncertainty is difficult
- Arbitrary impact of plan year end dates on sponsor's results. Your funded status would look a lot different if your plan year ends on 6/30 or 9/30 rather than 12/31/20.
- Interest rate volatility wreaks havoc with LDI glidepaths.

Market volatility since February 2020 is important, but we question how much it should impact a 10-year outlook used to guide strategic investment policy.

- Equity market bottomed in March, then surged through most of the second, third, and fourth quarters.
- Fed cut rates to zero immediately and has no short-term plans to even think about raising rates.
- Over-reliance on data at a specific starting date assigns outsized impact of current valuations on a 10-year forecast, but…
- Long-term forecast should not be moving month to month; suggests a level of precision and market timing that is not practical.
- One can argue that we have pulled future returns forward from the next couple of years for both stocks and bonds in 2020.

Rhetoric aside, we believe this time the shorter-term changes in the capital markets, particularly the bond market, have indeed been deep enough to change our outlook.

Stunning Recovery in Global Equity Markets in 3Q20

V-shaped equity rebound, ahead of the global economy

Global equity continued the rally in 4Q after March market bottom.

- S&P -33.5% from peak (02/19/20) to low on 3/23/20
- Rebound since March lifted the S&P 500 by 70% through December! However, the strong recovery was concentrated in a few stocks – mega cap, IT.
- Fed cut rates to zero, commenced QE, instituted multiple facilities to backstop money markets, credit markets, and economy.
  - Fed expects to get paid back.
  - Further fiscal stimulus added at year-end.
- Economic recovery will be uncertain in 2021. Release of vaccines a huge positive development, but distribution challenges may keep widespread inoculation from being achieved until mid-year. As COVID-19 infections surge anew, re-openings may be reversed in many states and localities.

Returns for Periods ended 12/31/20

	1 Quarter	1 Year	5 Years	10 Years	25 Years
U.S. Equity					
Russell 3000	14.68	20.89	15.43	13.79	9.67
S&P 500	12.15	18.40	15.22	13.88	9.56
Russell 2000	31.37	19.96	13.26	11.20	9.05
Global ex-U.S. Equity					
MSCI World ex USA	15.85	7.59	7.64	5.19	5.17
MSCI Emerging Markets	19.70	18.31	12.81	3.63	--
MSCI ACWI ex USA Small Cap	18.56	14.24	9.37	5.95	6.49
Fixed Income					
Bloomberg Barclays Aggregate	0.67	7.51	4.44	3.84	5.16
90-day T-Bill	0.03	0.67	1.20	0.64	2.27
Bloomberg Barclays Long Gov/Credit	1.68	16.12	9.35	8.16	7.42
Bloomberg Barclays Global Agg ex-US	5.09	10.11	4.89	1.99	3.97
Real Estate					
NCREIF Property	0.74	1.19	5.82	8.96	9.08
FTSE Nareit Equity	11.57	-8.00	4.77	8.31	9.64
Alternatives					
CS:Hedge Fund Idx*	3.44	2.41	2.76	3.64	7.25
Cambridge Private Equity*	10.82	18.54	13.90	13.85	15.41
Bloomberg Commodity	10.19	-3.12	1.03	-6.50	1.00
Gold Spot Price	-0.02	24.42	12.32	2.92	6.55
Inflation - CPI-U	0.07	1.36	1.59	1.66	2.10

*Cambridge PE data through 09/30/20; CS Hedge Fund Index data through 9/30/20
Sources: Bloomberg, Bloomberg Barclays, Callan, Cambridge, Credit Suisse, FTSE Russell, MSCI, NCREIF, S&P Dow Jones Indices

Summary of Important Changes for 2021 Capital Markets Assumptions

Cash return lowered to 1.0%.

Core fixed income return down 1.0%, to 1.75%.

Public equity returns down 45-55 bps; equity risk premium over both cash and fixed income widened.

Inflation lowered 25 bps to 2.0%.

Efficient smid cap weight set to 15% of broad U.S. equity.

Efficient emerging market equity weight set to 30% of global ex-U.S. equity.

Efficient U.S. / global ex-U.S. equity split to 60/40 neutral weight (not a change, but the market has now caught up to us!)

Private markets returns lowered commensurate with public equity; hedge funds reflect starting cash return.

Ever-broadening set of diversifying asset classes to consider:

- Private credit
- Private infrastructure
- Inflation sensitive equity – REITs, natural resources, global listed infrastructure

2021–2030 Callan Capital Markets Assumptions

Asset Class	Index	Projected Return			Projected Risk	Projected Yield
		1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	
Equities						
Broad U.S. Equity	Russell 3000	8.00%	6.60%	4.60%	17.95%	1.95%
Large Cap U.S. Equity	S&P 500	7.85%	6.50%	4.50%	17.70%	2.00%
Smid Cap U.S. Equity	Russell 2500	8.75%	6.70%	4.70%	21.30%	1.75%
Global ex-U.S. Equity	MSCI ACWI ex USA	8.70%	6.80%	4.80%	20.70%	2.80%
Developed ex-U.S. Equity	MSCI World ex USA	8.25%	6.50%	4.50%	19.90%	3.00%
Emerging Market Equity	MSCI Emerging Markets	9.80%	6.90%	4.90%	25.15%	2.35%
Fixed Income						
Short Duration Gov't/Credit	Bloomberg Barclays 1-3 Yr Gov / Credit	1.50%	1.50%	-0.50%	2.00%	1.55%
Core U.S. Fixed	Bloomberg Barclays Aggregate	1.80%	1.75%	-0.25%	3.75%	2.50%
Long Government	Bloomberg Barclays Long Government	1.35%	0.60%	-1.40%	12.50%	3.00%
Long Credit	Bloomberg Barclays Long Credit	2.95%	2.45%	0.45%	10.50%	4.65%
Long Government/Credit	Bloomberg Barclays Long Gov / Credit	2.30%	1.80%	-0.20%	10.35%	4.00%
TIPS	Bloomberg Barclays TIPS	1.80%	1.70%	-0.30%	5.05%	2.35%
High Yield	Bloomberg Barclays High Yield	4.85%	4.35%	2.35%	10.75%	6.70%
Global ex-U.S. Fixed	Bloomberg Barclays Global Agg xUSD	1.15%	0.75%	-1.25%	9.20%	1.80%
Emerging Market Sovereign Debt	EMBI Global Diversified	3.90%	3.50%	1.50%	9.50%	5.95%
Alternatives						
Core Real Estate	NCREIF ODCE	6.60%	5.75%	3.75%	14.10%	4.40%
Private Infrastructure	MSCI Global Infra / FTSE Dev Core 50/50	7.00%	6.00%	4.00%	15.45%	4.60%
Private Equity	Cambridge Private Equity	11.50%	8.00%	6.00%	27.80%	0.00%
Private Credit	n/a	7.15%	6.25%	4.25%	14.60%	6.25%
Hedge Funds	Callan Hedge FOF Database	4.25%	4.00%	2.00%	8.00%	0.00%
Commodities	Bloomberg Commodity	3.80%	2.25%	0.25%	18.00%	2.00%
Cash Equivalents	90-Day T-Bill	1.00%	1.00%	-1.00%	0.90%	1.00%
Inflation	CPI-U		2.00%		1.50%	

* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

2021–2030 Capital Markets Assumption Correlations

	Broad U.S. Equity	Large Cap	Smid Cap	GI ex-U.S. Equity	Dev ex-U.S. Equity	Em Market Equity	Short Dur	Core U.S. Fixed	Long Gov	Long Credit	Long Gov / Credit	TIPS	High Yield	Global ex-U.S. Fixed	Em Market Debt	Core Real Estate	Private Infra	Private Equity	Private Credit	Hedge Funds	Comm	Cash Equiv	Inflation
Broad U.S. Eq	1.00																						
Large Cap	1.00	1.00																					
Smid Cap	0.93	0.90	1.00																				
GI ex-U.S. Equity	0.82	0.81	0.80	1.00																			
Dev. ex-U.S. Eq	0.78	0.77	0.77	0.98	1.00																		
Em Market Eq	0.80	0.79	0.76	0.93	0.84	1.00																	
Short Duration	-0.06	-0.06	-0.08	-0.08	-0.06	-0.10	1.00																
Core U.S. Fixed	-0.10	-0.10	-0.12	-0.12	-0.11	-0.14	0.81	1.00															
Long Gov	-0.15	-0.15	-0.16	-0.15	-0.13	-0.16	0.67	0.84	1.00														
Long Credit	0.27	0.28	0.25	0.26	0.26	0.24	0.64	0.80	0.69	1.00													
Long Gov / Cr	0.09	0.09	0.07	0.09	0.09	0.07	0.71	0.88	0.90	0.94	1.00												
TIPS	-0.08	-0.08	-0.08	-0.09	-0.09	-0.10	0.56	0.65	0.53	0.52	0.57	1.00											
High Yield	0.72	0.71	0.68	0.71	0.69	0.69	-0.01	0.00	-0.08	0.40	0.20	0.06	1.00										
GI ex-U.S. Fixed	0.01	0.01	0.00	0.06	0.05	0.08	0.48	0.50	0.42	0.49	0.50	0.40	0.12	1.00									
Em Market Debt	0.53	0.53	0.51	0.56	0.52	0.58	0.08	0.12	0.05	0.35	0.24	0.18	0.60	0.15	1.00								
Core Real Estate	0.71	0.71	0.66	0.67	0.66	0.63	-0.01	-0.04	-0.09	0.24	0.10	-0.02	0.53	-0.02	0.36	1.00							
Private Infra	0.72	0.72	0.67	0.69	0.68	0.65	0.00	0.01	-0.03	0.27	0.15	-0.02	0.50	0.03	0.35	0.76	1.00						
Private Equity	0.80	0.80	0.76	0.78	0.76	0.74	-0.10	-0.19	-0.21	0.15	-0.01	-0.14	0.59	0.06	0.43	0.60	0.62	1.00					
Private Credit	0.74	0.73	0.70	0.72	0.70	0.69	0.00	-0.06	-0.10	0.28	0.12	-0.09	0.63	0.06	0.48	0.56	0.52	0.68	1.00				
Hedge Funds	0.78	0.78	0.73	0.76	0.74	0.73	0.10	0.14	0.07	0.39	0.27	0.09	0.64	0.05	0.55	0.52	0.47	0.60	0.61	1.00			
Commodities	0.26	0.26	0.25	0.25	0.25	0.25	-0.10	-0.10	-0.10	0.01	-0.04	0.10	0.15	0.15	0.19	0.21	0.18	0.23	0.17	0.23	1.00		
Cash Equiv	-0.06	-0.06	-0.08	-0.10	-0.10	-0.10	0.30	0.15	0.08	-0.05	0.01	0.12	-0.11	0.00	-0.07	0.00	-0.07	0.00	-0.06	-0.04	-0.02	1.00	
Inflation	-0.01	-0.02	0.02	0.01	0.00	0.03	-0.21	-0.25	-0.23	-0.25	-0.26	0.08	0.05	-0.10	0.00	0.10	0.06	0.06	0.06	0.15	0.29	0.05	1.00

- Relationships between asset classes are as important as standard deviation
- To determine portfolio mixes, Callan employs mean-variance optimization
- Return, standard deviation, and correlation determine the composition of efficient asset mixes

Source: Callan LLC

MCERA Asset Classes - Return and Risk

Asset Class	10-Year Compound Return	Projected Standard Deviation	Real Return
Broad Domestic Equity	6.60%	17.95%	4.60%
Global ex-US Equity	6.80%	20.70%	4.80%
Domestic Fixed Income	1.75%	3.75%	-0.25%
Private Equity	8.00%	27.80%	6.00%
Real Assets	**5.55%**	**12.20%**	**3.55%**
Cash Equivalents	1.00%	0.90%	-1.00%

Total Real Assets portfolio:

- 8% private real estate, 7% public real assets
- Public real assets = 25% TIPS, 25% Commodities, 25% REITs, 25% Natural Resource Equity

The new Opportunistic allocation has a 0% target, so it is not included in these projections.

Source: Callan LLC

MCERA Asset Classes - Correlation

	Broad Domestic Equity	Global Ex-U.S. Equity	Domestic Fixed	Real Assets	Private Equity	Cash Equivalents	Inflation
Broad Domestic Equity	1.00						
Global Ex-U.S. Equity	0.82	1.00					
Domestic Fixed	-0.10	-0.12	1.00				
Real Assets	0.81	0.79	-0.07	1.00			
Private Equity	0.80	0.78	-0.19	0.71	1.00		
Cash Equivalents	-0.06	-0.10	0.15	-0.01	0.00	1.00	
Inflation	-0.01	0.01	-0.25	0.20	0.06	0.05	1.00

Total Real Assets portfolio:

- 8% private real estate, 7% public real assets
- Public real assets = 25% TIPS, 25% Commodities, 25% REITs, 25% Natural Resource Equity

Source: Callan LLC

MCERA - 2021 Efficient Mixes

Real Assets Constrained to 15% of Portfolio

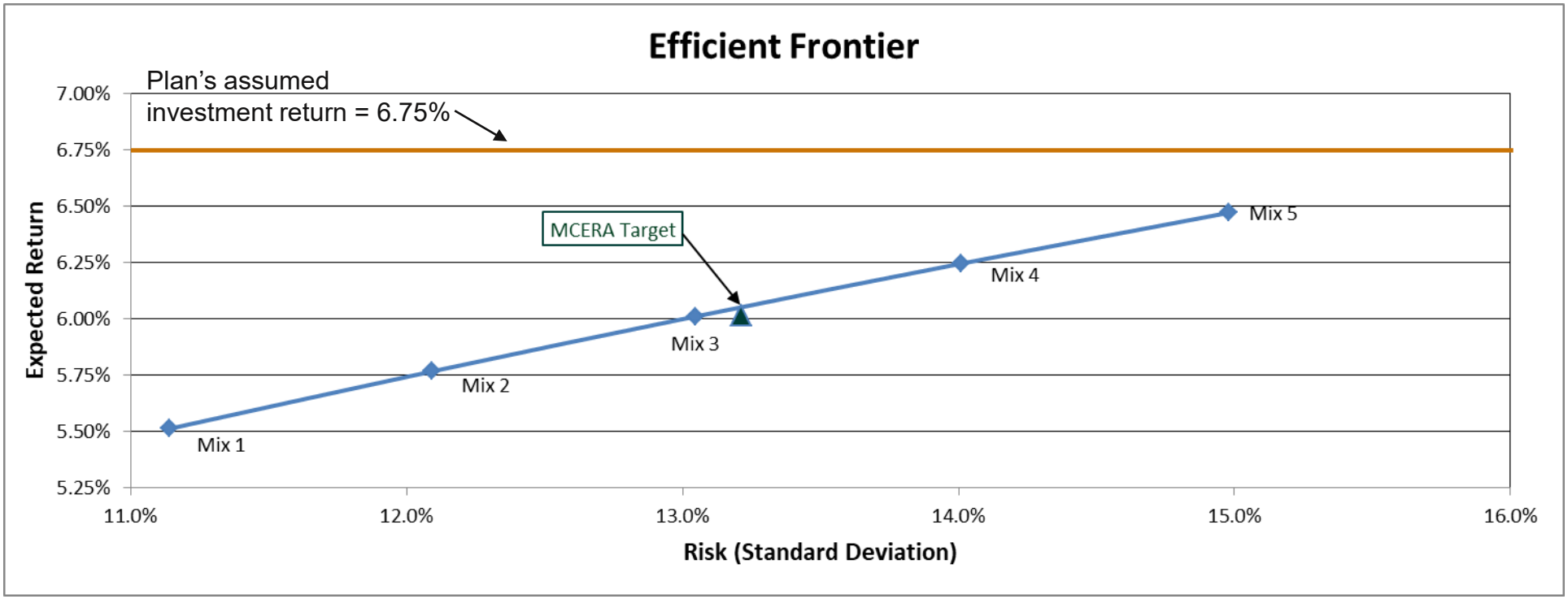
				Alternative Asset Mixes - 15% Real Assets				
Asset Class	MCERA Target	Min Alloc	Max Alloc	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Broad US Equity	32%	0%	100%	24%	27%	29%	32%	34%
Broad International Equity	22%	0%	100%	16%	17%	19%	20%	22%
Broad US Fixed Income	23%	0%	100%	35%	30%	25%	20%	15%
Real Assets	15%	15%	15%	15%	15%	15%	15%	15%
Private Equity	8%	0%	100%	10%	11%	12%	13%	14%
Totals	**100%**			**100%**	**100%**	**100%**	**100%**	**100%**
Expected Return	6.0%			5.5%	5.8%	6.0%	6.2%	6.5%
Real Return	4.0%			3.5%	3.8%	4.0%	4.2%	4.5%
Risk (Standard Deviation)	13.2%			11.1%	12.1%	13.0%	14.0%	15.0%
% equity	62%			50%	55%	60%	65%	70%
% fixed income	23%			35%	30%	25%	20%	15%
% real assets	15%			15%	15%	15%	15%	15%

- Mixes are constrained to hold 15% real assets
- Maximum private equity allocation = 25% of public equity exposure
- No new asset classes included
- The current target mix is efficient and lies on the efficient frontier
- Real assets expands the real estate allocation category to include other real assets, all publicly traded: TIPS, commodities, natural resource equity and REITs. Real estate remains the core, with added diversification.

Source: Callan LLC

MCERA - 2021 Efficient Frontier – Nominal Return

Maximum Private Equity Allocation = 25% of Public Equity Exposure



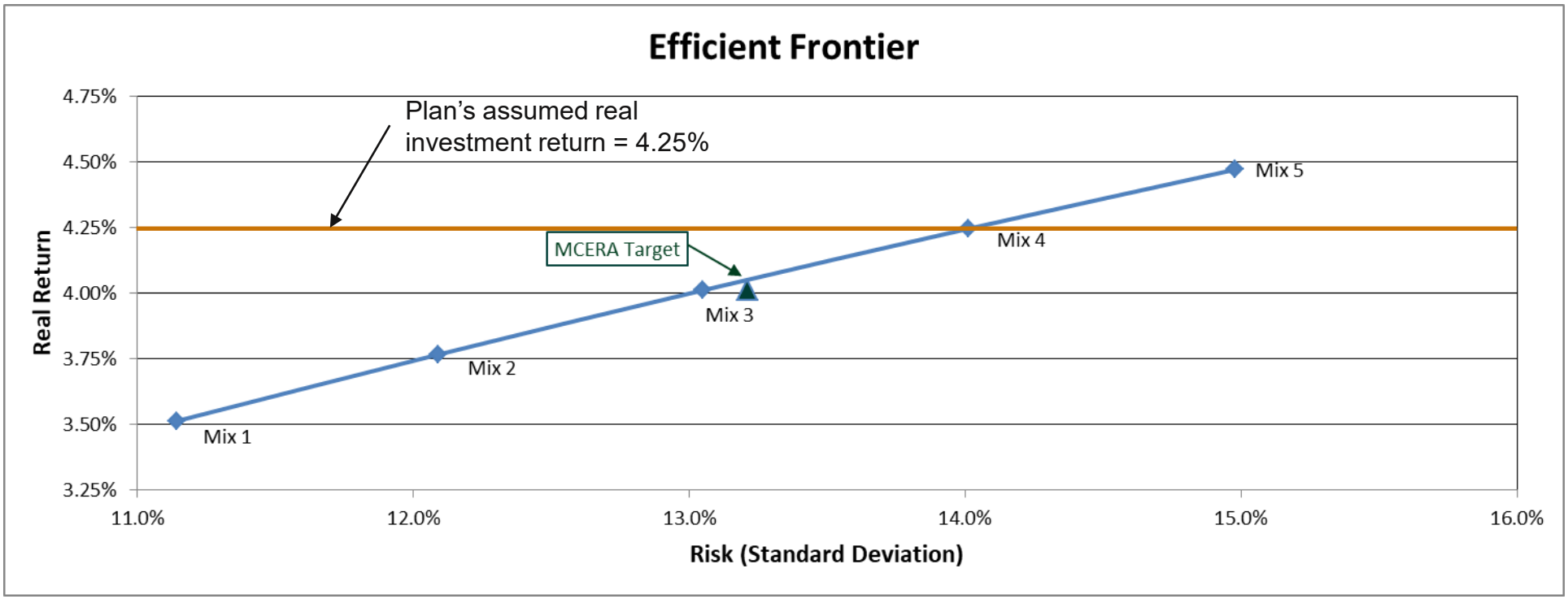
MCERA's asset allocation target is an optimal allocation, since it lies on the efficient frontier depicting risk and return.

Current target is a well-diversified portfolio that includes fixed income, public equity, private equity and real assets, including private real estate.

Source: Callan LLC

MCERA - 2021 Efficient Frontier – Real Return

Maximum Private Equity Allocation = 25% of Public Equity Exposure



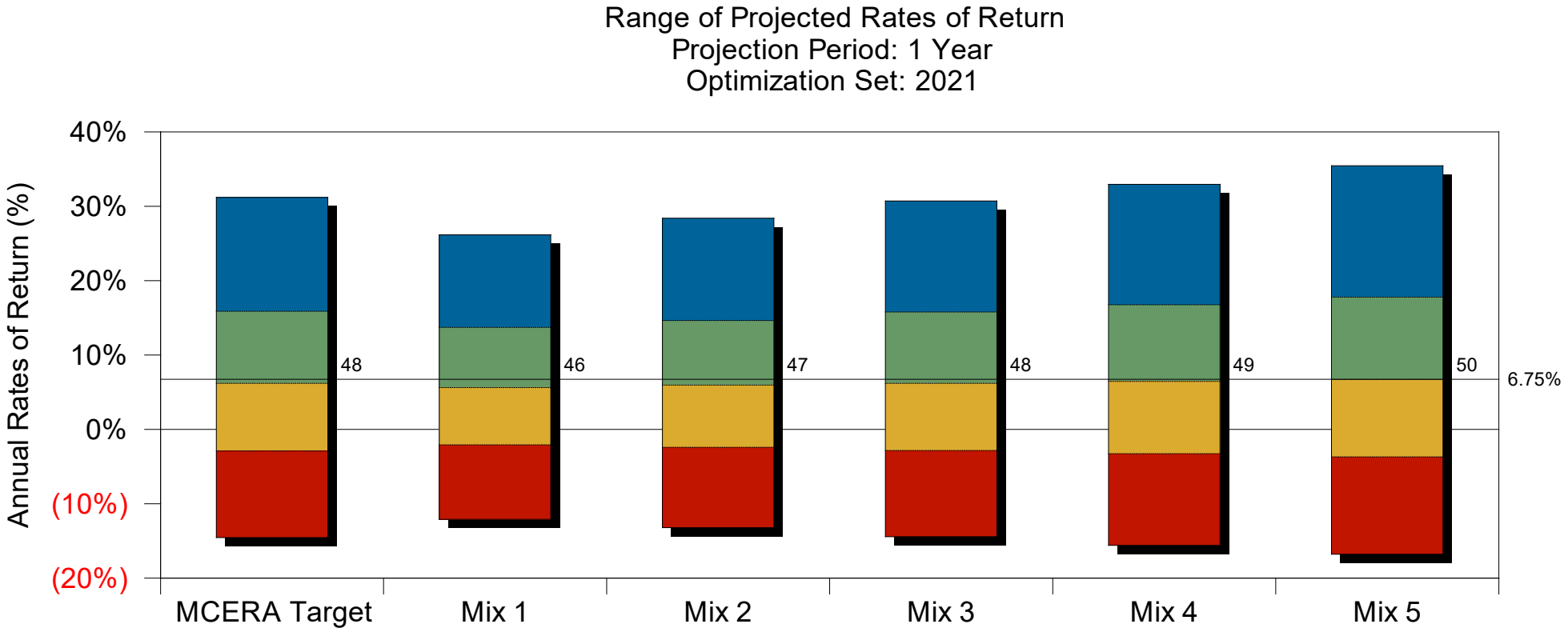
MCERA's long term nominal return assumption of 6.75% and inflation assumption of 2.5% suggest a long term real return target of 4.25%.

Callan's 10-year return expectation for the target asset allocation is 6.0%, and combined with our inflation assumption of 2.0%, yields a real return expectation of 4.0%, lower than the 4.25% assumed in the actuarial valuation.

Source: Callan LLC

Projected Rates of Return – One Year

Maximum Private Equity Allocation = 25% of Public Equity Exposure

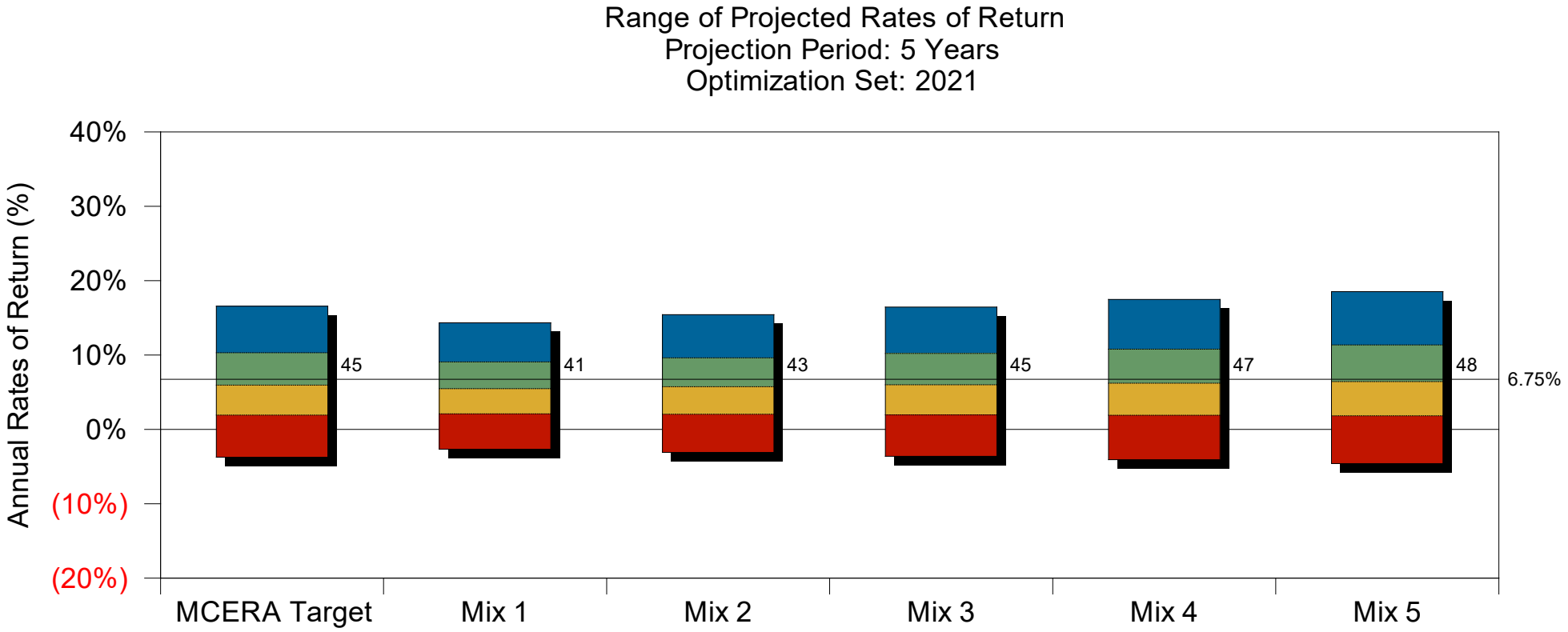


	MCERA Target	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
5th Percentile	31.2%	26.2%	28.4%	30.7%	33.0%	35.5%
25th Percentile	15.9%	13.7%	14.6%	15.8%	16.8%	17.8%
Median	6.2%	5.6%	6.0%	6.2%	6.5%	6.7%
75th Percentile	(2.9%)	(2.0%)	(2.4%)	(2.8%)	(3.3%)	(3.7%)
95th Percentile	(14.5%)	(12.1%)	(13.2%)	(14.4%)	(15.6%)	(16.8%)
Prob > 6.75%	48.4%	46.1%	47.1%	48.2%	49.3%	50.0%

Source: Callan LLC

Projected Rates of Return – Five Years

Maximum Private Equity Allocation = 25% of Public Equity Exposure

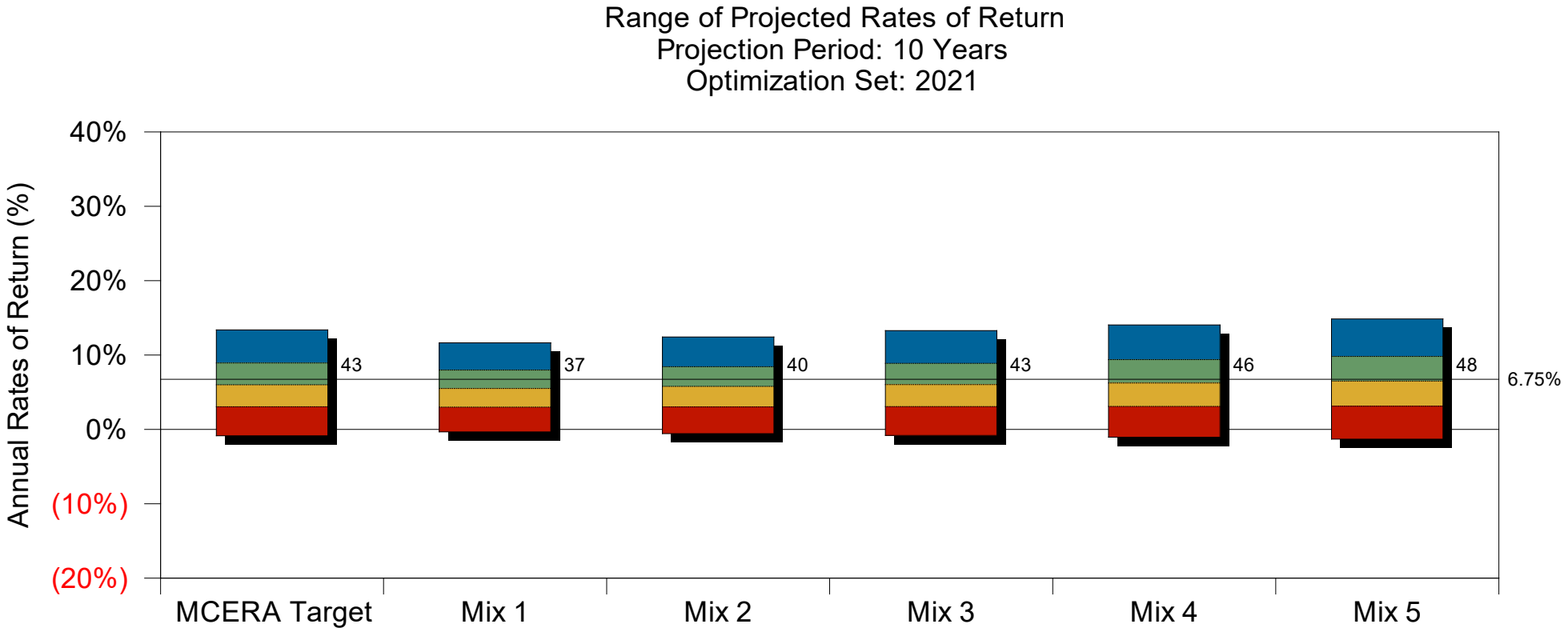


	MCERA Target	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
5th Percentile	16.6%	14.3%	15.4%	16.5%	17.5%	18.5%
25th Percentile	10.3%	9.1%	9.6%	10.2%	10.8%	11.4%
Median	6.0%	5.5%	5.8%	6.0%	6.2%	6.4%
75th Percentile	1.9%	2.1%	2.1%	2.0%	1.9%	1.8%
95th Percentile	(3.7%)	(2.7%)	(3.1%)	(3.6%)	(4.1%)	(4.6%)
Prob > 6.75%	45.0%	40.6%	42.8%	45.1%	46.9%	48.5%

Source: Callan LLC

Projected Rates of Return – Ten Years

Maximum Private Equity Allocation = 25% of Public Equity Exposure



	MCERA Target	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
5th Percentile	13.4%	11.7%	12.4%	13.3%	14.1%	14.9%
25th Percentile	8.9%	8.0%	8.4%	8.9%	9.4%	9.8%
Median	6.0%	5.5%	5.8%	6.0%	6.3%	6.5%
75th Percentile	3.1%	3.0%	3.0%	3.1%	3.1%	3.1%
95th Percentile	(0.8%)	(0.3%)	(0.6%)	(0.8%)	(1.0%)	(1.3%)
Prob > 6.75%	43.0%	36.6%	39.9%	43.0%	45.5%	47.9%

Source: Callan LLC

2021 Capital Market Expectations – Nominal vs Real

Modest Return Expectations Across All Asset Classes

The expected return for the MCERA Policy Target Mix is 6.0%, 75 bps below the 6.75% return assumed in the actuarial valuation. The Plan has a reasonable chance of achieving this result over 10 years (43% probability). Looking to the real return, the gap is smaller. The real return embedded in the valuation (6.75% - 2.5% inflation = 4.25%) is 25 bps higher than Callan's expected real return (6.0% - 2.0% inflation = 4.0%).

While return expectations are low relative to long-term history for the next five- to ten-year horizon, MCERA will need to retain a strong orientation toward risk assets (equity) in pursuit of return to achieve its funding goals.

Whether the plan should pursue more or less exposure to risk assets than the current policy target mix should not be unduly influenced by subdued expectations for the shorter-term 5-10 year horizon. We do not believe investors are likely to be compensated for greater risk taking in the shorter term.

Time Horizon for Capital Market Expectations and Asset-Liability Analysis

Open, active pension plans have very long term liabilities, and necessarily should maintain a long term perspective for investment strategy.

Callan's asset-liability analysis typically focuses on a planning cycle of 5-10 years, incorporating current market conditions and the path from these short term conditions to long term expectations.

Over much of Callan's history, the difference between our shorter-term expectations and our long term numbers was modest; for most planning purposes our short term and long term expectations were the same.

Current conditions, particularly in the fixed income markets, suggest substantial difference in capital market expectations depending on time horizon, and the path from the current conditions to the long term expectations.

The theme of the current Callan 10-year projections: The path to a rational set of long-term capital market outcomes is likely through a shorter term period of rising interest rates, capital losses in fixed income, and volatile equity markets.

Callan

Integration of Assets and Liabilities and the Final Study

Asset/Liability Study Process

Liability Model and Projected Cash Flows

Pension Plan Equation: Benefits + Expenses = Investment Return + Contributions

Callan builds the liability model

- Uses data from plan actuary (Segal)

Liability Assumptions

- Funding Policy
  - Employee contributions
  - Employer contributions
- Benefit Policy
  - Benefit formulas
  - Cost of living increases
- Demographics
  - Ratio of Active vs Retirees
  - Average age
  - Population growth
  - Salary increases
  - Mortality table – longevity risk management
  - Discount rate

Asset/Liability Study

Simulate Financial Condition

Asset mixes are compared and evaluated on both absolute and relative basis.

- Absolute measures are used to evaluate objectives: returns, funded ratios.
- Relative measures compare probable outcomes across asset mixes.

Asset mixes are analyzed through the use of simulated returns.

- Values are based on 2,000 simulated returns over a 10-year projection time period.
- Median results represent the mid point of the simulated outcomes (1,000 returns worse, 1,000 better).
- 95th percentile results represent the highest return of the worst 5% of simulations.
- Forecast range of returns is used to show the probable ranges of contributions and funded status.

Observe patterns of results across Asset Mixes

- Focus is on Median and 95th percentile market values, returns and funded ratios.

After the Modeling – How to Make a Decision?

Potential decision variables include:

- The range of actuarial liability
- Present value of future contributions
- Range of the market (or actuarial) value of Plan assets
- Funded Ratio
- Liquidity and cash flow needs
- Present value of future unfunded liability
- Ultimate Net Cost
  - Ultimate net cost combines contributions paid in over the planning horizon plus the value of the unfunded liability at the end of the projection period.

A discussion of goals and objectives for MCERA's financial future will inform all three major policies: benefits, funding and investments.

Summary Comments

Considerations in the selection of the Investment Policy

Financial strength of the Plan Sponsor

- Contribution volatility

Financial strength of the Plan

- Funded Status: Assets/Liabilities

Investment goals & objectives

- Absolute return
- Relative return
- Funded status

Time Horizon

Liquidity needs

Risk tolerance of decision makers

- Volatility of short term results

Defining Risk Tolerance

Factor	Public Pension and Taft-Hartley	Corporate Pension	Endowment and Foundation
Investment Goal	✓	✓	✓
Time Horizon	✓	✓✓	✓
Liquidity Needs	✓	✓	✓
Willingness to take Risk	✓	✓	✓
Size of Plan/Fund relative to Sponsor	✓	✓✓	✓
Financial Strength of Sponsor	✓	✓✓	✓
Absolute Return Target	✓✓✓		✓✓✓
Projected Funded Status	✓✓	✓	
Contribution Volatility	✓✓	✓	
Liability Characteristics	✓	✓✓	
Financial Statement Sensitivity		✓	
Permissible Investments	✓		
Spending Volatility			✓
Peer Group Comparison	✓	✓	✓

Summary

The asset/liability study will enable MCERA to evaluate the financial condition of the pension plan under alternative investment scenarios into the future.

Only modest changes have been made to funding and benefit policy since the last asset/liability study in 2017; study will fully incorporate these changes and reflect the valuation and projection results of the actuary.

Key actuarial assumptions may need to be reviewed as Callan develops our liability projection model:

- Mortality/longevity
- Salary growth
- Assumed rate of return

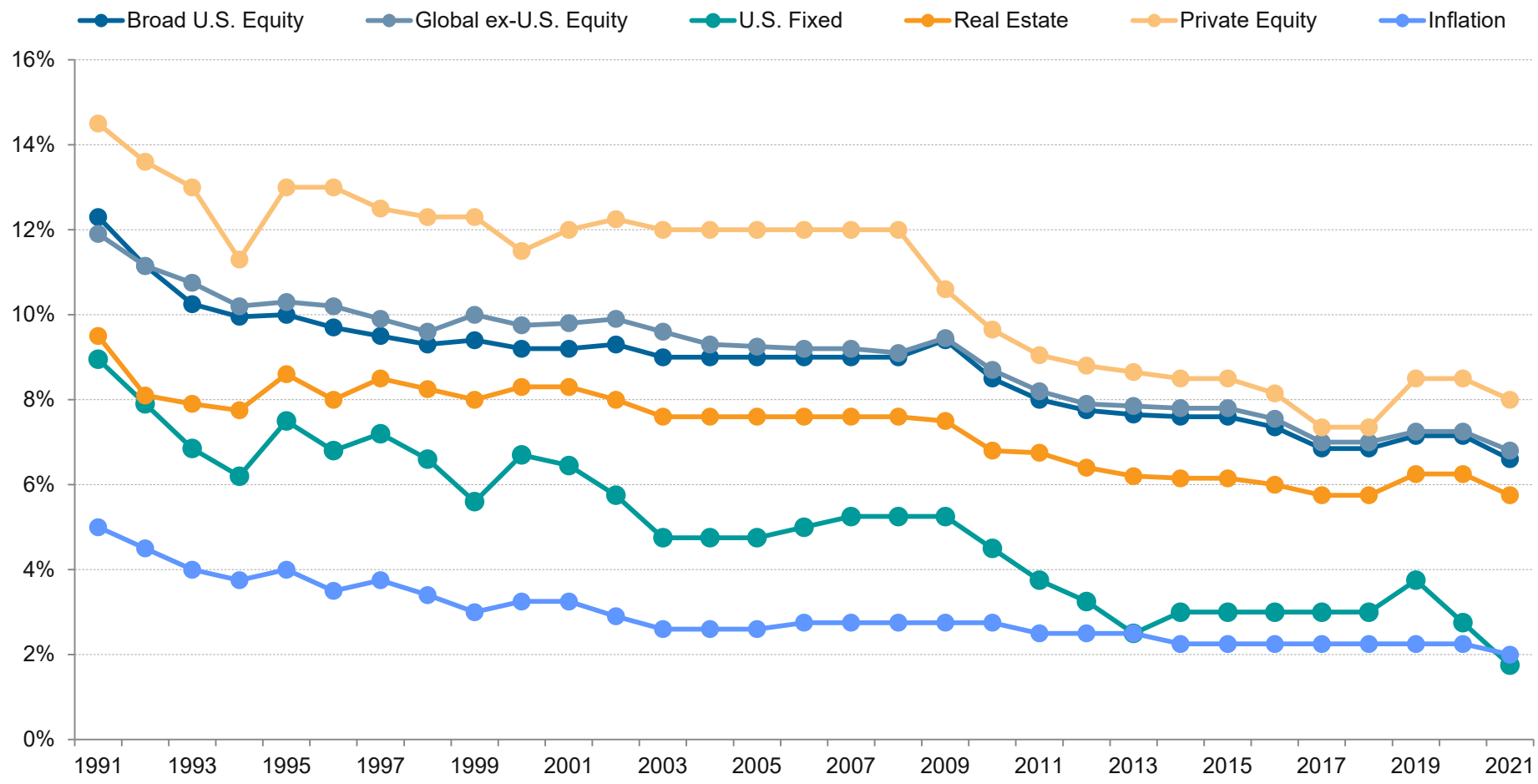
The modeling process will begin using the 2020 valuation; the 6/30/2021 asset results will be incorporated, along with any expected changes to liabilities.

Callan

Appendix

Return Projections: Major Asset Classes

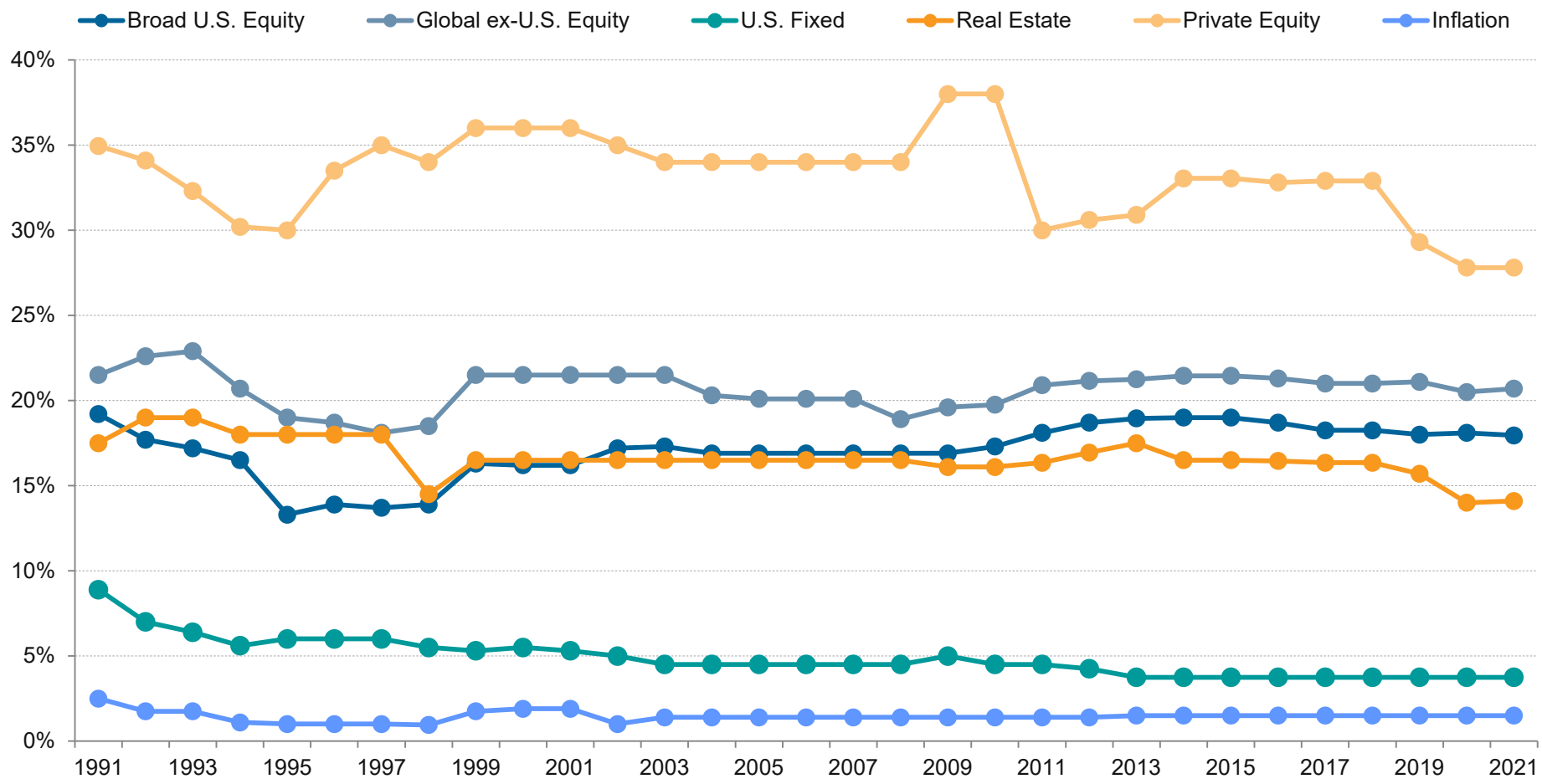
1991–2021



Source: Callan LLC

Risk Projections: Major Asset Classes

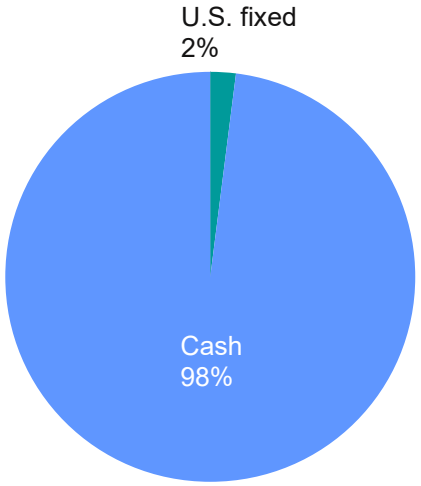
1991–2021



Source: Callan LLC

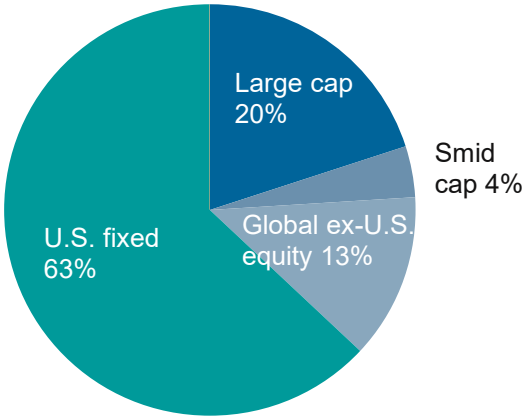
7% Expected Returns Over Past 30+ Years

Increasing Complexity



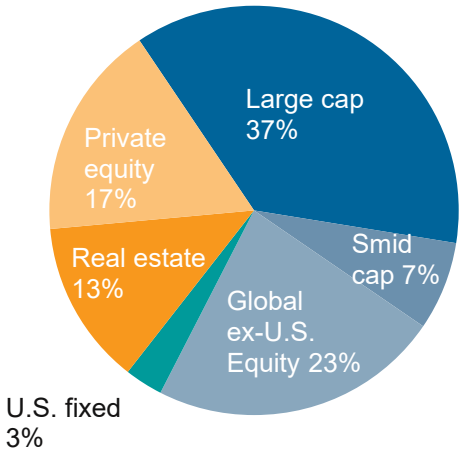
1991

Return:	**7.0%**
Risk:	**1.1%**



2006

Return:	**7.0%**
Risk:	**6.7%**



2021

Return:	**7.0%**
Risk:	**17.3%**

Increasing Risk

In 1991, our expectations for cash and broad U.S. fixed income were 6.95% and 8.95%, respectively

Return-seeking assets were not required to earn a 7% projected return

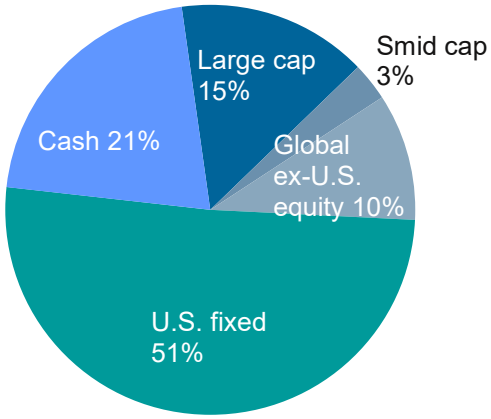
15 years later, an investor would have needed over a third of the portfolio in public equities to achieve a 7% projected return, with 6x the portfolio volatility of 1991

Today an investor is required to include 97% in return-seeking assets to earn a 7% projected return at almost 16x the volatility compared to 1991

Source: Callan LLC

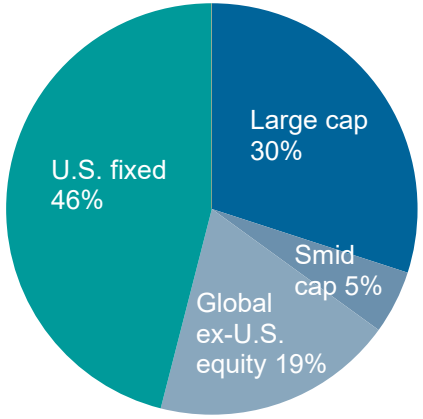
5% Expected Real Returns Over Past 30+ Years

Increasing Complexity



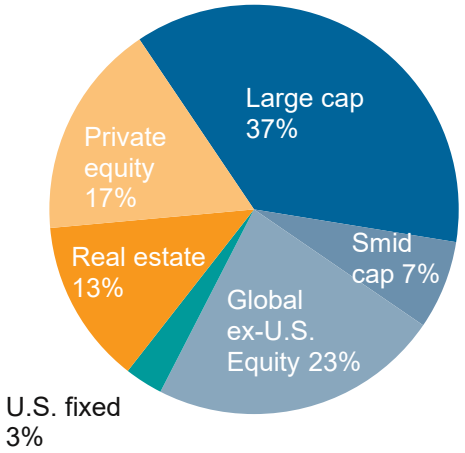
1991

Inflation:	**5.00%**
Real Return:	**5.0%**
Risk:	**6.6%**



2006

Inflation:	**2.75%**
Real Return:	**5.0%**
Risk:	**9.3%**



2021

Inflation:	**2.00%**
Real Return:	**5.0%**
Risk:	**17.3%**

Increasing Risk

Despite a 5% inflation projection, an investor could have almost three-quarters of the portfolio in low-risk assets (cash and fixed income) and still earn a 5% projected real return in 1991

15 years later, an investor would have needed over half of the portfolio in public equities to achieve a 5% projected real return

Today an investor must have 97% in return-seeking assets to earn a 5% projected real return at over 2.5x the volatility compared to 1991

Source: Callan LLC

Disclaimers

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Measuring Pension Liabilities

Marin County Employees' Retirement Association

Strategic Workshop, April 27, 2021

Graham Schmidt
Bill Hallmark

How Do Pension Liabilities Change Over Time?

Overview of Liabilities
History of Liabilities
Projection of Liabilities

How Do Assumptions About Risk Impact the Measurement of the Liability?

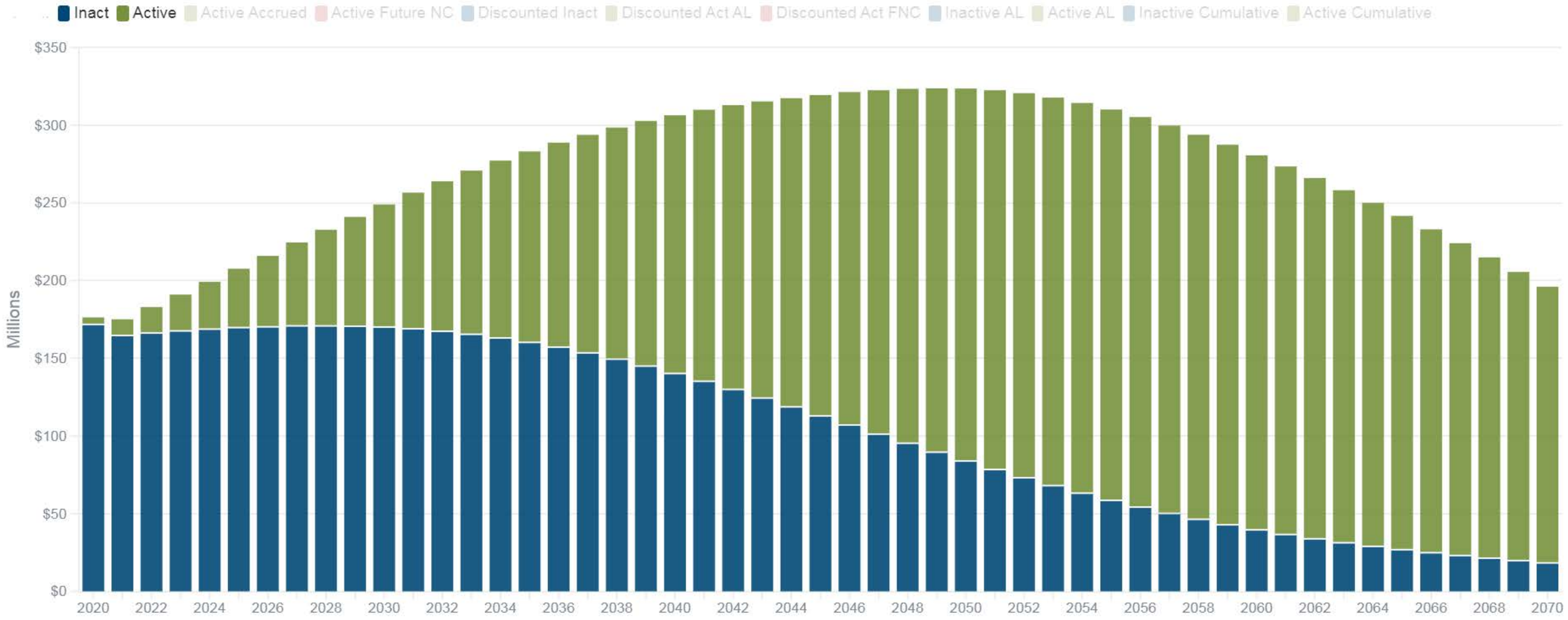
They Don't
Well, Risk Levels Can Affect Assumptions

How Are Liability Measures Used in an Asset/Liability Study?

Projected Liabilities Fixed
Projected Assets Simulated

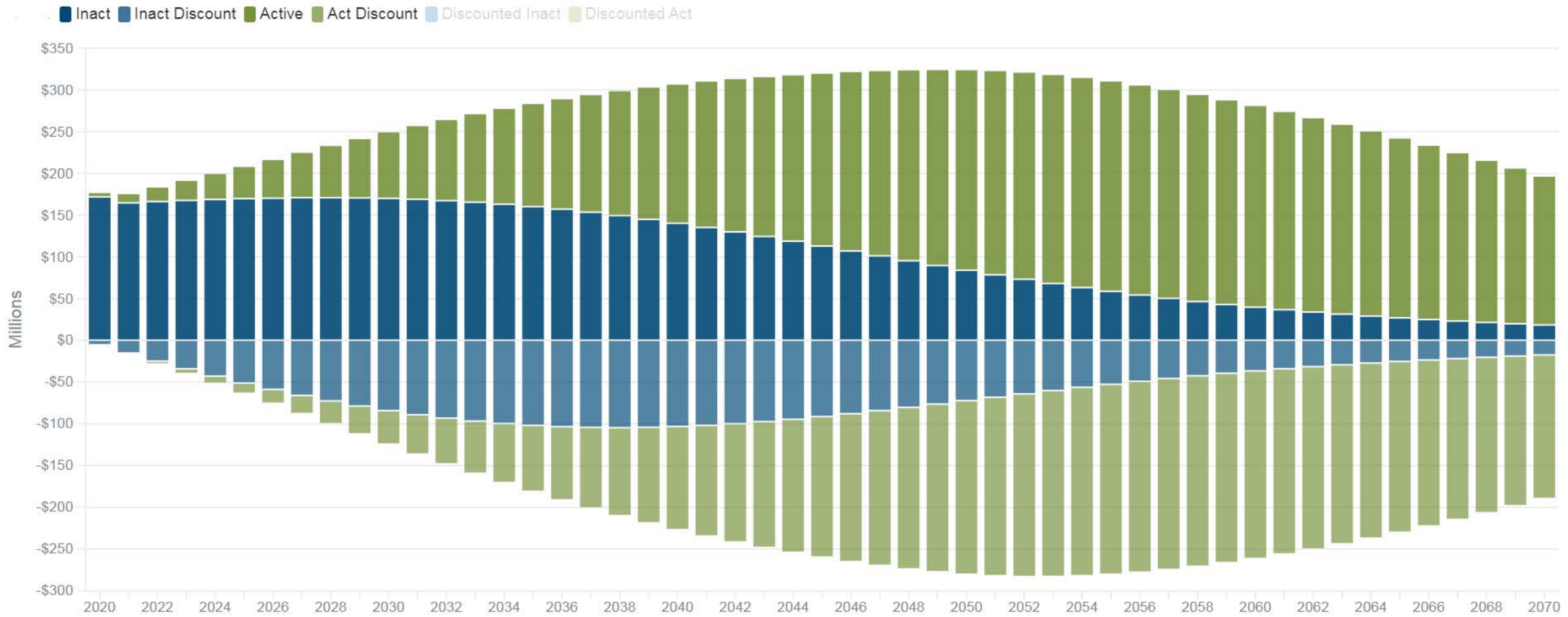
How Do Pension Liabilities Change Over Time?

To calculate liabilities, we first project benefit payments for current the population (including **active** and **inactive** members)



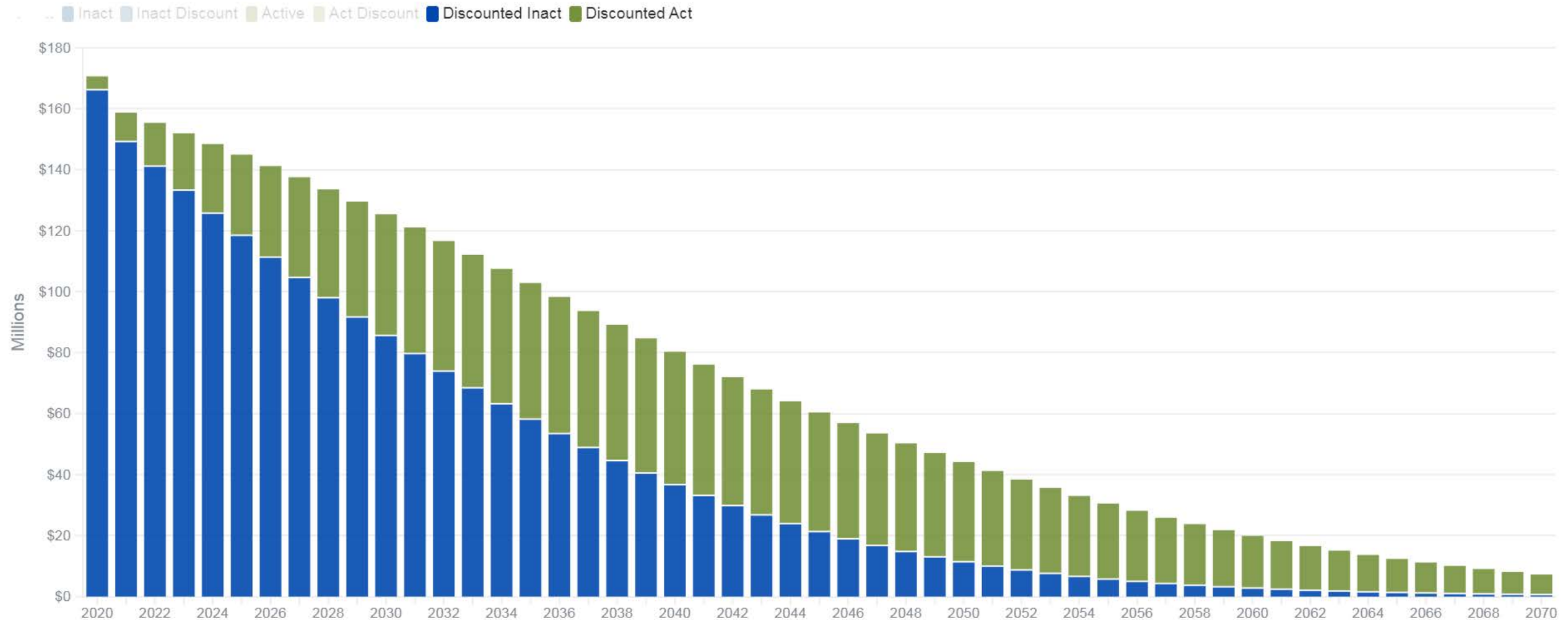
CHEIRON

Now we apply an **interest discount**, which reduces the value of future benefits when expressed in today's dollars (because of the time value of money)

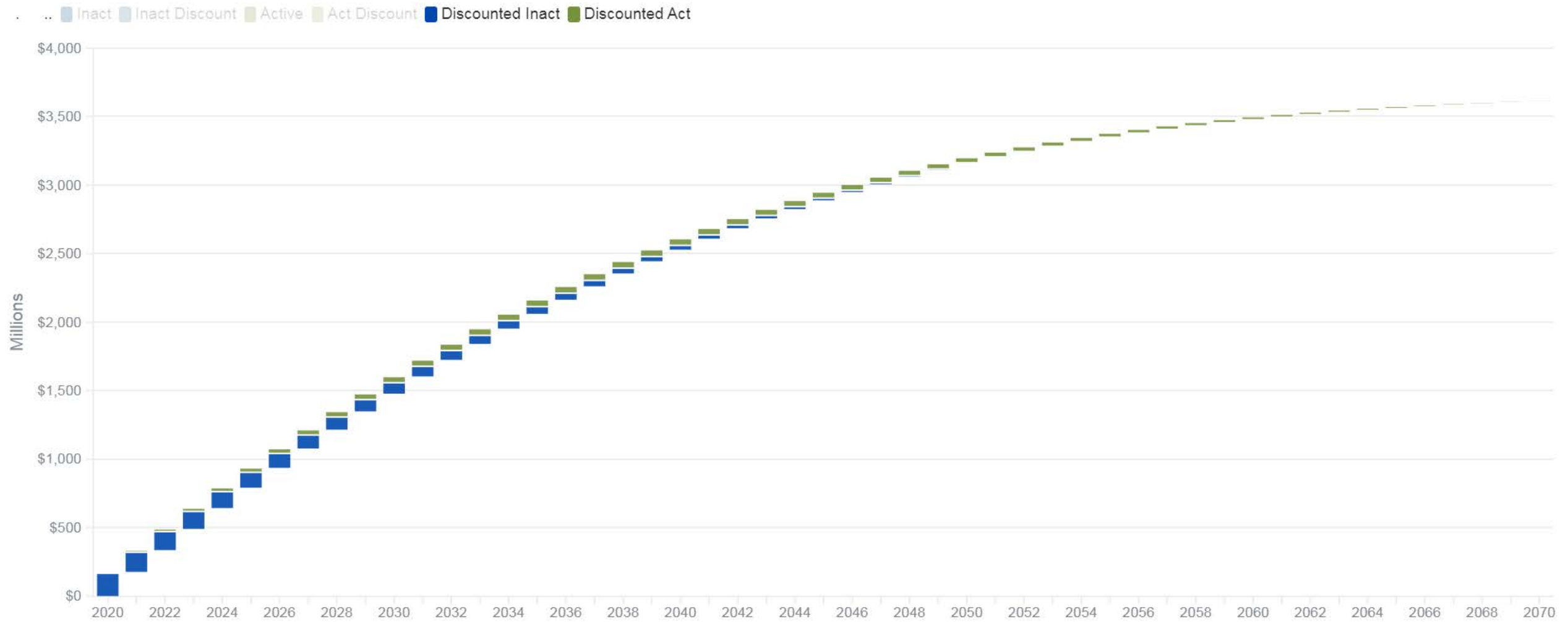


CHEIRON

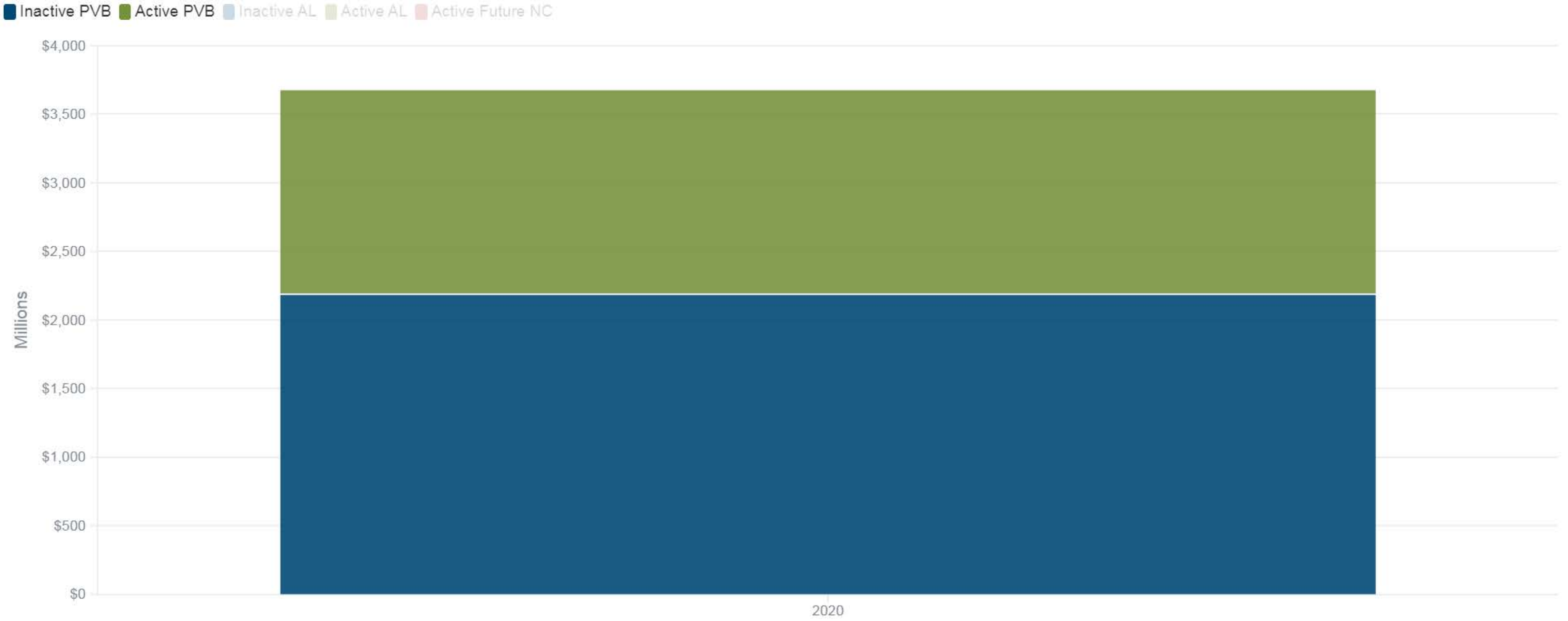
Now showing the **present value** of each year's benefit payment



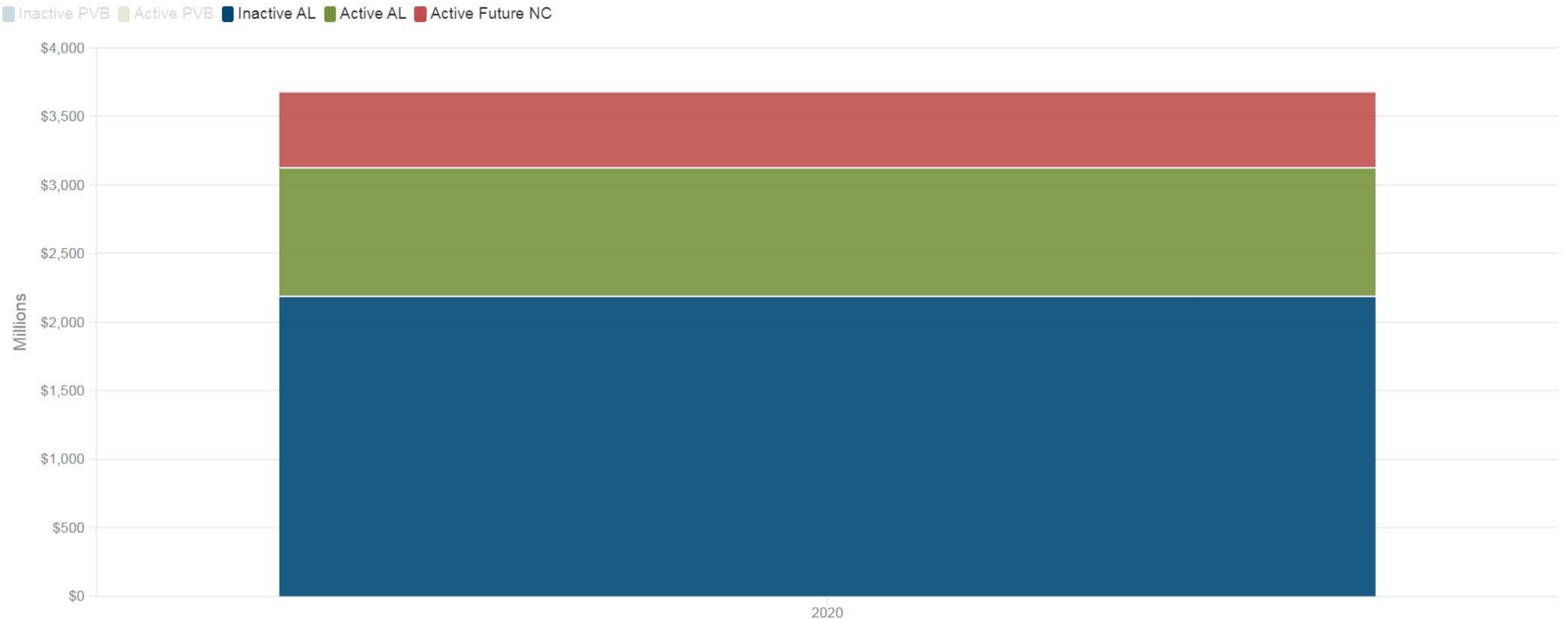
We add them together



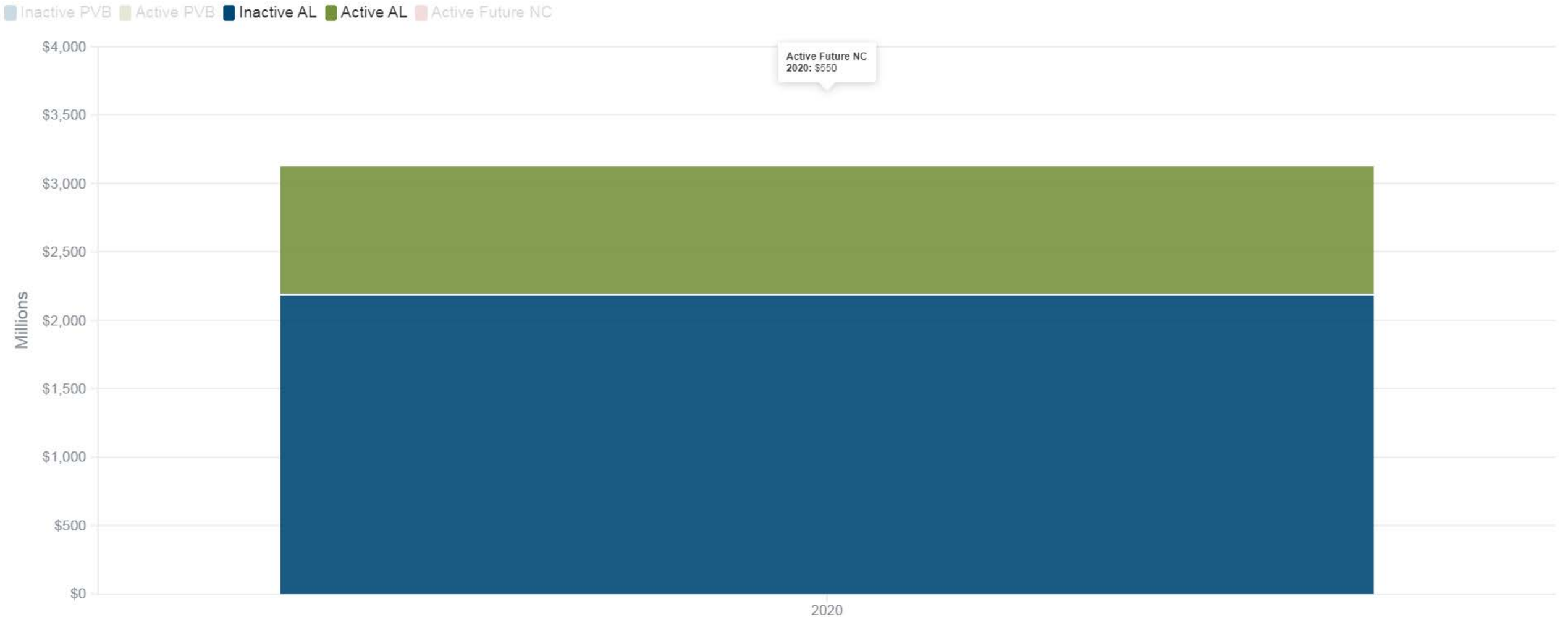
And express as a single sum - the **Present Value of Benefits** - in today's dollars



The active portion can be split into the **accrued liability** (already earned) and **future normal cost** (yet to be earned) portions



Removing the future normal costs produces the **Actuarial Liability** (or current funding target for the assets)



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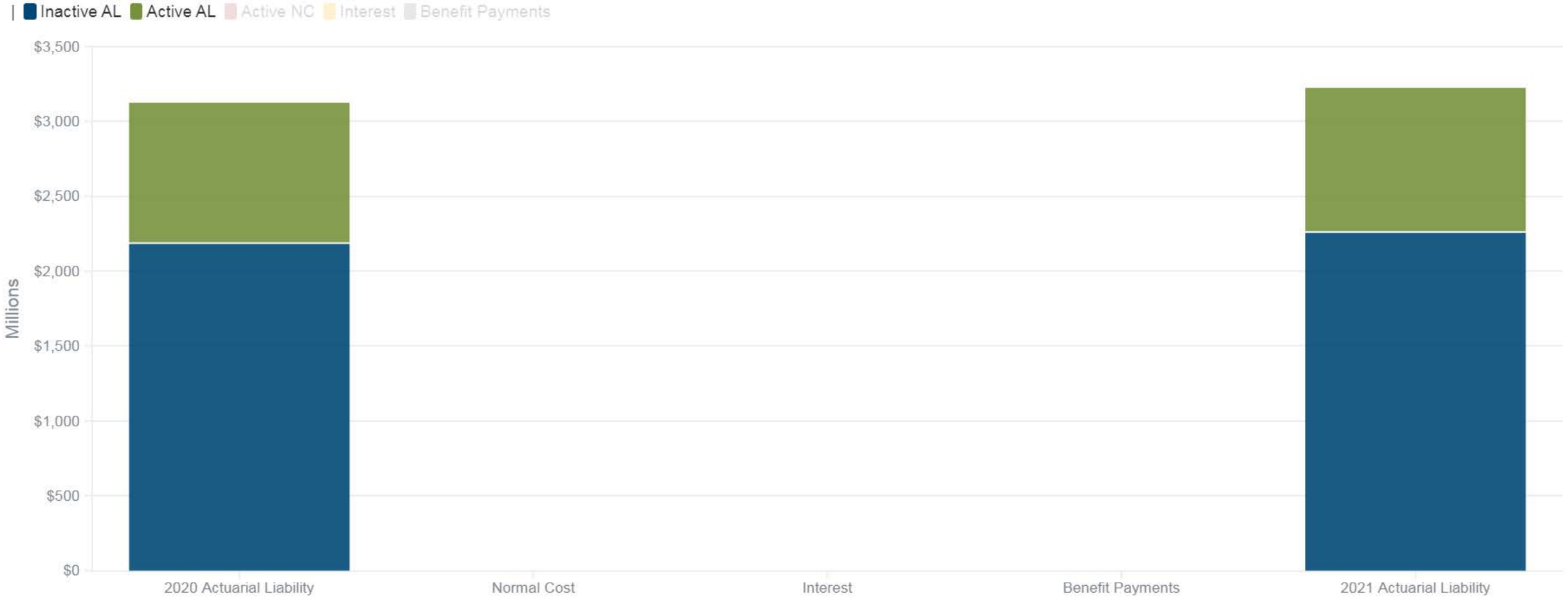
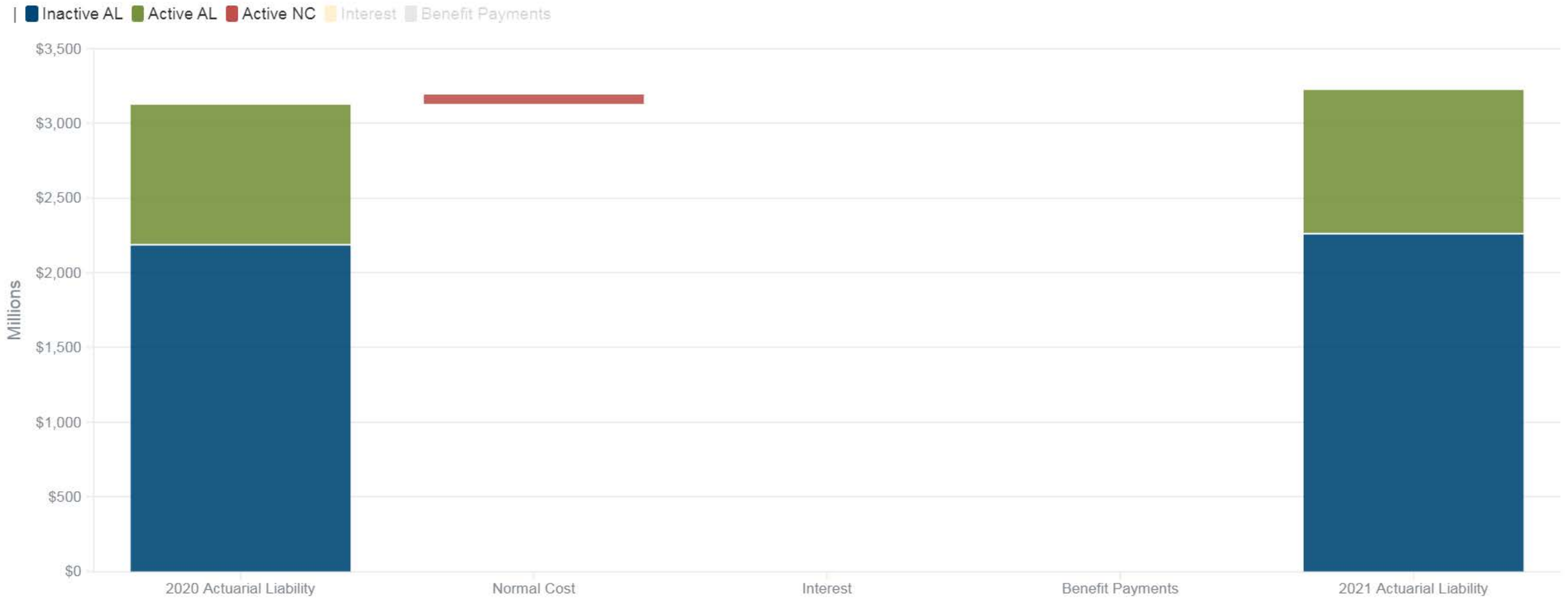
The Actuarial Liability is expected to grow each year

Actuarial Liability Changes by Year



It increases as members earn additional benefits (i.e. the **Normal Cost**)

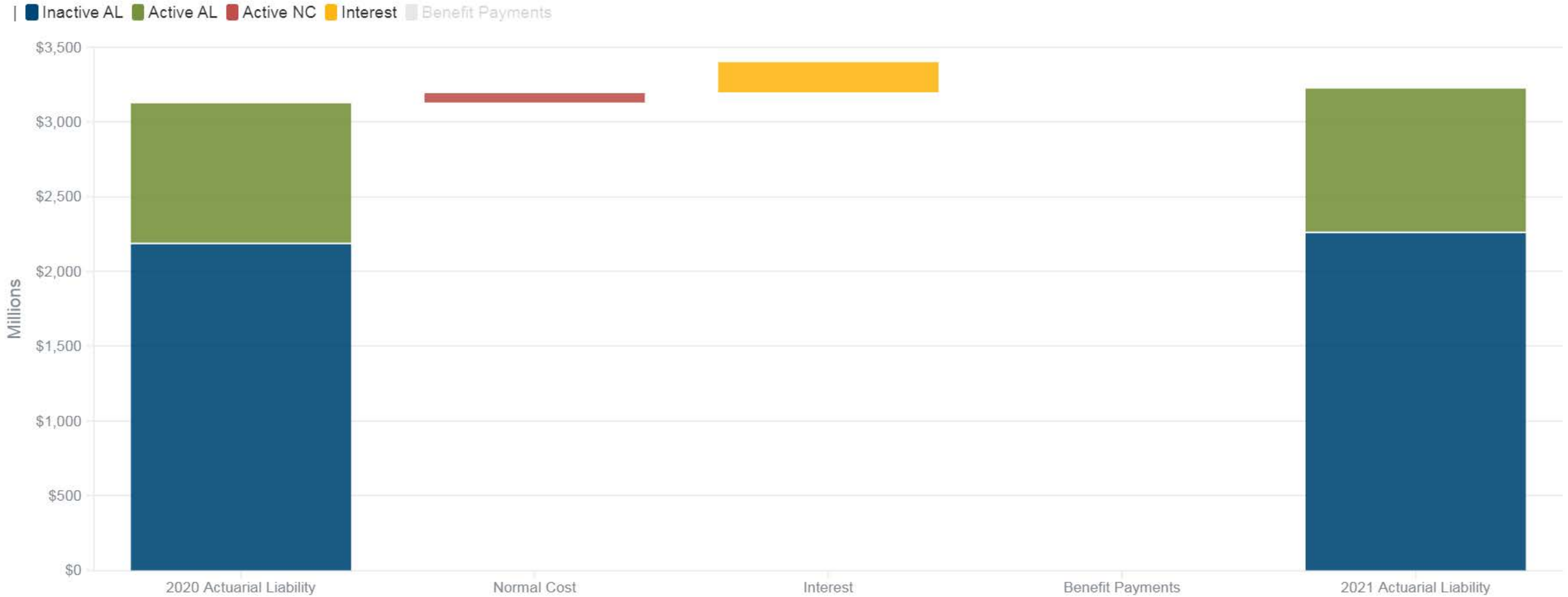
Actuarial Liability Changes by Year



CHEIRON

And it increases for **interest**

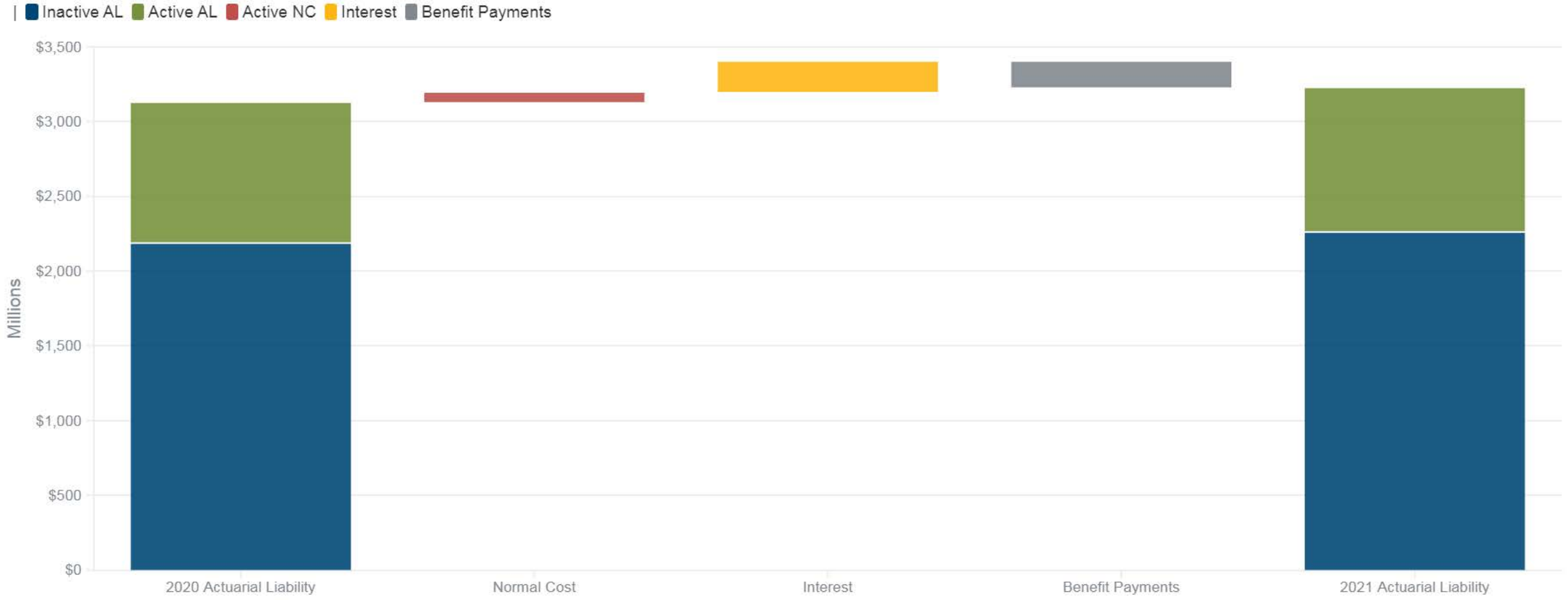
Actuarial Liability Changes by Year



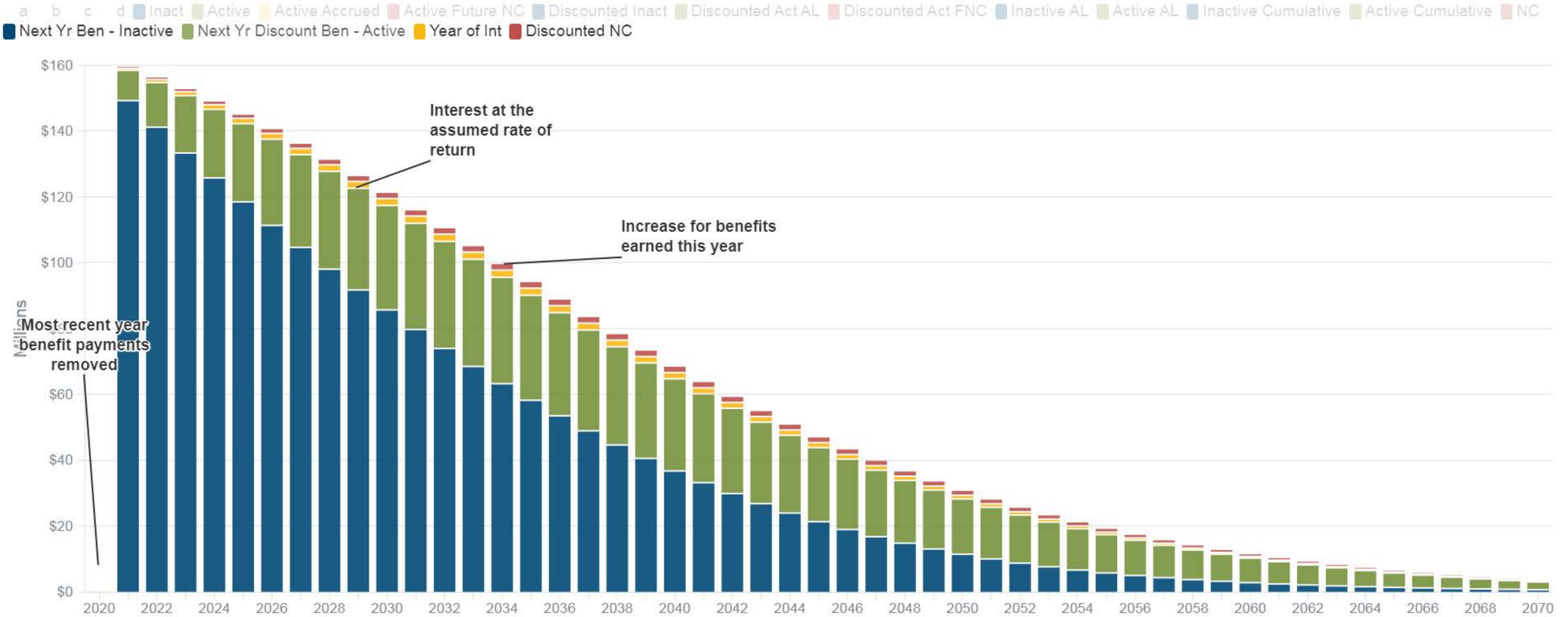
CHEIRON

These increases are offset by the amount of **benefits paid** during the year

Actuarial Liability Changes by Year

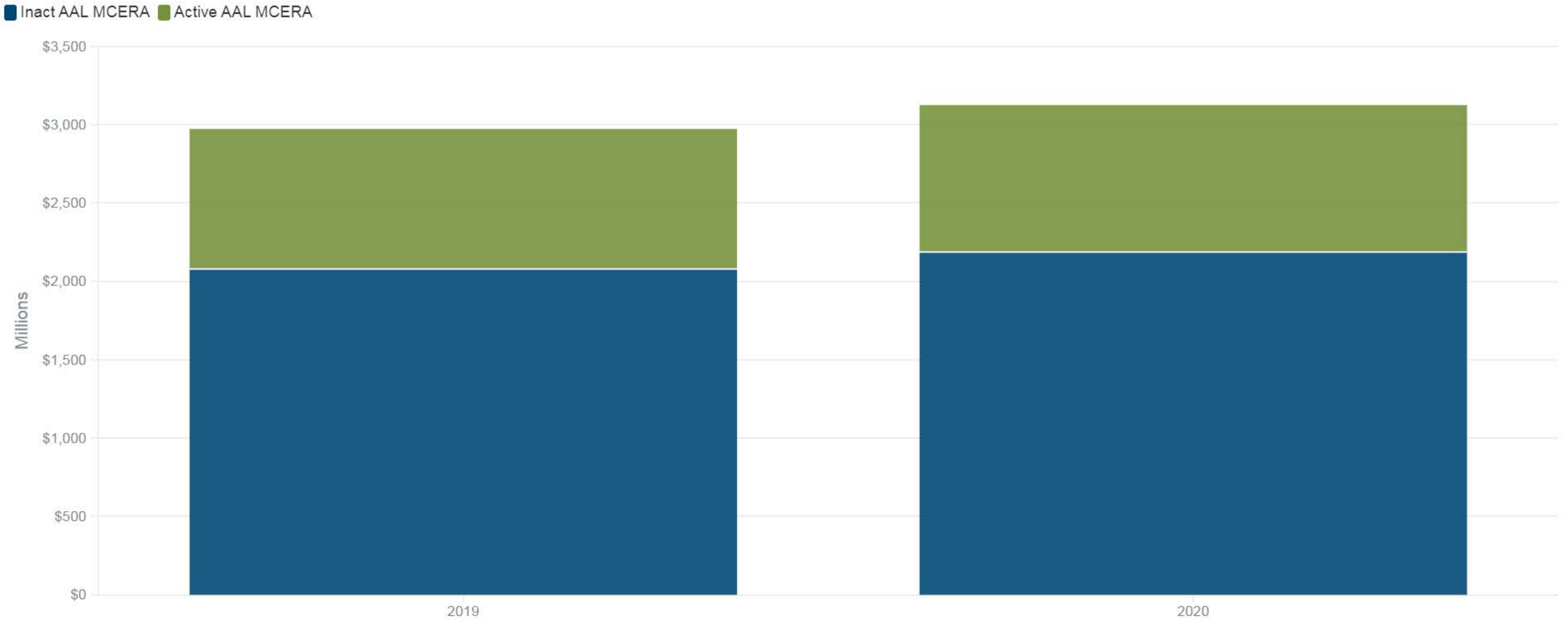


These changes reflect an updated projection of discounted future benefit payments

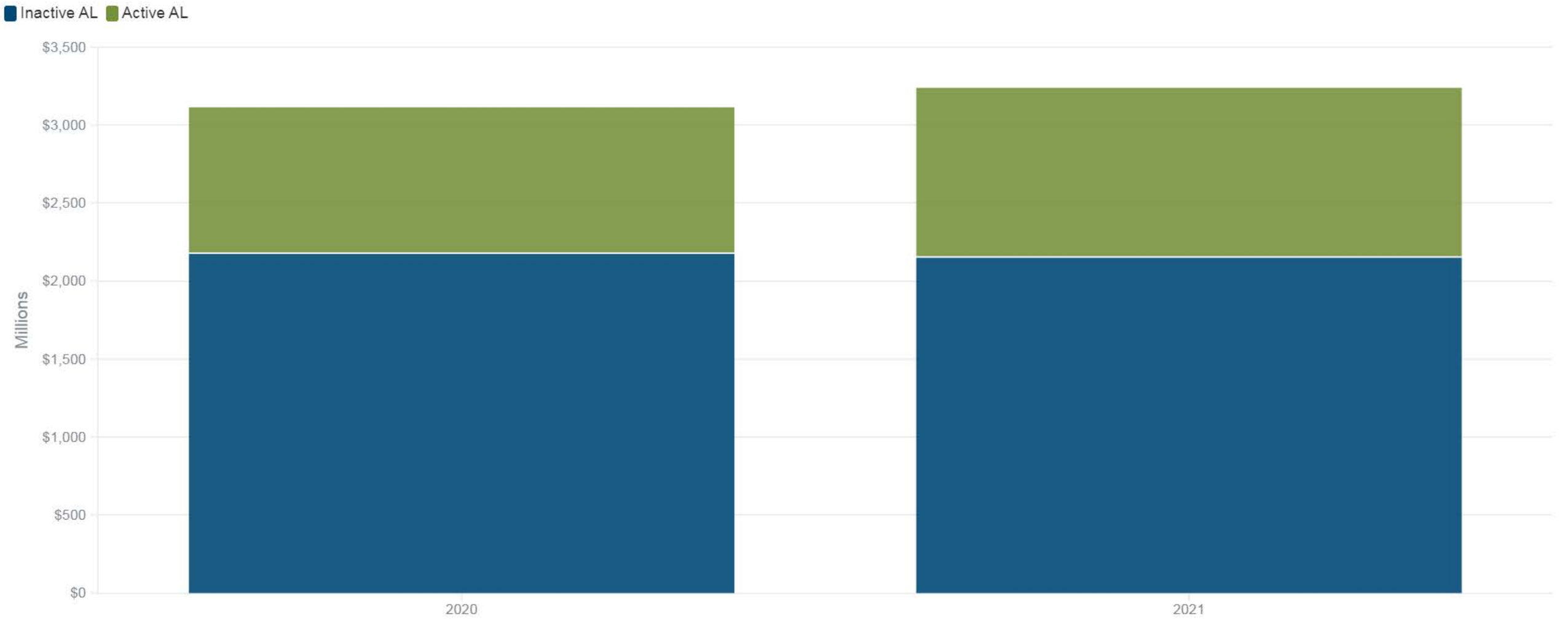


CHEIRON

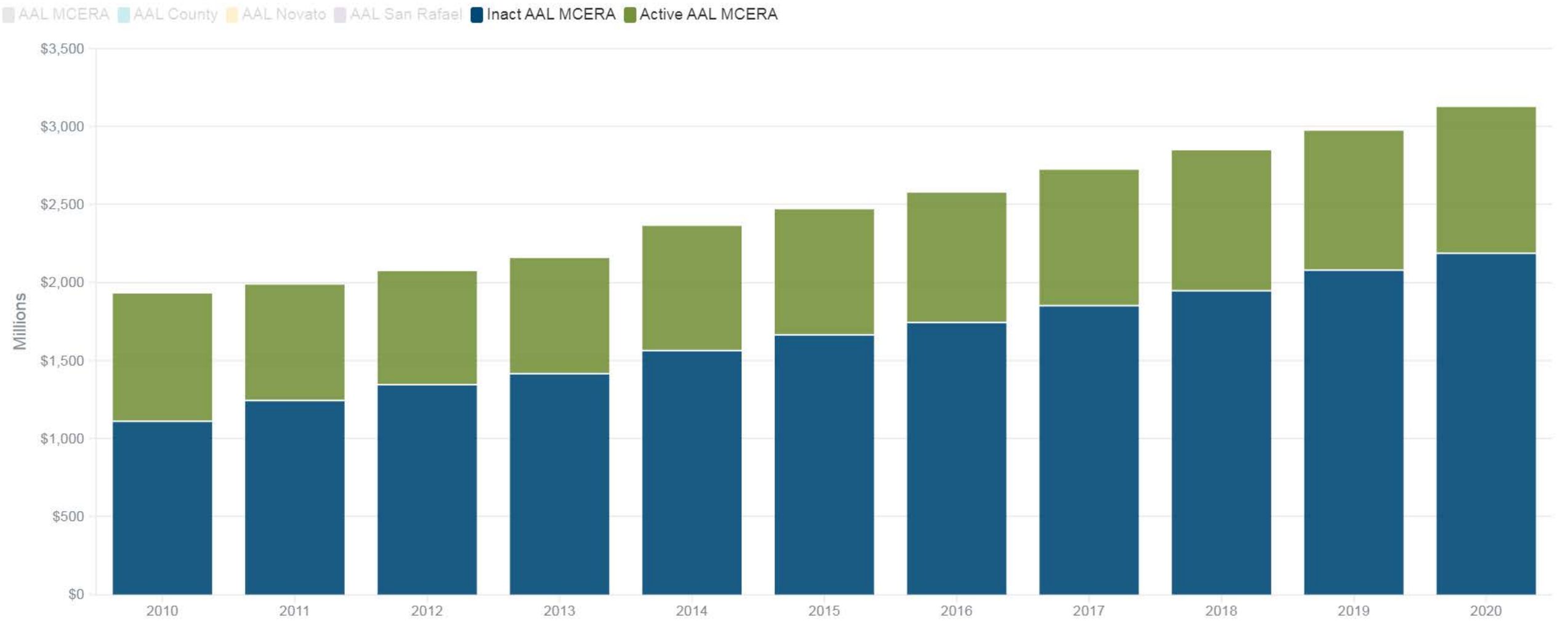
Now we begin to look at **MCERA**'s actual liabilities. Again, we first look at a two-year history, with liabilities split between actives and inactives.



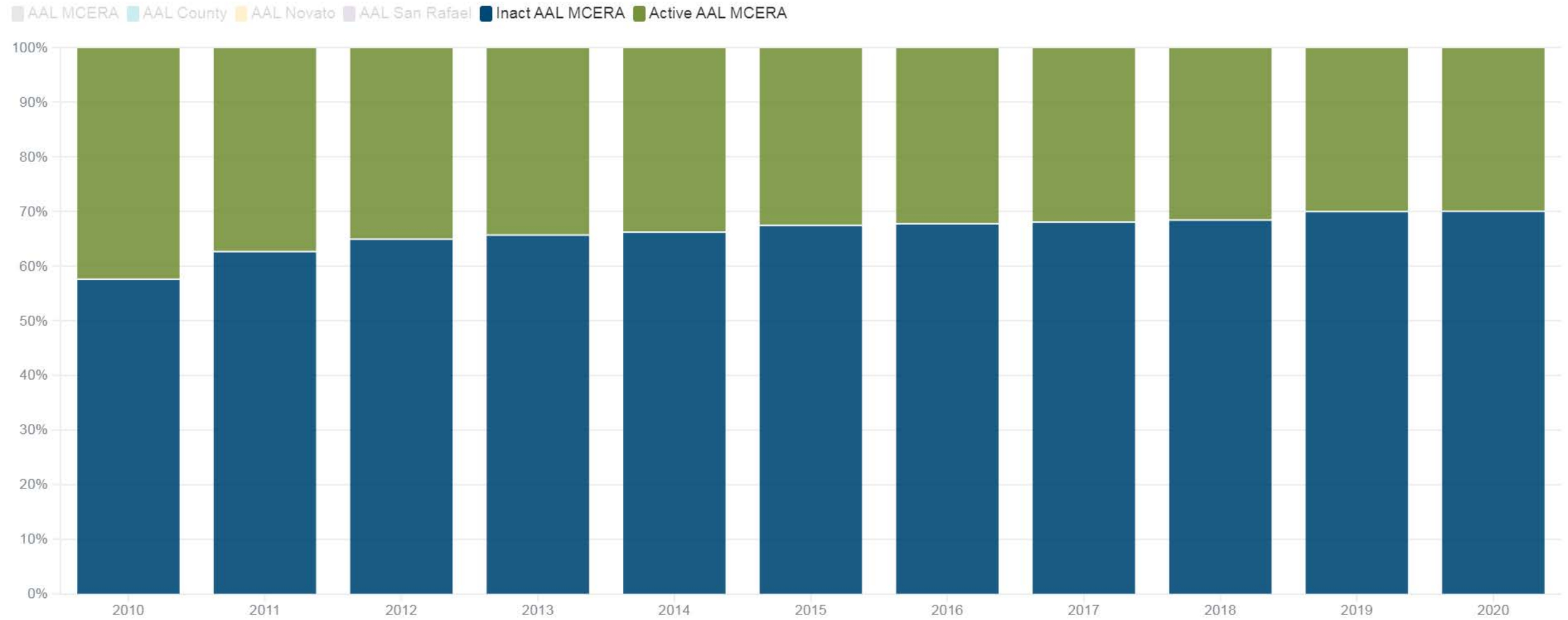
Which can be accumulated and expressed as a single sum as of the next valuation date



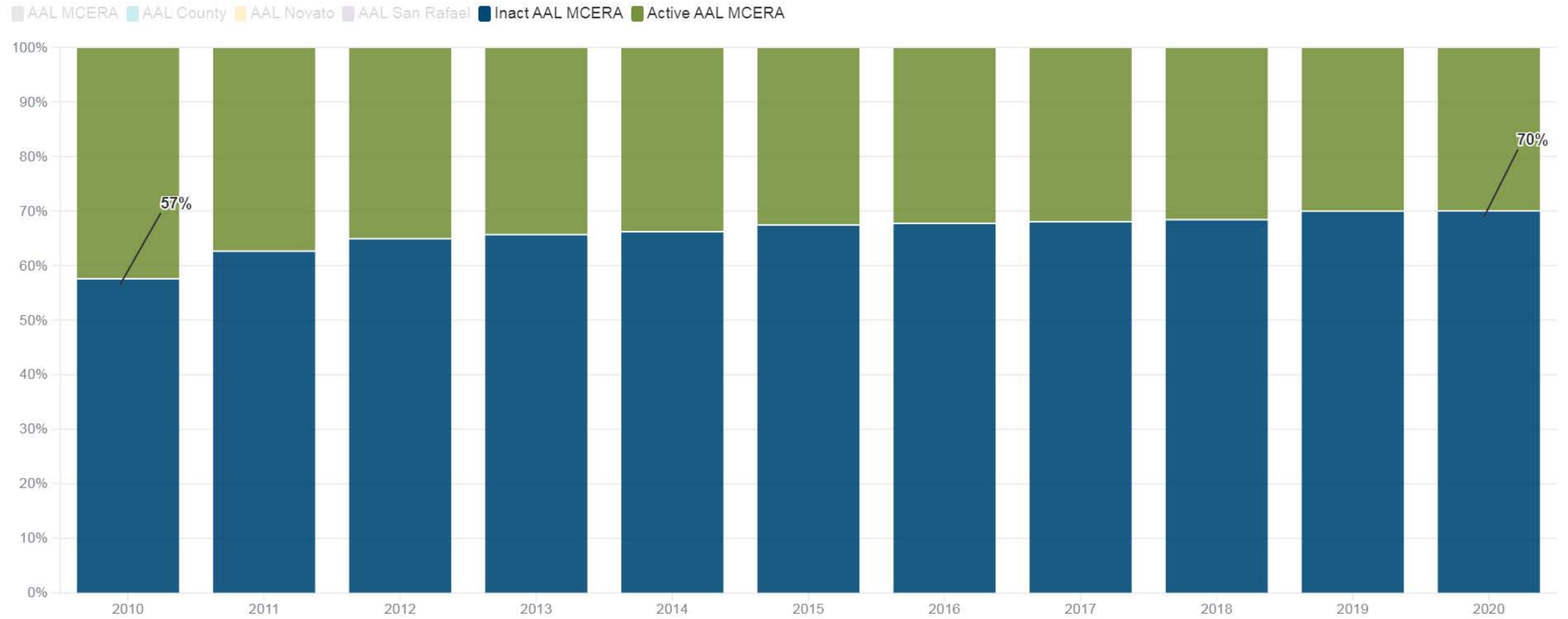
Next we look over a longer history, going back over ten years, which shows a steady increase in liabilities (as expected)



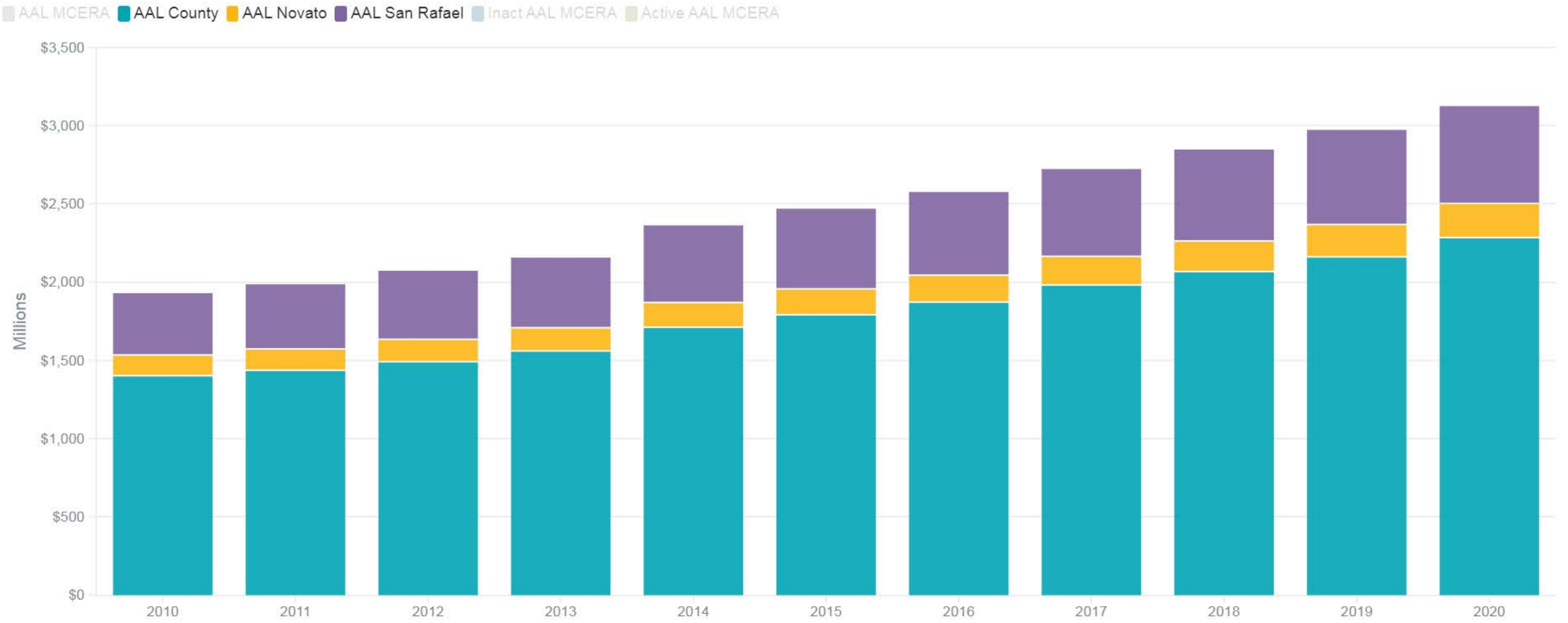
We can scale the results each year to show the percentage of liabilities from inactives vs. actives. We sometimes refer to this as the **inactive funded ratio** in our valuation reports.



We note that the **inactive funding ratio** has increased substantially from 2010 to 2020, as the Plan population has matured. This makes the plan costs more volatile (as a percent of pay).

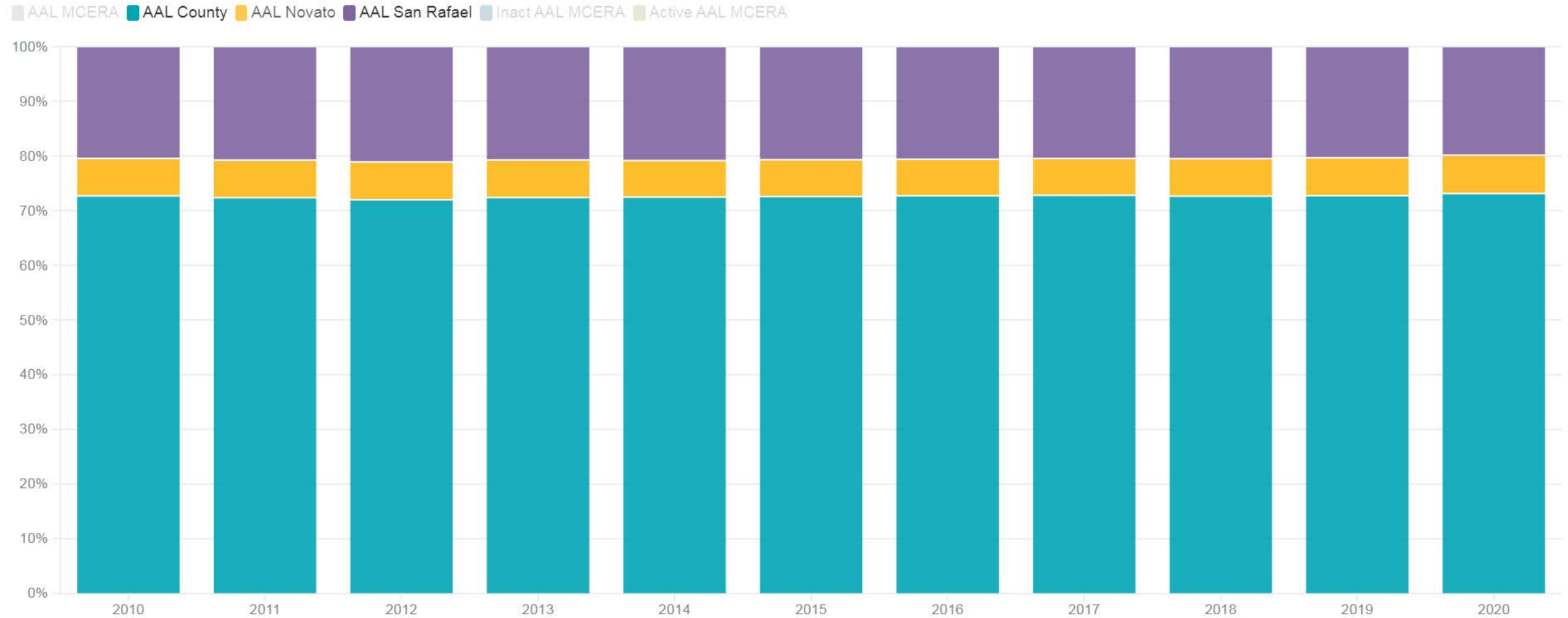


Similarly we can look at how the liabilities assigned to the main plan subgroups (**County** / **Novato** / **San Rafael**) have changed over time



CHEIRON

In this case, the percentage of liability associated with each subgroup has remained relatively consistent



CHEIRON

However, if we divide the liability by active payroll (the **Liability to Payroll ratio**), it tells a different story, a story about risk and volatility levels

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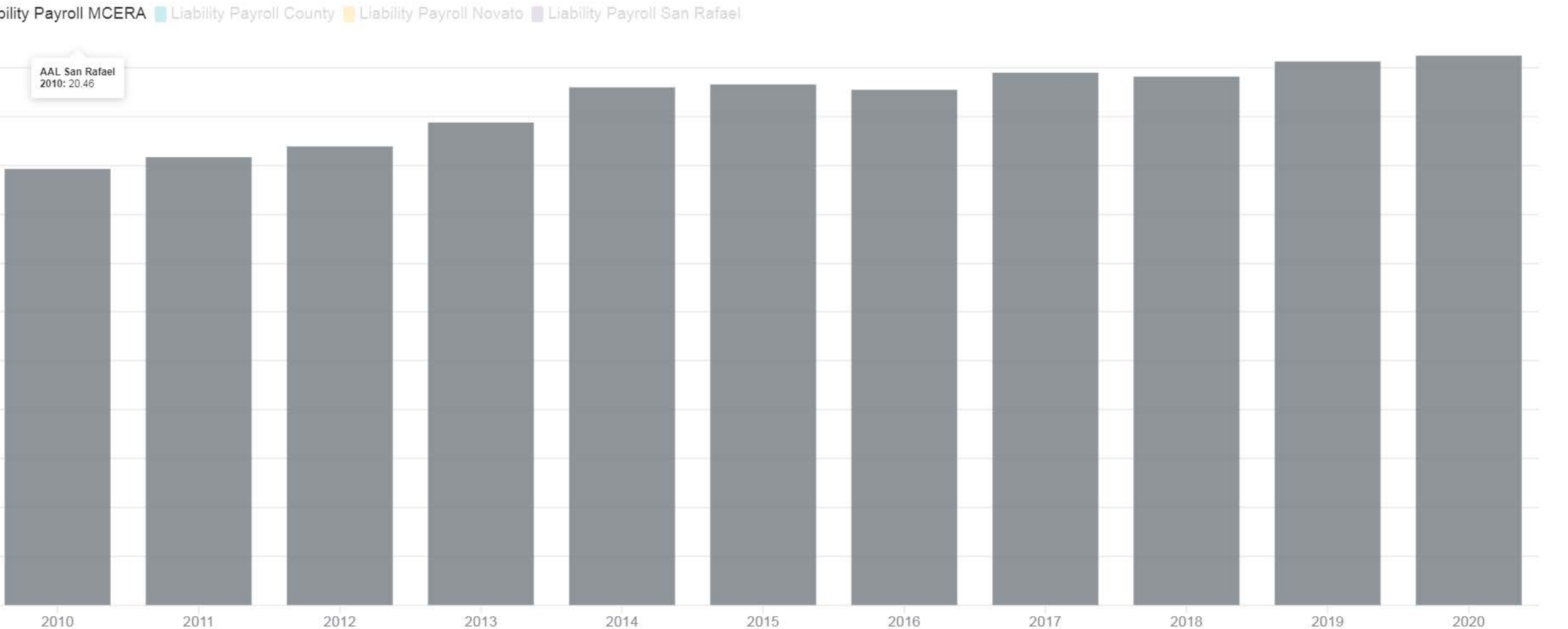
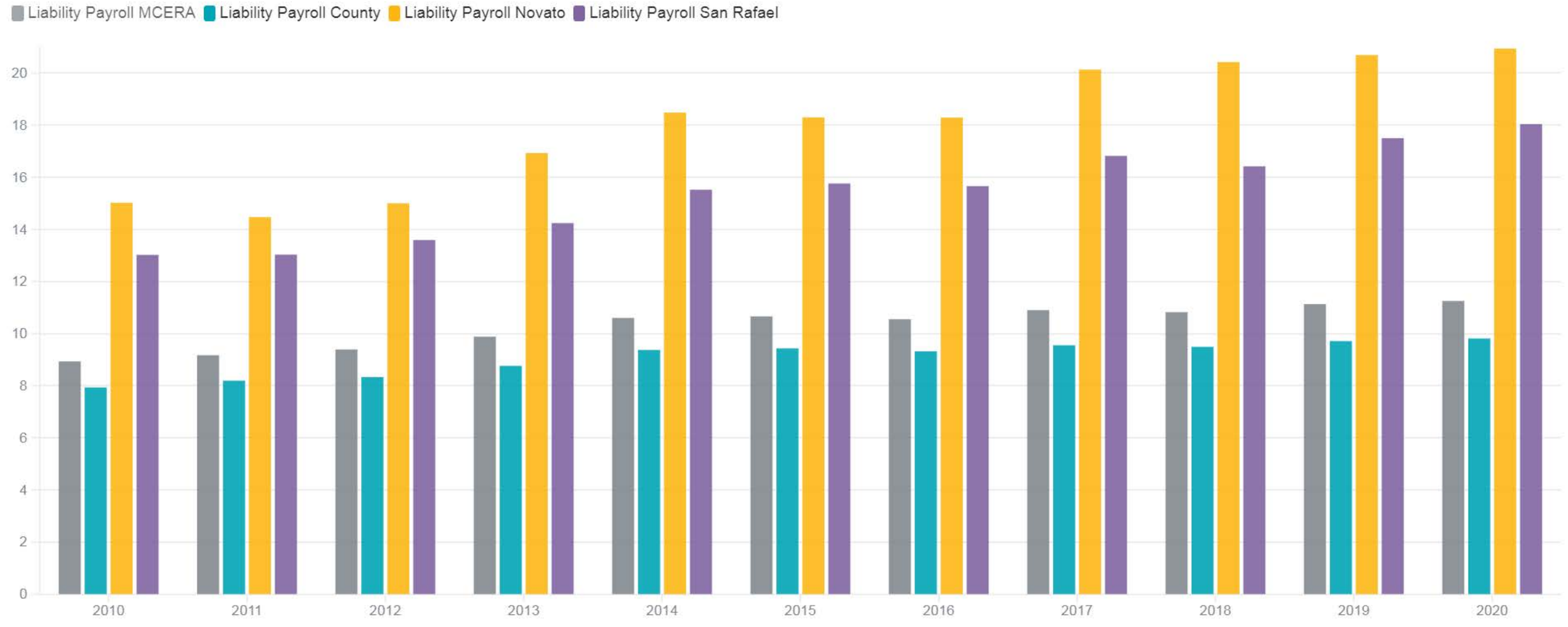
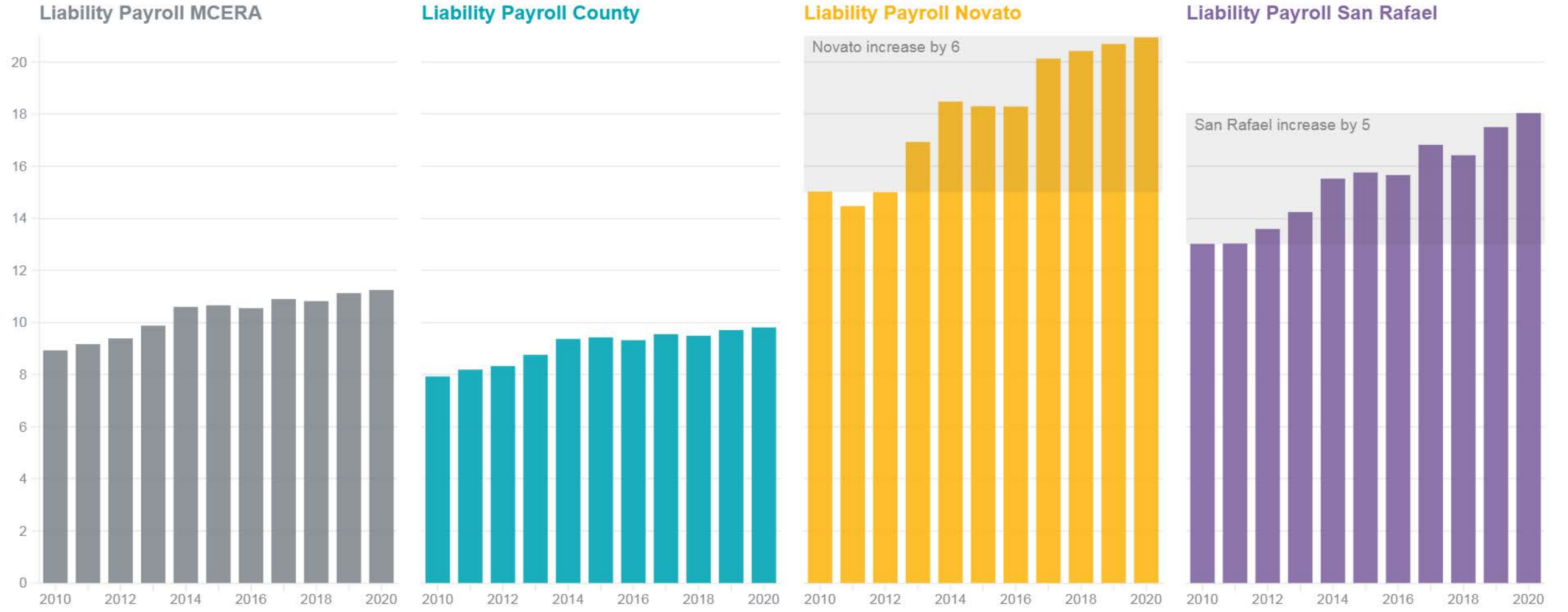


CHEIRON

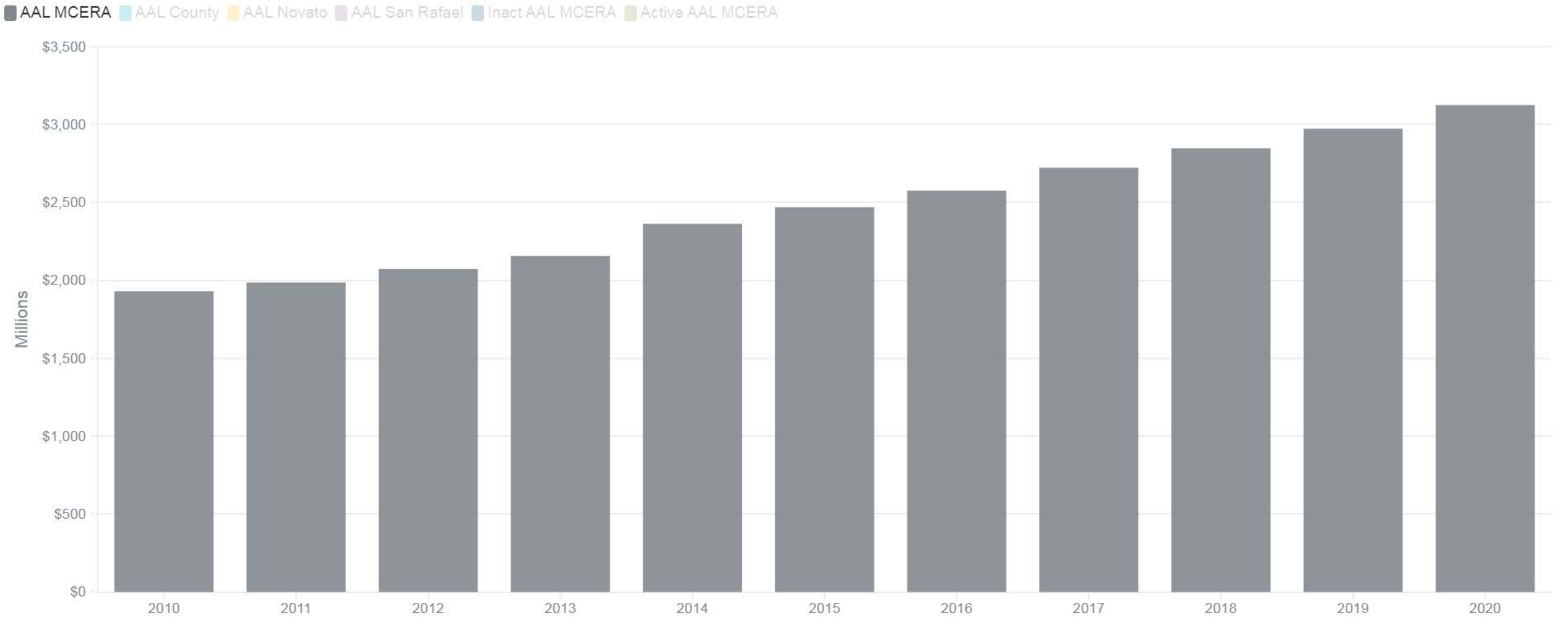
The ratios of liabilities (and assets) to payroll for Novato and San Rafael are much higher than those for the County, which means their contribution rates are more volatile



And we note that they have increased by substantially more over the last ten years



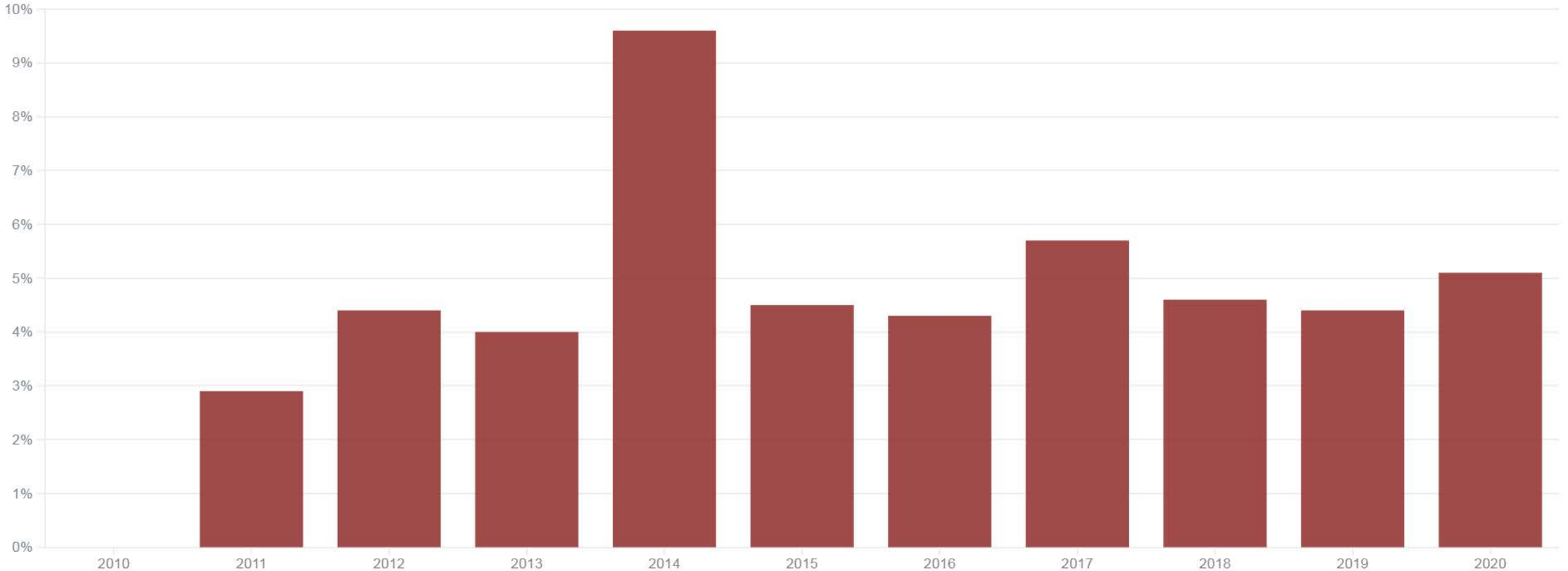
Finally, instead of just looking at the total liability each year



CHEIRON

We can look at the year over year percentage change

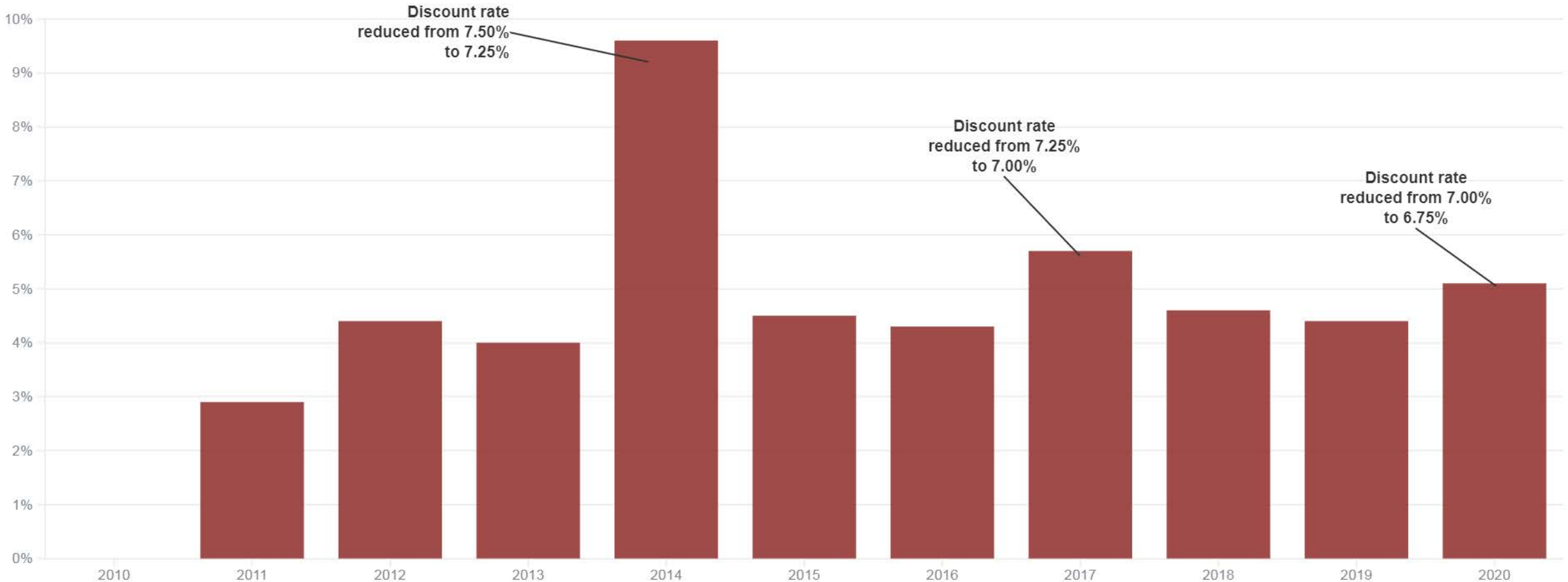
Percentage Change in Actuarial Liability



CHEIRON

As can be expected, the biggest changes coincide with the years when the assumptions are changed, in particular the **discount rate**

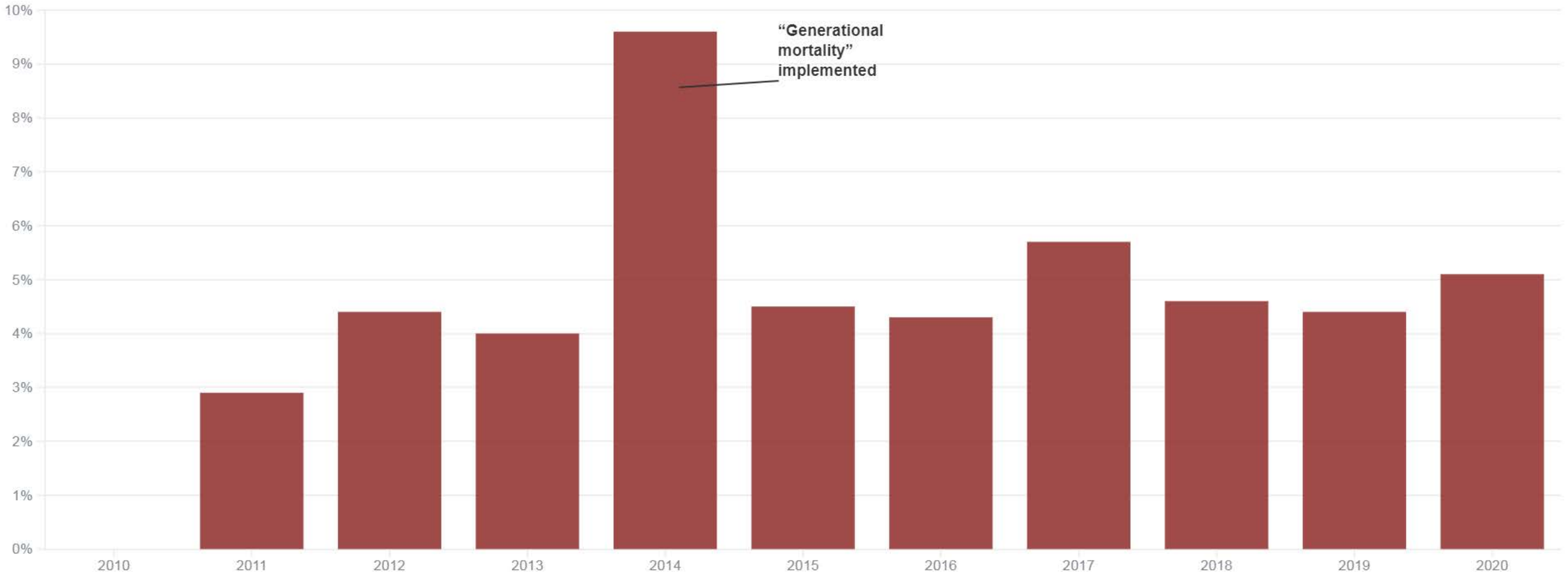
Percentage Change in Actuarial Liability



CHEIRON

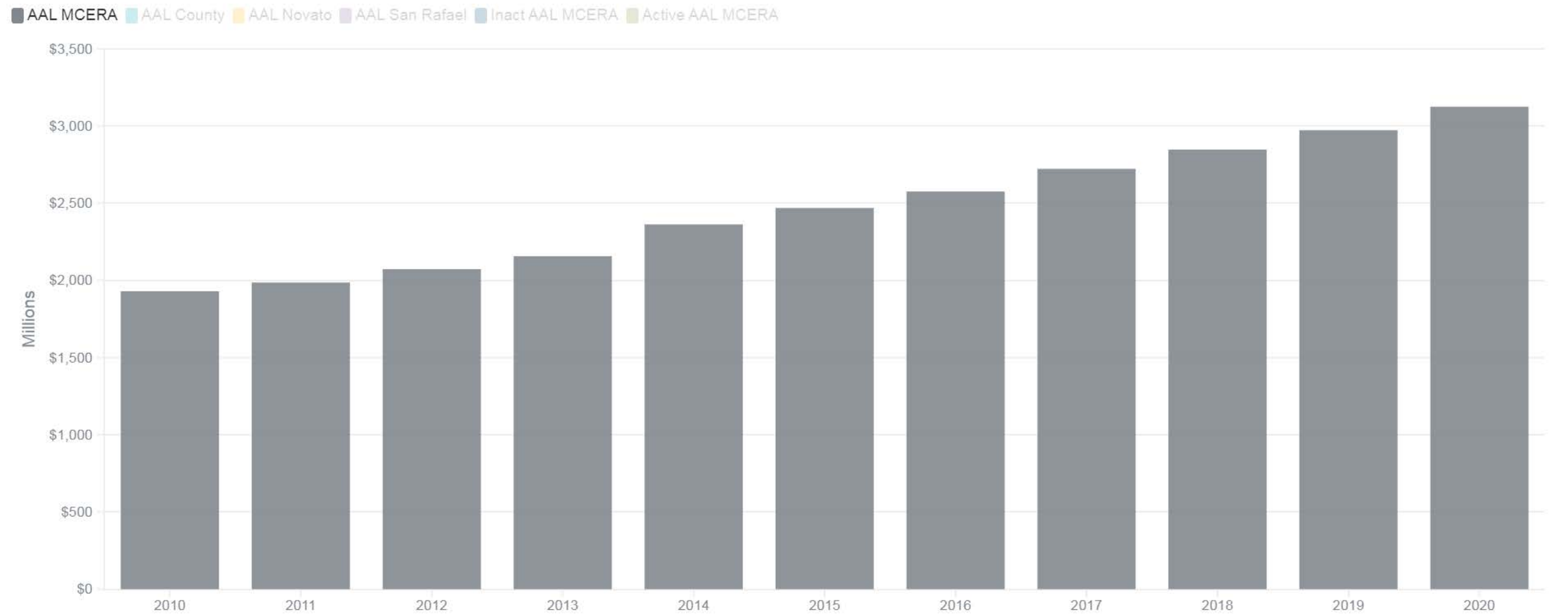
In addition, in 2014 the **mortality assumptions** were made significantly more conservative

Percentage Change in Actuarial Liability



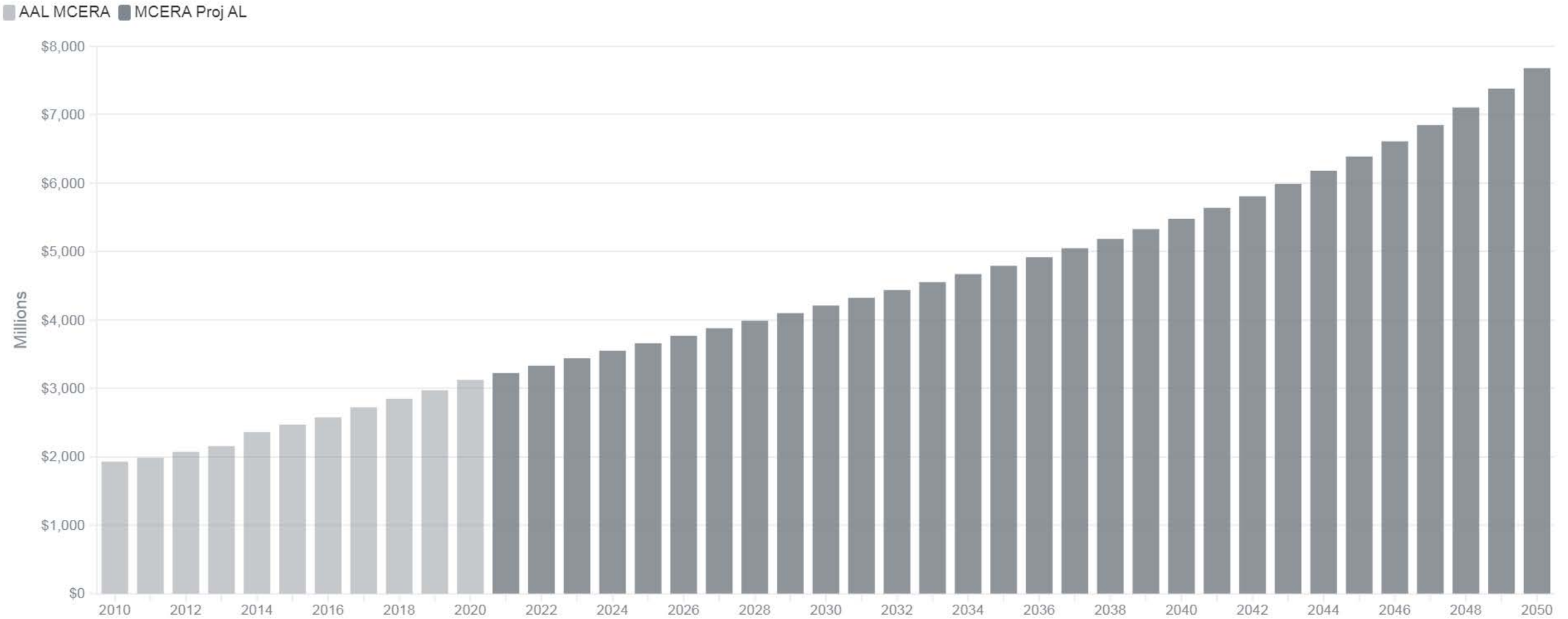
CHEIRON

Next we move from the **history** of the liabilities



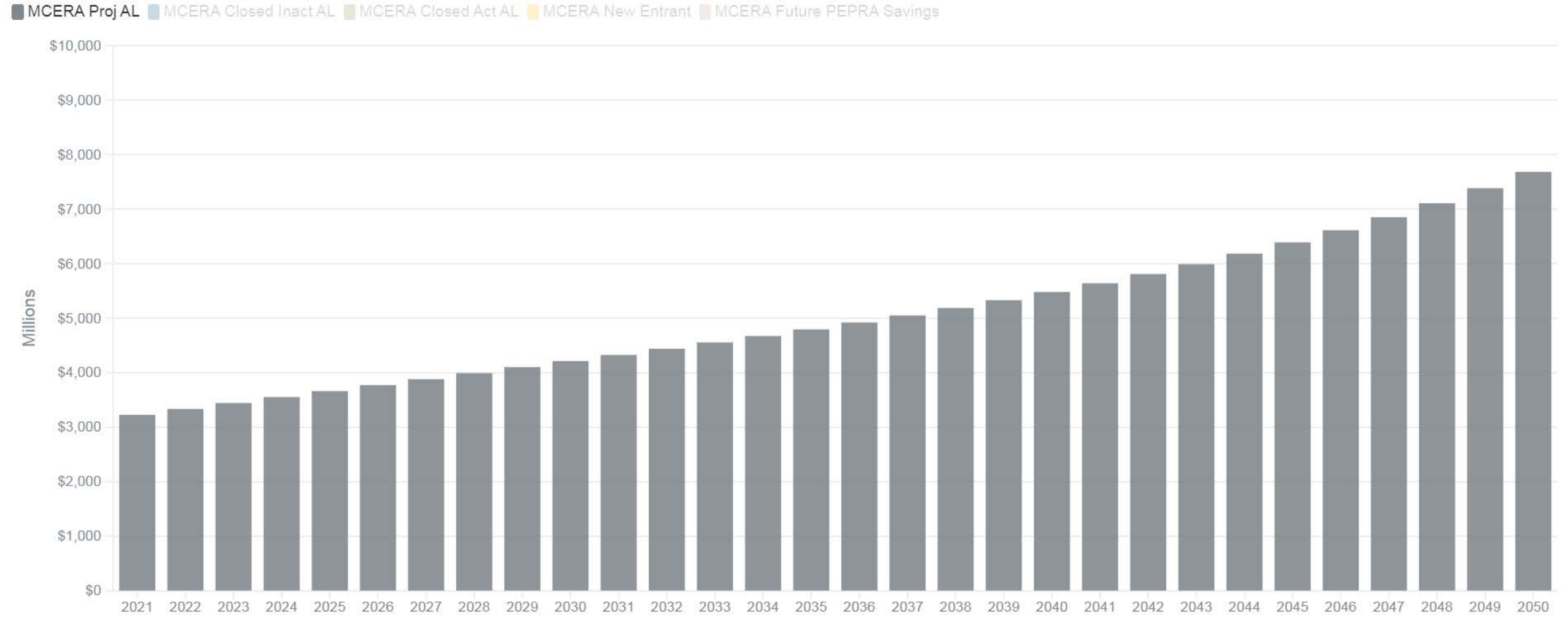
CHEIRON

To the **projections** of future liabilities



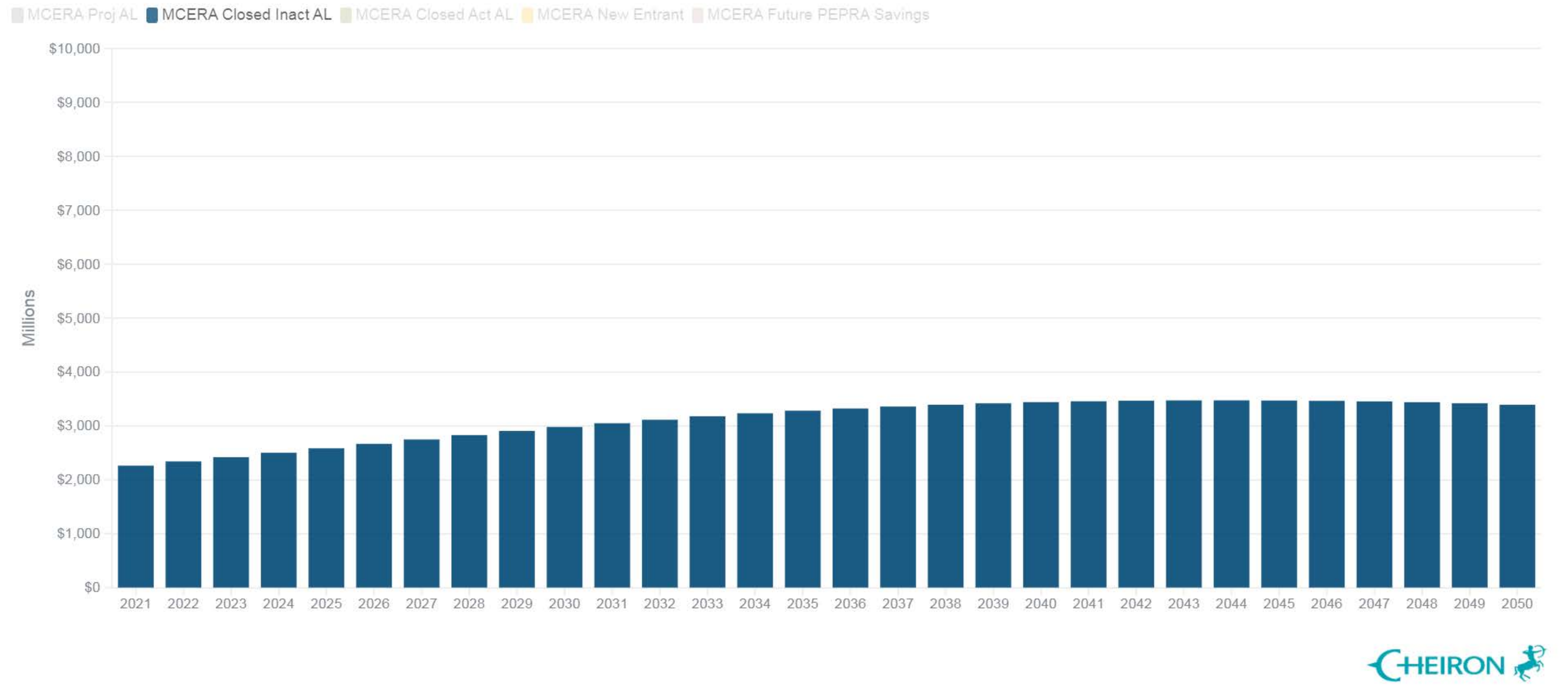
CHEIRON

This represents the projection of the liability under our standard baseline assumption: a **stable active population**, with members who leave employment being replaced by members in the new PEPRA tiers



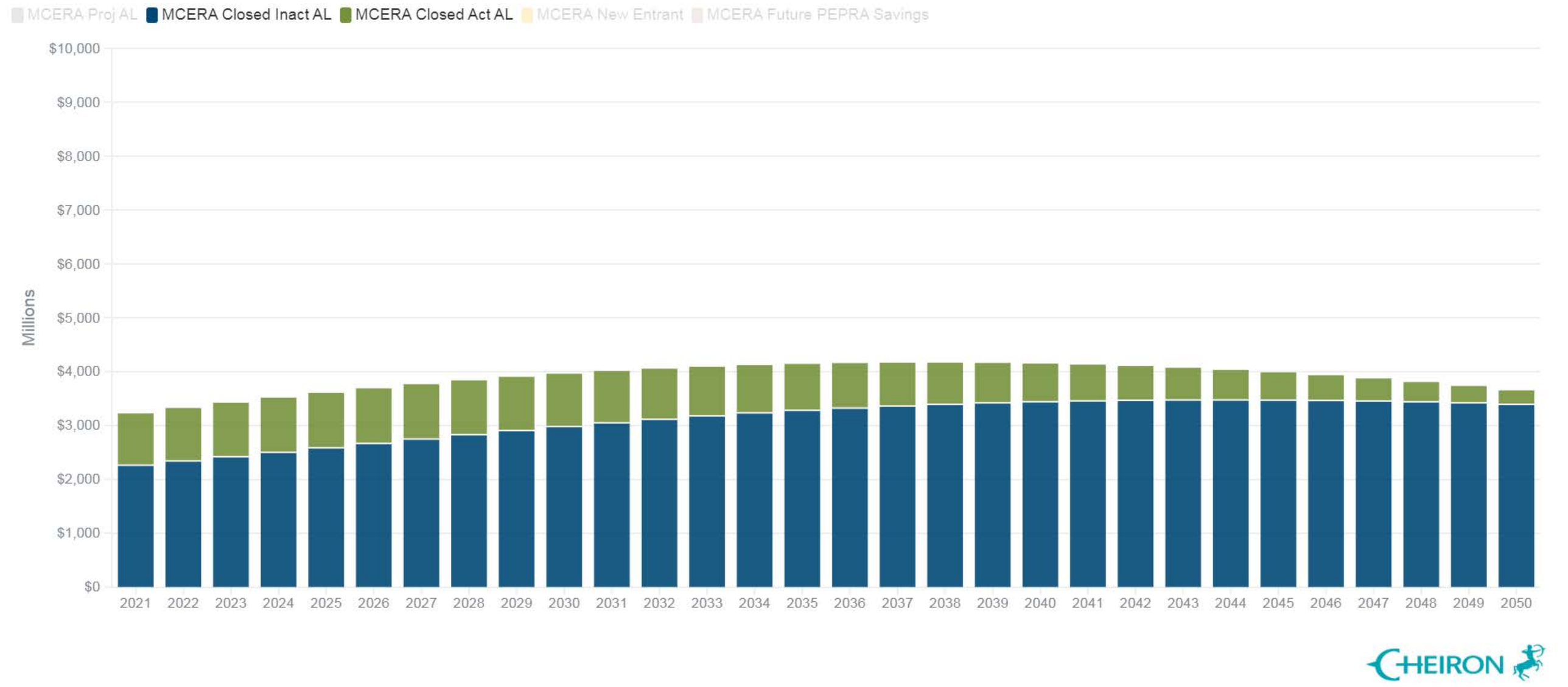
CHEIRON

The projected liability is made up of three pieces: The current inactives and the projected retirees from the current active population

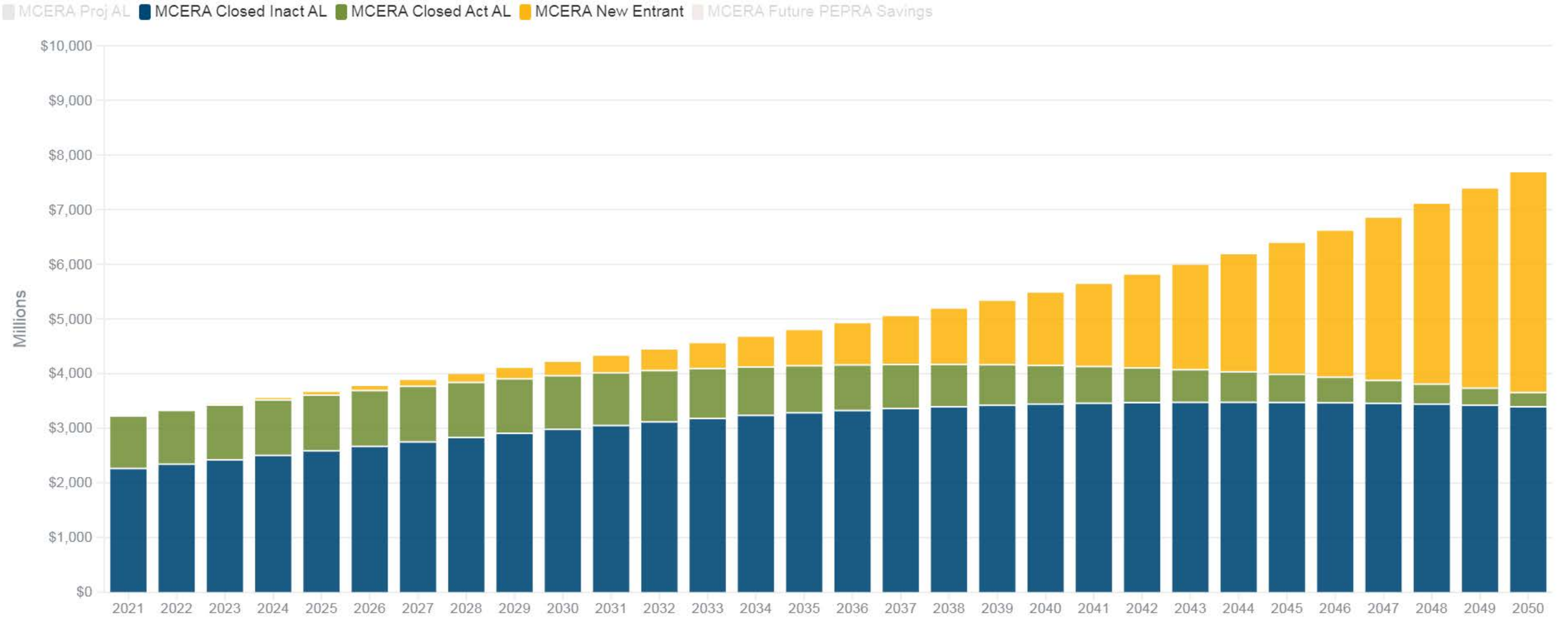


CHEIRON

Plus the liability for the current actives (until they retire)

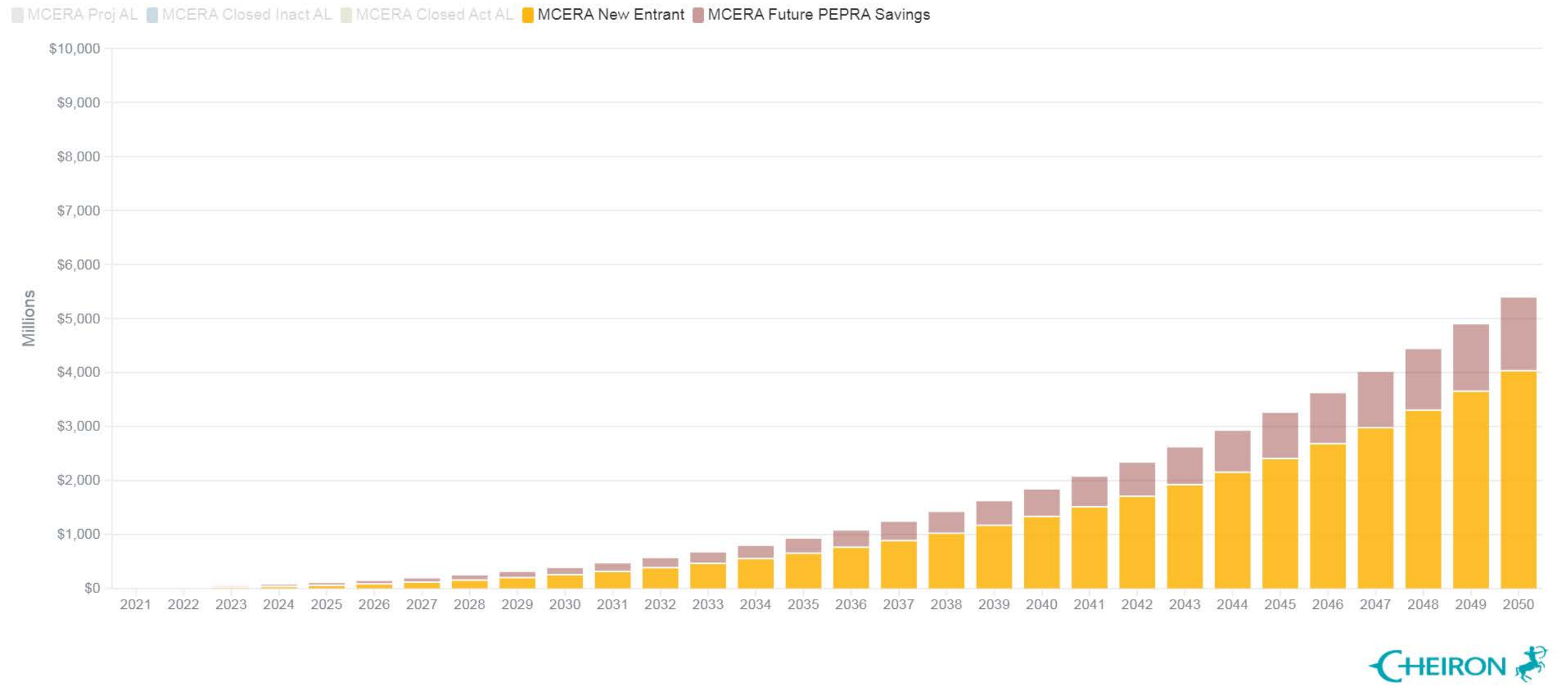


Plus the expected liability associated with future new hires



CHEIRON

This is how much higher the liability would be if new members didn't go into the PEPRA tiers, but rather the most recent tier prior to PEPRA

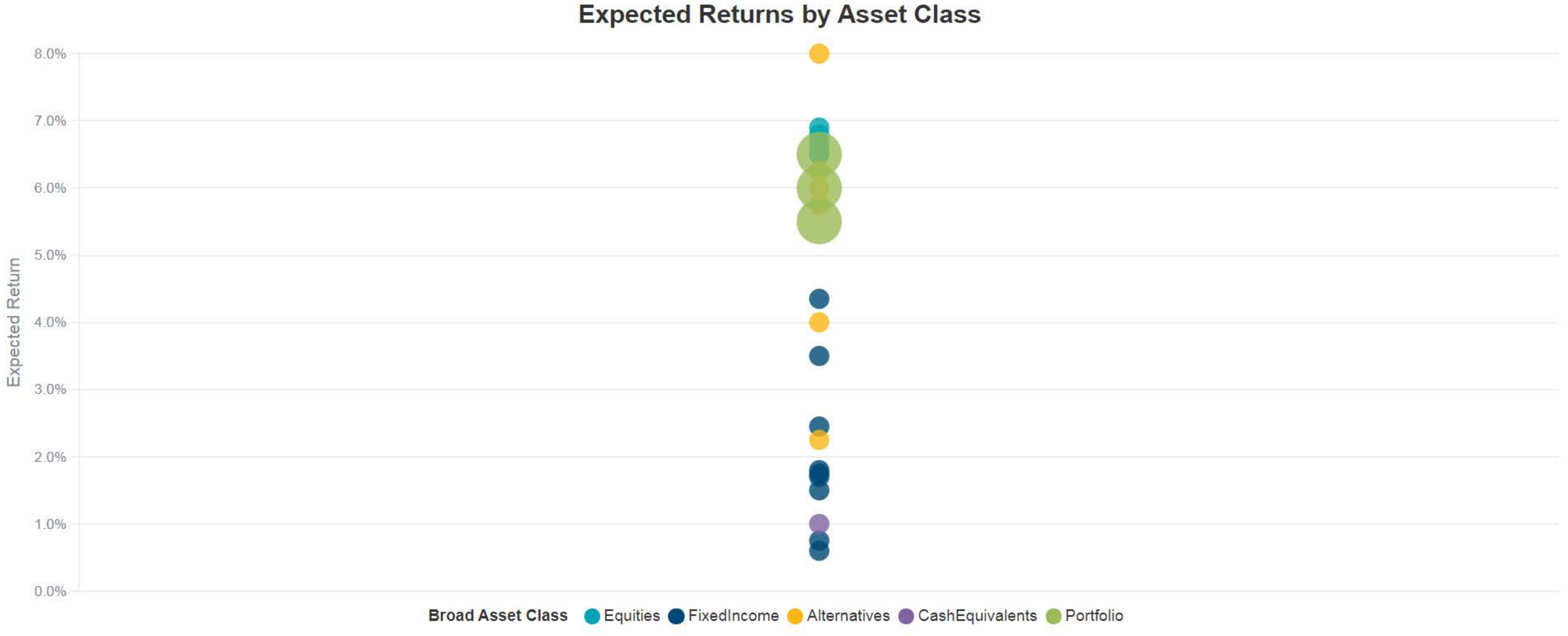


CHEIRON

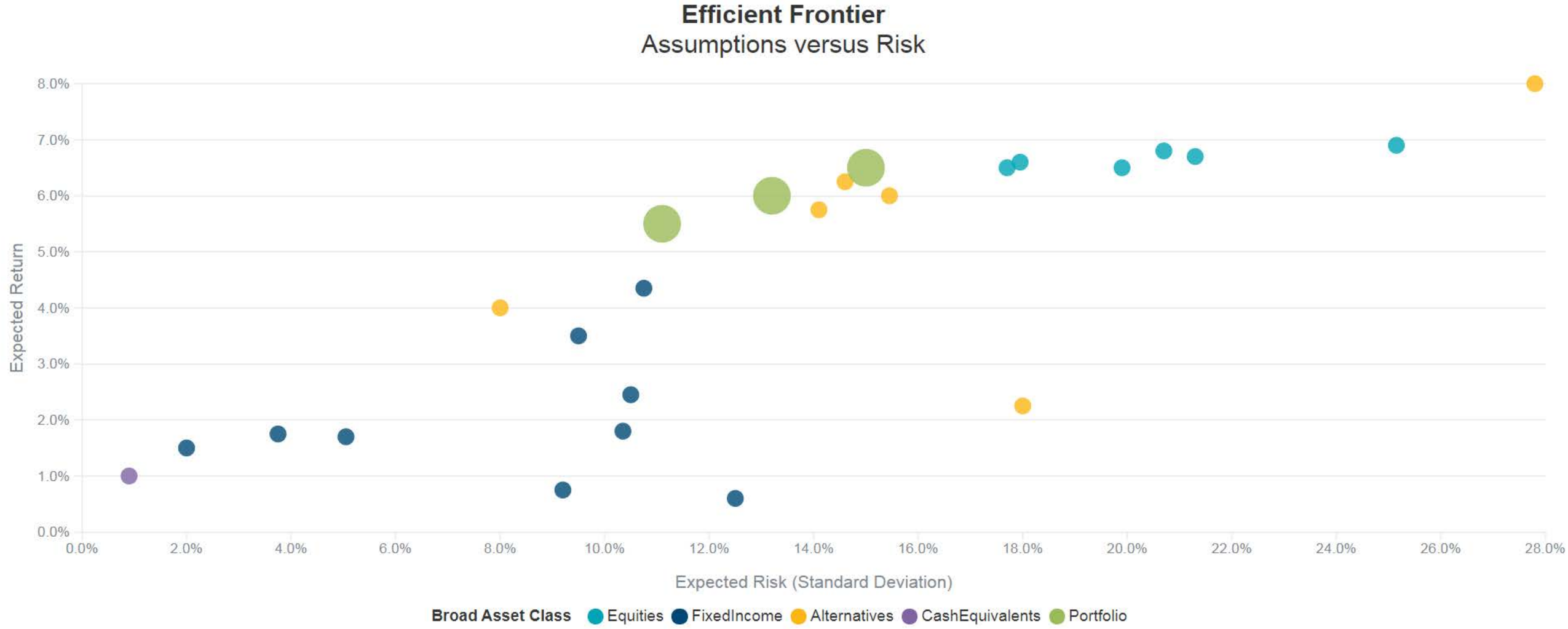
How do assumptions about risk impact the measurement of the liability?

Assumptions are **best estimates**, but they do not indicate the **risk** (or range of outcomes). For example, when we set the expected return we start with the expected returns for each asset class.

The expected return for a portfolio is a weighted blend of the expected returns for each asset class



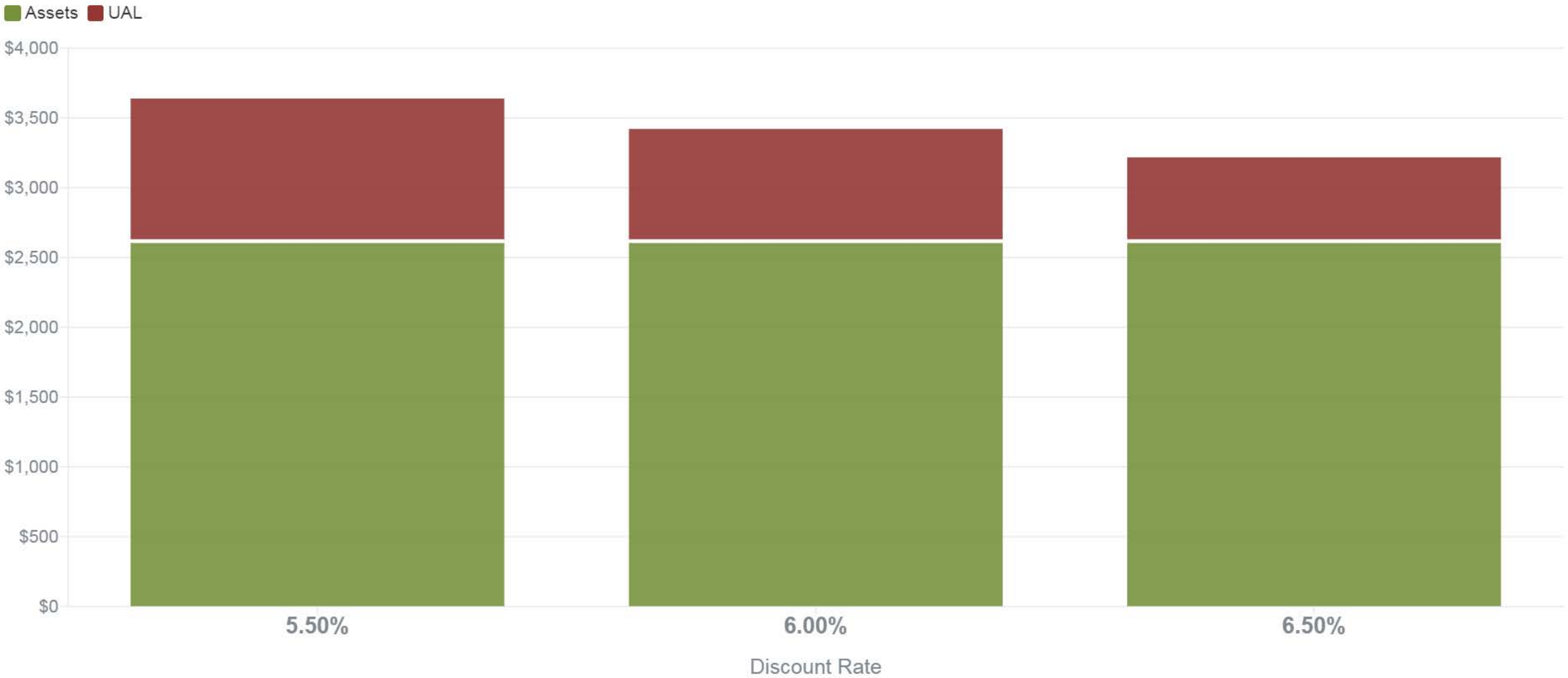
Each asset class and each portfolio also have varying amounts of risk. Generally, if the expected return is higher, risk will also be higher.



CHEIRON

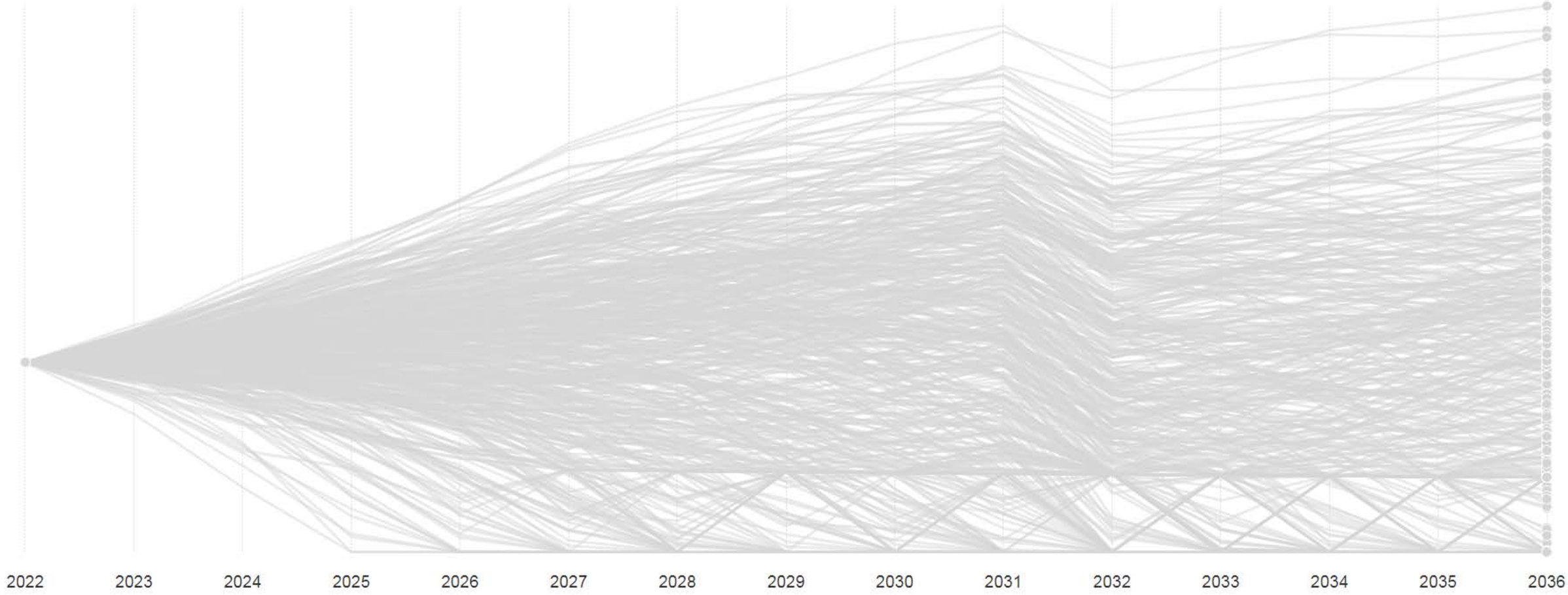
Higher expected returns produce lower measures of liability and lower contribution rates

Assets and Unfunded Liability



But when future contribution rates are projected, there is a wide array of paths depending on the actual investment returns experienced each year. Higher levels of risk produce a wider range of potential future contribution rates.

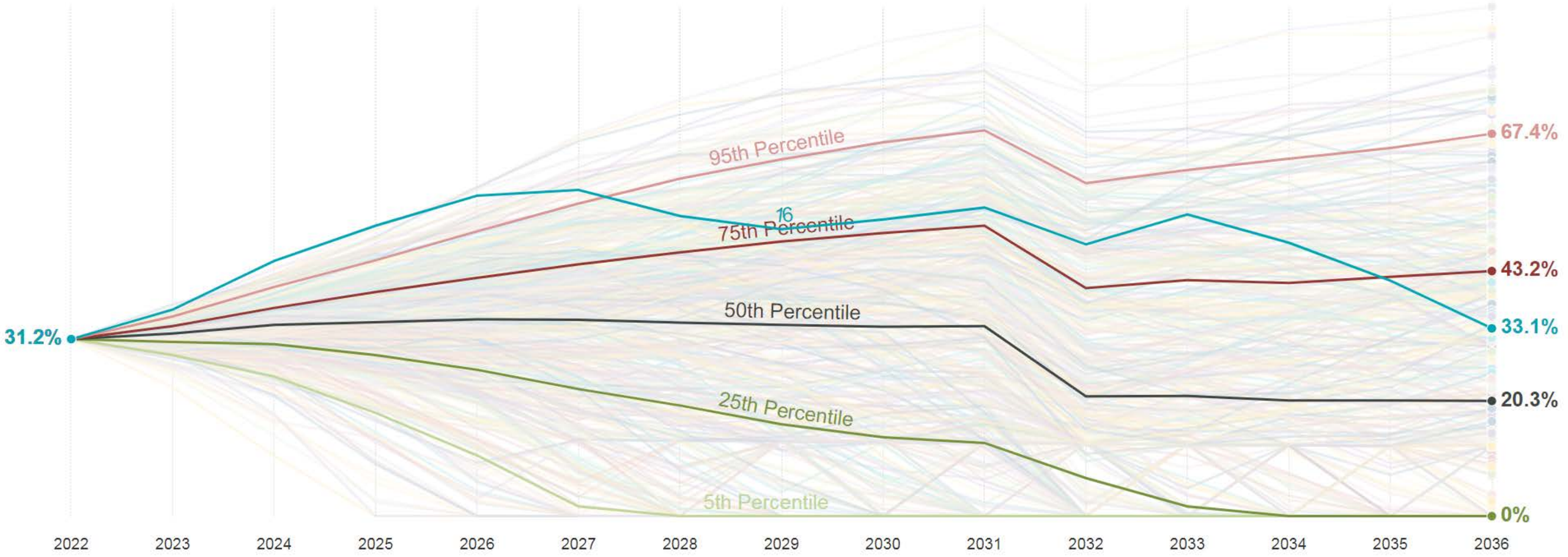
Projected Employer Contribution Rates



CHEIRON

To get a better understanding of this range, the projected contribution rates are organized into groups from the 5th percentile to the 95th percentile

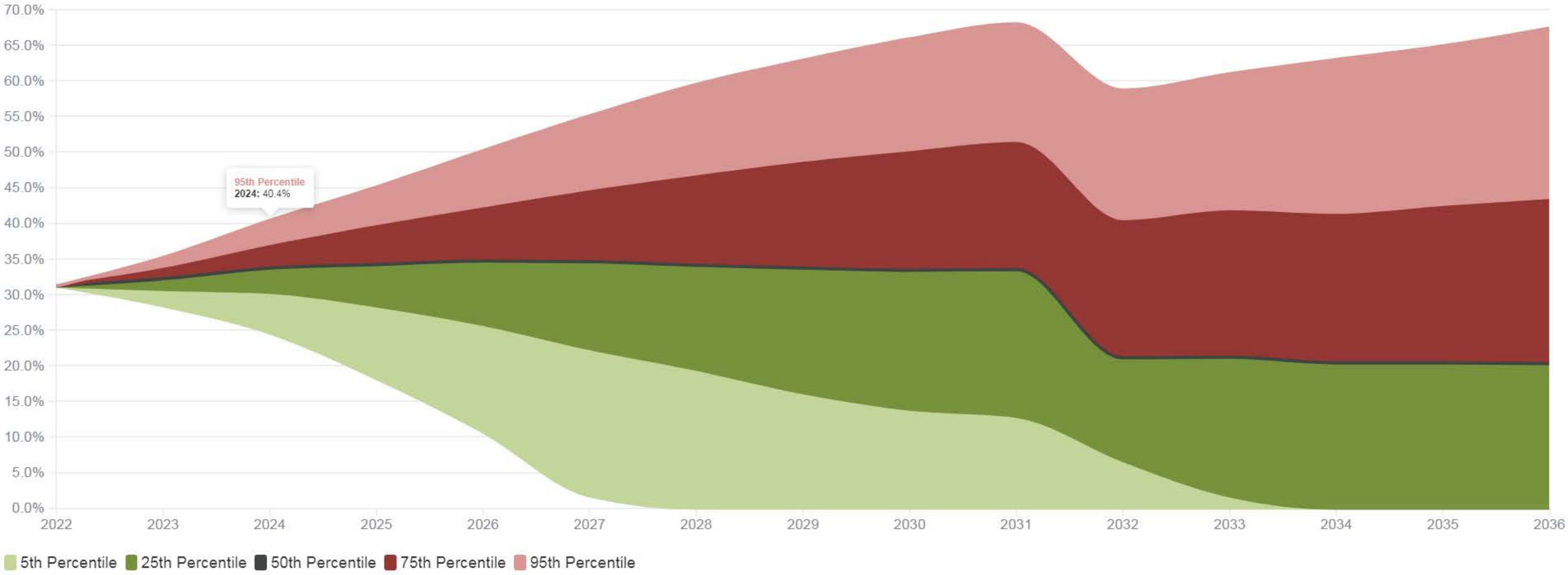
Projected Employer Contribution Rates



CHEIRON

Rather than show each of the individual projections, here the areas are colored in

Range of Projected Employer Contribution Rates

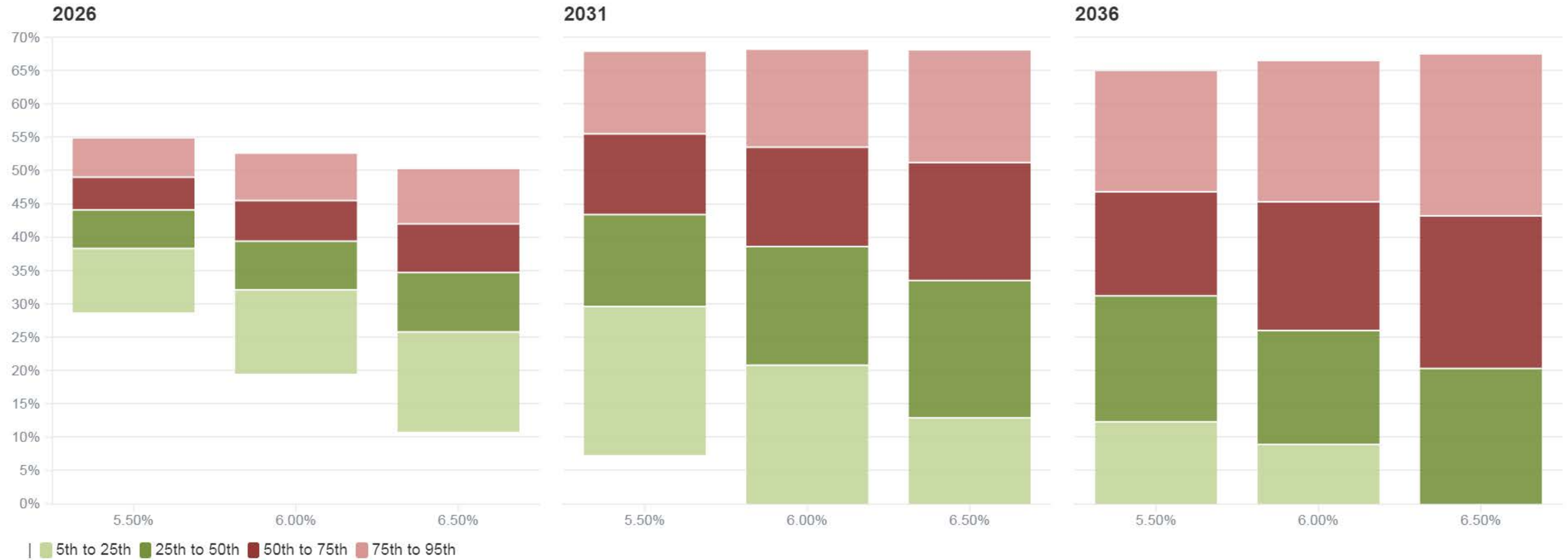


CHEIRON

The range of projections can be compared for different expected returns and levels of risk. Over time, riskier asset allocations produce a wider range of potential contribution rates, but a lower expected cost.

Range of Projected Employer Contribution Rates

Different Discount Rates and Levels of Investment Risk



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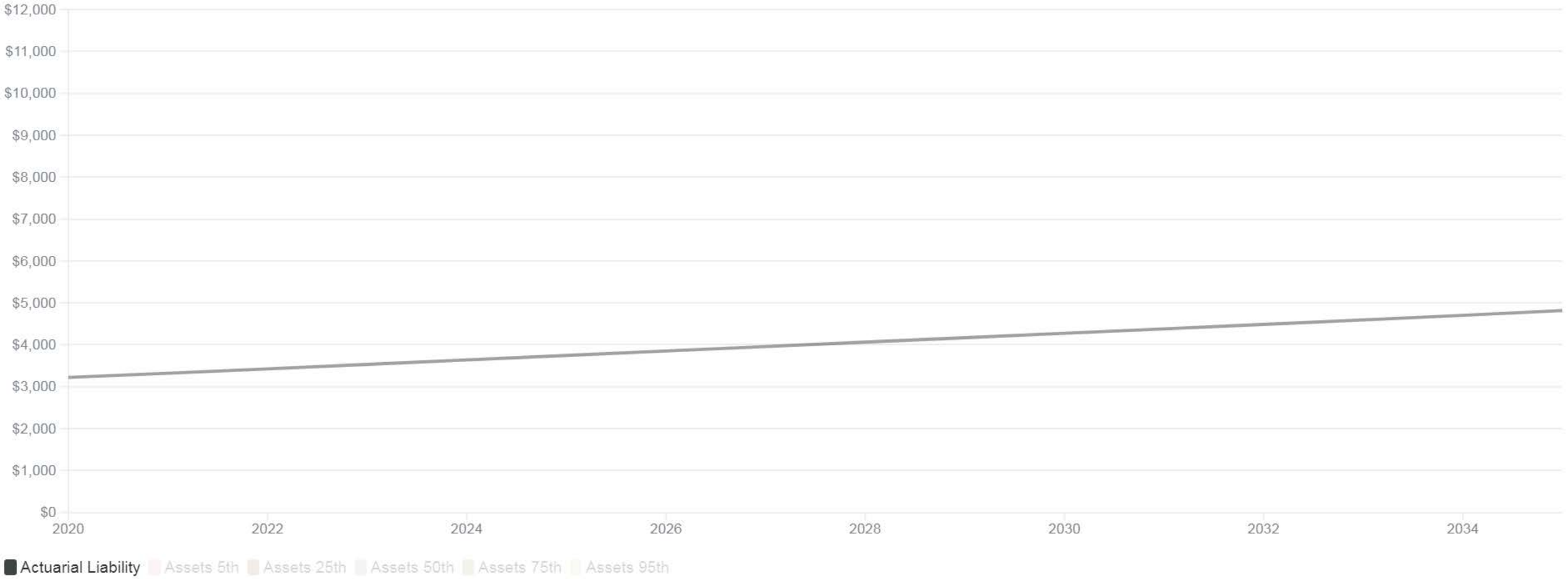
How Are Liability Measures Used in an Asset/Liability Study?

In most asset liability studies, the projection of the actuarial **liability is fixed**

Projected Liabilities and Assets



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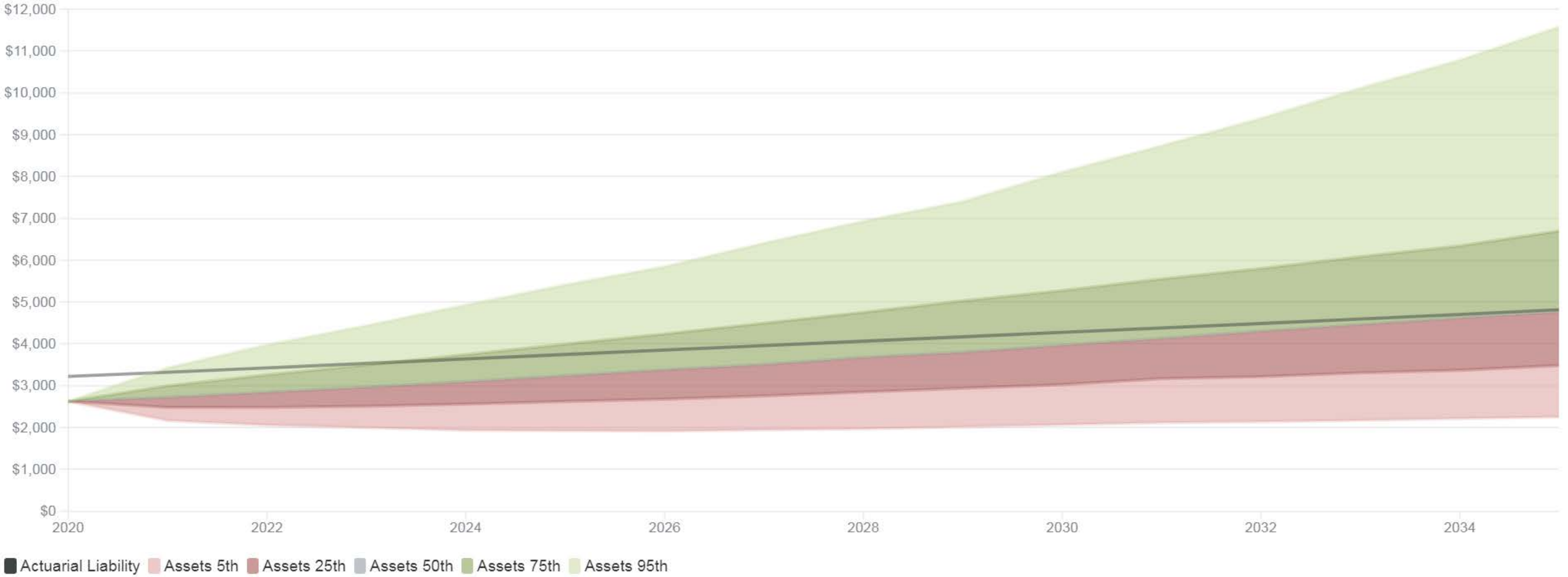
The fixed projection of the actuarial liability is compared to a **stochastic projection of assets**

Projected Liabilities and Assets



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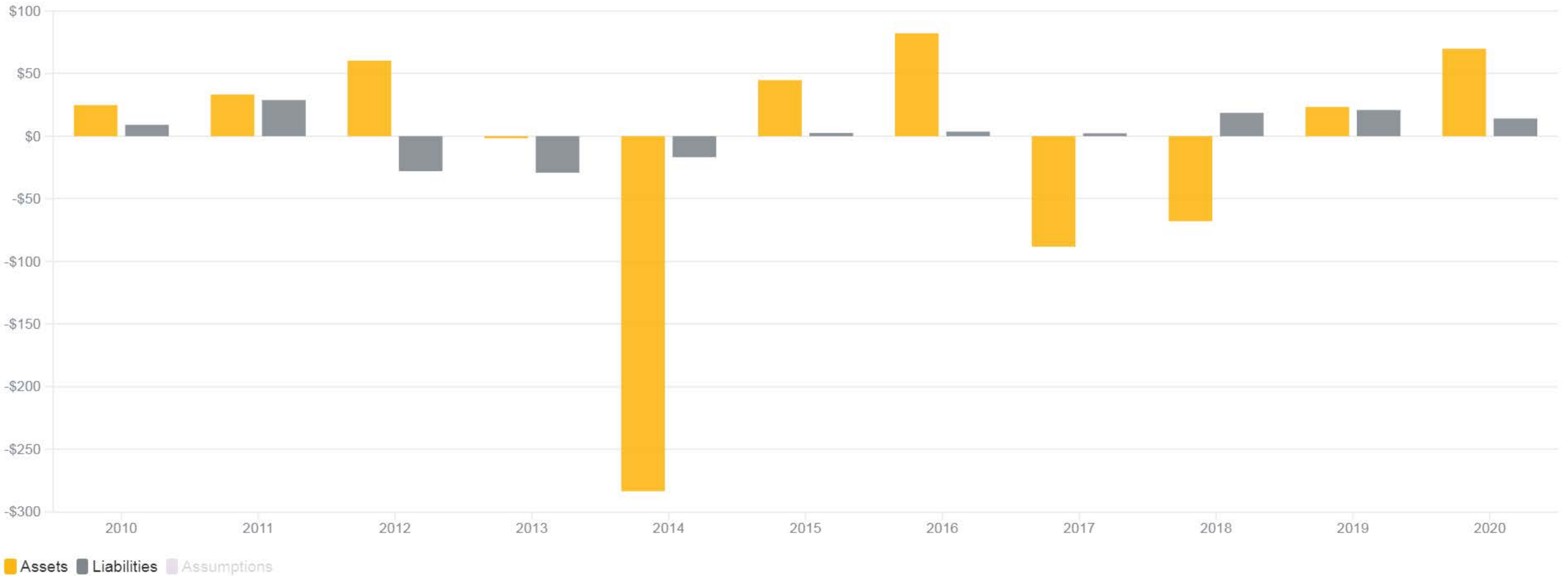
The main reason for this approach is that the projection of assets varies far more than the projection of liabilities, as can be seen by comparing the historical gains and losses

Historical (Gains) and Losses

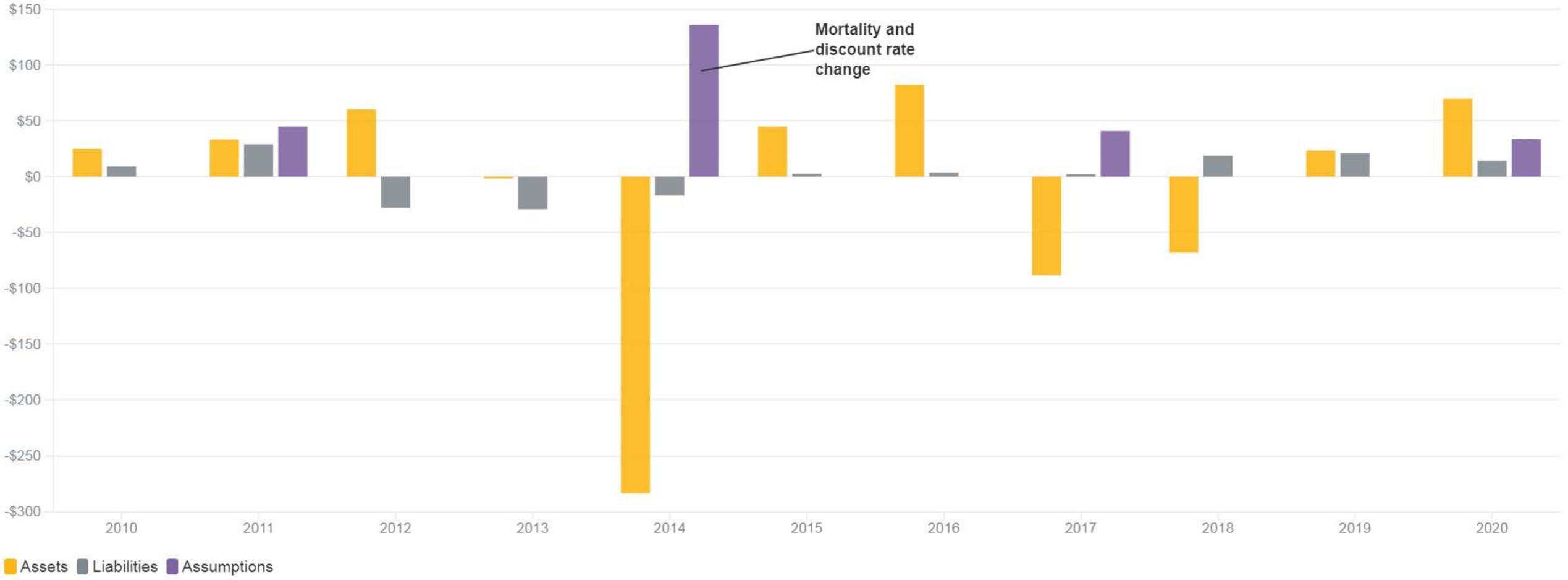


Comparing the range of projected liabilities and assets shows the volatility of assets is far more significant. However, there are some scenarios where you may want to consider liability changes too.

Projected Liabilities and Assets

Assumption changes also have an impact on the measurement of liabilities

Historical (Gains) and Losses



Adding in the liability volatility from assumption changes increases the variability, and in come cases for scenarios (like changing interest rates) estimating theliability change may be useful. But the volatility of assets is still likely to be the most important.

Projected Liabilities and Assets

MCERA Consulting Team

Click card for bio or to contact

Graham Schmidt
Consulting Actuary

Lafayette, CA

Bill Hallmark
Consulting Actuary

Portland, OR

Tim Doyle
Associate Actuary

Portland, OR

Anastasia Dopko
Associate Actuary

Philadelphia, PA

CHEIRON

Purpose:

The purpose of this report is to provide education related to the Board's Asset Liability studies. Projections are provided for demonstration purposes only; determinations for other purposes may be significantly different from the results shown in this presentation. Actual results will be different than our projections and vary to the extent that the Plan experience differs from the assumptions.

Intended Users:

This presentation was prepared for the Marin County Employees' Retirement Association Board for the purposes described herein. This presentation is not intended to benefit any third party. Other users of this presentation are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any other user.

Reliance:

In preparing our presentation, we relied on information (some oral and some written) supplied by MCERA. This information includes, but is not limited to, the Plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23. The data and actuarial assumptions used (unless modified within this communication) are described in our June 30, 2020 actuarial valuation report.

Variance:

Future results may differ significantly from the current projections presented in this presentation due to such factors as the following: plan experience different from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law.

Callan

April 27, 2021

Modern Portfolio Theory: How do investment risk and diversification affect returns

Jay Kloepfer
Capital Markets Research

Capital Markets – Basic Terms

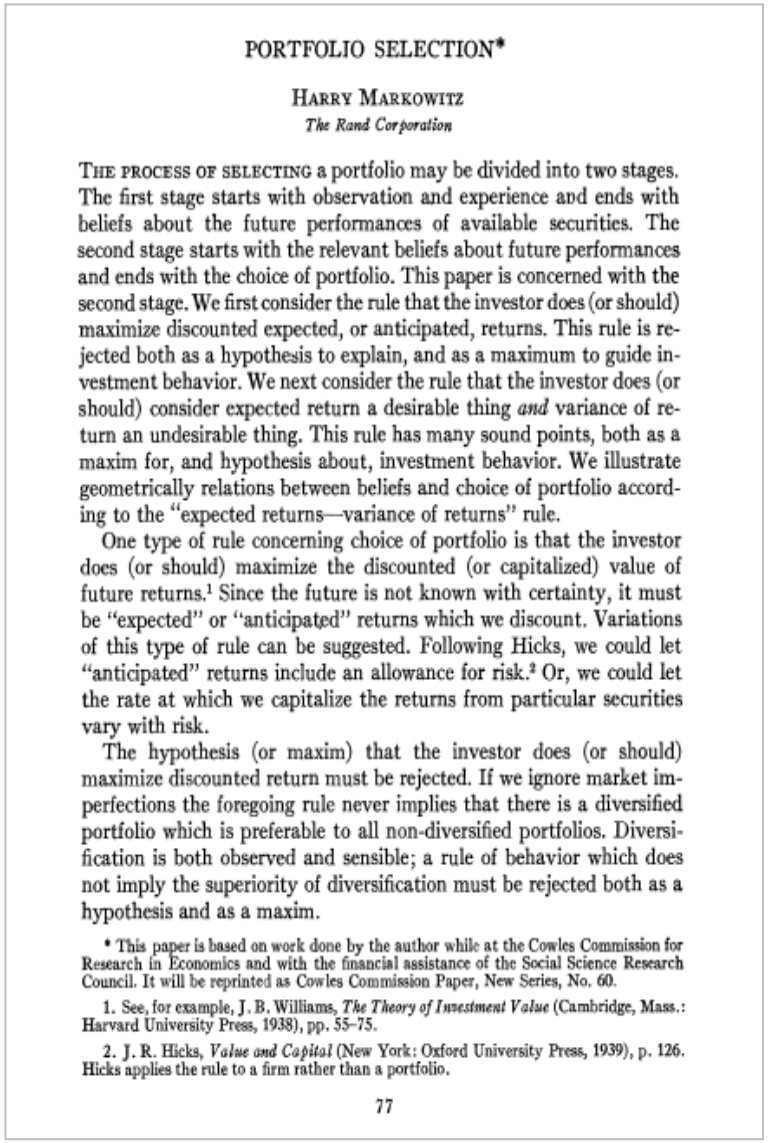
What are capital markets?

Modern Portfolio Theory concepts

- Assets and asset classes
  - Risk and return
  - Correlation
  - Portfolio
  - Diversification

Strategic asset allocation

Modern Portfolio Theory



PORTFOLIO SELECTION*

HARRY MARKOWITZ
The Rand Corporation

THE PROCESS OF SELECTING a portfolio may be divided into two stages. The first stage starts with observation and experience and ends with beliefs about the future performances of available securities. The second stage starts with the relevant beliefs about future performances and ends with the choice of portfolio. This paper is concerned with the second stage. We first consider the rule that the investor does (or should) maximize discounted expected, or anticipated, returns. This rule is rejected both as a hypothesis to explain, and as a maximum to guide investment behavior. We next consider the rule that the investor does (or should) consider expected return a desirable thing *and* variance of return an undesirable thing. This rule has many sound points, both as a maxim for, and hypothesis about, investment behavior. We illustrate geometrically relations between beliefs and choice of portfolio according to the "expected returns—variance of returns" rule.

One type of rule concerning choice of portfolio is that the investor does (or should) maximize the discounted (or capitalized) value of future returns.[1] Since the future is not known with certainty, it must be "expected" or "anticipated" returns which we discount. Variations of this type of rule can be suggested. Following Hicks, we could let "anticipated" returns include an allowance for risk.[2] Or, we could let the rate at which we capitalize the returns from particular securities vary with risk.

The hypothesis (or maxim) that the investor does (or should) maximize discounted return must be rejected. If we ignore market imperfections the foregoing rule never implies that there is a diversified portfolio which is preferable to all non-diversified portfolios. Diversification is both observed and sensible; a rule of behavior which does not imply the superiority of diversification must be rejected both as a hypothesis and as a maxim.

* This paper is based on work done by the author while at the Cowles Commission for Research in Economics and with the financial assistance of the Social Science Research Council. It will be reprinted as Cowles Commission Paper, New Series, No. 60.

1. See, for example, J. B. Williams, *The Theory of Investment Value* (Cambridge, Mass.: Harvard University Press, 1938), pp. 55–75.

2. J. R. Hicks, *Value and Capital* (New York: Oxford University Press, 1939), p. 126. Hicks applies the rule to a firm rather than a portfolio.

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Modern Portfolio Theory (MPT) provides investors with one of the most powerful quantitative tools for constructing "efficient portfolios" by considering three important capital market inputs:

- Expected Returns
- Standard Deviation (Risk)
- Correlations

MPT was published by Harry Markowitz in 1952.

- "Portfolio Selection", Journal of Finance, 1952

MPT facilitates the quantification of portfolio diversification by incorporating correlations.

Focus on Broad Asset Classes

Equities (stocks)

U.S. equities
- Large cap
- Smid cap

Non-U.S. equities
- Developed markets (ex U.S.)
- Emerging markets

Fixed Income (bonds)

Short duration / cash

U.S. fixed income
- High yield
- Bank loans

Non-U.S. fixed income
- Emerging debt

Long duration
- Long government
- Long credit

Other

Private real estate

Private equity

Hedge funds

Liquid real assets
- Commodities
- TIPS
- REITs
- Listed infrastructure

Strategic asset allocation typically focuses on broad asset classes (bolded).

Breakdowns between investment styles within asset classes (growth vs. value, large cap vs. small cap) are best addressed in a manager structure analysis.

Normally Distributed Asset Class Returns – Bell Curve

Modern Portfolio Theory assumes that all asset class returns are normally distributed.

Capital market projections convey a range of outcomes.

- More volatile asset classes such as equities have a wider range of outcomes (greater risk).
- Risk is expressed as standard deviation.

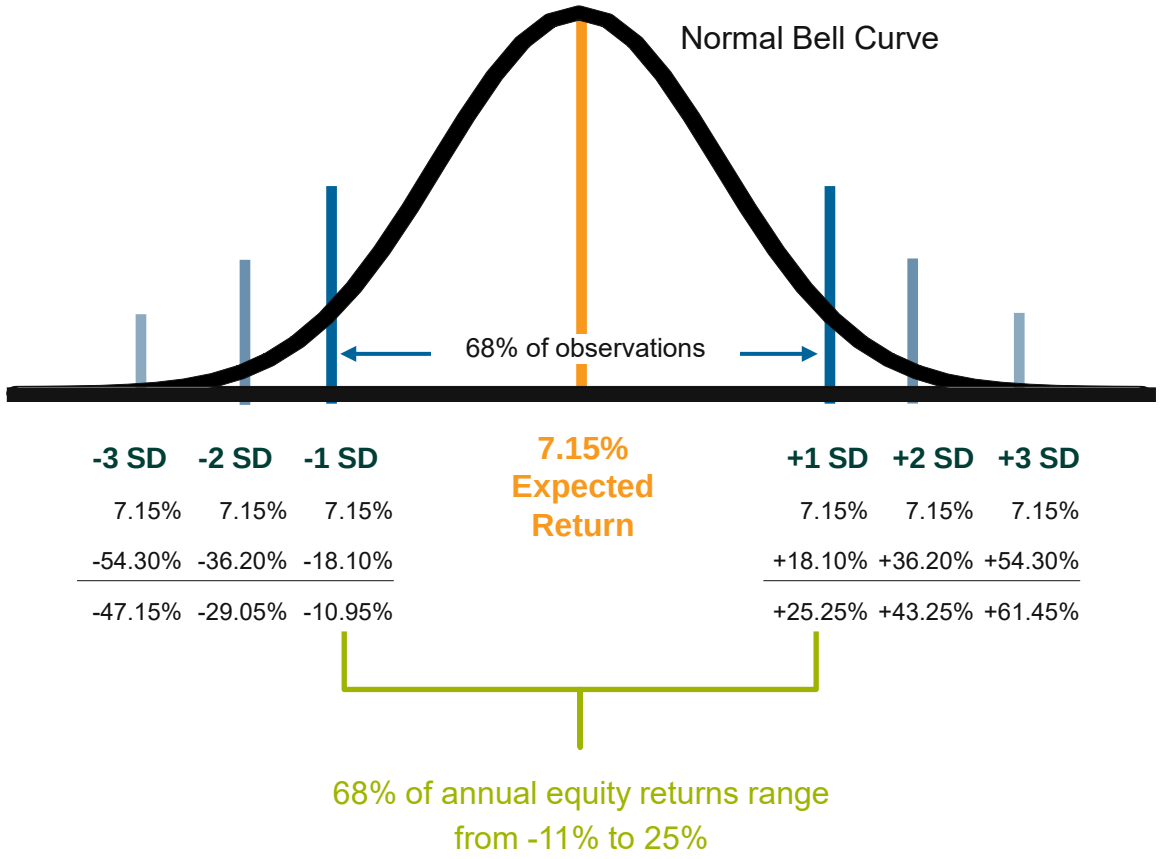
The 68–95–99.7 rule is shorthand for describing how many observations (returns) lie within one, two, and three standard deviations from the mean (expected return).

- 68% of annual equity returns are within one standard deviation: anywhere from -11% to 25%

U.S. Broad Equity (stocks)

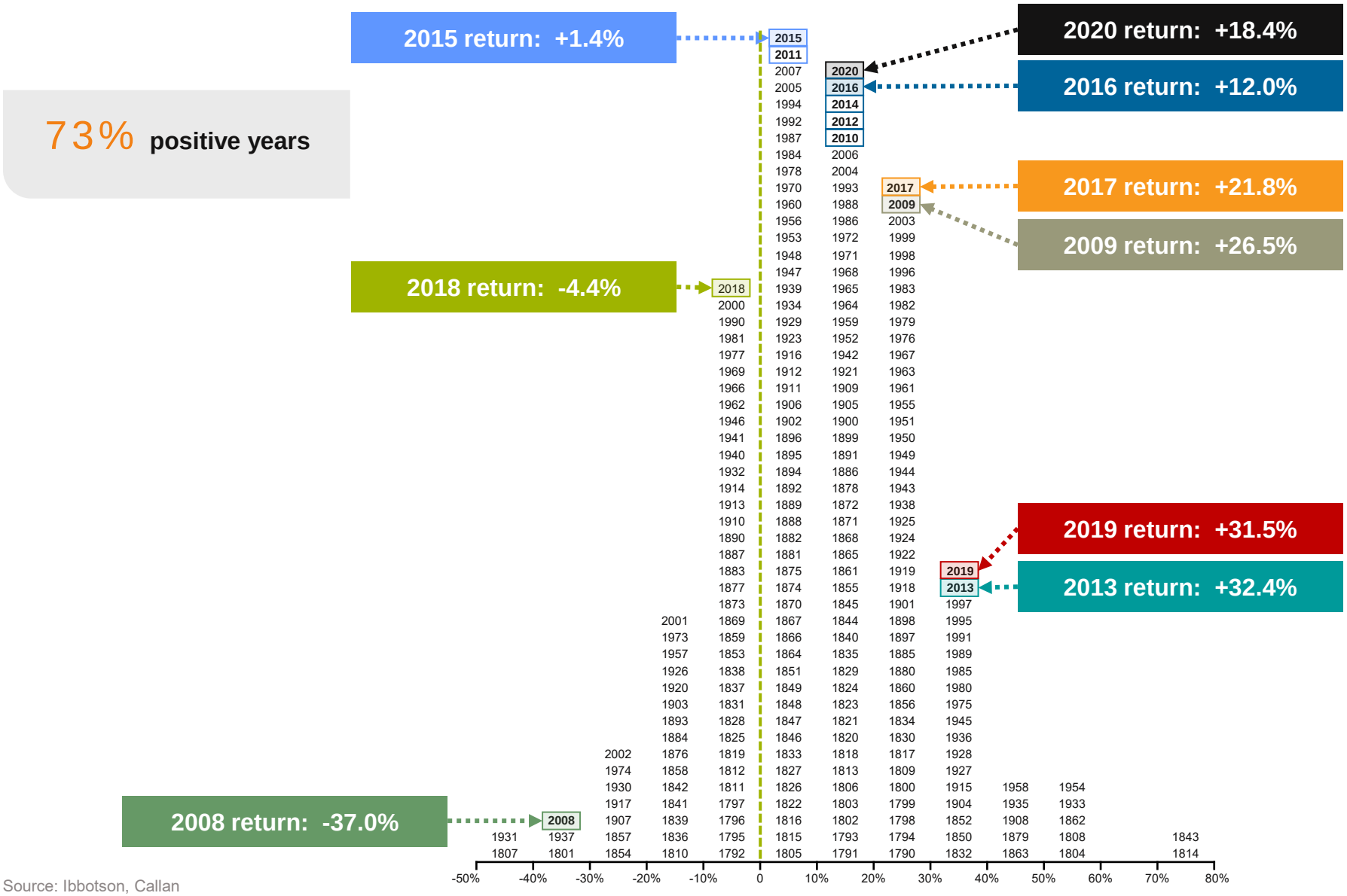
Expected Return = 7.15%

Standard deviation = 18.10%



Stock Market Returns by Calendar Year

2020 performance in perspective: History of the U.S. stock market (231 years of returns)



Source: Ibbotson, Callan

Market Risk is Rewarded With Higher Returns Over Long Run

Investors have demanded and received higher long-term returns for taking on greater risk (higher standard deviation).

But high risk (high standard deviation) means that shorter-term results can vary meaningfully from long-term averages.

Statistics Since Inception Ended December 31, 2020

	Returns	Standard Deviation
U.S. Small Cap Stocks	11.9%	37.5%
U.S. Large Cap Stocks	10.3%	22.0%
U.S. Long-term Corporate Bonds	6.2%	8.4%
U.S. Intermediate Government Bonds	4.9%	4.2%
U.S. T-Bills	3.4%	1.6%
U.S. Inflation	2.9%	2.6%

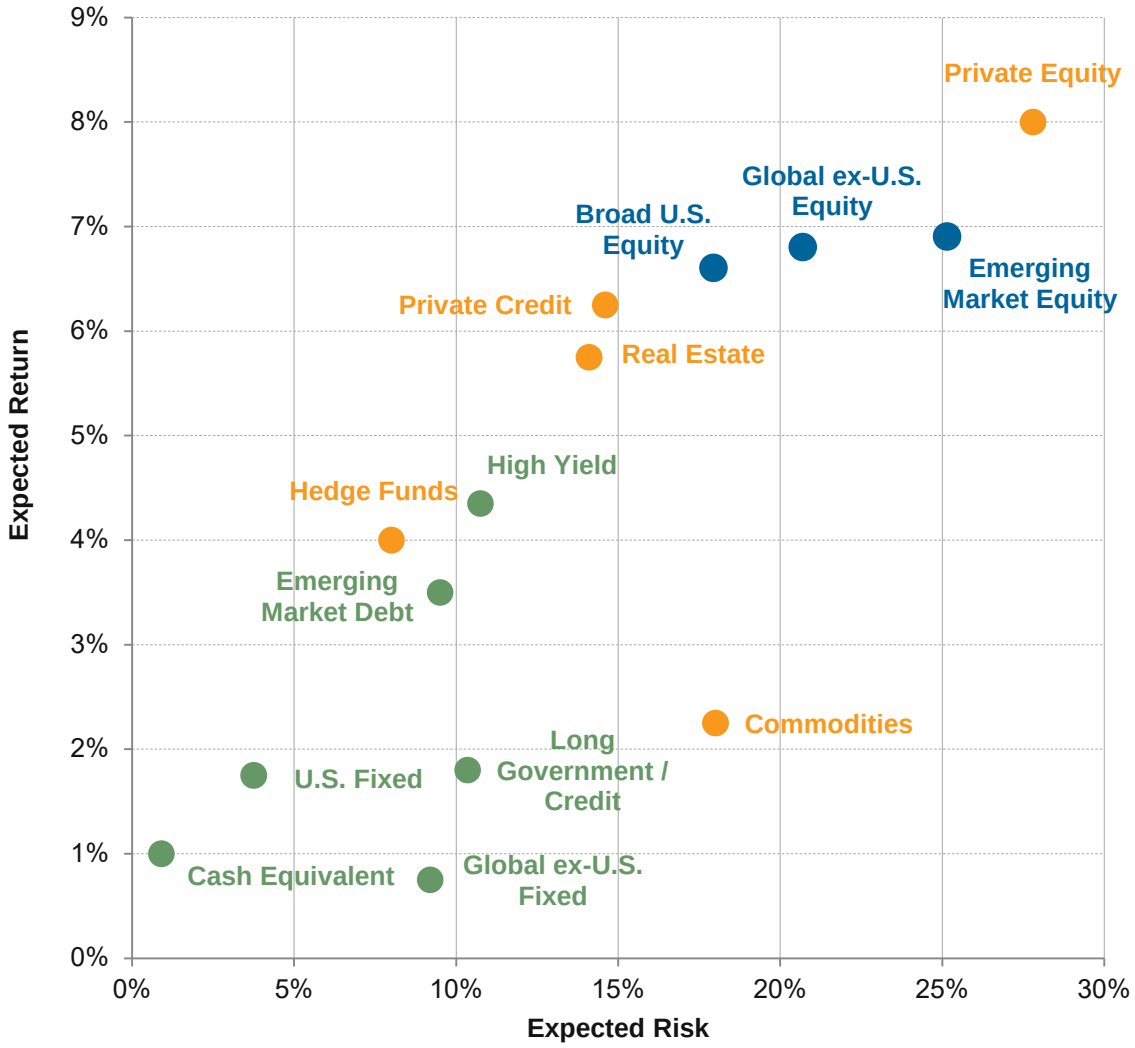
Source: Ibbotson. Data from 1926-2019.

Risk Aversion

Visualizing Callan's 2021–2030 Capital Market Assumptions

Modern portfolio theory assumes investors are risk averse – given a choice between two assets with the same level of return, an investor will select the asset with a lower level of risk.

- The risk premium demanded by investors provides evidence of risk aversion.
- For example, investors demand a greater return from equities over bonds for the increased risk they are assuming.



Source: Callan 2020 – 2029 return-risk expectations

Callan 2021–2030 Capital Market Projections

The basis for asset allocation is the long-term expected characteristics of each asset class and how they interact with each other.

Public market expectations represent passive exposure (beta only); however, return expectations for real estate and private equity reflect active management (alpha).

All return projections are net of fees.

Callan capital market projections are used for long-term strategic planning.

Asset Class	Benchmark	Expected Return*	Standard Deviation
Broad U.S. Equity	Russell 3000	6.60%	17.95%
Global ex-U.S. Equity	MSCI ACWI ex USA	6.80%	20.70%
Core U.S. Fixed Income	Bloomberg Barclays Aggregate	1.75%	3.75%
Core Real Estate	NCREIF ODCE	5.75%	14.10%
Private Equity	Cambridge Private Equity	8.00%	27.80%

* 10-year annualized return

Callan 2021–2030 Correlations

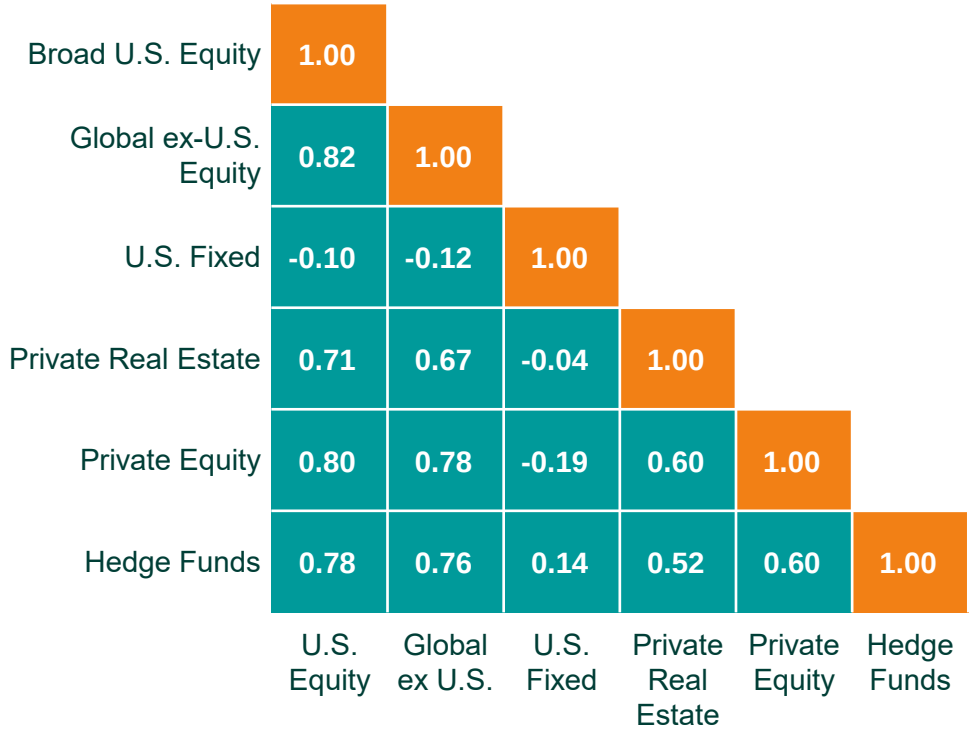
Correlation measures the degree to which two investments move in relation to each other:

+1 correlation:
- Returns are "perfectly correlated" or synchronized
- No diversification benefit or reduction in volatility

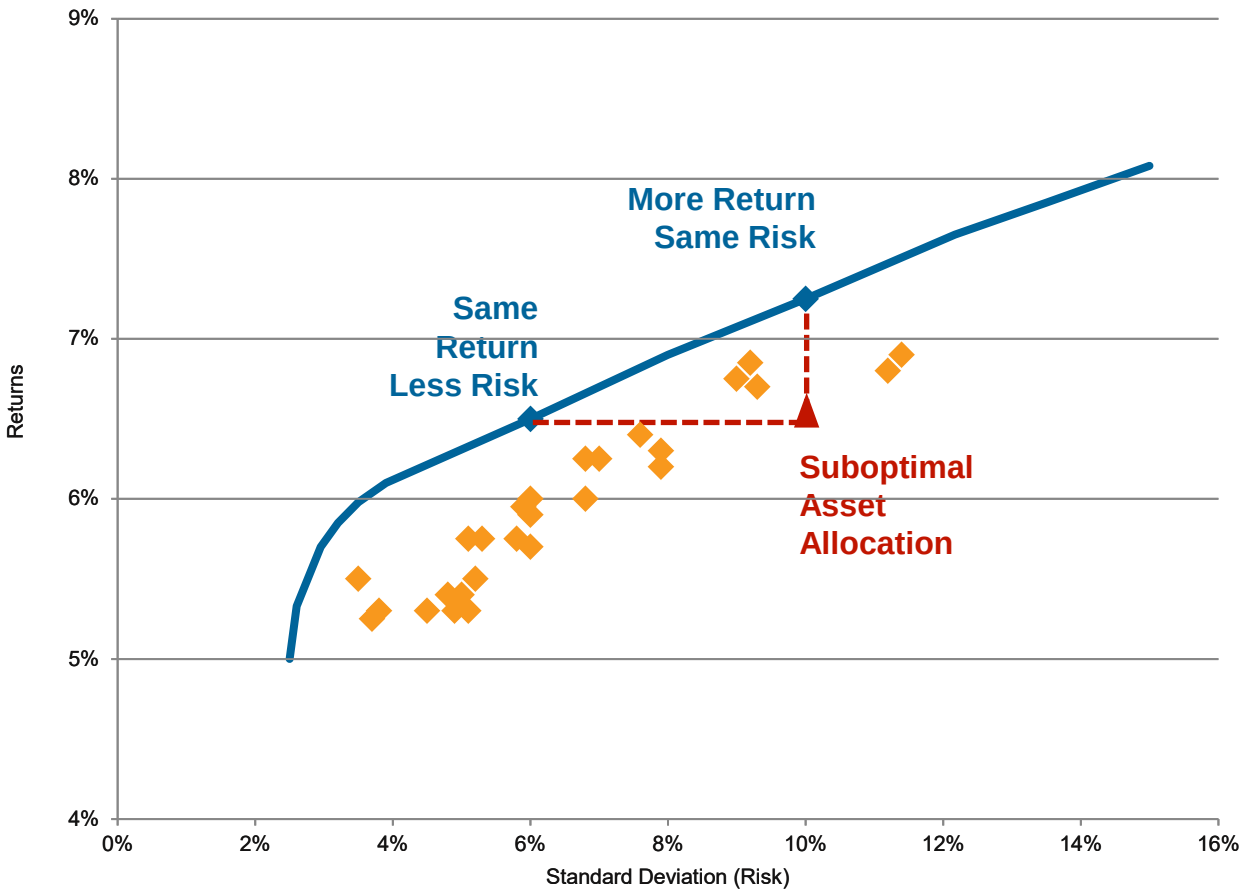
0 correlation:
- The relationship between the returns of two investments is completely random
- Substantial reduction in volatility

-1 correlation:
- Returns are completely unsynchronized
- Good and bad returns exactly cancel out, leaving no volatility

These relationships will have a large impact on the generation of efficient asset mixes using mean-variance optimization.



Mean-Variance Optimization



Capital Market Assumptions

Expected Returns
Risks
Correlations

Mean-Variance Optimization

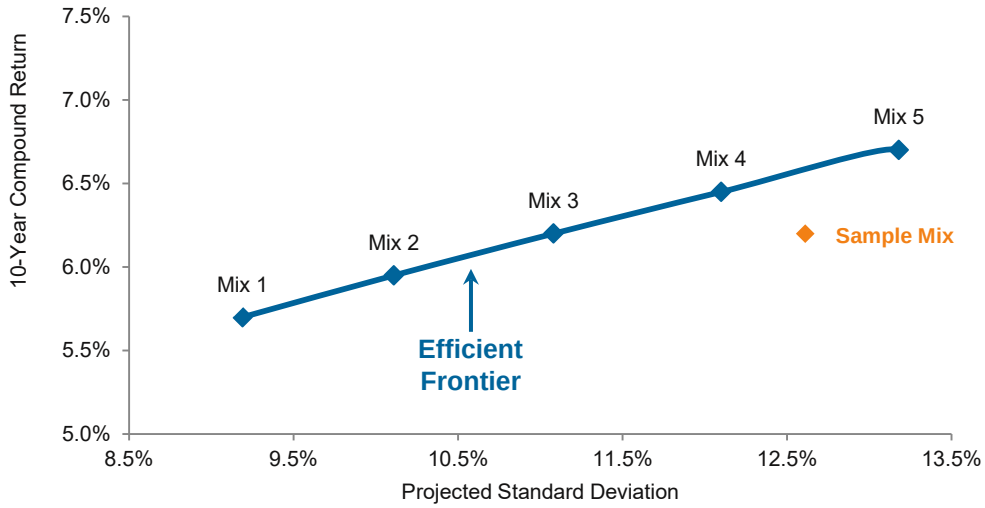
Mathematically finds the highest returning portfolio for each level of risk – an “efficient portfolio”

Select Portfolio

An efficient portfolio is selected based on multiple factors

Portfolio Mean-Variance Optimization Example

Efficient frontier



	Sample Mix	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
Broad U.S. Equity	70%	20%	22%	25%	27%	30%
Global ex-U.S. Equity	0%	13%	15%	16%	18%	19%
Private Equity	0%	9%	9%	10%	11%	12%
Broad U.S. Fixed Income	30%	46%	41%	36%	30%	25%
Private Real Estate	0%	7%	8%	9%	10%	10%
Hedge Funds	0%	5%	5%	4%	4%	4%
Totals	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
10-Year Compound Return	6.20%	5.70%	5.95%	6.20%	6.45%	6.70%
Projected Standard Deviation	12.61%	9.19%	10.11%	11.08%	12.10%	13.18%
Sharpe Ratio	0.30	0.37	0.36	0.35	0.34	0.33

The optimization model determines the portfolios with the highest expected return for any given risk level known as the “efficient frontier”

The sample portfolio is below the efficient frontier because it is relatively undiversified

Determining the efficient frontier is the first step in developing asset allocation policy

The Importance of Asset Allocation

The number one task

Asset allocation is the primary determinant of investment return and asset volatility.

Asset allocation is the process of determining the optimal allocation of a portfolio among broad asset classes based upon, among other factors:

- Investment goals
- Time horizon
- Liquidity needs
- Capital market expectations
- Liability characteristics
- Risk tolerance

Elements of an appropriate target asset allocation include:

- Identifying asset classes for inclusion (avoid overlaps and minimize gaps)
- Special considerations such as fees, size or capacity constraints, liquidity requirements
- Rebalancing discipline

Role of Asset Class

Growth

Equities
- Global public equity
- Private equity
- Alternative beta

Credit Sensitive
- High yield
- Emerging debt
- Bank loans
- Long credit
- Private debt

Risk Mitigation

Income Producing
- Short duration
- Core U.S. fixed income
- Non-U.S. fixed income

Rising Rate Protection
- Cash equivalents
- Short duration
- Floating rate securities

Liability Hedging
- Long Treasury
- Long credit

Real Assets

Short / Intermediate Hedge
- Inflation-linked debt
- Commodities

Growth-Oriented
- REITs
- MLPs
- Natural resource equity
- Core real estate
- Value-add real estate
- Infrastructure
- Timber
- Agriculture

Diversifying Assets

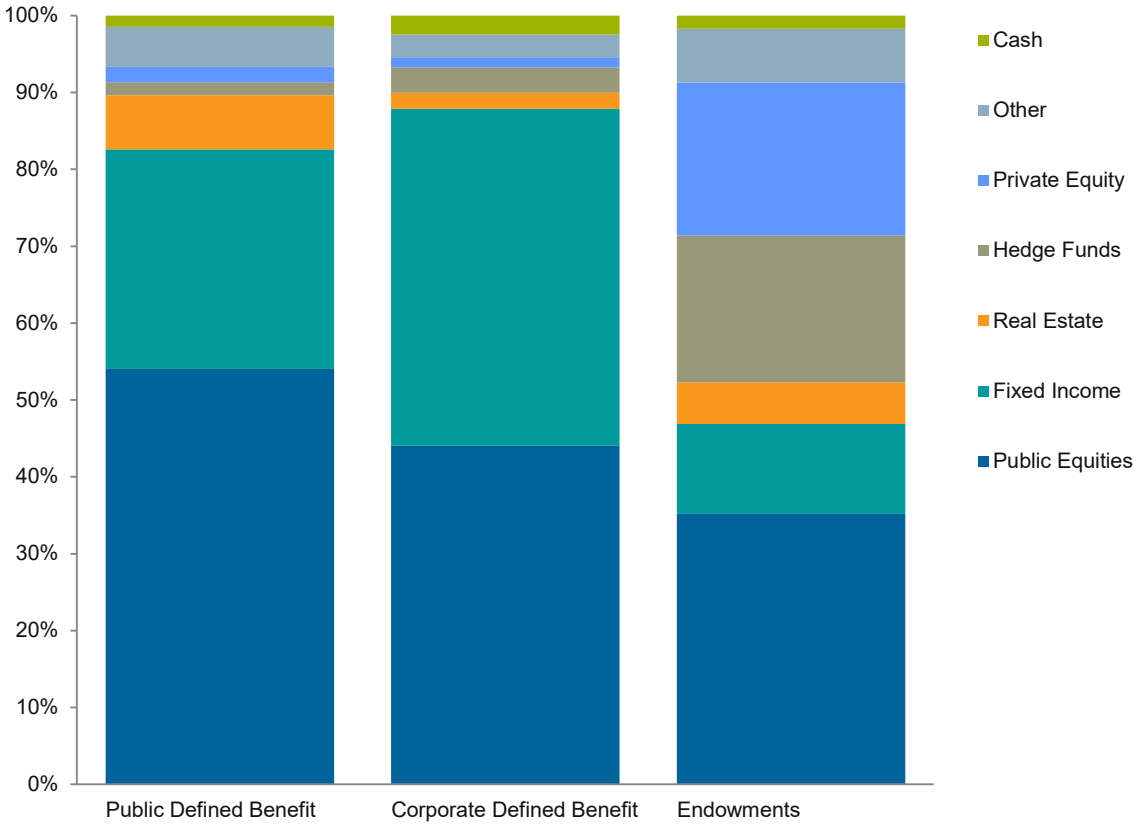
- Multi-asset class strategies
- Hedge funds
- Managed futures

Each asset class should play a role in the portfolio.

Long-term investors who are less sensitive to short-term volatility may allocate 60–70% of the portfolio to growth assets.

Asset Allocation Policies Vary Widely by Plan Type

Average allocations



Long-term investors (public pension funds, endowments) typically allocate 60–70% or more of the portfolio to growth assets (e.g., public equities, private equity).

Corporate defined benefit funds allocate more to fixed income to hedge liabilities (mark-to-market framework).

Endowments more heavily invested in alternative investments.

Sources: Callan (December 31, 2019), NACUBO (2019 study)

Callan

April 27, 2021

The Case for Reversion to the Mean

Jim Callahan, CFA
President

Jay Kloepfer
Capital Markets Research

Callan Capital Market Projection Process

Historical Rolling 10-year Return – US Large Cap Equity

Historical 10-year return for US large cap has averaged 10.5%.

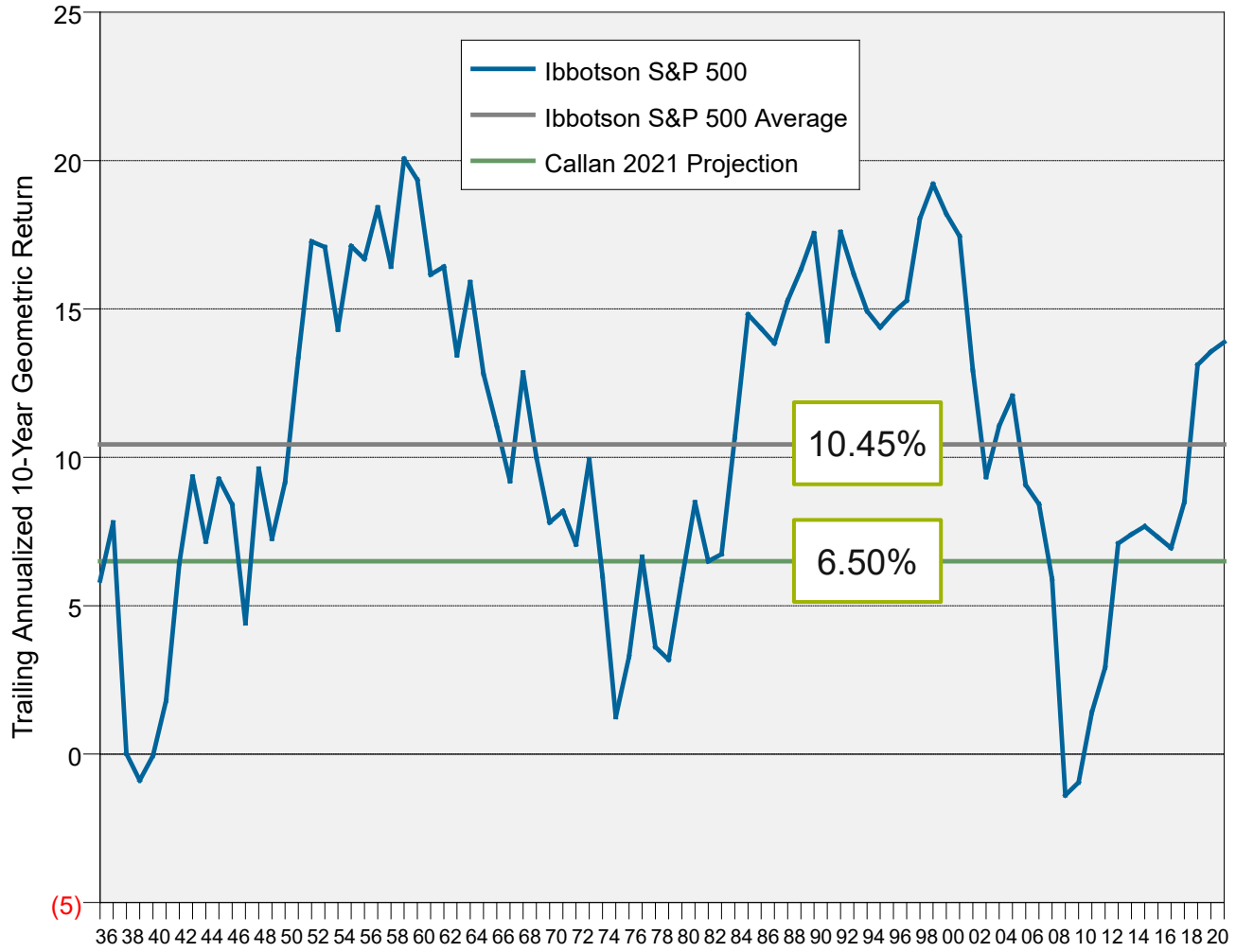
2021 Projection is 6.5%.

Very few periods historically of negative 10-year return for US equities.

Current outlook is in lower third of historical distribution, driven by relatively high valuations and low inflation outlook.

Generally lower return periods have been associated with higher valuations at the beginning of the period or recession events.

Rolling 10 Year Returns
Ibbotson S&P 500



Callan Capital Market Projection Process

Historical Rolling 20-year Return – US Large Cap Equity

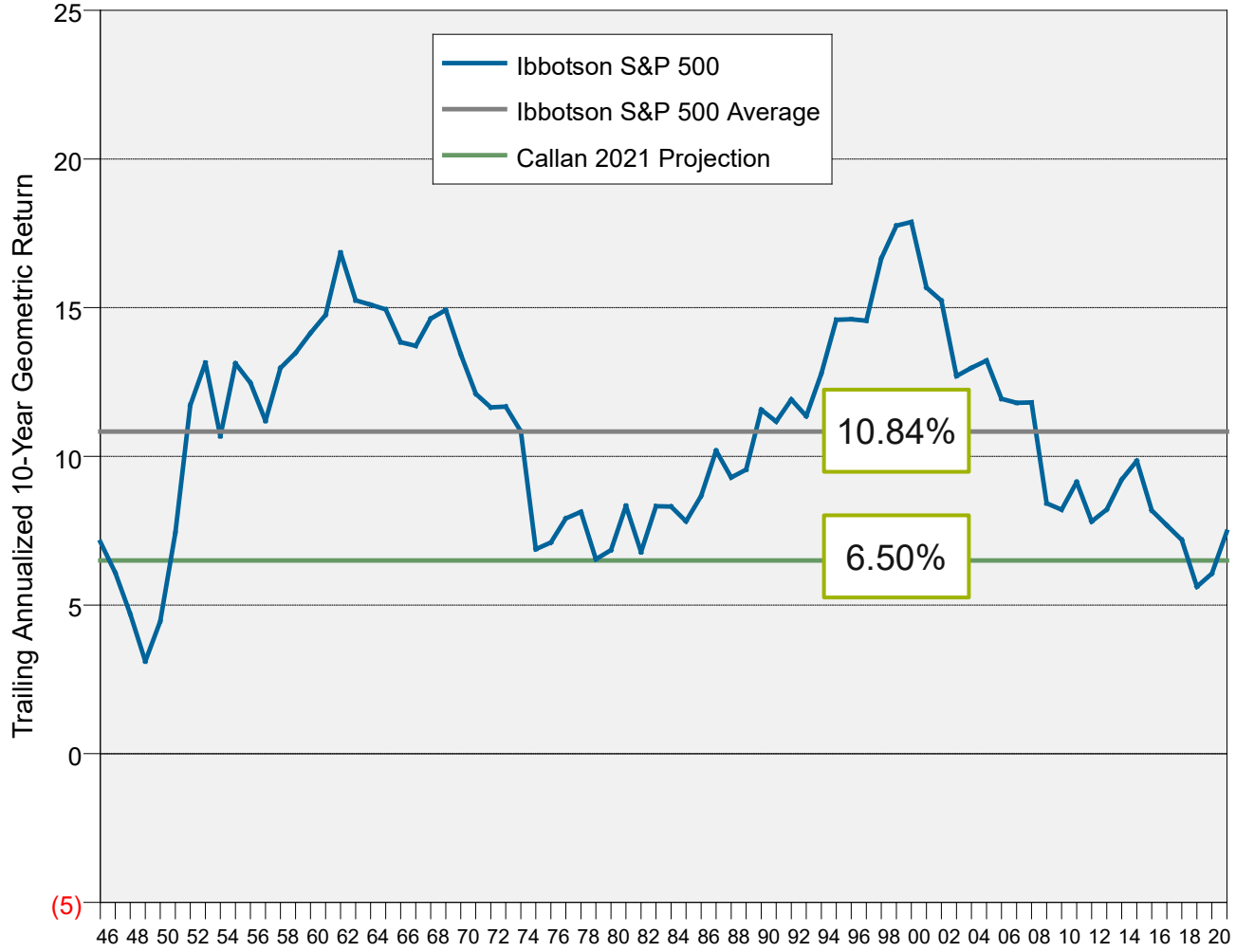
Historical 20-year return for US large cap has averaged 10.8%.

2021 Projection is 6.5%.

Very few periods historically where the 20-year return was below 6.50% projection.

Worst 20-year period for S&P 500 since 1926 was period ended 12/31/1950 (great depression, WW II, Korean War). Annualized Return 3.1% (almost entirely dividends).

Rolling 20 Year Returns
Ibbotson S&P 500



Callan Capital Market Projection Process

Historical Rolling 30-year Return – US Large Cap Equity

Historical 30-year return for US large cap has averaged 11.2%.

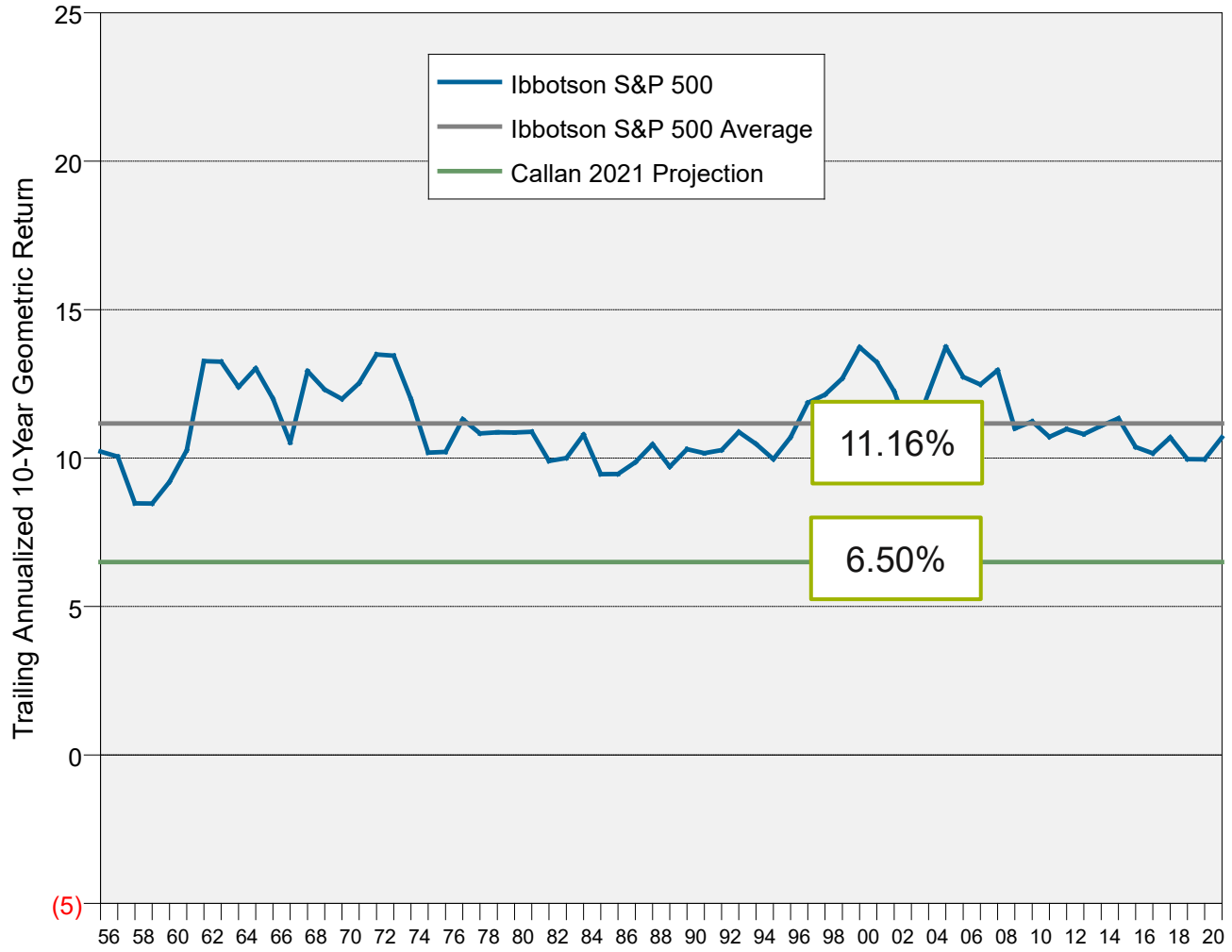
2021 Projection is 6.5%.

Worst historical 30-year return for S&P 500 was 8.47%.

30-year annualized returns in fairly tight range around long term average.

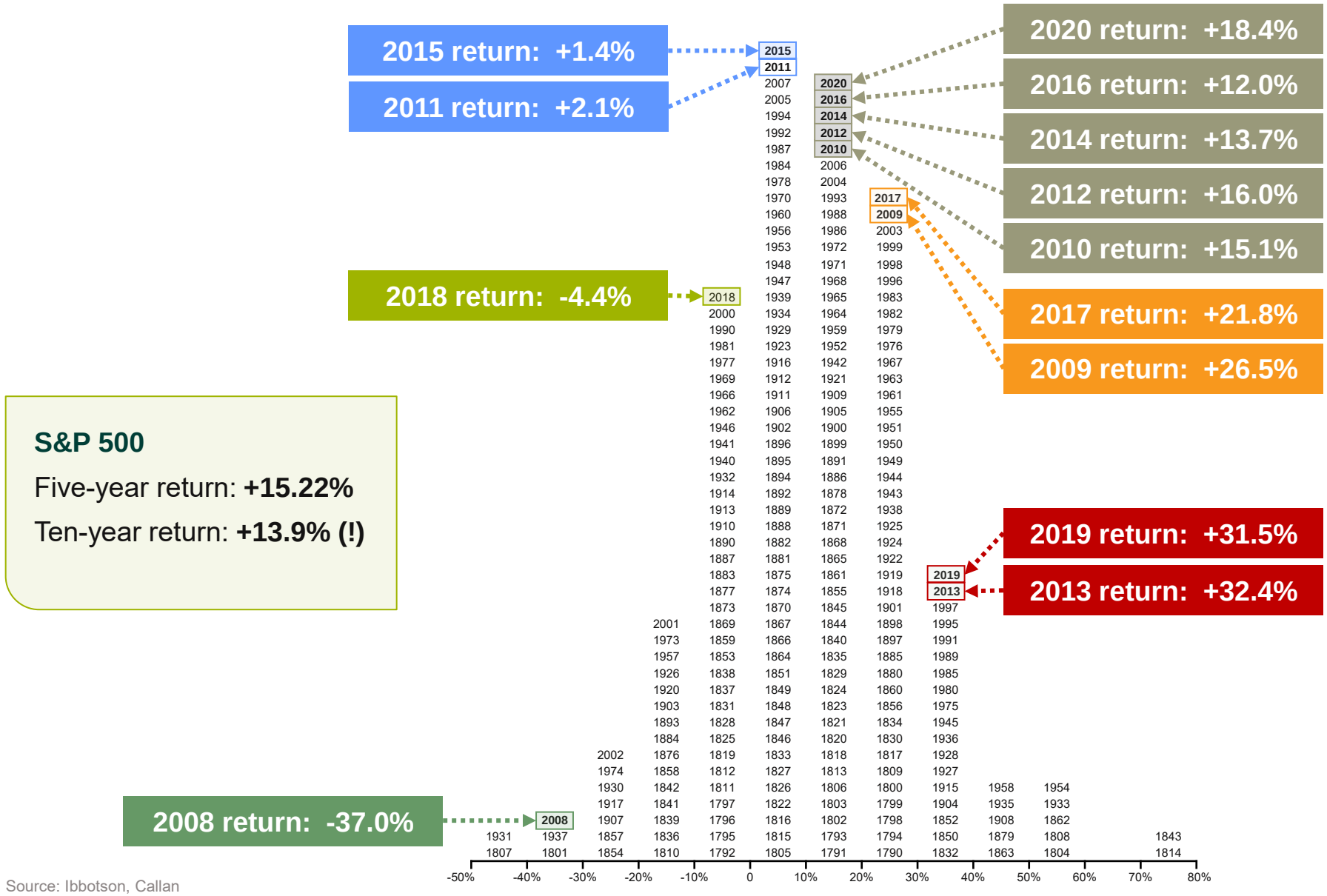
Longer time horizons reward equity risk takers with more consistent positive returns.

Rolling 30 Year Returns
Ibbotson S&P 500



Stock Market Returns by Calendar Year

2020 performance in perspective: History of the U.S. stock market (231 years of returns)



S&P 500

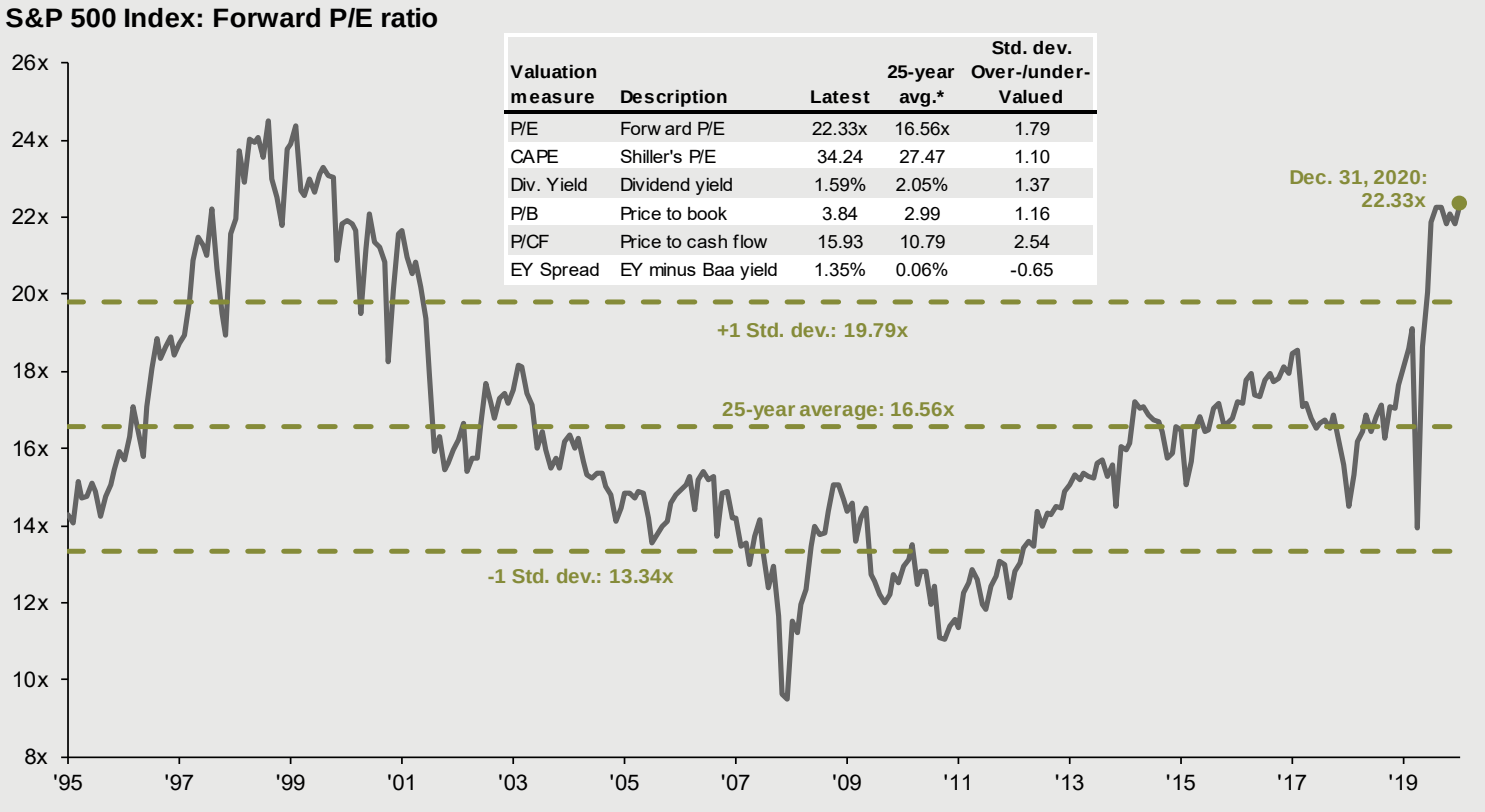
Five-year return: **+15.22%**

Ten-year return: **+13.9% (!)**

Source: Ibbotson, Callan

U.S. Equity Projections

Large cap valuations



Valuation measure	Description	Latest	25-year avg.*	Std. dev. Over-/under-Valued
P/E	Forward P/E	22.33x	16.56x	1.79
CAPE	Shiller's P/E	34.24	27.47	1.10
Div. Yield	Dividend yield	1.59%	2.05%	1.37
P/B	Price to book	3.84	2.99	1.16
P/CF	Price to cash flow	15.93	10.79	2.54
EY Spread	EY minus Baa yield	1.35%	0.06%	-0.65

Price-to-earnings is price divided by consensus analyst estimates of earnings per share for the next 12 months as provided by IBES since December 1995, and FactSet for December 31, 2020. Current next 12-months consensus earnings estimates are $167. Average P/E and standard deviations are calculated using 25 years of IBES history. Shiller's P/E uses trailing 10-years of inflation-adjusted earnings as reported by companies. Dividend yield is calculated as the next 12-months consensus dividend divided by most recent price. Price-to-book ratio is the price divided by book value per share. Price-to-cash flow is price divided by NTM cash flow. EY minus Baa yield is the forward earnings yield (consensus analyst estimates of EPS over the next 12 months divided by price) minus the Moody's Baa seasoned corporate bond yield. Std. dev. over-/under-valued is calculated using the average and standard deviation over 25 years for each measure.

Guide to the Markets – U.S. Data are as of December 31, 2020.

Valuations are 1.8 standard deviations above the 25-year average based on forecast earnings

Longer term historical valuations are also elevated

- Shiller's cyclically adjusted price earnings (CAPE) ratio is 1.1 standard deviation above average

Stock prices reflect anticipated rather than historical earnings

Market is concentrated in Tech and Consumer Discretionary which both have high valuations.

Sources: FactSet, FRB, Robert Shiller, S&P Dow Jones Indices, Thomson Reuters, J.P. Morgan Asset Management.

Callan Capital Market Projection Process

Historical Return – US Fixed Income

Historical 10-year return for US bonds has averaged 5.5%.

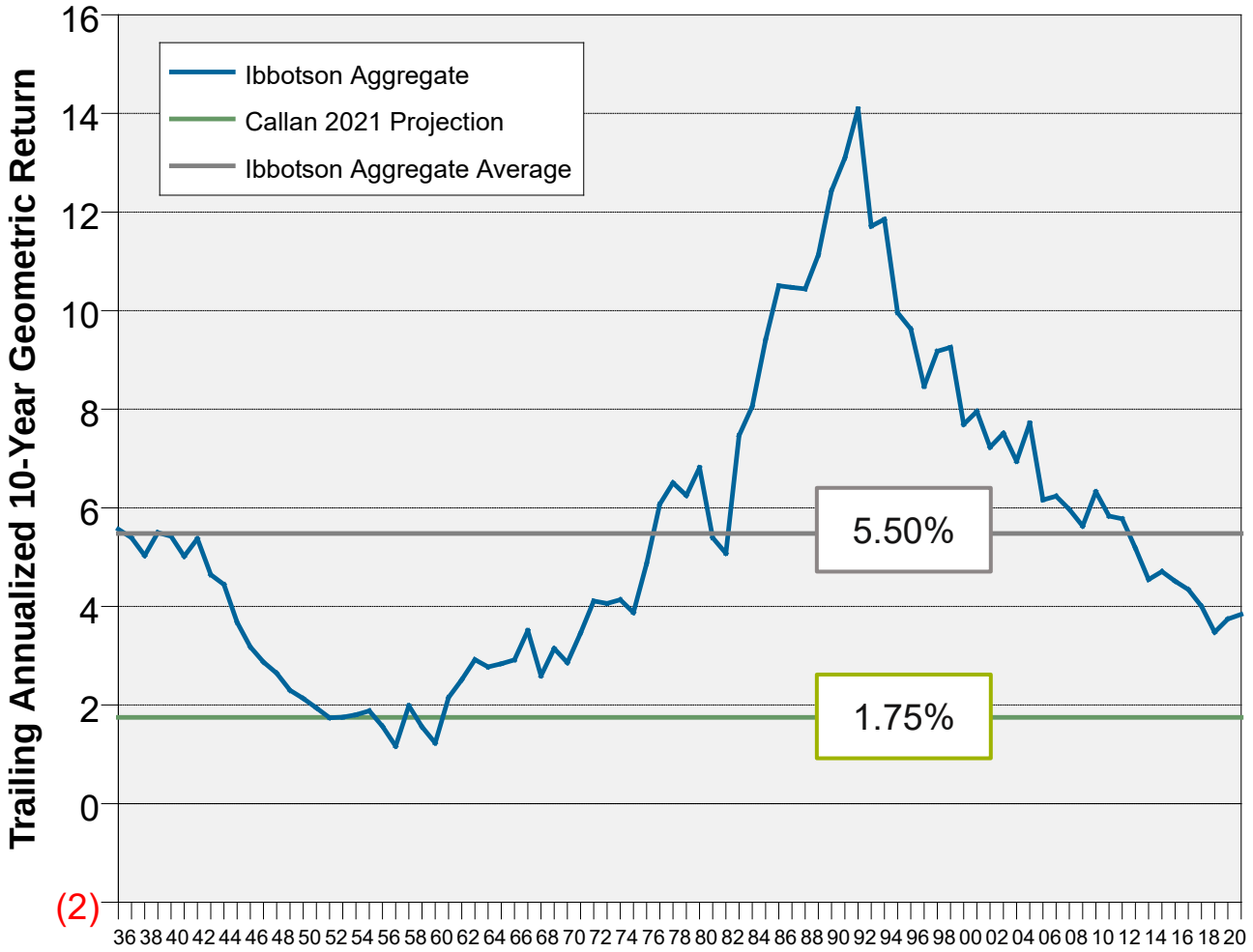
2021 Projection is 1.75%.

No periods historically of negative 10-year return for US bonds.

Current outlook is in bottom decile of historical distribution due to low yields and low inflation outlook.

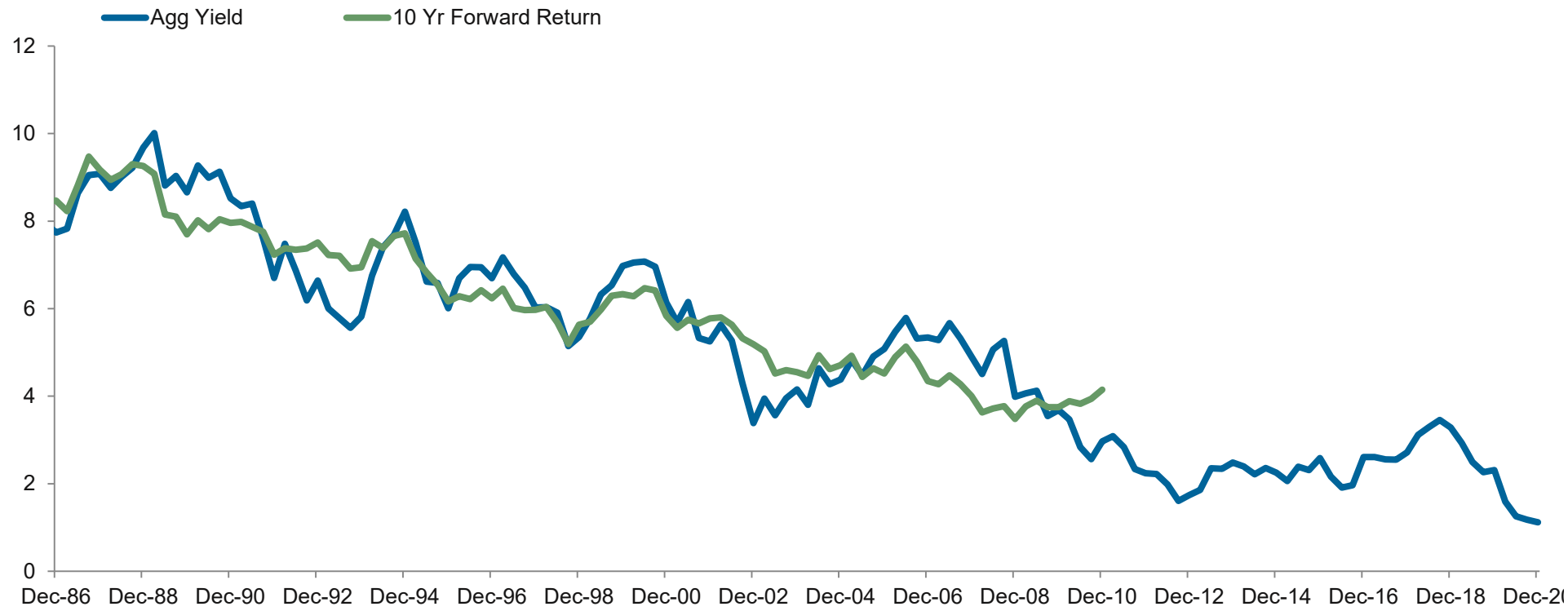
Rising interest rates will eventually allow higher forward looking returns but will reduce return in the intermediate term.

Rolling 10 Year Returns
Ibbotson Aggregate



Starting Yield Strongly Predicts Forward Returns

Bloomberg Aggregate Index Starting Yield vs. 10-Year Forward Return



There is a strong relationship between starting yields and subsequent 10-Year returns.

Current yield on the Bloomberg Aggregate index is below 2%.

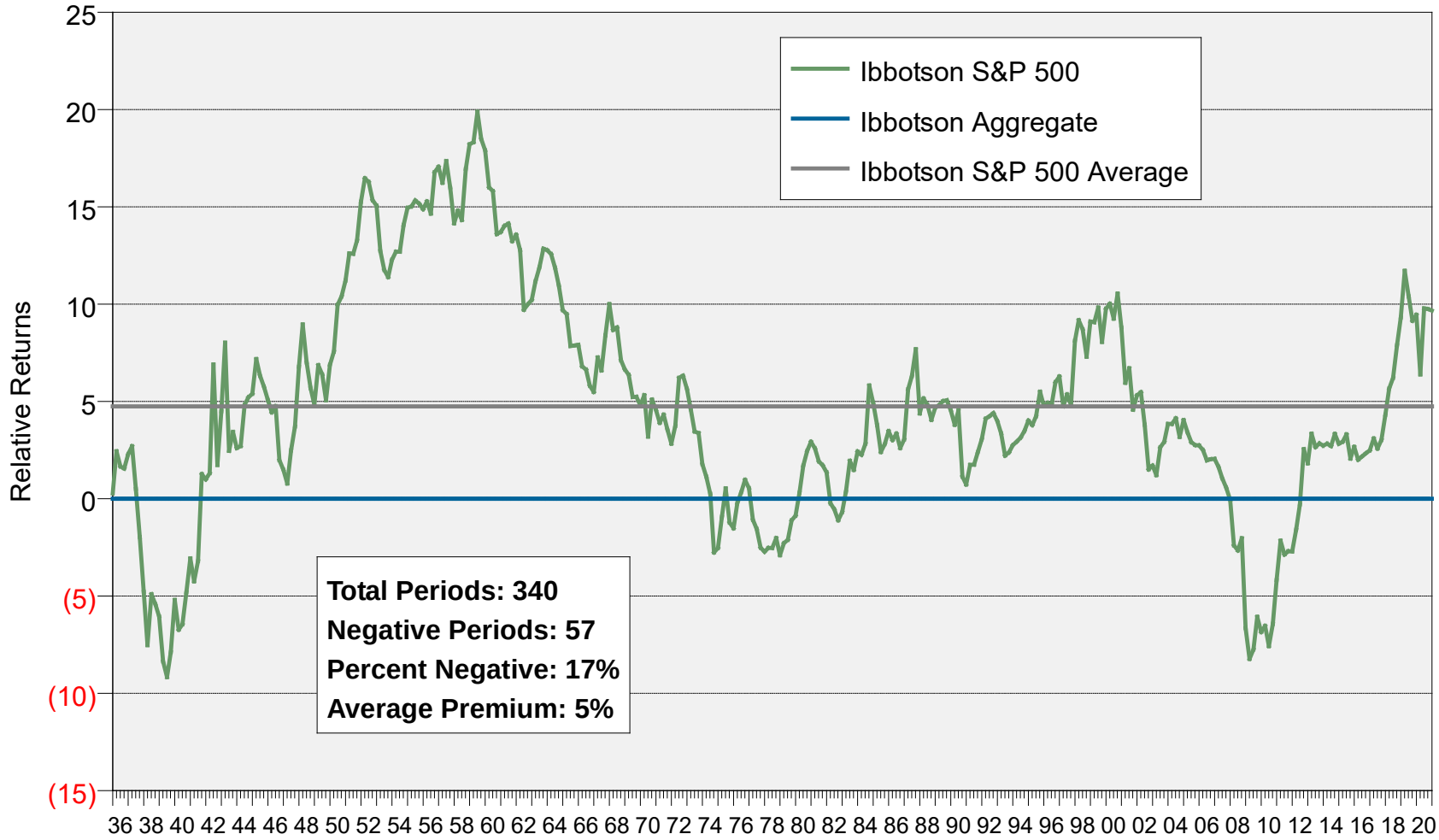
Projection includes assumption of gradually rising yields over 10-year period.

Sources: Bloomberg Barclays

Relative Returns Stocks versus Bonds – 10-year Roll

Long Term Relationship Between Stocks and Bonds

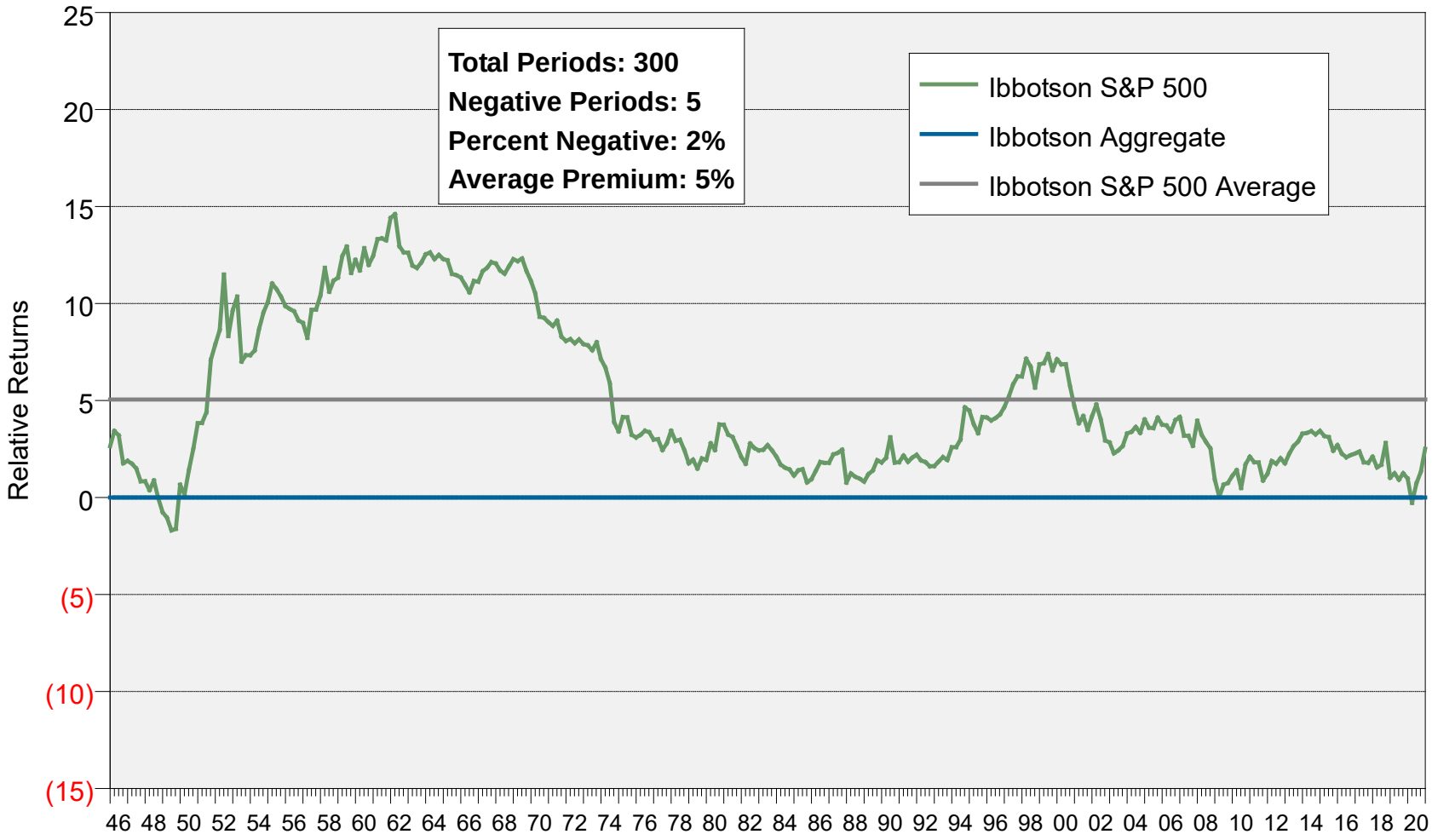
Rolling 10 Year Relative Returns
US Stocks versus US Bonds



Relative Returns Stocks versus Bonds – 20-year Roll

Long Term Relationship Between Stocks and Bonds

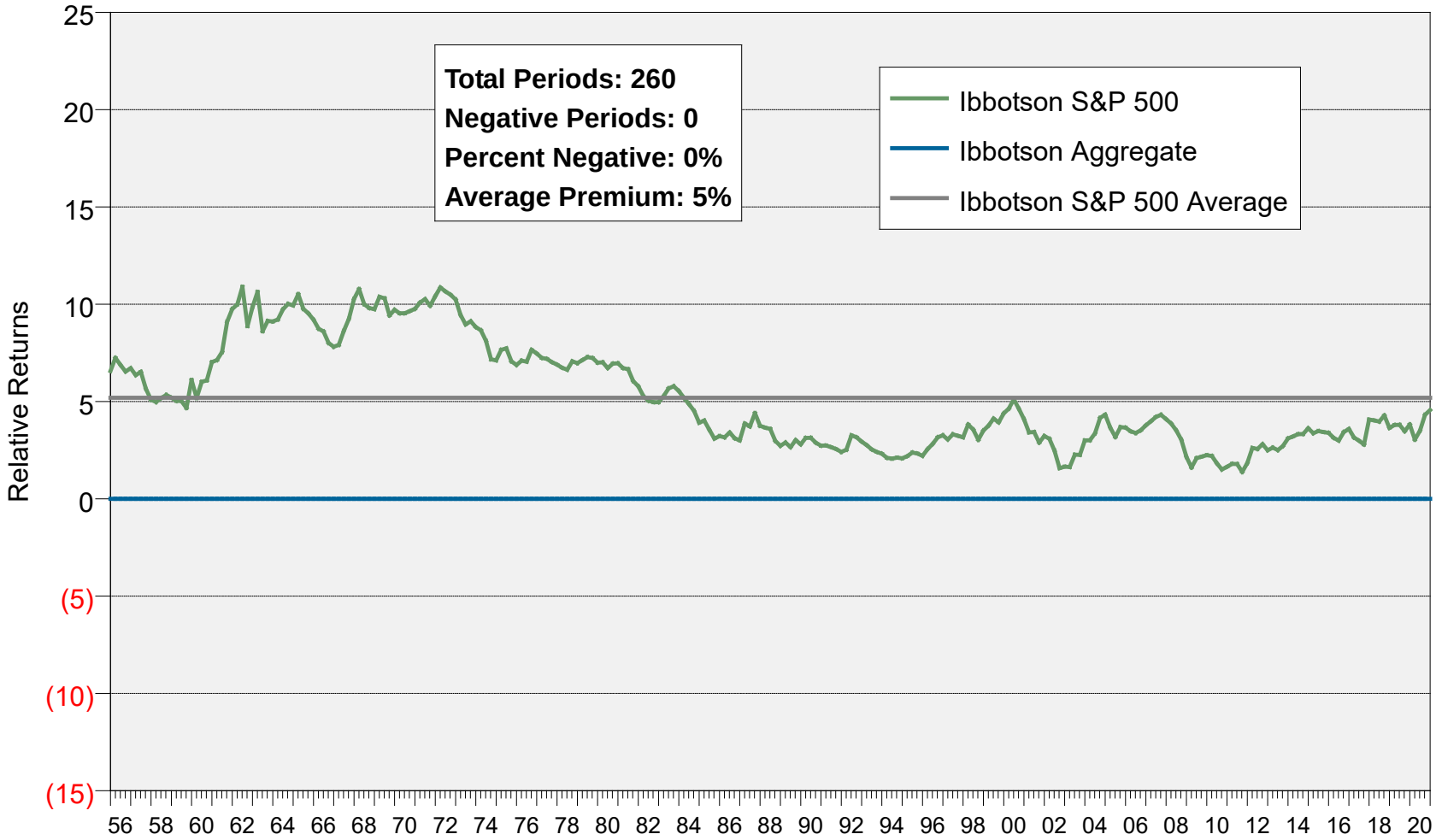
Rolling 20 Year Relative Returns
US Stocks versus US Bonds



Relative Returns Stocks versus Bonds – 30-year Roll

Long Term Relationship Between Stocks and Bonds

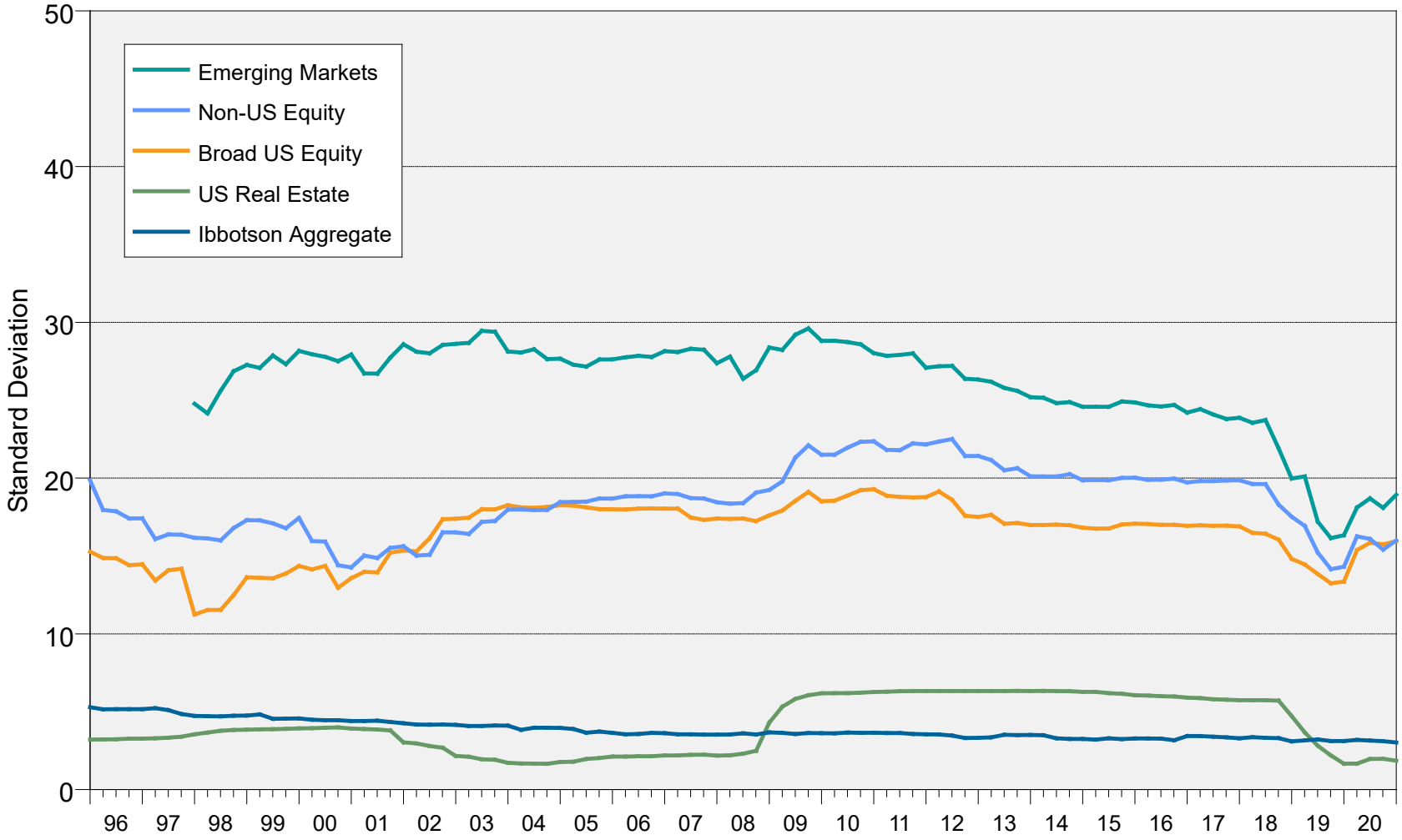
Rolling 30 Year Relative Returns
US Stocks versus US Bonds



Rolling 10-Year Standard Deviation

Asset Class Volatility Over Time

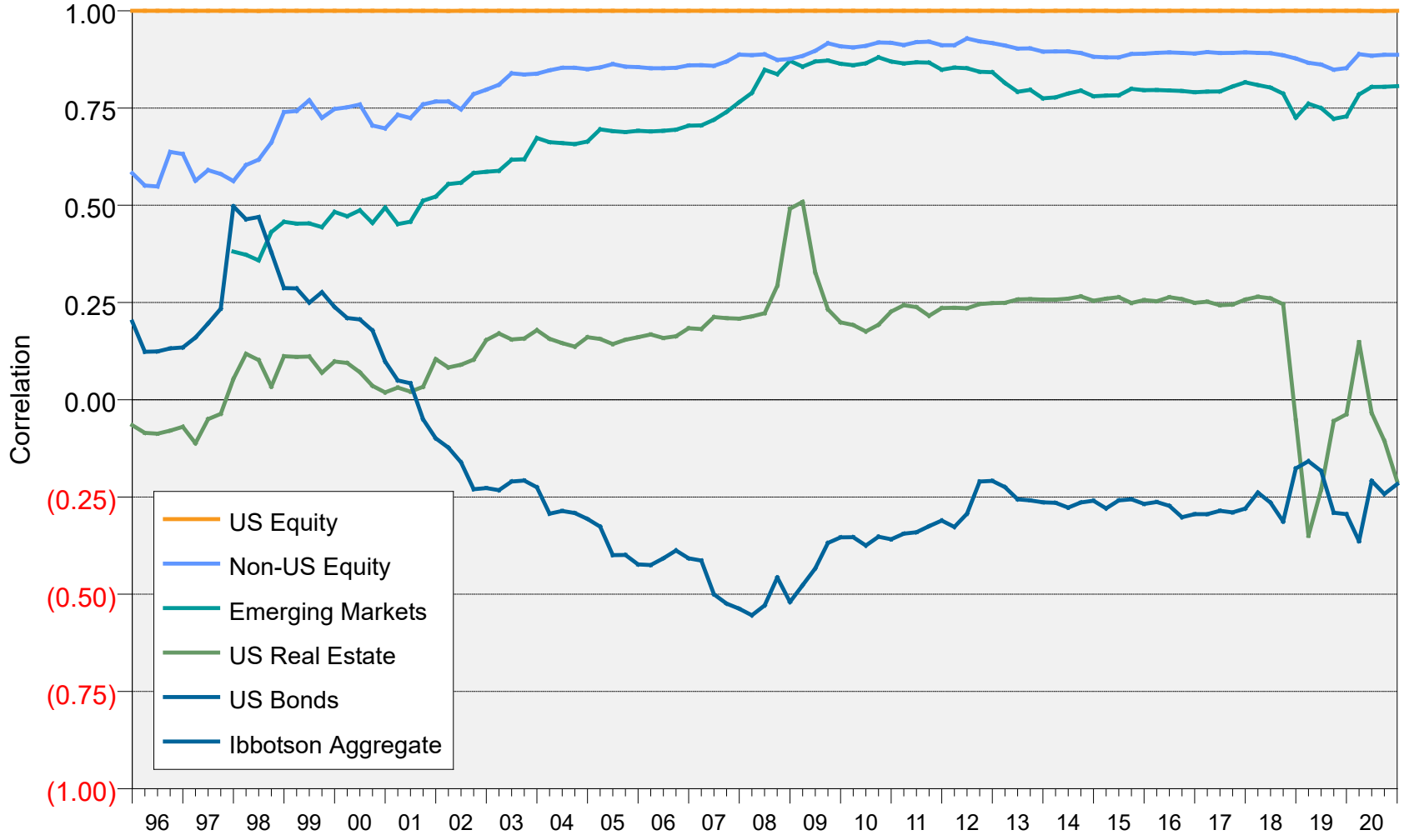
Rolling 10 Year Standard Deviation
25 Years ended December 31, 2020



Relative Returns Stocks versus Bonds

Correlations to US Equity Over Time

Rolling 10 Year Correlation with US Equity
25 Years ended December 31, 2020



Periodic Table of Investment Returns

Diversification Over Recent Calendar Year Periods

Periodic Table of Investment Returns
for Calendar Years

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Real Estate 15.0%	Non US Equity 17.0%	US Equity 33.6%	US Equity 12.6%	Real Estate 14.2%	US Equity 12.7%	Non US Equity 27.8%	Private Equity 10.1%	US Equity 31.0%	US Equity 20.9%
US Bonds 7.8%	US Equity 16.4%	Private Equity 21.2%	Private Equity 11.8%	Private Equity 8.6%	Private Equity 9.5%	US Equity 21.1%	Real Estate 7.3%	Non US Equity 21.6%	Non US Equity 11.1%
Private Equity 7.2%	Private Equity 13.6%	Non US Equity 15.8%	Real Estate 11.4%	US Bonds 0.5%	Marin Target 8.5%	Private Equity 19.6%	US Bonds 0.0%	Marin Target 19.8%	US Bonds 7.5%
US Equity 1.0%	Marin Target 12.4%	Marin Target 14.2%	US Bonds 6.0%	US Equity 0.5%	Real Estate 8.4%	Marin Target 16.4%	Marin Target (5.2%)	Private Equity 16.1%	Real Estate 0.8%
Marin Target (0.7%)	Real Estate 9.9%	Real Estate 12.4%	Marin Target 5.1%	Marin Target (2.0%)	Non US Equity 4.4%	Real Estate 6.9%	US Equity (5.2%)	US Bonds 8.7%	
Non US Equity (14.3%)	US Bonds 4.2%	US Bonds (2.0%)	Non US Equity (3.9%)	Non US Equity (4.6%)	US Bonds 2.6%	US Bonds 3.5%	Non US Equity (14.8%)	Real Estate 5.2%	

Periodic Table of Investment Returns

Diversification Over Three-Year Periods

Periodic Table of Investment Returns
for Rolling 3 Yr. Periods

4th Quarter 2011	4th Quarter 2012	4th Quarter 2013	4th Quarter 2014	4th Quarter 2015	4th Quarter 2016	4th Quarter 2017	4th Quarter 2018	4th Quarter 2019	4th Quarter 2020
US Equity 14.9%	Real Estate 13.3%	US Equity 16.2%	US Equity 20.5%	US Equity 14.7%	Real Estate 11.3%	Private Equity 12.5%	Private Equity 13.0%	Private Equity 15.2%	US Equity 14.5%
Private Equity 14.5%	Private Equity 13.2%	Private Equity 13.9%	Private Equity 15.5%	Private Equity 13.8%	Private Equity 10.0%	US Equity 11.1%	US Equity 9.0%	US Equity 14.6%	US Bonds 5.3%
Marin Target 12.5%	US Equity 11.2%	Real Estate 12.4%	Real Estate 11.2%	Real Estate 12.6%	US Equity 8.4%	Real Estate 9.8%	Real Estate 7.5%	Non US Equity 9.8%	Non US Equity 4.8%
Non US Equity 11.5%	Marin Target 8.4%	Marin Target 8.4%	Marin Target 10.5%	Marin Target 5.6%	Marin Target 3.8%	Non US Equity 8.4%	Marin Target 6.2%	Marin Target 9.8%	Real Estate 4.4%
US Bonds 6.8%	US Bonds 6.2%	Non US Equity 5.1%	Non US Equity 9.2%	Non US Equity 2.0%	US Bonds 3.0%	Marin Target 7.4%	Non US Equity 4.4%	Real Estate 6.5%	
Real Estate (3.1%)	Non US Equity 4.2%	US Bonds 3.3%	US Bonds 2.7%	US Bonds 1.4%	Non US Equity (1.4%)	US Bonds 2.2%	US Bonds 2.1%	US Bonds 4.0%	

Periodic Table of Investment Returns

Diversification Over Ten-Year Periods

Periodic Table of Investment Returns
for Rolling 10 Yr. Periods

4th Quarter 2011	4th Quarter 2012	4th Quarter 2013	4th Quarter 2014	4th Quarter 2015	4th Quarter 2016	4th Quarter 2017	4th Quarter 2018	4th Quarter 2019	4th Quarter 2020
Private Equity 11.1%	Private Equity 13.8%	Private Equity 14.1%	Private Equity 12.8%	Private Equity 11.5%	Private Equity 9.4%	Private Equity 9.2%	Private Equity 13.7%	Private Equity 13.6%	US Equity 13.8%
Non US Equity 6.9%	Non US Equity 10.2%	Non US Equity 7.9%	US Equity 7.9%	US Equity 7.4%	US Equity 7.1%	US Equity 8.6%	US Equity 13.2%	US Equity 13.4%	Real Estate 9.1%
Marin Target 6.9%	Marin Target 9.0%	US Equity 7.9%	Marin Target 6.9%	Marin Target 5.7%	Marin Target 4.9%	Marin Target 5.4%	Marin Target 8.5%	Real Estate 10.5%	Non US Equity 5.1%
US Bonds 5.8%	US Equity 7.7%	Marin Target 7.9%	Real Estate 5.8%	Real Estate 5.3%	Real Estate 4.7%	US Bonds 4.0%	Non US Equity 7.0%	Marin Target 8.0%	US Bonds 3.8%
Real Estate 4.8%	Real Estate 5.4%	Real Estate 5.8%	Non US Equity 5.4%	US Bonds 4.5%	US Bonds 4.3%	Real Estate 3.9%	Real Estate 5.9%	Non US Equity 5.2%	
US Equity 3.5%	US Bonds 5.2%	US Bonds 4.5%	US Bonds 4.7%	Non US Equity 3.2%	Non US Equity 1.2%	Non US Equity 2.2%	US Bonds 3.5%	US Bonds 3.7%	

Periodic Table of Investment Returns

Diversification Over Twenty-Year Periods

Periodic Table of Investment Returns
for Rolling 20 Yr. Periods

4th Quarter 2011	4th Quarter 2012	4th Quarter 2013	4th Quarter 2014	4th Quarter 2015	4th Quarter 2016	4th Quarter 2017	4th Quarter 2018	4th Quarter 2019	4th Quarter 2020
Private Equity 16.1%	Private Equity 16.1%	Private Equity 16.1%	Private Equity 16.0%	Private Equity 15.0%	Private Equity 14.0%	Private Equity 13.5%	Private Equity 13.1%	Private Equity 10.3%	US Equity 7.8%
Marin Target 8.2%	Marin Target 8.7%	US Equity 9.3%	US Equity 10.0%	US Equity 8.3%	Real Estate 7.9%	Real Estate 7.6%	Real Estate 7.3%	Real Estate 7.0%	Real Estate 6.4%
US Equity 8.0%	US Equity 8.3%	Marin Target 8.6%	Marin Target 8.7%	Real Estate 8.0%	US Equity 7.9%	Marin Target 7.5%	Marin Target 6.3%	US Equity 6.4%	Non US Equity 5.6%
US Bonds 6.5%	Real Estate 6.8%	Real Estate 7.4%	Real Estate 7.7%	Marin Target 7.6%	Marin Target 7.4%	US Equity 7.4%	US Equity 6.0%	Marin Target 6.2%	US Bonds 4.8%
Real Estate 6.2%	Non US Equity 6.5%	Non US Equity 5.8%	US Bonds 6.2%	US Bonds 5.3%	US Bonds 5.3%	Non US Equity 6.0%	Non US Equity 4.6%	US Bonds 5.0%	
Non US Equity 5.0%	US Bonds 6.3%	US Bonds 5.7%	Non US Equity 5.2%	Non US Equity 4.6%	Non US Equity 4.6%	US Bonds 5.0%	US Bonds 4.5%	Non US Equity 4.0%	

Periodic Table of Investment Returns

Notes on Data

Marin Target	Index	Weight
US Equity	Russell 3000	32.00%
Non-US Equity	MSCI ACWI ex-U.S. IMI	22.00%
Fixed Income	Bloomberg Barclays U.S. Aggregate	23.00%
Private Equity	Cambridge PE Index	8.00%
Real Assets		15.00%
Private Real Estate	NCREIF NFI-ODCE Equal Weight Net	8.00%
Public Real Assets		7.00%
TIPS	*Bloomberg Barclays TIPS*	*1.75%*
Commodities	*Bloomberg Barclays Commodities TR*	*1.75%*
Global Natural Resource Equity	*S&P Global Natural Resources (Net)*	*1.75%*
REITs	*S&P DJ U.S. Select REIT*	*1.75%*
		100.00%

Marin Target is 12/31/20 policy target and index returns for each asset class.

Public real assets data available back to 2003 Q1; prior to 2003, real assets = ODCE.

ACWI ex-US IMI data available back to 1994 Q1; prior to 1994, Non-US equity = MSCI EAFE.

Fixed income = Bloomberg Barclays U.S. Aggregate for all periods.

Long Term Risk Premia vs. Long Term Nominal Returns

	Long Term History			Callan 2021 Assumptions		
	Annualized Return	Real Return	Risk Premium	Annualized Return	Real Return	Risk Premium
Bonds (Aggregate)	5.35	2.49		1.75	-0.25	
Large Cap (S&P 500)	10.29	7.43	4.94	6.50	4.50	4.75
Small Cap (Russell 2000/Ibbotson Small Company)	11.86	9.00	6.51	6.70	4.70	4.95
T-Bills	3.43	0.57		1.00	-1.00	
Inflation (CPI)	2.86			2.00		

Long term historical nominal returns are influenced by historic inflation.

- Average of 2.86 obscures substantial periods of double-digit inflation, which also goosed nominal equity returns.

Long term real returns (nominal returns minus inflation) have been strong, but not likely sustainable going forward.

Long-term real risk premia for stocks over bonds has been persistent.

Current capital market expectations include risk premia for large cap that is in line with historical average; less premium expected for small cap relative to its historic average.

Returns over the next 10 years for bonds are much lower relative to inflation and cash compared to history.

- Result of bond market reset in 2020 and zero interest rate policy

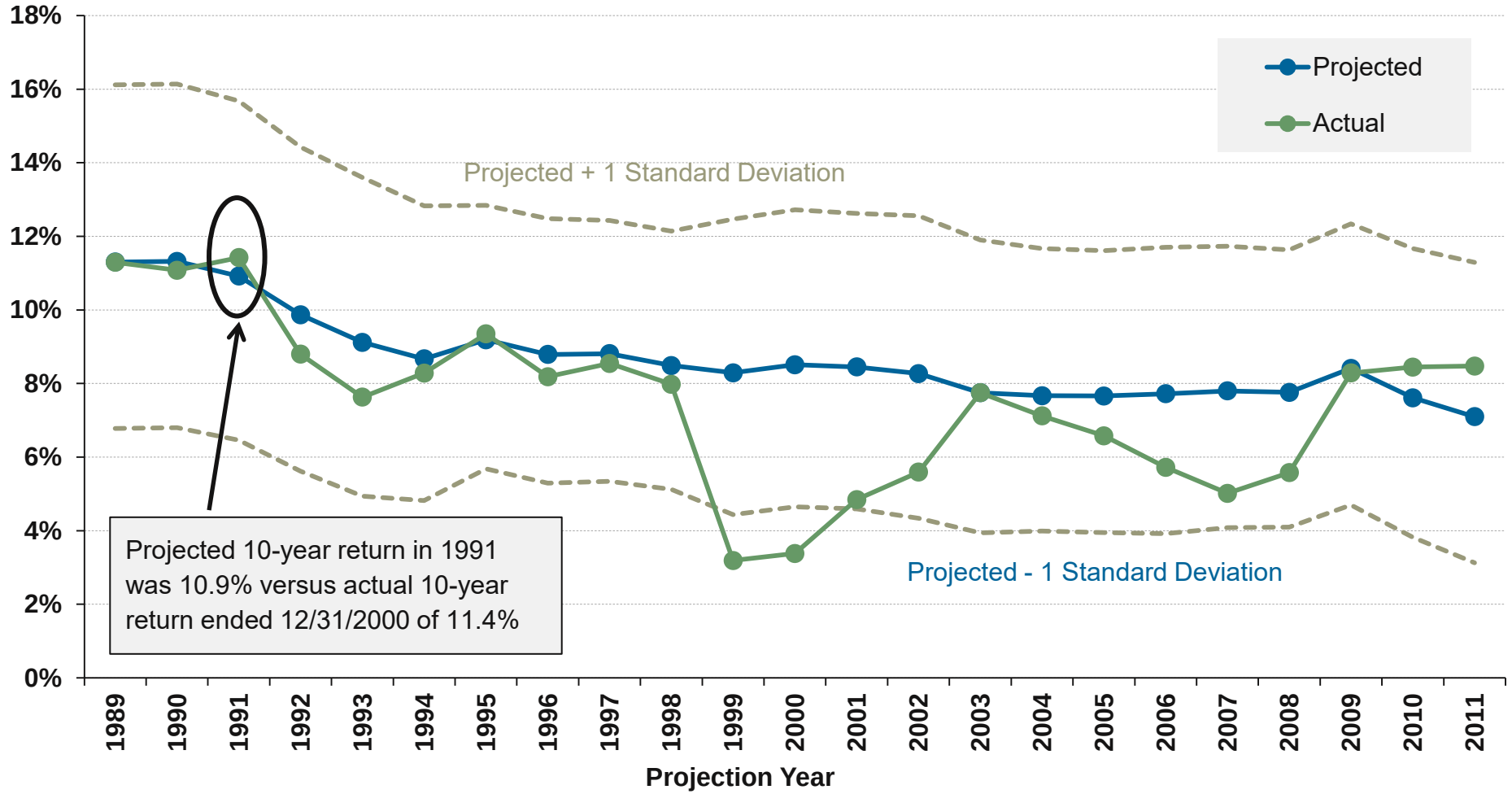
Over the longer term (30 years +):

- We expect real cash returns to turn positive, and bond returns to show a premium to both inflation and cash.
- We expect the equity risk premium to be maintained near the long-term average for large cap, and still show a modest premium for small cap.

How Have we Done? Projections versus Actual Returns

Portfolio: 60% Equity, 30% Fixed Income, 10% Real Estate

Projected versus Actual 10-Year Returns



Portfolio is assumed to be invested passively in Russell 3000 index, MSCI ACWI ex-US index, Bloomberg Aggregate Index, and NCREIF ODCE Index. Portfolio is assumed to be rebalanced quarterly with no transactions costs.

Concluding Observations

Callan's 2021 Capital Market Projections

Reduction in fixed income return projections is the most significant year-over-year change in Callan's 10-year capital market projections.

Callan's public equity return and risk projections were also reduced contributing to the reduction in expected total return for diversified portfolios.

Private market return expectations have also come down, albeit moderately, relative to 2020 projections.

The current COVID-19 pandemic has not had a material impact on our long term equilibrium projections, which are much more influenced by GDP, inflation, current yield, and valuations.

Callan

April 27, 2021

Domestic Equity Structure Review

Jim Callahan, CFA
President

Domestic Equity Structure

Key Decision Variables

The role of U.S. equity in the asset allocation is capital growth.

Primary determinants of equity risk and return:

- Size exposures as measured by market capitalization
- Styles exposures - value, core, and growth
- The amount of active/passive management

A diversified structure should generally reflect the characteristics of the market.

- The default structure is style and capitalization neutral.
- Active management has historically added more value in mid and small cap than large cap.

MCERA's Domestic Equity Structure - two primary determinants of risk vs. benchmark (Tracking Error):

- Active/Passive exposures
  - MCERA's large cap exposure is passive (minor tracking error), but small cap exposure is active (increased tracking error).
- "Misfit" Risk – different exposures than benchmark (i.e. Small Cap Overweight to Benchmark)
  - MCERA's domestic equity allocation is structured with an intentional overweight to small cap versus the Russell 3000 Index under the historical premise that small cap stocks are typically expected to generate greater returns over the long run (albeit with greater volatility), and that active management on average has tended to be able to outperform the market.

➢ Discussion items: should these determinants be adjusted within MCERA's domestic equity structure?

Equity Structure Considerations

Seek to maximize plan alpha at a palatable level of active risk relative to the plan benchmark

- Think of manager structure in an overall portfolio context
- Incorporate active managers only if they are expected to contribute sufficient alpha to compensate for the possibility of underperforming the benchmark
- This is a net-of-fees exercise

Spend plan's active risk budget efficiently

- Spend active risk in sectors and regions where active management has high probability of succeeding
- Otherwise, rely heavily on indexes in order to control both expenses and risk
- Keep magnitude of systematic bets vs. the plan benchmark (misfit risk) under control

Incorporate diversification

- Seek broad diversification across global equity markets
- The risk an individual active manager contributes to the overall portfolio depends on both its size and its tracking error
- Avoid excessive risk contribution from any one manager
- However, avoid over diversification or "closet indexing"

Simplify where appropriate

- Structure should meet investment objective with the minimum level of complexity
- Benefit is lower monitoring costs as well as explicit costs
- Active manager mandate sizes must be large enough to be meaningful to the fund but not overwhelming to the manager

Sources of Active Risk in the Equity Structure

Selection Risk

Risk stemming from active managers' bets relative to their benchmarks

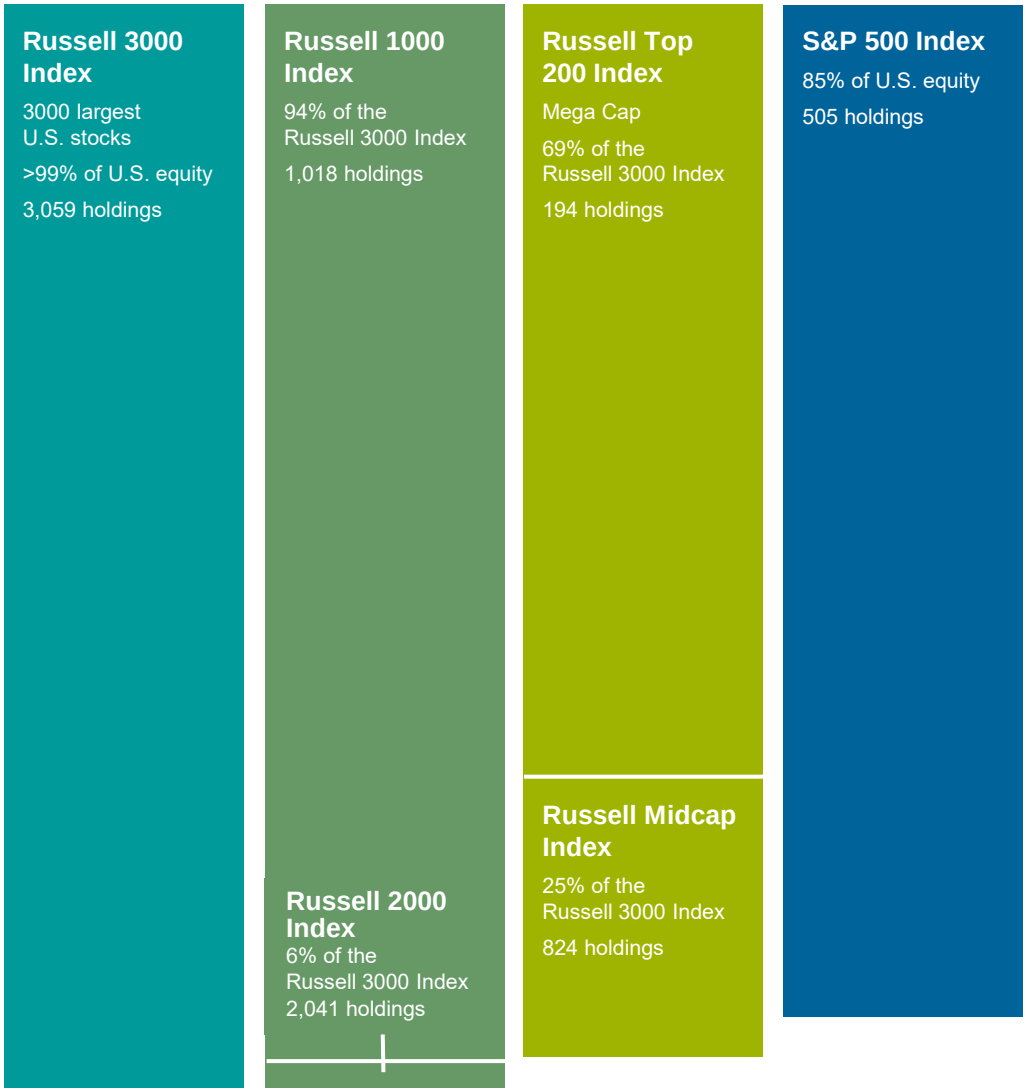
- Risk which is expected to be rewarded with alpha if manager is skillful
- The risk you are paying your active managers to take
- This risk at the plan level is reduced as the number of active managers increases due to diversification

Misfit Risk

Risk which results when the overall style exposures of the plan's manager benchmarks differ from the plan's benchmark

- When unintentional, misfit confers additional active risk without any expected return
- Misfit can be controlled by ensuring overall manager style exposures (large vs. small; value vs. growth, U.S. vs. international) are generally consistent with the plan's benchmark
- When intentional, some misfit can be justified if reflects a high conviction bet on styles, capitalizations, or regions
- However, the bar for skill is high and tactical bets should be scaled as to not be a disproportionate driver of active risk

U.S. Equity Framework



The Russell 3000 is a capitalization-weighted index which includes large, mid, and small cap stocks:

- 69% mega cap (Russell Top 200)
- 25% mid cap (Russell Midcap)
- 6% small cap (Russell 2000)

Large cap, mid cap, small cap are each split into growth and value components to arrive at six style buckets.

Style buckets are used both for performance attribution and to ensure the managers' styles, in aggregate, are close to the Russell 3000.

The S&P 500 is also a capitalization-weighted index which includes mostly large and some mid cap stocks:

- 90% large cap
- 10% mid cap

Source: FTSE Russell as of December 31, 2020.

Active vs. Passive Management

U.S. Equity Historical Results

Active management should be considered when the investor believes there will be compensation on a net-of-fee basis. Historical data can help indicate attractive market segments.

- Large Cap and Mid Cap strategies have been challenged to beat passive strategies, even gross-of-fees.
- SMID Cap, Small Cap, and Micro Cap active strategies have had greater historical success.

Equity Style	Benchmark	Avg. Gross Excess Return over Benchmark
Large Cap Core	Russell 1000	-0.05%
Large Cap Growth	Russell 1000 Growth	0.33%
Large Cap Value	Russell 1000 Value	0.05%
Mid Cap Core	Russell Midcap	-0.07%
Mid Cap Growth	Russell Midcap Growth	0.02%
Mid Cap Value	Russell Midcap Value	-0.13%
SMID Cap Core	Russell 2500	0.65%
SMID Cap Growth	Russell 2500 Growth	0.95%
SMID Cap Value	Russell 2500 Value	0.66%
Small Cap Core	Russell 2000	1.62%
Small Cap Growth	Russell 2000 Growth	1.48%
Small Cap Value	Russell 2000 Value	1.49%
Micro Cap	Russell Microcap	2.30%

Based on 20 years of rolling 3 year average annualized returns (Q4 2000 to Q4 2020)

Source: Callan Active vs. Passive Data.

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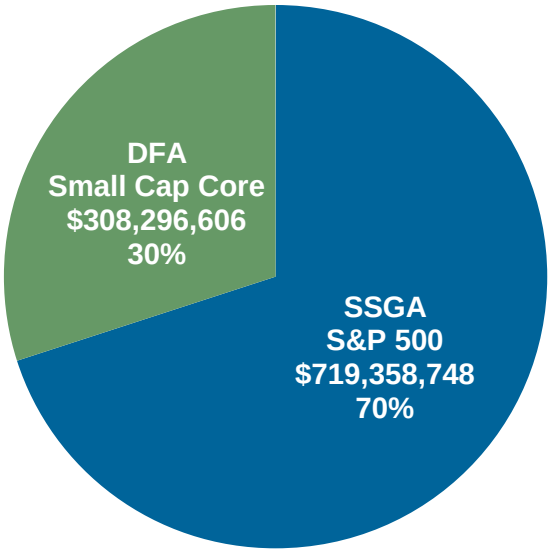
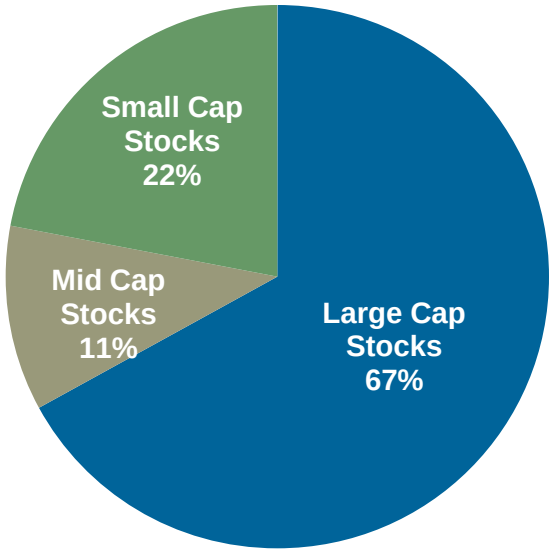
Current Structure

MCERA Domestic Equity Structure

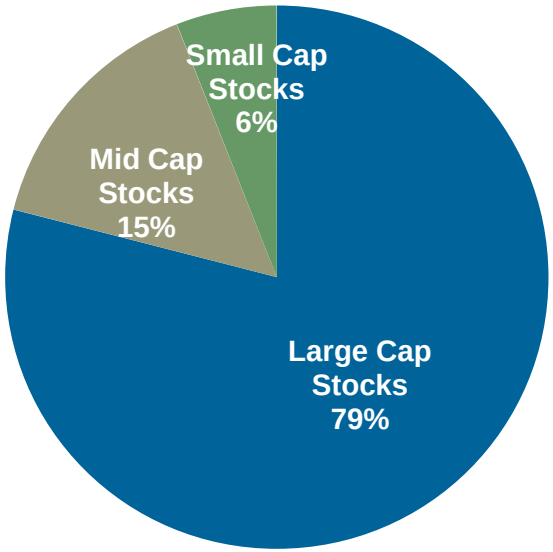
MCERA
Target Manager Allocations



MCERA
Market Cap Exposure



Russell 3000 Index
Market Cap Exposure



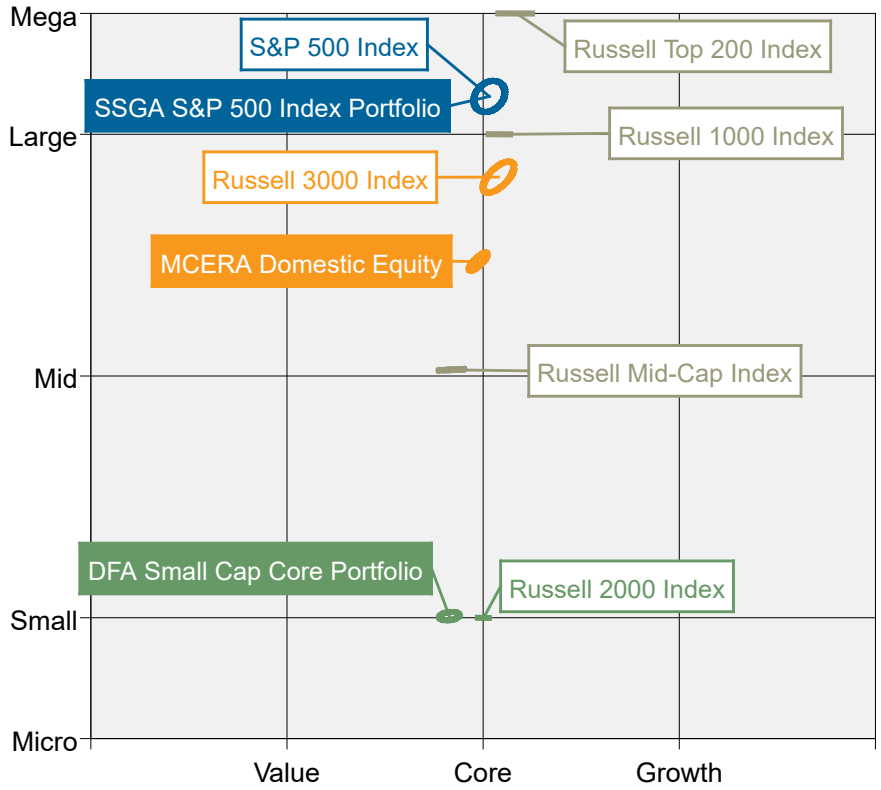
The target allocations are 70% to Large Cap (Passive) and 30% to Small Cap (Active).

Risk (tracking) relative to Russell 3000 comes from:

- Active Small Cap (DFA Core)
- Misfit Risk – significant overweight in small cap relative to Russell 3000 (22% vs. 6%)

MCERA Domestic Equity Structure

Domestic Equity Style Map
for 2 Years Ended December 31, 2020

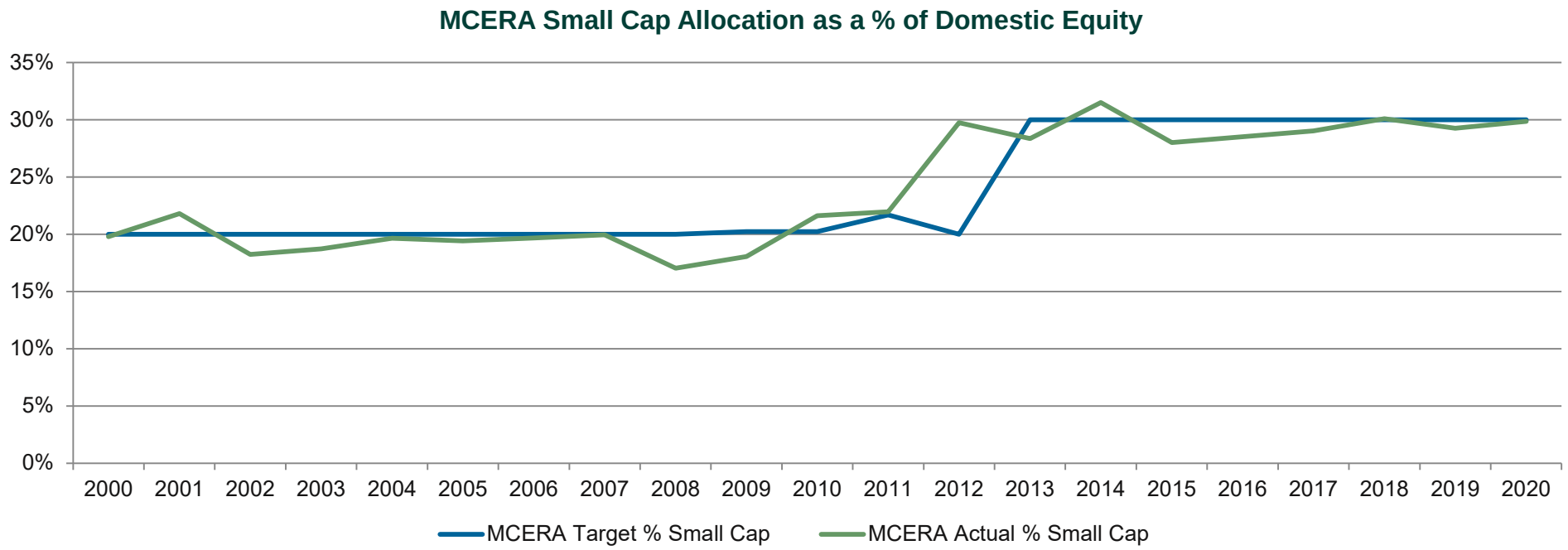


Style Exposure Matrix
Holdings as of December 31, 2020

	Value	Core	Growth	Total
Large	14.1% (85) 16.1% (86)	19.8% (103) 22.6% (105)	32.8% (85) 40.4% (109)	66.8% (273) 79.2% (300)
Mid	3.3% (120) 4.1% (154)	3.1% (109) 4.7% (198)	5.0% (129) 6.1% (248)	11.4% (358) 14.9% (600)
Small	4.7% (227) 1.3% (293)	7.9% (352) 2.2% (513)	6.8% (300) 1.8% (396)	19.4% (879) 5.4% (1202)
Micro	1.2% (325) 0.2% (371)	0.8% (195) 0.2% (380)	0.5% (92) 0.1% (150)	2.5% (612) 0.6% (901)
Total	23.3% (757) 21.8% (904)	31.6% (759) 29.7% (1196)	45.2% (606) 48.5% (903)	100.0% (2122) 100.0% (3003)

-- MCERA Domestic Equity
-- Russell 3000 Index

MCERA's Small Cap Allocation as a % of Domestic Equity



MCERA's target small cap allocation noticeably increased from 20% to 30% in 2012.

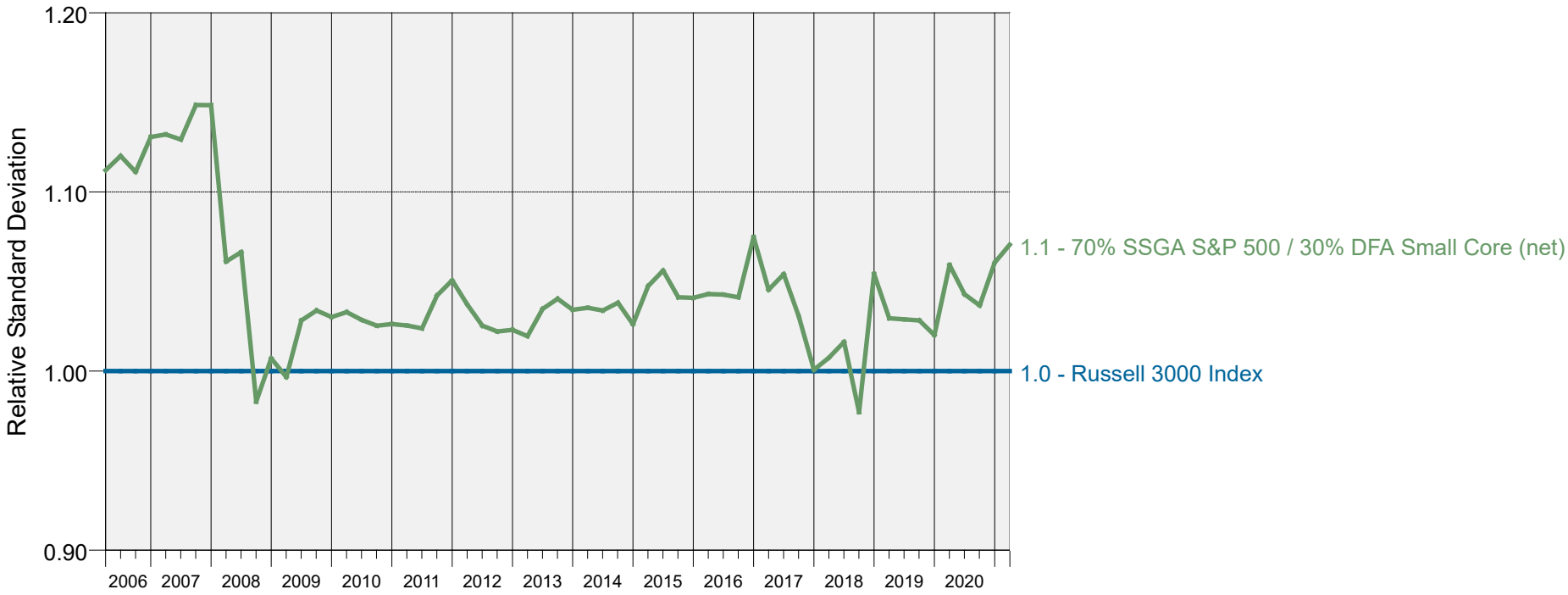
- At this time, the active large cap growth and value managers were terminated and the large cap assets were moved to 100% passive management.
- The small cap equity allocation was increased to generate excess return in the domestic equity composite. The small cap composite consisted of a small cap value portfolio (DFA) and a small cap growth portfolio (Columbus Circle).

The small cap style-oriented portfolios were removed in 2018 and converted to the current small cap core portfolio with DFA. It was decided at that time to keep the small cap target allocation at 30%.

MCERA Current Structure

Rolling Three Year Standard Deviation

Rolling 3 Year Relative Standard Deviation vs. Russell:3000 Index
for 15 Years Ended March 31, 2021



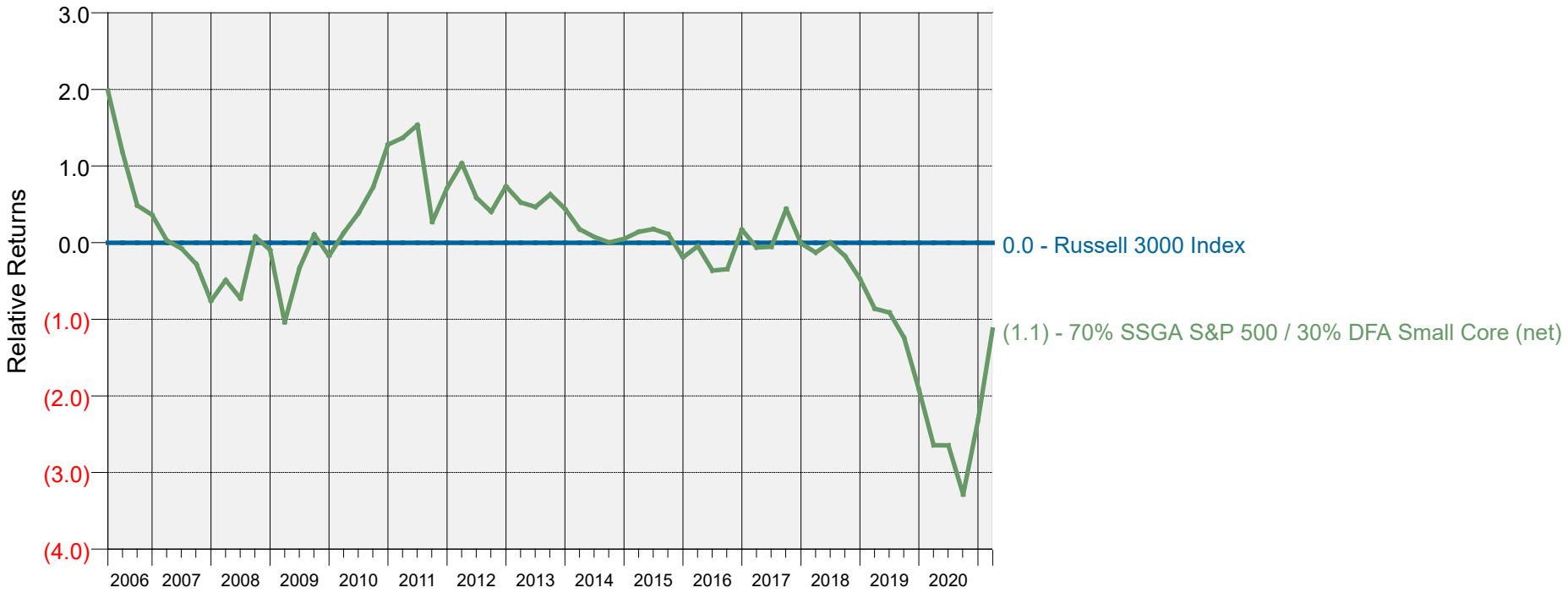
MCERA's current structure consists of:

- SSGA S&P 500 Index (net) – MCERA performance (from 2Q2011) linked to SSGA composite
- DFA Small Cap Core Portfolio (net) – MCERA performance (from 1Q2019) linked to DFA composite

MCERA Current Structure

Rolling Three Year Returns

Rolling 3 Year Relative Returns vs. Russell:3000 Index
for 15 Years Ended March 31, 2021



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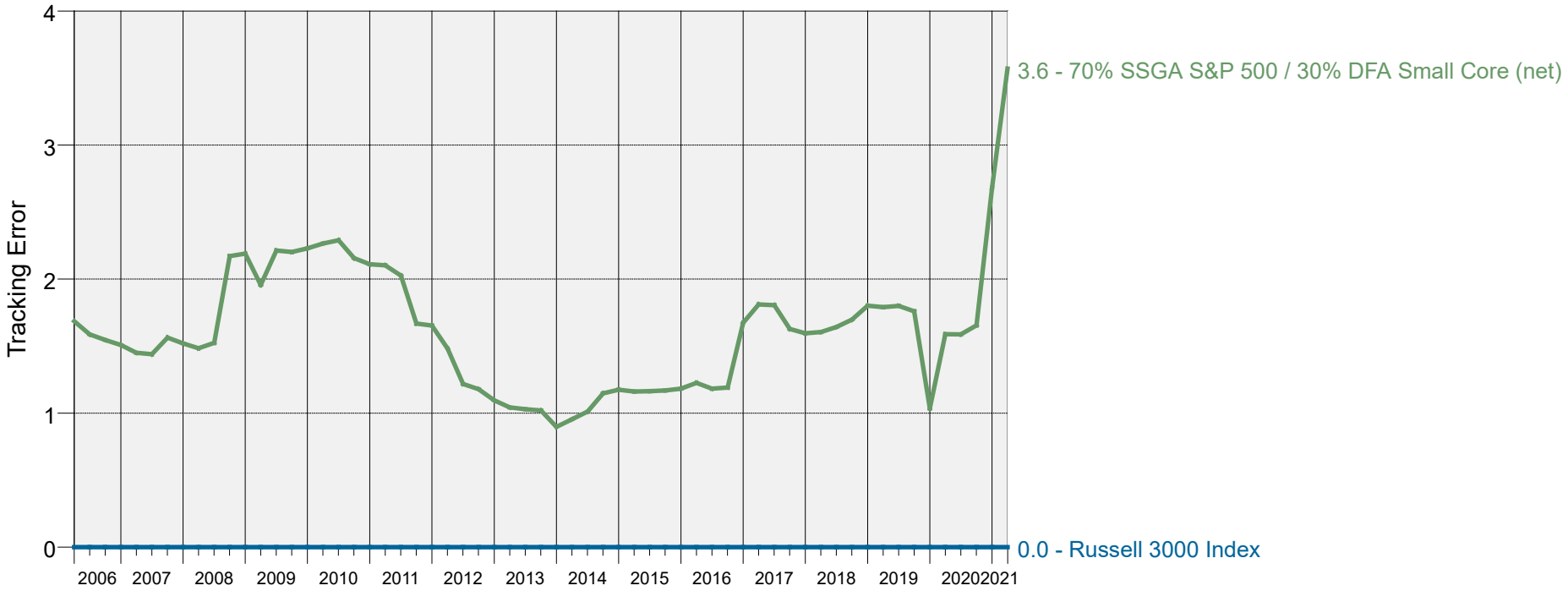
MCERA Current Structure

Rolling Three Year Tracking Error

Rolling 3 Year Tracking Error vs. Russell:3000 Index
for 15 Years Ended March 31, 2021



- Is the Board comfortable with this tracking error?

MCERA's current structure consists of:

- SSGA S&P 500 Index (net) – MCERA performance (from 2Q2011) linked to SSGA composite
- DFA Small Cap Core Portfolio (net) – MCERA performance (from 1Q2019) linked to DFA composite

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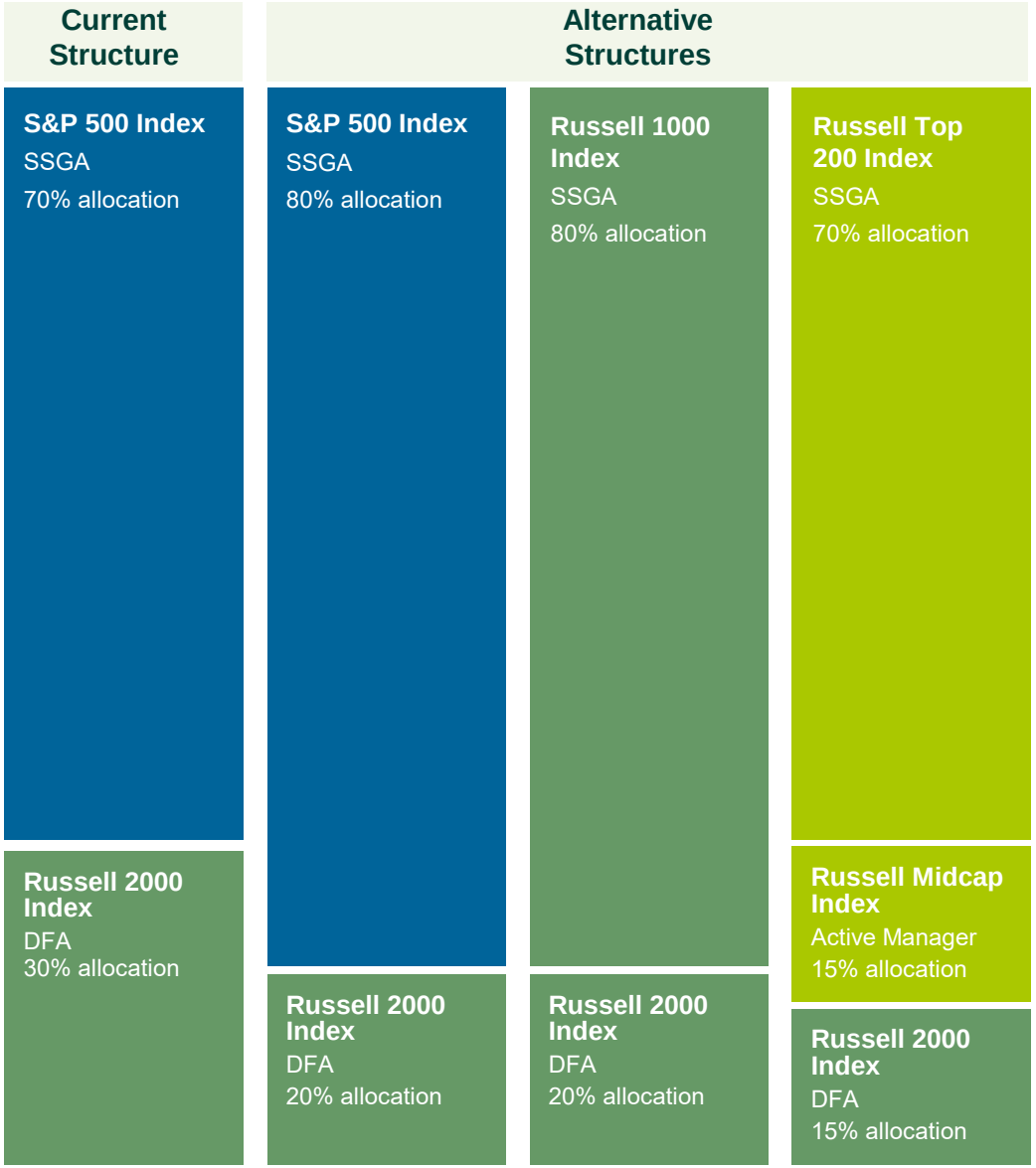
Alternative Structures

Alternative Domestic Equity Structures to Reduce Tracking Error



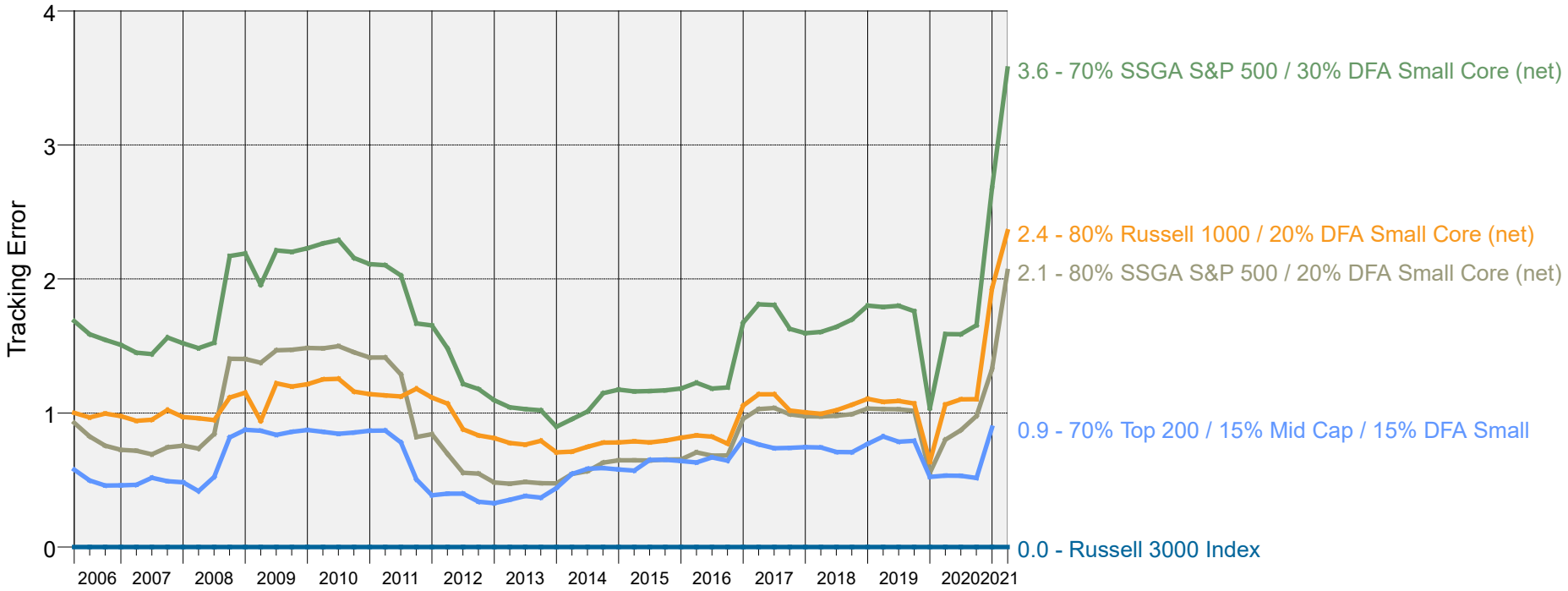
Some alternative structures to help reduce tracking error to the Russell 3000 Index include:

1. Keep current structure but reduce allocation to DFA to 20%
   - Pro: reduces volatility, tracking, and fees
   - Con: still have gap in mid cap exposure
2. Change large cap benchmark to the Russell 1000 and reduce DFA to 20%
   - Pro: captures mid cap stocks, reduces volatility, tracking, and fees
   - Con: none
3. Change large cap benchmark to the Russell Top 200 Index, add a 15% allocation to an active mid cap core manager, and reduce DFA to 15%.
   - Pro: captures mid cap stocks, reduces tracking and volatility
   - Con: increases fee, active mid cap managers may allocate to small and large cap stocks

Alternative Structures

Rolling Three Year Tracking Error

Rolling 3 Year Tracking Error vs. Russell:3000 Index
for 15 Years Ended March 31, 2021



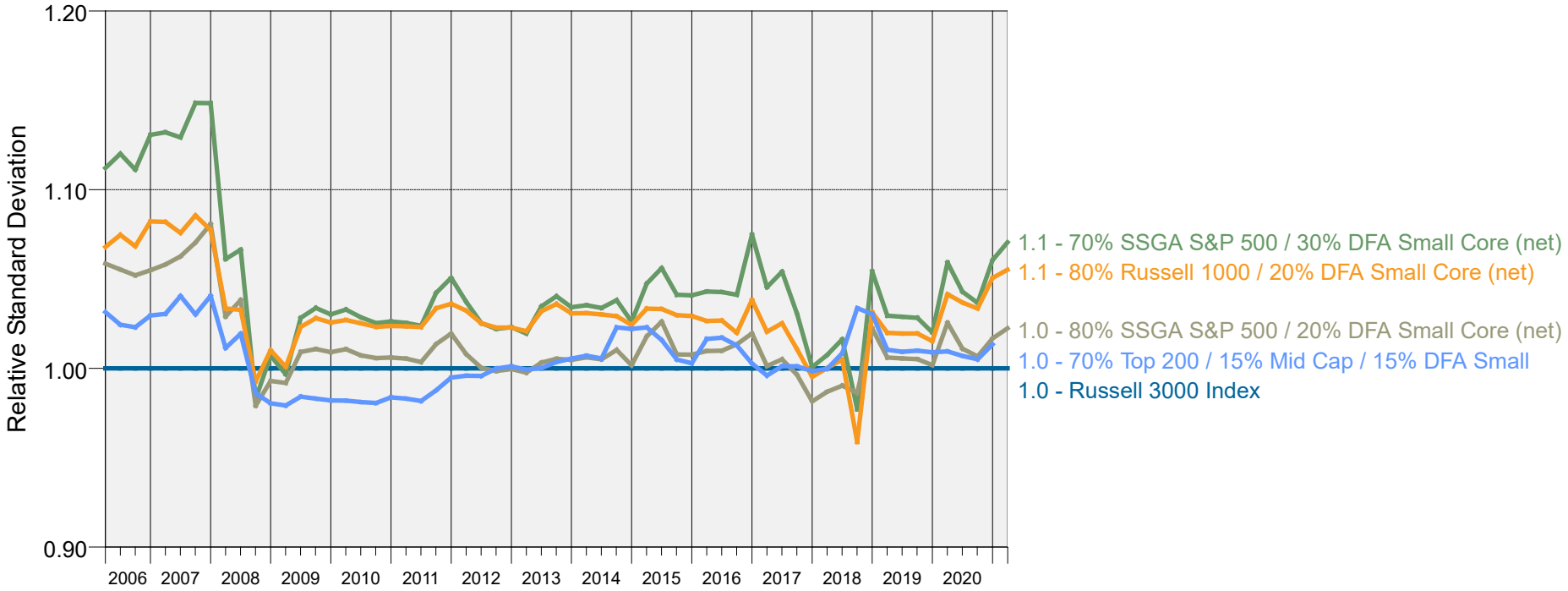
Alternative structures consist of:

- SSGA S&P 500 Index (net) – MCERA performance (from 2Q2011) linked to SSGA composite
- DFA Small Cap Core Portfolio (net) – MCERA performance (from 1Q2019) linked to DFA composite
- Russell 1000 Index returns
- Russell Top 200 Index returns
- Callan Mid Cap Broad peer group median returns (gross)

Alternative Structures

Rolling Three Year Standard Deviation

Rolling 3 Year Relative Standard Deviation vs. Russell:3000 Index
for 15 Years Ended March 31, 2021



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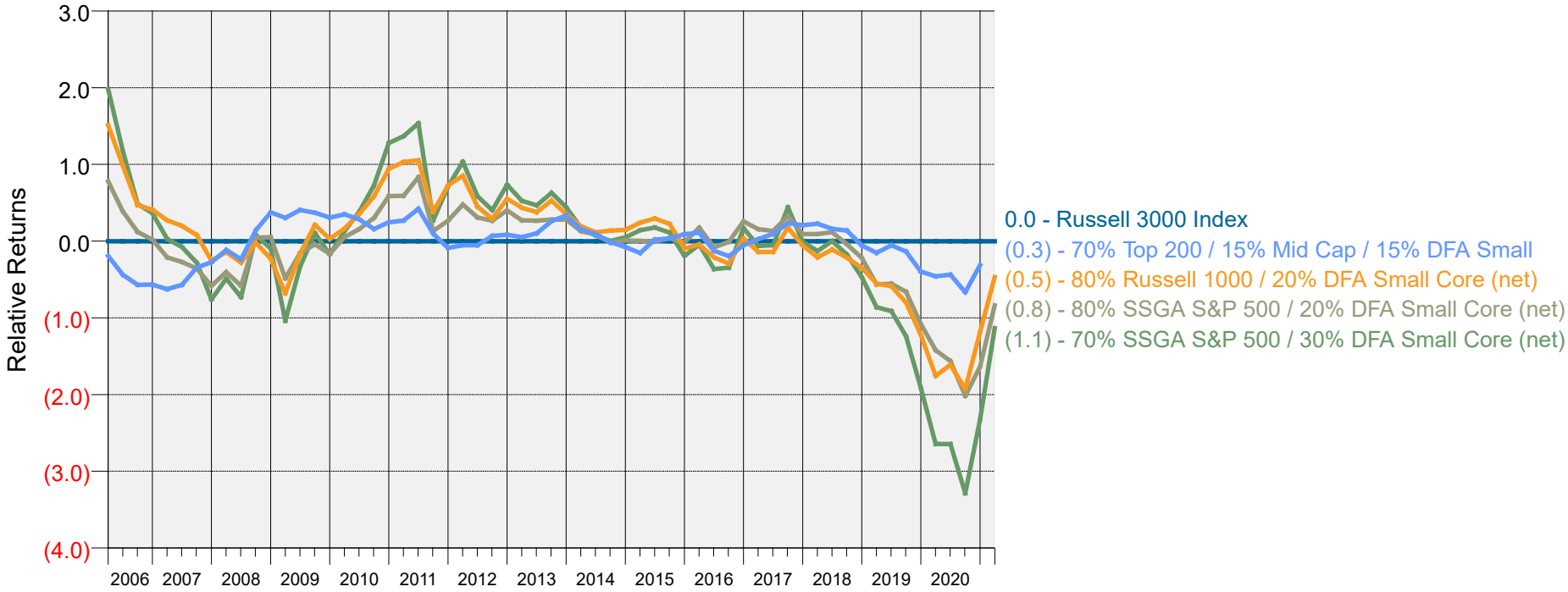
Alternative Structures

Rolling Three Year Returns

Rolling 3 Year Relative Returns vs. Russell:3000 Index
for 15 Years Ended March 31, 2021



Alternative structures consist of:

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- DFA Small Cap Core Portfolio (net) – MCERA performance (from 1Q2019) linked to DFA composite
- Russell 1000 Index returns
- Russell Top 200 Index returns
- Callan Mid Cap Broad peer group median returns (gross)

Estimated Fees (Based on Market Values as of March 31, 2021)

Current Structure: 70% Large Cap / 30% Small Cap			
Manager	**Market Value**	**Fees (%)**	**Annual Fee ($)**
Large Cap Core - SSGA	$719,358,748	0.05% on the first $50 million 0.04% on the next $50 million 0.02% on the balance	$168,872
		Minimum annual fee:	$175,000
Small Cap Core - DFA	$308,296,606	0.30% on all assets	$924,890
Total	**$1,027,655,354**	**0.11%**	**$1,099,890**

Alternative Structure: 80% Large Cap/20% Small Cap			
Manager	**Market Value**	**Fees (%)**	**Annual Fee ($)**
Large Cap - SSGA	$822,124,283	0.05% on the first $50 million 0.04% on the next $50 million 0.02% on the balance	$189,425
		Minimum annual fee:	$175,000
Small Cap Core - DFA	$205,531,071	0.30% on all assets	$616,593
Total	**$1,027,655,354**	**0.08%**	**$806,018**

Alternative Structure: 70% Large Cap/15% Mid Cap/15% Small Cap			
Manager	**Market Value**	**Fees (%)**	**Annual Fee ($)**
Large Cap - SSGA	$719,358,748	0.05% on the first $50 million 0.04% on the next $50 million 0.02% on the balance	$168,872
		Minimum annual fee:	$175,000
Mid Cap Core - New Manager	$154,148,303	0.61% on all assets	$944,890
Small Cap Core - DFA	$154,148,303	0.30% on all assets	$462,445
Total	**$1,027,655,354**	**0.15%**	**$1,582,335**

Notes:
SSGA would charge the same fee schedule for a separate account regardless of index with a minimum annual fee of $175,000.
Mid Cap Core Manager - median fee from Callan's Mid Cap Broad peer group was used as a proxy.

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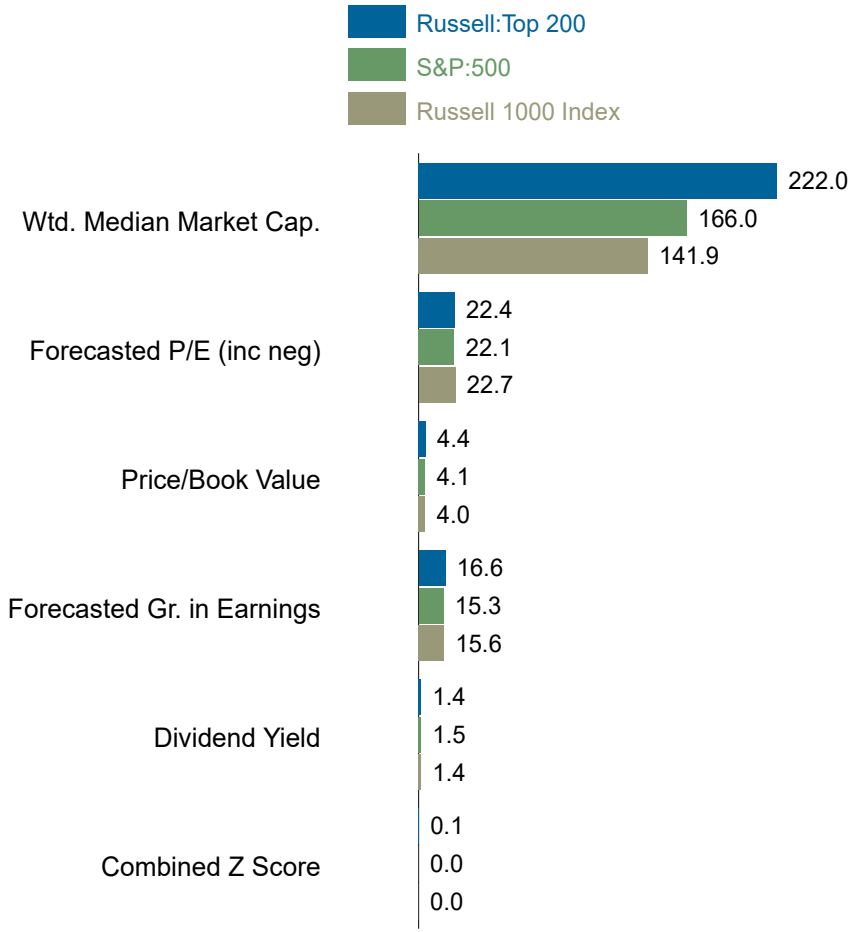
Appendix

Large Cap Index Comparison

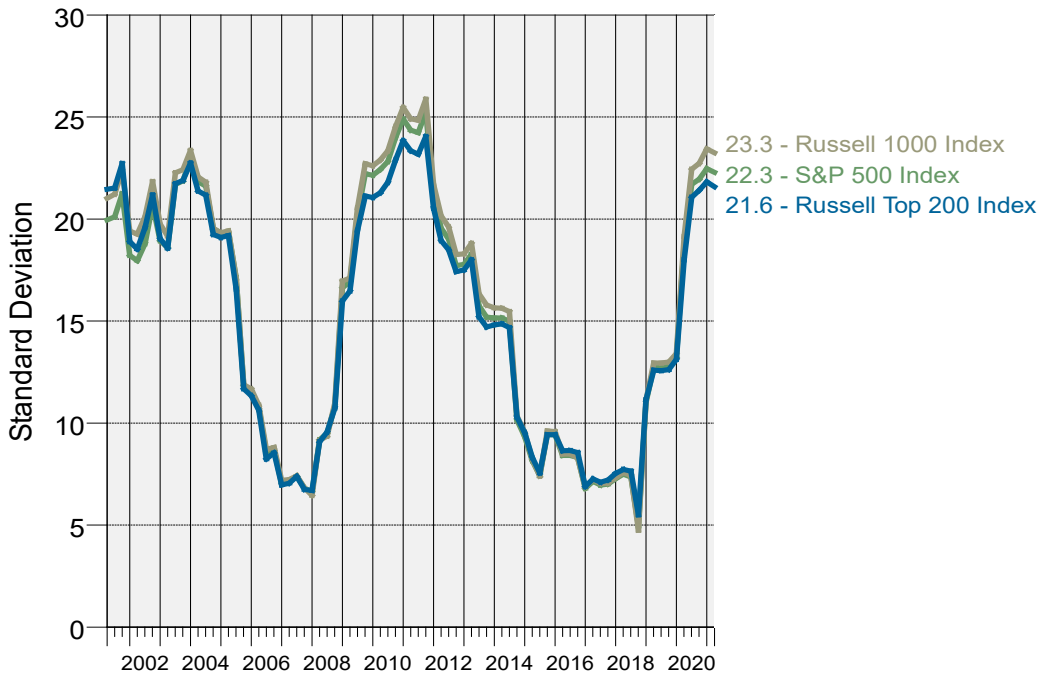
Large Cap Index Comparison

Characteristics & Standard Deviation

Portfolio Characteristics as of March 31, 2021



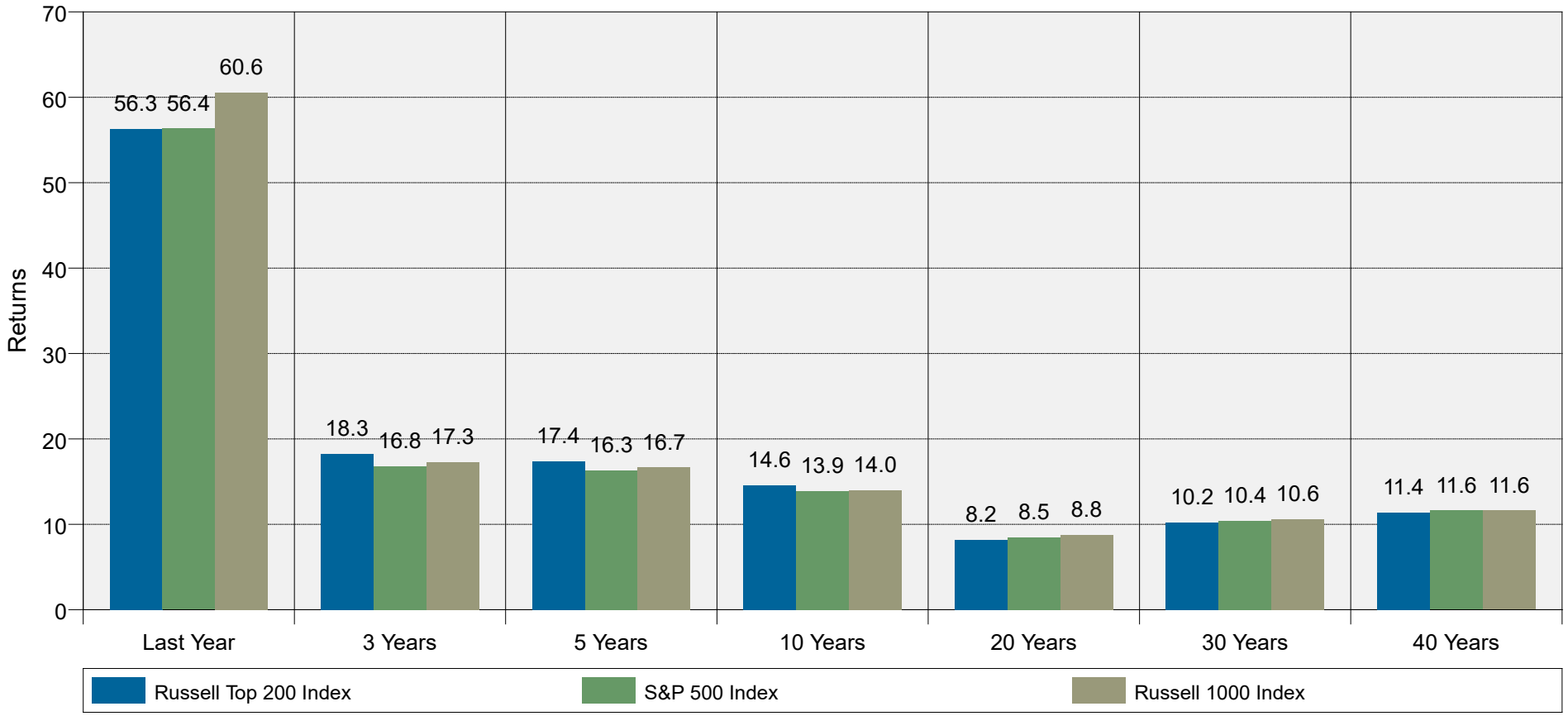
Rolling 3 Year Standard Deviation for 20 Years Ended March 31, 2021



Large Cap Index Comparison

Annualized Returns

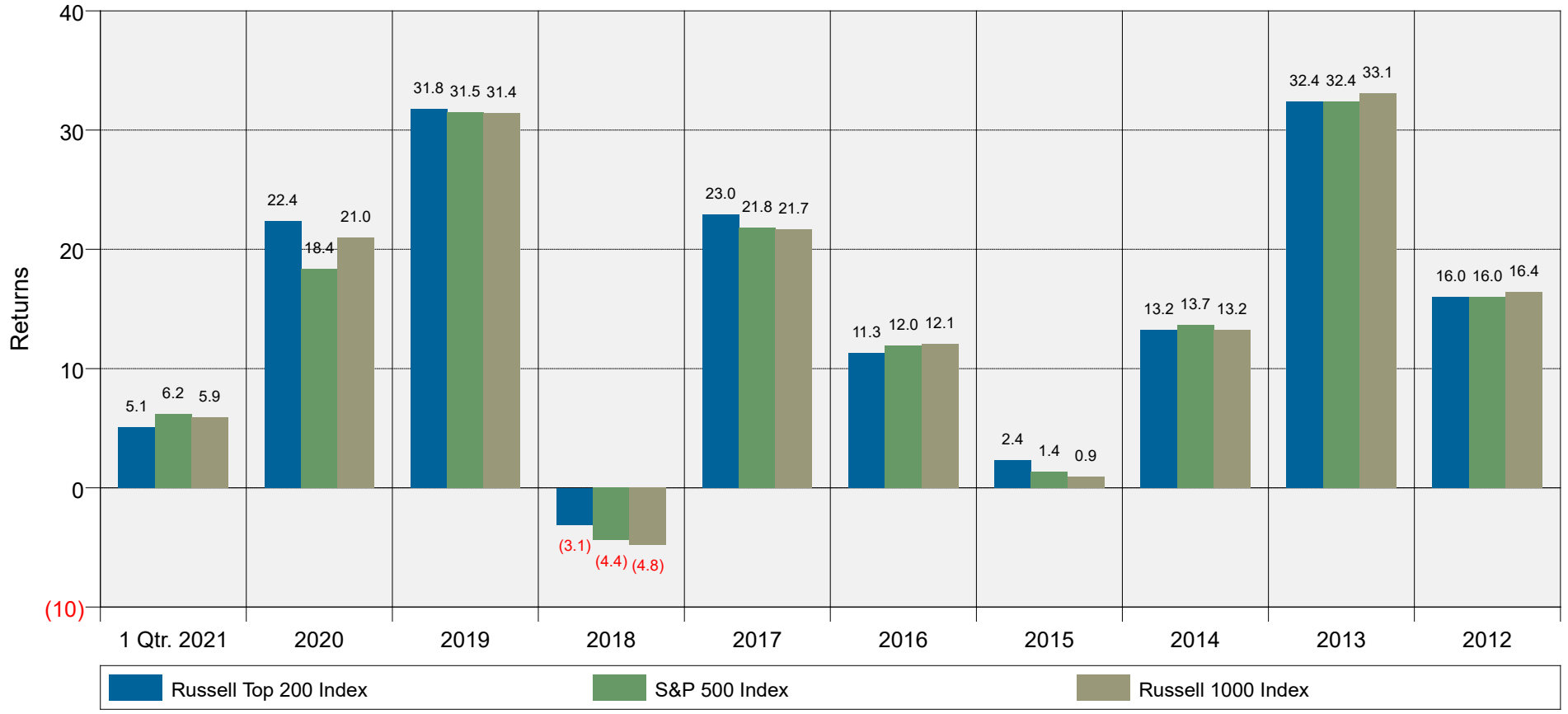
Annualized Returns For Periods Ending March 31, 2021



Large Cap Index Comparison

Calendar Year Returns

Calendar Year Returns



Callan

April 27, 2021

Absolute Return/Multi-Asset Class Investments

Jim Callahan, CFA
President

What is a Hedge Fund?

Hedge funds are unconstrained in terms of investment strategies and guidelines to achieve better risk-adjusted returns.

Hedge funds can use a wide variety of asset classes and their derivatives, as well as varying degrees of leverage or illiquidity.

Hedge fund managers typically have significant alignment of interests with investors via side-by-side capital and incentive fee structures based on performance.

Hedge funds are usually private placement vehicles (e.g., limited partnerships or limited liability companies) that are exempt from SEC registration and therefore not readily available to the public.

What is the Opportunity?

Why hedge funds?

- Higher risk-adjusted return
- Manager and/or strategy diversification
- Less sensitive to equity market risk
- Alternative to lower expected returns from stocks and bonds

Do you believe all of the following?

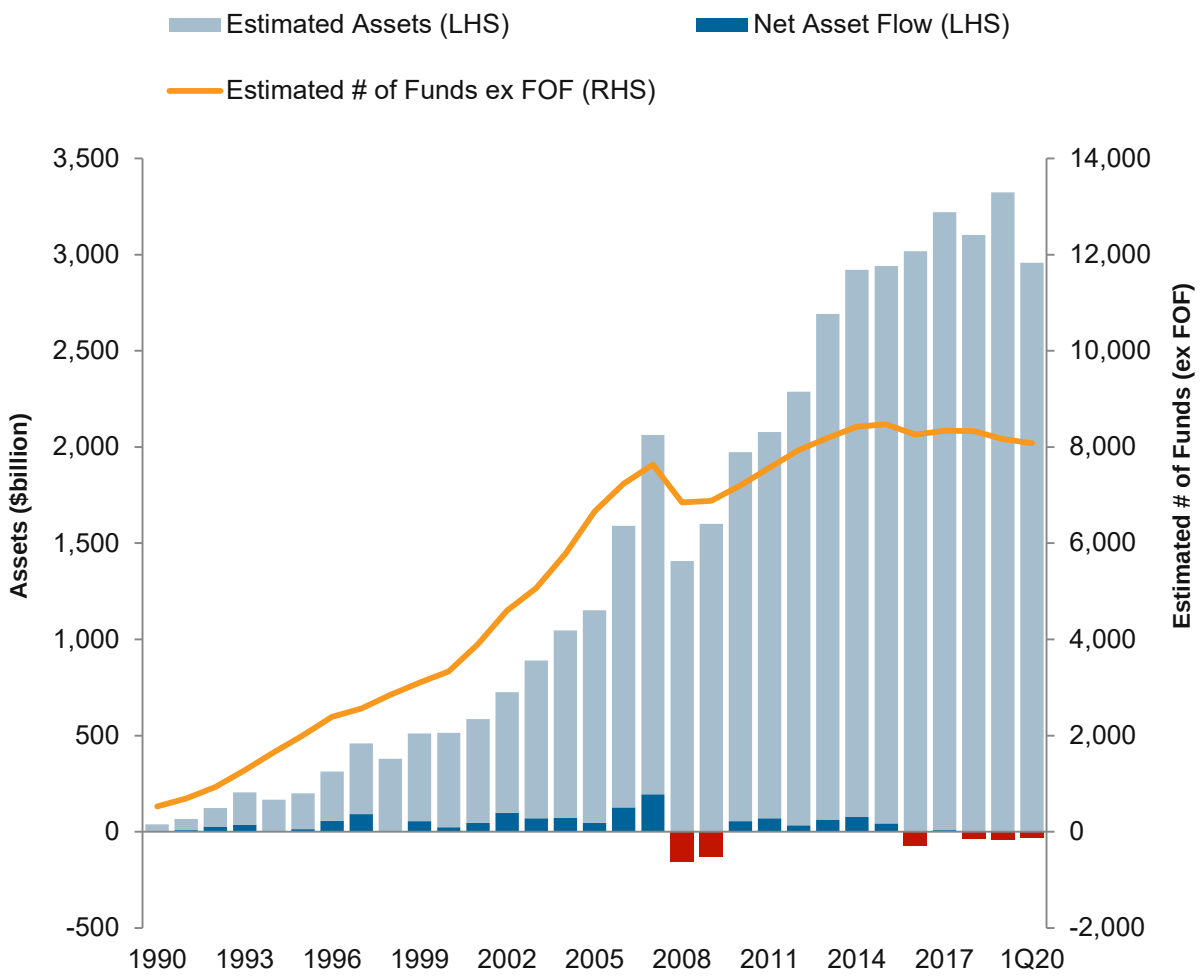
- A portfolio of stocks and bonds benefits from additional diversification to smooth a fund's path to meet long-term return objectives.
- Given manager skills and investment tools not available to traditional portfolio management, hedge funds can provide value-added returns from inefficiencies in public capital markets.
- The various risks of hedge funds, including concerns of liquidity and capacity constraints, are manageable with proper due diligence and oversight given available resources.

Size and Structure of Hedge Fund Market

Industry growth stopped pre-COVID-19 crisis: What's next?

$3 trillion industry has reached maturity:

- Assets have recovered well from post-GFC lows, with net outflows since 2015.
- To resume growth hedge funds will need to demonstrate a clear risk-adjusted return advantage to justify high fees.
- Current environment more advantageous but short-term outflows likely.
- Hedge funds still represent only a small part of global capital markets (<5%).

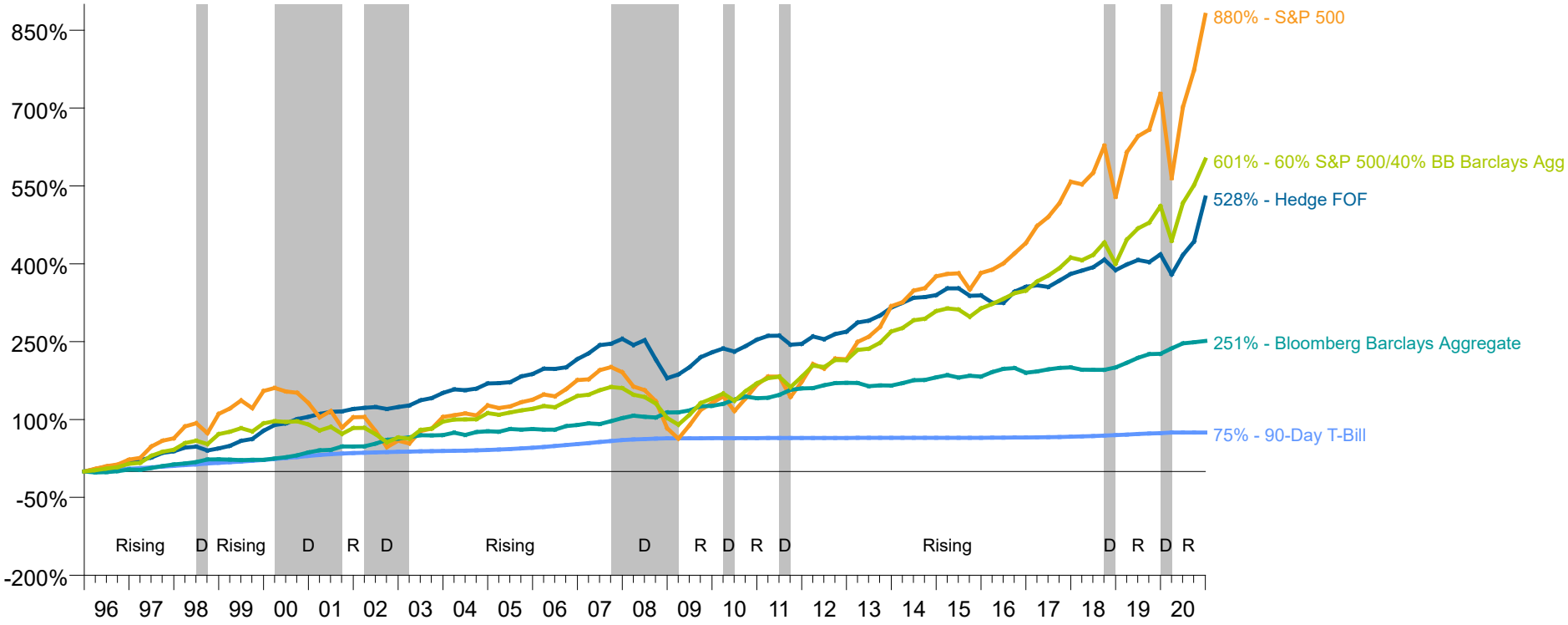


Source: HFR® *Global Hedge Fund Industry Report – First Quarter 2020* (www.hedgefundresearch.com)

Hedge Fund Performance

Cumulative Returns throughout Market Cycles

Cumulative Returns (over Rising/Declining Periods) for 25 Years ended December 31, 2020



Given the power of compounding based on less volatile returns, hedge funds can perform better in choppy or declining markets versus long-only equity.

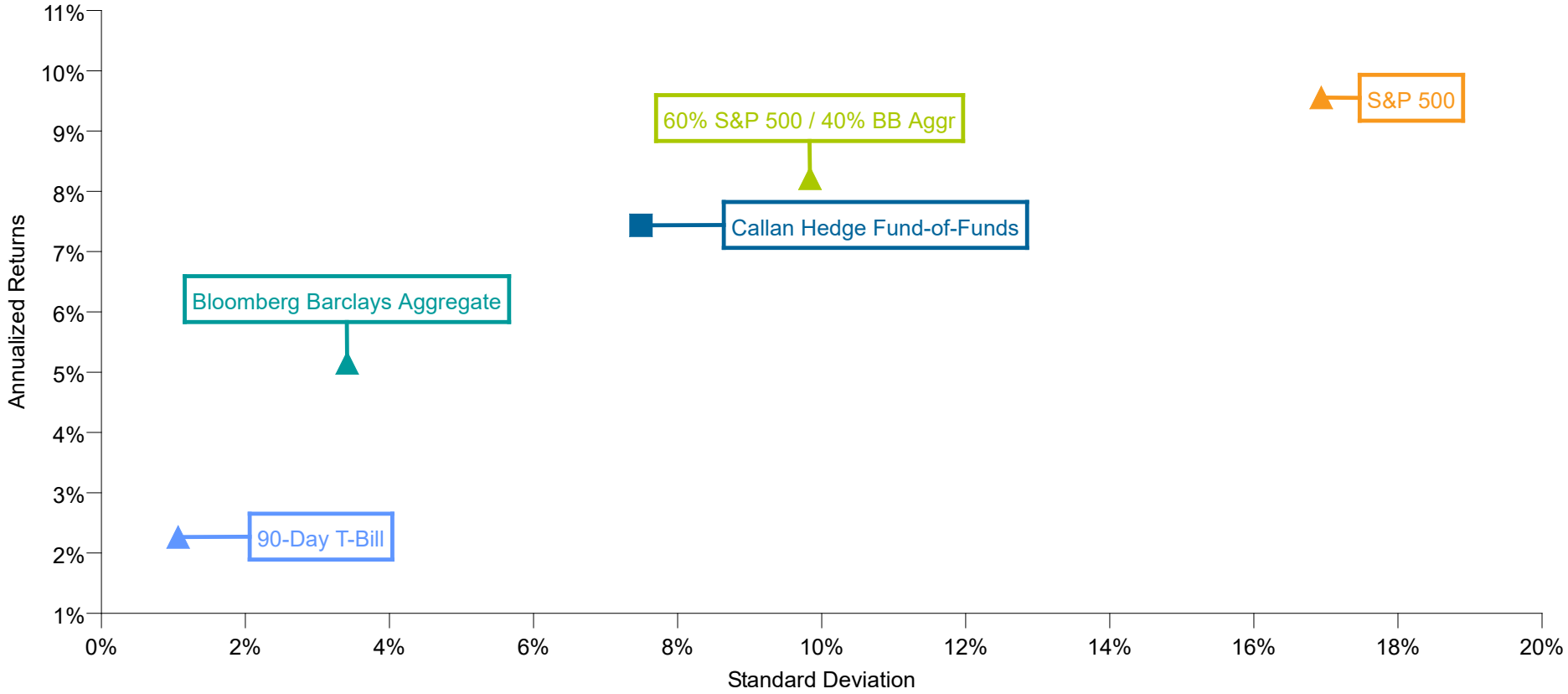
- However, hedge funds lag in prolonged bull markets or sharply rising markets.

Sources: Bloomberg Barclays, Callan, Standard & Poor's

Hedge Fund Performance

Risk Adjusted Return versus Traditional Assets

Annualized Returns vs. Standard Deviation for Last 25 Years ended December 31, 2020

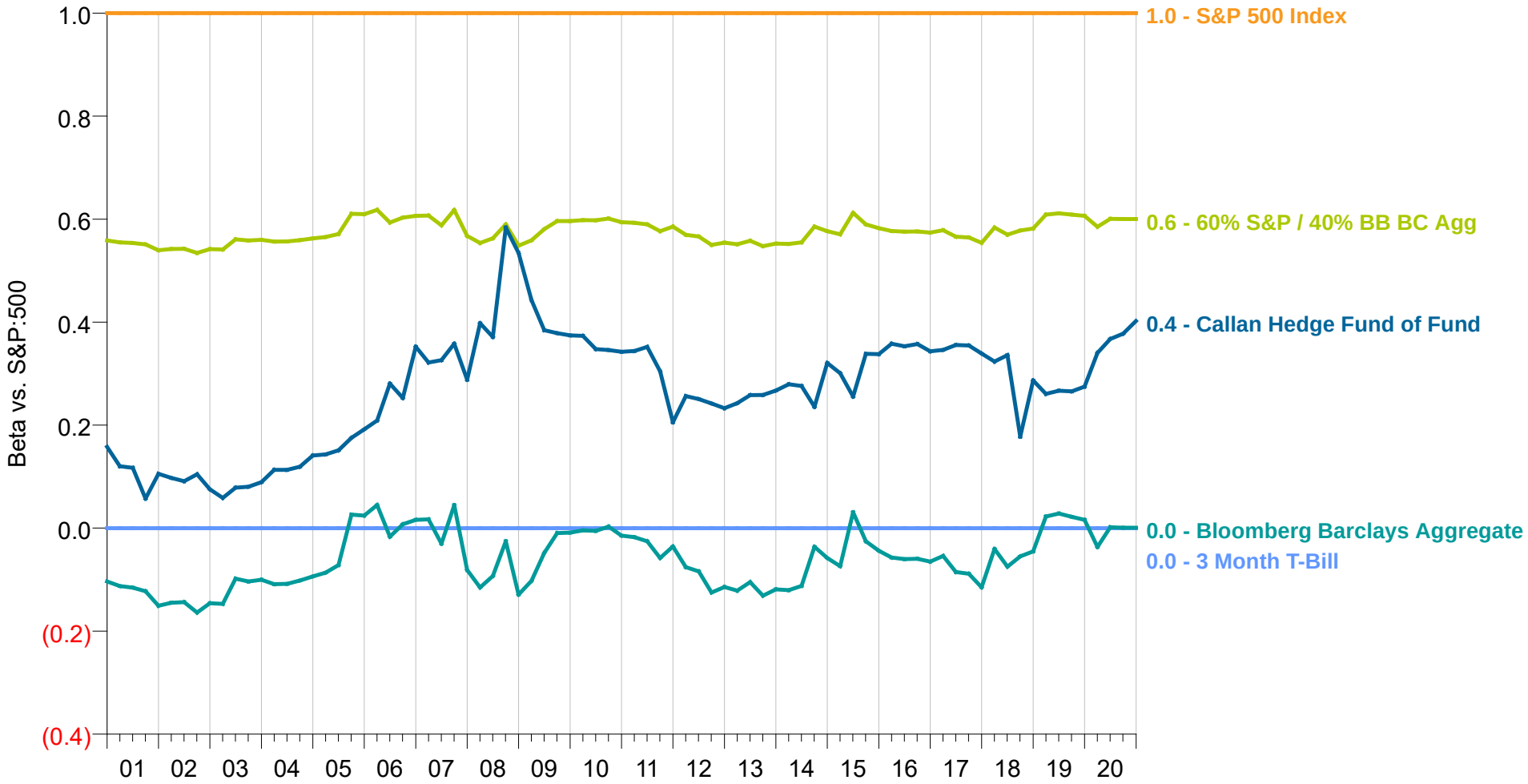


Historical experience indicates that hedge funds have a risk-reward profile between stocks and bonds.

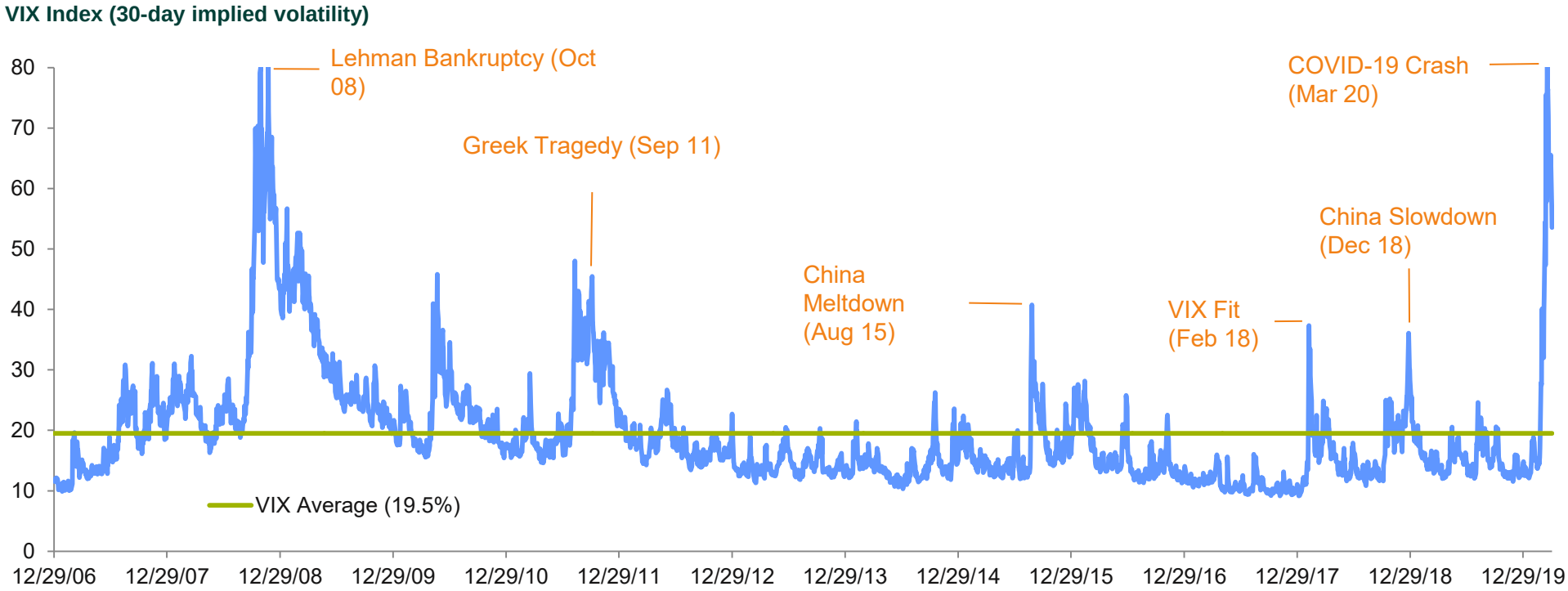
Sources: Bloomberg Barclays, Callan, Standard & Poor's

Sensitivity to Equity Market Risk

Rolling 12 Quarter Beta vs. S&P:500
for 20 Years ended December 31, 2020



Current Market Conditions and Volatility



Hedge fund opportunities often improve with increased volatility

- Lack of volatility mutes ability of active traders to find profitable trades.
- Higher volatility creates more macro opportunities from market dislocation, and more micro opportunities from price dispersion.

Source: CBOE (www.cboe.com)

Recent Dislocations and Hedge Fund Performance

Hedge funds have outperformed global equities during severe downturns

			HFRI Hedge Fund Index Relative Performance vs. Global Equities				
Dislocation Event	**Time Period**	**Global Equities**	**Fund-Wtd**	**Equity Hedge**	**Event Driven**	**Relative Value**	**Macro**
Global Financial Crisis	Jun 2008 – Jun 2009	-29.3	19.3	14.1	17.8	22.0	27.6
Euro Crisis	Jun 2011 – Dec 2011	-11.5	5.5	0.7	4.6	8.0	9.6
China Slowdown	4Q 2018	-12.8	6.7	6.5	8.9	10.7	10.6
COVID-19 Crisis	1Q 2020	-21.4	10.5	9.1	8.1	14.3	18.2
Worst 5 Quarters*	**Time Period**						
1st	4Q 2008	-22.4	13.2	9.5	10.4	11.7	25.0
2nd	1Q 2020	-21.4	10.5	9.1	8.1	14.3	18.2
3rd	3Q 2002	-18.3	14.4	14.3	12.9	18.9	19.7
4th	3Q 2011	-17.4	10.7	6.4	10.5	13.9	17.6
5th	3Q 2008	-16.6	7.0	1.6	9.1	9.6	11.2

* Worst 5 quarters over the past 20 years for Global Equities (April 1, 2000 – March 31, 2020)

Sources: Global Equity: MSCI ACWI (net) Index; Hedge Funds: HFRI

Hedge Fund Strategies

Hedged portfolios with flexible and dynamic investment strategies

Relative Value

Matching purchase and sale of similar securities or related assets to profit from price divergences, with low net market exposure; high leverage often used

Event-Driven

Equity and credit strategies that capitalize on company or industry catalysts such as a merger or regulatory change; modest leverage

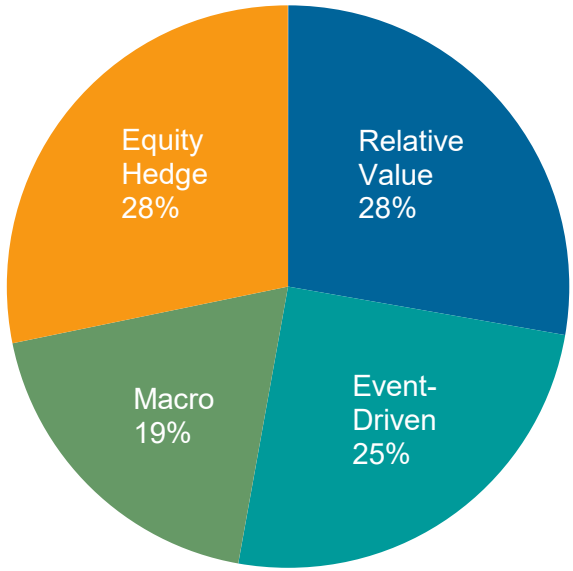
Macro

Thematic investing globally across asset classes including equity, debt, currencies, commodities, and rates to exploit trends and price dislocations

Equity Hedge (or Long / Short Equity)

Bottom-up stock pickers seeking alpha from longs and / or shorts, with significant net market exposure; leverage and beta vary

Primary Hedge Fund Styles (% of Industry AUM)



Fees typically 1.5%–2.0% plus 15%–20% performance fee

Source: HFR® *Global Hedge Fund Industry Report – First Quarter 2020* (www.hedgefundresearch.com)

Hedge Fund Trends

Evolution of underlying strategies

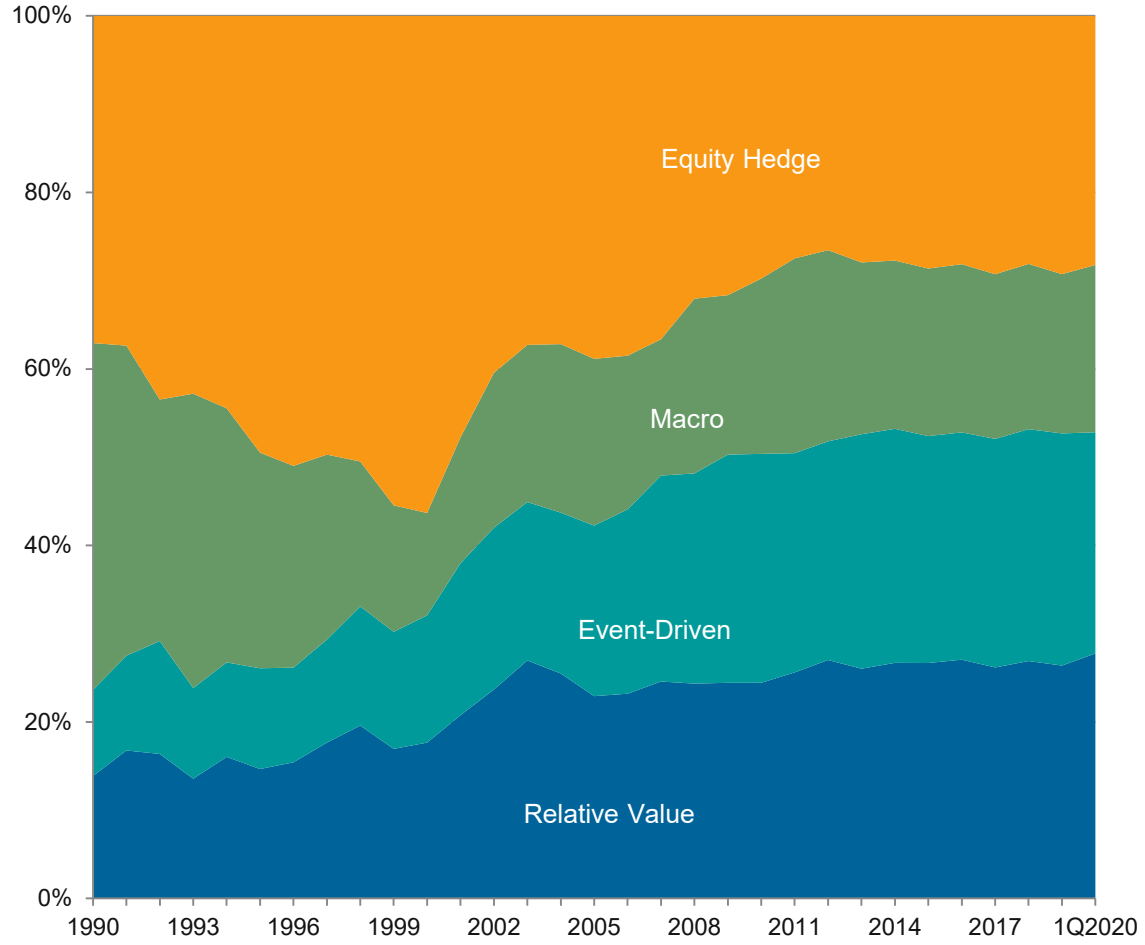
Early hedge fund investors were primarily endowments and private wealth pools seeking to capture outsized and idiosyncratic returns.

Larger institutions such as pensions later entered the space, with an increased focus on downside protection.

Concurrently, changes to regulation (e.g., “Reg FD”), market structure, and central bank policy created headwinds for equity and macro traders.

Managers also sought more scalable trades, with quant strategies becoming more prevalent.

Strategy Allocations as a % of Total



Source: HFR® Global Hedge Fund Industry Report – First Quarter 2020 (www.hedgefundresearch.com)

Strong Case for Building Diversified Hedge Fund Exposure

Periodic table of annual returns for the Credit Suisse Hedge Fund strategies since 2001

2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Distressed	Managed Futures	Emerging Markets	Distressed	Emerging Markets	Emerging Markets	Emerging Markets	Managed Futures	Convertible Arb	Event-Driven Multi	Global Macro	Distressed	Long/Short Equity	Managed Futures	Multi Strategy	Convertible Arb	Emerging Markets	Fixed Income Arb	Emerging Markets	Risk Arb
20.01%	18.33%	28.75%	15.62%	17.39%	20.49%	20.26%	18.33%	47.35%	14.36%	6.44%	11.77%	17.73%	18.36%	3.84%	6.60%	16.87%	1.10%	13.38%	15.98%
Global Macro	Global Macro	Distressed	Event-Driven Multi	Distressed	Event-Driven Multi	Global Macro	Risk Arb	Emerging Markets	Global Macro	Fixed Income Arb	Multi Strategy	Distressed	Multi Strategy	Long/Short Equity	Distressed	Long/Short Equity	Risk Arb	Long/Short Equity	Emerging Markets
18.38%	14.66%	25.12%	14.04%	11.74%	16.38%	17.36%	-3.27%	30.03%	13.47%	4.69%	11.19%	16.00%	6.09%	3.56%	6.38%	13.41%	0.17%	12.17%	12.24%
Convertible Arb	Market Neutral Eq.	Global Macro	Emerging Markets	Long/Short Equity	Distressed	Event-Driven Multi	Global Macro	Fixed Income Arb	Fixed Income Arb	Market Neutral Eq.	Fixed Income Arb	Event-Driven Multi	Long/Short Equity	Market Neutral Eq.	Risk Arb	Market Neutral Eq.	Global Macro	Event-Driven Multi	Convertible Arb
14.58%	7.42%	17.99%	12.49%	9.68%	15.58%	16.82%	-4.62%	27.41%	12.51%	4.49%	11.04%	15.28%	5.54%	1.69%	5.89%	8.45%	-0.11%	11.42%	10.25%
Market Neutral Eq.	Emerging Markets	Long/Short Equity	Long/Short Equity	Global Macro	Multi Strategy	Long/Short Equity	Event-Driven Multi	Multi Strategy	Managed Futures	Multi Strategy	Emerging Markets	Multi Strategy	Fixed Income Arb	Convertible Arb	Emerging Markets	Distressed	Multi Strategy	Global Macro	Long/Short Equity
9.31%	7.36%	17.27%	11.56%	9.25%	14.54%	13.66%	-16.25%	24.62%	12.22%	1.83%	10.28%	11.23%	4.37%	0.81%	4.47%	7.27%	-1.05%	10.38%	7.86%
Fixed Income Arb	Multi Strategy	Event-Driven Multi	Global Macro	Multi Strategy	Long/Short Equity	Multi Strategy	Long/Short Equity	Distressed	Emerging Markets	Convertible Arb	Event-Driven Multi	Market Neutral Eq.	Global Macro	Fixed Income Arb	Multi Strategy	Multi Strategy	Distressed	Managed Futures	Event-Driven Multi
8.04%	6.31%	17.19%	8.49%	7.54%	14.38%	10.10%	-19.76%	20.95%	11.34%	1.13%	10.14%	9.27%	3.11%	0.59%	4.41%	6.83%	-1.59%	9.01%	6.92%
Event-Driven Multi	Fixed Income Arb	Multi Strategy	Multi Strategy	Event-Driven Multi	Convertible Arb	Market Neutral Eq.	Distressed	Event-Driven Multi	Convertible Arb	Risk Arb	Long/Short Equity	Emerging Markets	Distressed	Risk Arb	Fixed Income Arb	Fixed Income Arb	Convertible Arb	Convertible Arb	Global Macro
6.79%	5.75%	15.04%	7.53%	7.21%	14.30%	9.27%	-20.48%	19.94%	10.95%	0.80%	8.21%	8.81%	2.55%	0.41%	4.29%	6.52%	-2.26%	8.15%	6.53%
Emerging Markets	Convertible Arb	Managed Futures	Fixed Income Arb	Market Neutral Eq.	Global Macro	Risk Arb	Multi Strategy	Long/Short Equity	Distressed	Managed Futures	Convertible Arb	Convertible Arb	Emerging Markets	Global Macro	Global Macro	Event-Driven Multi	Long/Short Equity	Multi Strategy	Multi Strategy
5.84%	4.05%	14.13%	6.86%	6.14%	13.53%	8.77%	-23.63%	19.47%	10.26%	-4.19%	7.82%	6.03%	1.52%	0.17%	3.58%	5.85%	-4.62%	7.25%	5.60%
Risk Arb	Event-Driven Multi	Convertible Arb	Market Neutral Eq.	Risk Arb	Market Neutral Eq.	Distressed	Fixed Income Arb	Risk Arb	Multi Strategy	Distressed	Global Macro	Risk Arb	Event-Driven Multi	Emerging Markets	Event-Driven Multi	Risk Arb	Market Neutral Eq.	Fixed Income Arb	Distressed
5.68%	1.22%	12.90%	6.48%	3.08%	11.15%	8.35%	-28.82%	12.00%	9.29%	-4.24%	4.58%	4.89%	1.14%	-0.22%	1.25%	5.80%	-5.00%	6.10%	3.82%
Multi Strategy	Distressed	Risk Arb	Managed Futures	Fixed Income Arb	Fixed Income Arb	Managed Futures	Emerging Markets	Global Macro	Long/Short Equity	Emerging Markets	Risk Arb	Global Macro	Market Neutral Eq.	Managed Futures	Long/Short Equity	Convertible Arb	Event-Driven Multi	Risk Arb	Fixed Income Arb
5.50%	-0.69%	8.98%	5.96%	0.63%	8.66%	6.01%	-30.41%	11.55%	9.28%	-6.68%	2.82%	4.32%	-1.20%	-0.93%	-3.43%	5.01%	-5.19%	4.89%	3.64%
Managed Futures	Long/Short Equity	Fixed Income Arb	Risk Arb	Managed Futures	Risk Arb	Convertible Arb	Convertible Arb	Market Neutral Eq.	Risk Arb	Long/Short Equity	Market Neutral Eq.	Fixed Income Arb	Risk Arb	Distressed	Market Neutral Eq.	Managed Futures	Managed Futures	Market Neutral Eq.	Managed Futures
1.90%	-1.60%	7.97%	5.45%	-0.11%	8.15%	5.17%	-31.59%	4.05%	3.17%	-7.31%	0.85%	3.80%	-1.32%	-5.30%	-4.58%	3.29%	-6.67%	1.58%	1.86%
Long/Short Equity	Risk Arb	Market Neutral Eq.	Convertible Arb	Convertible Arb	Managed Futures	Fixed Income Arb	Market Neutral Eq.	Managed Futures	Market Neutral Eq.	Event-Driven Multi	Managed Futures	Managed Futures	Convertible Arb	Event-Driven Multi	Managed Futures	Global Macro	Emerging Markets	Distressed	Market Neutral Eq.
-3.65%	-3.46%	7.07%	1.98%	-2.55%	8.05%	3.83%	-40.32%	-6.57%	-0.85%	-11.96%	-2.93%	-2.56%	-1.67%	-6.67%	-6.84%	2.14%	-10.16%	1.39%	1.69%

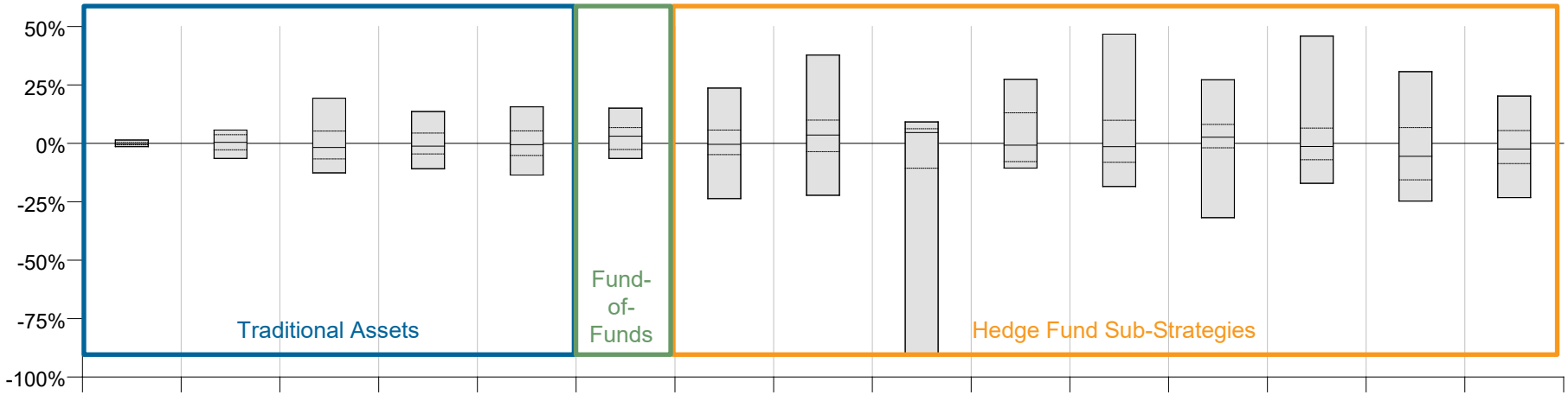
Individual manager and strategy risks are substantial, so diversification effect remains important to success.

Source: Credit Suisse Hedge Fund Index

Hedge Fund Performance Variance (Long Term)

Degrees of separation (2020)

Return Dispersion within Peer Group vs. Average Member for Year to Date ended December 31, 2020



	Callan Core Bond FI	Callan Large Cap Core	Callan NonUS Eq	Callan Small Cap Core	Callan Emerging Broad	Callan Hedge Fund of Fund	Institutional Hedge Funds	HFRI RV Multi Strategy	HFRI RV FI Asset Backed	HFRI EH Equity Mkt Ntrl	HFRI ED Merger Arbitrage	HFRI Rel Value (Total)	HFRI Event Driven (Total)	HFRI Equity Hedge (Total)	HFRI Macro (Total)
5th Percentile	1.48	5.69	19.36	13.65	15.68	15.11	23.69	37.82	9.22	27.45	46.75	27.20	45.89	30.70	20.25
25th Percentile	0.42	3.73	5.26	4.42	5.35	6.81	5.72	9.97	6.30	13.13	9.93	8.10	6.53	6.75	5.47
Median	-0.12	0.44	-1.73	-1.16	-0.56	3.10	-0.42	3.57	4.67	-0.77	-1.40	2.67	-1.31	-5.47	-2.38
75th Percentile	-0.61	-2.71	-6.67	-4.54	-5.12	-2.58	-4.82	-3.51	-10.61	-7.79	-8.03	-1.87	-6.96	-15.60	-8.63
95th Percentile	-1.38	-6.46	-12.58	-10.84	-13.54	-6.41	-23.62	-22.23	-90.06	-10.53	-18.43	-31.81	-17.10	-24.67	-23.19

Within hedge fund strategies, manager selection is a key determinant of success, whether for one quarter or longer periods of a year or more.

Source: Callan; HFRI peer group distributions calculated by Callan using data sourced from Hedge Fund Research, Inc. (HFR) Database

Program Design

Portfolio construction driven by risk and return expectation

Absolute return

Fixed-income alternative; focus on downside protection

Key goal: less-correlated returns from non-market risks such as alternative beta, illiquidity premium, complexity premium, and idiosyncratic risks

Balanced

Diversified mix of absolute return and directional strategies

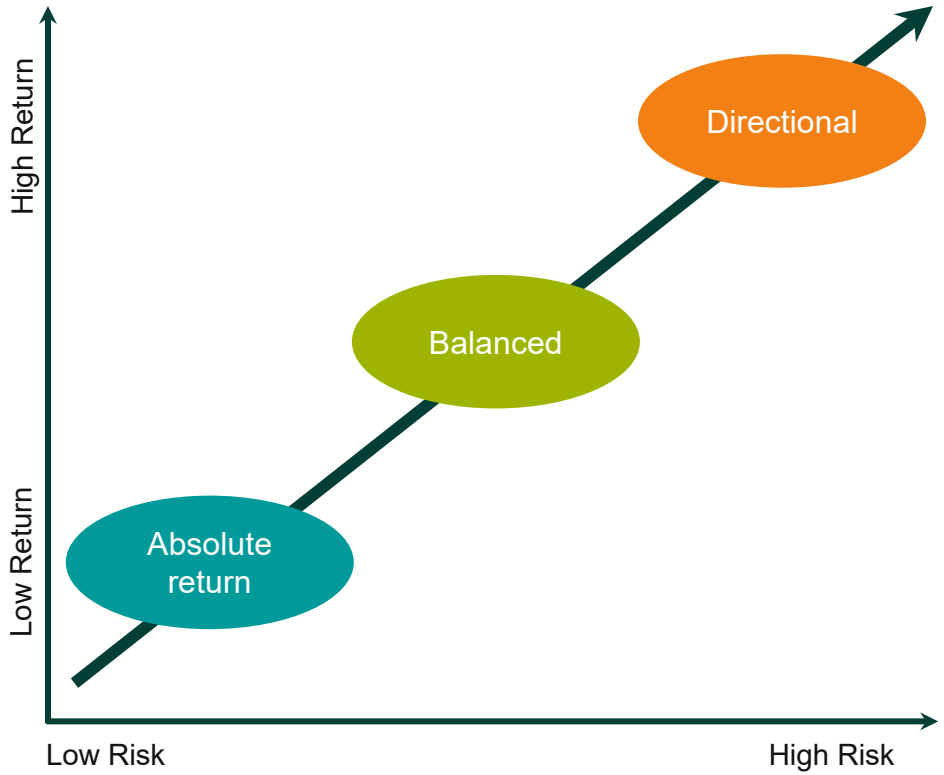
Key goal: a more unconstrained approach that enables varying degrees of market exposures over full market cycles

Directional

Equity complement (long / short equity, event driven); intended to provide diversification vs. long-only strategies

Key goal: equity-like returns over a full market cycle with less volatility

Risk / Return Tradeoff

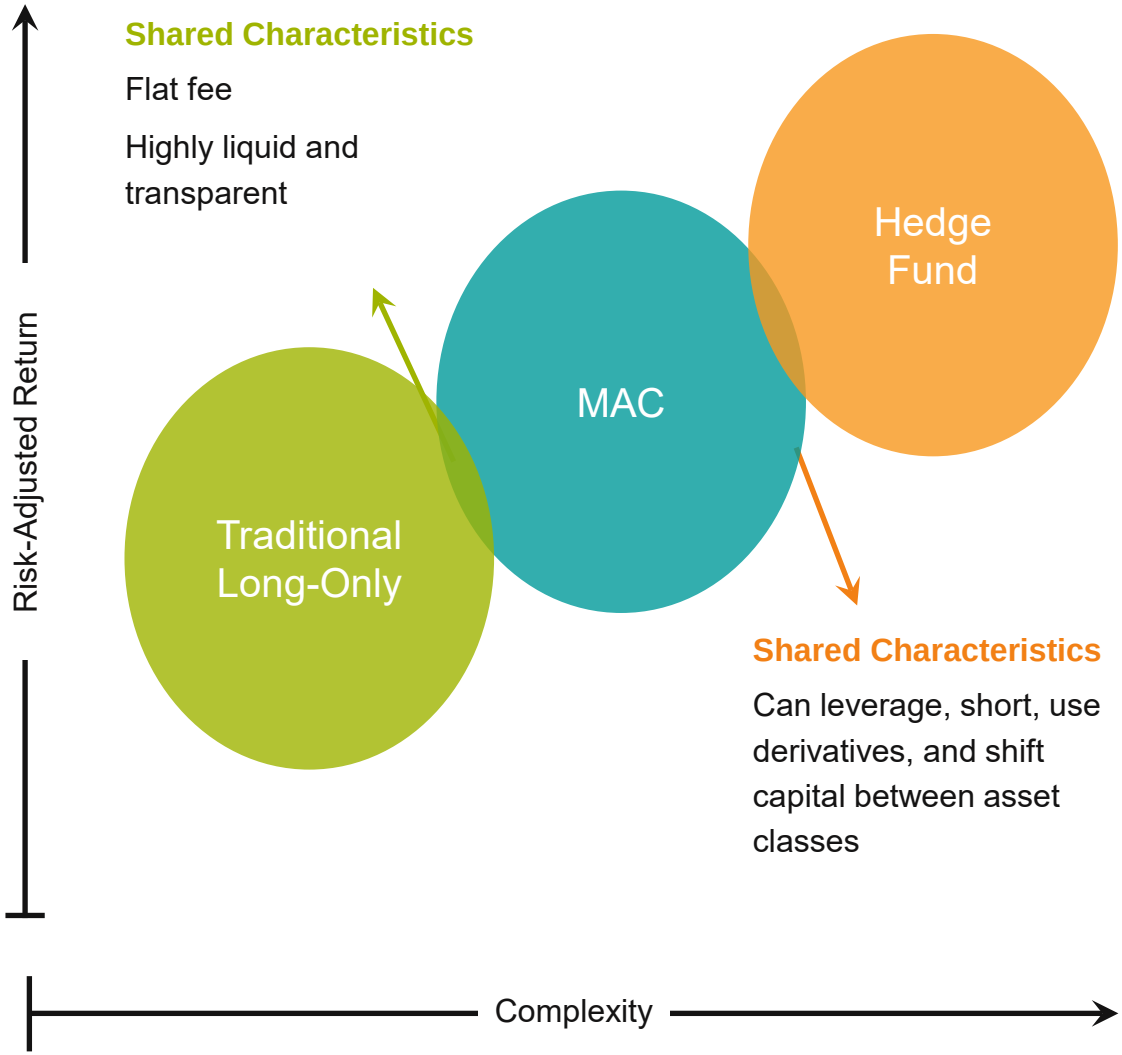


Introducing Absolute Return Strategies

Multi-Asset Class (MAC) Strategies

Most traditional “long-only” portfolios are dominated by equity risk.

MAC and Hedge Fund strategies can mitigate equity risk with broader diversification, more dynamic risk management, and better drawdown protection.



Source: Callan

MAC Style Groups Defined

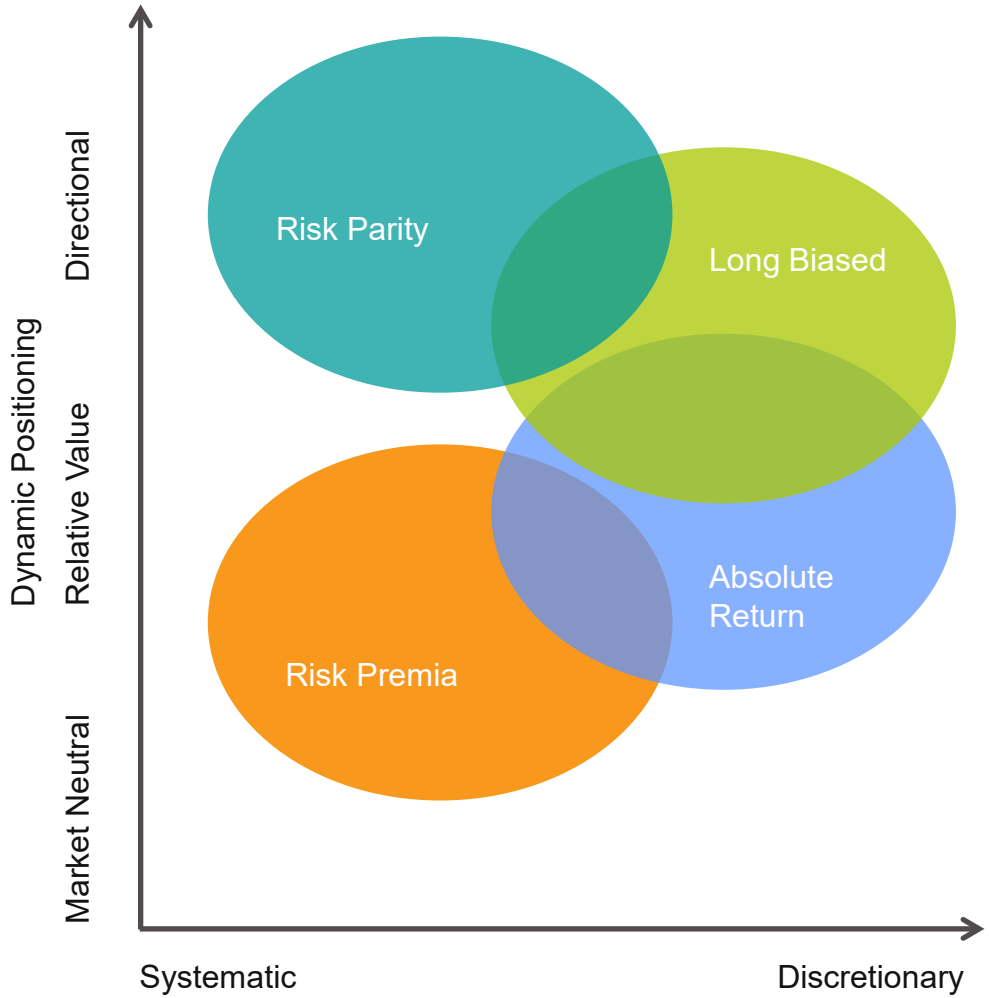
Directional or relative value trades driven by macro perspectives

Long Biased
Directional and dynamic strategy with an equity bias, managed tactically

Absolute Return
Risk-controlled tactical strategy across multiple asset classes, with low net market exposure

Risk Premia
Exposure to alternative risk premia and return anomalies, implemented with relative value trades and portfolio leverage; target volatility of 5% – 15%

Risk Parity
Balanced and strategic risk-weighted exposure to major asset classes, including equity, credit, commodities, currencies, and rates



Fees typically 0.70%–1.1.0%

Source: Callan

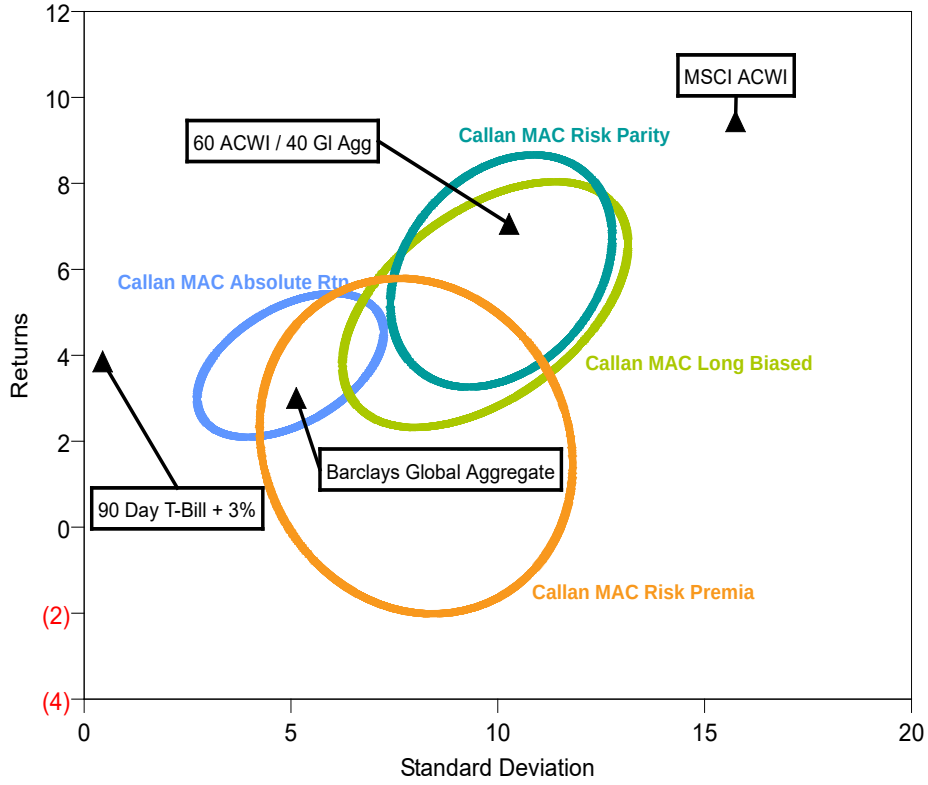
MAC Returns vs. Risk

Dispersion is meaningful and groups can have jumbled outcomes.

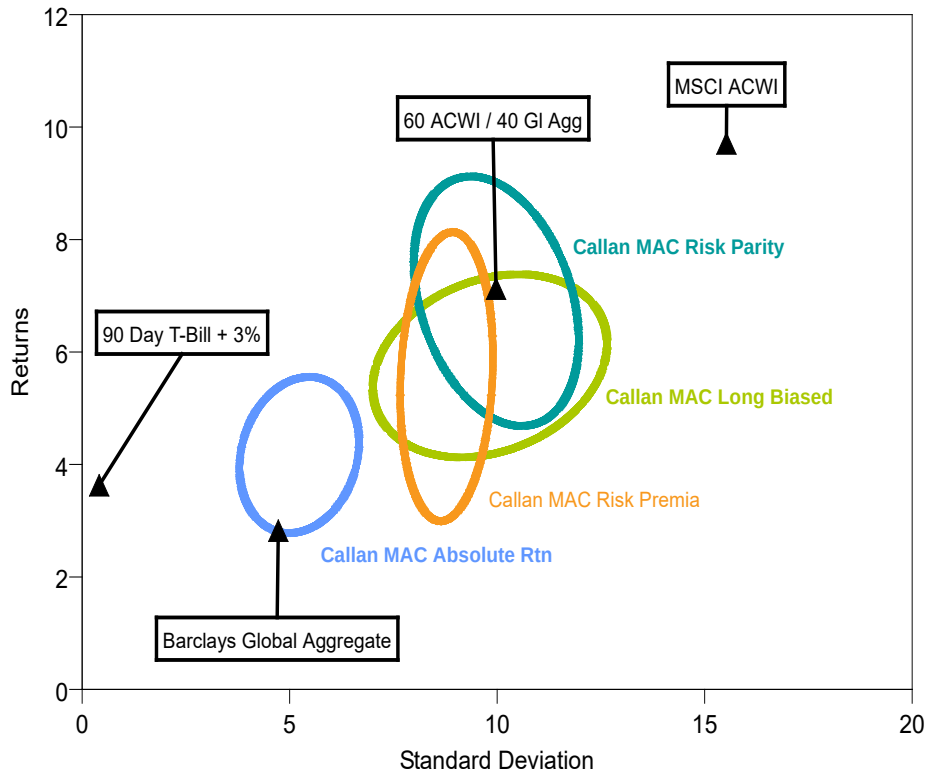
A higher Sharpe ratio than traditional asset mixes is a key measure of success for MAC.

The ellipses represent an 80% confidence region.

Scatter Chart for 7 Years ended December 31, 2020

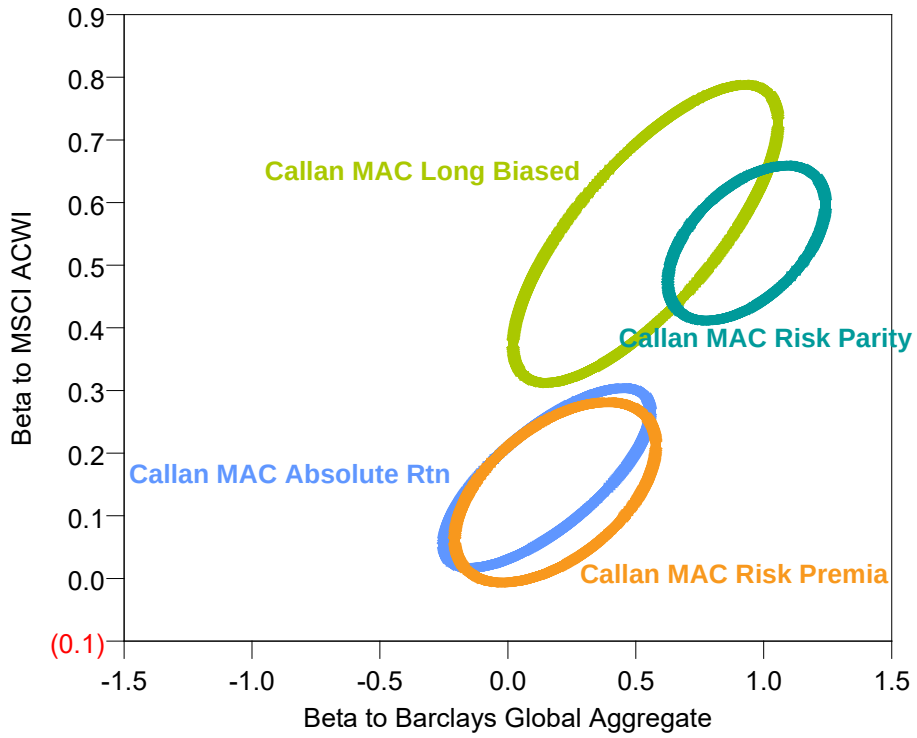


Scatter Chart for 10 Years ended December 31, 2020

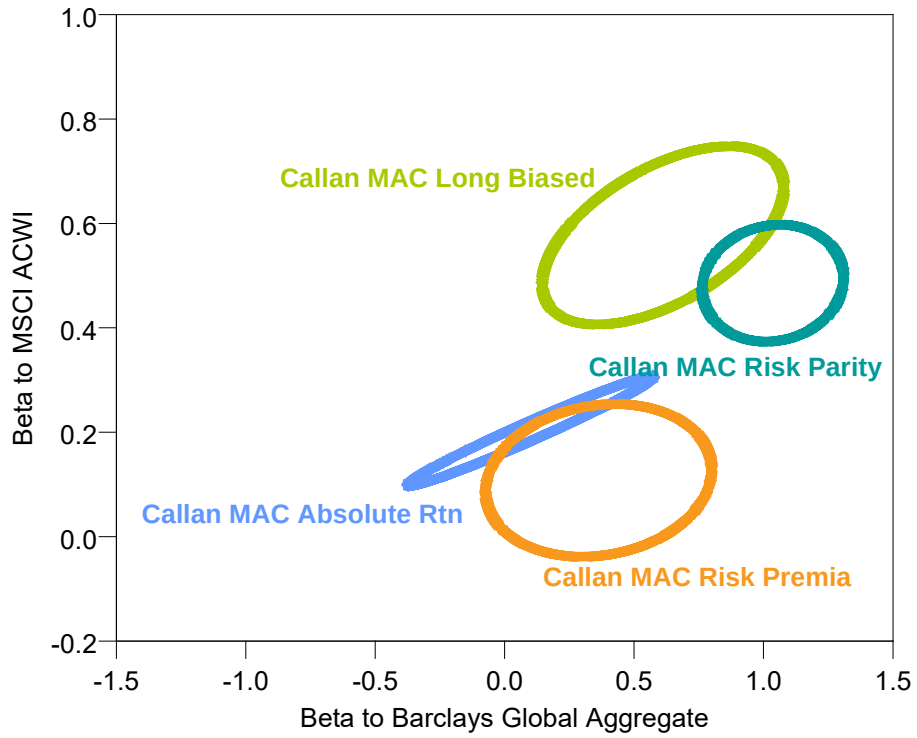


MAC Beta

Beta Chart for 7 Years ended December 31, 2020



Beta Chart for 10 Years ended December 31, 2020



Long biased has illustrated high correlation to equities, but typically an equity beta < 1.0.

Absolute return has lower beta, but correlation varies considerably.

Risk parity has high beta and correlation to bonds.

Finding Opportunity Amid Crisis

Closed-end and open-end hedge funds as well as MACs

Renewed appreciation for more dry powder, lower risk tolerance, and better diversification

Cash is king

- Previously closed hedge funds are now selectively open to new investors
- Hedge funds willing to negotiate fees and high watermarks, though NAVs may need extra vetting
- New closed-end funds also present sizable opportunities to allocate fresh capital

Less-directional hedge funds vs. bonds

- Short-duration risk of cash + x% returns is less sensitive to inflation risk
- Choppy markets ahead help hedge funds reap more alpha from mispriced securities

Additive and complementary solutions

- Hedge funds and flat-fee, scalable MACs
- Beware of “broken clocks that are right twice a day,” given lessons learned post-GFC

Finding Opportunity Amid Crisis

Trend-following, systematic macro, and macro hedges

Macro strategies do not need to be 2% and 20% hedge funds

Trend-following

- Feeds on market volatility and diverse economic recoveries that lead to divergent outcomes
- Profits occur in either rising or declining markets, but risk lies in nothing happening

Systematic macro

- Focuses on scalable alternative risk premia often not correlated with stocks and bonds
- Embraces both long and short exposures across stocks, bonds, currencies, and commodities

Macro hedges

- Offer asymmetric returns in both inflationary and deflationary environments
- Example: gold serves as a crisis-risk hedging tool in the short run and a proven store of value over the (really) long-term relative to cash

Highly liquid investments that can be ideal funding sources for rebalancing portfolios

Finding Opportunity Amid Crisis

Reinsurance and other non-traditional alternatives

The hunt for diversification beyond traditional capital markets continues

Reinsurance

- Supports insurance companies needing to offload excess weather, fire, and other event-related risks
- Risk premia uncorrelated to major asset classes, while offering attractive returns versus fixed-income alternatives
- Pricing has risen recently to attract more capital needed to back insurance needs

Private credit

- Lending to gold-mining companies at attractive loan-to-value measures based on proven reserves
- Capital for law firms helping plaintiffs with viable claims against corporations or governments
- Life settlement cash to insureds needing liquidity, in exchange for future insurance policy payouts

Key Takeaways and Conclusions

- Are not a distinct “asset class”: can move across asset classes and geographies
- Experienced rapid growth leading up to and following the 2008–2009 GFC, then much slower growth in recent years
- Mix of attractive long-term returns and strong downside protection during market downturns, but high fees
- Saw a shift in the most prevalent strategies from more directional but volatile equity hedge and global macro to more scalable relative value and event driven
- Can be used to structure portfolios with a wide variety of risk and return characteristics
- COVID-19 crisis has severely dampened economic outlook, challenging capital markets, alternative betas, and hedge fund strategies.
- Opportunities created by the crisis are now plentiful for investors providing liquidity to meet structural selling ahead.
- Next steps require an investor to match its given resources, skill sets, and styles of governance with the appropriate strategic partners.

Operational Performance

Strategic Workshop
April 28, 2021

Marin County Employees' Retirement Association

Agenda

- What We Measure
- What We Manage
- Covid-19 Response
- Covid-19 Opportunities
- Moving Forward

What We Measure

What gets measured gets done.

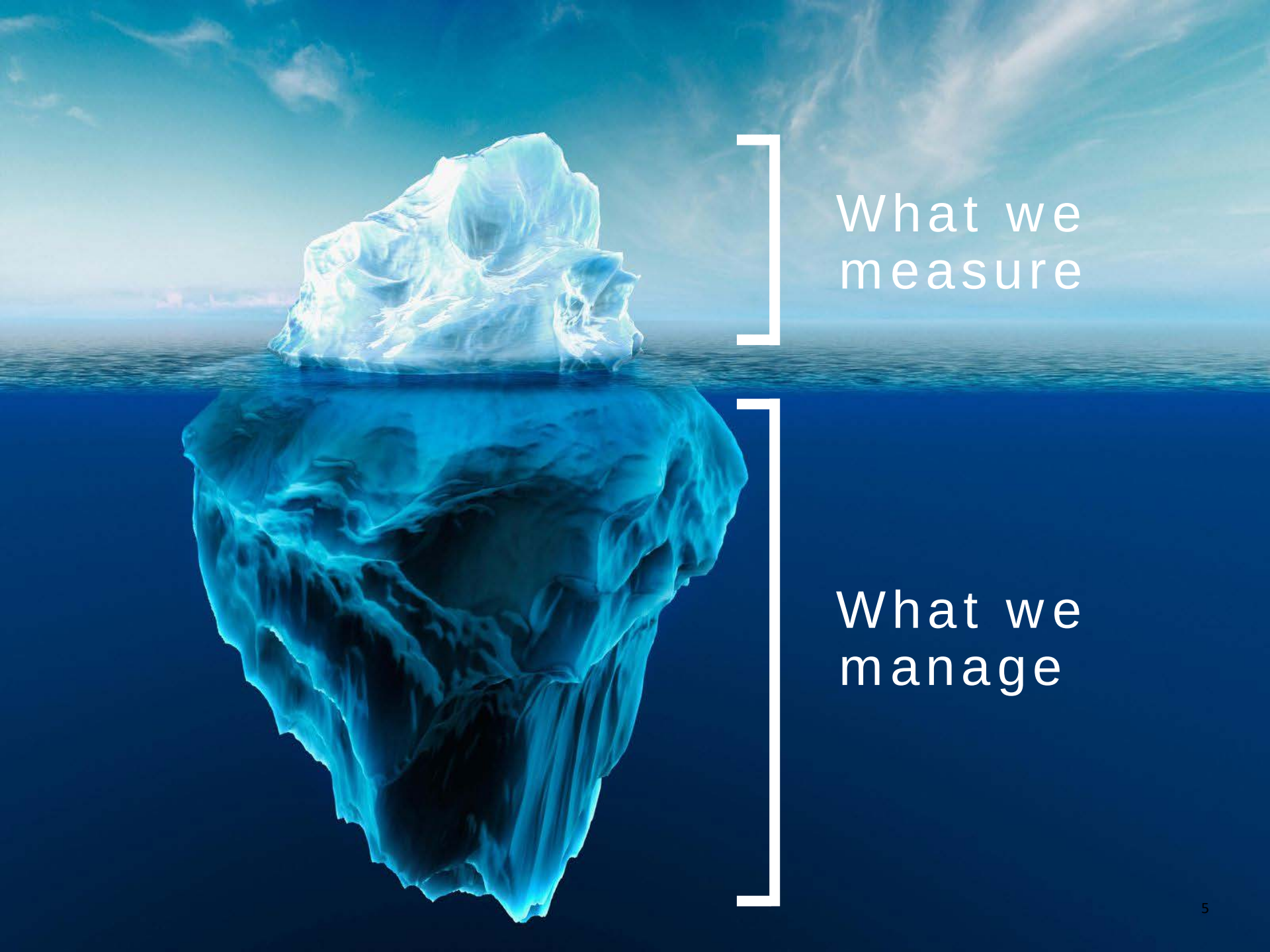
- Tracking our efforts, measuring our performance, and reporting our results are the keys to being accountable.
- Current performance measures tie directly to our core business.
- Stated within the Retirement Administrator's annual Business Objectives and progress is reported to the Board on a quarterly basis.

What We Measure

Complete
95% of new retiree payroll inceptions the month following the retirement

Complete
80% of retirement benefit estimates within 30 days of receiving the request

Complete
75% of service purchases within 30 days of the date documentation is available


What we measure
What we manage

What We Manage

Ongoing Workflow

- Retirements
- Estimates
- Purchases/Redeposits
- Service Credit Audits
- Divorce/Dissolutions
- Reciprocity
- Deaths
- Monthly Disbursements
- Front Desk Calls
- Emails
- Disability Processing
- CPAS Changes/Builds
- Employer Active Payroll Uploads
- Powers of Attorney
- Post-retirement Employment Monitoring
- Address Changes for MCARE

Recurring Processes

- 1099-Rs
- Age 70 Disbursements
- Interest Crediting
- Returned Mail
- Medicare Enrollment Reminders
- Member Benefit Statements
- Retiree COLA
- Financial Audit
- Actuarial Valuation Reports
- Retiree Vision Care Open Enrollment
- Medicare Rate Changes
- Healthcare Premium & Deduction Changes
- IT Risk Assessment
- Contribution Rates

What We Manage

Board of Retirement

- Terms of office (Elections and Appointments)
- Education Events and Hours
- Investment Managers
- Policy Review
- Form 700
- Placement Agents
- Electronic Equipment

Accounting

- Member Payment Receipts
- Employer Payment Receipts
- Disbursements
- Budget Expenditures
- Reserve Movements
- Investment Manager Fees
- Capital Calls & Distributions

Human Resources

- Performance Reviews
- Step Increases
- Required Training
- Systems Access (key fobs, software programs, user roles)

Progress is impossible without change.

Covid-19 Response

Physical Changes Allowed Reopening

Ensured safe environment for visitors and staff

- Implemented a Site-Specific Protection Plan
- Posted social distancing signage in all public and staff areas
- Installed acrylic barriers at the front desk, counseling room, and around each staff workstation
- Made hand sanitizer, sanitizing wipes, spray sanitizer and paper towels available throughout the building
- Required face coverings at all times except when alone in an office with a door
- Cleaned the HVAC system
- Staff complete health self-certifications when working onsite

Covid-19 Response

Staff Shifted to Remote Work

Business processes continued uninterrupted

- Staff instructed to work from home using remote desktop through VPN
- Laptops, monitors, keyboards, chairs, and various office supplies were provided
- Specific instructions were provided to staff to safeguard member information and privacy while working from home
- One-on-one member and team meetings held via Microsoft Teams
- Staff phones forwarded to personal phones, and VOIP phones allowed voicemails on work extensions to be sent via email

Covid-19 Opportunities

Workflow Processing

Increased efficiency in business processes

- Front desk continuously staffed for receipt and processing of mail and document imaging
- Drop-off bin placed in lobby to eliminate need to enter the suite to provide documents
- Application packets, etc. sent to members electronically as well as hard copy
- Witnessed signature requirements for Retirement Applications and Beneficiary Change forms were suspended and a validation process was implemented
- New paperless workflow process implemented
- OneDrive utilized for ability to simultaneously edit shared documents and spreadsheets
- Hard copy member files moved offsite

Covid-19 Opportunities

Board of Retirement

Increased public transparency

- Virtual meetings held via Zoom Webinars
- MCERA YouTube channel created to live-stream meetings
- Public comment processes implemented to allow for live comment as well as email submission
- Electronic agenda packets posted on MCERA website

There is no better teacher than experience.

Moving Forward

Successful Changes Will Stay

- Hybrid schedules that include both remote and onsite work
- Paperless workflow
- Video conferencing for internal and external meetings
- Video-based staff training
- Posting electronic Board packets on the website
- Video broadcasting of Board meetings

Future Changes Based on Past Experience

- How can we improve performance?
- How can we improve tracking mechanisms?
- How can we increase transparency?
- How can we further maximize existing resources?