ALASKA PERMANENT FUND CORPORATION

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Callan 2021 Capital Market Projections – APFC FY2022 Policy Target

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Outline

- Callan’s capital market projection process.
- Current economic and capital market environment.
- Summary of Callan’s 2021 capital market projections.
- Projected return and risk for APFC policy portfolio.
- Concluding observations.
- Performance and Valuation Update as of March 31, 2021.

Callan Capital Market Projection Process

Long Term Capital Market Projections

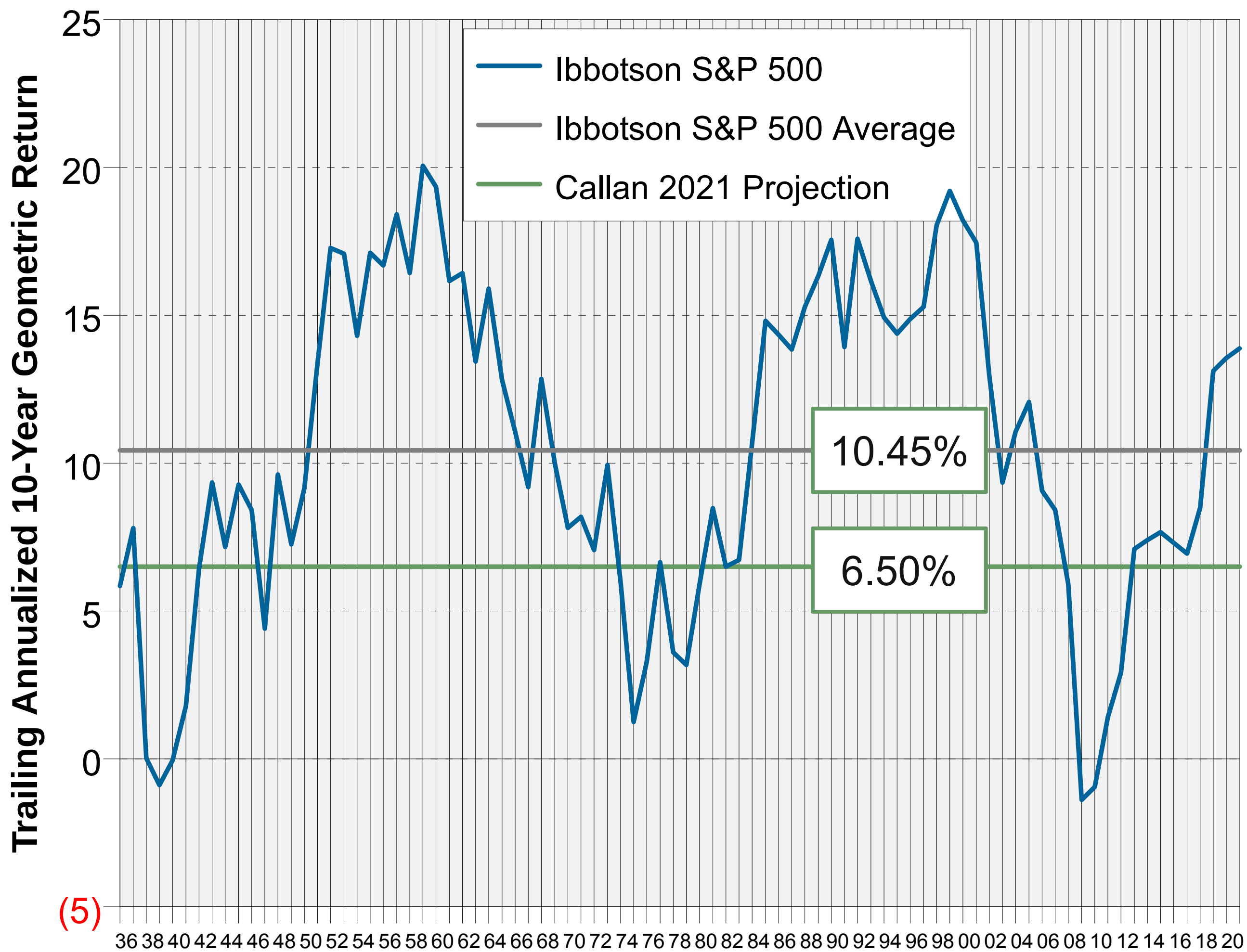
- Callan updates long term capital market projections each year in January and uses them for the full year with all clients for strategic planning purposes.
- Projections take into account long term relationships balanced with current market conditions.
- Consensus expectations (central banks, economists, 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%.
- 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

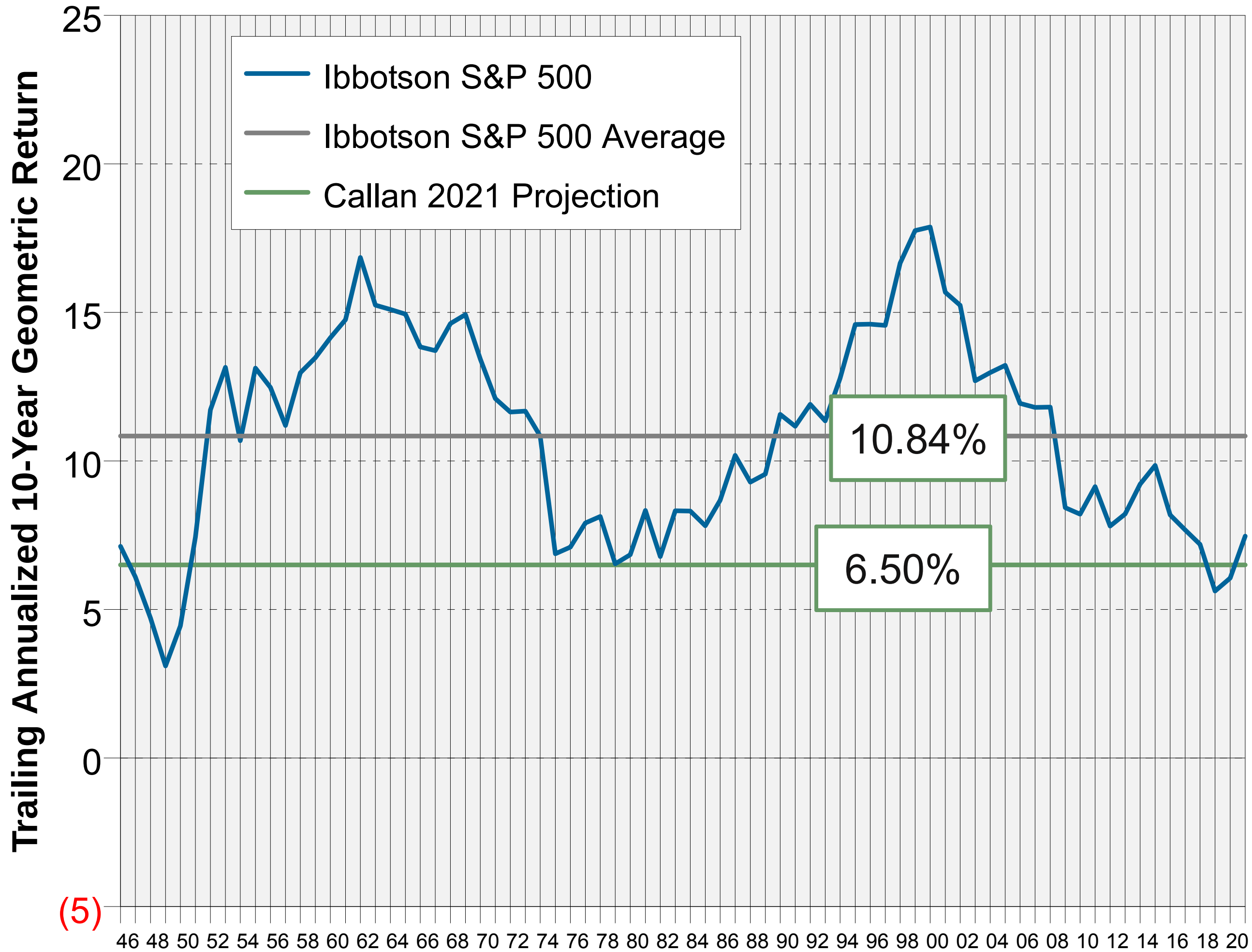


Callan Capital Market Projection Process

Historical Rolling 20-year Return – US Large Cap Equity

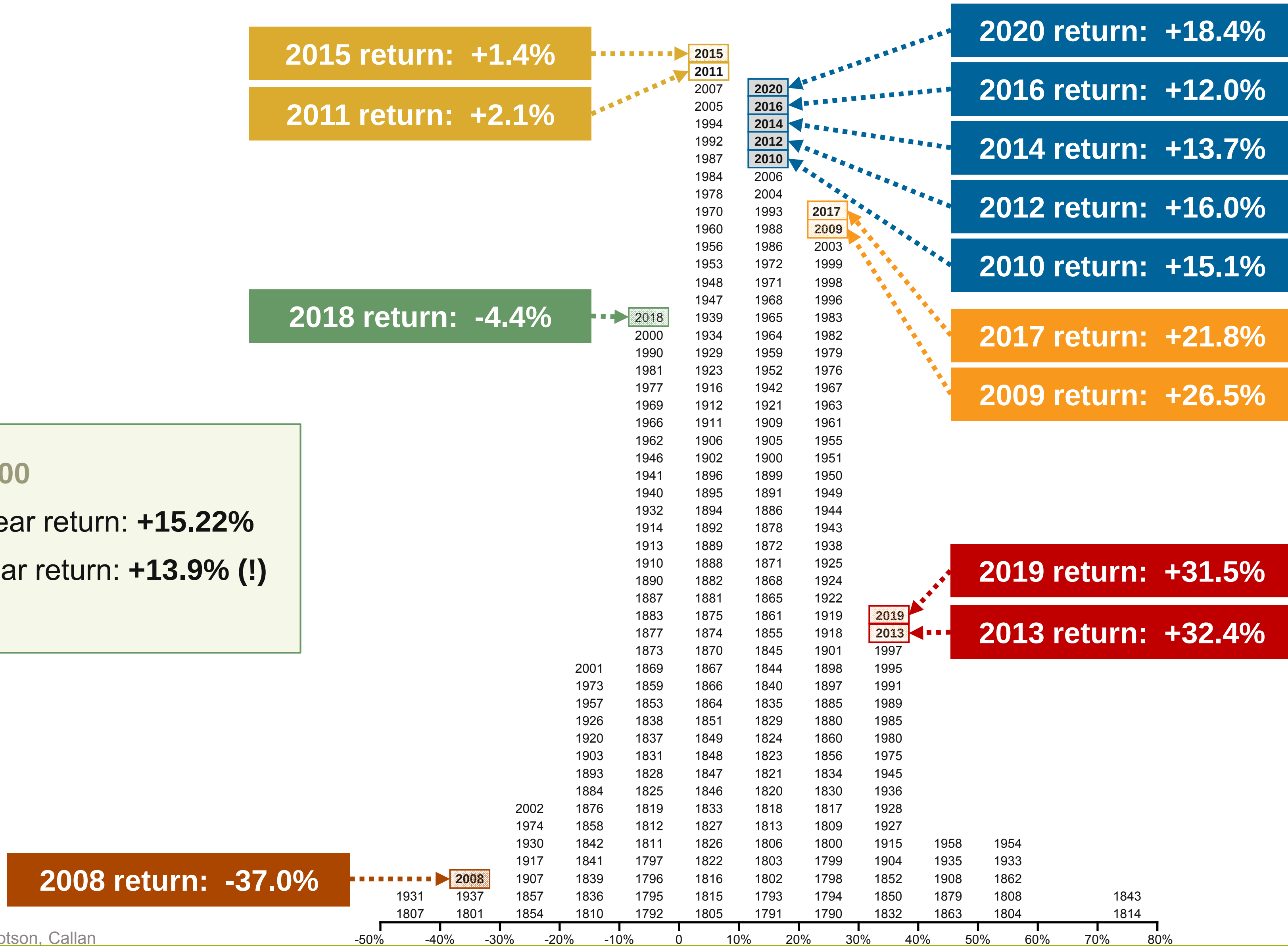
- Historical 20-year return for US large cap has averaged 10.8%.
- 2021 Projection is 6.5%.
- Very few periods historically where the 20-year return was below 6.50% projection
- Longer time horizons reward equity risk takers with more consistent positive returns.
- Worst 10-year period for S&P 500 since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

Rolling 20 Year Returns
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% (!)**

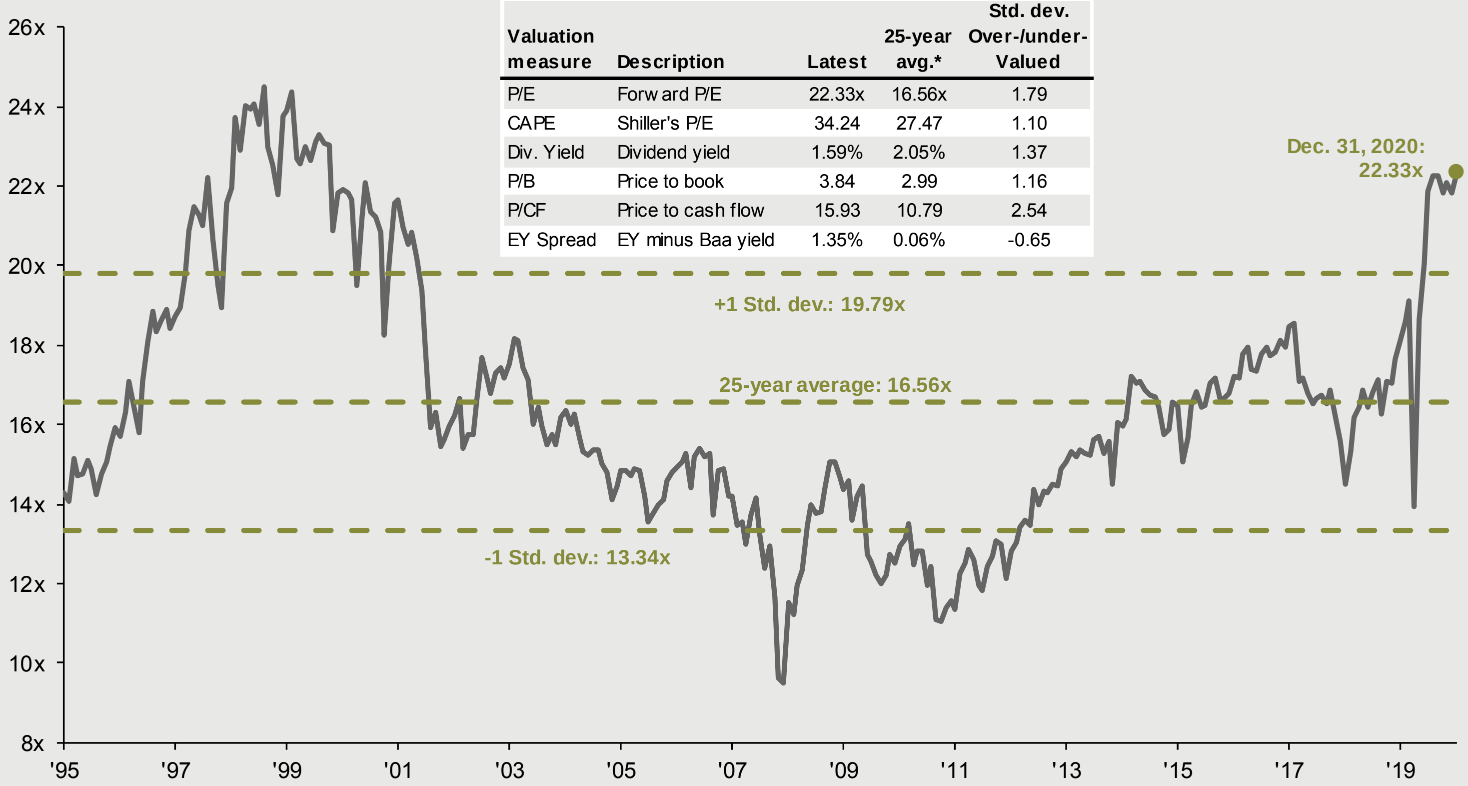
- Source: Ibbotson, Callan

U.S. Equity Projections

Large cap valuations

S&P 500 Index: Forward P/E ratio

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.

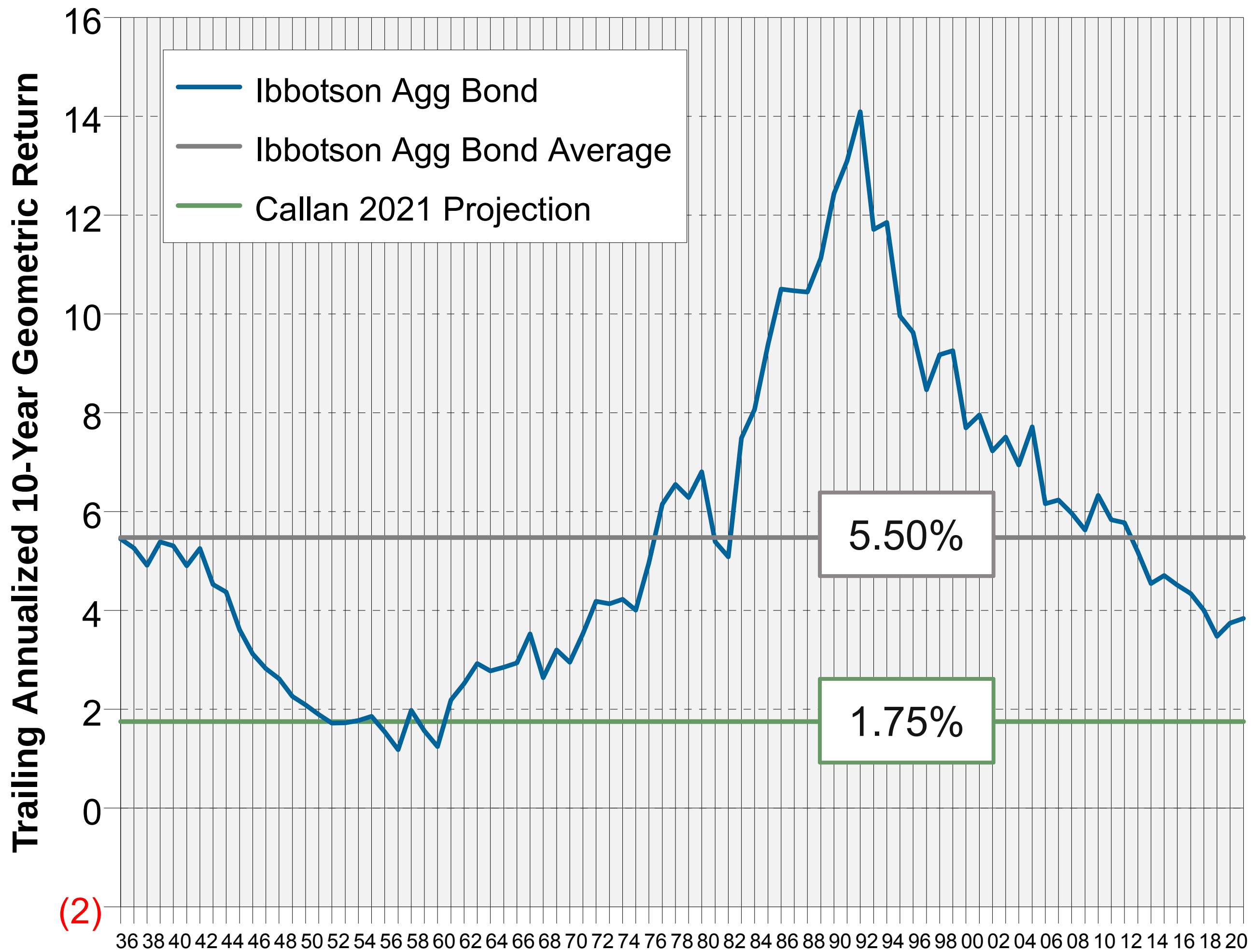
Sources: FactSet, FRB, Robert Shiller, S&P Dow Jones Indices, Thomson Reuters, J.P. Morgan Asset Management.

Callan Capital Market Projection Process

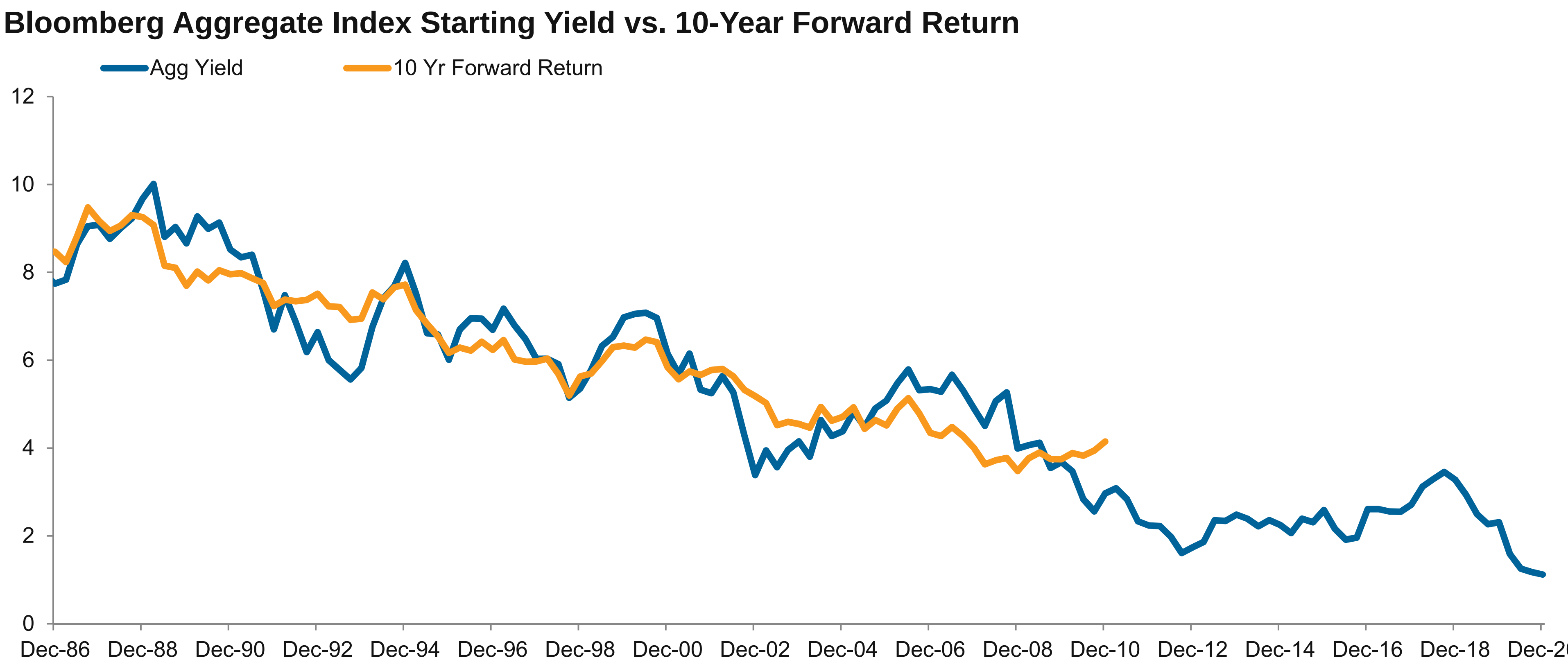
Historical Return – US Fixed Income

- 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 Agg Bond



Starting Yield Strongly Predicts Forward Returns



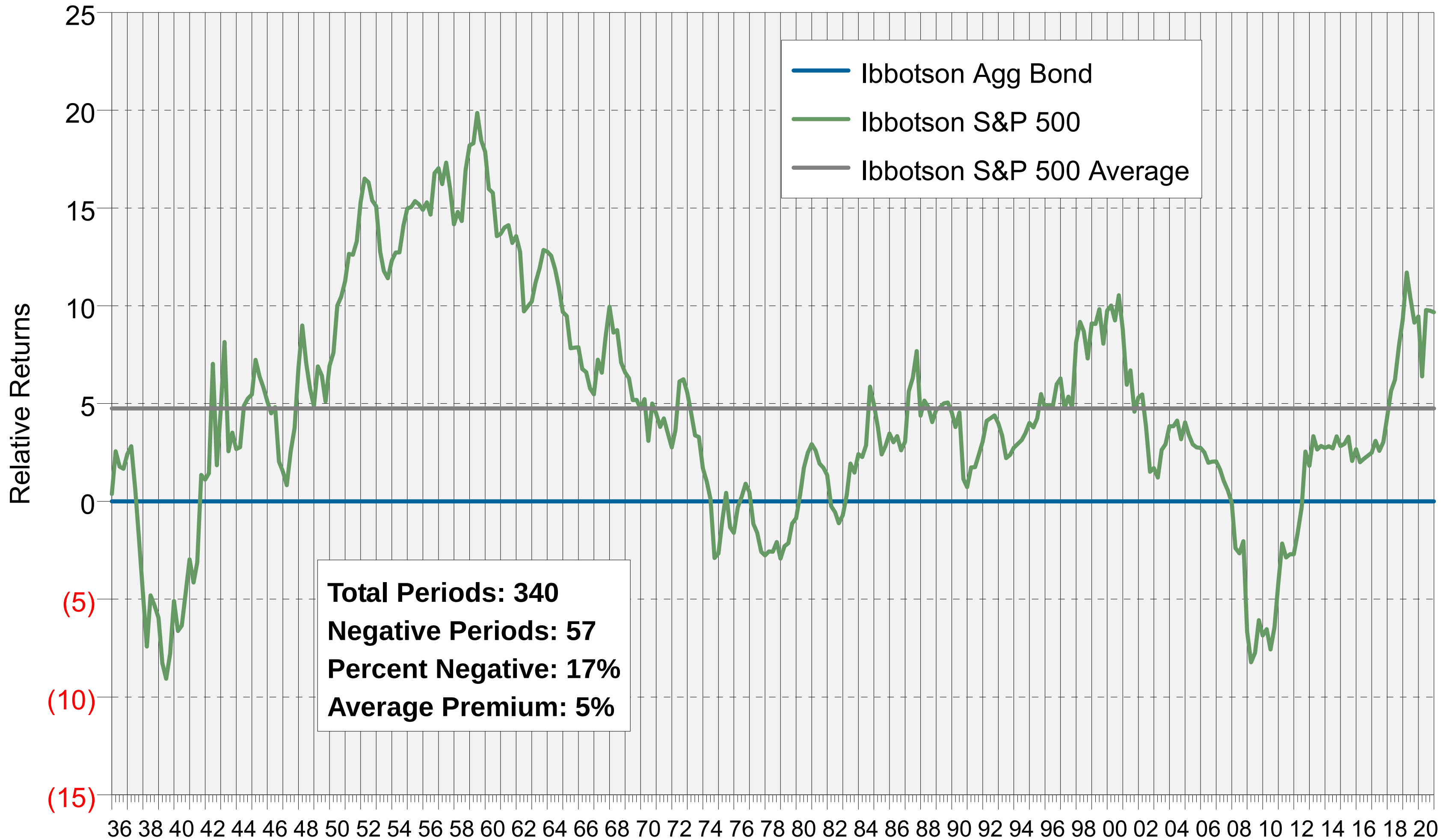
– There is a strong relationship between starting yields and subsequent 10-Year returns.
– Current yield on the Bloomberg Aggregate index is below 2%.
– Projection includes assumption of gradually rising yields over 10-year period.

- Sources: Bloomberg Barclays

Relative Returns Stocks versus Bonds – 10-year Roll

Long Term Relationship Between Stocks and Bonds

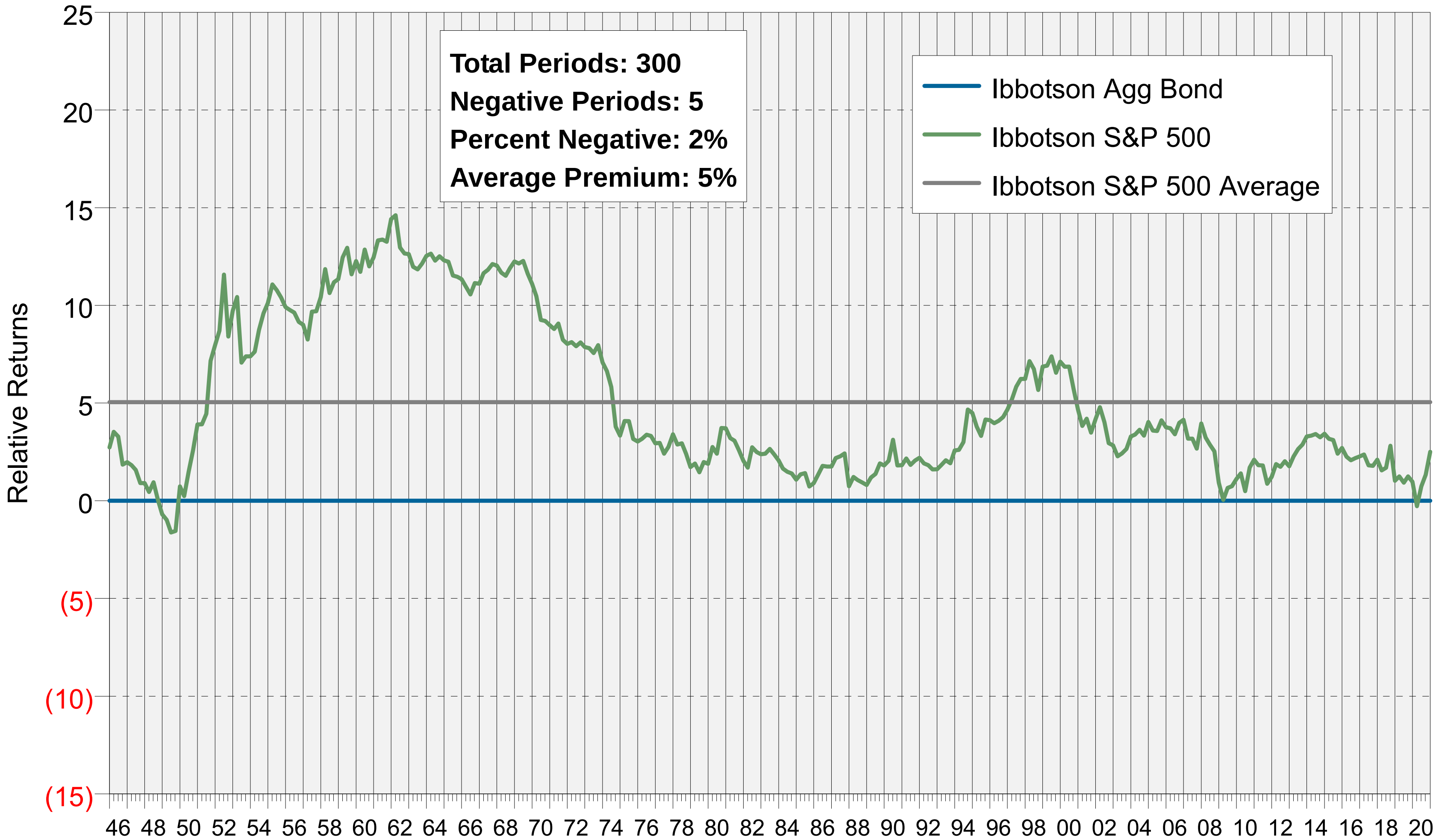
Rolling 10 Year Relative Returns
US Stocks versus US Bonds



Relative Returns Stocks versus Bonds – 20-year Roll

Long Term Relationship Between Stocks and Bonds

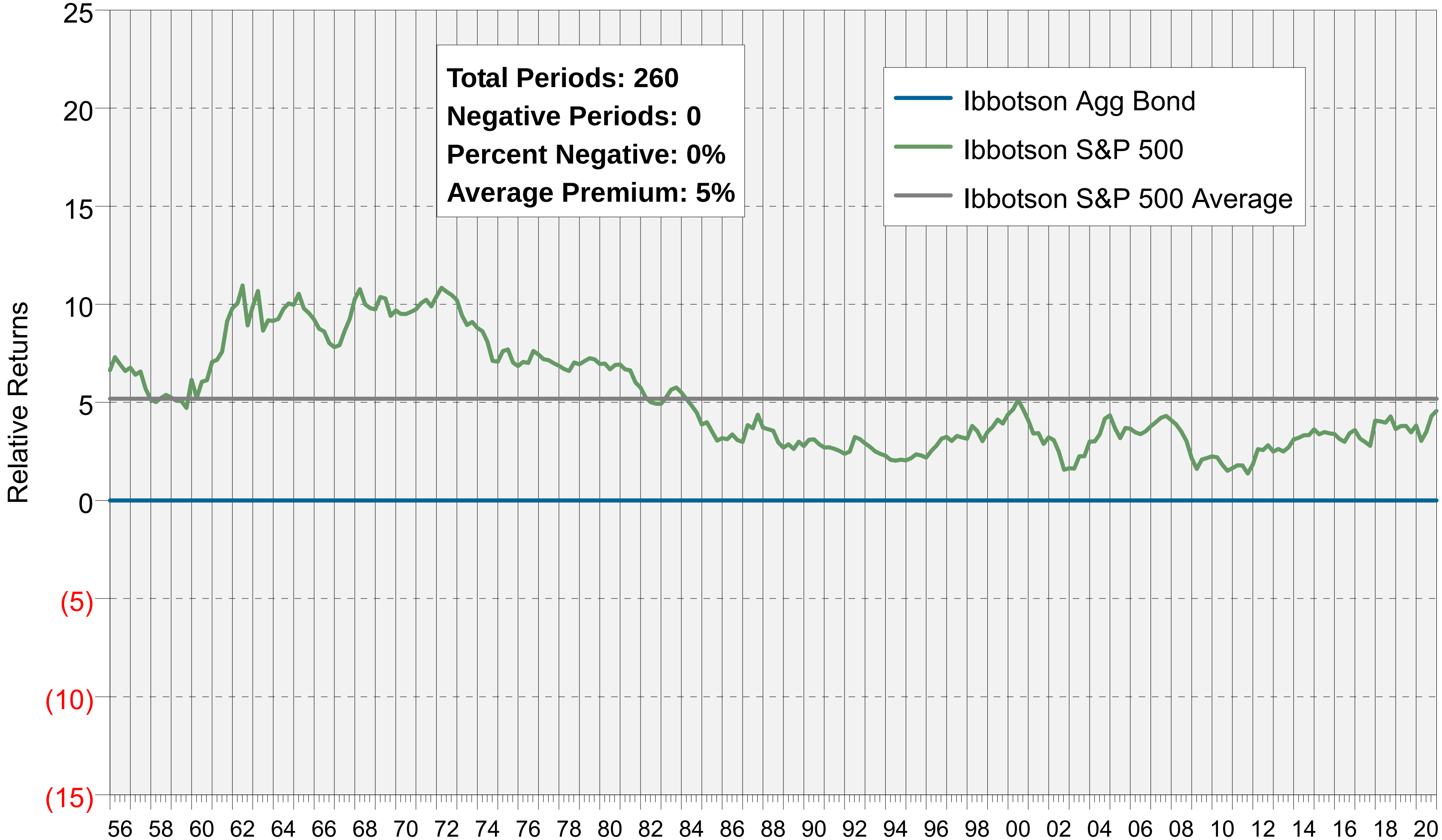
Rolling 20 Year Relative Returns
US Stocks versus US Bonds



Relative Returns Stocks versus Bonds – 30-year Roll

Long Term Relationship Between Stocks and Bonds

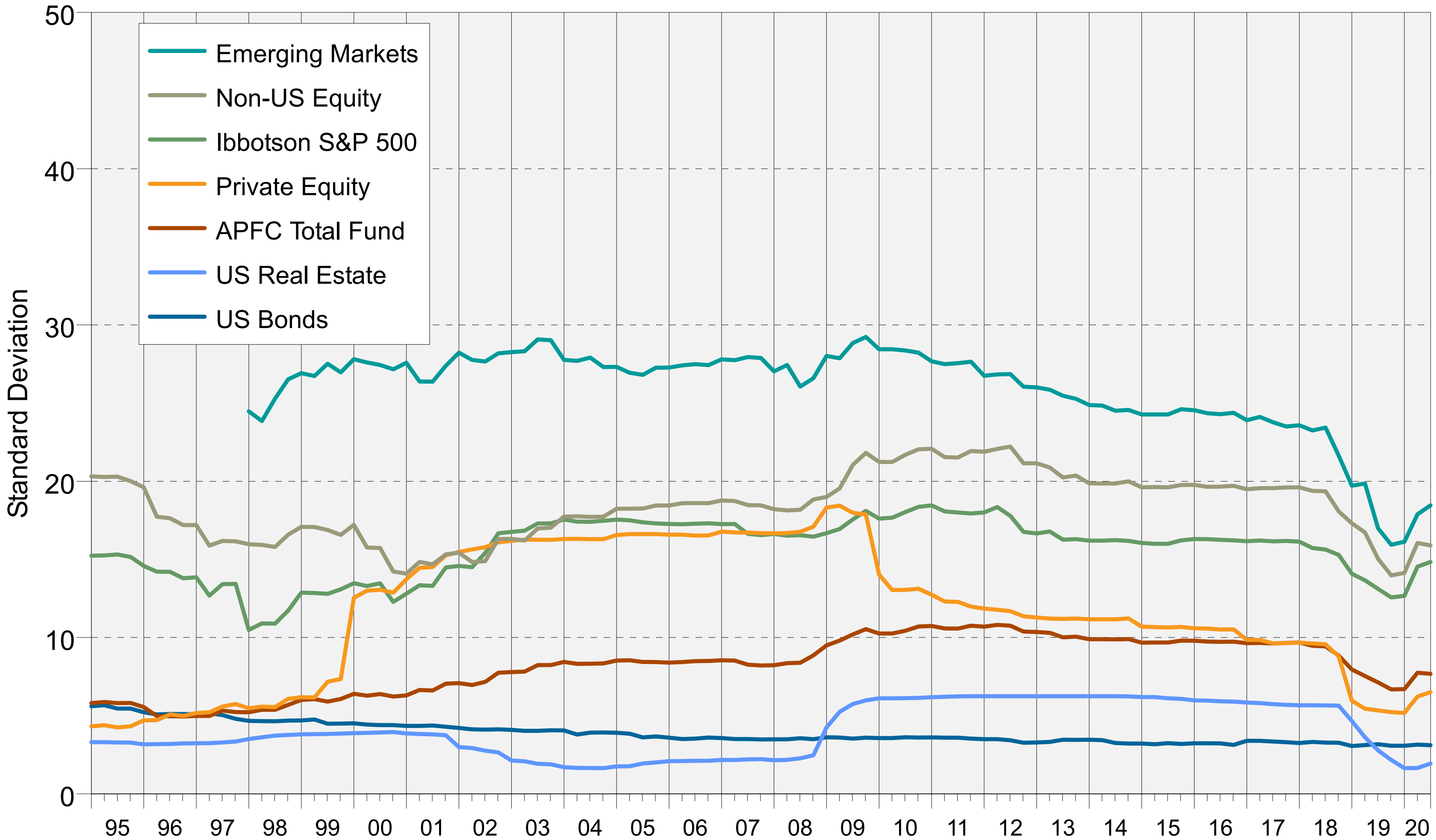
Rolling 30 Year Relative Returns
US Stocks versus US Bonds



Rolling 10-Year Standard Deviation

Asset Class Volatility Over Time

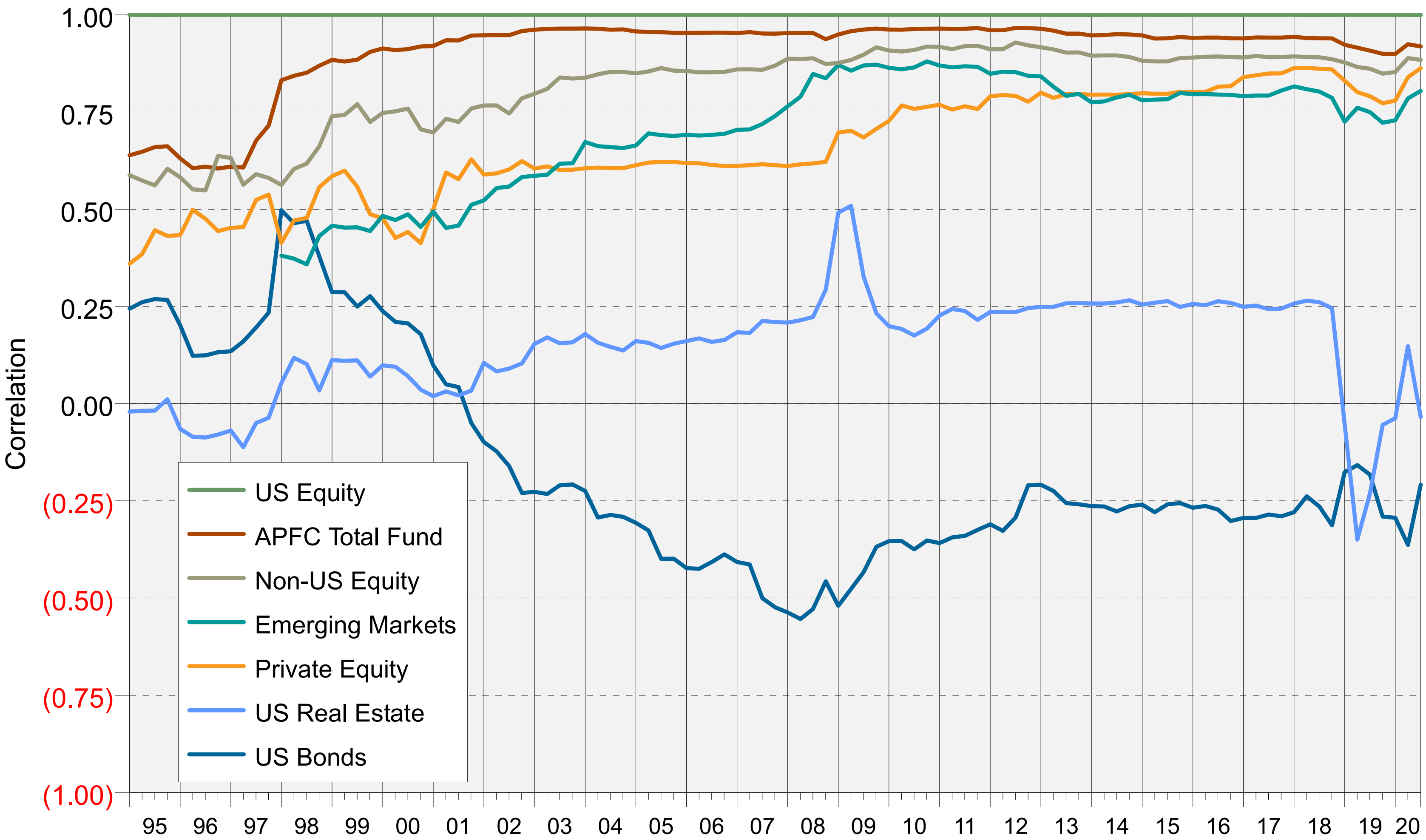
Rolling 10 Year Standard Deviation
25 1/2 Years ended June 30, 2020



Relative Returns Stocks versus Bonds

Correlations to US Equity Over Time

Rolling 10 Year Correlation with US Equity
25 1/2 Years ended June 30, 2020



Periodic Table of Investment Returns

Diversification Over Recent Calendar Year Periods

Periodic Table of Investment Returns for Calendar Years

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Emerging Markets 19.2%	Real Estate 14.3%	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 10.1%	US Equity 31.0%
Private Equity 19.1%	US Bonds 7.8%	Non US Equity 17.3%	Non US Equity 22.8%	Private Equity 11.8%	Private Equity 8.5%	Emerging Markets 11.6%	Non US Equity 25.0%	Real Estate 6.7%	Non US Equity 22.0%
US Equity 16.9%	Private Equity 7.2%	US Equity 16.4%	Private Equity 21.2%	Real Estate 11.8%	APFC Total Fund 3.4%	Private Equity 9.5%	US Equity 21.1%	US Bonds 0.0%	Emerging Markets 18.9%
Real Estate 13.1%	US Equity 1.0%	Private Equity 13.6%	APFC Total Fund 12.8%	US Bonds 6.0%	US Bonds 0.5%	APFC Total Fund 8.4%	Private Equity 19.4%	APFC Total Fund (1.1%)	Private Equity 16.1%
APFC Total Fund 11.9%	APFC Total Fund 0.4%	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 (12.1%)	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 6.5%	Emerging Markets (18.2%)	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%

Periodic Table of Investment Returns

Diversification Over Three-Year Periods

Periodic Table of Investment Returns
for Rolling 3 Yr. Periods

4th Quarter 2010	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
US Bonds 5.9%	Emerging Markets 20.4%	Private Equity 13.2%	US Equity 16.2%	US Equity 20.5%	US Equity 14.7%	Real Estate 11.0%	Private Equity 12.4%	Private Equity 12.9%	Private Equity 15.1%
Private Equity 0.8%	US Equity 14.9%	Real Estate 12.6%	Private Equity 13.9%	Private Equity 15.5%	Private Equity 13.7%	Private Equity 9.9%	US Equity 11.1%	Emerging Markets 9.7%	US Equity 14.6%
Emerging Markets 0.0%	Private Equity 14.5%	US Equity 11.2%	Real Estate 11.9%	Real Estate 11.1%	Real Estate 12.0%	US Equity 8.4%	Emerging Markets 9.5%	US Equity 9.0%	Emerging Markets 12.0%
APFC Total Fund (0.3%)	APFC Total Fund 9.6%	APFC Total Fund 8.1%	APFC Total Fund 8.4%	Non US Equity 11.1%	APFC Total Fund 7.1%	APFC Total Fund 5.7%	Real Estate 9.4%	APFC Total Fund 7.6%	APFC Total Fund 10.0%
US Equity (2.0%)	Non US Equity 7.6%	US Bonds 6.2%	Non US Equity 8.2%	APFC Total Fund 10.1%	Non US Equity 5.0%	US Bonds 3.0%	APFC Total Fund 9.2%	Real Estate 7.2%	Non US Equity 9.6%
Real Estate (4.2%)	US Bonds 6.8%	Emerging Markets 5.0%	US Bonds 3.3%	Emerging Markets 4.4%	US Bonds 1.4%	Non US Equity (1.6%)	Non US Equity 7.8%	Non US Equity 2.9%	Real Estate 6.7%
Non US Equity (7.0%)	Real Estate 2.4%	Non US Equity 3.6%	Emerging Markets (1.7%)	US Bonds 2.7%	Emerging Markets (6.4%)	Emerging Markets (2.2%)	US Bonds 2.2%	US Bonds 2.1%	US Bonds 4.0%

Periodic Table of Investment Returns

Diversification Over Five-Year Periods

Periodic Table of Investment Returns
for Rolling 5 Yr. Periods

4th Quarter 2010	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
Emerging Markets 13.1%	US Bonds 6.5%	US Bonds 5.9%	US Equity 18.7%	US Equity 15.6%	Private Equity 12.4%	US Equity 14.7%	US Equity 15.6%	Private Equity 11.8%	Private Equity 12.6%
Private Equity 10.7%	Private Equity 6.1%	Private Equity 4.5%	Private Equity 15.6%	Private Equity 14.5%	Real Estate 12.2%	Private Equity 12.8%	Private Equity 14.0%	Real Estate 9.3%	US Equity 11.2%
US Bonds 5.8%	Real Estate 3.1%	APFC Total Fund 2.3%	Emerging Markets 15.1%	Real Estate 12.1%	US Equity 12.2%	Real Estate 10.9%	Real Estate 10.2%	US Equity 7.9%	APFC Total Fund 8.3%
APFC Total Fund 4.4%	Emerging Markets 2.7%	Real Estate 2.1%	Non US Equity 12.4%	APFC Total Fund 8.4%	APFC Total Fund 6.7%	APFC Total Fund 8.4%	APFC Total Fund 9.1%	APFC Total Fund 6.3%	Real Estate 8.2%
Real Estate 3.5%	APFC Total Fund 1.8%	US Equity 2.0%	APFC Total Fund 10.8%	Non US Equity 5.3%	Non US Equity 3.6%	Non US Equity 6.5%	Non US Equity 7.9%	US Bonds 2.5%	Emerging Markets 6.0%
US Equity 2.7%	US Equity 0.0%	Emerging Markets (0.6%)	Real Estate 5.7%	US Bonds 4.4%	US Bonds 3.2%	US Bonds 2.2%	Emerging Markets 4.7%	Emerging Markets 2.0%	Non US Equity 5.7%
Non US Equity 2.5%	Non US Equity (4.7%)	Non US Equity (3.7%)	US Bonds 4.4%	Emerging Markets 2.1%	Emerging Markets (4.5%)	Emerging Markets 1.6%	US Bonds 2.1%	Non US Equity 0.5%	US Bonds 3.0%

Periodic Table of Investment Returns

Diversification Over Ten-Year Periods

Periodic Table of Investment Returns for Rolling 10 Yr. Periods

4th Quarter 2010	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
Emerging Markets 16.2%	Emerging Markets 14.2%	Emerging Markets 16.9%	Private Equity 14.0%	Private Equity 12.8%	Private Equity 11.5%	Private Equity 9.4%	Private Equity 9.1%	Private Equity 13.7%	Private Equity 13.6%
Private Equity 7.9%	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%
Real Estate 7.4%	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%
US Bonds 5.8%	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 5.3%	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 3.5%	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%
US Equity 2.2%	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%

Periodic Table of Investment Returns

Diversification Over Twenty-Year Periods

Periodic Table of Investment Returns
for Rolling 20 Yr. Periods

4th Quarter 2010	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
Private Equity 16.5%	Private Equity 16.1%	Private Equity 16.1%	Private Equity 16.1%	Private Equity 15.9%	Private Equity 15.0%	Private Equity 13.9%	Private Equity 13.5%	Private Equity 13.1%	Private Equity 10.3%
Emerging Markets 12.2%	Emerging Markets 8.5%	Real Estate 8.8%	Real Estate 9.3%	US Equity 10.0%	Real Estate 9.9%	Real Estate 9.8%	Real Estate 9.4%	Real Estate 9.0%	Real Estate 8.7%
US Equity 9.5%	Real Estate 8.1%	Emerging Markets 8.8%	US Equity 9.3%	Real Estate 9.6%	US Equity 8.3%	US Equity 7.9%	Emerging Markets 8.1%	Emerging Markets 8.8%	Emerging Markets 7.0%
APFC Total Fund 8.1%	US Equity 8.0%	US Equity 8.3%	APFC Total Fund 7.6%	APFC Total Fund 7.9%	APFC Total Fund 7.0%	APFC Total Fund 6.9%	US Equity 7.4%	APFC Total Fund 6.1%	US Equity 6.4%
Real Estate 7.0%	APFC Total Fund 7.2%	APFC Total Fund 7.5%	US Bonds 5.7%	US Bonds 6.2%	Emerging Markets 5.5%	Emerging Markets 5.7%	APFC Total Fund 6.9%	US Equity 6.0%	APFC Total Fund 6.3%
US Bonds 6.9%	US Bonds 6.5%	US Bonds 6.3%	Emerging Markets 5.7%	Emerging Markets 6.0%	US Bonds 5.3%	US Bonds 5.3%	Non US Equity 5.2%	US Bonds 4.5%	US Bonds 5.0%
Non US Equity 5.8%	Non US Equity 4.6%	Non US Equity 6.1%	Non US Equity 5.7%	Non US Equity 5.0%	Non US Equity 4.4%	Non US Equity 4.2%	US Bonds 5.0%	Non US Equity 3.5%	Non US Equity 3.3%

Highlights of 2021 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 lowered to 2.0%.
- Global equity, projected return of **6.85%** with a standard deviation (or risk) of 18.3%, roughly a **50 bp.** reduction from last year.
- For APFC public fixed income, projected return of **2.2%** (risk: 3.75%), roughly an **85 bp.** reduction from last year reflecting the low yield 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.
  - Private equity **8.0%** projected return;
  - Private real estate **5.75%** projected return;
  - Private infrastructure/credit **6.40%** projected return.

Capital Market Projections

Projected Return, Standard Deviation, and Yield

Summary of Callan's Long-Term Capital Market Projections for APFC Asset Allocation Model (FY 2022 - 2031)

			PROJECTED RETURN		PROJECTED RISK	
Asset Class	**Performance Index**	**FY 2021 Target Weight**	**1-Year Arithmetic**	**10-Year Geometric Return**	**Annualized Standard Deviation**	**Projected Yield**
APFC Public Equities		**38.00%**	**8.30%**	**6.85%**	**18.30%**	**2.40%**
Global Equity	MSCI ACWI - IMI	38.00%	8.30%	6.85%	18.30%	2.40%
APFC Public Fixed Income		**20.00%**	**2.25%**	**2.20%**	**3.75%**	**3.05%**
Money Markets	90-Day T-Bill	1.00%	1.00%	1.00%	0.90%	1.00%
TIPS	Bloomberg TIPS	1.00%	1.80%	1.70%	5.05%	2.35%
US Fixed Income	Bloomberg Aggregate	5.50%	1.80%	1.75%	3.75%	2.50%
US Investment Grade Credit	Bloomberg Credit	5.50%	2.30%	2.25%	4.25%	2.85%
Non-US Fixed Income	Bloomberg Global Treasury ex-US Hedged	2.00%	1.15%	0.75%	9.20%	1.80%
Emerging Market Debt	50/50 JPM EMBI/JPM GBI	1.00%	3.90%	3.50%	9.50%	5.95%
High Yield	Bloomberg US High Yield 2% Issuer Cap	2.00%	4.85%	4.35%	10.75%	6.70%
US Securitized	Bloomberg US Securitized	2.00%	2.00%	1.95%	4.00%	2.60%
Private Equity/Growth Opps		**16.00%**	**11.50%**	**8.00%**	**27.80%**	**0.00%**
Private Equity	Cambridge Private Equity (lag)	16.00%	11.50%	8.00%	27.80%	0.00%
Private Real Estate		**8.00%**	**6.60%**	**5.75%**	**14.10%**	**4.40%**
Real Estate	NCREIF Total Index (lag)	8.00%	6.60%	5.75%	14.10%	4.40%
Private Infra/Credit/Income Opps		**9.00%**	**7.05%**	**6.40%**	**13.30%**	**5.25%**
Private Infrastructure	Cambridge Global Private Infra (lag)	5.40%	7.55%	6.60%	15.20%	5.25%
Private Credit	Bloomberg US High Yield (lag)	3.60%	6.50%	5.90%	12.10%	5.25%
Absolute Return		**6.00%**	**4.25%**	**4.00%**	**8.00%**	**0.00%**
Hedge Funds	HFRI Total HFOF Universe	6.00%	4.25%	4.00%	8.00%	0.00%
Risk Parity		**1.00%**	**5.70%**	**5.25%**	**10.90%**	**2.45%**
Risk Parity	HFR Risk Parity Vol 12	1.00%	5.70%	5.25%	10.90%	2.45%
Cash Equivalents		**2.00%**	**1.00%**	**1.00%**	**0.90%**	**1.00%**
Hedge Funds	90-Day T-Bill	2.00%	1.00%	1.00%	0.90%	1.00%
Total Fund	APFC Total Fund Target	**100.00%**	**6.90%**	**6.20%**	**13.50%**	**2.40%**
Inflation	CPI-U			2.00%	1.50%	

Capital Market Assumptions

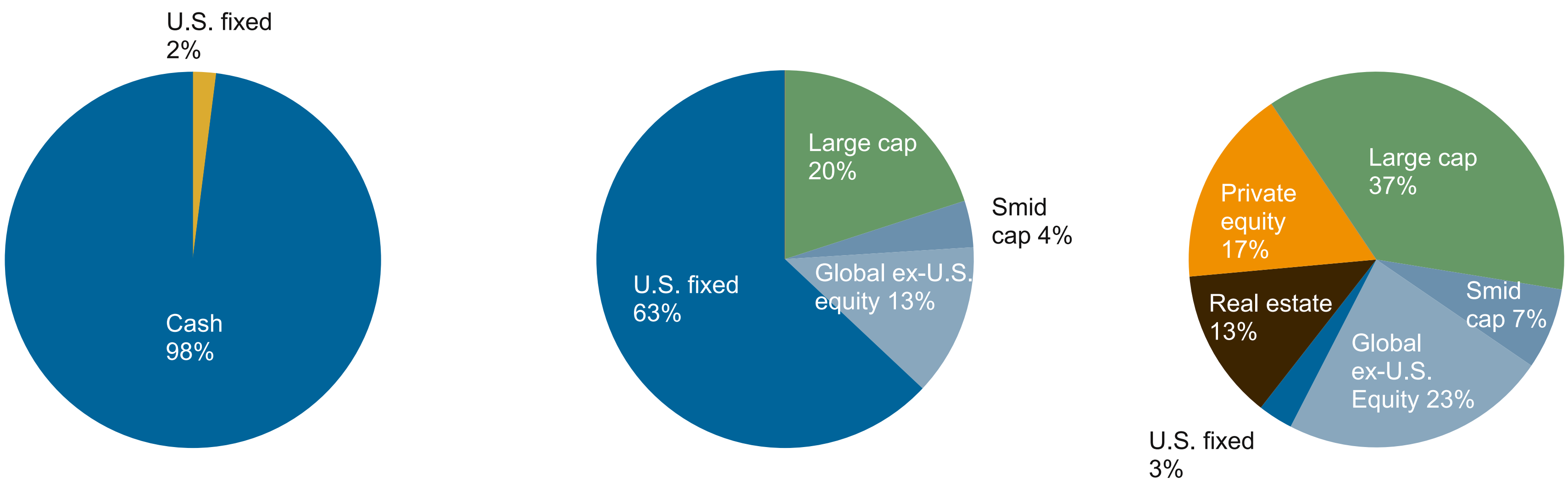
Projected Correlation Matrix

Correlation Matrix	GE	FI	Cash	TIPS	Core FI	Credit	NU FI	EMD	GHY	MBS	PE	RE	PI	AR	RP	CPI
APFC Global Equity	**1.000**	0.331	-0.090	-0.090	-0.118	0.279	0.038	0.572	0.749	-0.109	0.831	0.724	0.853	0.809	0.991	-0.002
APFC Fixed Income	0.331	**1.000**	0.020	0.610	0.802	0.920	0.663	0.499	0.516	0.754	0.204	0.250	0.333	0.445	0.444	-0.175
Cash Equivalents	-0.090	0.020	**1.000**	0.120	0.150	-0.050	0.000	-0.070	-0.110	0.138	0.000	0.000	-0.075	-0.040	-0.070	0.050
TIPS	-0.090	0.610	0.120	**1.000**	0.654	0.520	0.400	0.180	0.055	0.602	-0.140	-0.020	-0.051	0.085	0.000	0.080
Core US Fixed	-0.118	0.802	0.150	0.654	**1.000**	0.796	0.500	0.120	-0.004	0.920	-0.190	-0.035	-0.019	0.142	0.019	-0.250
Inv Grade Credit	0.279	0.920	-0.050	0.520	0.796	**1.000**	0.490	0.350	0.400	0.732	0.150	0.240	0.312	0.390	0.390	-0.250
Global ex-US Fixed	0.038	0.663	0.000	0.400	0.500	0.490	**1.000**	0.150	0.120	0.460	0.060	-0.020	0.047	0.050	0.107	-0.100
EMD	0.572	0.499	-0.070	0.180	0.120	0.350	0.150	**1.000**	0.600	0.110	0.430	0.355	0.455	0.550	0.592	0.000
High Yield	0.749	0.516	-0.110	0.055	-0.004	0.400	0.120	0.600	**1.000**	-0.004	0.589	0.525	0.626	0.643	0.754	0.050
US Securitized	-0.109	0.754	0.138	0.602	0.920	0.732	0.460	0.110	-0.004	**1.000**	-0.175	-0.032	-0.018	0.131	0.017	-0.230
Private Equity	0.831	0.204	0.000	-0.140	-0.190	0.150	0.060	0.430	0.589	-0.175	**1.000**	0.600	0.732	0.602	0.811	0.060
Core Real Estate	0.724	0.250	0.000	-0.020	-0.035	0.240	-0.020	0.355	0.525	-0.032	0.600	**1.000**	0.777	0.520	0.724	0.100
Private Infra/Credit	0.853	0.333	-0.075	-0.051	-0.019	0.312	0.047	0.455	0.626	-0.018	0.732	0.777	**1.000**	0.599	0.856	0.065
Hedge Funds	0.809	0.445	-0.040	0.085	0.142	0.390	0.050	0.550	0.643	0.131	0.602	0.520	0.599	**1.000**	0.834	0.150
APFC Risk Parity	0.991	0.444	-0.070	0.000	0.019	0.390	0.107	0.592	0.754	0.017	0.811	0.724	0.856	0.834	**1.000**	-0.036
Inflation	-0.002	-0.175	0.050	0.080	-0.250	-0.250	-0.100	0.000	0.050	-0.230	0.060	0.100	0.065	0.150	-0.036	**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		2006		2021	
Return:	**7.0%**	**Return:**	**7.0%**	**Return:**	**7.0%**
Risk:	**1.1%**	**Risk:**	**6.7%**	**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

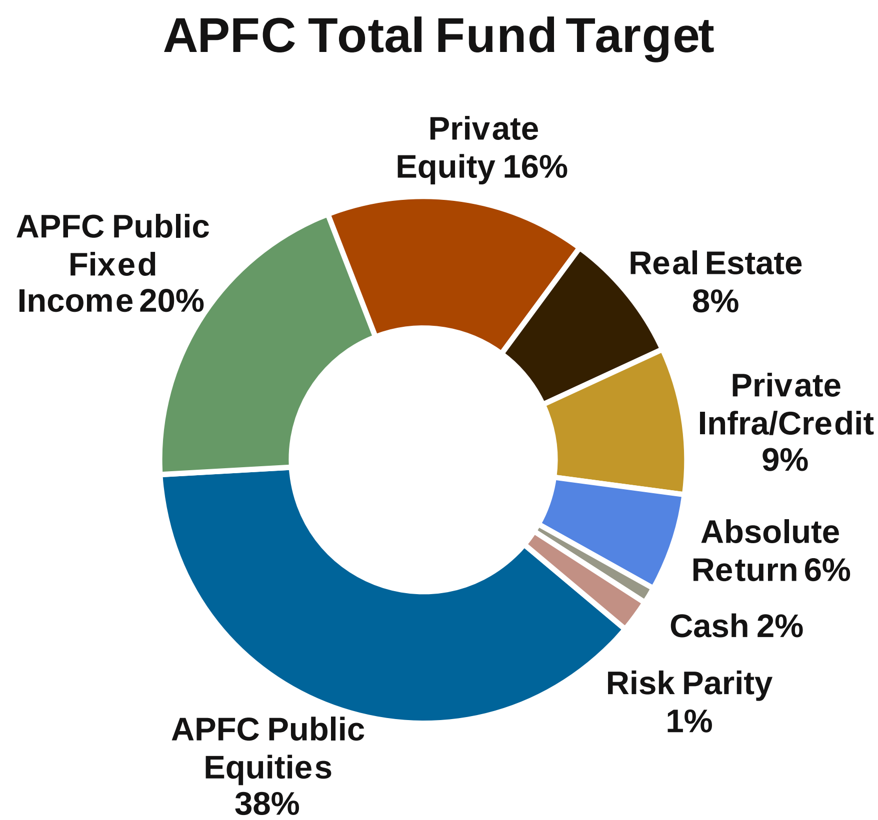
Today an investor is required to include 97% in return-seeking assets to earn a 7% projected return at almost 16x the volatility compared to 1991

- Source: Callan

APFC FY 2022 Total Fund Policy Target

Projected Return and Standard Deviation

- Projected median 10-year annualized return of **6.20%** is a reduction of roughly 55 basis points relative to last year.
- Inflation expectation reduced from 2.25% to **2.00**%.
- Projected median 10-year annualized real return of **4.20%** is a reduction of roughly 30 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 **45.6%.**



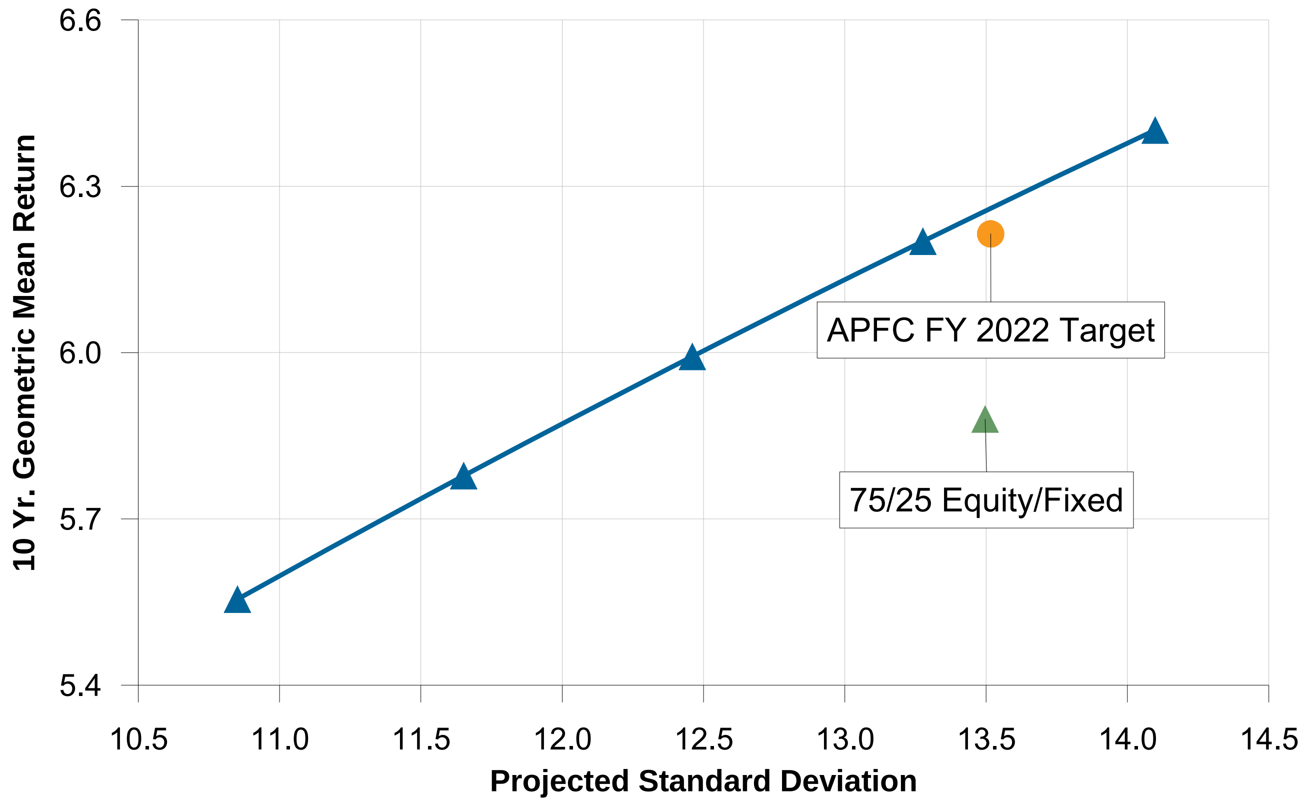
Expected 10-year Geometric Return:	**6.20%**
Expected Standard Deviation:	**13.50%**
Expected Inflation:	**2.00%**
Expected Real Return:	**4.20%**

Constrained Efficient Frontier Analysis 39% Private Assets

Projected Return and Standard Deviation

- Efficient frontier with 39% 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 30 basis point projected return premium over 75/25 public markets portfolio.

Efficient Frontier
10-Year Geometric Mean Return versus Projected Standard Deviation



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

Concluding Observations

Callan's 2021 Capital Market Projections

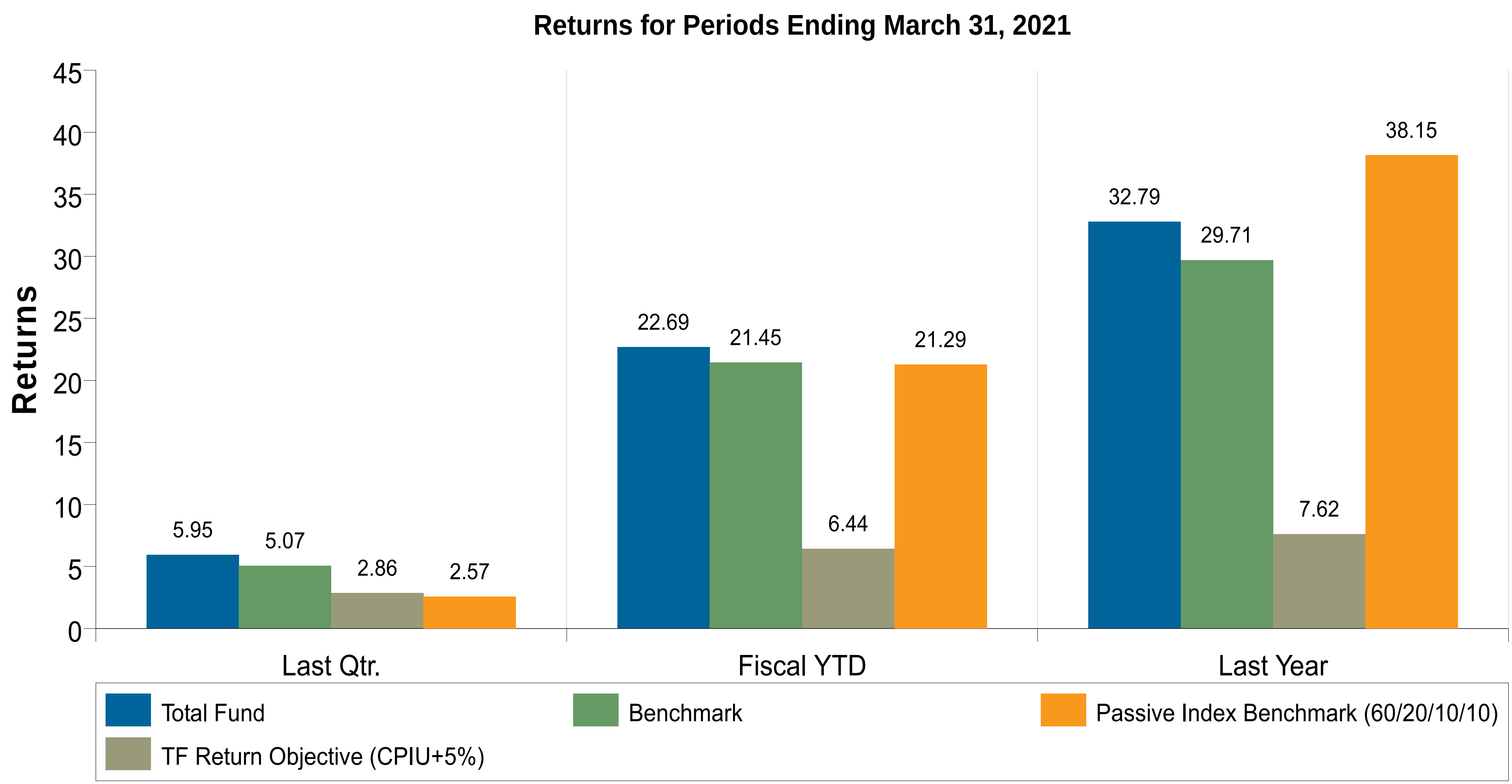
- Reduction in fixed income return projections is the most significant year-over-year change in Callan's capital market projections.
- Callan's public equity return and risk projections were also reduced contributing to the reduction in expected total return for diversified portfolios.
- Private market 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 run projections, they are much more influenced by GDP, inflation, current yield, and valuations.
- APFC Policy Target is well diversified and lies just below the efficient frontier for portfolios with a target of 39% 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.

Alaska Permanent Fund Corporation

Performance Update Through March 31, 2021

APFC Total Fund Cumulative Returns

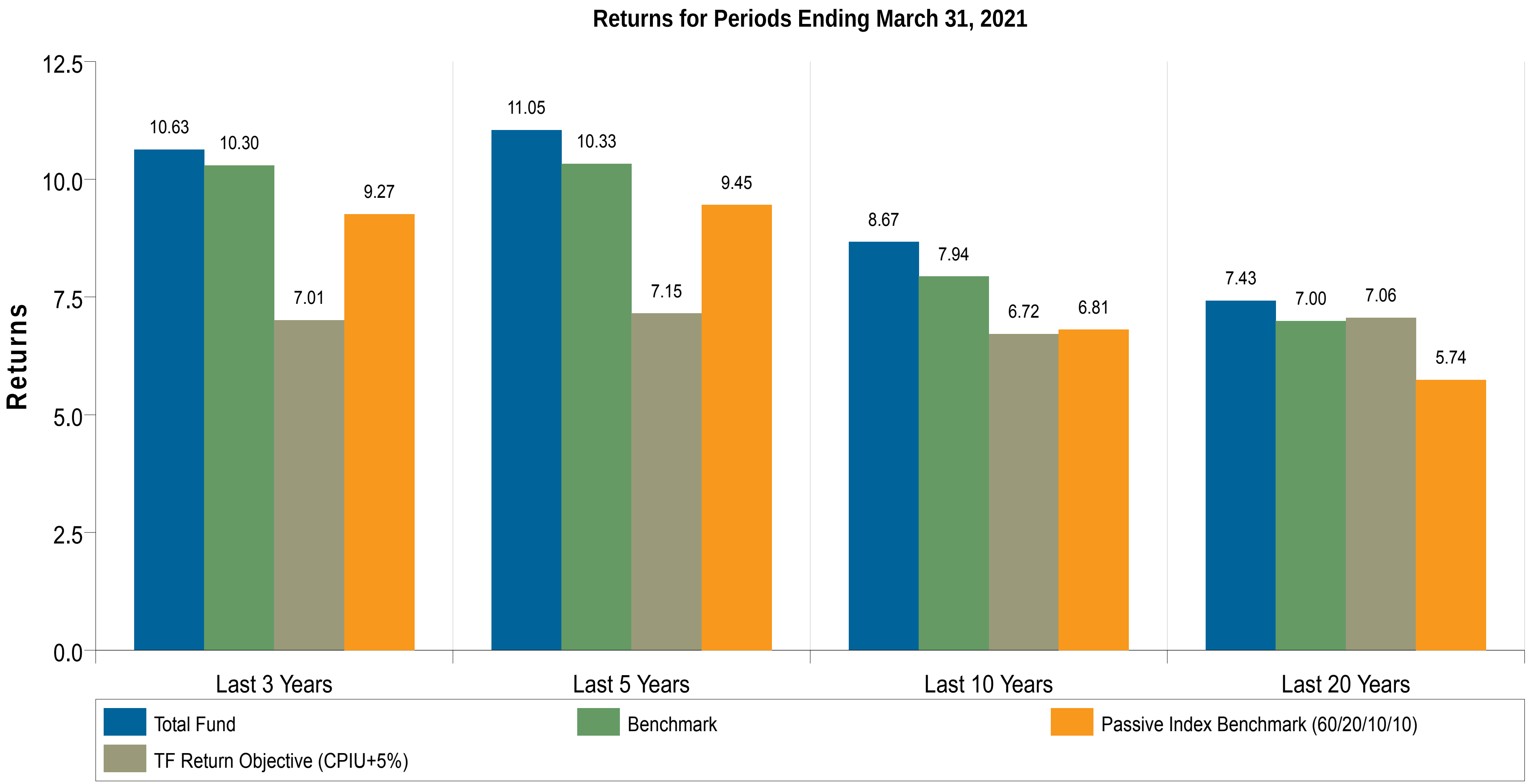
Total Fund versus Total Fund Targets



- Benchmark (FY20-FY21) = 39% MSCI ACWI IMI, 1.1% 90 Day T-Bills, 1.1% BB US TIPS, 5.8% BB Agg, 5.8% BB Corp IG, 2.1% BB Global Treasury ex-US Hedged, 0.5% JPM EMBI Global Diversified, 0.5% JPM GBI-EM Global Diversified TR, 2.1% BB US High Yield 2% Issuer Cap, 2.1% BB US Securitized, 15% Cambridge PE (lagged), 6% NCREIF Total Index (lagged), 1.1% MSCI US REIT (lagged), 5.4% Cambridge Global Pvt. Infrastructure (lagged), 3.6% Cambridge Pvt Credit (lagged), 6% HFRI Total HFOF Universe (weighted), 2% 90 Day T-Bills, 1% HFR Risk Parity Vol 12% Institutional Index.

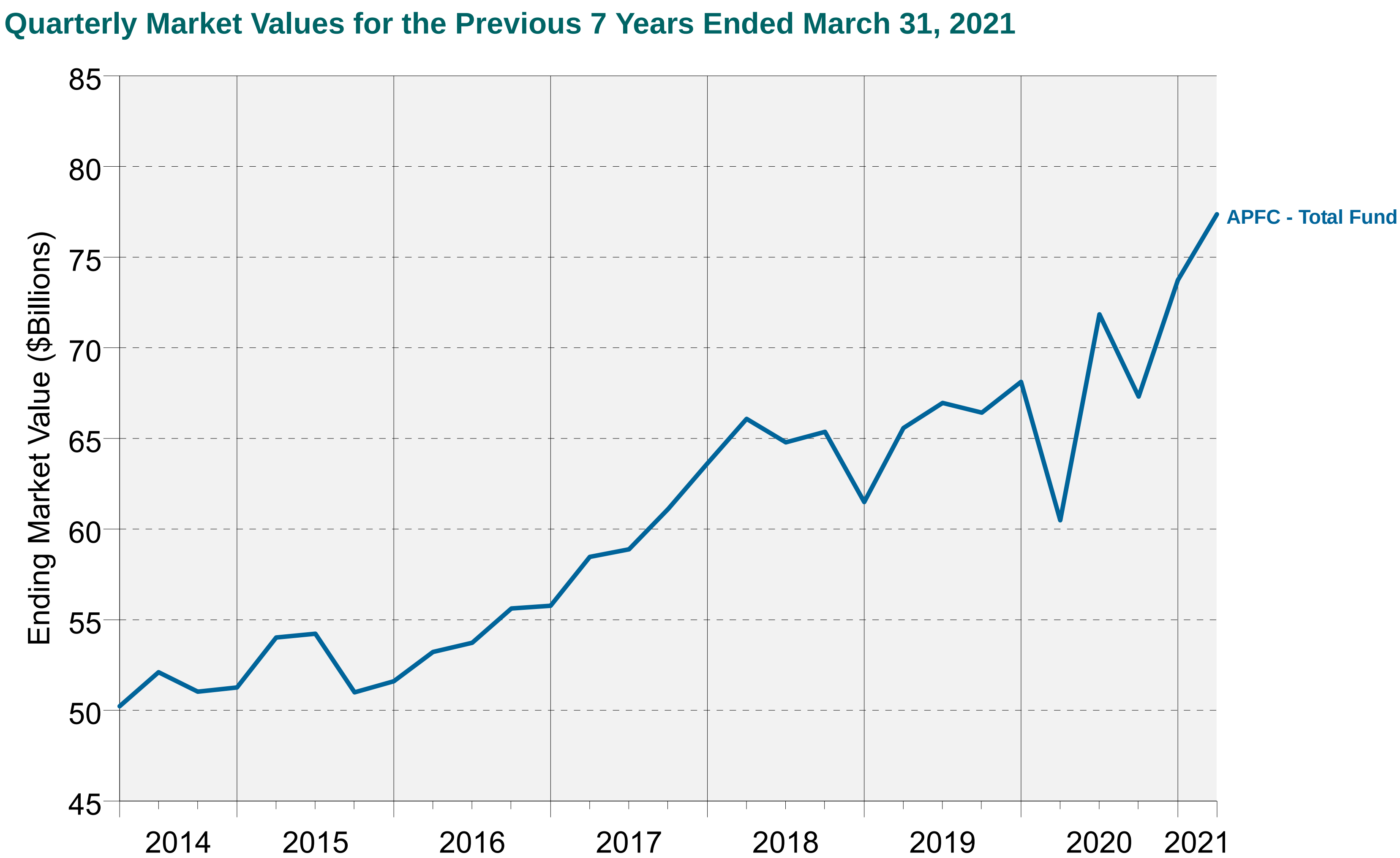
APFC Total Fund Cumulative Returns

Total Fund versus Total Fund Targets



- Benchmark (FY20-FY21) = 39% MSCI ACWI IMI, 1.1% 90 Day T-Bills, 1.1% BB US TIPS, 5.8% BB Agg, 5.8% BB Corp IG, 2.1% BB Global Treasury ex-US Hedged, 0.5% JPM EMBI Global Diversified, 0.5% JPM GBI-EM Global Diversified TR, 2.1% BB US High Yield 2% Issuer Cap, 2.1% BB US Securitized, 15% Cambridge PE (lagged), 6% NCREIF Total Index (lagged), 1.1% MSCI US REIT (lagged), 5.4% Cambridge Global Pvt. Infrastructure (lagged), 3.6% Cambridge Pvt Credit (lagged), 6% HFRI Total HFOF Universe (weighted), 2% 90 Day T-Bills, 1% HFR Risk Parity Vol 12% Institutional Index.

APFC Asset Growth



- The Alaska Permanent Fund ended the first quarter of 2021 with just under $77.4 billion in assets.