Callan

April 2017

Exxon Valdez Oil Spill Trust Council

2017 Asset Allocation Review

Paul Erlendson
Senior Vice President

The Capital Markets at January 2017

U.S. and Global Capital Markets Rallied After Mid-Year Investor Uncertainty

- Stock and bond markets endured a wild ride around the world, with Brexit and the US elections roiling investors' emotions. Underlying economic data remain positive, and tell a story of persistent modest growth in the U.S. and weak recovery in Europe.
- Five-year US equity returns through 2016 are very strong. Ten-year returns no longer include the robust 2003-05 results. Fifteen-year equity returns are still below long-run averages, but are above those of fixed income, as 2000-2002 downturn as rolled off the calculation.

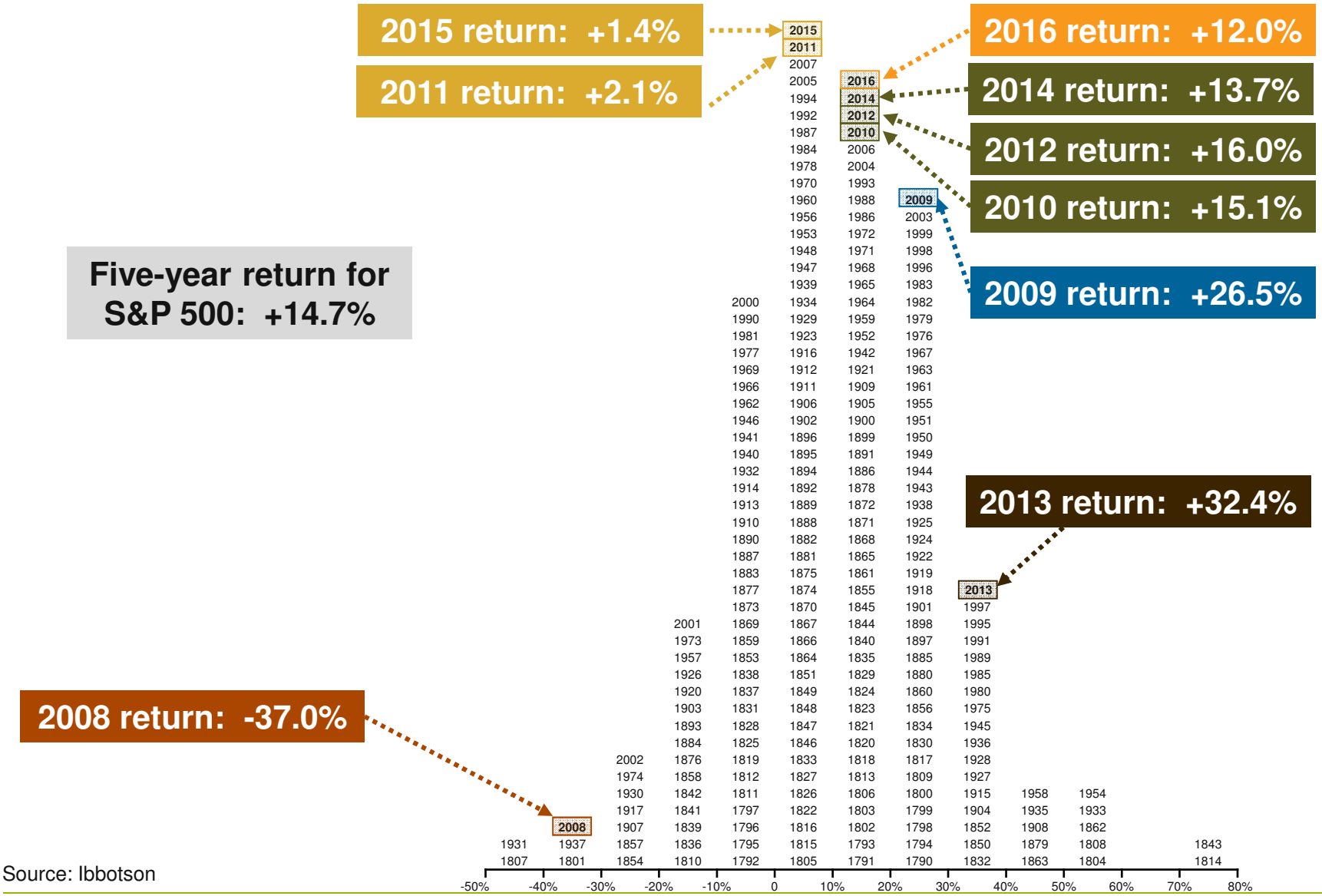
							Average Annual Returns for periods ended 12.31.2016		
	2011	2012	2013	2014	2015	2016	5 Years	10 Years	15 Years
Broad U.S. Stock Market									
Russell 3000	1.03	16.42	33.55	12.56	0.48	12.74	14.67	7.07	7.11
Large Cap U.S. Stocks									
S&P 500	2.11	16.00	32.39	13.69	1.38	11.96	14.66	6.95	6.69
Small Cap U.S. Stocks									
Russell 2000	-4.18	16.35	38.82	4.89	-4.41	21.31	14.46	7.07	8.49
Non-U.S. Stock Markets									
MSCI EAFE US$	-12.14	17.32	22.78	-4.90	-0.81	1.00	6.53	0.75	5.28
MSCI Emerging Markets	-18.17	18.63	-2.27	-1.82	-14.60	11.60	1.64	2.17	9.85
Fixed Income									
Barclays Aggregate	7.84	4.21	-2.02	5.97	0.55	2.65	2.23	4.34	4.58
Barclays Glbl Agg ex USD	4.36	4.09	-3.08	-3.09	-6.02	1.49	-1.39	2.44	4.96
Barclays Long Gov/Credit	22.49	8.78	-8.83	19.31	-3.30	6.67	4.07	6.85	7.03
Real Estate									
NCREIF	14.26	10.54	10.98	11.82	13.33	8.01	10.92	6.94	9.01
Hedge Funds									
CS Hedge Fund Index	-2.52	7.67	9.73	4.13	-0.71	1.25	4.34	3.75	5.74
Private Equity									
Cambridge Private Equity*	11.00	13.33	22.13	12.75	7.10	4.06*	10.89*	10.54*	10.22*
Commodities									
Bloomberg Commodity	-13.37	-1.14	-9.58	-17.04	-24.70	11.40	-9.06	-6.23	-0.11
Cash Market									
90-Day T-Bill	0.10	0.11	0.07	0.03	0.05	0.33	0.12	0.80	1.34
Inflation									
CPI-U	2.96	1.74	1.50	0.76	0.73	2.07	1.36	1.81	2.10

- Private equity data is time-weighted return series for periods ended 6.30.2016 rather than 12.31.2016 in select columns due to a reporting lag.

Source: Callan Associates

Stock Market Returns by Calendar Year

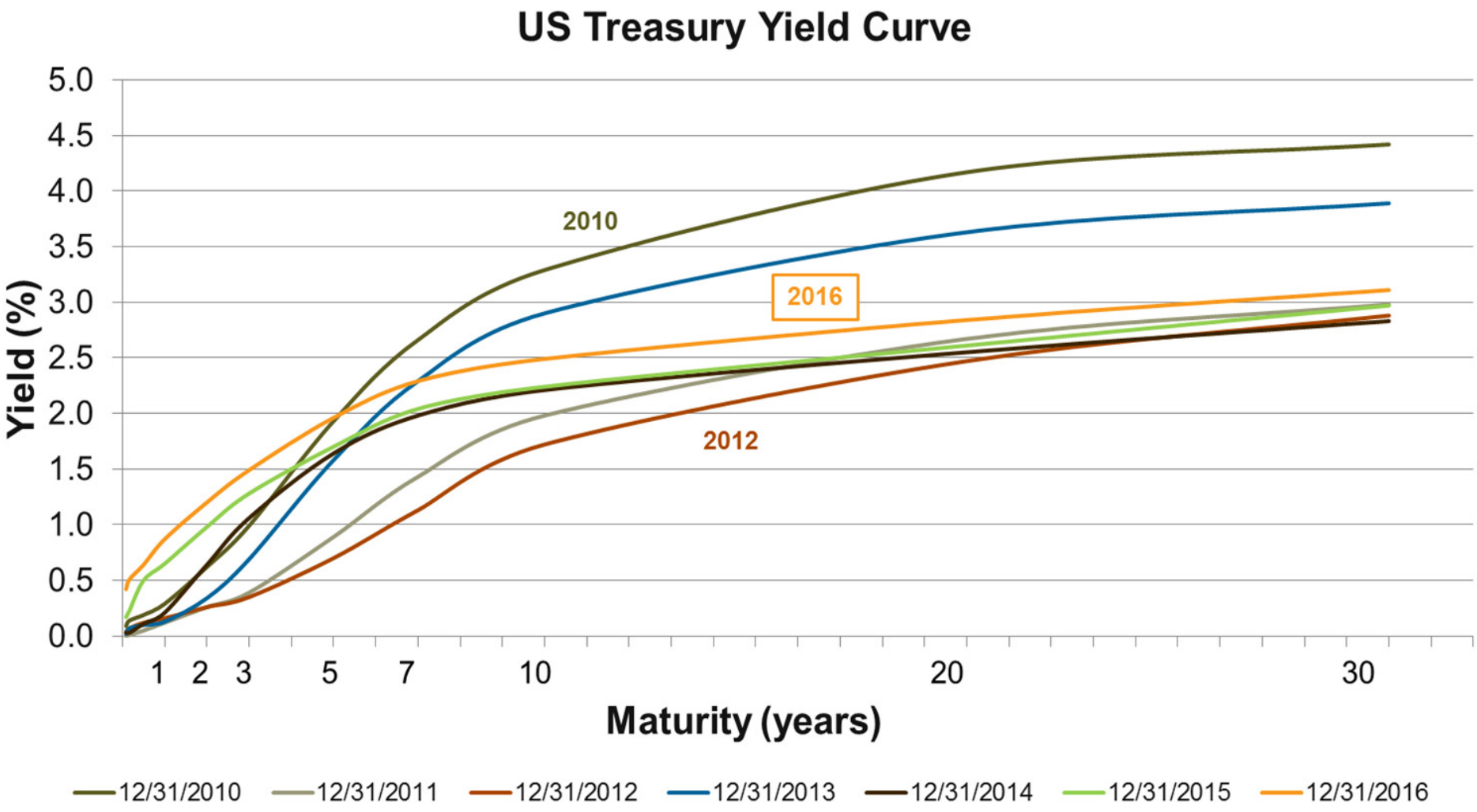
2016 Performance in Perspective: History of the U.S. Stock Market (228 Years of Returns)



Source: Ibbotson

Treasury Rates Rose Across the Curve by the End of 2016

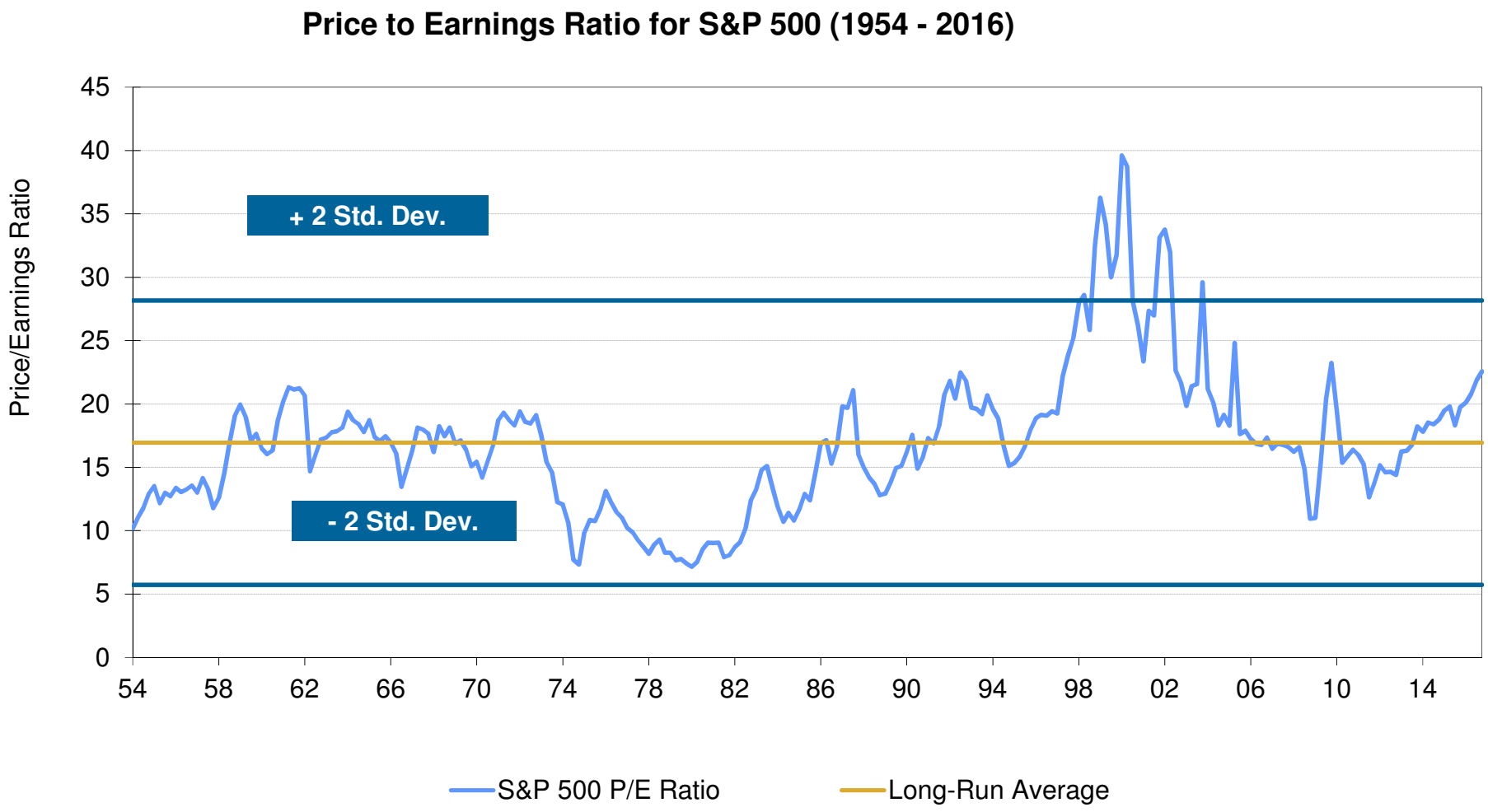
U.S. Treasury Yield Curves



Source: Federal Reserve and Callan

Egregiously Overvalued, Or the Best of What's Out There?

Trailing P/E for the S&P 500 Surges Past Its Long Run Average



Trailing earnings as reported for the fiscal year; includes negative earnings from 1998 onward.
Source: Standard & Poor's and Callan

Economic Outlook

Role of Economic Variables

- GDP and Inflation
  - GDP forecasts provide a very rough estimate of future earnings growth
  - Inflation forecasts provide an approximate path for short-term yields
  - Inflation is added to the real return forecasts for equity and fixed income
- GDP Forecasts
  - 2% to 2.5% for the US
    - *Higher growth rate than the post financial crisis time period but lower than the last half century average*
  - 1.5% to 2.0% for Developed Non-US Markets
    - *Lower than the US due to concerns about political, fiscal and monetary policy as well as the banking system*
  - 4% to 5% for Emerging Markets
    - *Growth rates still substantially exceed those of the developed markets*
- Inflation Forecasts
  - 2% to 2.5% for the US
  - 1.75% to 2.25% for Developed Non-US Markets
  - 2.5% to 3.5% for Emerging Markets

Equity Forecasts

Overview

- Fundamental Relationship

Equity Return = Capital Appreciation + Income

- Broad US Equity
  - Return = 6.85%, Risk = 18.25%
  - Earnings growth likely to improve
    - *Stronger GDP growth*
    - *More expansive economic policies*
  - Dividend yield consistent with recent history
    - *Payout ratios close to historical norms*
    - *Yields have been stable for 20 years in the face of changing interest rates*
- Broad Non-US Equity
  - Return = 7.00%, Risk = 21.00%
  - Earnings growth likely to be moderate
    - *Significant uncertainty in future economic policies*
  - Relatively high dividend yields will support returns

Fixed Income Forecasts

Overview

- Fundamental Relationship

Bond Return = Capital Appreciation + Income + Roll Return

- Broad US fixed income
  - Return = 3.00%, Risk = 3.75%

  - Interest rates expected to rise
  - Yield curve expected to flatten
  - Higher yields expected to be earned over most of the forecast horizon
  - Capital losses expected as yields increase in early years
  - Little impact from changing credit spreads
  - Roll return expected to decline

2017 Capital Market Expectations—Return and Risk

Summary of Callan's Long-Term Capital Market Projections (2017 – 2026)

		PROJECTED RETURN			PROJECTED RISK			2016-2025		
Asset Class	Index	1-Year Arithmetic	10-Year Geometric*	Real	Standard Deviation	Sharpe Ratio	Projected Yield	10-Year Geometric*	Standard Deviation	Geometric* Delta
Equities										
Broad Domestic Equity	Russell 3000	8.30%	6.85%	4.60%	18.25%	0.332	2.00%	7.35%	18.70%	-0.50%
Large Cap	S&P 500	8.05%	6.75%	4.50%	17.40%	0.333	2.10%	7.25%	17.95%	-0.50%
Small/Mid Cap	Russell 2500	9.30%	7.00%	4.75%	22.60%	0.312	1.55%	7.55%	22.75%	-0.55%
Global ex-U.S. Equity	MSCI ACWI ex USA	8.95%	7.00%	4.75%	21.00%	0.319	3.10%	7.55%	21.30%	-0.55%
International Equity	MSCI World ex USA	8.45%	6.75%	4.50%	19.70%	0.315	3.25%	7.25%	20.05%	-0.50%
Emerging Markets Equity	MSCI Emerging Markets	10.50%	7.00%	4.75%	27.45%	0.301	2.65%	7.60%	27.85%	-0.60%
Fixed Income										
Short Duration	Barclays G/C 1-3	2.60%	2.60%	0.35%	2.10%	0.167	2.85%	2.60%	2.25%	0.00%
Domestic Fixed	Barclays Aggregate	3.05%	3.00%	0.75%	3.75%	0.213	3.50%	3.00%	3.75%	0.00%
Long Duration	Barclays Long G/C	3.75%	3.20%	0.95%	10.90%	0.138	4.50%	3.70%	11.40%	-0.50%
TIPS	Barclays TIPS	3.10%	3.00%	0.75%	5.25%	0.162	3.35%	3.00%	5.30%	0.00%
High Yield	Barclays High Yield	5.20%	4.75%	2.50%	10.35%	0.285	7.75%	5.00%	10.50%	-0.25%
Non-U.S. Fixed	Barclays Global Aggregate ex US	1.80%	1.40%	-0.85%	9.20%	-0.049	2.50%	1.40%	9.20%	0.00%
Emerging Market Debt	EMBI Global Diversified	4.85%	4.50%	2.25%	9.60%	0.271	5.75%	4.60%	9.90%	-0.10%
Other										
Real Estate	Callan Real Estate	6.90%	5.75%	3.50%	16.35%	0.284	4.75%	6.00%	16.45%	-0.25%
Private Equity	TR Post Venture Cap	12.45%	7.35%	5.10%	32.90%	0.310	0.00%	8.15%	32.80%	-0.80%
Hedge Funds	Callan Hedge FOF Database	5.35%	5.05%	2.80%	9.15%	0.339	2.25%	5.25%	9.30%	-0.20%
Commodities	Bloomberg Commodity	4.25%	2.65%	0.40%	18.30%	0.109	2.25%	2.75%	18.50%	-0.10%
Cash Equivalents	90-Day T-Bill	2.25%	2.25%	0.00%	0.90%	0.000	2.25%	2.25%	0.90%	0.00%
Inflation	CPI-U		2.25%		1.50%			2.25%	1.50%	0.00%

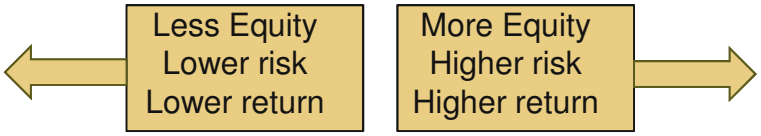
* Geometric returns are derived from arithmetic returns and the associated risk (standard deviation).

2017's 10-year projections are lower than last year's.

Source: Callan Associates

EVOSTC Existing Asset Classes: Return and Risk Projections

EVOSTC Asset Mix Alternatives

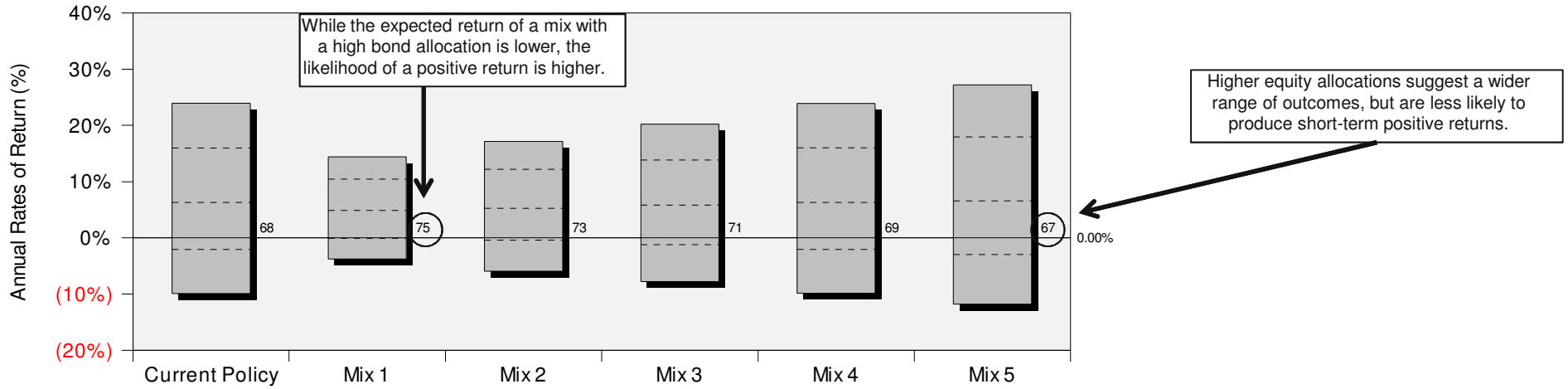


Portfolio Component	Current Policy	Min	Max	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
US Broad Equity	40	0	100	22	28	35	41	47
Global ex-US Equity	27	0	100	15	19	22	26	30
Domestic Fixed	33	0	100	63	53	43	33	23
Totals	100			100	100	100	100	100
Projected Arithmetic Return	6.75%			5.09%	5.64%	6.19%	6.74%	7.29%
Projected Standard Deviation	12.46%			7.04%	8.78%	10.59%	12.44%	14.32%
5 Yr. Geometric Mean Return	6.16%			4.95%	5.39%	5.79%	6.16%	6.49%
10 Yr. Geometric Mean Return	6.14%			4.94%	5.38%	5.78%	6.14%	6.46%
10 Yr. Simulated Sharpe Ratio	0.30%			0.37%	0.35%	0.32%	0.30%	0.29%

- Current policy includes both developed and emerging non-US markets in “Global ex-US Equity”.
- Fixed income allocations are highlighted in red. Current allocation is 33%, the same as Mix 4. Mix 1 has the highest bond allocation, as well as the lowest return and risk levels.

Possible Short-term Outcomes

Range of Projected Rates of Return Projection Period: 1 Year

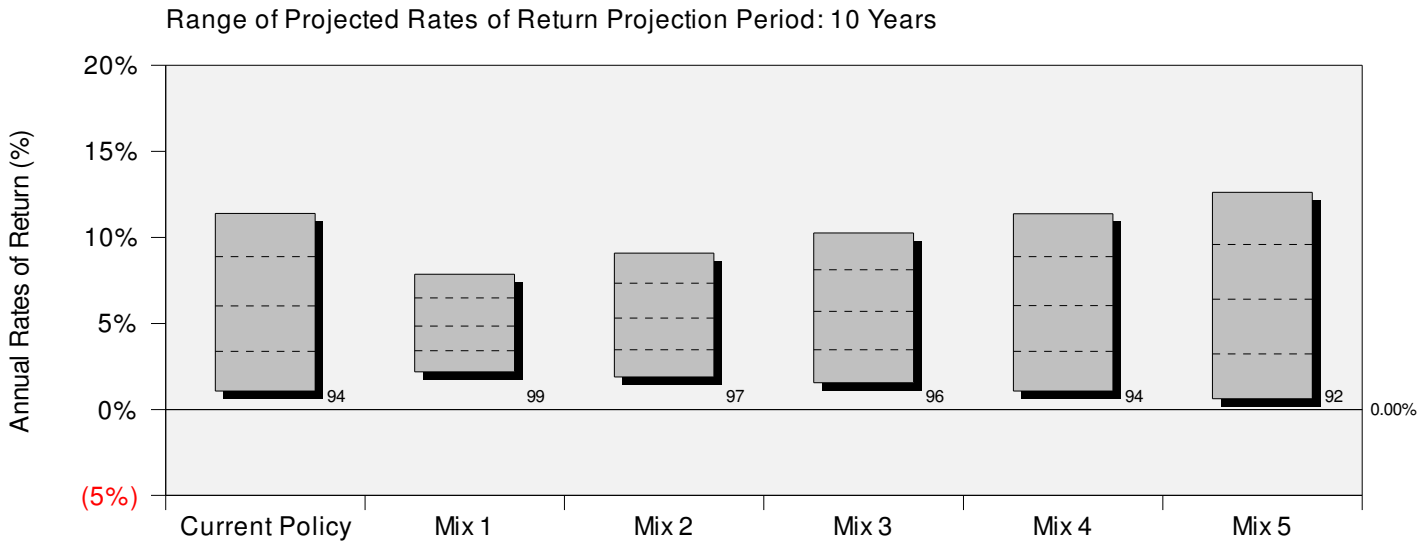


	Current Policy	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
10th Percentile	24.0%	14.4%	17.2%	20.2%	23.9%	27.2%
25th Percentile	16.0%	10.5%	12.2%	13.8%	16.0%	18.0%
Median	6.3%	4.9%	5.3%	5.8%	6.3%	6.6%
75th Percentile	(2.1%)	0.0%	(0.4%)	(1.2%)	(2.1%)	(3.0%)
90th Percentile	(9.9%)	(3.7%)	(5.9%)	(7.8%)	(9.8%)	(11.8%)
Prob > 0.00%	68.4%	74.9%	73.1%	71.3%	68.6%	67.4%

The 75th percentile represents the worst one-in-four outcome for each mix. Mixes 1,2 and 3, with higher bond allocations, have better returns than the Current Policy or Mixes 4 and 5, which have more equity.

- If losing money over a one-year period is a concern, a Mix with more bonds and less equity than the Current Policy has a greater appeal; Mixes 1, 2, and 3 meet this standard. The boxed line in the table above quantifies the probability of each Mix achieving a positive return over any one-year period.
- Mixes 1, 2 and 3 have lower expected returns at the median level (half the possible outcomes are higher, half are lower) than those Mixes with more equity (Mixes 4 and 5). Return variability is narrower, reflecting less risk.

Possible Longer-term Outcomes



	Current Policy	Mix 1	Mix 2	Mix 3	Mix 4	Mix 5
10th Percentile	11.4%	7.9%	9.1%	10.3%	11.4%	12.6%
25th Percentile	8.9%	6.5%	7.3%	8.1%	8.9%	9.6%
Median	6.0%	4.9%	5.3%	5.7%	6.0%	6.4%
75th Percentile	3.4%	3.4%	3.5%	3.5%	3.4%	3.2%
90th Percentile	1.1%	2.2%	1.9%	1.5%	1.1%	0.6%
Prob > 0.00%	93.7%	98.8%	97.5%	95.8%	93.7%	92.4%

- All Mixes have a greater than 90% probability of producing positive returns over a ten-year period. The range of outcomes, however, grows wider and more uncertain as equity allocations increase.
- A longer investment horizon (e.g. – 10 years) suggests greater wealth may result from a higher equity allocation at the median (and above) level. Expected returns below median are relatively lower as equity allocations increase.

Concluding Observations

2017 Asset Allocation Review

- The two most critical variables in establishing an appropriate asset allocation policy are:
  - Investment time horizon (what is the amount of time until the assets need be converted to cash?); and
  - Cash flow requirements (what is the amount of the Total Fund that is required for a distribution?).

Three asset allocation policy considerations:

1. Aggressive (higher equity): aligns with long investment horizons and low cash flow requirements
   - Higher equity allocations present the opportunity for higher rates of return over the long run. The risk is that the Trust is subject to greater short-term volatility and capital loss. If a distribution is required coincident with a market decline, a greater proportion of the Trust's market value will be withdrawn (since the asset base will be lower due to the market decline). The result will be less money available to fund future distributions.
2. Conservative (more bonds): aligns with shorter time horizons and higher cash flow requirements
   - Higher bond allocations will reduce the negative impact of equity market corrections, thereby retaining more of the Trust's assets to fund future distributions. This "safety" comes at the opportunity cost of potentially lower returns over the long-term.
3. Asset allocation must balance the Trust's ability to fund near-term distributions (limit risk) with the assets required to fund intermediate to longer-term distributions (maximize risk-adjusted return).

The Current Policy is aggressive. Its higher expected return over longer periods reflects a high allocation (67%) to equities. The attendant risk: this policy mix has a 32% chance of a negative return over any single year.