



ALASKA PERMANENT
FUND CORPORATION

February, 2022

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2022 Asset Allocation Review

Gregory C. Allen
CEO, Chief Research Officer

Steven J. Center, CFA
Senior Vice President

Outline

- Callan's capital market projection process.
- Historical long-term structural patterns of capital market behavior.
- Summary of Callan's 2022 capital market projections.
- Projected return and risk for APFC 2023 policy target portfolio.
- Concluding observations.

Callan Capital Market Projection Process

Long Term Capital Market Projections

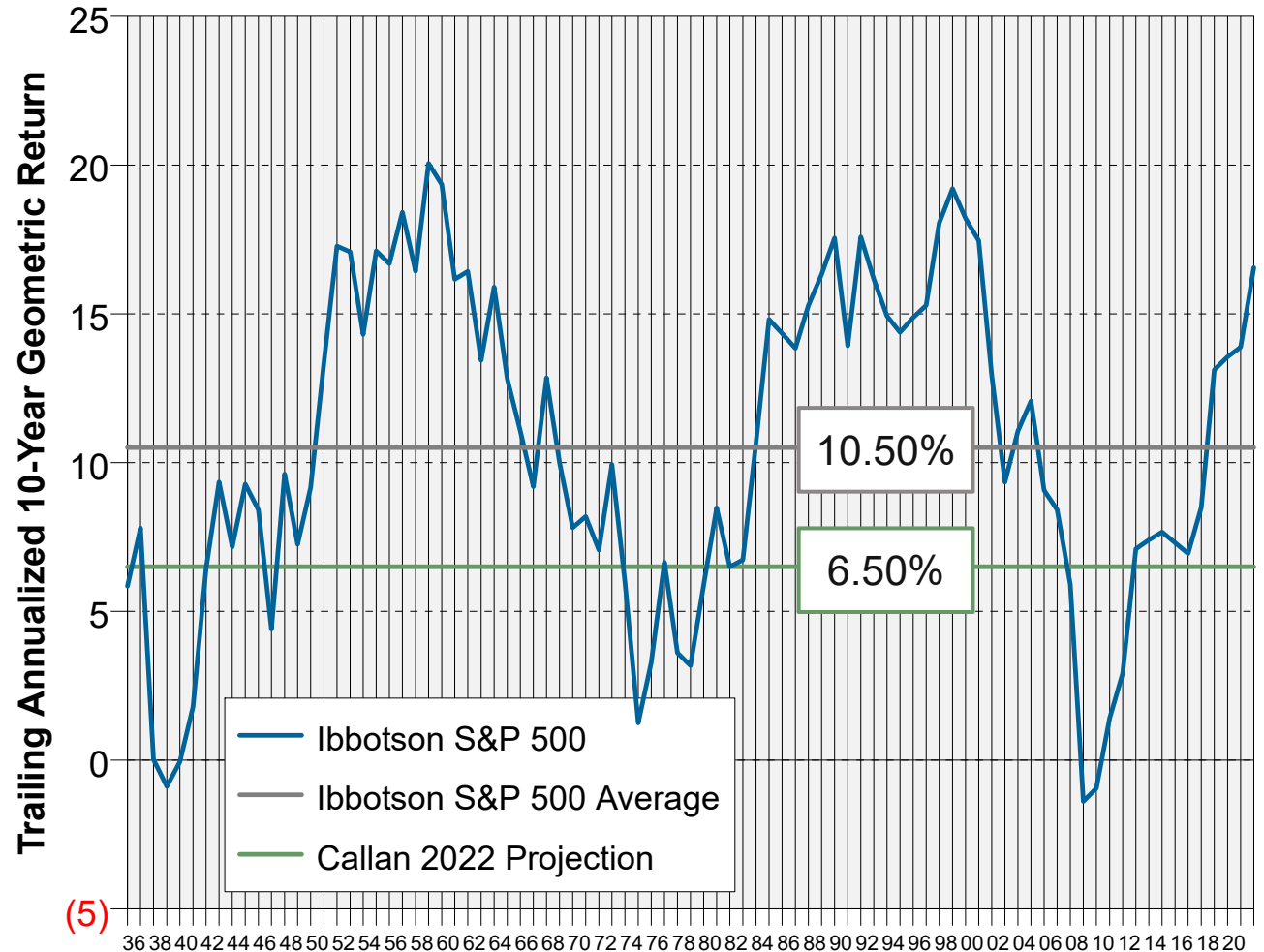
- Callan updates long term capital market projections each year in January and uses them for the full year with all clients for strategic planning purposes.
- Projections take into account long term relationships balanced with current market conditions.
- Consensus expectations (central banks, economists, asset managers, consultants, etc.) are carefully considered as an integral part of the process.
- Each number – **return, risk, correlation** – for every asset class must be individually defensible, and the numbers collectively need to work together as a set to generate reasonable portfolios during strategic planning exercises.
- Projections change slowly over time and are not designed to provide tactical insights.
- Process is executed by Callan's capital markets research group and projections are peer reviewed by Client Policy Review Committee as well as the hundreds of the clients that use them every year.
- Process is battle proven – it has evolved and improved, but hasn't fundamentally changed over the last four decades.

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%.
- 2022 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
US Large Cap Equity (Ibbotson S&P 500)**

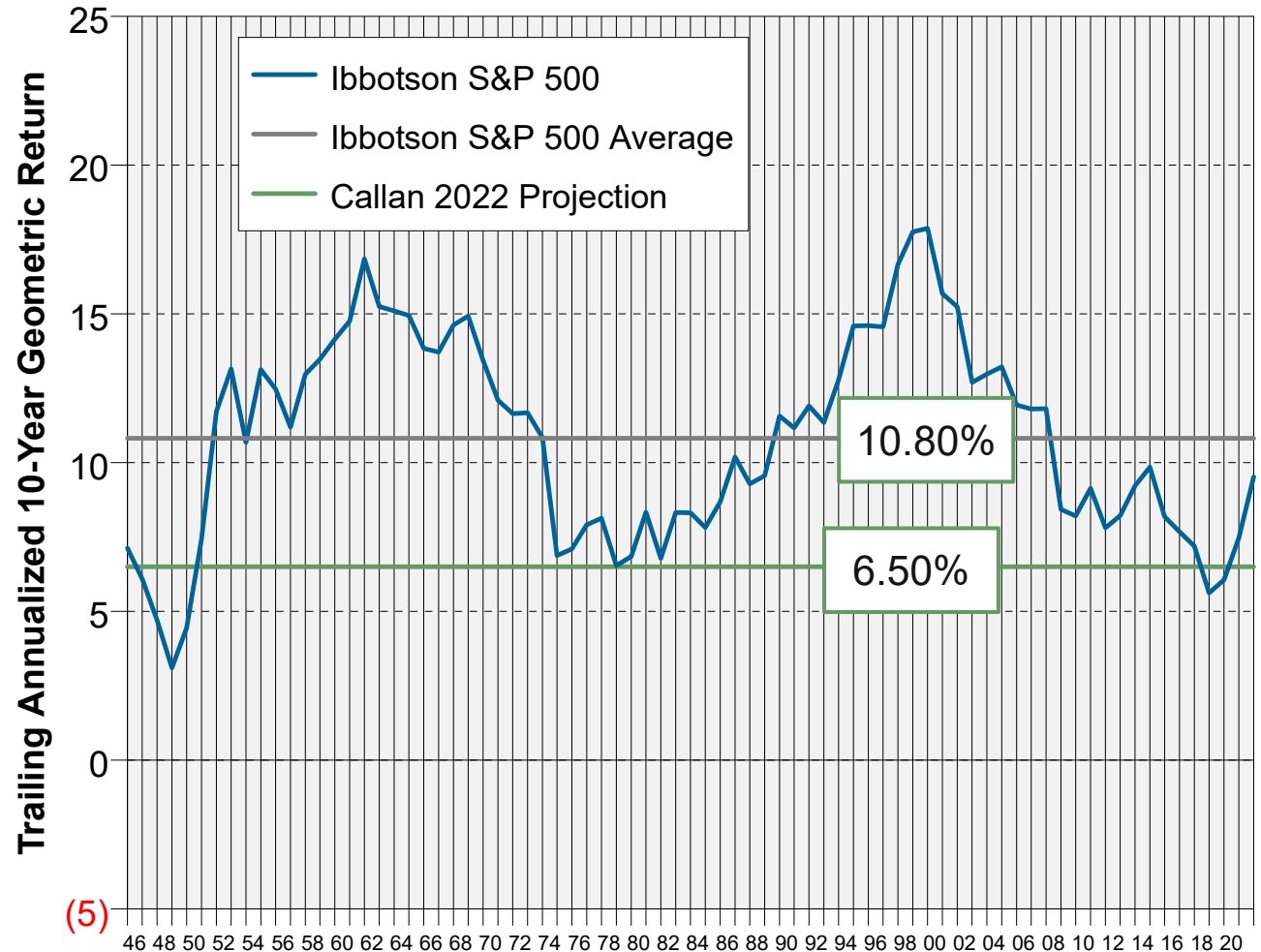


Callan Capital Market Projection Process

Historical Rolling 20-year Return – US Large Cap Equity

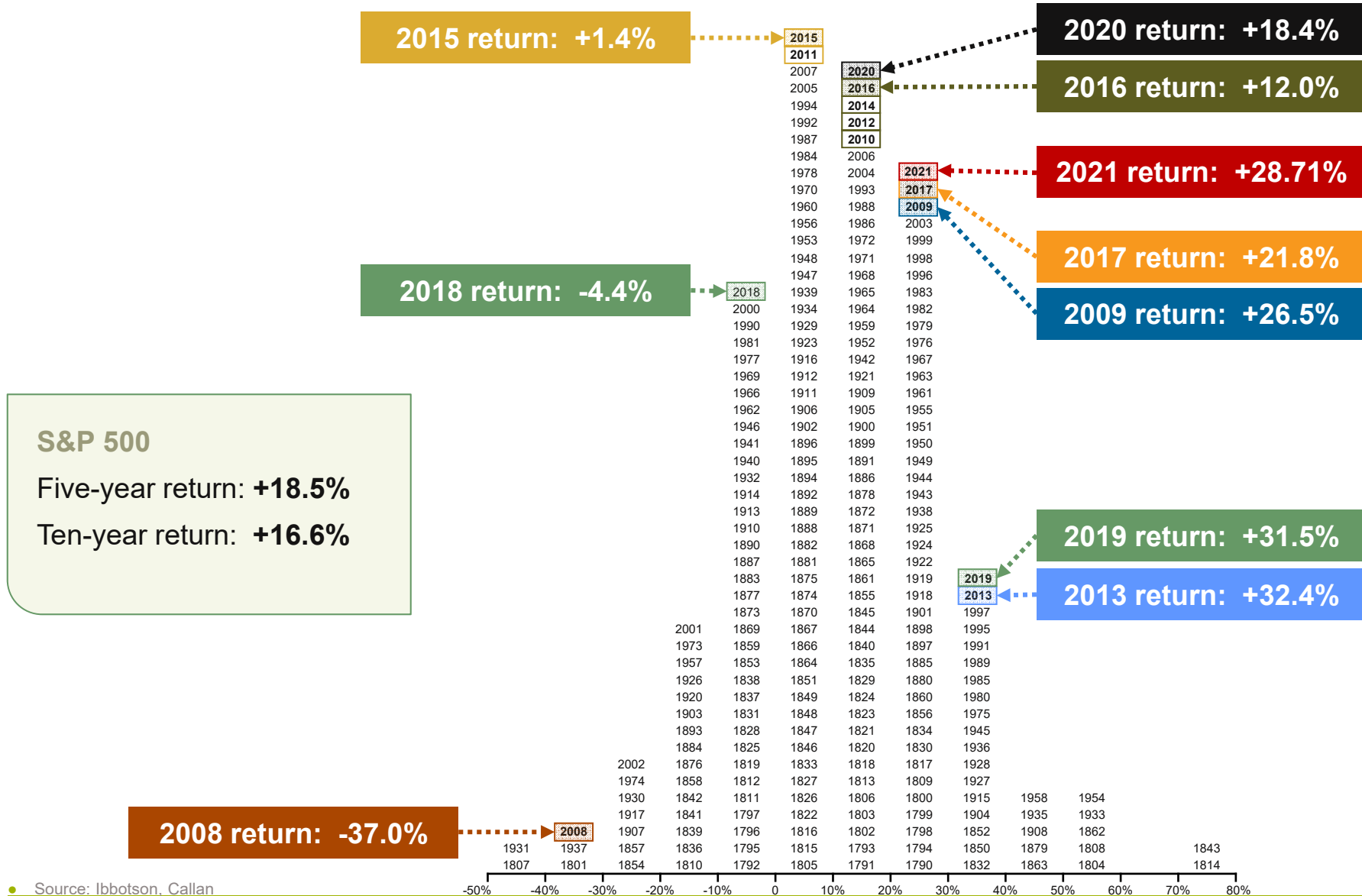
- Historical 20-year return for US large cap has averaged 10.8%.
- 2021 Projection is 6.5%.
- Very few periods historically where the 20-year return was below 6.50% projection
- Longer time horizons reward equity risk takers with more consistent positive returns.
- Worst 10-year period for S&P 500 since 1926 was period ended 12/31/1950 (great depression, WW II, Korean War). Annualized Return 3.1% (almost entirely dividends)

Rolling 20 Year Returns
US Large Cap Equity (Ibbotson S&P 500)



Stock Market Returns by Calendar Year

2021 performance in perspective: History of the U.S. stock market (232 years of returns)



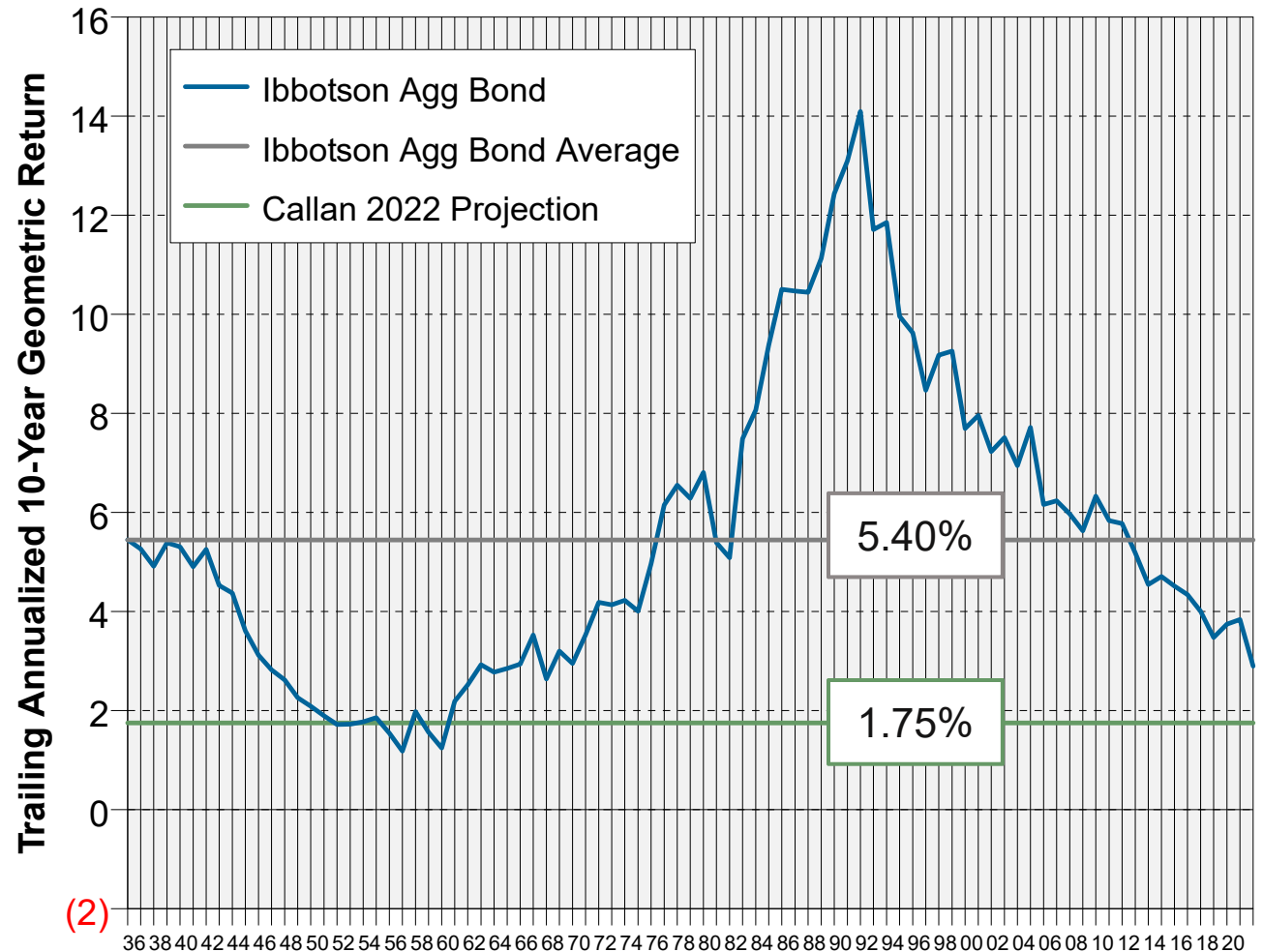
Callan Capital Market Projection Process

Historical Return – US Fixed Income

- Historical 10-year return for US bonds has averaged 5.5%.
- 2022 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.

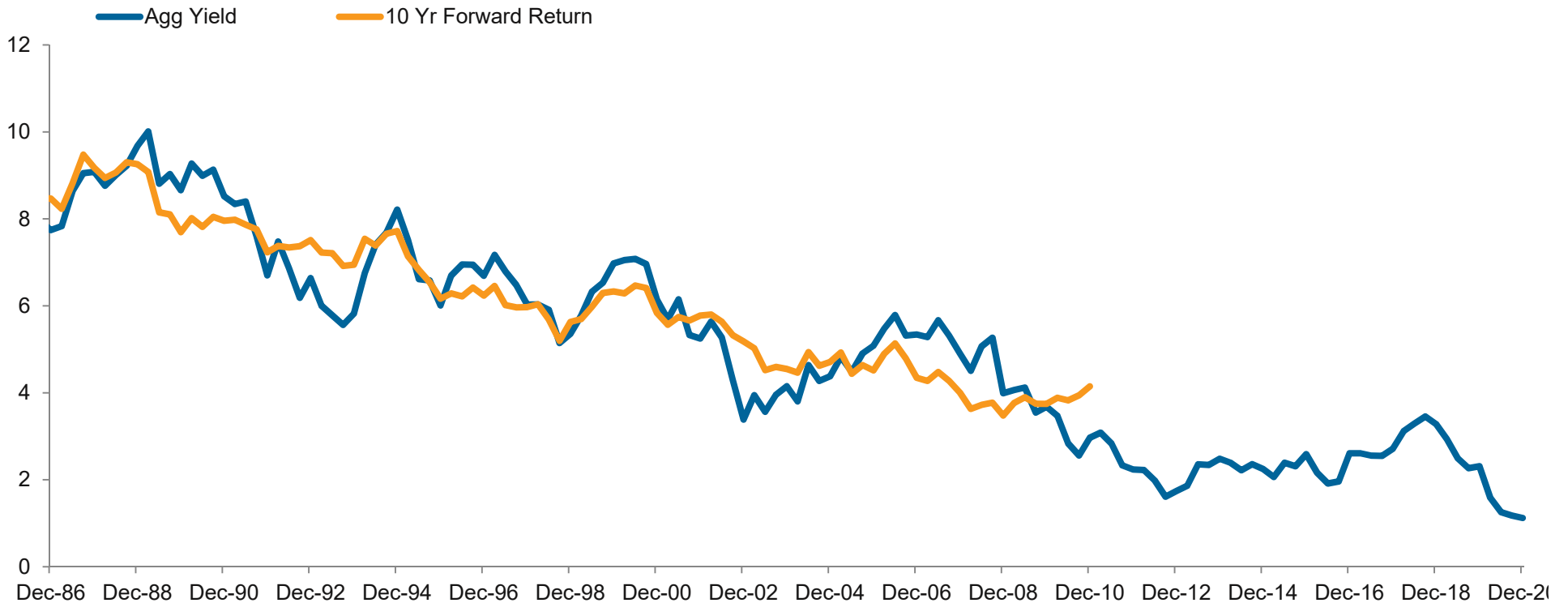
Rolling 10 Year Returns

US Investment Grade Fixed Income (Ibbotson Agg Bond)



Starting Yield Strongly Predicts Forward Returns

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



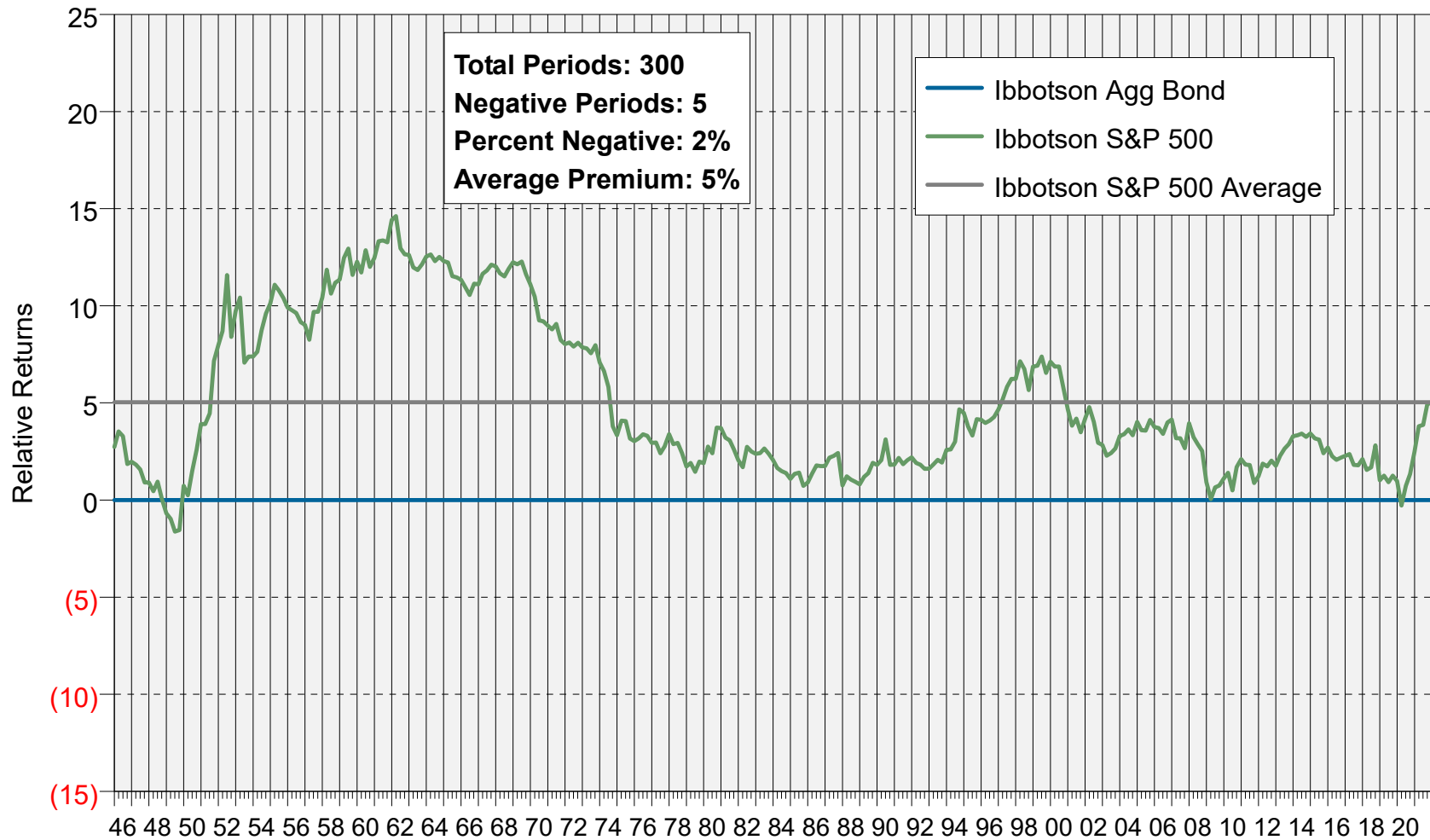
- There is a strong relationship between starting yields and subsequent 10-Year returns.
- Current yield on the Bloomberg Aggregate index is below 2%.
- Projection includes assumption of gradually rising yields over 10-year period.

● Sources: Bloomberg Barclays

Relative Returns Stocks versus Bonds – 20-year Roll

Long Term Relationship Between Stocks and Bonds

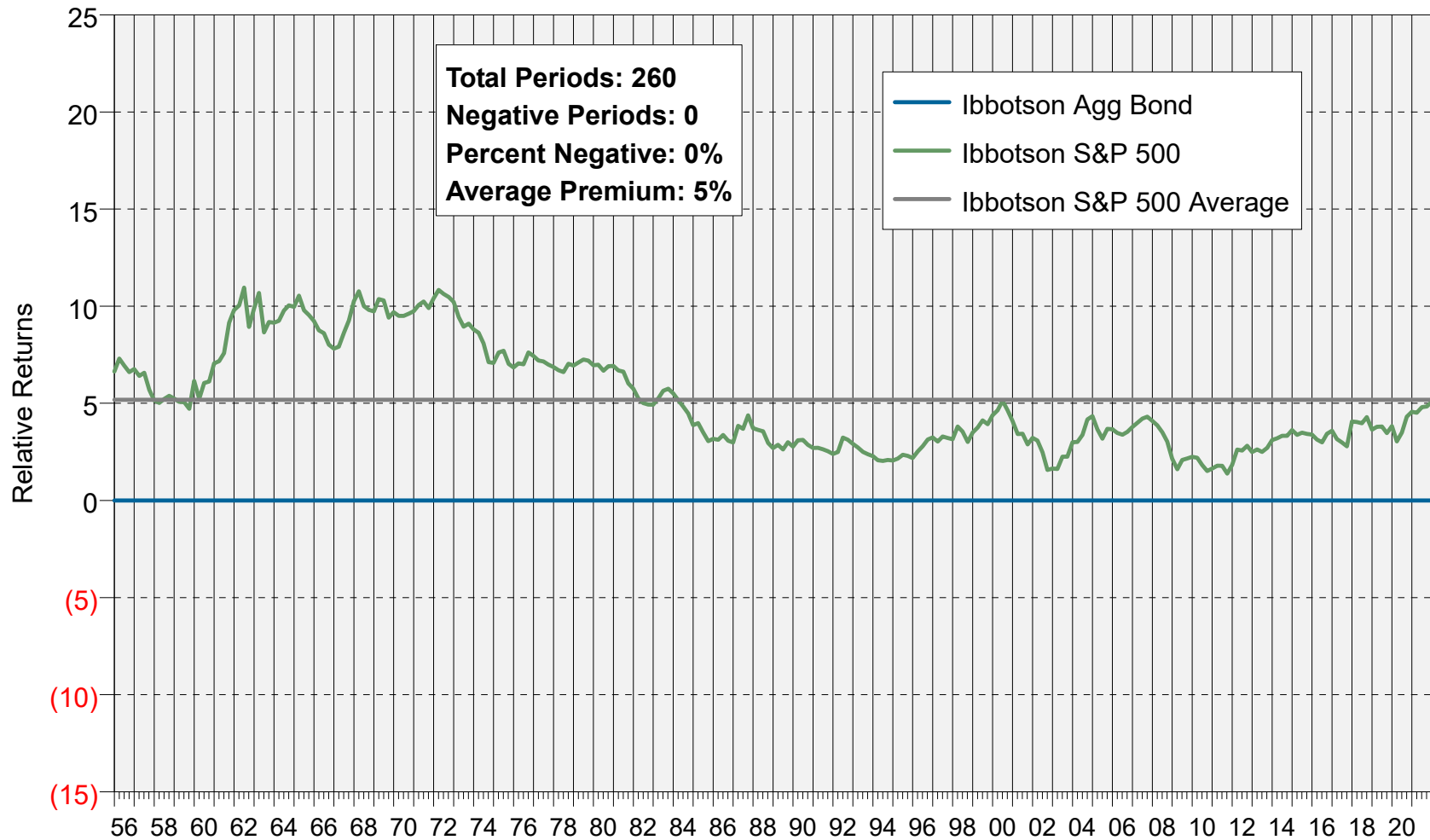
Rolling 20 Year Relative Returns US Stocks versus US Bonds



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

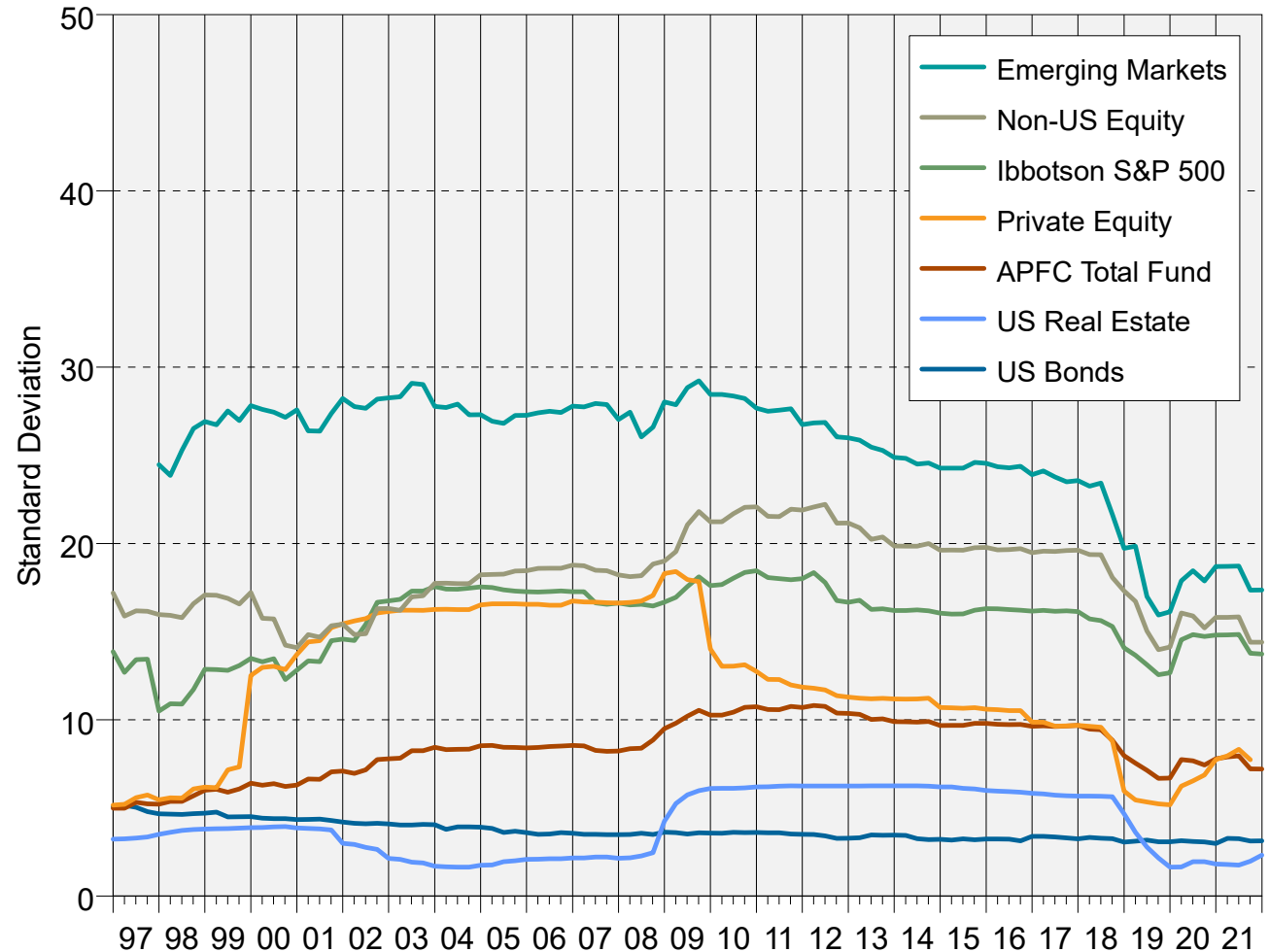


Rolling 10-Year Standard Deviation

Asset Class Volatility Over Time

- Standard deviations are relatively stable compared to returns.
- Relative risk between asset classes is also fairly stable.
- Since the GFC standard deviations for equity asset classes have been lower than historical averages.
- Large shifts in observed volatility for private markets asset classes typically caused by episodic events.

**Rolling 10 Year Standard Deviation
25 Years ended December 31, 2021**

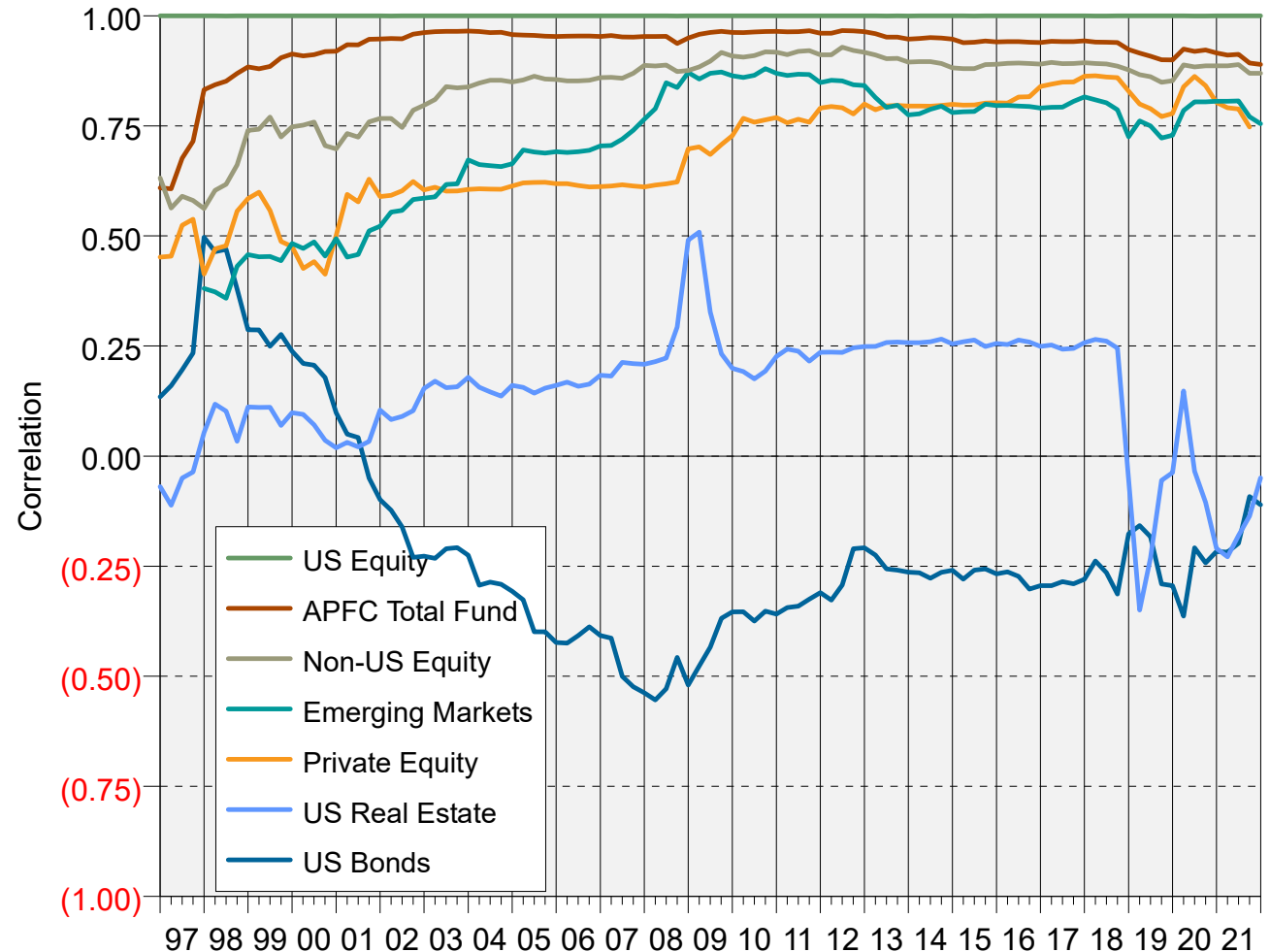


Rolling 10-Year Correlation

Asset Class Relationships over Time

- Correlations between asset classes are also relatively stable compared to returns.
- Correlations between stocks and bonds have structurally declined since 2000.
- Large shifts in correlations for private markets asset classes typically caused by episodic events.
- GFC and pandemic both increased observed correlation between Real Estate and the equity markets.

Rolling 10 Year Correlation with US Equity
25 Years ended December 31, 2021



Periodic Table of Investment Returns

Diversification Over Recent Calendar Year Periods

Periodic Table of Investment Returns
for Calendar Years

2012	2013	2014	2015	2016	2017	2018	2019	2020	3 Qtrs. 2021
Emerging Markets 18.6%	US Equity 33.6%	US Equity 12.6%	Real Estate 13.3%	US Equity 12.7%	Emerging Markets 37.8%	Private Equity 10.3%	US Equity 31.0%	Private Equity 30.2%	Private Equity 28.4%
Non US Equity 17.3%	Non US Equity 22.8%	Real Estate 11.8%	Private Equity 8.6%	Emerging Markets 11.6%	Non US Equity 25.0%	Real Estate 6.7%	Non US Equity 22.0%	US Equity 20.9%	APFC Total Fund 15.3%
US Equity 16.4%	Private Equity 21.2%	Private Equity 11.8%	APFC Total Fund 3.4%	Private Equity 9.5%	US Equity 21.1%	US Bonds 0.0%	Emerging Markets 18.9%	Emerging Markets 18.7%	US Equity 15.0%
Private Equity 13.7%	APFC Total Fund 12.8%	US Bonds 6.0%	US Bonds 0.5%	APFC Total Fund 8.4%	Private Equity 19.7%	APFC Total Fund (1.1%)	Private Equity 16.3%	APFC Total Fund 12.4%	Real Estate 10.9%
APFC Total Fund 12.4%	Real Estate 11.0%	APFC Total Fund 5.3%	US Equity 0.5%	Real Estate 8.0%	APFC Total Fund 16.2%	US Equity (5.2%)	APFC Total Fund 15.7%	Non US Equity 7.8%	Non US Equity 8.3%
Real Estate 10.5%	US Bonds (2.0%)	Emerging Markets (1.8%)	Non US Equity (0.8%)	US Bonds 2.6%	Real Estate 7.0%	Non US Equity (13.8%)	US Bonds 8.7%	US Bonds 7.5%	Emerging Markets (1.0%)
US Bonds 4.2%	Emerging Markets (2.3%)	Non US Equity (4.9%)	Emerging Markets (14.6%)	Non US Equity 1.0%	US Bonds 3.5%	Emerging Markets (14.2%)	Real Estate 6.4%	Real Estate 1.6%	US Bonds (1.6%)

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
Emerging Markets 14.2%	Emerging Markets 16.9%	Private Equity 14.1%	Private Equity 12.8%	Private Equity 11.5%	Private Equity 9.4%	Private Equity 9.2%	Private Equity 13.8%	Private Equity 13.6%	Private Equity 14.7%
Private Equity 11.1%	Private Equity 13.8%	Emerging Markets 11.5%	Emerging Markets 8.8%	Real Estate 7.8%	US Equity 7.1%	US Equity 8.6%	US Equity 13.2%	US Equity 13.4%	US Equity 13.8%
Real Estate 8.1%	Real Estate 8.4%	Real Estate 8.6%	Real Estate 8.4%	US Equity 7.4%	Real Estate 6.9%	Real Estate 6.1%	APFC Total Fund 8.5%	Real Estate 10.2%	Real Estate 9.0%
US Bonds 5.8%	Non US Equity 8.2%	US Equity 7.9%	US Equity 7.9%	APFC Total Fund 5.6%	APFC Total Fund 5.1%	APFC Total Fund 5.6%	Emerging Markets 8.4%	APFC Total Fund 8.4%	APFC Total Fund 8.4%
APFC Total Fund 5.6%	US Equity 7.7%	Non US Equity 6.9%	APFC Total Fund 6.1%	US Bonds 4.5%	US Bonds 4.3%	US Bonds 4.0%	Real Estate 7.5%	Non US Equity 5.5%	Non US Equity 5.5%
Non US Equity 4.7%	APFC Total Fund 7.4%	APFC Total Fund 6.7%	US Bonds 4.7%	Emerging Markets 3.9%	Emerging Markets 2.2%	Emerging Markets 2.0%	Non US Equity 6.3%	Emerging Markets 4.0%	Emerging Markets 4.0%
US Equity 3.5%	US Bonds 5.2%	US Bonds 4.5%	Non US Equity 4.4%	Non US Equity 3.0%	Non US Equity 0.7%	Non US Equity 1.9%	US Bonds 3.5%	US Bonds 3.7%	US Bonds 3.8%

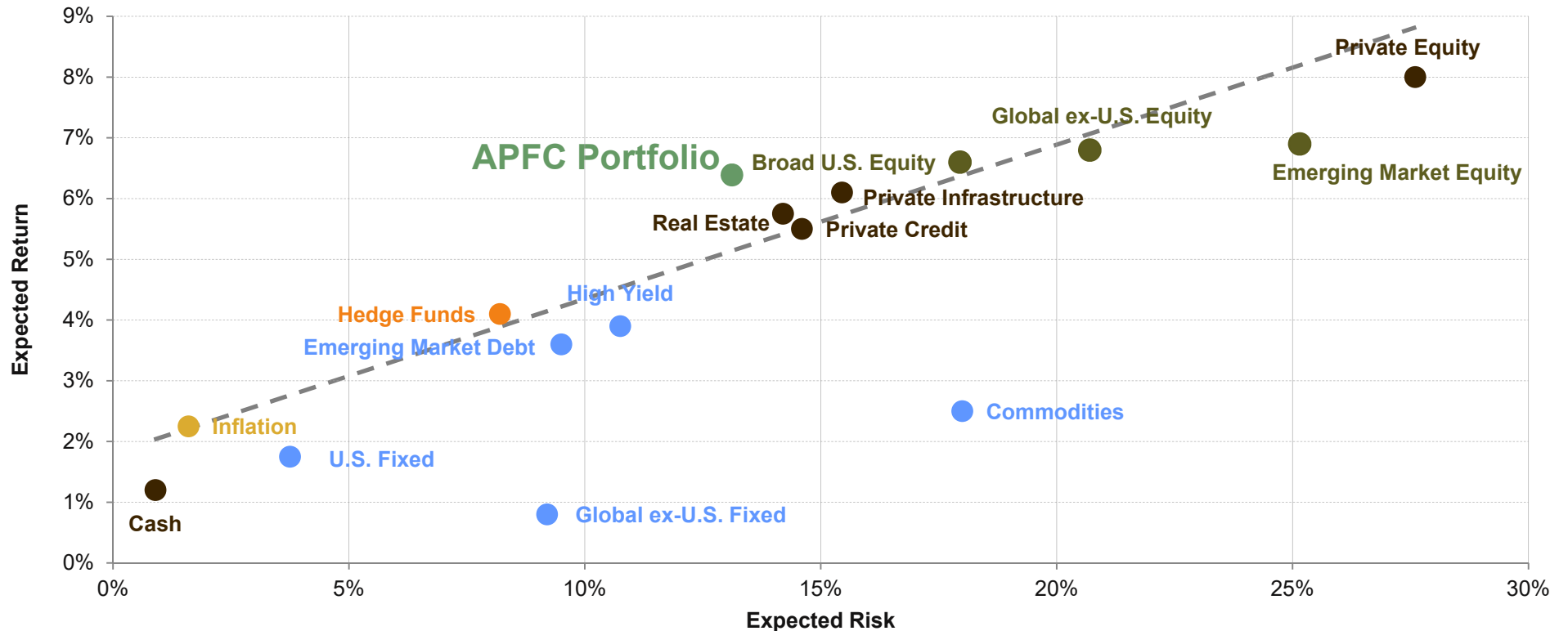
Highlights of 2022 Capital Market Projections

Changes and Observations

- GDP growth of 2% to 2.5% for the U.S., 1.5% to 2% for developed ex-U.S. markets, and 4% to 5% for emerging markets. Embedded in all of these economic forecasts is the expectation that the path to this longer-term growth will include cycles with recessions.
- Inflation expectation increased to 2.25%.
- Global equity, projected return of **6.85%** with a standard deviation (or risk) of 18.3%, roughly the same as last year.
- For APFC public fixed income, projected return of **2.1%** (risk: 3.75%), roughly **10 bp.** reduction from last year reflecting the lower yield and spread environment for fixed income.
- Gradually ratcheted down our expectations over recent years for equities to reflect higher valuations, a lower growth environment, and lower inflation.
- Continue to project a premium for private markets portfolios over public markets assuming long term commitment and institutional implementation.

Relationship Between Expected Return and

Visualizing Callan's 2022–2031 capital markets assumptions



- **Our forecasts link expected return to risk**

For example, investors demand a greater return from private equity than public equity as compensation for higher risk

Lower correlation asset classes can fall below the capital markets line and still be efficient components of a diversified portfolio (eg Global ex-US Fixed, Emerging Market Equity)

Capital Market Projections

Projected Return, Standard Deviation, and Yield

Summary of Callan's Long-Term Capital Market Projections for APFC Asset Allocation Model (FY 2023 - 2032)

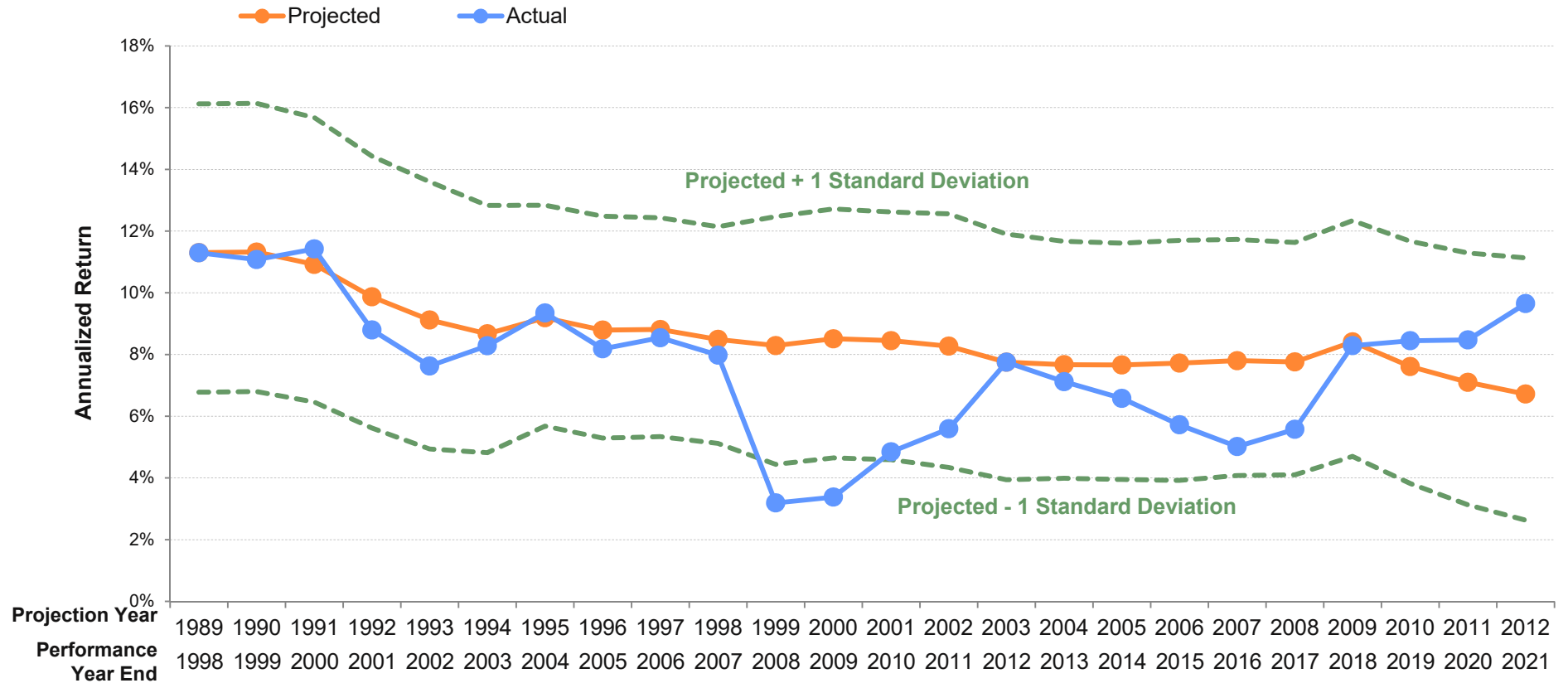
Asset Class	Performance Index	FY 2023 Target Weight	PROJECTED RETURN		PROJECTED RISK	
			1-Year Arithmetic	10-Year Geometric Return	Annualized Standard Deviation	Projected Yield
APFC Public Equities		36.00%	8.30%	6.85%	18.30%	2.15%
Global Equity	MSCI ACWI - IMI	36.00%	8.30%	6.85%	18.30%	2.15%
APFC Public Fixed Income		20.00%	2.15%	2.10%	3.75%	3.30%
Money Markets	90-Day T-Bill	1.00%	1.20%	1.20%	0.90%	1.20%
TIPS	Bloomberg TIPS	1.00%	1.35%	1.25%	5.05%	2.50%
US Fixed Income	Bloomberg Aggregate	5.50%	1.80%	1.75%	3.75%	2.90%
US Investment Grade Credit	Bloomberg Credit	5.50%	2.05%	2.00%	4.20%	2.95%
Non-US Fixed Income	Bloomberg Global Treasury ex-US Hedged	2.00%	1.20%	0.80%	9.20%	2.15%
Emerging Market Debt	50/50 JPM EMBI/JPM GBI	1.00%	4.00%	3.60%	9.50%	6.05%
High Yield	Bloomberg US High Yield 2% Issuer Cap	2.00%	4.40%	3.90%	10.75%	6.95%
US Securitized	Bloomberg US Securitized	2.00%	2.00%	1.95%	4.00%	2.95%
Private Equity/Growth Opps		17.00%	11.45%	8.00%	27.60%	0.00%
Private Equity	Cambridge Private Equity (lag)	17.00%	11.45%	8.00%	27.60%	0.00%
Private Real Estate		9.00%	6.60%	5.75%	14.20%	4.40%
Real Estate	NCREIF Total Index (lag)	9.00%	6.60%	5.75%	14.20%	4.40%
Private Infra/Credit/Income Opps		9.00%	6.80%	6.10%	13.30%	4.95%
Private Infrastructure	Cambridge Global Private Infra (lag)	5.40%	7.10%	6.10%	15.45%	4.60%
Private Credit	Bloomberg US High Yield (lag)	3.60%	6.40%	5.50%	14.60%	5.50%
Absolute Return		6.00%	4.35%	4.10%	8.20%	0.00%
Hedge Funds	HFRI Total HFOF Universe	6.00%	4.35%	4.10%	8.20%	0.00%
Risk Parity		1.00%	5.85%	5.30%	11.55%	2.60%
Risk Parity	HFR Risk Parity Vol 12	1.00%	5.85%	5.30%	11.55%	2.60%
Cash Equivalents		2.00%	1.20%	1.20%	0.90%	1.20%
Hedge Funds	90-Day T-Bill	2.00%	1.20%	1.20%	0.90%	1.20%
Total Fund	APFC Total Fund Target	100.00%	6.90%	6.20%	13.30%	2.30%
Inflation	CPI-U			2.25%	1.50%	

Actual Returns versus Callan Projections

Projection Years 1989-2012

Historical Comparison: Actual Returns vs. Callan Capital Markets Projections

Portfolio (60% Equity, 30% Fixed, 10% Real Estate)



2022 Capital Market Assumptions Comparison

Callan versus Other Organizations

2022 Capital Market Return Assumptions	Callan	Aon	AQR	BlackRock	JP Morgan	Northern Trust	Robeco	SSGA	Voya	GMO	High*	Median*	Average*	Low*
Equities											Equities			
Broad US Equity	6.60%	5.80%	6.20%	6.45%	4.23%		5.25%	5.58%	4.80%	-7.45%	6.60%	5.69%	5.61%	4.23%
Large Cap US Equity	6.50%			6.70%	4.10%	4.30%		5.40%	4.80%	-7.50%	6.70%	5.10%	5.30%	4.10%
Small/Mid Cap US Equity	6.70%			6.20%	4.35%			5.75%	4.95%	-7.40%	6.70%	5.75%	5.59%	4.35%
Global ex-US Equity	6.80%	6.75%	7.65%	8.60%	6.80%	5.21%	5.06%	5.80%	3.63%	0.18%	8.60%	6.75%	6.26%	3.63%
Developed ex-US Equity	6.50%	6.30%	6.90%	8.30%	6.50%	4.95%	5.25%	5.20%	3.40%	-2.60%	8.30%	6.30%	5.92%	3.40%
Emerging Market Equity	6.90%	6.90%	7.90%	8.70%	6.90%	5.30%	5.00%	7.00%	3.70%	1.10%	8.70%	6.90%	6.48%	3.70%
Fixed Income											Fixed Income			
Short Duration Govt/Credit	1.50%				2.10%						2.10%	1.80%	1.80%	1.50%
Core US Fixed	1.75%	1.75%	2.22%	1.60%	2.60%	2.40%	1.00%	0.90%	1.30%	-3.50%	2.60%	1.75%	1.72%	0.90%
Long Duration Govt/Credit	1.80%			0.65%	2.30%						2.30%	1.80%	1.58%	0.65%
TIPS	1.25%	1.30%		2.70%	2.10%	2.20%		0.10%	1.00%	-3.50%	2.70%	1.30%	1.52%	0.10%
High Yield	3.90%	3.30%	2.90%	3.40%	3.90%	3.50%	2.75%	2.90%	2.90%		3.90%	3.30%	3.27%	2.75%
Global ex-US Fixed	0.80%		2.00%	1.30%	2.40%		0.75%	-0.20%	0.00%	-4.40%	2.40%	0.80%	1.01%	-0.20%
Emerg Mkt Sovereign Debt	3.60%	3.90%	4.00%	3.90%	5.20%		4.75%	4.80%	4.00%	-1.40%	5.20%	4.00%	4.27%	3.60%
Other											Other			
Core Real Estate	5.75%	4.70%	5.20%	6.40%	5.80%		4.75%				6.40%	5.48%	5.43%	4.70%
Private Equity	8.00%	8.20%	8.30%	18.70%	8.10%	7.60%		7.00%			18.70%	8.10%	9.41%	7.00%
Private Credit	5.50%			9.40%	6.90%	6.00%		4.60%			9.40%	6.00%	6.48%	4.60%
Hedge Funds	4.10%	3.20%		5.30%	3.60%	2.90%		4.90%			5.30%	3.85%	4.00%	2.90%
Commodities	2.50%		4.00%		2.60%		7.00%	3.90%	1.60%		7.00%	3.25%	3.60%	1.60%
Cash Equivalents	1.20%		1.00%	1.20%	1.30%	0.30%	1.00%	1.50%	1.50%	-1.00%	1.50%	1.20%	1.13%	0.30%
Inflation	2.25%	2.20%	2.60%	3.20%	2.30%	2.00%	2.25%	2.00%	2.40%	2.20%	3.20%	2.25%	2.36%	2.00%
Projection Period	10 Years	10 Years	5-10 Years	10 Years	10-15 Years	5 Years	5 Years	10+ Years	10 Years	7 Years	Shading denotes Callan is the (or one of the) high/low			

*Excludes GMO

Arithmetic versus Geometric Average Returns

What is the Distinction and Why do We use Geometric?

- The annualized arithmetic mean return is the simple average of the return in each year.
- The annualized geometric mean return is the annualized compound return over the period.
- You earn the geometric return, not the arithmetic return.
- Example illustrates how volatility of return reduces the geometric average return relative to the arithmetic average return.

No Volatility

	Return	BMV	EMV
Year 1	7.0%	\$100.0	\$107.0
Year 2	7.0%	\$107.0	\$114.5

Arithmetic Average: 7.0%
Geometric Average: 7.0%
Standard Deviation: 0.0%

Volatility

	Return	BMV	EMV
Year 1	-50.0%	\$100.0	\$50.0
Year 2	64.0%	\$50.0	\$82.0

Arithmetic Average: 7.0%
Geometric Average: -9.4%
Standard Deviation: 57.0%

Capital Market Assumptions

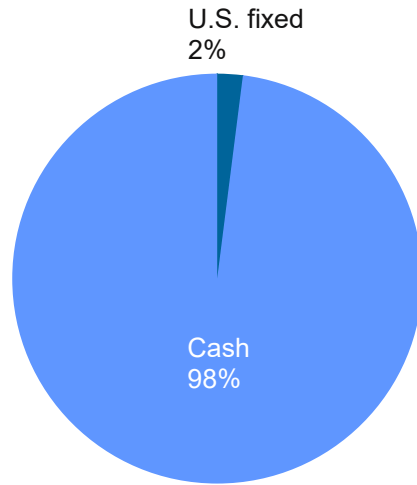
Projected Correlation Matrix

Correlation Matrix	GE	FI	Cash	TIPS	Core FI	Credit	NU FI	EMD	HY	MBS	PE	RE	PI	HF	RP	CPI
APFC Global Equity	1.000	0.318	-0.090	-0.090	-0.118	0.219	0.038	0.604	0.749	-0.109	0.802	0.653	0.777	0.819	0.992	-0.002
APFC Fixed Income	0.318	1.000	0.048	0.655	0.789	0.902	0.671	0.501	0.520	0.742	0.192	0.216	0.309	0.422	0.432	-0.163
Cash Equivalents	-0.090	0.048	1.000	0.120	0.150	0.040	0.000	-0.070	-0.110	0.138	0.000	0.000	-0.075	-0.040	-0.079	0.050
TIPS	-0.090	0.655	0.120	1.000	0.695	0.570	0.450	0.180	0.055	0.639	-0.140	-0.020	-0.051	0.085	0.000	0.080
Core US Fixed	-0.118	0.789	0.150	0.695	1.000	0.730	0.500	0.136	-0.004	0.920	-0.190	-0.035	-0.019	0.130	-0.010	-0.250
US Inv Grade Credit	0.219	0.902	0.040	0.570	0.730	1.000	0.495	0.330	0.405	0.672	0.120	0.140	0.229	0.335	0.326	-0.210
Global ex-US Fixed	0.038	0.671	0.000	0.450	0.500	0.495	1.000	0.150	0.120	0.460	0.060	-0.020	0.047	0.050	0.123	-0.100
EMD	0.604	0.501	-0.070	0.180	0.136	0.330	0.150	1.000	0.600	0.125	0.400	0.325	0.455	0.530	0.640	0.000
High Yield	0.749	0.520	-0.110	0.055	-0.004	0.405	0.120	0.600	1.000	-0.004	0.589	0.525	0.626	0.643	0.780	0.050
US Securitized	-0.109	0.742	0.138	0.639	0.920	0.672	0.460	0.125	-0.004	1.000	-0.175	-0.032	-0.018	0.120	-0.007	-0.230
Private Equity	0.802	0.192	0.000	-0.140	-0.190	0.120	0.060	0.400	0.589	-0.175	1.000	0.500	0.719	0.568	0.787	0.060
Core Real Estate	0.653	0.216	0.000	-0.020	-0.035	0.140	-0.020	0.325	0.525	-0.032	0.500	1.000	0.737	0.450	0.650	0.100
Private Infra/Credit	0.777	0.309	-0.075	-0.051	-0.019	0.229	0.047	0.455	0.626	-0.018	0.719	0.737	1.000	0.599	0.780	0.065
Hedge Funds	0.819	0.422	-0.040	0.085	0.130	0.335	0.050	0.530	0.643	0.120	0.568	0.450	0.599	1.000	0.834	0.150
APFC Risk Parity	0.992	0.432	-0.079	0.000	-0.010	0.326	0.123	0.640	0.780	-0.007	0.787	0.650	0.780	0.834	1.000	-0.023
Inflation	-0.002	-0.163	0.050	0.080	-0.250	-0.210	-0.100	0.000	0.050	-0.230	0.060	0.100	0.065	0.150	-0.023	1.000

- Projected correlations between asset classes are the third dimension of capital market expectations.
- They are generally not discussed in detail but are very important in identifying and quantifying the diversification effects of asset classes.
- Negative correlations between asset classes (i.e. Core US Fixed and Global Equity) mean that the combination of the two has a powerful risk reduction impact when held together.
- Projected correlations take into account long term relationships between asset classes while also considering recent trends, particularly if they represent structural changes.
- Correlations are particularly tricky because the entire matrix must satisfy certain mathematical criteria (i.e. it must be positive semi-definite).

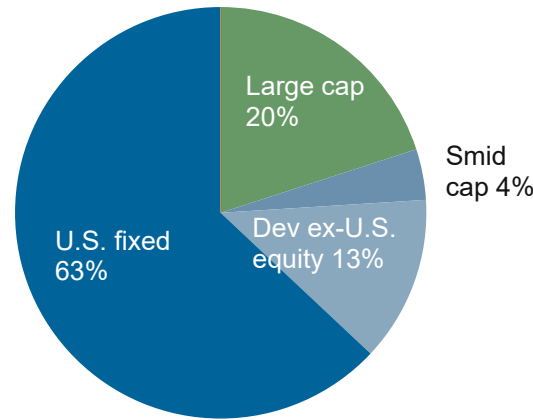
7% Expected Returns Over Past 30+ Years

Increasing Complexity →



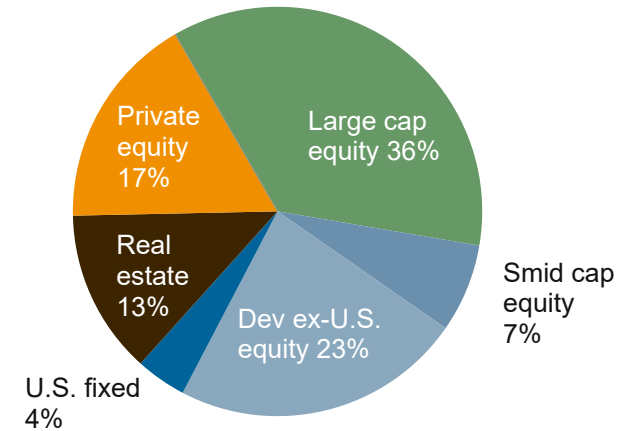
1991

Return: 7.0%
Risk: 1.1%



2006

Return: 7.0%
Risk: 6.7%



2022

Return: 7.0%
Risk: 16.8%

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

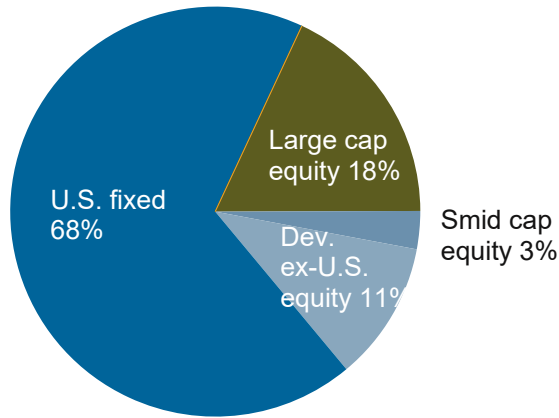
15 years later, an investor would have needed over a third of the portfolio in public equities to achieve a 7% projected return, with 6x the portfolio volatility of 1991

Today an investor is required to include 96% in return-seeking assets (including 30% in private market investments) to earn a 7% projected return at over 5x the volatility compared to 1992

Source: Callan

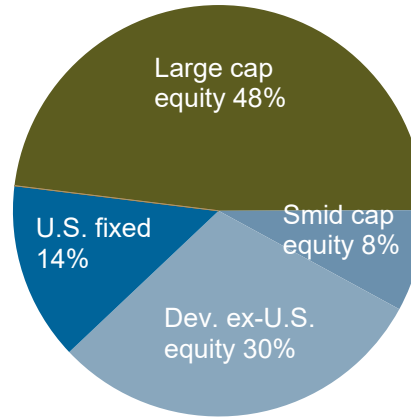
5% Expected Real Returns Over Past 30 Years

Increasing Complexity →



1992

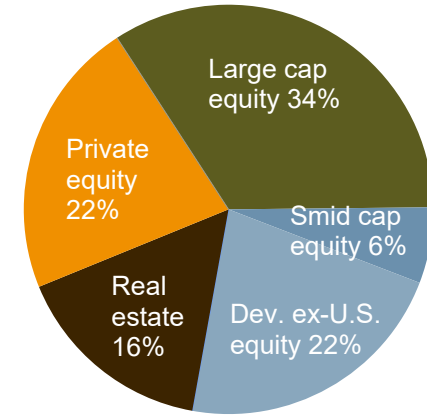
Inflation: 4.50%
Real Return: 5.0%
Risk: 7.2%



2007

Inflation: 2.75%
Real Return: 5.0%
Risk: 14.6%

Increasing Risk →



2022

Inflation: 2.25%
Real Return: 5.0%
Risk: 17.8%

Despite a 4.5% inflation projection, an investor could have over two-thirds of the portfolio in low-risk assets (fixed income) and still earn a 5% projected real return in 1992

15 years later, an investor would have needed 86% in public equities to achieve a 5% projected real return with over 2x the portfolio volatility of 1992

Today an investor must have 100% of the portfolio in return-seeking assets to earn a 5% projected real return at approximately 2.5x the volatility compared to 1992

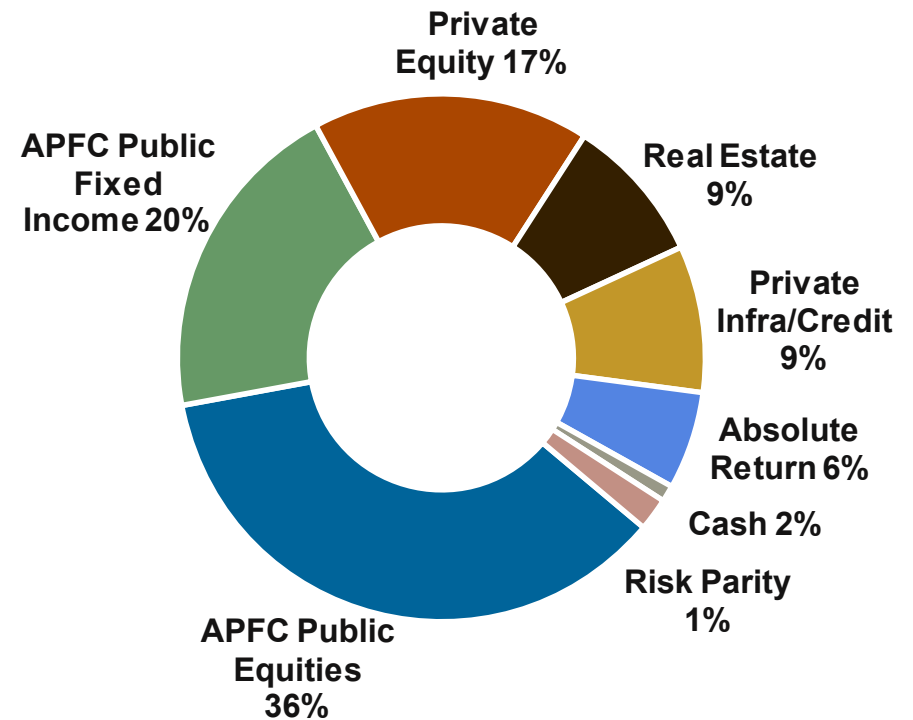
Source: Callan

APFC FY 2023 Total Fund Policy Target

Projected Return and Standard Deviation

- Projected median 10-year annualized return of **6.20%** is roughly the same as last year.
- Inflation expectation increased from 2.00% to **2.25%**.
- Projected median 10-year annualized real return of **4.20%** is a reduction of roughly 25 basis points relative to last year.
- Projected standard deviation of **13.50%** is roughly the same as last year.
- Percent probability of exceeding 5% annualized real return over 10-year horizon is estimated to be **41%**.
- Percent probability of exceeding 4.6% median effective payout is estimated to be **44%**.

APFC Total Fund Target

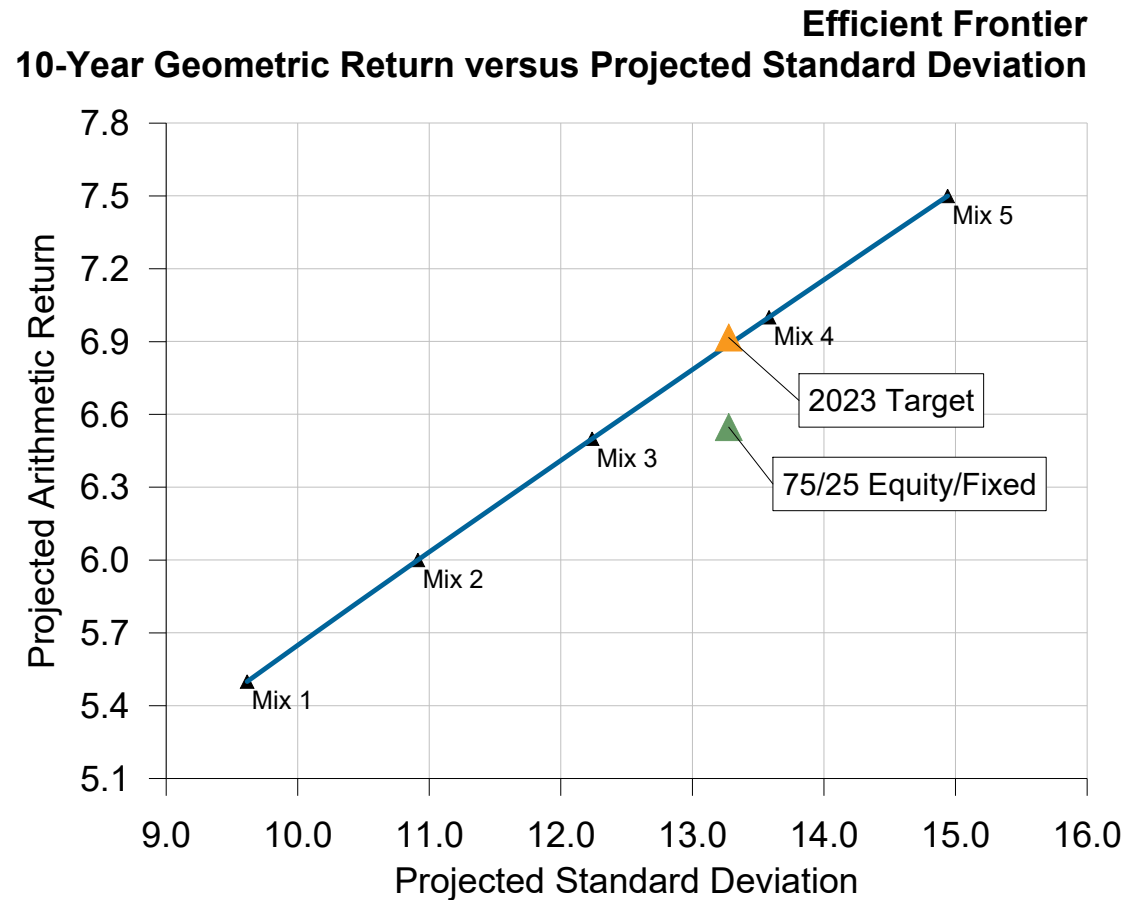


Expected 10-year Geometric Return: 6.20%
Expected Standard Deviation: 13.30%
Expected Inflation: 2.25%
Expected Real Return: 3.95%

Constrained Efficient Frontier Analysis 40% Private Assets

Projected Return and Standard Deviation

- Efficient frontier with 40% private markets constraint.
- Strategic Policy target portfolio is slightly below the constrained efficient frontier due to under-allocation to private real estate.
- 75/25 Equity/Fixed portfolio is pure public markets portfolio with same projected standard deviation as APFC Policy Target.
- APFC Policy Target has roughly a **35** basis point projected return premium over 75/25 public markets portfolio.



*75/25 Equity/Fixed portfolio assumes 75% allocation to APFC Global Equity benchmark and 25% allocation to Bloomberg Aggregate Index

Concluding Observations

Callan's 2022 Capital Market Projections

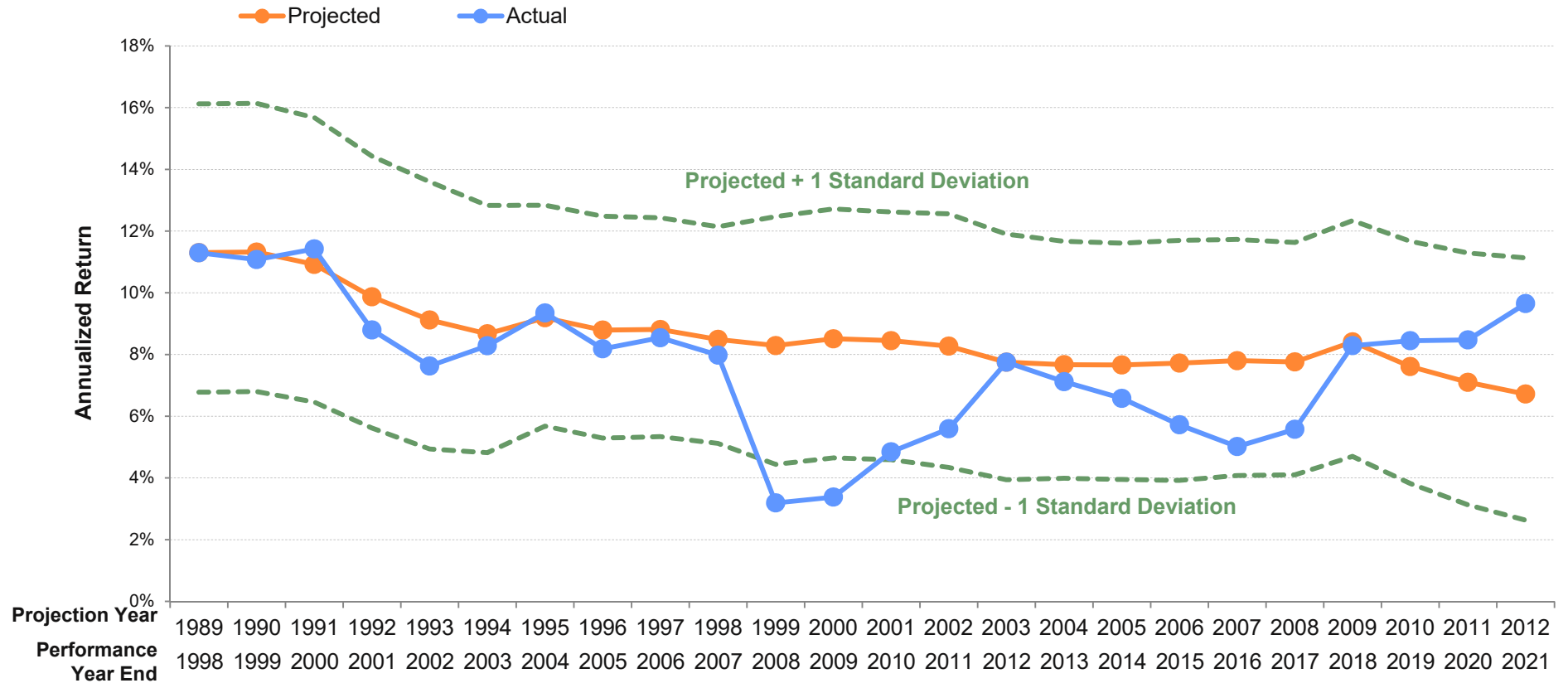
- A modest increase in the inflation expectation results in a reduction in real return projections for all asset classes.
- Callan's public equity return and risk projections were also reduced contributing further to the reduction in expected real return for diversified portfolios.
- Private market return expectations have also come down, albeit moderately, relative to 2021 projections.
- The COVID-19 pandemic has not had a material impact on our long run projections, they are much more influenced by GDP, inflation, current yield, and valuations.
- APFC Policy Target is well diversified and lies on the efficient frontier for portfolios with a target of 40% private markets.
- APFC Policy Target has similar projected risk to a public markets portfolio with a 75% allocation to Global Equity and 25% allocation to US Fixed Income, but has a higher projected return.
- Gradually increasing private real estate exposure will modestly improve the risk/return profile of the APFC Policy Target over time.

Actual Returns versus Callan Projections

Projection Years 1989-2012

Historical Comparison: Actual Returns vs. Callan Capital Markets Projections

Portfolio (60% Equity, 30% Fixed, 10% Real Estate)



2022 Capital Market Assumptions Comparison

Callan versus Other Organizations

2022 Capital Market Return Assumptions	Callan	Aon	AQR	BlackRock	JP Morgan	Northern Trust	Robeco	SSGA	Voya	GMO	High*	Median*	Average*	Low*
Equities											Equities			
Broad US Equity	6.60%	5.80%	6.20%	6.45%	4.23%		5.25%	5.58%	4.80%	-7.45%	6.60%	5.69%	5.61%	4.23%
Large Cap US Equity	6.50%			6.70%	4.10%	4.30%		5.40%	4.80%	-7.50%	6.70%	5.10%	5.30%	4.10%
Small/Mid Cap US Equity	6.70%			6.20%	4.35%			5.75%	4.95%	-7.40%	6.70%	5.75%	5.59%	4.35%
Global ex-US Equity	6.80%	6.75%	7.65%	8.60%	6.80%	5.21%	5.06%	5.80%	3.63%	0.18%	8.60%	6.75%	6.26%	3.63%
Developed ex-US Equity	6.50%	6.30%	6.90%	8.30%	6.50%	4.95%	5.25%	5.20%	3.40%	-2.60%	8.30%	6.30%	5.92%	3.40%
Emerging Market Equity	6.90%	6.90%	7.90%	8.70%	6.90%	5.30%	5.00%	7.00%	3.70%	1.10%	8.70%	6.90%	6.48%	3.70%
Fixed Income											Fixed Income			
Short Duration Govt/Credit	1.50%				2.10%						2.10%	1.80%	1.80%	1.50%
Core US Fixed	1.75%	1.75%	2.22%	1.60%	2.60%	2.40%	1.00%	0.90%	1.30%	-3.50%	2.60%	1.75%	1.72%	0.90%
Long Duration Govt/Credit	1.80%			0.65%	2.30%						2.30%	1.80%	1.58%	0.65%
TIPS	1.25%	1.30%		2.70%	2.10%	2.20%		0.10%	1.00%	-3.50%	2.70%	1.30%	1.52%	0.10%
High Yield	3.90%	3.30%	2.90%	3.40%	3.90%	3.50%	2.75%	2.90%	2.90%		3.90%	3.30%	3.27%	2.75%
Global ex-US Fixed	0.80%		2.00%	1.30%	2.40%		0.75%	-0.20%	0.00%	-4.40%	2.40%	0.80%	1.01%	-0.20%
Emerg Mkt Sovereign Debt	3.60%	3.90%	4.00%	3.90%	5.20%		4.75%	4.80%	4.00%	-1.40%	5.20%	4.00%	4.27%	3.60%
Other											Other			
Core Real Estate	5.75%	4.70%	5.20%	6.40%	5.80%		4.75%				6.40%	5.48%	5.43%	4.70%
Private Equity	8.00%	8.20%	8.30%	18.70%	8.10%	7.60%		7.00%			18.70%	8.10%	9.41%	7.00%
Private Credit	5.50%			9.40%	6.90%	6.00%		4.60%			9.40%	6.00%	6.48%	4.60%
Hedge Funds	4.10%	3.20%		5.30%	3.60%	2.90%		4.90%			5.30%	3.85%	4.00%	2.90%
Commodities	2.50%		4.00%		2.60%		7.00%	3.90%	1.60%		7.00%	3.25%	3.60%	1.60%
Cash Equivalents	1.20%		1.00%	1.20%	1.30%	0.30%	1.00%	1.50%	1.50%	-1.00%	1.50%	1.20%	1.13%	0.30%
Inflation	2.25%	2.20%	2.60%	3.20%	2.30%	2.00%	2.25%	2.00%	2.40%	2.20%	3.20%	2.25%	2.36%	2.00%
Projection Period	10 Years	10 Years	5-10 Years	10 Years	10-15 Years	5 Years	5 Years	10+ Years	10 Years	7 Years	Shading denotes Callan is the (or one of the) high/low			

*Excludes GMO